Texas Department of Transportation

DESIGN-BUILD SPECIFICATIONS Items 10-29

February 2026

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Item 10
General

10.1 **Offices, Equipment, and Vehicles**

Except where noted elsewhere in the Contract Documents, Design-Build (DB) Contractor and TxDOT shall co-locate until Final Acceptance to facilitate Project coordination and daily communication. The definition of "co-locate" for the Term is office space meeting the conditions of these Design-Build Specifications that is within one mile of the Project Right of Way (ROW), or as approved by TxDOT. Co-location requirements for specified personnel are described in the General Conditions.

The office space requirements for the Project offices are provided below.

10.1.1 **Core Office**

DB Contractor shall provide all space, facilities, and support elements necessary to design, construct, and maintain the Project core office in accordance with the Contract Documents. DB Contractor shall provide separate office space for the exclusive use of TxDOT's design and Project management staff ("TxDOT facility area"). This TxDOT facility area shall be located within the same building or complex as DB Contractor's office staff, unless otherwise approved by TxDOT. TxDOT will be reasonable regarding re-use of existing space within DB Contractor's current office facility, provided that the TxDOT facility area is contiguous and workable in TxDOT's good faith discretion.

DB Contractor shall provide core office space for TxDOT (i.e., available for occupancy) within 90 days following issuance of Notice to Proceed 1 (NTP1), and prior to Notice to Proceed 2 (NTP2). The location, condition, and amenities of the TxDOT facility area are subject to TxDOT's prior written approval. DB Contractor shall provide a preliminary TxDOT facility area layout plan, in which DB Contractor shall identify the portion of the Project core office space provided by DB Contractor for TxDOT's use, to TxDOT no later than 30 days after NTP1. TxDOT will promptly review and comment on required modifications to the layout within 10 Business Days. DB Contractor shall submit a final TxDOT facility area layout plan within 10 Business Days of receipt of TxDOT comments.

10.1.1.1 **Core Office Condition**

The TxDOT facility area of the core office, provided by DB Contractor, shall be in good and serviceable condition, at least of the same quality as that of DB Contractor's counterpart core 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 first took occupancy of the facility, except for reasonable wear and tear and except for alterations, loss, or damage caused by any member of a DB Contractor-Related Entity.

10.1.1.2 **Core Office Loss or Damage**

If core office spaces, related facilities, or fixtures are destroyed, damaged, or stolen during the Term in the TxDOT facility area, except as a direct result of willful misconduct of TxDOT's personnel, DB Contractor shall, at its cost and within 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 provided by the DB Contractor (e.g., computers, fax machines, copy machines, and printers) necessary for normal office operations, replacement shall occur within two Business Days. If loss or damage is caused as a direct result of willful misconduct of TxDOT's personnel, DB Contractor shall replace the items noted herein within the timeframes specified herein, and TxDOT will reimburse DB Contractor for actual, reasonable, and documented costs incurred.

10.1.1.3 **Core Office Facilities and Equipment**

For the core office it provides, DB Contractor shall:

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

- 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., network/telecommunications, 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;
- Lighting and Electricity. Include with all interior spaces overhead lighting meeting Occupational Safety and Health Administration (OSHA), building, electrical, and energy code requirements for similar office space (provide nominal 30-foot candles of light at 30 inches above finished floor). Each office space must have at least four duplex receptacles, with minimum circuit capacity of 20 amperes. In addition, each personal office area and conference room must have a 1,500 Volt-ampere (VA) uninterruptible power supply (UPS). All local area network (LAN), telephone system equipment, and appurtenances must have a UPS sized properly to be capable of providing up to one hour of battery run time;
- Janitorial and Trash Services. Provide daily janitorial service on Business Days and maintain trash containers and trash pickup service for the building and surrounding areas. Cleaning shall include cleaning and disinfecting all office spaces in accordance with Governmental Entities' guidelines. This shall include, but not be limited to, sweeping and mopping floors, cleaning restrooms and break rooms, emptying wastebaskets, and periodic dusting;
- Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas;
- Accessibility and Licensing. Meet all access requirements of the Texas Accessibility Standards, Americans with Disabilities Act (ADA) Accessibility Guidelines, ADA, 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 16 TAC Chapter 68;
- 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, seven days per week, and 365 days per year. In lieu of access to a common break room, DB Contractor may provide a 200 square feet (SF) break room/kitchen within the TxDOT space, with refrigerator and freezer compartment, sink, and microwave. Break room/kitchen will have storage closet (25 SF) and cabinets with drawers and counter tops. In the event that restrooms cannot be accessed from a common building entry/lobby, DB Contractor may provide separate restrooms for the TxDOT facility area. All restrooms shall be maintained with necessary supplies including toilet supplies and hand washing liquid soaps. All break room and entry spaces shall be provided with an alcohol-based hand rub containing at least 60% alcohol;
- Heating, Ventilation and Air Conditioning (HVAC). Provide electrical, HVAC systems capable of maintaining temperatures between 65- and 75-degrees Fahrenheit in all spaces, 24 hours per day/seven days per week, 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;
- Code Requirements. Meet all applicable building and fire code requirements; and
- 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; and
- Pest Control. Provide pest control service to prevent and resolve pest infestation inside the core office space.

10.1.1.4 **Core Office 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:

- Offices. Enclosed offices for TxDOT's management staff (nominal 150 SF each, unless otherwise approved by TxDOT), 10 total with keyed door hardware, desk, ergonomic desk

chair, bookcase, file cabinet with lock, credenza, a 2-foot by 3-foot white-erase board, and guest desk chair;

- Cubicles. Cubicle area spaces for administration staff (nominal 64 SF each), 15 total with L-shaped desk, ergonomic desk chair, and file cabinet with lock; (power supply and data and communication lines to cubicles may be provided through power pole drops);
- Conference Rooms. Three conference rooms (enclosed), two TxDOT-dedicated at nominal 12 feet by 20 feet (240 SF) and one shared assembly room (enclosed) at nominal 32 feet by 45 feet (1,440 SF); all shall have dimmable lighting; conference rooms shall have a 60-inch minimum flat panel monitor with VGA/HDMI accessibility and a 4-foot by 6-foot white erase board; assembly room shall have an overhead projector and screen with a minimum 120-inch diagonal projected image and 1024 by 768 resolution; each conference room shall have one chair for every 24 SF of conference room space and a conference table of sufficient size to accommodate the total number of required chairs;
- Reception Area. Receptionist space with waiting area with seating for two visitors (nominal 200 SF); minimum 46-inch flat panel monitor with VGA/HDMI accessibility; other furniture to be determined jointly by DB Contractor and TxDOT;
- Work Room. Work room (nominal 150 SF) with 30-inch high plastic laminate wall-mounted counters (15 linear feet of counter). Work room shall be located near the center of the facility, and in close proximity to the receptionist space;
- Storage and Filing. One lockable space for storage and filing, nominal 10 feet by 10 feet (100 SF);
- Server Room. One computer server room (150 SF or larger to meet ADA, OSHA and NEC requirements as applicable) 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 non-static floor covering, a standard 7-foot by 19-inch rack, and a minimum of six duplex receptacles with 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 in Section 10.1.1.3;
- Parking Area. Parking area for at least 30 vehicles (25 staff/5 visitors) that is reasonably level (all-weather surface and all-weather access); a portion of the available parking area must accommodate an 8-foot vehicle height. If covered parking is available, no fewer than two covered parking spaces shall be made available to TxDOT;
- Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain 2-foot candles of lighting within the building and parking areas of the site; and
- Corridors. Corridors within the TxDOT facility shall have a nominal width of 54 inches.

10.1.1.5 **Core Office Miscellaneous Requirements and Features**

DB Contractor shall provide the following for the core office:

- Flooring. Carpeted flooring (carpet not required in server or network/telecommunications room);
- Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with UPS on locks (fail closed), and boot-scrape/boot-brush at entry;
- Electrical Outlets. All data/voice outlets shall be installed next to power outlets;
- Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window;
- Power Circuits. Provide dedicated electrical power circuits for copiers, and minimum of six duplex receptacles with three dedicated 20-amp circuits and one 30-amp circuit for the server room or network/telecommunications room;
- Fire Extinguishers. DB Contractor shall provide fire extinguishers, per fire code and fire marshal with jurisdiction;
- Defibrillators. Provide and maintain one defibrillator;

- Insurance. Insurance (obtained and provided by DB Contractor) covering the use of the Project core 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 Contract Documents;
- Vending Area. DB Contractor shall provide access to a general building vending area;
- Utilities. Initial installation and monthly expense of all utilities shall be paid by DB Contractor;
- Monthly Services. DB Contractor shall procure and pay vendors directly for janitorial, trash, recycling, and secure document shredding services;
- Emergency Contacts. 24-hour emergency contact to DB Contractor;
- Furniture. DB Contractor-provided allowance as described in DBA Exhibit 9 for additional furniture not listed in the requirements of this Section 10.1.1, 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; and
- Cable Television. Provide cable television connections and service to each flat screen television.

10.1.2 **Field Office**

DB Contractor shall provide all space, facilities, and support elements necessary to conduct field operations to complete the Work in accordance with the Contract Documents. DB Contractor shall provide office space for TxDOT staff including the TxDOT-designated Construction Manager and other TxDOT staff and/or consultants. The field office shall be located within one mile of the Project ROW. The field office shall not be located underneath, or in close proximity to (as determined by TxDOT), an existing or proposed bridge structure.

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 office may be combined with the core office described in Section 10.1.1 as long as the combined offices meet the requirements of this Section and Section 10.1.1.

Subject to TxDOT's prior written approval, DB Contractor shall provide separate facilities for TxDOT's field construction staff, to be located within the same complex as DB Contractor's field office. Should DB Contractor elect to construct the Work using additional 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 facilities.

Prior to commencing construction of TxDOT's field office space, DB Contractor shall submit for TxDOT's approval final wiring and circuitry plans, office furniture and equipment layout, a field office floor plan, a lighting plan, and a parking plan for TxDOT's Project management and contract staff vehicles.

Concurrent with NTP1, DB Contractor is authorized to begin work on the field office space. Final completion of TxDOT's field office space, including all punch list items, shall occur before TxDOT issues NTP2.

10.1.2.1 **Field Office Condition**

The DB Contractor-provided TxDOT facility area of the field office shall be in good and serviceable condition meeting all ADA and local government regulatory criteria for a safe workspace environment, at least of the same quality as that of DB Contractor's counterpart management and field staff, respectively, and shall be 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 to DB Contractor in essentially the same condition as when TxDOT first took occupancy of the facility, except for reasonable wear and tear and except for alterations, loss, or damage caused by any member of a DB Contractor-Related Entity.

10.1.2.2 **Field Office Loss or Damage**

If field office spaces or related facilities, furniture, or fixtures that are provided by DB Contractor are destroyed, damaged, or stolen during the Term, except as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall, at its cost and within 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 provided by DB Contractor (e.g., computers, fax machines, copy machines, printers) necessary for normal office operations, replacement shall occur within two 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 items noted herein within the timeframes specified herein, and TxDOT shall reimburse DB Contractor for actual, reasonable, and documented costs incurred.

10.1.2.3 **Field Office Facilities and Equipment**

For the field facilities it provides, DB Contractor shall:

- General. Secure sites, obtain all site permits, install and pay for all utility services, and maintain the facilities clean and in good working order as part of the Work;
- Access and Security. Provide separate buildings or trailers for TxDOT staff that include at least two entrances/exits, providing an 8 foot by 10 foot (minimum) covered entrance area, from each building or trailer. Each entrance/exit shall be secured with a door lock plus a deadbolt lock;
- Lighting and Electricity. Include, with all interior spaces, overhead lighting meeting the requirements of OSHA and building and electrical codes for all office space. Each office space shall have at least two duplex receptacles. The minimum circuit capacity shall be 20 amperes;
- Janitorial and Trash Service. Provide daily janitorial service on Business Days 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. Cleaning shall include cleaning and disinfecting all office spaces in accordance with Governmental Entities guidelines;
- Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas;
- Accessibility and Licensing. Meet all access requirements of the Texas Accessibility Standards, ADA Accessibility Guidelines, ADA, as amended (42 USC § 12101, et seq.), and the applicable building code. Facility design plans shall be submitted to the TDLR for review and approval as required by 16 TAC Chapter 68;
- Utility Service. Provide potable water, sewer service, and electricity to the field office facility;
- HVAC. Provide electrical and HVAC systems capable of maintaining temperatures between 65 and 75 degrees Fahrenheit in all spaces, 24 hours per day, seven days a week, through the year. Server room or network/telecommunications room, as applicable, shall have dedicated air conditioning/cooling system capable of maintaining temperatures between 65 and 70 degrees Fahrenheit, and 15% relative humidity. Temperature controls for TxDOT's field office space shall be placed in an appropriate location within TxDOT's secured area;
- Code Requirements. Meet all local building and fire code requirements; and
- Disposal and Removal. Be responsible for disposal or removal of all DB Contractor-provided facilities and any site restoration Work as required; and.
- Pest Control. Provide pest control service to prevent and resolve pest infestation inside the field office space.

10.1.2.4 **Field Office Space Requirements**

Although actual space requirements will depend upon Project Schedule and geographic locations of the field offices, a typical field office should include the following elements:

- Offices. Enclosed offices with lockable doors for TxDOT's management staff and three other TxDOT or contract employees (five offices at 150 SF each, unless otherwise approved by TxDOT), with keyed door hardware, desk, ergonomic desk chair, bookcase, file cabinet with lock, a 2-foot by 3-foot white erase board, credenza and guest chair;
- Offices/Cubicles. Offices or cubicles for up to six field engineer/inspection/ administration staff (60-80 SF each) Field office furniture shall include L-shaped desk, ergonomic desk chair, guest chair and filing cabinet with lock;

- Conference Rooms. One enclosed conference room of not less than 350 SF for TxDOT's exclusive use and access to another common conference room of not less than 350 SF;
- Server room. One Server room, matching the requirements of the core office server room;
- Storage and Filing. Two lockable spaces for storage and filing at each field office (each 50 SF minimum);
- Surveying Equipment Storage. Clean inside storage space with a locking door for surveying equipment (80 SF);
- Tool Shed. Outside shed for small tools and equipment (200 SF);
- Site Amenities. A well-graded site for the field offices with access road, parking area, and security fence with lockable drive-in gates sufficient to enclose the office and parking area;
- Staff Parking Area. A parking area for at least fifteen vehicles that is reasonably level (all-weather surface and all-weather access) within the boundaries of a security fence that can be locked overnight, weekends, holidays, and when not in use;
- 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 2,000 SF);
- Security. A 24-hour security service or silent watchmen-type security system;
- Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain 2-foot candles of lighting within the fenced field office sites;
- Window Security. Security bars on all exterior windows;
- Laboratory Facility. A completed facility suitable to accommodate a functioning portable lab (approximately 2,500 SF), including a separate temperature controlled cure room (approximately 850 SF) and a large trash container adequately sized for disposal of laboratory generated waste materials, located immediately adjacent to the Independent Quality Firm (IQF) laboratory required in Section 4.4 of the TxDOT Quality Assurance Program for CDA/Design-Build Projects (QAP);
- Cultural Resources Storage. Sufficient space and covered facilities for any archeological or paleontological recovery operations (approximately 2,000 SF);
- Kitchen/Break Room. Each field office shall contain a 300 SF kitchen with storage closet (25 SF), cabinets with drawers and counter tops. Kitchen shall be equipped as described above for the core office. Each break room shall be provided with an alcohol-based hand rub containing at least 60% alcohol;
- Restrooms. Two permanent restrooms including toilets and sinks; and
- First Aid Supplies. Provide emergency first aid supplies in accordance with DB Contractor's Safety Plan.

10.1.2.5 **Field Office Miscellaneous Requirements and Features**

DB Contractor shall provide the following for the field offices:

- Flooring. Easy to clean non-slip flooring for field offices (nonstatic in server room) consistent with Section 10.1.2 above;
- Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with UPS on locks (fail closed), and boot-scrape/boot-brush at entry;
- 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 (e.g., workroom, storage room, etc.). All data/voice outlets shall be installed next to power outlets;
- HVAC. 24 hours per day, seven days per week HVAC as previously described above for the core office;
- Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window;
- Power Circuits. Dedicated electrical power circuits for copiers, and minimum of six duplex receptacles with three dedicated 20-amp circuits and one 30-amp circuit for the server room or network/telecommunications room;

- Fire Extinguishers. Fire extinguishers, per fire code and fire marshal with jurisdiction;
- Defibrillators. Provide and maintain one defibrillator;
- Insurance. Insurance (obtained and provided by DB Contractor) covering the use of the Project field 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 Contract Documents;
- Utilities. Initial installation and monthly expense of all utilities shall be paid by DB Contractor;
- Emergency Contacts. 24-hour emergency contact to DB Contractor; and
- Furniture. DB Contractor-provided allowance as described in DBA Exhibit 9 for additional furniture not listed in the requirements of this Section 10.1.2, 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.

10.1.3 **Office Network and Systems**

DB Contractor shall provide, furnish, install, operate, and maintain the following for the TxDOT office spaces as described in Section 10.1.1 and Section 10.1.2:

- A local area network (LAN) with a minimum of two 1-gigabits per second (Gbps) network drops for each personal office area and a minimum of four 1-Gbps drops for each conference room. All drops shall have the ability to connect to the internet. The network shall allow for multiple virtual private network (VPN) connections/sessions. The network shall also provide WPA2 secured wireless (wi-fi) in accordance with Institute of Electrical and Electronics Engineers (IEEE) 802.11n standards. Coverage shall be provided for the entire office utilizing dual band radios capable of operating at both 2.4 and 5 gigahertz (GHz);
- A touch-tone telephone system (with voicemail) with at least one telephone, with speakers, for each personal office and cubicle area. Also provide at least one telephone, with speakers, and a minimum of one satellite microphone for each conference room. The telephone system shall have the ability to host two lines per telephone, access all outside lines, receive any incoming call, caller identification, conference-call capability (three-way calling), call forwarding, call transfer, hold, hold music, and send to voice mail functionality;
- One laptop docking station compatible with TxDOT staff's laptops with two flat panel monitors, including all necessary peripherals for each personnel office area, cubicle area, and the reception area in the Project core and field offices;
- Peripherals shall include at minimum, monitor stands, mouse, and keyboard, and 16 GB minimum thumb drive; DB Contractor shall provide one external Digital Video Disc (DVD) drive and one external hard drive with not less than two terabytes of memory per drive;
- The monitors and peripherals shall be at least equal to the ones used by DB Contractor's staff;
- High speed, highly reliable internet service(s) capable of providing a minimum download speed of 300 Mbps and a minimum upload speed of 20 Mbps per network drop, with a minimum of three concurrent download connections and a minimum of two concurrent upload connections;
- The ability to print to any printer listed in this Section 10.1.3 from any network drop or wireless connection regardless of user domain (e.g. TxDOT and others' computers shall be able to print to any printer listed in this Section 10.1.3 from any network drop);
- Include all network equipment, racks, structured cabling, wall plates, jacks, patch panels, patch cords (including patch cables) for each LAN and telephone drop in each personal office area, cubicle area, and conference rooms, power assemblies, and other appurtenances needed to meet the requirements contained within these Design-Build Specifications;
- All hardware and software shall meet applicable industry standards and protocols;
- On-site technical support eight hours per day, five days per week until the completion and close out of the Project;

- Office equipment meeting the following requirements, or multipurpose piece of equipment capable of meeting multiple parts of the following requirements:
    - One color plotter capable of handling 36 inches by 24 inches plots for core office only;
    - One high-speed color printer capable of handling 11 inches by 17 inches prints for core office and one for field office;
    - One high-speed color photocopy machine capable of handling 11 inches by 17 inches prints for core office and one for field office; and
    - One high-speed color scanner capable of handling 11 inches by 17 inches prints for core office and one for field office;
- One paper shredder or secure paper shredding service for core office and one for field office;
- One commercial grade three-hole punch for core office and one for field office;
- One commercial grade GBC binder (or equal) for core office;
- All office supplies, including copier paper, toners, pens, pencils, notepads, and other miscellaneous office supplies; and
- One hard copy of all TxDOT and American Association of State Highway and Transportation Officials (AASHTO) design manuals and standards as specified in the Contract Documents for the core office.

DB Contractor shall certify supplied components as functional before installation and will bear all responsibility for replacement of parts at all times during the Term. DB Contractor shall prepare a test plan for all parts and components, submit the test plan prior to installation, test installed systems, and supply test results, in conformance with industry standard testing procedures.

DB Contractor shall provide the following additional software packages for TxDOT's use. TxDOT shall direct DB Contractor as to which computers these software packages are to be installed. During the course of the Project, DB Contractor may be required to move one or more of these additional software packages between computers. DB Contractor shall provide the necessary licenses and software upgrades throughout the Term.

- Four copies of Bentley's MicroStation latest version;
- Four copies of latest TxDOT approved design software;
- Four copies of Adobe Acrobat Professional latest version; and
- Four copies of BlueBeam Revu latest version.

DB Contractor shall provide the following additional items for TxDOT's use:

- Five iPad Air (latest version available), or equal, with wi-fi + unlimited cellular, 512 GB capacity along with 4G/LTE minimum cellular service and rugged protective case appropriate for construction field conditions with keypad;
- Three global positioning system (GPS) cameras (to include compass/GPS module, minimum 4 GB secure digital (SD) card, camera bag, additional battery, USB cable, neck strap, rechargeable lithium-ion battery, battery charger, instruction manuals, and warranty card); and
- One GoPro Hero Black Edition (latest version available), or equal.

10.1.4 Control of Materials

DB Contractor shall adhere to TxDOT Standard Specifications Item 6, unless otherwise approved by TxDOT. Flammable materials, equipment, or other construction items may not be stored underneath, or in close proximity to (as determined by TxDOT), an existing or proposed bridge structure.

10.2 Three Dimensional (3-D) Design

DB Contractor shall design the Project utilizing the most recent version of OpenRoads Designer as identified on the TxDOT Digital Delivery "TxDOT Workspace" webpage (https://www.txdot.gov/business/resources/digital-delivery/bentley-disclaimer.html) as of the Proposal Due Date and shall submit its 3-D design files to TxDOT for use during the design and construction process.

10.2.1 **3-D Design Requirements**

DB Contractor shall submit proposed 3-D design file naming conventions to TxDOT for review and approval, prior to the start of Design Work.

DB Contractor shall incorporate the Schematic Design into DB Contractor's Project design files utilizing 3-D methodologies and techniques.

DB Contractor shall create a 3-D model of the existing condition of the Project, using OpenRoads Designer, that reflects, among other things, existing ground surface and subsurface elements and infrastructure (including, but not limited to, drainage structures, Utilities, bridges and wall foundations), data from light detection and ranging (LiDAR), subsurface utility engineering (SUE), field surveys, and existing plans (as-built) data collection; including currently available LiDAR or other existing ground surface data (digital terrain model (DTM), extensible markup language (XML), or triangulated irregular network (TIN) formats) provided in the Reference Information Documents (RIDs). 3-D model of the existing conditions shall be of the same level of accuracy as SUE information provided in RIDs, and the limits of Utility elements within the existing model shall be consistent with Project limits.

DB Contractor shall utilize 3-D methodologies and techniques to develop the geometric design, as well as the 3-D design model for each proposed roadway and shall incorporate it into the Project's design models. When preparing any geometric design, DB Contractor shall:

- Refine and finalize 3-D horizontal and vertical alignments for all high-occupancy vehicle lanes, exclusive lanes, general purpose lanes, ramps, direct connectors, collector-distributors, crossing from ROW to ROW and parallel roadways, pavement transitions, and tie-ins to existing lanes;
- Determine horizontal and vertical clearances at grade separations, underpasses, and overpasses;
- Develop superelevation and superelevation transition designs for each roadway. Verify rollover constraints are adequately addressed, including ramp, collector-distributor, and direct connector gore locations; and
- Attach the correct Texas State plan Geographic Coordinate System (GCS), in accordance with Section 17.3.5, to each 3-D model file.

DB Contractor shall include existing and proposed 2-D and 3-D design features for the following Elements of Work in accordance with the Design-Build Specifications. The proposed design features shall be organized in container DGN files that reference all applicable 2-D and 3-D design models as listed below. Separate proposed and existing containers, if applicable.

- Roadway: Sufficient detail to show top of pavement surface, pavement structure layers, and adjacent features (e.g., curb and gutter, concrete safety barrier, metal beam guard fence (MBGF)), pedestrian facilities, existing and proposed ROW, horizontal alignment with active vertical profiles;
- Drainage: Storm sewers (inlets, manholes), culverts, headwalls, and both temporary and permanent ditch and channel grading;
- Bridges: Sufficient detail to show top of deck surface and all deck surface features (e.g., rail, curb, sidewalk), structure type, bottom of beam surface, bent cap, piers, foundations (size and length), abutment, and wingwalls;
- Retaining Walls: Retaining wall locations including straps, nails and footings;
- Noise Walls: Noise wall locations and design elements;
- Utilities: Relocated and existing Utilities to remain in place;
- Signing: Overhead span or cantilever sign structure locations, structure type, and foundations (size and length);
- Striping (proposed only): Lane lines, shoulder line locations, auxiliary lanes, and gore locations;
- Temporary structures: Including, but not limited to, temporary shoring, nail walls and nail envelope, temporary bridges, temporary drainage structures, and temporary retaining walls;

- Lighting: Include all conventional and high-mast lighting elements;
- Landscaping (proposed only): Include all major landscape items;
- ITS and ETC: Include all ITS elements, such as message boards and cameras. Include all electronic toll collections equipment;
- Right-of-Way: Include existing and proposed;
- Signals: Include signal poles and infrastructure; and
- Railroad: Location and design elements.

10.2.2 **Immersive 3-D Over-the-Shoulder Milestone Review Meetings**

DB Contractor shall present the Project 3-D design model to TxDOT and stakeholders at review meetings. DB Contractor shall utilize software that allows for interactive visualization of the 3-D design model's key features. The 3-D design model shall be completed to a sufficient level of development that existing terrain, proposed design features, and existing infrastructure to remain in place can be viewed, analyzed, and discussed among participants. For guidance on level of development and 3-D design model development, refer to TxDOT website (https://www.txdot.gov/business/resources/digital-delivery/digital-delivery-documents.html). Review meetings shall occur prior to any design Submittals to TxDOT.

DB Contractor's 3-D design model shall be capable of providing the following minimum functionality during the immersive 3-D milestone review meetings:

- View the model and manipulate view settings to interactively change data display on the screen (e.g. pan, rotate, walk, fly, zoom, etc.);
- Measure distances and areas throughout all areas of the model;
- Reference baseline geometry, stationing, and existing and proposed ROW; and
- Dynamically visualize key existing and proposed design features and detect conflicts/clashes amongst the following disciplines:
  - Roadway (including cross sections);
  - Drainage;
  - Structures (bridges, retaining walls, and noise walls);
  - Utilities (existing and proposed);
  - Signing (overhead span or cantilever sign structure locations and structure type);
  - Lighting (pole and foundation locations and high-mast lighting elements);
  - Signals (controller, pole, and foundation locations);
  - Striping (lane line, shoulder line locations, auxiliary lanes, and gore locations);
  - Landscaping (trees, shrubs, sprinklers);
  - ITS and ETC: (message boards, cameras, and electronic toll collections equipment); and
  - Temporary structures.

DB Contractor shall submit the following at least three Business Days before every review meeting:

- All CADD and other electronic files used to develop the 3-D model along with all associated files required to duplicate the model;
- Container DGN files that reference all of the applicable 3-D design models by the disciplines defined in Section 10.2.2. Separate proposed and existing 3-D design models if applicable.
- 2-D keyhole markup language (KMZ) file of the current design compatible with Google Earth; and
- Updated Utility Adjustment Concept Plan.

10.2.3 **3-D Design Deliverables**

DB Contractor shall prepare and submit to TxDOT for review and comment a 3-D design model, using OpenRoads Designer, with the following Submittal packages:

- Preliminary Design Submittal;

- Final Design Submittal;
- Released for Construction Documents;
- Early Start of Construction;
- Notice of Design Change; and
- Record Documents.

The 3-D design model shall consist of TxDOT approved 3-D design software file(s) containing 3-D graphical elements (components, contours, superelevation transitions limits, and existing and proposed finish grade triangles) representative of the stage of design development of the Submittal package. The minimum level of development of the elements in the 3-D model shall accurately depict the size, shape, and location of all existing features to remain, existing features that affect the Traffic Control Plans (TCPs), and the proposed Elements of the Work to be constructed in the Submittal package. For guidance on level of development and 3-D design model development, refer to TxDOT website (https://www.txdot.gov/business/resources/digital-delivery/digital-delivery-documents.html).

Additional electronic design files to be submitted to TxDOT by DB Contractor include:

- Software: TxDOT approved 3-D design software files containing civil data of alignments, profiles, pertinent geometry, terrain surfaces, civil cells, corridor models, and final surface in addition to other design software elements used in the creation of the corridor model such as point controls, corridor references, OpenRoads Designer files, etc.;
- Template libraries (ITL);
- XML: Output files of alignments, profiles, pertinent geometry, terrain surface and final surfaces;
- SHP: Output files of final roadway alignment and surface/pavement;
- Drawing exchange format (DXF): Output files of terrain surfaces and final surfaces;
- Calibration files (JXL, CAL, DC): Form automatic placement of georeferenced models;
- Image color matching (ICM): Output files (infrastructure consensus model) in a rich data exchange format using Bentley i-model standards. Any ICMs used by DB Contractor to transfer the 3-D model information to construction equipment;
- DTM data:
  - Original ground terrain file in OpenRoads Designer Terrain (without voids);
  - Preliminary design surface: A comprehensive model of existing terrain. Progression through detailed design will advance the preliminary design surface to a final design surface; and
  - Final design surface: Proposed Project model in final condition.
- Electronic construction i-models: Compatible with DB Contractor's construction equipment to be utilized by TxDOT and Independent Quality Firm Manager (IQFM) to verify grading operations of subgrade and the final pavement surface, as well as construction of storm sewer systems and culverts; and
- 3-D Adobe portable document format (PDF) visualizations of 3-D design models.

DB Contractor shall provide, along with the Record Drawings, a 3-D 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. to provide complete compatibility between the DB Contractor and TxDOT.

10.3 **Required Software during Construction Work**

DB Contractor shall utilize a mobile based, web hosted, collaborative design-construction productivity software solution allowing real-time access to and management of construction documents. DB Contractor must purchase and provide licenses to DB Contractor staff (including subconsultants, as appropriate), and 20 copies for TxDOT staff and TxDOT's consultants from the commencement of Construction Work through Final Acceptance. Utilization will cover the course of the Construction Work. This software application will be used to view drawings, specifications and documents in the field, automate Request for Information (RFIs)

and punch lists for Construction Work, and to facilitate collaboration between Project stakeholders. The software solution must meet the following technical requirements:

- All features and Project documents uploaded in the system must be available offline in the event that there is no wireless connection;
- The solution must be compatible with iOS, Windows and Android operating systems and devices;
- The solution must be able to export an as-built set. This as-built set must be complete with documents, photos and hyperlinks embedded in the set;
- The solution must be capable of being used during post construction operations and maintenance phases;
- After Final Acceptance, the solution should be handed to the maintenance team for post construction coordination;
- The solution must be able to provide a detailed audit trail of all parties collaborating in the application. This includes date/time stamp of any mark-ups, photos, issues, RFIs and punch list items;
- The solution must auto-tag sheet disciplines to distinguish different trade drawings;
- Vendor must be able to support the Project with a dedicated sales representative for rollout; and
- Vendor must offer training/consulting on the software solution as needed during the Project.

10.4 Design Visualization

DB Contractor shall provide 3-D design visualization files to TxDOT for use during the design and construction process. All visualization files shall provide accurate 3-D views that depict the identified areas of the Project. Completed models shall represent realism and aesthetic attributes of the existing conditions, including adjacent buildings and land features, and proposed Project.

10.4.1 Animations

DB Contractor shall provide within 90 days after NTP2 one 3-D design visualization (animation) for the Project that provides a fly-through of the features noted below for TxDOT review and comment. The design visualization models shall show existing and proposed design conditions either separately or combined in the same display. The final design visualization deliverables shall include photo-matched renderings for adjacent buildings and land features, in accordance with Section 10.4.2 and animated sequences for the Project limits.

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 shall include TxDOT approved 3-D design files, OpenRoads Designer geometry files, existing terrain models, and digital ortho photography. DB Contractor shall field verify the existing and proposed condition of design visualization models for dimensional accuracy and realism.

Resulting animations for design visualization purposes do not have to be native Bentley applications, but do need to be capable of viewing on any device with minimal support to, or effort by TxDOT.

10.4.2 Design Visualization Services – Photo Renderings and Exhibits

DB Contractor shall provide photo renderings of no more than ten locations to be determined by TxDOT as part of the Preliminary and Final Design Submittal, or as directed by TxDOT, but not to exceed 20 renderings total. DB Contractor shall submit the completed renderings to TxDOT within 30 days of TxDOT's request.

DB Contractor shall coordinate with TxDOT the location of the photographs. DB Contractor shall take a minimum of two existing condition photographs at each of the 10 locations. These photographs will serve as the basis for the photo-renderings.

DB Contractor shall provide two mounted "before" images and two mounted "after" static 3-D photo matched images of proposed design elements at each of the 10 locations.

The computer model shall accurately depict the geometric design of the proposed improvements at each of the 10 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 Schematic Design. The computer model is intended to be used by TxDOT for public information purposes.

10.5 **Aerial Imagery**

DB Contractor shall take aerial imagery of the Construction Work and Utility Adjustment Work that covers the entire Project limits and shall provide the aerial imagery and videos to TxDOT on separate drives no less frequently than monthly. Aerial imagery shall be taken at the same elevation every month.

Should DB Contractor desire to utilize Unmanned Aerial Systems (UAS) on the Project, it shall comply with the requirements of the current version of the TxDOT *UAS Flight Operations and User's Manual*. In addition to the requirements within the TxDOT *UAS Flight Operations and User's Manual*, DB Contractor shall comply with the requirements of the Federal Aviation Administration, the State, and local Governmental Entities for UAS operations, including flight restrictions.

10.6 **Acceptable Use of Artificial Intelligence**

DB Contractor shall follow the TxDOT Acceptable Use of Artificial Intelligence (AI) Policy (P-ITD-002) and shall not input any non-public TxDOT data, and any data meeting the definitions for confidential, sensitive, or private data as defined in the TxDOT Data Classification Policy into publicly available systems, or any system that has not been explicitly approved for use by TxDOT. DB Contractor shall ensure that any approved AI deployments and AI operational systems are overseen by a human, especially in reviewing and validating AI outputs, and maintaining human-in-the-loop decision making.

10.7 **Submittals**

All Submittals described in this Item 10 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 10-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 10-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Preliminary TxDOT facility area layout plan	After NTP1	Review and comment	10.1.1
Final TxDOT facility area layout plan	Within 10 days after receipt of TxDOT comments	Approval	10.1.1
Final wiring and circuitry plans, office furniture and equipment layout, a field office floor plan, a lighting plan, and a parking plan	Prior to commencing construction of TxDOT's field office	Approval	10.1.2
3-D design files	Upon request and with the Submittal packages identified in Section 10.2.3	Review and comment	10.2
Proposed 3-D design file naming conventions	Prior to start of Design Work	Approval	10.2.1
All CADD files associated with the 3-D model, Container DGN files, 2-D KMZ file of current design, and updated Utility Adjustment Concept Plan	Three Business Days Prior to every 3-D milestone review meeting and with the Submittal packages identified in Section 10.2.3	Review and comment	10.2.2, 10.2.3
Additional OpenRoads Designer files, ITL, XML, SHP, DXF, ICM and DTM design files, calibration files, 3-D PDF visualizations of 3-D design models	As necessary	For information	10.2.3

Table 10-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Electronic construction i-models	Upon request	For information	10.2.3
Design visualization – animations	Within 90 days after NTP2	Review and comment	10.4.1
Photo renderings and exhibits	As part of Preliminary and Final Design Submittal, or as directed by TxDOT within 30 days	For information	10.4.2
Construction Work and Utility Adjustment Work aerial imagery and videos	Monthly	For information	10.5.1

Item 11
Public Information and Communications

11.1 General Requirements

In coordination with TxDOT, Design-Build (DB) Contractor shall be responsible for developing and implementing a Public Information and Communication Plan (PICP) in order to maintain a high level of two-way communication by informing and engaging local Governmental Entities, special interest groups, stakeholders, businesses, communities, and the general public about the Project status throughout the design and construction period. These groups will be referred to as Community Groups.

DB Contractor shall coordinate all public information communications with ongoing TxDOT public information activities to ensure that a consistent message is being distributed to the Community Groups. All public information activities shall be performed in accordance with the TxDOT *Environmental Handbook for Public Involvement, Section 1: Public Involvement Policy* and the TxDOT *Public Involvement Toolkit,* which can be found at www.txdot.gov.

11.2 Administrative Requirements

On a schedule mutually agreed upon between DB Contractor and TxDOT's public information office, DB Contractor shall meet regularly with TxDOT's public information office and Community Groups to coordinate efforts.

DB Contractor shall provide to TxDOT complete copies of all materials to be presented to the public or the media as early as possible, in accordance with Section 11.9.

11.3 Public Information and Communications Plan

In addition to the PICP requirements listed in Section 4.2.2 of the General Conditions, DB Contractor shall implement the following public information and communication strategies:

- Develop a strategy that may include multiple approaches and outreach tools to engage and maintain on-going communications with Community Groups, TxDOT, and the DB Contractor.
- Prepare and distribute Project-related materials in a user-friendly format to inform Community Groups through appropriate means such as: meetings, business owner task force meetings, website, media kits, news releases, telephone correspondence, newsletters, brochures, e-mail, text messaging service, social media, mobile phone apps, hotlines, highway conditions reporting system (HCRS), Houston Transtar, dynamic message boards, web alerts, public opinion polls/surveys, videos, display booths, presentations, public access information kiosks, open houses, milestone events, and special events.
- Organize and manage meetings and communications with Community Groups. Meetings can be held on an ad hoc basis or, as appropriate, on a regular basis as established in consultation with TxDOT. Meetings may also be conducted in person or virtually depending on the timing, audience, and mutual agreement of all invitees.
- Attend in-person and online events and meetings when invited and seek opportunities to attend meetings, conferences and other events at which Project information can be exchanged with Community Groups.
- Notify Community Groups in advance of Work being performed, including key Project Right of Way (ROW) acquisition, construction, operations, and maintenance activities, and communicate the potential impacts of these activities.
- Develop, disseminate, and display timely, high-quality, innovative, user-friendly, accurate, and appropriate community information concerning the Project, including exhibits showing typical sections, slope grading, drainage, bridge structures, retaining walls, Noise Barriers, Project ROW acquisition, and aesthetic characteristics.
- Develop and manage a public relations campaign and communication strategy to convey key messages, branding, and pertinent information about the Project. Seek to incorporate public input and support where possible.

  - Include Work elements, timing, and durations;
  - Provide contact information for inquiries by Community Groups.
- As requested by TxDOT, coordinate and perform tours of the Project.
- Comply with the latest requirements of the following TxDOT guidance:
  - TxDOT *Traffic Noise Toolkit*;
  - TxDOT *Brand Guidelines* at https://www.txdot.gov/about/brand-guidelines.html;
  - TxDOT communications guidelines; and
  - TxDOT requirements for Project websites to be hosted on www.txdot.gov in coordination with TxDOT.
- Develop materials and make arrangements for multi-lingual groups when it can be reasonably anticipated that material will be presented to multi-lingual Community Groups.
- Provide reasonable accommodation for individuals with disabilities, including providing access to and use of information and data that is comparable to the access to and use of the information and data provided to members of the public without disabilities.
- Communicate impacts and Project design for accommodation of pedestrians and bicyclists throughout the Project.
- As design for sections of the project are complete, make available 3-D animations, renderings, and exhibits to be prepared in accordance with Section 10.4 on the Project website, in the project communication and outreach office, and at meetings with the public. Ensure compliance with Section 508 of the 1998 amendment to the Rehabilitation Act of 1973.
- Compile, manage, and update as needed a database of all Community Group contacts and make readily available to TxDOT in an easily accessible format.
- Provide immediate notification to TxDOT's public information officer of any media inquiries.
- Utilize existing TxDOT media resources, if available, to create and develop advertising messages, including graphics, and slogans.
- In consultation with TxDOT, place Project-related messages, advertisements, and public outreach in the appropriate media.
- Support TxDOT in managing media relations with key transportation and business reporters and prepare and distribute news releases and media kits.
- Develop public service announcements, paid advertising, news releases, news reports, and other communication materials as appropriate and as directed by TxDOT.
- Provide to TxDOT Project updates (such as anticipated closures and traffic switches) on a weekly basis that can be used on the Houston District's website/blog/twitter feed, etc.
- Develop and implement communications plans that anticipate and minimize traffic impacts on the Project from public, special, and seasonal events.
- Monitor and report on, and provide articles in local, state, and national media coverage regarding the Project for accuracy and to gauge local opinion. Coordinate with TxDOT regarding any inaccurate information related to the Project that DB Contractor discovers. Respond in a method, time, form, and message approved by TxDOT to such inaccurate information as soon as possible but no later than within one day after discovery of the inaccurate information.
- Document and make available Project-specific media clips to the entire Project team.
- Identify methods of notifications, invitations, and advertisement of meetings organized and managed by DB Contractor with Community Groups to maximize participation by members of the applicable Community Group.

11.4 Project Communications Coordinator

DB Contractor shall provide a Project Communications Coordinator to lead DB Contractor's public information and communication activities on a day-to-day basis throughout the Term. The Project Communications Coordinator shall have recent, relevant experience on projects of similar type and scope, and the ability to competently perform the following:

- Serve as the primary point of contact between DB Contractor and Community Groups, be responsible for the dissemination of Project information, and serve as the clearinghouse for the receipt of and response to written or verbal comments or complaints regarding the Project.
- Coordinate all interactions with elected officials or their representatives with TxDOT's Public Information Office and its Government Affairs Office.
- Lead the production, implementation, quality control, and update of the PICP.
- Coordinate and supervise day-to-day activities of DB Contractor's personnel in performing the public information activities described in the PICP.
- Facilitate communication among DB Contractor, TxDOT personnel (including TxDOT's public information officers), and Community Groups.
- Interact with Community Groups and represent the interests of the Project at meetings and other formal and informal events.
- Develop a clear understanding for Community Groups' concerns and reactions regarding the Project and public information program and incorporate that knowledge into improving the PICP.
- Liaise with the person assigned to coordinate the initial response to any Incident or Emergency and any Governmental Entity that may have jurisdiction in the Emergency.
- Liaise with the appropriate staff and Community Groups as appropriate to outline the impacts and benefits of the Project in relation to parks and pedestrian/bicyclist access.
- Speak fluent English and speak fluent Spanish or have a Spanish translator available at all times.

The Project Communications Coordinator shall actively engage, inform, and seek appropriate support from Community Groups for the Project throughout every phase of the Project.

11.5 Project Communication and Outreach Office

DB Contractor shall maintain a project communication and outreach office for the Term. The hours of operation for this office shall be as outlined below. This office shall serve as the primary business location for the Project Communications Coordinator and shall be conveniently located within one mile of the Project ROW. The project communication and outreach office shall provide a centralized location for residents and other Community Groups to obtain information on the Project, including Project maps and Plans, fact sheets, alternative routes, lane closures, construction updates, community impacts, and commute options.

The project communications and outreach office shall have readily available two conference rooms capable of hosting meetings with Community Groups. The rooms shall be Americans with Disabilities Act (ADA) compliant, convenient to and accessible by Community Groups, and appropriately supplied with electrical outlets, tables, chairs, and other equipment to meet meeting requirements. If appropriate meeting rooms are not available, the DB Contractor will make arrangements to accommodate the needed meeting space within the general vicinity of the Project. DB Contractor shall provide sufficient parking to accommodate use of the project communications and outreach office.

During design and construction, the minimum hours of operation of the project communications and outreach office shall be as follows:

- Monday-Friday 8 a.m. to 5 p.m. and by appointment
- Saturday By appointment
- Sunday Closed

DB Contractor shall extend hours of operation to appropriately service Community Groups.

In addition to the services listed above, DB Contractor shall provide a 24-hour telephone hotline that is staffed locally during the project communications and outreach office's normal business hours and that provides a recorded message describing Emergency procedures after hours. DB Contractor shall respond to voicemail and email messages left after hours within 48 hours of receiving the voicemail or email message. DB Contractor's Project Communications Coordinator shall log the messages, responses, day and time of message, and day and time of response.

11.6 Meetings with the Public and Community Groups

DB Contractor shall organize and manage meetings with the general public and Community Groups during the Term and will develop with TxDOT the list of meeting and event invitations for review and comment.

The frequency of such meetings shall be addressed in the PICP. This frequency must be increased or decreased as needs arise to better inform and engage general public and the Community Groups. From time to time, upon TxDOT's request, DB Contractor shall modify its meeting schedule to better inform and engage the general public and Community Groups.

To maximize public participation in meetings with the general public and Community Groups, DB Contractor shall advertise meetings hosted by DB Contractor a minimum of 15 days in advance. Advertisement shall include utilization of TxDOT Meetings/Hearings page on www.txdot.gov, e-alerts, social media, the Project website, and the appropriate media outlets, such as the Texas Register, local newspapers, and television and radio stations, or via media advisories and media releases. For the online notices to be posted on TxDOT's website, DB Contractor shall submit to TxDOT meeting notification as early as possible, but at least seven Business Days prior to posting. Notices must include the latest TxDOT approved language regarding special accommodations.

DB Contractor is solely responsible for creating all meeting advertisements.

During such meetings, DB Contractor shall inform participants of the Project's progress and discuss key issues as they emerge. DB Contractor shall provide timely and useful information regarding subjects of interest to the Community Groups, including:

- Design and construction issues affecting adjacent residential areas, businesses, frontage roads, local streets, and utilities (including such issues as design and alignment refinements and changes, the Project ROW definition, the Project ROW acquisition process, grading, drainage, detention, access, lighting, visual impacts, aesthetics, Noise Barriers, and retaining walls);
- Street and roadway detour design and implementation;
- Scheduling and duration of Work, including hours of Construction Work;
- Haul routes;
- Methods to minimize noise and dust;
- Environmental mitigation measures, including noise workshops; and
- Other environmental issues.

DB Contractor shall notify TxDOT a minimum of 15 Business Days in advance of any meetings with the general public and Community Groups. TxDOT reserves the right to attend any such meetings. When requested by TxDOT, DB Contractor shall participate in and provide support for any meetings with the Community Groups scheduled and conducted by TxDOT. When TxDOT decides to conduct such meetings, DB Contractor shall share, in a form that is easy to manipulate, all necessary information regarding potential Community Groups at TxDOT's request.

11.7 Meeting Summaries

For all meetings DB Contractor conducts or directly participates in, DB Contractor shall prepare meeting agendas and summaries. DB Contractor shall submit draft versions of all meeting summaries to TxDOT for review and comment on TxDOT's electronic content management system (ECMS). TxDOT comments shall be incorporated before distributing final versions to the meeting attendees and appropriate Community Groups. DB Contractor shall also submit final versions of meeting summaries to TxDOT, which may be posted to www.txdot.gov when required. At a minimum, DB Contractor shall include the following items in each meeting summary:

- A complete list of attendees (including their affiliations, telephone numbers, and e-mail addresses);
- Documentation of the exhibits, presentations and handouts available at the meeting;
- 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 date for action or resolution); and

- Copy of meeting announcement and how associated invitations or advertisements were disseminated.

For any formal public meetings or open houses at which a court reporter is required, DB Contractor shall also include detailed oral transcripts in the summary.

11.8 Emergency Communications

For all Emergencies, including major vehicle collisions, severe weather conditions, and Hazardous Materials spills, the Project Communications Coordinator shall timely notify and take appropriate action to inform TxDOT and Community Groups of all pertinent details. The Project Communications Coordinator 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 (DMSs), TxDOT's HCRS, email/web, text alerts, telephone notification, and social media account(s) notification(s), as appropriate.

In the event of an Emergency, "timely notify" shall mean as soon as practicable, but in no event longer than within one hour of knowledge of the occurrence. DB Contractor shall follow TxDOT's general guidelines requiring notification when an Emergency results in delays for motorists in traffic extending beyond 20 minutes. If advanced warning is available for an Emergency event such as ice, snow or other severe weather conditions, "timely notify" 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 Communications Coordinator shall continue to provide updated information, as available and on a timely basis, until the Emergency no longer exists. Timely notification of conclusion of Emergency shall also be provided.

Procedures and protocols for Emergency communications and key staff Emergency contact information shall be provided by DB Contractor in the PICP.

11.9 Disseminating Public Information

DB Contractor shall prepare and distribute public information using all appropriate methods, including materials for meetings, news releases, telephone correspondence, quarterly newsletters, emails, text messages, mobile device applications, hotlines, HCRS, DMS, web alerts (if applicable), maps, displays, renderings, presentations, milestone events, business owner taskforce meetings, open houses, brochures, pamphlets, highway advisory radio, video news releases, and other social media services as directed by TxDOT. Copies of draft public information materials shall be submitted to TxDOT for review and comment. TxDOT shall have a review and comment period of five Business Days in advance of final editing. After incorporation of TxDOT comments to the satisfaction of TxDOT, DB Contractor shall provide complete copies of all final materials to TxDOT at least three Business Days prior to dissemination.

All written materials produced for Community Groups shall follow TxDOT *Brand Guidelines* and other appropriate content guidelines.

DB Contractor shall participate in the planning, implementation, and maintenance of a public Project website to convey Project-related information. DB Contractor shall assign no more than two personnel to participate in developing and maintaining the site content, which may include information such as:

- Website page design and development;
- Website page updates;
- Draft Website page(s) mock-ups with tabs and drop down menu;
- Project contact information;
- Project maps;
- Frequently asked questions (FAQs);
- Current Project activities addressing design, construction, and maintenance;
- Timing of street and ramp closures and openings;
- Recommended route alternatives during closures;
- Newsletter and meeting materials;
- Meetings and special events announcements and calendar;
- Links to TxDOT Highway Conditions Reports;
- Links to other related sites as deemed appropriate by TxDOT;

- Email list signup form in adherence to TxDOT privacy policies and guidelines (https://www.txdot.gov/about/privacy-policy.html)
- Limited archive of photos taken during construction, per CMD web policy;
- Links to other related sites as deemed appropriate by TxDOT;
- Special time-sensitive alerts;
- Renderings or video animations of the Project, as appropriate; and
- Published materials in Spanish and other languages as needs warrant and in consultation with TxDOT.

Website development and its ongoing maintenance shall be managed as a 'Project website' under www.txdot.gov and coordinated with TxDOT to ensure content is consistent with TxDOT *Brand Guidelines,* web style guidelines, TxDOT privacy policies and TxDOT accessibility standards. DB Contractor shall work with TxDOT to implement software provided by TxDOT for access to the TxDOT network (Citrix or designated VPN); receive training in the txdot.gov content management system; and submit the draft public website materials to TxDOT for review and comment. All website materials and elements shall be prepared according to standards supplied by TxDOT CMD Web Services, and materials must be submitted to TxDOT for review, uploading, and publishing. The website shall contain other general Project-related information that enhances the engagement or education of the general public.

DB Contractor may not utilize the Project website for business purposes such as job postings, posting content that could be reasonably interpreted as intending to generate business for the DB Contractor, or otherwise implying TxDOT's endorsement of business services. DB Contractor shall regularly review and update information on this public website as it becomes available throughout the Project to provide current and appropriate information and the website shall provide for question and feedback opportunities for public communication. DB Contractor shall develop and implement a plan to make the Community Groups aware of the Project website.

DB Contractor shall ensure electronic and information technology is accessible to people with disabilities, in accordance with ADA and in compliance with Title VI of the Civil Rights Act of 1964, 42 U.S.C. 2000d et seq. DB Contractor, working collaboratively with TxDOT, shall assess the need for multi-lingual communications and, where appropriate, also furnish Project-related materials in Spanish or other demographic adaptations.

DB Contractor shall track all incoming comments, inquiries, and requests for information related to the Project. The following information shall be collected with each contact, and a summary of all contacts (after removing information obtained in response to items (a) through (d) below) shall be reported to TxDOT on a monthly basis:

a) Name of individual
b) Address (not required)
c) Phone number
d) E-mail address
e) Subject matter
f) Specific comment, question or request
g) Date of comment, question or request
h) Response given

DB Contractor shall track requests for language assistance services and ADA accommodations and provide information to TxDOT each quarter for TxDOT's use, including for its inclusion in the Office of Civil Rights' Limited English Proficiency Report, the Office of Civil Rights' Transition Plan Progress Report, and FHWA's ADA Program Reporting.

11.9.1 Lane Closure Notifications

Subject to the Lane Closure restrictions set forth in Item 26 and the TxDOT notification requirements in DBA Exhibit 15, Section A, DB Contractor shall provide appropriate Community Groups advance notice prior to placement of any traffic control devices associated with a lane closure, using all appropriate information dissemination tools. For i) Full Roadway Closures or ii) Lane Closures and/or traffic switches planned to be in effect longer than 24 hours, notice shall be a minimum of two weeks in advance. For Lanes Closures

planned to be in effect less than 24 hours, notice to Community Groups shall be a minimum of 48 hours in advance.

DB Contractor shall be responsible for the rental and placement of portable messaging signs (dynamic and static) as required by the approved traffic control plan to alert the public to traffic impacts/road closures. DB Contractor shall ensure that messaging on the signs is current and accurate at all times.

The Project Communications Coordinator shall be responsible for advertising such closures via electronic notices, media releases, website and social media posts on, at a minimum, a weekly basis. DB Contractor shall input all approved lane closure information into the HCRS and the Houston Transtar Lane Closure System before 3pm on the prior Business Day before implementation of the lane closure. Additional emphasis and efforts will be expected related to scheduled closures anticipated to have major traffic impacts and/or emergency situations that result in Lane Closures.

11.10 Third Party Claims

11.10.1 Claims against Third Parties by DB Contractor

As part of the PICP, DB Contractor shall prepare policies related to its pursuit of claims against third parties for damage caused to the Project, including procedures for sensitive handling of claims in which there is death or injury, and process to keep TxDOT informed of the status of such claims against third parties.

11.10.2 Third Party Claims against DB Contractor

Other than the case of a Third Party Claim that DB Contractor has notified TxDOT to be, and TxDOT has accepted, as a shared liability in accordance with Section 7.12.2.8 of the General Conditions, in no case will TxDOT accept any liability for Third Party Claims in connection with damage to persons or property in connection with the Project.

In accordance with Section 7.12.2.1 of the General Conditions, TxDOT will forward to DB Contractor any claims or complaints it receives from the public in connection with the Project. DB Contractor shall be responsible for resolving all claims and complaints, whether received directly or forwarded by TxDOT, appropriately and in a timely manner and shall retain a record of the actions DB Contractor has taken with respect to each such complaint. If DB Contractor determines that neither DB Contractor nor any DB Contractor-Related Entity is responsible for the damage, DB Contractor shall notify the complainant of this position promptly by certified mail and shall retain a copy of all correspondence. All documentation, including a copy of logs and claims, shall be available for inspection by TxDOT upon request.

11.11 Project Milestone Events

DB Contractor shall provide an allowance as described in DBA Exhibit 9 for the expenses (non-labor charges) to be incurred for items listed below in the requirements of Section 11.11.1, Section 11.11.2, and Section 11.11.3 which shall be provided by DB Contractor as requested by TxDOT, and billed through DB Contractor.

11.11.1 Groundbreaking Event(s) and Activities

DB Contractor shall participate in groundbreaking events and activities to mark the beginning of the Construction Work of the Project. DB Contractor shall provide the following elements for the groundbreaking: tents, chairs, stage, podium, sound system, mementos, refreshments, invitations, and programs, as approved by TxDOT. DB Contractor shall work with TxDOT to identify the location of the ceremonial activities, invitees to the event, assist with parking, logistics, and traffic control as needed and as directed by TxDOT.

11.11.2 Grand Opening Event(s) and Activities

DB Contractor shall participate in grand opening events and activities to mark the opening of the Project to traffic. DB Contractor shall provide the following elements for the grand opening: tents, chairs, stage, podium, sound system, mementos, refreshments, invitations, and programs, as approved by TxDOT. DB Contractor shall work with TxDOT to identify the location of the ceremonial activities, invitees to the event, assist with parking, logistics, and traffic control as needed and as directed by TxDOT.

11.11.3 **Additional Events**

DB Contractor shall participate in up to two additional events throughout the Term as directed by TxDOT. These events may include milestones of the Project. DB Contractor shall provide the following elements for the additional events: one piece of heavy construction equipment, tents, chairs, stage, podium, sound system, mementos, refreshments, invitations, and programs, as approved by TxDOT. DB Contractor shall work with TxDOT to identify the location of the additional events, invitees to the event, assist with parking, logistics, and traffic control for the subject events as directed by TxDOT.

11.12 **Submittals**

All Submittals described in this Item 11 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 11-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 11-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Media coverage responses	Within one day of release	Approval	11.3
Draft meeting agendas summaries	Upon request	Review and comment	11.7
Final meeting summaries (to TxDOT and meeting attendees)	Upon request	For information	11.7
Draft public website content	Prior to website content development	Review and comment	11.9
Final and ongoing website content and materials	Seven Business Days prior to publishing	Approval	11.9
Draft public information materials	At least five Business Days prior to final editing	Review and comment	11.9
Final copies of public information materials	At least three Business Days prior to dissemination	For information	11.9
Public comment/inquiry log	Monthly	For information	11.9
Language assistance log and ADA accommodation log	Quarterly	For information	11.9
Copy of claims and complaints documentation, logs, and record of the actions	Upon request	For information	11.10

Item 12
Environmental

12.1 **General Requirements**

Design-Build (DB) Contractor shall ensure fulfillment of the Environmental Commitments (Environmental Permits, Issues, and Commitments) (EPIC) required by the Contract Documents, Governmental Entities, Environmental Approvals (including all TxDOT-Provided Approvals), all other Governmental Approvals, the Comprehensive Environmental Protection Plan (CEPP) and all applicable Laws and regulations, including, Environmental Laws.

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

12.1.1 **Comprehensive Environmental Protection Plan**

DB Contractor shall develop, implement and, as necessary, update a CEPP for the Work to ensure compliance with all applicable Environmental Laws, Environmental Approvals and Environmental Commitments. The CEPP shall obligate DB Contractor to 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 requirements for the CEPP are contained in Section 4.2.4 of the General Conditions.

The CEPP shall effectively demonstrate in detail DB Contractor's knowledge of all Environmental Approvals, Environmental Commitments, and Environmental Laws including those set forth in these Design-Build Specifications. The CEPP shall also describe the processes that will be followed during the course of the Work to comply with those Environmental Approvals, Environmental Commitments, and Laws, as well as to prepare the documentation required to validate compliance. All monitoring and reporting documentation shall be:

- Concise and consistent throughout the Term;
- Applicable to the activities being performed; and
- In accordance with the requirements set forth in the Design-Build Agreement (DBA), the Environmental Approvals, Environmental Commitments and applicable Environmental Laws.

The CEPP shall effectively describe the quality control and assurance measures that DB Contractor will implement to verify the compliance of the program with all applicable Environmental Laws.

The CEPP shall define procedures for obtaining Environmental Approvals and implementing procedures, and Environmental Commitments consistent with the Environmental Approvals, including New Environmental Approvals, and TxDOT environmental policies. The CEPP shall establish a goal of zero environmental violations during the performance of all Work activities. However, should violations occur, the CEPP shall set forth detailed processes for rectifying such violations in an appropriate and timely manner, and coordination requirements with appropriate Governmental Entities. DB Contractor shall be responsible for all measures and activities required to rectify such violations.

12.2 **Environmental Approvals**

12.2.1 **TxDOT-Provided Approvals**

For TxDOT-Provided Approvals, see Section 3.1 of the DBA.

12.2.2 **New Environmental Approvals Including Amended TxDOT-Provided Approvals**

TxDOT-Provided Approvals are based on the design features illustrated therein. Such approvals may require re-evaluation, amendment, supplement or additional studies and reports as the Work progresses in order to accommodate actions not identified in the TxDOT-Provided Approvals or covered specifically by existing resource agency coordination. Changes to the Schematic Design 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.

Subject to Section 5.2.6.4 of the General Conditions, DB Contractor is responsible for any coordination with Governmental Entities necessary to obtain New Environmental Approvals except where TxDOT has agreements with Governmental Entities to perform such coordination, or where TxDOT, at its discretion, directs that TxDOT will perform the coordination. DB Contractor shall extend an invitation to TxDOT five Business Days in advance for any meetings it has with Governmental Entities to discuss changes to the Environmental Approvals, other TxDOT-Provided Approvals, and permit documents.

DB Contractor is responsible for assembling and providing supporting exhibits, cost estimates, field studies and other design and re-evaluation information applicable for TxDOT's approval and use in coordinating with Governmental Entities to obtain New Environmental Approvals where TxDOT has agreement with the Governmental Entity to perform such coordination.

Only one re-evaluation, amendment, or supplement can be in process at any given time during the Term.

DB Contractor shall ensure compliance with the conditions and schedules set forth in amendments to any TxDOT-Provided Approvals or New Environmental Approvals.

12.2.3 **Responsibilities Regarding Environmental Studies**

DB Contractor is responsible for conducting continuing environmental studies based on the Environmental Approvals and the Schematic Design.

DB Contractor is 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. DB Contractor is responsible for all coordination of environmental studies with appropriate Governmental Entities, except where TxDOT has agreements with Governmental Entities to perform such coordination, or where TxDOT, at its discretion, directs that TxDOT will perform the coordination.

The environmental review and the documentation of the review shall at all times be conducted under the oversight of TxDOT and any federal agency acting as a lead agency and shall comply with all requirements of state and federal law, including National Environmental Policy Act (NEPA), if applicable.

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

TxDOT-Provided Approvals may identify Section 404 impacts associated with Project improvements.

DB Contractor shall, based on Final Design, assess impacts to each potentially jurisdictional feature. Based on results of the assessment, and if required, DB Contractor shall update the document related to Section 404 impacts associated with the Project and perform all Work required to procure the necessary Section 404 permits and Section 401 certifications from the U.S. Army Corps of Engineers (USACE) and Texas Commission on Environmental Quality (TCEQ), respectively. If required, DB Contractor shall prepare a Section 404 mitigation plan in accordance with 33 CFR Part 332, and implement all required Section 404 mitigation as determined by USACE.

If required, Project mitigation options shall be provided by DB Contractor in accordance with the TxDOT *Standard Operating Procedure: Acquiring and/or Purchasing Section 404 Compensatory Mitigation Credits* (320.01.SOP) or *Standard Operating Procedure: Section 404 Compensatory Mitigation via Permittee Responsible Mitigation (PRM)* (320.02.SOP), both regarding TxDOT's mitigation procurement policy, as applicable. DB Contractor shall be responsible for the maintenance and monitoring of any permittee-responsible mitigation sites for the term stipulated within the USACE approved mitigation plan, if applicable. All coordination with USACE regarding Section 404 permitting and mitigation shall be disclosed to TxDOT, and any submittals required by this coordination shall be submitted to TxDOT for review and comment before submission to USACE.

DB Contractor shall document how it will identify Section 404 impacts, obtain the required Section 404 permit(s) and associated Section 401 certification, and comply with all the terms, conditions and special conditions of the Section 404 permit(s) and 401 certification issued to DB Contractor during the life of the Project, in accordance with any applicable parts of the TxDOT *Environmental Handbook for Water Resources* (900.01.GUI). At a minimum, the documentation shall include:

- Process for training personnel to recognize waters of the U.S. that fall under the jurisdiction of the USACE;
- Process for identifying Section 404 impacts associated with the Project;
- Process for obtaining required Section 404 permit(s) and associated Section 401 certification;
- Process for communicating and complying with the terms, conditions and special conditions of all Section 404 permit(s) and Section 401 certification and other permits as necessary;
- Procedures for carrying out any required Environmental Commitments and mitigation;
- Procedures for incorporating additional properties outside the original NEPA approved Schematic Design and any off-right-of-way Project Specific Locations (PSLs) as required by the Section 404 permit(s) issued to either TxDOT or DB Contractor and other permits associated with the Section 404 permit(s); and
- A summary of all the final permit requirements based on the Final Design.

DB Contractor shall comply with all general and regional conditions set forth by authorized Section 404 permits.

12.2.4 **TxDOT Review and Approval of DB Contractor Submissions**

TxDOT reserves the right to review, comment on, require revisions to and reject for resubmission documentation that is submitted for environmental compliance or Environmental Approvals. Documentation shall conform to current TxDOT submission standards and the requirements of all applicable Governmental Entities and applicable Laws. TxDOT shall return approved documentation to DB Contractor for submittal to the appropriate Governmental Entity in cases where DB Contractor performs coordination. Those submissions for which TxDOT signature or other approval is required shall be subject to TxDOT approval, provided TxDOT approvals of such submissions are not subject to the review time limitations in the Contract Documents. Documentation not meeting current submission standards or requirements of Governmental Entities will be returned to DB Contractor, and shall be revised by DB Contractor to meet the applicable standards or requirements.

12.2.5 **Responsibilities Regarding Commitments within Environmental Approvals**

DB Contractor is responsible for ensuring all commitments identified in the Environmental Approvals are met.

A summary of Environmental Commitments and mitigation measures is provided in Attachment 12-1 (Environmental Permits, Issues and Commitments (EPICs)).

DB Contractor shall not obtain borrow, stockpile, stage, nor use as parking area for any vehicles, equipment, maintenance, or fueling areas adjacent to or near jurisdictional aquatic resources.

12.2.5.1 **Traffic Noise Mitigation**

DB Contractor is 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 Environmental Approvals secured by DB Contractor. DB Contractor acknowledges that TxDOT-Provided Approvals and proposed permanent noise mitigation are based on the Schematic Design and Schematic ROW as identified in Table 12-1. If the design changes (e.g., roadway geometry or Noise Barrier length, height, and location), from what is shown in the Schematic Design and TxDOT-Provided Approvals, then the applicable noise analyses may require re-assessment and the proposed permanent noise mitigation may require amending by DB Contractor. DB Contractor shall submit the revised noise analysis and any permanent noise mitigation amendment to TxDOT for approval prior to conducting noise workshops.

TxDOT has conducted four noise workshops with affected property owners based on the Schematic Design. Table 12-1 below reflects Noise Barriers for which affected property owners have approved the incorporation of noise walls based on the Schematic Design. Noise workshops were conducted for Noise Barrier 1: Huntington Oaks Apartment and Noise Barrier 2: Steeplechase Apartments, and affected property owners did not approve incorporation of these Noise Barriers.

Table 12-1: Noise Barrier Locations

Noise Barrier	Total # Benefited Receptors	Location
Barrier 3: Watermark Subdivision	29	Between E. South Street and E. House Street, east of SH 35
Barrier 4: Lakes in Bay Colony Subdivision	19	Between Calder Drive and FM 646 along the north ROW line of the Bay Colony Subdivision

Subject to this Section 12.2.5.1, DB Contractor is responsible for public notification of affected property owners and conducting noise workshops, including the surveying/balloting of affected property owners, as well as performing the final design of all Noise Barriers. DB Contractor shall perform a preliminary design and constructability assessment to develop Noise Barriers layouts for TxDOT's approval prior to conducting noise workshops.

Subject to this Section 12.2.5.1, DB Contractor shall conduct all noise workshops in accordance with Item 11 and the latest approved version of the TxDOT *Traffic Noise Toolkit*. In accordance with Section 11.6, DB Contractor shall notify TxDOT a minimum of 15 Business Days in advance of conducting any noise workshops. DB Contractor shall allow 15 days for adjacent affected and benefiting property owner comments after each noise workshop. DB Contractor shall follow TxDOT's environmental policies for preparation, submittal, and review of documentation of the noise workshops prior to final design of Noise Barriers. DB Contractor shall construct Noise Barriers as early as practical in the construction phase of the Project to help minimize construction noise.

Noise Barriers design and construction requirements are described in Item 21.

12.2.5.2 **Property Access**

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

12.2.5.3 **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.

Dust control measures shall include a combination of watering, chemical stabilization, and construction vehicle speed reduction (not to exceed 20 mph).

DB Contractor shall identify and discontinue all dust creating Construction Work when winds reach a constant velocity of 25 mph or more, or when wind conditions may create a dust concern, or as directed by TxDOT.

DB Contractor shall keep concrete traffic barriers and any other elements that can cause accumulation of dust, sand, and debris (such as retaining walls, bridge columns, and drainage walls) within the Project limits clean of dust, sand, and debris during Construction Work to the extent practicable.

DB Contractor shall prevent, control, and mitigate fugitive noxious or toxic vapors or particulate matter (dust) during disturbance of noxious or Hazardous Materials and media.

12.2.5.4 **Hazardous Materials**

DB Contractor shall test, identify, inspect, notify, amend notifications as necessary, pay notification fees, and abate for all Hazardous Materials encountered during construction. DB Contractor shall manage, treat, handle, store, remediate, remove, transport, and dispose of all Hazardous Materials, including contaminated groundwater, encountered within the Project limits, in accordance with applicable Laws, guidance, Governmental Approvals, the Hazardous Management Plan, and all applicable provisions in the Contract Documents.

DB Contractor shall take appropriate measures to prevent the spillage of Hazardous Materials in the construction areas. All construction materials used for the Project shall be removed as soon as the work schedule permits. DB Contractor shall initiate early regulatory agency coordination during Project development.

12.2.5.4.1 **Phase II Environmental Site Assessment**

DB Contractor shall not perform any Phase II environmental site assessments until the applicable Phase I environmental site assessment has been completed and the following conditions have been met:

(a) DB Contractor has delivered to TxDOT and TxDOT has approved a list of Hazardous Material sites on which DB Contractor proposes to perform Phase II environmental site assessments. For each test proposed, DB Contractor shall describe the type of testing proposed, justification of the need for the test, the extent of the testing needed, and the proposed costs associated with the testing;

(b) NTP2 has been issued, or if prior to NTP2 DB Contractor has delivered to TxDOT and TxDOT has approved the following;

i. The Safety and Health Plan in accordance with General Conditions Section 4.2.3;

ii. The Hazardous Materials Management Plan (General Conditions Section 4.2.4.4), the Investigative Work Plans if applicable (General Conditions Section 4.2.4.4.1);

iii. Any additional site-specific applicable components of the Comprehensive Environmental Protection Plan (General Conditions Section 4.2.4);

(c) Property rights, or Right of Entry Agreement, acceptable to TxDOT, in its sole discretion, for performing investigation work for the applicable Hazardous Material sites have been acquired or obtained in favor of TxDOT;

(d) DB Contractor has satisfied all applicable requirements contained in the Environmental Approvals and other Governmental Approvals that are applicable to the proposed Hazardous Material site investigative; and

(e) TxDOT has delivered notice acknowledging DB Contractor's satisfaction of the conditions above and authorizing DB Contractor to commence the proposed investigations.

Upon satisfactorily completing the investigative work, DB Contractor shall summarize the findings and make recommendations in accordance with General Conditions Section 4.2.4.4.1.

12.2.5.5 **Asbestos-Containing Material/Lead Based Paint**

DB Contractor shall test for asbestos-containing material (ACM) and lead based paint (LBP) on any existing bridge structures to be removed that require any work to be done, including, but not limited to, removals, rehabilitations, and widenings.

DB Contractor shall identify, inspect, notify TxDOT of, amend notifications as necessary, pay notification fees, and abate ACM and LBP found on any structure, including, but not limited to, bridges, buildings, rails, girders, and retaining walls, in accordance with appropriate or relevant regulations or guidance.

DB Contractor shall provide TxDOT any inspection reports, proposed abatement plan, and/or report documenting abatement (as necessary).

DB Contractor shall notify the Texas Department of State Health Services (DSHS) of bridge demolitions or building structures 10 Business Days prior to the scheduled demolition, including any required amendments to the notification.

12.2.5.6 **Project Specific Locations**

DB Contractor shall ensure regulatory compliance of all its PSLs.

12.2.5.7 **Existing Trees and Vegetation**

DB Contractor shall make efforts to protect any trees that are not in conflict with construction, especially those trees located near the edge of construction areas.

12.2.5.8 **Reserved**

12.3 **Environmental Team (ET)**

DB Contractor, acting through the Environmental Compliance Manager (ECM), shall designate an ET, as detailed in this Section 12.3, to prevent, minimize, and/or correct any violation of or noncompliance with Environmental Approvals and Environmental Commitments. The ET shall include staff meeting the qualification requirements as indicated in this Section 12.3. All of the ET shall be deemed other principal personnel.

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

- Staffing and availability of the ECM and all ET personnel; and
- ET staff response times during the Work.

12.3.1 **Environmental Compliance Manager**

DB Contractor shall designate an ECM for the Work in accordance with Section 4.2.4.1.1 of the General Conditions.

12.3.2 **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 DB Contractor's personnel. All training shall be in accordance with the Environmental Protection Training Plan and requirements set forth in Section 4.2.4.3 of the General Conditions. Environmental Training Staff members shall have at least one year of experience providing environmental compliance inspection for freeway construction.

12.3.3 **Environmental Compliance Inspectors (ECIs)**

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 non-compliance 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 with Storm Water Pollution Prevention Plan (SWP3) activities.

12.3.4 **Hazardous Materials Manager**

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

- Schedule and/or conduct training for DB Contractor's employees;
- Verify all employees have required certifications prior to the handling of Hazardous Materials;
- Maintain records of all incidents involving Hazardous Materials; and
- Notify the ECM, TxDOT, and appropriate authorities in writing of any incidents involving Hazardous Materials in accordance with the Contract Documents.

The Hazardous Materials Manager shall meet the certification requirements of TxDOT Work Category 2.13.1, "Hazardous Materials Initial Site Assessment", have a current 40-hour hazardous waste operations and

emergency response (HAZWOPER) certification and at least five years of experience in similar projects in the following areas:

- Developing Investigative Work Plans (IWPs), Site Investigation Reports (SIRs), and remedial action plans or equivalent reports necessary and acceptable to TCEQ in material discovery and remediation efforts of Hazardous Materials; and
- Following TCEQ guidance for the investigation and remediation of Hazardous Materials under the TCEQ Voluntary Cleanup Program, Texas Risk Reduction Program, and the TCEQ Petroleum Storage Tank rule.

12.3.5 **Reserved**

12.3.6 **Reserved**

12.3.7 **Reserved**

12.3.8 **Reserved**

12.3.9 **Water Quality Specialist**

The ECM shall designate a water quality specialist to provide expertise in delineation, permitting, stormwater pollution prevention, and the protection of jurisdictional waters during the course of the Work.

The water quality specialist shall have verifiable experience implementing SWP3s and be able to demonstrate a working knowledge of the Texas Pollutant Discharge Elimination System and Municipal Separate Storm Sewer System (MS4) permit requirements applicable to the Project.

The water quality specialist shall meet the certification requirements of TxDOT Work Categories 2.3.1, "Wetland Delineation," 2.4.1, "Nationwide Permit," and 2.4.2, "Clean Water Act §404 (Title 33, United States Code §1344) Permits (including mitigation and monitoring)."

12.4 **Submittals**

All Submittals described in this Item 12 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 12-2. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 12-2: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Assembling and providing supporting exhibits, cost estimates, field studies, and other design and re-evaluation information	When TxDOT is coordinating with Governmental Entities to obtain New Environmental Approvals where TxDOT has agreement with the Governmental Entity to perform such coordination	Approval	12.2.2
Section 401 certification(s), Section 404 permit(s), other permits associated with the Section 404 permit(s), and mitigation plan	As necessary, prior to commencement of Construction Work	Review and comment prior to submittal to USACE	12.2.3.1
Documentation of identification, permitting, and compliance with Section 404 permit(s), Section 401 certification(s) and other permits associated with the Section 404 permit(s)	As necessary, prior to commencement of Construction Work	For information	12.2.3.1
Revised noise analysis and any permanent noise mitigation amendment from the TxDOT-Provided approvals	Prior to conducting noise workshops	Approval	12.2.5.1

Table 12-2: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Noise Barrier layouts	Prior to conducting noise workshops	Approval	12.2.5.1
Notification of noise workshops	15 Business Days prior to conducting noise workshops	For information	12.2.5.1
Documentation of noise workshops	Prior to final design of Noise Barriers	Review and comment	12.2.5.1
Notifications and amended notifications of ACM, LBP and Hazardous Materials encountered during construction	As encountered and in accordance with the CEPP	For information	12.2.5.4 and 12.2.5.5
Notifications and amended notifications to DSHS of bridge or building demolitions	10 working days prior to the scheduled demolition	For information	12.2.5.5
ACM / LBP Inspection Reports	Prior to demolition of applicable structures	Approval prior to demolition of applicable structures	12.2.5.5
ACM / LBP Abatement Plan	Prior to demolition of applicable structures	Approval prior to demolition of applicable structures	12.2.5.5
ACM / LBP Mitigation Report	Prior to demolition of applicable structures	Approval prior to demolition of applicable structures	12.2.5.5

Item 13
Third Party Coordination

13.1 **General Requirements**

TxDOT has existing Third Party Agreements with certain local, state and federal Governmental Entities with respect to the Project. These Third Party Agreements define additional requirements for the design, construction, operations, and maintenance of the Project. These Third Party Agreements do and will specify the Governmental Entities' responsibilities and TxDOT's responsibilities with respect to the requirements. DB Contractor shall coordinate with and provide reasonable accommodations to the third party designated to carry out the installation, operations, and maintenance obligations as specified in such agreements.

Design-Build (DB) Contractor shall assume and execute TxDOT's responsibilities and duties stated in Third Party Agreements to the extent set forth in the Design-Build Contract (DBC), including payments for work performed or services provided by the Governmental Entity. DB Contractor is responsible for providing TxDOT and Governmental Entities with all information necessary to fulfill TxDOT's responsibilities stated in such agreements. In the case that the Governmental Entity under such agreements will need to be reimbursed by TxDOT for work performed, DB Contractor shall make payment of stated costs to the Governmental Entity within 30 days from receipt of request for payment. Alternatively, TxDOT may deduct the amount of such costs and expenses from any sums owed by TxDOT to DB Contractor pursuant to the DBC.

DB Contractor responsibilities and duties with respect to executed Third Party Agreements are described in Exhibit 8 to the Design-Build Agreement (DBA).

13.2 **Traffic Signals**

New construction or modifications to the existing traffic signals are defined in Item 24.

Some Governmental Entities may request additional traffic signals within the Project Right of Way (ROW) throughout the Term not identified in Item 24. Should this occur, additional agreements or modifications to existing agreements between TxDOT and the Governmental Entity will be required. DB Contractor, at its expense, shall coordinate with TxDOT and the appropriate Governmental Entity to define the scope of work for the additional traffic signals, including design and construction requirements, and oversight of DB Contractor's Work, if applicable. DB Contractor shall not be required to design or construct additional traffic signals requested by Governmental Entities except in accordance with Section 4.6 of the General Conditions.

13.3 **Roadway Illumination**

New construction or modifications to the existing illumination features are defined in Item 24.

Some Governmental Entities may request additional illumination within the Project ROW throughout the Term not defined in Item 24. Should this occur, additional Third Party Agreements or modifications to existing agreements between TxDOT and the Governmental Entity will be required. DB Contractor, at its expense, shall coordinate with TxDOT and the appropriate Governmental Entity to define the scope of work for the additional illumination, including design and construction requirements and oversight of DB Contractor's Work, if applicable. DB Contractor shall not be required to design or construct additional illumination requested by Governmental Entities except in accordance with Section 4.6 of the General Conditions.

13.4 **Aesthetics and Landscape Enhancements**

Aesthetics and landscape enhancements shall comply with Item 23.

Some Governmental Entities may request additional aesthetics and landscape enhancements within the Project ROW throughout the Term not defined in Item 23. DB Contractor shall be responsible for coordinating with such Governmental Entities in accordance with Section 23.1.2.1.

13.5 **Access on TxDOT Controlled Facilities**

TxDOT shall be solely responsible, at its expense, for handling requests and permitting for adjacent property access to frontage roads of the Project, provided that TxDOT may request DB Contractor to review access

permit applications at DB Contractor's expense. DB Contractor shall provide TxDOT with any comments within 10 Business Days after receipt of these permit applications. Nothing in the Contract Documents shall restrict TxDOT from granting access permits or determining the terms and conditions of such permits. TxDOT will keep DB Contractor regularly informed of access permit applications and will deliver to DB Contractor a copy of each issued access permit within five days after it is issued. DB Contractor shall have no claim for a Change Order by reason of TxDOT's grant of access permits, the terms and conditions thereof, or the actions of permit holders or their employees, agents, representatives and invitees. DB Contractor at its expense shall cooperate and coordinate with permit holders to enable them to safely construct, repair and maintain access improvements allowed under their access permits.

13.6 Other Affected Third Parties

DB Contractor is responsible for coordination and cooperation with all third parties affected by the Work, except as specifically provided otherwise. An Affected Third Parties Plan shall be prepared by the DB Contractor in accordance with Section 4.2.6 of the General Conditions.

13.6.1 Confederate Cemetery

The Confederate Cemetery is a privately owned cemetery that has been designated a Wreaths Across America Cemetery. The Confederate Cemetery is located at the corner of SH 35 and FM 517/Dickinson Road in Alvin. DB Contractor shall be responsible for coordinating with the Confederate Cemetery and shall cease construction operations within 1,500 feet north and south of the cemetery property along SH 35 and within 1,500 feet east and west of the cemetery property along FM 517/Dickinson Road when the cemetery's burial services are underway.

13.6.2 City of League City – Pat Hallisey Park

The City of League City is progressing with development of a new park and associated detention facilities on the remainders of Parcel 309 adjacent to the Schematic ROW. DB Contractor shall be responsible for coordinating with the City of League City to provide reasonable access for the City's continued use of the existing access roads within the Project ROW for the new park construction activities or to provide a reasonable alternate access plan acceptable to the DB Contractor and the City that maintains the same functional access for crossing Parcel 309 as further described in "SH 99 - Parcel 309 City of League City – Park Construction Access" provided in the RIDs.

13.7 Submittals

All Submittals described in this Item 13 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 13-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 13-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Provide comments to TxDOT on third-party frontage road permit applications	Within 10 days after permit application provided to DB Contractor	For Information	13.5

Item 14
Utility Adjustments

14.1 General Requirements

A number of existing Utilities are located within or in the vicinity of the Project Right of Way (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 Item 14 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 Item 14 references certain TxDOT forms for Design-Build (DB) Contractor's use in Utility Adjustments. Forms not included in Attachment 14-1 (Utility Adjustment Forms) are available at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/row.html. Except as otherwise provided in this Item 14 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 obtain TxDOT approval of all changes to the forms agreed to by DB Contractor and the Utility Owner 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. Some Utility Adjustments may be performed by the Utility Owner with its own employees and/or contractors and representatives (i.e., Owner-Managed); all others shall be performed by DB Contractor with its own employees and/or Subcontractors and representatives (subject to any approval rights required by the Utility Owner for those working on its facilities) (i.e., DB Contractor-Managed). The Utility Agreement shall specify the allocation of responsibility for the Utility Adjustment Work between DB Contractor and the Utility Owners as described in Section 14.1.4.

Regardless of the allocation of Utility Adjustment Work in the Utility Agreement and prior to the installation of materials that are subject to Buy America compliance, DB Contractor shall submit an executed TxDOT form 1818 – Material Statement with proper attachments that are issued and signed by: (i) initial fabricator, (ii) suppliers of materials, (iii) DB Contractor, or (iv) Utility Owner. TxDOT form 1818 – Material Statement is required for all Utility Adjustments to document compliance in accordance with Exhibit 7 to Attachment 3-1 and Section 4.5.7.2 of the General Conditions. If the costs of all the Utility Adjustment Work included in a Project Utility Adjustment Agreement (PUAA) are not eligible for reimbursement from TxDOT under applicable law, then the Utility Owner is not required to comply with Buy America for such Utility Adjustment. 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 this Item 14 and Section 4.5 of the General Conditions.

This Item 14 does not address the Project's Highway Service Systems. Utility services to the Project's Highway Service Systems shall be the subject of separate agreements between DB Contractor and the Utility Owners. DB Contractor is responsible for all Work and costs associated with the Project's Highway Service Systems, as set forth in Section 4.1.1.1 of the General Conditions.

14.1.1 When Utility Adjustment is Required

A Utility Adjustment may be necessary for the following reasons: (a) a physical conflict between the Project and the Utility, or (b) an incompatibility between the Project and the Utility based on the requirements in Section 14.2.1, 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 14.2.4.2 contains provisions that address the acquisition of Replacement Utility Property Interests 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 14.2.1 are met, (b) the existing location will not adversely affect the construction, operation, safety, maintenance, or intended use of the Project and Utility, and (c) the Utility Owner agrees to the Utility remaining in its existing location.

Existing Utilities that are not in physical conflict with the Project that cross a roadway centerline at approximately 90 degrees may remain in the existing alignment. The existing Utilities may remain, be adjusted in place, or be protected in place in these areas only if all other conditions of the TxDOT Utility Accommodation Rules (UAR) are met and TxDOT and the affected Utility Owners agree to and approve all corresponding Utility Adjustment Plans.

Existing Utilities located on an Existing Utility Property Interest that cross the mainlane centerline at less than 90 degrees may remain in the existing alignment as long as the Utility facility crosses at no less than a 28-degree angle to the mainlane centerline and does not cross diagonally through connecting intersections. The existing Utilities may remain or be relocated in place in these areas only if all conditions of the UAR are met, other than the 90-degree reference in the UAR and the affected Utility Owners agree to and approve all proposed Utility Adjustment (UA) plans.

14.1.2 Certain Components of the Utility Adjustment Work

14.1.2.1 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 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 and prior to the commencement of any Utility Adjustment construction related activity.

14.1.2.2 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 becomes effective, as set forth in Section 4.5.2 of the General Conditions. DB Contractor shall perform all coordination necessary for Betterments.

14.1.2.3 Protection in Place

DB Contractor shall be responsible for Protection in Place of all Utilities impacted by the Project as necessary for the continued safe operation and structural integrity of each Utility, and to satisfy the requirements described in Section 14.2.1. For each impacted Utility, DB Contractor shall obtain Utility Owner's approval of DB Contractor's proposed Protection in Place prior to beginning the Construction Work.

14.1.2.4 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 14.2.1, 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 the work necessary to complete each abandonment or removal (and disposal) of such Utility. Utilities that will be abandoned in place must be clearly identified in the Utility Assembly plans and shall require approval by TxDOT. The Utility Assembly plans must detail the method of abandonment to be utilized for TxDOT to determine if UAR requirements are met. The plans must also detail the age, condition, material type, active status and size of each Utility. If a Utility is to be abandoned, the plans shall (i) state that the Utility Owner continues to own and maintain the abandoned Utility and keep records of its location, and (ii) include a certification from the Utility Owner stating that the Utility does not contain nor is composed of Hazardous Materials. Voids and abandoned pipe beneath the ROW are prohibited and only allowed at TxDOT's sole discretion. In accordance with jurisdictional requirements or as directed by TxDOT, all voids must be filled with cement slurry or backfilled, and any pipe to be abandoned in place must be grout filled and capped. For open cuts under existing and proposed pavement, DB Contractor shall use fill material as specified in Item 400, *Excavation and Backfill for Structures*, of the TxDOT Standard Specifications. For cuts in all other areas of TxDOT owned ROW, DB Contractor shall use fill material as specified in Item 132, *Embankment*, of the TxDOT Standard Specifications. DB Contractor shall submit a trenching and backfill plan as part of the Utility Adjustment Concept Plans.

14.1.2.5 **Service Lines and Utility Appurtenances**

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

14.1.3 **Reserved**

14.1.4 **Agreements Between DB Contractor and Utility Owners**

Except as otherwise stated in this Item 14 or in the Design-Build Contract (DBC), DB Contractor shall address each Utility Adjustment in a PUAA or in a Utility Adjustment Agreement Amendment (UAAA), as described elsewhere in this Item 14. DB Contractor is responsible for preparing, negotiating (to the extent allowed by this Item 14) and obtaining execution by the Utility Owners of all Utility Agreements (including preparing all necessary exhibits and information about the Project, such as reports, Utility Adjustment Plans and surveys).

A Utility Agreement is not required for any Utility work consisting solely of Protection in Place of a Utility that is in its 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, a Utility Joint Use Agreement / Acknowledgement (UJUA) or Utility permit and plans detailing UAR compliance are required pertaining to the Utility Adjustment or Protection in Place work. The UJUA and Utility permit options are further described in Section 14.2.6. If a Utility Owner requests that DB Contractor adjust a Utility and the cost of that Utility Adjustment is the Utility Owner's sole responsibility in accordance with Transportation Code 203.092, then 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.

14.1.4.1 **Project Utility Adjustment Agreement**

DB Contractor shall enter into one or more PUAAs with each affected Utility Owner to define the design, material, construction, inspection, and acceptance standards and procedures necessary to complete Utility Adjustments, and to define DB Contractor's and the Utility Owner's respective responsibilities for Utility Adjustment costs and activities, including 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 UAAA.

DB Contractor shall prepare each PUAA using the TxDOT Form DB-ROW-U-PUAA-OM – PUAA (Owner-Managed) or DB-ROW-U-PUAA-DM – PUAA (DB Contractor-Managed). DB Contractor shall not modify the forms unless approved by TxDOT.

Promptly following issuance of Notice to Proceed 1 (NTP1), DB Contractor shall begin negotiations with each affected Utility Owner to reach agreement on all necessary PUAAs and UAAAs. DB Contractor shall include any proposed changes to the form (other than filling in the blanks specific to a particular Utility Owner) in a track-change format that clearly identifies the changes and the party requesting the change. Each PUAA (including the Utility Adjustment Plans attached thereto) shall be subject to TxDOT review and approval as part of a Utility Assembly.

DB Contractor shall obtain approval by TxDOT of any language modification to a PUAA by the Utility Owner and DB Contractor.

DB Contractor shall include with each PUAA Submittal to TxDOT a certification that (a) the PUAA does not include any material changes to the scope of the Utility Adjustment Work for the Utility Adjustment from the scope of the work agreed to by the Utility Owner in any relevant Pre-Proposal Utility Commitment(s), or (b) the PUAA includes one or more material changes to the scope of the Utility Adjustment Work for the Utility Adjustment from the scope of the work agreed to by the Utility Owner in the relevant Pre-Proposal Utility Commitment, along with a description of the material changes in the scope of the work and the reason for such material changes.

14.1.4.2 **Utility Adjustment Agreement Amendment**

Except where Utility Adjustment Field Modifications (UAFM) are permitted pursuant to Section 14.4.6, modification or amendment 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 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 parent Utility Agreement; otherwise, an additional PUAA will be required.

Each UAAA (including any Utility Adjustment Plans attached thereto) shall be subject to TxDOT approval. Except as otherwise directed by TxDOT or provided in an applicable Utility Agreement, DB Contractor shall prepare all UAAAs using the appropriate form included in Attachment 14-1 (Utility Adjustment Forms). DB Contractor shall include any proposed changes to the appropriate form (other than filling in the blanks specific to a particular Utility Owner) in a Utility Owner-specific addendum.

DB Contractor shall obtain TxDOT approval of all changes to a UAAA form prior to execution by the Utility Owner.

DB Contractor shall include with each UAAA Submittal to TxDOT a certification that (a) the UAAA does not include any material changes to the scope of the work for the Utility Adjustment from the scope of the work agreed to by the Utility Owner in any relevant Pre-Proposal Utility Commitment(s), or (b) the UAAA includes one or more material changes to the scope of the work for the Utility Adjustment from the scope of the work agreed to by the Utility Owner in the relevant Pre-Proposal Utility Commitment, along with a description of each material change in the scope of the work and the reason for such material change(s).

14.1.5 **Recordkeeping**

DB Contractor shall maintain construction and inspection records in order to ascertain and demonstrate that Utility Adjustment Work is accomplished in accordance with the approved Utility Adjustment Plans and as required by the Contract Documents and the applicable Utility Agreement(s).

14.2 **Administrative Requirements**

14.2.1 **Standards**

All Utility Adjustment Work shall comply with all applicable Laws (including, but not limited to, 43 TAC, Part 1, Chapter 21, Subchapter C, UAR), The TxDOT *ROW Utilities Manual*, requirements within the Contract Documents, including Section 4.5 of the General Conditions, and the requirements specified in this Item 14.

14.2.2 **Communications**

14.2.2.1 **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.

DB Contractor shall notify TxDOT of all meetings, and TxDOT may 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 format, content and addressees of any such mass mailings. For purposes of this Item 14, the term “mass mailing” means correspondence that is sent to 50% or more of Utility Owners within a three-week time period and contains substantially the same content with respect to each Utility Owner.

14.2.2.2 **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 first and then to the appropriate Utility Owner unless otherwise provided. DB Contractor shall prepare minutes of all meetings and shall keep copies of all correspondence.

DB Contractor shall prepare and submit meeting minutes within five Business Days after the conclusion of each meeting. 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 or resolutions; and
- 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 Community Groups. DB Contractor shall ensure action items resulting from the meeting are resolved.

14.2.3 **Utility Adjustment Team**

DB Contractor shall provide a Utility Adjustment team whose members have all appropriate qualifications and experience to perform the Utility Adjustment Work. DB Contractor shall provide a list of the names and contact details, titles, job roles and specific experience of the team members in the Project Management Plan (PMP). Specifically, DB Contractor shall provide a Utility Manager (UM) and a Utility Design Coordinator (UDC) to manage all aspects of the Utility Adjustment process. If DB Contractor assigns the Construction Work to a Subcontractor or Affiliate, DB Contractor shall provide a DB Contractor Utility Coordinator (DUC) as described herein.

The UM's primary work responsibility shall be the performance of all DB Contractor's obligations with respect to Utility Adjustments. The UM shall have a bachelor's degree and have relevant experience in coordinating and solving complex Utility Adjustments on highway improvement projects. DB Contractor shall authorize the UM to approve all financial and technical modifications associated with Utility Adjustments and modifications to the Utility Agreement.

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

If applicable, the DUC shall hold a bachelor's degree and have relevant experience in ROW and Utility coordination activities involving large transportation projects. The DUC will be responsible for tracking and following DB Contractor's Affiliate's and Subcontractor's activities and communicating the progress to DB Contractor. The DUC will assist with developing good working relationships with the Utility Owners and assisting DB Contractor in all Utility coordination matters.

14.2.4 **Real Property Matters**

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

14.2.4.1 **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 review as part of a Utility Assembly approval. Except as otherwise directed by TxDOT, DB Contractor shall prepare all Affidavits of Property Interest using TxDOT Form ROW U-Affidavit.

14.2.4.2 **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:

- 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; and
- If any DB Contractor-Related Entity 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:
  - The files and records must be kept separate and apart from all acquisition files and records for the Project ROW;

- 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; and
- Any DB Contractor-Related Entity personnel negotiating the acquisition of Replacement Utility Property Interests must be different from those negotiating the acquisition of the Project ROW.
- DB Contractor is not responsible for Utility Owner condemnation proceedings except for DB Contractor's cost share set forth in Section 4.5.6 of the General Conditions. The Utility Owner is responsible for utilizing its authority for condemnation proceedings for all Replacement Utility Property Interests.

14.2.4.3 **Relinquishment of Existing Utility Property Interests**

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

14.2.4.4 **Quitclaim Deeds**

Except as otherwise directed by TxDOT, DB Contractor shall prepare and record in the appropriate jurisdiction a Quitclaim Deed for each relinquishment of an Existing Utility Property Interest using the TxDOT Quitclaim Deed form ROW-N-30. Each Quitclaim Deed is subject to TxDOT approval.

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 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, with 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 DB Contractor recording such deed in the local real property records.

14.2.5 **Notice of Required Accommodation**

If requested by TxDOT, promptly following NTP1, DB Contractor shall prepare and fill out TxDOT Form DB-ROW-U-NORA – Notice of Required Accommodation with all required information and deliver as certified mail return receipt (CMRR) to each Utility Owner that requires a Utility Adjustment within the Project ROW. The Notice of Required Accommodation (NORA) shall be sent utilizing TxDOT letterhead and signed by TxDOT. DB Contractor shall submit to TxDOT each draft of TxDOT Form DB-ROW-U-NORA – Notice of Required Accommodation for review and comment before sending the Utility Owner from TxDOT. A copy of each form and receipt of delivery shall be provided to TxDOT for information.

14.2.6 **UJUAs and Utility Permit Requirements**

DB Contractor shall prepare a UJUA for each Utility that will remain within the boundaries of its Existing Utility Property Interest location within the Project ROW. DB Contractor shall prepare all UJUAs using the TxDOT Form ROW-U-JUA-Utility Joint Use Agreement. DB Contractor also shall prepare all required documentation to be included with each UJUA.

DB Contractor shall arrange for the Utility Owner to execute each UJUA, which shall be subject to TxDOT's written approval as part of a Utility Assembly.

DB Contractor shall assist the Utility Owner in preparing a Utility permit application through TxDOT's Right of Way Utility and Leasing Information System (RULIS) as required by TxDOT, for each Utility that will remain or be relocated within the Project ROW and is not located within an Existing Utility Property Interest held by the Utility Owner. Such Utilities shall not be considered New Utilities.

DB Contractor shall arrange for the Utility Owner to submit for approval to TxDOT a complete Utility permit application prior to DB Contractor's inclusion of the required documentation as part of a Utility Assembly. DB Contractor shall analyze each application and provide to TxDOT a recommendation (together with supporting analysis) as to whether the request should be approved, denied, or approved subject to conditions. As part of the recommendation process, DB Contractor shall furnish to TxDOT Utility No Conflict Sign-Off Forms,

signed by both DB Contractor's UDC and DB Contractor's UM, using TxDOT Form DB-ROW-U-USO-UDC and TxDOT Form DB-ROW-U-USO-UM. DB Contractor shall limit the grounds for its recommendation to the grounds on which TxDOT is entitled to approve or deny the application or to impose conditions on its approval. However, TxDOT shall have the right to issue approval of the Utility permit in its sole discretion. Subject to Section 14.6, the 10 Business Day review time for TxDOT approval of the Utility permit application shall begin after the DB Contractor provides its recommendation to TxDOT as to whether a Utility permit application submitted by a Utility Owner should be approved.

14.2.7 **Documentation Requirements**

DB Contractor shall prepare, negotiate (to the extent permitted by this Item 14), and obtain execution by the Utility Owner of (and record in the appropriate jurisdiction, if applicable) all agreements and deeds described in this Item 14, including all necessary exhibits and information concerning the Project (e.g., reports, Utility Adjustment Plans and surveys). Each agreement or deed shall identify the subject Utility(ies) by the applicable Utility Assembly Number and shall also identify any real property interests by parcel number or highway station number, or by other identification acceptable to TxDOT.

14.2.8 **Utility Management Plan**

DB Contractor shall prepare and submit a Utility Management Plan in accordance with the requirements in Section 4.2.8 of the General Conditions.

14.2.9 **DB Contractor's Utility Tracking Report (UTR)**

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

- Name of the Utility Owner;
- Utility Assembly Number;
- Utility size and type;
- Location of the Utility based upon station and offset;
- Proposed method of treatment;
- Dates on which NORA letters' CMRR were received;
- Designation whether the Utility Adjustment will be Owner Managed, or DB Contractor-Managed;
- Dates on which the Utility Agreement was executed by TxDOT, the Utility Owner and DB Contractor, as applicable;
- Dates on which the UJUA or Utility Permit, was executed by the Utility Owner and TxDOT, as applicable;
- Utility Owner's existing right of occupancy of the ROW for each Utility (e.g., UJUA, permit, easement or combination);
- Whether any Replacement Utility Property Interest will be necessary;
- Estimated cost approved in the Utility Agreement, if applicable;
- Amounts and dates of payments made by DB Contractor to the Utility Owner, listing in each case the type of payment (final, partial or lump sum);
- Scheduled start and completion date for construction of each Utility Adjustment;
- Percent complete of construction;
- Whether any Betterment is included in the Utility Adjustment; and
- Whether TxDOT Form 1818 - Material Statement is required for each Utility Adjustment.

The UTR 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 UTR and submit it to TxDOT in the same manner as all other portions of the UTR

14.2.10 **FHWA Alternate Procedure**

DB Contractor shall develop the Alternate Procedure List that includes the Utility Owner's name, approximate station numbers and estimated cost of Utility Adjustments. TxDOT is authorized by the FHWA to utilize the Alternate Procedure process. Upon receipt of the required information, TxDOT shall then consider and approve the list and notify DB Contractor. Promptly upon determining that any additional Utility Owner not referenced on the Alternate Procedure List is impacted by the Project, DB Contractor must submit to TxDOT all documentation as referenced above in order to amend the Alternate Procedure List.

14.3 **Design**

14.3.1 **DB Contractor's Responsibility for Utility Identification**

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

DB Contractor shall prepare and submit to TxDOT prior to the first Utility Assembly submission a DB Contractor Utility Strip Map showing the information obtained and confirmed pursuant to this Section 14.3.1. The DB Contractor Utility Strip Map shall show in plan view all Utilities within the Project ROW and those outside of the Project ROW which are otherwise impacted by the Project. The map shall detail the type of Utility (e.g., communication, gas, oil, water, etc.) size, material, subsurface utility engineering (SUE) level and the Utility Owner's name and contact information. The scale of the DB Contractor Utility Strip Map shall be 1 inch = 100 feet. DB Contractor shall verify and update the information provided in the Utility Strip Map with SUE data obtained by DB Contractor and incorporate such information into the DB Contractor Utility Strip Map.

14.3.2 **Technical Criteria and Performance Standards**

DB Contractor shall ensure that all design plans for Utility Adjustment Work, whether furnished by DB Contractor or by the Utility Owner, are consistent and compatible with:

- the applicable requirements of the Contract Documents, including Section 14.2.1;
- the Project design;
- any existing and proposed Utility(ies);
- all applicable Governmental Approvals; and
- approvals of all private sector third parties necessary for such Utility Adjustment Work.

14.3.3 **Utility Adjustment Concept Plans**

DB Contractor shall prepare and submit to TxDOT, 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 in accordance with Section 14.3.1, the existing Utilities to remain, the 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 Plan(s) to TxDOT for its review. The Utility Adjustment Concept Plan(s) shall be submitted in both tabular and plan formats. The tabular format shall identify and numerically list each Utility conflict and each associated Utility. 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 each affected Utility Owner as necessary to obtain its respective concurrence with the Utility Adjustment Concept Plan(s) and with any subsequent revisions. The Utility Adjustment Concept Plan is a working document, and DB Contractor shall modify the plan as more project information becomes available. DB Contractor shall make the updated Utility Adjustment Concept Plans available to TxDOT upon request. Each approved Utility Assembly will identify approved Utility locations.

14.3.4 **Utility Adjustment Plans**

DB Contractor shall ensure that all Utility Adjustment Plans, whether furnished by DB Contractor or by the Utility Owner, are signed and sealed by a PE unless such requirement is waived by TxDOT at its sole discretion and as allowed by governmental regulations and industry practice.

14.3.4.1 **Plans Prepared by DB Contractor**

In the event that 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 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 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-submittal to TxDOT as necessary to obtain TxDOT approval.

14.3.4.2 **Plans Prepared by the Utility Owner**

For all Utility Adjustment Plans 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 14.2.1. Utility Owner-prepared Utility Adjustment Plans shall be attached to the applicable Utility Agreement, which DB Contractor shall include in the appropriate Utility Assembly for TxDOT 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 approval.

14.3.4.3 **Design Documents**

Each existing Utility and 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.

14.3.4.4 **Certain Requirements for Utilities**

Casing as specified in the 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 UAR 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 in writing the Barlow's Formula calculation(s) signed and sealed by a PE to be included in the Utility Assembly.

Underground communication facilities, including multiple conduits, that cross the roadway, including side roads, shall be encased in Schedule 80 polyvinyl chloride (PVC) or standard dimension ratio (SDR) 11 high density polyethylene (HDPE) pipe as long as it is one continuous piece.

Refer to Item 22 for design requirements for underground Utilities within the potential railroad corridor.

14.3.5 **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 review and comment and for TxDOT approval of any items for which this Item 14 requires TxDOT approval. Temporary Utility Adjustments that are installed within the Project ROW must also be included with a Utility Assembly for TxDOT prior approval, unless TxDOT waives such requirement or allows other approval methods concerning temporary Utility Adjustments. Each Utility Adjustment shall be addressed in a full Utility Assembly, unless it is appropriate for a UAAA 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 receipt of any required TxDOT approvals, shall be required before the start of Construction Work for the affected Utility Adjustment Work.

Provisions governing the procedure for and timing of Utility Assembly Submittals are in Section 14.6.

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

Each Utility Assembly shall include the following:

(a) A transmittal memo recommending approval and detailing any unique characteristics or information pertaining to the Utility Adjustment. The transmittal memo shall also describe any applicable amendment (UAAA) and explain why the amendment is necessary;

(b) A completed Utility Assembly Checklist;

(c) A TxDOT approved Utility Agreement;

(d) Utility Adjustment Plans which:

(i) Show the existing and proposed Utility(ies);

(ii) Show existing and proposed grades for all Utility crossings;

(iii) Show the existing and Project ROW lines along with the control of access denial line;

(iv) Show the roadway centerline or baseline stationing;

(v) Show an offset distance from the Project ROW line to all longitudinal Utilities within the Project ROW;

(vi) Show the existing Utility conflict;

(vii) Present sufficient information to enable TxDOT to verify compliance with the UAR requirements for each Utility located within the Project ROW, including highway design features; and

(viii) Are folded to 8.5-inch by 11-inch 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 Work), which shall, without limitation:

(i) Detail material type and quantity (material quantities detailed on the estimates must correlate to the materials shown on the plans described in (d) above), labor, and engineering;

(ii) Identify materials subject to the Build America, Buy America Act (BABA Act), Buy America Act provisions of 23 U.S.C. § 313 and 23 CFR 635.410;

(iii) List and identify the estimated amount of reimbursement to the Utility Owner, taking into consideration the Betterment credit calculation, salvage credit, and any applicable eligibility ratio; and

(iv) Not include the estimated cost(s) associated with DB Contractor's internal coordination costs and overheads.

(f) A proposed UJUA or Utility permit, in accordance with Section 14.2.6;

(g) TxDOT Form ROW-U-48 - Statement Covering Utility Construction Contract Work, if applicable;

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

(i) A ROW map showing the existing and proposed Utility(ies) identified on a plan view. This ROW map will only be required to be included with TxDOT's copy of the Utility Assembly, unless otherwise approved by TxDOT; and

(j) All Utility No Conflict Sign-Off forms utilizing TxDOT Forms DB-ROW-U-USO-UDC and DB-ROW-USO-UM.

14.3.5.1 **Utility Adjustment Agreement Amendment Utility Assemblies**

For each 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 Assembly shall contain all requirements listed in (a) through (j) as identified in this Section 14.3.5.

14.3.5.2 **Abbreviated Utility Assemblies**

DB Contractor shall prepare an Abbreviated Utility Assembly for each Utility proposed to remain in its original location within the Project ROW that is not required to be addressed in a PUAA or UAAA, unless a Utility Adjustment is required pursuant to Section 14.1.1. If DB Contractor is reimbursing a Utility Owner any of its costs, a PUAA or UAAA is required. Each Abbreviated Utility Assembly shall contain:

(a) Transmittal memo recommending that the subject Utility(ies) remain in place;

(b) Set of plans detailing UAR compliance;

(c) Completed Utility Assembly Checklist;

(d) Certification from the Utility Owner approving leaving the Utility(ies) in place

(e) UJUA(s) or Utility permit, as required by Section 14.2.6; and

(f) Affidavit(s) of Property Interest, if applicable.

If a Utility proposed to remain in its original location is wholly within existing TxDOT ROW where there is no additional ROW acquisition and has an existing permit for that Utility for the original location in the RULIS, then the UJUA or Utility permit is not required.

DB Contractor shall include with each Abbreviated Utility Assembly submitted to TxDOT a certification that (a) the Abbreviated Utility Assembly does not include any material changes to the scope of the work for the Utility Adjustment from the scope of the work agreed to by the Utility Owner in any relevant Pre-Proposal Utility Commitment(s), or (b) the Abbreviated Utility Assembly includes one or more material changes to the scope of the work for the Utility Adjustment from the scope of the work agreed to by the Utility Owner in the relevant Pre-Proposal Utility Commitment, along with a description of each material change in the scope of the work and the reason for such material change(s).

14.3.6 **Utility Assembly Submittals**

TxDOT will review the Utility Assembly for compliance with the requirements of Section 14.6, and within 10 Business Days will return the Utility Assembly to DB Contractor with the appropriate notations pursuant to Section 5.2.1 of the General Conditions 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 approval, as applicable. Upon (a) TxDOT approval of any Utility Assembly components for which TxDOT 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 Item 14 requires TxDOT signature.

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 the Professional Services Quality Management Plan (PSQMP); and
- Resolve all comments made by the quality control/quality assurance entity, coordinating with the Utility Owner as appropriate.

DB Contractor shall submit to TxDOT one electronic copy of each Utility Assembly, as appropriate. The Utility Assembly shall be color-coded and shall include the Project ROW map with the existing and proposed Utility(ies) identified on a plan view. These Submittals shall be made through TxDOT's electronic content management system (ECMS) for the Project, unless otherwise approved by TxDOT, in PDF text-searchable format with bookmarks for each Utility Assembly. These Submittals shall be for TxDOT review and comment, except for any components of the Utility Assembly for which TxDOT approval is required by Section 14.6.

DB Contractor shall submit to TxDOT a Utility Assembly Submittal log with each Submittal or group of Submittals. The Utility Assembly Submittal log shall establish the review priority.

14.4 Construction Requirements

14.4.1 General Construction Criteria

All Construction Work performed by DB Contractor for Utility Adjustments shall conform to the requirements listed below. DB Contractor shall conduct all Construction Work necessary to meet the requirements for this Item 14 and the TxDOT Standard Specifications.

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:

- All criteria identified in Section 14.3.2;
- The Utility Adjustment Plans included in the Utility Agreement approved by TxDOT (other than UAFM complying with Section 14.4.6);
- All Project safety and environmental requirements;
- All pre-construction meeting requirements;
- Document compliance with 23 CFR Part 645 Subpart A, 23 CFR § 635.410 (Buy America), in accordance with Section 14.1;
- The Project Schedule; and
- Utility(ies) standards provided in the Utility Agreement.

Subject to approval by TxDOT, alternate material specifications and construction requirements may be proposed by DB Contractor provided the objectives of the Project are met and equivalent requirements to this Item 14 are provided.

DB Contractor shall also conduct all Work for this Item 14 in accordance with the requirements of the following TxDOT special specifications:

14.4.1.1 Reinstatement of Utility Cuts

After installation of drainage structures, storm sewers or any other public or private Utility by open cut across existing pavements, the pavement shall be restored and maintained to a normal satisfactory riding surface equal to or better than the existing riding surface. For open cuts under existing and proposed pavement, DB Contractor shall use fill material as specified in Item 400 of the TxDOT Standard Specifications. For cuts in all other areas of TxDOT owned ROW, DB Contractor shall use fill material as specified in Item 132 of the TxDOT Standard Specifications. DB Contractor shall submit a trenching and backfill plan as part of the Utility Adjustment Concept Plans.

14.4.2 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 its contractors) to verify compliance with the applicable requirements described in Section 14.4.1. DB Contractor is responsible for quality control and quality assurance for all Utility Adjustment Work performed by the Utility Owners and their contractors.

14.4.3 Scheduling Utility Adjustment Work

The commencement of Utility investigations and negotiation of Utility Agreements with Utility Owners are subject to Section 8.1.1 of the General Conditions.

Refer to Section 8.1.2 of the General Conditions for the conditions to commence construction 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 Work until all of the following conditions are satisfied:

- 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);
- A pre-construction meeting, in accordance with Section 14.2.2.2, shall be required after execution of the Utility Agreement and prior to commencement of any construction activities, unless otherwise approved by TxDOT;
- Availability and access to affected Replacement Utility Property Interests have been obtained by the Utility Owner (and provided to DB Contractor, if applicable);
- If any part of the Utility Adjustment construction work 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;
- If applicable, the Alternate Procedure List has been approved by TxDOT, as authorized by the 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;
- The review and comment process has been completed and required approvals have been obtained for the Utility Assembly covering the Utility Adjustment;
- 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; and
- All other conditions to that Utility Adjustment Work stated in the Contract Documents have been satisfied.

14.4.4 **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 restored to existing condition.

DB Contractor shall coordinate with and obtain approval from each Utility Owner in connection with providing safe passage over and under all existing Utilities. DB Contractor shall comply with all Utility Owner standards of protection, encroachment agreements, and requirements established by the Utility Owner needed for Construction Work in the areas of the Utility Owner's existing Utilities. The standards of protection, encroachment agreements, and requirements include, but are not limited to, obtaining agreements with pipeline owners for crossing utility facilities with heavy equipment, utilizing steel plates as pipeline protection from drilling, obtaining agreements with overhead utilities for crossing under their facilities, and any other protective measures to accommodate Utility Owner requirements for Protection in Place of Utility Owner facilities during Construction Work.

14.4.5 **Emergency Procedures**

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

14.4.6 **Utility Adjustment Field Modification (UAFM)**

DB Contractor shall establish a procedure in the Utility Management Plan to address a UAFM as 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 provide, at minimum, the following:

- The Utility Owner's review and approval of a UAFM proposed by DB Contractor, or DB Contractor's review and approval of a UAFM proposed by the Utility Owner. DB Contractor shall obtain all required approvals of the UAFM prior to commencement of construction. All revisions shall be signed and sealed by a PE, unless otherwise permitted by TxDOT in its sole discretion;
- Transmittal of UAFMs to TxDOT and the appropriate Utility Owner's and DB Contractor's construction field personnel; and

- Inclusion of any UAFMs in the Record Drawings for the Project.

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

14.4.7 **Switch Over to New Facilities**

After a newly adjusted Utility has been accepted by the Utility Owner and is 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 of the Utility being replaced.

14.4.8 **Utility Record Drawings**

DB Contractor shall provide Utility Record Drawings to each Utility Owner for its adjusted Utilities where the Utility Adjustment Work was performed by DB Contractor. For the purpose of this Item 14, Utility Record Drawings means construction drawings and related documentation revised to show approved changes made during the Construction Work, usually based on marked-up Released for Construction Documents furnished by DB Contractor.

DB Contractor shall provide Utility 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 except for those Utility Adjustments handled under an Advance Utility Relocation Agreement. For each Utility Adjustment covered by a Utility Assembly, DB Contractor shall provide individual Utility Record Drawings which show the plan and profile location of all adjusted, remain-in-place, and abandoned Utilities as constructed, and shall comply with Item 4 of the General Conditions. DB Contractor shall provide the individual Utility Record Drawings for each Utility Adjustment to TxDOT prior to Substantial Completion and in accordance with this Section 14.4.8.

Prior to Substantial Completion, DB Contractor shall provide to TxDOT a color-coded composite Utility plan set in plan view of all final Utility locations (both owner-managed and DB Contractor-managed) that include Utilities that remained in place, were adjusted in place or relocated. The color-coded composite Utility plan set in plan view must detail the Utility horizontal alignment with highway stationing, ROW lines, roadway features, Utility Owners name, Utility type, size and Utility Assembly Number. This color-coded composite Utility plan set in plan view is separate from the individual Utility Record Drawing plans required for each Utility Assembly and shall be signed and sealed by a PE.

14.4.9 **Maintenance of Utility Service and Access**

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 during the Construction Work and after completion of the Project. All access and access locations to the Utility(ies) must be agreed to by the Utility Owner and approved by TxDOT.

14.4.10 **Traffic Control**

DB Contractor shall be responsible for the Traffic Management Plan (TMP). The TMP shall cover all traffic control made necessary for Utility Adjustment Work, whether performed by DB Contractor or by the Utility Owner. Traffic control for Utility 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 *Texas Manual on Uniform Traffic Control Devices* (TMUTCD) (2025 Edition, as adopted) and of Item 26.

14.5 **Final Closeout Procedures**

The following procedures shall govern submittal, review and final closeout of each Utility Assembly:

DB Contractor shall provide closeout information and documentation within 90 days after each Utility has been relocated, fully reimbursed and accepted by the Utility Owner. The closeout information shall contain the following:

- Utility Agreement form(s), if applicable (PUAA, UAAA, et al);
- Utility Record Drawings (“as-built”) plans;

- UJUA or Utility permit approval;
- TxDOT Form ROW-N-30 – Quitclaim Deed, if applicable;
- Estimated and actual cost comparison of the Utility Adjustment showing any cost variance along with an explanation of the variance. The cost comparison shall be in a format compatible with and allowing direct comparison to the estimate contained in each applicable Utility Assembly;
- Summary of the Utility Adjustment; and
- TxDOT Form 1818 – Material Statement and applicable attachments (e.g. mill test reports).

DB Contractor shall address conditions of approval, if any, for each Utility Assembly prior to completing the final closeout procedure.

14.6 **Utility Assembly Submittals**

DB Contractor shall time all Submittals described in this Section 14.6 to meet the Project Schedule, taking into account the maximum number of Submittals set forth in this Section 14.6 or, if not stated therein, then as stated in Section 5.2.1 of the General Conditions. All Submittals shall conform to the standards required in the PMP. Any deliverable submitted by DB Contractor to TxDOT for review after 11:59 a.m. will be considered as submitted on the next business day.

14.6.1 **Maximum Number of Submittals**

DB Contractor shall coordinate all Submittals required pursuant to this Section 14.6. In each 10 Business Day period, DB Contractor shall not submit more than:

- Eight Utility Assemblies (excluding Abbreviated Utility Assemblies); and
- Eight of any other Submittals required under this Item 14 and requiring TxDOT review and approval.

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 10 Business Day period, as necessary.

All Submittals described in this Item 14 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 14-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, and Adobe Acrobat files, unless otherwise indicated.

Table 14-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Form 1818 – Material Statement, if applicable	Prior to the installation of materials	For information	14.1
Project Utility Adjustment Agreement(s)	After NTP1, based on DB Contractor schedule	Approval	14.1.4.1
Utility Adjustment Agreement Amendment(s)	After NTP1, based on DB Contractor schedule	Approval	14.1.4.2
Any mass mailings to Utility Owners	21 days in advance of distribution	Review and comment	14.2.2.1
Meeting agendas	At least three Business Days in advance of each scheduled meeting	For information	14.2.2.2
Draft meeting minutes	Prior to final distribution to the meeting attendees and appropriate Community Groups	Review and comment	14.2.2.2
Final meeting minutes	Within five Business Days after the conclusion of each meeting	Review and comment	14.2.2.2

Table 14-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Names, contact details, etc. for the Utility coordination team	Prior to Notice to Proceed 2 (NTP2), in the applicable chapter of the PMP	Approval	14.2.3
Affidavit of Property Interest	In the applicable Utility Assembly	Approval	14.2.4.1
Draft Quitclaim Deeds	With the submission of Utility Assembly	Approval	14.2.4.4
Letter of Confirmation (relinquishment of interest once Adjustment completed) from Utility Owner and/or Utility Owner's authorized representative, if applicable	In the applicable Utility Assembly, including copy of unsigned Approved Draft Quitclaim Deed	Approval	14.2.4.4
Executed Quitclaim Deeds	1. Prior to recording deed in local real property records, and 2. After the completion of Utility Adjustment, or unless otherwise directed by TxDOT in writing	For information	14.2.4.4
Notice of Required Accommodation, if applicable	Promptly following NTP1	For Information	14.2.5
Utility Joint Use Acknowledgments	In the applicable Utility Assembly	Approval	14.2.7
Utility permit	Prior to DB Contractor's inclusion as part of a Utility Assembly	Approval	14.2.7
Utility Management Plan	In accordance with requirements of Section 4.2.8 of the General Conditions	Approval	14.2.8
Utility Tracking Report	Monthly	For information	14.2.9
Alternate Procedure List	Prior to commencement of any demolition, removal or other construction work for any Utility Adjustment	Approval	14.2.10
DB Contractor Utility Strip Map	(i) After NTP2 or (ii) before the first assembly package submission	Review and comment	14.3.1
Utility Adjustment Concept Plan(s)	(i) After NTP2 or (ii) before the first assembly package submission (this plan is a working document and shall be continuously updated and modified as more Project information becomes available)	Review and, if applicable, comment	14.3.3
Utility Adjustment Plans	In the applicable Utility Assembly	Approval	14.3.4.1, 14.3.4.2
Utility Assemblies	Prior to start of the affected Utility Adjustment Work	Approval	14.3.5, 14.3.6

Table 14-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Temporary Adjustments	In the applicable Utility Assembly, if applicable, unless TxDOT waives/allows other method	Approval	14.3.5
Abbreviated Utility Assemblies	As necessary	Approval	14.3.5.2
Utility Assembly Submittal log	With each Submittal or group of Submittals	For information	14.3.6
Utility Adjustment Work emergency procedures and contact information	In the applicable chapter of the PMP and PSQMP, and prior to any construction activities	Approval	14.4.5
Set of Utility Record Drawings and color-coded composite Utility plan set in plan view of all final Utility locations	Prior to Substantial Completion	For information	14.4.8
Individual Record Drawing plans	In the applicable Utility Assembly, and at Project closeout	Approval	14.4.8
Closeout information and documentation	After each Utility has been relocated, fully reimbursed and accepted by the Utility Owner	For information	14.5

Item 15
Right of Way (ROW)

15.1 **General Requirements**

Design-Build (DB) Contractor's obligations in respect of the acquisition of Project ROW are set forth in Section 4.4.1 of the General Conditions and as amended by the Design-Build Agreement (DBA).

This Item 15 sets forth the ROW activities assigned to DB Contractor, including pre-acquisition and acquisition activities, and designates which ROW activities TxDOT will conduct. This Section 15.1 also sets forth the requirements applicable to the Work assigned to DB Contractor related to the acquisition of Project ROW.

15.1.1 **Schematic ROW**

TxDOT will prepare ROW maps for the Schematic ROW and acquire all Schematic ROW, as shown on the Schematic Design. TxDOT will make all Schematic ROW parcels, through acquisition or Possession and Use Agreement (PUA), available to DB Contractor for construction by NTP1 with the exception of the parcels identified in Table 15-1. Subject to the provisions of Section 6.5 of the DBA, TxDOT will make those parcels available for construction by the applicable Available for Construction Dates set forth in Table 15-1.

Table 15-1: ROW Availability Dates

Parcel No.	Available for Construction Date
120, 345E	NTP1 + 120 days
110, 111, 306, 309	NTP1 + 180 days
102, 138, 139, 338E	NTP1 + 270 days

TxDOT will provide regular updates to DB Contractor on the acquisition status of each parcel identified in Table 15-1.

15.1.2 **Additional Properties**

DB Contractor shall provide all services necessary to acquire title to Additional Properties, if any, in form and substance acceptable to TxDOT, in the name of the State; relocate displacees; and clear/demolish improvements from Additional Properties as more fully described in the following sub-sections.

Except as otherwise set forth in the DBA, DB Contractor's ROW staff and/or Subcontractors will function as independent contractors while acquiring Additional Properties, and not as an agent, representative, or employee of TxDOT.

DB Contractor shall provide TxDOT copies of all property agreements it obtains to facilitate design, construction or maintenance in relation to the Project. No documents shall be used for the purpose of Construction Work other than a PUA, a deed, or a notice of deposit of the Special Commissioners' award, unless otherwise approved by TxDOT.

15.2 **Administrative Requirements**

15.2.1 **Standards**

DB Contractor shall acquire all Additional Properties in accordance with State and Federal Law and the practices, guidelines, procedures, and methods contained in the following available at http://onlinemanuals.txdot.gov/manuals:

- All TxDOT ROW manuals;
- TxDOT *Access Management Manual*; and
- TxDOT *Survey Manual*.

Pursuant to the applicable Federal regulations, DB Contractor shall (i) acquire ROW parcels for the Project on behalf of the State, but without the direct participation of TxDOT, subject to TxDOT's rights of review,

approval, and audit; (ii) utilize the TxDOT ROW manuals; (iii) provide adequate access to all occupied properties; (iv) maintain Utility service to occupied properties until relocation is complete; and (v) not permit open burning within 1,000 feet of an occupied dwelling.

DB Contractor shall maintain a complete set of the TxDOT ROW manuals, TxDOT *Access Management Manual*, TxDOT *Survey Manual* and a current approved Project ROW map for public use. DB Contractor's complete set of ROW manuals shall be current as of the Effective Date. Any TxDOT forms referenced in this Item 15 are available at https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/row.html.

All real estate activities for Additional Properties must be completed and documented in compliance with all applicable Laws, including the Texas Property Code, Title IV Chapter 21, 49 CFR Part 24 and 23 CFR Part 710 governing the use of federal funds for acquisition, management and disposal of real property.

15.2.2 **Software Requirements**

DB Contractor shall utilize software that is fully compatible with the software in use by TxDOT, or fully transferable to TxDOT's systems, including TxDOT's electronic content management system (ECMS) (for uploading, review, document retrieval, etc.). DB Contractor must supply and maintain a parcel-by-parcel status information database that incorporates the fields and information required by TxDOT's web-based technology system: TxDOTConnect. DB Contractor must maintain and participate in any other required ROW tracking system required by the Contract Documents. The database shall be fully accessible to Persons authorized by TxDOT.

15.2.3 **ROW Acquisition Management Plan**

DB Contractor shall prepare a ROW Acquisition Management Plan in accordance with the requirements contained in Section 4.2.9 of the General Conditions.

15.2.4 **Schedule and Review Procedures**

The Project Schedule shall indicate the date to begin the acquisition of any Additional Properties and the anticipated completion date of acquisition activities for such parcels. DB Contractor shall advise TxDOT of all Additional Properties and temporary rights or interests in real property to be acquired by DB Contractor. For Schematic ROW parcels, DB Contractor shall indicate the Available for Construction Dates no earlier than the dates as shown in Table 15-1. In developing the Project Schedule, DB Contractor shall give priority to the acquisition of parcels that have significant impact on the Project Schedule or affect the Critical Path. The monthly Project Schedule Update required by Item 8 of the General Conditions shall provide updated projections for the acquisition date of each parcel.

In developing the Project Schedule, DB Contractor shall incorporate adequate time periods for TxDOT review and approval of Acquisition Packages and Condemnation Packages. TxDOT intends to review the completed Acquisition Packages and Condemnation Packages as expeditiously as possible; however, for the purposes of the Project Schedule, DB Contractor shall assume that the reviews performed by TxDOT will require 10 Business Days for Acquisition Packages and Condemnation Packages (collectively) that DB Contractor submits as final and complete in accordance with Section 15.3.6 and Section 15.4.4, up to a maximum of five Acquisition Packages and Condemnation Packages (collectively), unless otherwise directed by TxDOT. Any Submittals that would require TxDOT to review more than five Acquisition Packages and Condemnation Packages (collectively) within any given 10 Business Day period shall be considered excess, and TxDOT may defer its review of any such Acquisition Packages and/or Condemnation Packages to a subsequent 10 Business Day period (or periods as necessary). TxDOT will notify DB Contractor of its election to defer any excess Acquisition Packages and/or Condemnation Packages within 10 Business Days after receipt. The balance of Acquisition Packages and Condemnation Packages (collectively) in excess of five will be rolled over to the next 10 Business Day period and added to the Acquisition Package Submittals and Condemnation Package Submittals made by DB Contractor in that period. When DB Contractor submits more than five Acquisition Packages and Condemnation Packages (collectively) at any given time, DB Contractor shall indicate the priority of review.

DB Contractor shall also assume that the reviews performed by TxDOT will require 10 Business Days for the following Submittals: payment Submittals, relocation Submittals, administrative settlement Submittals, and closing Submittals, up to a maximum of five submissions for each type of Submittal noted above, in addition

to the Acquisition Packages and Condemnation Packages. With the combination of the above, DB Contractor shall not submit more than 25 total Submittals, in any given 10 Business Day period.

If TxDOT notifies DB Contractor that any ROW related Submittal has a deficiency, DB Contractor shall correct such deficiency and resubmit the package to TxDOT. Resubmissions shall be treated as a new ROW related Submittal, as applicable, for purposes of the limitations on the number of Submittals that may be submitted in a 10 Business Day period. A ROW related Submittal shall be deficient, as determined by TxDOT, if any of its components fails to meet any of the criteria established by this Item 15 for such component or contains any material errors or omissions. Schedule delays resulting from inadequate or incomplete submissions of ROW related Submittals shall be the responsibility of DB Contractor and will not be eligible for treatment as a Change Order.

TxDOT shall have the right to undertake additional review and extend the review time for an additional 10 Business Days on ROW related Submittals that contain or identify facts or issues of an unusual nature or which do not clearly fit within TxDOT Standards. In such event, TxDOT will notify DB Contractor in writing that the review period will be extended by an additional 10 Business Days before rendering a decision regarding approval of the package to DB Contractor.

DB Contractor may request TxDOT to perform a preliminary review of the survey, ROW map and appraisal before the complete Acquisition Package is submitted. TxDOT may elect in its sole discretion to review the preliminary submission of the survey, map and appraisal, and notify DB Contractor of any deficiencies after TxDOT's receipt and review of such preliminary submission. There will be no time limits associated with these preliminary reviews.

15.2.5 **DB Contractor's Project ROW Scope of Services**

DB Contractor shall complete all administrative activities and prepare all documentation sufficient for DB Contractor to acquire Additional Properties. DB Contractor shall obtain TxDOT's review and prior written approval of all applicable ROW maps and surveys, appraisals, legal descriptions, acquisition documentation, purchase price, requests to acquire Additional Properties, condemnation-related activities, and funding/closing procedures. For such Additional Properties acquisition documentation, TxDOT will (a) approve and return the Submittal, (b) provide review comments for incorporation by DB Contractor in accordance with Section 15.2.4, or (c) in the case of a ROW related Submittal that is deficient, notify DB Contractor of the deficiency(ies) to be corrected by DB Contractor prior to resubmission in accordance with Section 15.2.4. Except as otherwise authorized by applicable State and federal policy and regulations for early acquisition and approved by TxDOT, DB Contractor shall not proceed with acquisition of any Additional Properties until all required National Environmental Policy Act (NEPA) approvals for such parcels are issued, public involvement procedures have been completed, and ROW maps and legal descriptions for the applicable constructible segment as established by the logical termini of the Project have been prepared and approved by TxDOT. TxDOT will provide a separate release for each NEPA approved highway segment. Further, DB Contractor shall not commence any negotiations with the owner of a parcel, and TxDOT will not begin eminent domain procedures with respect to the parcel until after the Acquisition Package for that particular parcel is approved by TxDOT.

If DB Contractor and the landowner cannot negotiate an agreed-upon conveyance by deed acceptable to TxDOT, DB Contractor shall recommend for TxDOT to commence acquisition of the property through eminent domain procedures. TxDOT will initiate eminent domain procedures at its discretion.

Neither DB Contractor nor its Subcontractors shall begin any Construction Work on any parcel of real estate unless and until all requirements under the Uniform Act have been met (including relocation assistance in accordance with Section 15.4.2) and (i) property rights for the parcel have been conveyed and recorded in favor of TxDOT, (ii) possession has been obtained through eminent domain or any other method provided for by the standards set forth in Section 15.2.1, or (iii) a PUA has been executed and delivered by all necessary parties in accordance with Section 15.4.1.

15.2.6 **Acquisition Process Summary**

DB Contractor's major activities with respect to the acquisition of Additional Properties include:

- Additional Properties surveying and mapping;
- Additional Properties and Utility cost estimates and updates;

- Title services;
- Appraisal services;
- Appraisal review;
- Negotiations;
- Closing services;
- Relocation assistance;
- Condemnation support services;
- Clearance and demolition of Additional Properties;
- Environmental due diligence;
- Documentation and document control;
- Progress reports;
- Additional Properties administration and management;
- Additional Properties quality management;
- Letter from DB Contractor's design engineer certifying that the required Project ROW acquisition is necessary and that any proposed alternatives are not feasible or are cost prohibitive; and
- Obtaining Right of Entry (ROE) Agreements, as necessary.

15.2.7 **ROW Personnel Qualifications**

DB Contractor's Right of Way Acquisition Manager (ROW AM) shall have at least five years' experience managing the acquisition of transportation ROW projects for a condemning authority, be licensed as a real estate salesman or broker pursuant to the *Texas Real Estate License Act* or rules established by the Texas Real Estate Commission (TREC), be familiar with appraisal and appraisal report review pursuant to the Uniform Standard of Professional Appraisal Practices (USPAP), and be familiar with the Uniform Act and applicable Laws of the State.

Quality Control Specialist(s) – DB Contractor shall designate a specific person(s) responsible for internal quality control. This individual shall review all DB Contractor deliverables associated with survey, title, appraisal, acquisition, relocation, and eminent domain prior to the deliverable being delivered to TxDOT for review.

Appraiser and Appraisal Reviewer – Each appraiser and appraisal reviewer shall be licensed and certified in the State and shall have a minimum of five years' experience in appraising real property for eminent domain purposes, including partial taking appraisal, partial taking appraisal review and expert witness testimony. Each individual must have been actively and continuously engaged for at least three years immediately preceding their selection for this Project in appraisal work primarily in the county(ies) where the Project is located, and as approved and pre-certified by TxDOT. The appraisers and the appraisal reviewers shall have separate and distinct duties, and appraisers must be employed by different firms from the appraisal reviewers. Each appraiser shall be required to submit three samples of previous appraisal work prepared for eminent domain purposes. All appraisers preparing and signing appraisals must be approved and pre-certified by TxDOT before performing any appraisals on the Project. If required by TxDOT, the appraiser will be required to demonstrate his or her skills at expert witness testimony.

Land Planner – Each land planner shall have a minimum of five years' experience in land planning including experience with expert witness testimony in eminent domain proceedings. Each individual must have been actively and continuously engaged for at least three years immediately preceding selection for this Project in land planning work primarily in the county(ies) where the Project is located, or as approved and pre-certified by TxDOT. DB Contractor shall provide a minimum of two land planners to assist appraisers and complete land plans.

Relocation Agent – Each relocation agent shall have a minimum of three years' experience in relocation assistance for ROW projects pursuant to the Uniform Act. A relocation agent's responsibilities shall include the following: determination of eligibility of all displacees, contacting all displacees and informing them of their benefits, maintaining a file of all documentation concerning the relocation of the displacees, and extending all relocation assistance advisory services.

Negotiator – Each ROW negotiator shall be licensed as either a Real Estate Sales Agent or broker pursuant to the *Texas Real Estate License Act* or rules established by the TREC, and shall be familiar with appraisal and appraisal report review pursuant to the USPAP. The negotiator shall have a minimum of three years' experience in ROW negotiations. The ROW negotiator's responsibilities shall include the following: contact with property owners on the Project to discuss the acquisition of property needed for the Project, maintaining complete and accurate files of all transactions and contacts with the property owners and their representatives, and actively working toward a joint resolution to acquire the property with the property owner.

Eminent Domain Specialist – Each eminent domain specialist shall have a minimum of three years' experience with TxDOT procedures and policies as related to acquisition of property through the use of eminent domain. The eminent domain specialist must have demonstrated experience in all activities necessary with the acquisition of parcels through the TxDOT eminent domain process. This includes correctly completing all TxDOT forms including the TxDOT Form ROW-E-49 – Request for Eminent Domain Proceedings, filing the eminent domain forms, coordinating the hearing with all appropriate parties and ensuring that the Award of Special Commissioners is deposited into the registry of the court and all notices sent to the appropriate parties.

Real Estate Attorney – Each real estate attorney shall be licensed by the State and shall have at least five years' experience in title review and curative matters. The real estate attorney's responsibilities shall include coordinating and clearing all title issues, and compliance assistance with State and Federal acquisition requirements for the properties acquired for the Project.

Other ROW Personnel – Such personnel shall have at least three years' experience in title review and curative matters. ROW personnel's responsibilities shall include, but not be limited to the following: maintain complete and accurate files of all transactions and contacts with the property owners and/or their representatives, coordinate and clear all title issues and assist at closing for properties acquired for the Project.

15.2.8 DB Contractor Conflict of Interest

If at any time, to the best of DB Contractor's knowledge, any DB Contractor-Related Entity directly or indirectly (a) acquires or has previously acquired any interest in real property likely to be parcels of the Project ROW or the remainders of any such parcels, (b) has any financial interest in any real property likely to be a Project ROW parcel, or the remainder of any such parcel that is not a whole acquisition, or (c) purchases or has previously purchased from an existing mortgagee the mortgage instrument that secures an existing loan against real property likely to be a Project ROW parcel, or the remainder of any such parcel, DB Contractor shall promptly disclose the same to TxDOT. In the case of acquisitions, loans or mortgage purchases that occurred prior to the Effective Date, such disclosure shall be made within 10 days after the Effective Date.

In the event that DB Contractor, or any subsidiary, sister, or parent company of DB Contractor, acquires a real property interest, whether title or mortgage, in parcels of the Project ROW, the real property interest acquired or a release of mortgage as the case may be, shall be conveyed to the State without the necessity of eminent domain.

DB Contractor shall not acquire or permit the acquisition by DB Contractor or any DB Contractor-Related Entity of any real property interest in a Project ROW parcel, whether in fee title or mortgage, for the purpose of avoiding compliance with the Laws, practices, guidelines, procedures and methods described in Section 15.2.1.

15.2.9 Meetings

DB Contractor shall coordinate, facilitate and attend meetings as requested by TxDOT. At such meetings DB Contractor shall provide exhibits, take minutes, and distribute the minutes to all attendees for review and comment. Minutes will not be finalized until all attendees have been given reasonable opportunity to comment on the content. DB Contractor shall provide meeting minutes to TxDOT within five Business Days of the applicable meeting. TxDOT will respond within five Business Days or at the next occurrence of the meeting. DB Contractor shall provide proposed agendas three Business Days prior to each meeting.

15.2.10 **Documentation and Reporting**

DB Contractor shall provide TxDOT with all specific reports and supporting documentation for review and approval during the acquisition process, including inputting and updating parcel status in TxDOTConnect.

All correspondence with TxDOT and property owners relating to acquisition of real property shall include a heading with the following information (at a minimum):

- County;
- Control section job (CSJ) number;
- ROW CSJ (RCSJ) number;
- Federal Project Number (if applicable);
- Highway designation;
- Project limits;
- Parcel number; and
- Name of record owner(s).

DB Contractor shall utilize TxDOT's approved naming convention for all electronic files and reporting fields.

In administering and managing its Additional Properties acquisition activities, DB Contractor shall:

- Maintain parcel records on file of all aspects of the acquisition process in accordance with TxDOT requirements and applicable Law. Each parcel file shall include all documents required by the Contract Documents, FHWA, and TxDOT.
- Provide monthly summaries for the cost of Additional Properties acquisition and related relocation assistance, including amounts authorized and amounts paid on a parcel-by-parcel basis and cost forecasting on an overall Project basis as requested by TxDOT.
- Maintain and electronically transmit to TxDOT, in a format acceptable to TxDOT, monthly status reports, including appraisal, acquisition, eminent domain and relocation status of all parcels and activities related to Additional Properties, acquisition and disposition of Additional Properties, acquisition and disposition of temporary easements and other property interests, and provide weekly (unless directed otherwise) updates to TxDOT.
- Evaluate and report to TxDOT, ROW Subcontractor status and performance on a monthly basis or more frequently as requested.
- Prepare and submit electronically to TxDOT, on a bi-weekly basis, a spreadsheet that contains Additional Properties specific data required in order to complete the fields in TxDOTConnect or as directed by TxDOT.
- Input and update parcel status in TxDOTConnect for Additional Properties as required by TxDOT.

15.2.11 **Responsibilities of DB Contractor**

As set forth in Section 4.4 of the General Conditions and as more fully described in this Section 15.2.11, DB Contractor shall be responsible for all services and preparation of all documentation for all Additional Properties ROW acquisition, easement acquisition, permitting and, except as set forth in Section 15.1.1, related relocation assistance for the Project. The Work related to Additional Properties acquisition includes mapping, surveying, environmental assessment, testing and remediation, appraisal, appraisal review, negotiation, acquisition, relocation advisory assistance and determination of relocation benefits to be provided, procurement of title insurance, clearing of title, closing of acquisitions, and condemnation support including expert witnesses required by TxDOT or the Office of the Attorney General for all condemnation proceedings. DB Contractor shall also be responsible for all expert witness testimony, exhibits, transcripts, and photos associated with condemnation services and proceedings required by the Office of the Attorney General or TxDOT for Special Commissioner's hearings, jury trials and appeals, through Final Acceptance.

DB Contractor shall not contact the Office of the Attorney General or an Assistant Attorney General handling a specific parcel that has been filed for eminent domain action or is in the process of settlement unless authorized by TxDOT.

DB Contractor acknowledges that subject to Section 18.2, it has incorporated the value of saleable improvements into DB Contractor's Additional Properties acquisition costs, and DB Contractor shall concurrently, with conveyance of the real property interest to the State, and without the necessity of further documentation executed by the State, obtain the rights to said saleable improvements. TxDOT has received the benefit of the saleable value of the improvements by a reduced Price. DB Contractor shall not be entitled to a credit for any improvements retained by a property owner or TxDOT. Upon conveyance of the real property interest to the State, DB Contractor shall comply with all applicable Laws with respect to relocation assistance and demolition.

DB Contractor shall be responsible for the costs of acquisition and documentation for the acquisition of any temporary right or interest in real property not necessary for the Project, but that DB Contractor deems advisable to acquire for workspace, contractor lay-down areas, material storage areas, borrow sites, or any other convenience of DB Contractor. Except as otherwise authorized by Law for temporary areas necessary for construction of the Project, TxDOT shall not be obligated to exercise its power of eminent domain in connection with DB Contractor's acquisition of any such temporary right or interest, and TxDOT shall have no obligations or responsibilities with respect to the acquisition, maintenance or disposition of such temporary rights or interests.

DB Contractor shall be responsible for processing payment Submittals as described in Section 15.4.6 and distributing all payments of: agreed purchase prices or court awards and judgments; Special Commissioner's awards; relocation assistance payments; all legal, administrative, and incidental expenses of, or related to, Additional Properties for which TxDOT is responsible for such costs.

DB Contractor is responsible for the payment of and all closing costs associated with the purchase of Additional Properties in accordance with the Uniform Act and TxDOT policies. TxDOT shall be responsible for the purchase price of title insurance for Project ROW in accordance with Section 4.4.2 of the General Conditions.

DB Contractor's cost for Additional Properties shall include all costs not paid by TxDOT.

DB Contractor shall be responsible for submitting to TxDOT the completed files in accordance with the closeout procedures as defined by TxDOT within 90 days of the completed Additional Properties parcel activity. DB Contractor shall provide the following documentation including, but not limited to:

- Appraisal report(s) (initial appraisal and all other issued appraisal reports, approved and not approved, with most recent appraisal report on top);
- Original conveyance document(s) (PUA(s), deed(s), easement(s), judgment(s), Award of Special Commissioners);
- Original title insurance policy or Attorney's Certificate;
- Memorandum of Agreement (MOA); and
- Negotiator's Certificate.

For relocation and general correspondence, the following shall be included:

- Relocation files (in chronological order);
- Offer letters;
- Negotiator reports and contact sheets;
- General correspondence; and
- All other documentation regarding the parcel.

15.2.12 **Responsibilities of TxDOT**

TxDOT will have the following responsibilities in connection with acquisition of Additional Properties:

- Except as otherwise set forth in this Item 15, provide final approval for all Acquisition Packages, Condemnation Packages, payment Submittals, relocation eligibility, relocation appeals, relocation Submittals, administrative settlement Submittals, closing Submittals, court settlement requests, and other approvals required by the Contract Documents, by the State, or by applicable Law subject to submission requirements and timelines in Section 15.2.4.

- After receiving a complete Condemnation Package from DB Contractor in accordance with Section 15.2.4 and Section 15.4.4, TxDOT will submit a minute order request on the agenda of the next scheduled Texas Transportation Commission (TTC) meeting; provided the completed Condemnation Package is submitted 10 Business Days before the ROW Division's required deadline for eminent domain minute order requests.
- After receiving a complete payment Submittal from DB Contractor in accordance with Section 15.2.4 and Section 15.4.6, TxDOT will submit a payment request to the Comptroller's Office. Upon receipt of the State warrant, TxDOT will notify DB Contractor that the State warrant is available for pickup within five Business Days.
- TxDOT will coordinate with the Office of the Attorney General to provide legal counsel to prepare and deliver to TxDOT the condemnation petition within 20 Business Days after the Attorney General's receipt of the condemnation packet, including Commission minute order approval. TxDOT will deliver the condemnation petition to DB Contractor within 10 Business Days after receipt of the condemnation petition from the Office of the Attorney General. If e-filing is not applicable, DB Contractor shall follow the standard procedures as described in the TxDOT ROW manuals.
- If applicable, TxDOT will provide all e-filed documents to DB Contractor as part of DB Contractor's support of the condemnation process and invoice DB Contractor for all e-filed charges. DB Contractor is responsible for reimbursing TxDOT all e-filed invoices. If e-filing is not applicable, DB Contractor shall follow the standard procedures as described in the TxDOT ROW manuals.
- TxDOT will provide all coordination services between DB Contractor and the Office of the Attorney General for prosecution of jury trials.
- TxDOT will provide a TxDOT ROW Project Manager to serve as the point of contact for all Project ROW issues as set forth in 23 CFR § 710.313(d)(7).
- TxDOT will review and approve the completed, final closeout files in accordance with the closeout procedures.

15.2.13 **TxDOT Project Monitor/Reviewer**

In addition to its review and approval authority as expressly set forth in other provisions of this Item 15, TxDOT may audit and monitor the ROW activities and services performed by DB Contractor. TxDOT may contract with independent entities to assist it in fulfilling the audit/monitoring function provided that the audit authority is not delegated. In addition to any Submittal components specifically required to be provided to TxDOT, DB Contractor shall provide information to TxDOT as requested to assist in its review and assessment of the progress, timeliness, adequacy and sufficiency of DB Contractor's Project ROW activities.

15.2.14 **Responsibilities of the Office of the Attorney General**

The Office of the Attorney General, with the assistance of DB Contractor and coordination of TxDOT, will be responsible for implementing all necessary legal actions for acquiring and obtaining possession of the Project ROW (and any necessary temporary construction easements approved by TxDOT for acquisition by condemnation) through the eminent domain process and eviction process. The responsibilities of the Office of the Attorney General will include:

- Represent TxDOT as the State's attorney of record;
- Preparation of complete petitions for condemnation with the appropriate court for a cause number to be assigned;
- If applicable, e-file condemnation documents and coordinate delivery of filed documents with TxDOT;
- Coordination with TxDOT on all legal matters concerning acquisition processes, including negotiated settlements;
- Analysis of recommended parcel values and/or appraisal issues;
- Additional legal advice and opinions as needed by TxDOT;
- Special Commissioners' hearings;
- Jury trials including determination of expert witnesses and all appeals; and

- Preparation, obtaining, and filing of all necessary legal documentation for eviction of property owners or tenants.

15.3 Pre-Acquisition Activities

15.3.1 Project ROW Surveying and Mapping

Subject to Section 15.1.1, DB Contractor shall perform all ROW surveying and mapping and shall prepare ROW documents in accordance with applicable TxDOT Standards, including the TxDOT ROW manuals and the TxDOT *Survey Manual*. DB Contractor shall refer to the current *Manual of Practice* by the Texas Society of Professional Surveyors and the *U.S. National Map Accuracy Standards*. DB Contractor shall refer to Item 17 for additional survey requirements.

Any ROW maps required for the acquisition of Additional Properties shall be prepared by DB Contractor and submitted to TxDOT for review and approval. The ROW map may be prepared in separate constructible segments established by the logical termini of the Project. TxDOT shall have 10 Business Days for review of each submitted ROW map, each containing up to a maximum of 25 parcels. Any Submittals that would require TxDOT to review more than 25 parcels within any given 10 Business Day period shall be considered excess, and TxDOT may defer its review of any such excess parcels to a subsequent 10 Business Day period (or periods as necessary).

DB Contractor shall assemble an Acquisition Survey Document to be included in the submission of the Acquisition Package. Unless otherwise specified by TxDOT, the Acquisition Survey Document shall include:

- A universal serial bus (USB) with PDF half size ROW maps, scale 1 inch = 100 feet (11 inches by 17 inches);
- Three half size ROW maps on paper, scale 1 inch = 100 feet (11 inches by 17 inches);
- One separate set of originals signed and sealed by a Registered Professional Land Surveyor (RPLS), legal descriptions and parcel sketch, traverse closure sheets and a copy of the parent tract deeds and subdivision plat if tract is a platted lot;
- A USB with MicroStation format (DGN) master file and associated reference files, PDF and Word or other text file of signed and sealed legal descriptions, closure reports, Excel point list, raw data file and/or field notes, and scanned PDF copies of the instruments of record or other pertinent documents;
- One full size ROW map on paper, Scale 1 inch = 50 feet (22 inches by 34 inches);
- One set of folders for each parcel, Parts 1 & 2, etc., would be considered one folder. With one copy (signed and sealed) legal description, sketch, closure sheet, parent tract deed and subdivision plat if tract is a platted lot (and bi-section, if applicable) secured inside on the right side;
- Three copies (signed and sealed) of each legal description and sketch;
- One separate set (copies) of legal description and sketch of each parcel for TxDOT records;
- One separate set (copies) of legal description and sketch of each parcel for title company; and
- One separate set of originals legal description and sketch signed and sealed by a RPLS to be kept in mapping files.

In addition to the foregoing, and subject to Section 15.1.1, DB Contractor shall prepare all ROW surveying and mapping needed for Additional Properties in accordance with the following:

- DB Contractor shall assemble an Acquisition Survey Document. The Acquisition Survey Document shall include the applicable supplemental or modified Project ROW map(s), a parcel (metes and bounds) description, and a parcel plat, with a closure report for each of these three items for each of the parcels to be acquired. The latter three items shall be on standard 8-1/2-inch by 11-inch bond paper. The applicable supplemental or modified Project ROW map sheets shall be on 22-inch by 34-inch paper. Each final submission to TxDOT shall include two sets of each document, unless otherwise directed. Each map sheet and document page shall have an “as of” date near the lower right-hand corner. The parcel plat and parcel description for a given parcel should show identical “as of” dates.

- The ROW map sheet and plat shall show all areas of denied access for the parcel according to the current TxDOT *Access Management Manual* and amendments.
- The point of beginning (POB) shall be located on the proposed Project ROW line and shown in all documents with its centerline (survey baseline) station and offset or as reviewed and approved by TxDOT.
- The point of commencing (POC), where applicable, shall be a well-defined monument or monument of record, and shall be tied to the POB by measured bearing and distance. The POC shall not be located on any proposed Project ROW line, or existing Project ROW line within the proposed Project ROW.
- The centerline (survey baseline) station and offset shall be shown on the supplemental and modified Project ROW map sheets for all significant points along the Project ROW line such as point of curvature (PC), point of tangency (PT), point of intersection (PI), point of compound curvature (PCC), and point of reverse curvature (PRC), for property line intersections (PLI) with the Project ROW line, and for any other monumentation points on the Project ROW line.
- The centerline (survey baseline) station and offset shall be shown in the parcel description and parcel plat at the beginning and ending, being the points with the lowest station and the highest station, of each parcel along the proposed Project ROW line.
- Supplemental and modified Project ROW map sheets shall include all curve data, with the station and coordinates of the PI, and the stations at each end (PC, PT, PRC, PCC), for every centerline (survey baseline) curve on that map sheet.
- Any existing ROW lines being incorporated into the proposed Project ROW, including intersecting ROW, shall be surveyed and monumented (if not previously monumented).
- All supplemental and modified Project ROW maps (and on the title sheet) and all parcel descriptions (at the end of the description) shall include a notation that identifies the State Plane Coordinate System with zone, North American Datum of 1983 (NAD83) (2011 adj), or as shown on the current ROW maps, and the Project grid-to-surface coordinate adjustment factor or refer to Project primary controls provided by TxDOT (refer to Section 17.3).
- An updated Project ROW map title sheet with signature blocks shall be produced for each portion of the Project. DB Contractor shall sign the Project ROW map.
- All Project ROW maps shall include a control sheet(s), to show the primary survey control points with their location relative to the Project.
- The parcel description and parcel plat documents shall all be referenced as parts of the exhibit recorded with the deed, so the pages shall be numbered accordingly. For example, if the parcel description is two pages, the parcel plat is one page, and then the first page of the parcel description is denoted “Page 1 of 3” and the parcel plat is denoted “Page 3 of 3.”
- Improvements within 100 feet outside of all proposed Project ROW shall be depicted on the applicable supplemental or modified Project ROW map sheets. All improvements shall be current as of the date of the on-the-ground property survey.
- All visible improvements (buildings and structures) within 50 feet outside of the proposed Project ROW line shall be located by an “on-the-ground” survey and documented on the applicable supplemental or modified Project ROW map sheets and the parcel plats by measured offset distance from the proposed Project ROW line. Clearly indicate which distances are surveyed on-the-ground.
- Calculated points shall be shown by a symbol on the drawing, with their relationship to the found reference points.
- All property, city, county, abstract, section and survey lines shall be indicated appropriately. A map legend shall clearly define the line styles and symbols used.
- DB Contractor shall cause the surveyor to set ROW monuments in accordance with Section 17.4.4.
- For any required revisions, DB Contractor shall resubmit to TxDOT all documents pertaining to the parcel to reflect the most recent revision date and shall add a notation on the appropriate documents to state briefly the reason for the revision.

- Documents shall contain deed references (survey name, abstract number, volume and page or document number, grantee, and area) for all existing public ROW encountered within the Project limits. If there is no recorded information found, and all research has been exhausted, a note shall state "Based upon our research, there appears to be no recorded vesting deed for the public ROW as shown hereon."
- The documents produced by the surveyor are the property of TxDOT, and release of any document shall be subject to TxDOT's prior written approval.
- DB Contractor shall cause the surveyor to include the denial of access line on the applicable supplemental or modified Project ROW map sheets and on the parcel plats, as required for controlled access facilities. DB Contractor also shall cause the surveyor to describe the area of denied access in the parcel description and monument on the ground with a 5/8-inch iron rod with a TxDOT aluminum cap stamped "TxDOT ADL" the limits of the denial of access.
- The Project ROW map and each parcel plat shall include a parcel information table containing the areas, expressed in square feet, of the following: 1) the parent ownership as stated in all adjoining record vesting deeds or converted from the stated record acreage in those vesting deeds; 2) the parcel to be acquired as shown on the closure report for that parcel; and 3) the remainder tract (item 1 *minus* item 2). If the parcel to be acquired consists of multiple parts, the Project ROW map shall show the net remainder. The parcel information table shall also contain the areas, expressed in acres, of the parent tract, the parcel to be acquired, and the remainder. This acreage (except stated record) shall be converted from the square footage as contained in the table. A note shall be included on the Project ROW map and on each parcel plat stating: "The acreage calculated and shown hereon is converted from the square footage shown hereon and is for informational purposes only." Parcels with area less than one acre will not require acreage units to also be shown. All parcels, including parcels acquired by TxDOT or a Governmental Entity, shall be included on the Project ROW map.
- Within the proposed Project ROW, all property owned by a city, county, or other local public agency in fee or easement that does not have a vesting deed shall be identified by a parcel number and included on the Project ROW map. DB Contractor shall cause the surveyor to prepare a parcel description and parcel plat for use as an exhibit in the Project ROW acquisition (property transfer) documents.
- DB Contractor shall cause an independent RPLS to review the Acquisition Survey Document for consistency as to the information delineated thereon and for compliance with all applicable Design-Build Specifications and survey documents. The boundary location and the survey methods remain the responsibility of DB Contractor and are not part of this review process. TxDOT will have no obligation to accept the Acquisition Survey Document as complete until the reviewing RPLS has signed and sealed the compliance certificate (compliance certificate form to be provided by TxDOT).
- Parcel numbering shall follow the TxDOT ROW manuals. Parcels are to be numbered based upon the parent tract. DB Contractor shall revise parcel numbering due to subsequent transactions as in the following example: From a 50-acre parent tract, with a proposed Project ROW acquisition parcel identified as Parcel 14, a five-acre parent tract is sold which will also require Project ROW acquisition. The result is, Parcel 14 is "Not Used", and the two new Project ROW acquisition parcels are identified as Parcel 14A and 14B. If the property containing Parcel 14B sells a portion, then 14B is "Not Used" and the new Project ROW acquisition parcels are identified as Parcel 14C and 14D, etc. DB Contractor shall not use the letter "E" to avoid confusion with easement designations. Parcel numbering shall be sensitive to the appraisal of the required parcels.
- Complicated portions of a Project ROW acquisition survey can cause the Project ROW Map to be very difficult to read. TxDOT's preferred solution is to create an additional Project ROW map sheet or sheets for details, curve data, general notes, etc. The primary page would still retain the whole property inset, record ownership data, and most of the usual information. The additional sheet(s) should be clearly referenced and be numbered as the next sequential page(s). Pages numbered with a letter added (for example: 6A, 6B) are for revisions and corrections. DB Contractor shall use the preferred solution unless TxDOT approves an alternate method.

- An ownership sheet or sheets, containing an index to the information for all the parcels, shall be included and located near the beginning of the Project ROW map, after the title sheet and control sheet. The ownership sheet index shall include the parcel numbers, the names of the property owners, the vesting deed recording information, the record area of the parent tract, the area of parcel(s) to be acquired, the area of the remainder(s) left and right, the beginning and ending stations of the parcel along the Project ROW line, and the sheet number in the Project ROW map where the parcel is located.
- DB Contractor, at the request of the property owner or TxDOT, shall re-stake the proposed ROW with a flagged wooden stake.

15.3.1.1 **Design Certification**

DB Contractor shall provide sufficiency of design to determine the Project ROW need and produce ROW maps that delineate the proposed ROW and potential impacts to the remaining existing ROW. DB Contractor shall provide a design certification of ROW for each parcel which confirms that the proposed Project ROW acquisition is adequate and necessary to construct and perform operations and maintenance on the Project and that other ROW acquisition alternatives are not feasible and/or are cost prohibitive.

15.3.1.2 **Geodatabase ROW Mapping Files**

DB Contractor shall submit for review and approval GIS files of the Acquisition Survey Documents in accordance with the requirements detailed in Chapter 4 Section 8 of the TxDOT *ROW Preliminary Procedures for the Authority to Proceed Manual*. DB Contractor shall submit GIS files concurrent with any Acquisition Survey Document for Additional Properties and prior to submitting the Acquisition Package for the applicable Additional Properties parcels. DB Contractor shall provide updates as needed.

15.3.2 **Additional Survey Reporting Requirements**

If Additional Properties are needed for the Project, in addition to the applicable supplemental or modified Project ROW maps, parcel description, and parcel plats, DB Contractor shall submit the following reports and electronic files:

- Survey monthly parcel report: a report, prior to the first of the month, listing all parcel deletions, parcel additions, and parcel splits;
- Survey monthly progress report: a report, prior to the first of the month, of all survey activity that occurred during the previous month, including a two-week look ahead of anticipated survey activity; and
- Computer aided drafting and design (CADD) files: digital CADD files in MicroStation format which include property lines and/or existing ROW lines, as surveyed, proposed ROW lines, parcel numbers, resource files, level assignments, and plot files. DB Contractor shall submit CADD files prior to submitting the Acquisition Package and provide updates as needed.

15.3.3 **Title Services**

With respect to title services, DB Contractor shall comply with the applicable standards identified in Section 15.2.1, including the following requirements:

- Select and contract with one or more title companies approved by TxDOT and submit with the Acquisition Package for each parcel to TxDOT a five year sales history, a preliminary title commitment or preliminary title report, and, if necessary or appropriate, copies of all underlying documents and a plot of all easements, including Existing Utility Property Interests, referenced therein for each parcel (including fee acquisitions, slope easements, other drainage and roadway ROW or easements and abandonment of Utility easements) to be acquired by TxDOT for the Project. Each title report shall be dated not more than 90 days prior to the date of submittal to TxDOT of the Acquisition Package for such parcel. DB Contractor shall, at its own cost, review each title report to ensure that it complies with the format required by the Contract Documents. DB Contractor shall, at its own cost, retain the services of a real estate attorney, licensed and located in the State, to be available for title support and acquisition assistance. All title reports must be in the following required format: clearly indicate which exclusions and exceptions shall be deleted upon acquisition of the subject parcel, and clearly indicate any required deliverables to the title company to clear

identified exclusions and exceptions. Title reports shall be in accordance with Good Industry Practice. DB Contractor shall notify the title company, by letter, which exceptions should be removed, including easements that (a) are appurtenant to and/or of benefit to the parcel but are not included in the parcel to be acquired, and (b) are a burden on the parcel and not acceptable.

- Review the preliminary title commitment or report to ensure that all current owners of record title are contacted and that negotiations or condemnation actions are conducted with all appropriate parties.
- Work with the current owners of record title to each parcel or interest in a parcel or their designee and all other appropriate parties to clear any title exceptions or exclusions not acceptable to TxDOT.
- Secure an owner's policy of title insurance in the amount of the total acquisition cost, to include the cost of the property, improvements and damages to the remainder of the property, for each parcel from a title company acceptable to TxDOT for each parcel acquired, whether by deed or eminent domain judgment, insuring title as required by TxDOT. All Additional Properties shall be acquired, and TxDOT's title in the Additional Properties shall be insured, in fee simple absolute or easement interest as appropriate, free and clear of any and all liens and encumbrances. Title policies must be in a form and substance approved by TxDOT. Title to the Additional Properties shall be insured in the name of the "State of Texas by and through the Texas Transportation Commission."

15.3.4 Introduction to Property Owners

For any Additional Properties to be acquired, DB Contractor shall provide TxDOT the current property owner list, with addresses, and shall pay for the distribution of initial contact letters of introduction to both property owners and displacees. The letters shall clearly describe the Project, TxDOT's need for the owner's property, and shall include the name and telephone number of a DB Contractor representative. TxDOT ROW Project Manager or designee will sign the letters on TxDOT letterhead. The forms for these letters will be approved by TxDOT prior to use. DB Contractor shall provide translation for property owners or displacees unable to read or understand the notices.

DB Contractor shall furnish a copy of the State of Texas Landowner's Bill of Rights for each property owner for inclusion with the letter of introduction. The copy of the State of Texas Landowner's Bill of Rights shall be the latest version as shown on the Office of Attorney General website: https://www.texasattorneygeneral.gov/sites/default/files/files/divisions/general-oag/landowners-bill-of-rights-2022.pdf.

15.3.5 Appraisals

15.3.5.1 Appraisal Services

DB Contractor shall submit to TxDOT market value appraisals prepared by appraisers meeting the minimum qualifications established herein for any Additional Properties to be acquired for the Project. DB Contractor shall ensure that all appraisals are prepared in conformance with applicable Law (including the Uniform Act and USPAP), and in accordance with professional appraisal methods and applicable TxDOT Standards for all parcels to be acquired by TxDOT. DB Contractor shall:

- Select appraisers from TxDOT's list of pre-certified fee appraisers and meeting the requirements specified in Section 15.2.7. TxDOT shall have final approval of the selection of each appraiser and appraisal reviewers submitted by DB Contractor. DB Contractor must identify and receive written TxDOT approval of the appraiser who will be responsible for the appraisal work product and who will be signing the reports.
- Establish personal pre-appraisal contact with each owner of record title and each occupant, and document all contacts utilizing forms provided by TxDOT.
- If necessary, make a diligent effort to secure a written agreement between the record title owner and DB Contractor granting TxDOT, DB Contractor or assignees permission to enter the applicable parcel to be acquired (a "ROE Agreement"). DB Contractor may, at its discretion and expense, offer to pay reasonable compensation for any required ROE Agreements. If DB Contractor, after best efforts, is unable to secure a ROE Agreement from

the property owner, DB Contractor shall provide documentation acceptable to TxDOT indicating conversations, correspondence, and efforts used to attempt to secure the ROE Agreement.

- Contact the record title owners or their designated representatives, in writing, to offer them the opportunity to accompany the appraiser on the appraiser's inspection of the parcel and maintain a record of all such contacts and attempts to contact in the parcel file.
- Cause the appraiser to prepare a complete appraisal report for each parcel to be acquired to include the whole property, the portion to be acquired, and any damage to the remainder. It shall also include all improvements on the whole property, unless otherwise directed by TxDOT. The appraisal reports shall comply with and include all matters required by this Section 15.3.5 and TxDOT ROW related manuals, and shall satisfy the requirements of USPAP in effect at the time the appraisal is submitted. Special analyses, studies or reports, as necessary, shall be a part of each appraisal. The appraiser must use the most current edition of the USPAP standards referenced above and continually monitor these standards to ensure the appraisals conform to the most current requirements of professional appraisal practice. All appraisals shall utilize TxDOT Form ROW-A-5 – Real Estate Appraisal Report, except for outdoor advertising signs which shall utilize TxDOT Form ROW-A-5 OAS – Real Estate Appraisal Report. In very limited situations and with written permission from TxDOT on a per parcel basis, the appraiser may utilize TxDOT Form ROW-A-6 – Real Estate Appraisal Report for less complicated parcels. All appraisals must be performed utilizing guidance from the TxDOT ROW manuals. All appraisals for condemnation proceedings shall utilize TxDOT Form ROW-A-5 – Real Estate Appraisal Report.
- Obtain and provide TxDOT with copies of all written leases, licenses and other occupancy agreements, including outdoor advertising/sign agreements that are not already included in the title commitment.
- Perform an evaluation of all outdoor advertising signs, as required, and identify all impacted signs utilizing the appropriate forms as instructed by TxDOT. The forms shall be completed and executed by the outdoor advertising sign owner.
- Prepare, for all parcels to be acquired that have off-premise outdoor advertising signs (sign structure), the preliminary appraisal package or the appraisal in the Acquisition Package for TxDOT approval, which must include:
    - Completed and executed appropriate TxDOT forms; and
    - The value of the sign structure as a real property fixture.
- Cause the appraiser(s) to testify as an expert witness(es) or provide expert witness(es) approved by TxDOT in Special Commissioners' hearings or eminent domain proceedings through jury trial and be available for depositions, other discovery, pre-hearing or pre-trial meetings and appeals, as directed by TxDOT in accordance with the TxDOT ROW manuals and USPAP. DB Contractor shall also provide administrative and/or technical support for such proceedings as requested by TxDOT.
- Coordinate with the review appraiser regarding corrections and additional information that may be required for a particular appraisal.
- Cause a report to be prepared by an environmental professional that meets the qualifications set forth in American Society for Testing and Materials (ASTM) E-1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, documenting the environmental condition of each parcel, which may be used on field investigations and/or historical review, as appropriate for the particular parcel. As directed by TxDOT, DB Contractor shall submit a summary report of the Phase I site assessment. Upon completion, the report shall be made available to the appraiser(s). A Phase I Environmental Site Assessment or a report provided in a manner approved by TxDOT shall be performed for all properties and submitted with the Acquisition Package. If it is determined that there is a potential environmental risk based on the Phase I report or other reports, then a Phase II investigation shall be performed and submitted to TxDOT before a payment Submittal is submitted for the purchase of the parcel or a Condemnation Package is submitted for approval. A Phase III investigation shall be performed if the Phase II report justifies it. The

Phase III report must indicate the approximate cost to remediate the parcel to achieve its current use and its highest and best use. DB Contractor shall provide timely written notification to TxDOT of any environmental or other concerns associated with the Project ROW to be acquired that could require environmental remediation or other special attention or which would cause a report to be prepared. In the event that DB Contractor has exhausted all means possible and is unable to access the properties to perform an Environmental Site Assessment Phase II and/or III, DB Contractor may submit the Acquisition Package and Condemnation Package without the Environmental Site Assessment reports. However, DB Contractor shall be responsible for performing and receiving approval from TxDOT for all required Environmental Site Assessments after possession of the property has been obtained through condemnation before commencement of Construction Work.

- Engage the services of, and cause, a land planner to perform or otherwise assist in the preparation of, any and all appraisals. The land planner shall be involved with all parcels with a valuation analysis indicating a highest and best use that is other than the current use of such parcels, or as directed by TxDOT, for certain other appraisals. DB Contractor shall notify TxDOT in writing of each and every instance when the highest and best use of a parcel is different from its current use, in which event TxDOT will determine to what degree land planner services will be utilized by DB Contractor.
- Cause the appraiser(s) to prepare updated appraisals, as well as updated appraisal reviews, when required by TxDOT or as needed during eminent domain proceedings. An updated appraisal package shall comply with USPAP. At a minimum, the updated appraisal report or new assignment must include:
    - A letter of transmittal with a specific reference to the original appraisal report, any changes in market conditions since the original appraisal, any changes in the subject property since the original appraisal, a statement of the current value or extension of the original value opinion, and the listing of the current date of value.
    - An updated Page 1 from TxDOT Form ROW-A-5 – Real Estate Appraisal Report, or TxDOT Form ROW-A-5 OAS – Real Estate Appraisal Report, if applicable, with the current date of a recent inspection of the subject property and a current date of value. This form needs to have a current signature and date from both the appraiser and the reviewing appraiser in the appropriate spaces on the form.
    - Any qualifying and limiting conditions or general assumptions by the appraiser shall be clearly stated and attached.
    - A copy of the survey and legal description of the property being acquired and current photographs of the subject property clearly showing the area being acquired, even though the original appraisal report contained photographs of the subject property and the area of the acquisition. If there are significant changes to the subject property, the area being acquired, access to the remainder property, damages to the remainder(s), market conditions, the subject property's highest and best use from the previous appraisal, or significant changes in the approaches to value, the property shall be reappraised using the TxDOT Form ROW-A-5 – Real Estate Appraisal Report, or TxDOT Form ROW-A-5 OAS – Real Estate Appraisal Report, if applicable. Appraisers shall refer to the TxDOT *ROW Appraisal and Review Manual* for additional guidance. DB Contractor shall follow these guidelines in producing updated appraisal reports or new assignments and shall discuss specific updating requirements for any complex appraisals with TxDOT before beginning the assignment.
- Prepare and deliver to TxDOT, upon request, a copy of all file documents, as formally requested in discovery motions or requests for production.
- Complete with the property owner and furnish, to the appraiser and relocation agent, TxDOT Form ROW-A-9 – Property Classification Agreement, before the appraisal is completed.
- If requested by TxDOT, prepare an additional appraisal report complying with Section 15.3.5.

15.3.5.2 **Appraisal Review**

In connection with appraisal review, DB Contractor shall:

- Select review appraisers from TxDOT's list of pre-certified fee appraisers that meet the requirements of Section 15.2.7. The review appraiser selected must follow the appraisal guidelines and procedures found in the TxDOT *ROW Appraisal and Review Manual*.
- Determine, in consultation with TxDOT, if additional appraisal reports or technical expert reports are required. Initiate, review, and reconcile each report required.
- Review all appraisal reports for each parcel to determine consistency of methodology, supporting documentation related to the conclusion reached, and compliance with TxDOT standards set forth, as defined in Section 15.3.5.1 and this Section 15.3.5.2, the TxDOT *ROW Appraisal and Review Manual*, the *Uniform Appraisal Standards of Federal Land Acquisitions*, and the requirements of the Appraisal Foundation's USPAP in effect at the time the appraisal is reviewed. The review appraiser must use the most current edition of the standards referenced above and continually monitor these standards to ensure the appraisals conform to the most current requirements of professional appraisal practice.
- Inspect the subject properties and the sale properties used in direct comparison for each appraisal being reviewed.
- Upon completion of the review outlined above, cause the review appraiser to certify in writing to TxDOT that all required standards have been met. This certification will occur by signing Page 1 of the TxDOT Form ROW-A-5 – Real Estate Appraisal Report, or TxDOT Form ROW-A-5 OAS – Real Estate Appraisal Report if applicable, in the block provided. The review appraiser will also complete TxDOT Form ROW-A-10 – Tabulation of Values, to accompany each appraisal.
- For appraisal updates or new assignments, cause the review appraiser to perform a complete review of the updated or new appraisal, re-inspecting the subject property and the comparable sales used, as of the current date of value. The review appraiser shall follow the procedures outlined in the TxDOT *ROW Appraisal and Review Manual*. A new TxDOT Form ROW-A-10 – Tabulation of Values, will be required for each updated appraisal or new assignment.
- Cause its Quality Control Specialist(s) as referred to in Section 15.2.7, to ensure that appraisal consistency and quality for the entire Project is monitored for Project-wide controls and consistency.

15.3.6 **Project ROW Acquisition Package Approval**

Acquisition Packages submitted by DB Contractor for TxDOT approval shall include the following items, prepared for each parcel in accordance with the requirements of this Section 15.3.6:

- A cover sheet setting forth the following information for each parcel:
  - Parcel ID;
  - Project ID;
  - Parcel number and number of parts;
  - Station number;
  - CSJ number;
  - RCSJ number;
  - Federal Identification Number (if applicable);
  - Location of parcel;
  - Name of owner;
  - County and/or other jurisdiction;
  - Extent of acquisition (partial or whole acquisition); and
  - Type of conveyance (fee, easement, etc.).
- A complete legal description of the parcel adequate to effect the desired acquisition of the parcel, signed and sealed by a RPLS. A legal description and parcel plat are required for each parcel. Control of access shall be addressed in all legal descriptions. All descriptions shall be in recordable form and shall be prepared in a form and manner acceptable to TxDOT in all respects.

- The parcel plat, as prepared by the RPLS, and a half-size (11 inches by 17 inches) copy of the ROW map sheet(s) pertaining to the parcel. The plat shall include control of access designations.
- A title report, current within 90 days, including copies of all documents identified in the exceptions listed therein and a plot of all easements identified therein. The Acquisition Package shall include DB Contractor's analysis of each preliminary title report or title commitment to determine potential problems and proposed methods to cure title deficiencies. DB Contractor shall perform title curative work. DB Contractor shall provide TxDOT with copies of all curative documents.
- A copy of the appraisal report with an effective date no earlier than 180 days prior to the date of submission of the Acquisition Package.
- Any appraisal reports produced or acquired by TxDOT relating specifically to the owner's property in the last 10 years prior to the offer being made must be included in the initial offer and sent by certified mail return receipt.
- A copy of the Environmental Site Assessment and all amendments as described in Section 15.3.5.1.
- A real/personal property report, including TxDOT Form ROW-A-9 – Property Classification Agreement, detailing the items making up each parcel that are classified as real estate, tenant-owned improvements or personal property. Particular attention shall be paid to items that have questionable classifications.
- Replacement Housing Calculations, notification of business eligibility, completed displacee interviews, all comparables used in estimating the Replacement Housing Calculations, and letter to displacee(s) explaining Replacement Housing Calculations. The calculations and replacement housing benefit package shall be prepared and reviewed by a qualified specialist, in conformance with TxDOT's standard relocation procedures and applicable State and federal Laws.
- The proposed initial offer letter, the State of Texas Landowner's Bill of Rights, TxDOT *State Purchase of Right of Way Booklet*, TxDOT *Relocation Assistance Brochure*, MOA, deed, required brochures, and any other documents, which shall be prepared by DB Contractor as required or requested by TxDOT, on DB Contractor's letterhead or as otherwise directed. TxDOT will provide the format for preparing these documents. Documents referred to in this Section 15.3.6 are standardized by TxDOT and modification of standardized documents shall be kept to a minimum. All changes are subject to approval by TxDOT in writing.
- TxDOT Form ROW-N-PUAIC - Possession and Use Agreement for Transportation Purposes with Additional Payment of Independent Consideration (PUAIC).
- Any other required TxDOT forms, such as record of all contacts with the property owner or any party with a compensable interest.

No Acquisition Packages will be approved if prepared or submitted by appraisers or agents not previously approved by TxDOT for this Project.

Upon TxDOT's written approval of the Acquisition Package, DB Contractor may proceed with the offer to the property owner.

15.4 Acquisition Activities

15.4.1 ROW Negotiations

DB Contractor shall conduct all negotiations in accordance with the requirements of applicable Law. In conjunction with negotiations, DB Contractor shall:

- Within 10 Business Days of TxDOT approval of the Acquisition Package, contact each property owner or owner's designated representative, in person where practical, to present the offer and deliver an appraisal report (not more than six months old) and appropriate brochures. The approved appraisal shall be sent by certified mail, return receipt requested. A copy of the appraisal report for the subject property shall be provided to the property owner or authorized representative at the time of initial offer. All appraisal reports produced or acquired by TxDOT relating specifically to the property owner's property and prepared in the 10 years

preceding the date of the offer must also be delivered to the property owner. DB Contractor shall also maintain a file record of receipt of appraisal signed by the property owner. DB Contractor shall also maintain follow-up contacts and secure the necessary documentation and title curative Work upon acceptance of the purchase offer.

- At the time of offer, produce and distribute to all property owners and displacees, TxDOT approved informational brochures and the State of Texas Landowner's Bill of Rights as updated on the Office of the Attorney General's website: https://www.texasattorneygeneral.gov/sites/default/files/files/divisions/general-oag/landowners-bill-of-rights-2022.pdf.
- Identify lessees, licensees, occupants, or other parties with potential compensable interests including outdoor advertising sign owners, and, if appropriate, after consultation with TxDOT, negotiate with such parties for the acquisition of their compensable interests.
- Advise the property owners, lessees, licensees, occupants, and other holders of compensable interests, as applicable, of the administrative settlement process. Confer with and transmit to the TxDOT ROW Administrator any settlement request from property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable, including a detailed recommendation from DB Contractor in accordance with standards, manuals and procedures as identified in Section 15.2.1. TxDOT shall determine whether to accept a settlement request. Delivery of the administrative settlement request and DB Contractor's recommendation to TxDOT must occur within 15 Business Days following DB Contractor's receipt of the administrative settlement request.
- Participate, at its request or the request by TxDOT or the TxDOT Administrative Settlement Committee, in the evaluation of the administrative settlement request and attend the committee meeting.
- Provide a letter stating the TxDOT Administrative Settlement Committee's response to the property owner, lessee, licensee, occupant, or other holder of a compensable interest, as applicable. DB Contractor shall deliver all settlement responses (if within reasonable proximity of the Project) by hand within three Business Days after receipt. If this delivery method is not feasible, DB Contractor shall mail (return receipt requested) response letters not more than three Business Days following any decision by the TxDOT Administrative Settlement Committee. If DB Contractor selects the mailing option, DB Contractor shall contact the property owner to discuss the settlement offer prior to mailing the response letter. The TxDOT ROW Administrator, on an as-needed basis, will convene the TxDOT Administrative Settlement Committee.
- Notwithstanding an unsuccessful completion of the formal administrative settlement process, engage in ongoing negotiations with the owners of compensable interests. DB Contractor shall develop and incorporate in its ROW Acquisition Management Plan a procedure for these negotiated settlements. Said negotiations may continue until such time as the Texas Transportation Commission adopts a minute order authorizing the filing of a condemnation petition. DB Contractor shall submit its recommendation to TxDOT of a negotiated settlement and obtain TxDOT consent prior to acceptance of any settlement.
- Provide timely (i.e., not more than 10 Business Days after inquiry) response to the verbal or written inquiries of any property owner, lessee, licensee, occupant or other holder of a compensable interest, as applicable.
- Prepare a separate negotiator contact report for each meeting or conversation with any person (or other appointed representative(s) supported by a written confirmation of appointment) who has a compensable interest in each parcel on TxDOT Form ROW-N-94 – Negotiator's Report. Contact reports shall also be prepared for unsuccessful attempts to contact such persons.
- Maintain a complete parcel file for each parcel. All original documentation related to the purchase of the real property interests shall be maintained (housed separately from the relocation files) in conformance with TxDOT Standards, manuals, and procedures, as defined in Section 15.2.1. All original Project ROW documents shall be retained and properly secured in DB Contractor's Project office or as otherwise approved by TxDOT. During the acquisition process, signed original documents shall be forwarded to TxDOT with a transmittal form

periodically or as requested by TxDOT; provided, however, that all remaining original documents shall be forwarded to TxDOT upon completion of the acquisition of Project ROW for the Project.

- Prepare and deliver documents of conveyance (including bisection clause and access clause, if applicable) to the property owner, lessee, licensee, occupant, or other holder of any compensable interest, as applicable, and obtain their execution of the same. All signatures on documents to be recorded shall be notarized in accordance with State Laws.
- Pursue and obtain a TxDOT PUA concurrently with the parcel negotiations. Except as otherwise set forth in this paragraph, each PUA shall include an incentive in the form of market rental consideration for the advance possession and use of the property and shall be in the form of TxDOT Form ROW-N-PUAIC. The amount of the market rental consideration shall be 10% of the approved value of the property, provided the minimum amount of the incentive shall be $3,000 per parcel and the maximum amount shall be $25,000 per parcel. For properties for which the Special Commissioners' hearing is within 30 days of the date of the TxDOT PUA, the TxDOT PUA shall not include market rental consideration and shall be in the form of TxDOT Form ROW-N-PUA. Such agreements shall be sought and negotiated by DB Contractor strictly in accordance with the Law and only with the prior written consent of TxDOT. If DB Contractor uses a TxDOT PUA, DB Contractor shall obtain a deed or commence action on condemnation proceedings by submitting a Condemnation Package to TxDOT for approval within six months from the date of the TxDOT PUA. No other conveyance documents shall be used for the purpose of Construction Work unless otherwise approved by TxDOT.
- Consider all reasonable settlement requests (that comply with the regulations as outlined in this Section 15.4.1) from the property owners, which are feasible and help expedite the Project ROW acquisition process. DB Contractor acknowledges and understands that TxDOT encourages all positive and creative solutions which satisfy the property owner and promote the success of the Project.
- Prepare and deliver a final offer letter to the property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable. The letter shall be on DB Contractor's letterhead and shall be signed by the ROW AM. The final offer letter shall allow a property owner lessee, licensee, occupant or other holder of compensable interest at least 14 days as the consideration time period to review the final offer. DB Contractor shall submit to TxDOT, a copy of the final offer letter within two days of delivery to the property owner.

If the final offer letter is not accepted, DB Contractor shall follow the procedures established for condemnation.

15.4.2 **Relocation Assistance**

DB Contractor shall coordinate and perform the administrative requirements necessary to relocate any occupants and personal property from Additional Properties and certain remainders, as permitted by TxDOT. All Work prepared by DB Contractor with respect to relocation assistance shall be performed in accordance with applicable Law, including the Uniform Act and TxDOT Standards, and in accordance with all provisions of the Design-Build Contract (DBC) and these Design-Build Specifications.

DB Contractor shall be available to all displacees from Additional Properties for relocation services at the convenience of the displacees.

DB Contractor's major activities with respect to the relocation assistance of occupants from Additional Properties include:

- Preparing a Relocation Plan in accordance with the TxDOT ROW manuals within 90 days after receipt of Notice to Proceed 1 (NTP1), as part of an updated ROW Acquisition Management Plan.
- Monitoring relocation assistance activities and provide advisory services.
- Preventing fraud, waste and mismanagement.
- Assisting with all requests and being responsible for carrying out decisions made by TxDOT, the review/appeal process and judicial reviews.

DB Contractor shall provide relocation assistance strictly in accordance with the Law, and, in particular, the Uniform Act and TxDOT Standards. With respect to relocation assistance, DB Contractor shall:

- Provide written notice to all property owners, lessees, licensees, occupants, other holders of compensable interests, and other potential displacees regarding relocation assistance and produce and provide them with a relocation assistance brochure that has been approved by TxDOT. DB Contractor shall perform relocation interviews, complete and maintain interview forms and discuss general eligibility requirements, programs, and services with potential displacees. DB Contractor shall maintain a written record of all verbal contacts.
- Give written notice of the pending acquisition to any non-eligible occupants. Any questions as to the eligibility of a potential displacee shall be directed in writing to the TxDOT ROW Administrator.
- Contact and provide relocation assistance to those parties affected by the Project ROW acquisition and complete forms for all displacees, as required.
- Locate, evaluate and maintain files on comparable available housing, commercial, retail and industrial sites.
- Calculate replacement supplement benefits.
- Compute and submit requests for relocation rental/housing supplement to TxDOT prior to submission to relocatees. All relocation supplements shall be subject to TxDOT's written approval.
- Perform a decent safe and sanitary (dwelling) (DSS) inspection for each replacement housing comparable, photograph the comparable and complete the DSS inspection form, TxDOT Form ROW-R116 – Replacement Housing Inspection.
- Obtain at least two moving estimates from moving companies to effect relocation of personal property or consistent with the Uniform Act.
- Prepare moving plan with appropriate photos, sketches and inventory of personal property to be moved.
- Coordinate moves with displacees and moving companies in accordance with TxDOT Standards and the Uniform Act.
- Maintain relocation contact logs on a TxDOT Form ROW-R96 – Relocation Advisory Assistance – Parcel Record.
- Attend all closings on replacement properties, if requested by any party involved, and assure supplemental payments, if any, are properly distributed.
- Process and compute increased interest payments on the mortgage of owner-occupied dwellings, as required.
- Deliver to displacees a 90-day notice of eligibility letter simultaneously with the delivery of the relocation benefits package. Deliver a 90-day letter to displacees with the location of the comparable property used to compute the supplement.
- Deliver a 30-day notice to displacees and property owners upon Possession of Additional Properties.
- Notify TxDOT, in writing, when displacee has vacated or abandoned the affected dwelling or structure. In addition, ensure that each displacee has removed all personal property from the Additional Properties.
- Notify the TxDOT ROW Administrator office immediately if a displacee has not moved after 30-day notice expires. Special effort and consideration should be extended to the displacees in the move out process. If the displacees have not moved from the State-owned ROW and eviction is necessary, DB Contractor must provide a written request to TxDOT to begin eviction proceedings. The request must include written evidence of the due diligence efforts to vacate the displacees. Prepare a written recommendation to facilitate the displacee's move.
- Be available for any appeals or hearings.
- Prepare relocation payment claim submissions for all displacees and all relocation assistance benefits.
- Verify DSS dwelling criteria on all replacement housing as selected by the displacees.

- Secure dwellings and structures no later than 10 days after vacancy and protect the Additional Properties following acquisition and relocation. It is DB Contractor's responsibility to ensure that all occupied and vacated improvements maintain insurance coverage or assume liability through completion of demolition.
- Maintain a complete file, separate from acquisition files, on each displacee and make available for inspection.
- Be responsible for all relocation activities that may occur after deposit of the Special Commissioner's award in the courts, including instances when a parcel referred to the Office of the Attorney General for eminent domain also has a relocation issue. Relocation computations shall be adjusted based on the approved administrative settlement and court award.
- Prepare all correspondence to the displacees or their representative(s) on DB Contractor's designated relocation letterhead and have DB Contractor's correspondence signed by the ROW relocation agent.
- Deliver to each displacee the relocation assistance payments according to the TxDOT ROW manuals.
- Assist TxDOT and the Office of the Attorney General with eviction proceedings. Serve notice of eviction proceedings to the occupant(s) of the property who have not complied with move dates. Coordinate the eviction process with the local authorities and accompany the Sheriff's Department when the local authorities are carrying out eviction.

15.4.3 **Closing Services**

For purposes of closing services for Additional Properties, DB Contractor shall:

- Submit a closing Submittal to TxDOT for review a minimum of 24 hours prior to closing. Closing Submittals shall include the following:
  - A reference to the disposition of any environmental matters;
  - Updated title commitment, dated no more than 15 days prior, with notations indicating the disposition of all schedule "B" and "C" items;
  - A copy of the executed warranty deed to be delivered;
  - A proposed closing statement indicating disposition of all proceeds;
  - A copy of any and all release(s) of liens;
  - A copy of any miscellaneous documents and other curative matters required to be delivered at closing; and
  - A copy of the closing memorandum outlined in the bullet below.
- Prepare the escrow agreement and closing documents, including a closing memorandum identifying all parties involved in the closing, and listing all documents to be executed and/or delivered in connection with the closing.
- Attend closings and provide curative documents and exhibits, as required, and in conjunction with the applicable title company. Confirm that all conditions to closing are satisfied and notify TxDOT of all closing appointments.
- Obtain and submit to TxDOT a copy of the issued title insurance policy and recorded conveyance document based on the approved updated title commitment within 45 days following closing.

15.4.4 **Condemnation Support**

DB Contractor shall support condemnation efforts for Additional Properties as directed by TxDOT and further delineated as follows:

- Conduct all applicable eminent domain-condemnation activities in accordance with the policies and procedures as described in the TxDOT ROW manuals; in Chapter 21 of the Texas Property Code; and Senate Bill 18.
- Communicate with TxDOT as to the parcel status on a weekly basis or as requested by TxDOT.

- Notify TxDOT of any potential parcels requiring condemnation actions and document the reason(s) for failure to close by deed such as title or compensation issues, including recommendations for property closure.

15.4.4.1 **Condemnation Package Preparation**

DB Contractor shall support condemnation efforts for Additional Properties as directed by TxDOT and further delineated as follows:

- After non-response or upon receipt of a copy of the rejected final offer from a property owner or other property right holder entitled to compensation, request an updated title report from the title company issuing the original title commitment.
- Provide to TxDOT, within 10 days following non-response or rejected certified mailing, notification thereof together with a signed and sealed parcel description and parcel plat, and a bisection clause and access clause, if necessary, with the clauses attached to a property exhibit containing the parcel description and parcel plat.
- Use the information from the title report to join all parties having a property interest on the applicable TxDOT form. Spouses of property holders with compensable rights must also be joined.
- Upon completion of TxDOT Form ROW-E-49 – Request for Eminent Domain Proceedings, prepare a condemnation packet containing two copies each of the following documents: the completed TxDOT form, negotiation logs, the updated title report not more than 30 days old, appraisal receipt acknowledgment, pre-appraisal contact sheet, signed and sealed field notes, parcel sketch, bisection clause and access clause exhibits (if necessary), initial offer letter and final offer letter reflecting the latest appraisal, complete minute order request form (form to be provided by TxDOT), any correspondence sent by DB Contractor, the owner of the compensable interest or any of their representatives, one copy of all the appraisal reports and evidence of a bona fide offer to the property owner. Submit two complete Condemnation Packages to the TxDOT ROW Administrator for review and approval.

15.4.4.2 **Condemnation Support Upon Approval of a Condemnation Package**

DB Contractor shall support condemnation efforts for Additional Properties as directed by TxDOT and further delineated as follows:

- Send a copy of the complete petition to the title company and confirm with the title company that the appropriate parties were joined in the case and that no changes in title have occurred since the original litigation guaranty was issued.
- File the petition for condemnation with the appropriate court clerk after a determination that a timely settlement is not feasible. In counties that require e-filing, the Office of the Attorney General will e-file as appropriate and provide a copy of the petition to TxDOT. DB Contractor shall record the lis pendens in deed records with the appropriate county. No later than three Business Days from the date of filing, DB Contractor shall send a copy of the petition and lis pendens, by certified mail, return receipt requested, to the owner, lessee, licensee, occupant or other holder of compensable interest. DB Contractor shall provide a copy of the petition and lis pendens to TxDOT.
- Coordinate and provide technical support to TxDOT, as required to facilitate filing the petition. The Office of the Attorney General will file petitions as required by Law. DB Contractor shall provide the location and setting of a hearing date.
- Make available to TxDOT on behalf of the Office of the Attorney General an agent who will be expected to assist in making arrangements for conferences with witnesses prior to trial, filing the condemnation petition, informing all parties as to the filing date of the petition and the case number assigned to the suit, and perform any other duties which will assist in the successful prosecution of the suit, including his or her attendance in court and filing necessary documents to complete all eminent domain proceedings.
- Notify TxDOT if the market conditions have changed substantially since the date of the initial offer or if over six months have elapsed since the date of the initial offer. Upon such notification, TxDOT will contact the Assistant Attorney General handling the case for TxDOT and confer about the advisability of preparing an updated appraisal. If it is determined that an

updated or new appraisal is necessary or desirable, DB Contractor shall obtain such appraisal using the same procedures as described in Section 15.3.5.1. DB Contractor must also undertake appraisal review as described in Section 15.3.5.2.

- Submit the updated appraisal or new assignment to TxDOT for review and approval. Once approved, TxDOT shall transmit the approved appraisal to the Office of the Attorney General. TxDOT must approve any updated appraisals or new assignments. If an updated appraisal or new assignment is approved, notify the property owner or other holders of a compensable interest, as applicable, and submit a copy to TxDOT.
- Be responsible for coordinating the pre-hearing meeting with TxDOT on behalf of the Office of the Attorney General and all others required for testimony or exhibit preparation.
- Schedule all court reporter services, transcription services, expert witnesses, exhibits, and exhibit workbooks as directed by TxDOT.
- Serve in person, a "Notice of Hearing" not later than 20 days before the date of the Special Commissioners' hearing or other hearings. DB Contractor shall also comply with all other notice requirements as directed or authorized by the court.
- Call and send reminder emails or letters two to three weeks in advance of any hearing to the assigned attorney, engineer, technical experts, appraiser, the commissioners, court reporter, and TxDOT ROW Administrator concerning hearing dates.
- Upon completion of the hearing, prepare TxDOT Form ROW-E-73 – Data Sheet – Special Commissioners Hearing, and Commissioners' time sheets. DB Contractor shall make payment to all commissioners involved in the hearing and include payment for commissioners as part of general services for acquiring Additional Properties.
- Timely file and provide proper service of citations if objections are filed after completion of the Special Commissioner's hearing and promptly submit evidence of filing and copies of all filed documents to TxDOT. As directed by TxDOT and the Office of the Attorney General, DB Contractor, at its cost, shall order transcripts of such hearing.
- Coordinate and provide support to TxDOT counsel, and facilitate distribution of copies of award, prepare requests for payment, and file notices of deposit.

15.4.4.3 **Condemnation Support by an Expert Witness**

DB Contractor shall support condemnation efforts for all Project ROW as directed by TxDOT and further delineated as follows:

- Provide an individual or individuals having sufficient knowledge of the design of the Project to appear as an expert witness for testimony at the Special Commissioners' hearing or other proceedings. This individual or individuals are also responsible for preparing exhibits as requested by TxDOT or the Office of the Attorney General in support of said testimony. Exhibits shall be left in the custody of TxDOT at the close of the hearing.
- Coordinate with TxDOT on behalf of the Office of the Attorney General regarding expert witnesses needed to testify on behalf of the State at the Special Commissioners' hearing and subsequent proceedings, including jury trials. At the request of the Office of the Attorney General or TxDOT, DB Contractor shall provide all necessary expert witnesses including: engineers, land planners, real estate specialists, cost estimators, outdoor advertising sign experts, and environmental specialists, and DB Contractor shall appear as expert witness or fact witness, as requested. DB Contractor shall also make any Subcontractors available to appear as an expert witness or fact witness, as requested at the Special Commissioners' hearing or subsequent proceedings until Final Acceptance of the Project and through any Capital Maintenance Contract Term. The selection of all expert witnesses to be used for jury trials shall be determined by the Office of the Attorney General.
- Require expert witnesses to be present at a pre-hearing meeting and bring all exhibits and documents.
- Coordinate with TxDOT on behalf of the Office of the Attorney General as to expert witnesses as required by the Office of the Attorney General. DB Contractor shall provide the expert witnesses at the request of TxDOT or the Office of the Attorney General. The expert witness

report, if required, shall be completed and forwarded to the appraiser before the updated appraisal is completed.

- Appear or provide for the appearance of expert witness(es) or fact witness(es) when requested by TxDOT or the Office of the Attorney General. The appearances may include pre-commissioner's hearing preparations, Special Commissioner's hearings, subsequent proceedings including jury trials and related proceedings and as other needs arise.

15.4.5 **Clearance/Demolition of Project ROW**

Prior to demolition of any improvements, DB Contractor shall provide to TxDOT photographs of the subject property and all improvements. If legal proceedings are initiated, all photos of personal property and any other items in dispute shall be in, and of a quality suitable for presentation as evidence in court. Following acquisition or possession of any Additional Properties parcel, DB Contractor shall:

- Within 10 days from vacancy of the property, secure and protect the buildings, improvements and fixtures on the parcel until they are disposed of or demolished. DB Contractor shall board-up, mow, fumigate and winterize as required by TxDOT or applicable Law.
- Coordinate with the owner and occupants to assure the clearance of personal property from the parcel, as applicable.
- Provide for any insect and rodent control and initiate extermination as required to protect the adjacent properties and rid the parcel from infestations.
- Secure Governmental Approvals required for demolition and environmental surveys or tests, notify TxDOT in writing of all such activities, and provide copies of such Governmental Approvals to TxDOT.
- To the extent required by Section 15.2.11, prepare necessary documentation for disposal of improvements, fixtures and buildings in accordance with applicable Laws and submit the same to TxDOT.
- Provide written notification to TxDOT of any abandoned personal property remaining on the parcel.
- Terminate all utility service(s) when appropriate.
- Process all required forms, documents and permit applications in order to proceed with the timely demolition or removal of any and all improvements, buildings and fixtures located within the parcel, as applicable including, but not limited to asbestos assessments and notification to the Texas Department of State Health Services.
- Demolish and/or remove all improvements.
- Notify TxDOT upon completion of the demolition and clearance of the respective parcels within the Project ROW, as applicable.

15.4.6 **Payment Submittal**

DB Contractor must submit a payment Submittal for any item that is a TxDOT payment responsibility as outlined in this Item 15. A payment Submittal shall consist of:

- Completed payment request forms for each type of payment;
- All required appropriate documents as shown on each payment request form – including Form W-9 – Request for Taxpayer Identification Number and Certification; and
- Form AP-152 – Application for Texas Identification Number.

The State's warrant will be returned to DB Contractor's ROW AM.

15.4.7 **Property Fence**

In connection with fences, DB Contractor shall comply with the policies and procedures of the TxDOT ROW manuals, as well as TxDOT Standard Specifications. Fencing standards for DB Contractor-provided fencing shall conform to the overall aesthetics requirements in the Contract Documents and referenced standards.

15.4.8 **Property Fencing for Public Properties**

Where public facilities now exist that are in high risk areas for public use (particularly those containing parks, sport areas, schools or any highly traveled pedestrian areas), DB Contractor shall construct similar like fence as in the preexisting condition or, at a minimum, construct a 6-foot-high chain-link fence with metal posts if no fence was in the preexisting condition. DB Contractor shall use Good Industry Practice in fencing public properties to control public access to the Project.

15.4.9 **Property Fencing for Private Properties**

DB Contractor shall instruct the appraiser to use the "cost to cure" format to compensate an owner of private property for a replacement fence when the Project ROW line leaves one or more unfenced remainder property(ies) that were fenced before the taking. Compensation for the new fencing will be based upon the same type of fence as the property owner's existing fence.

When the property owner is paid through the appraisal process for the cost to rebuild the fence on the remainder property, DB Contractor shall include the following clause in the MOA or the purchase agreement for such property:

"It is further understood and agreed that the Grantor has been compensated for the construction of a new fence and shall be responsible for constructing the necessary fencing within 30 days from the date of closing. Grantor specifically understands and agrees that the fences are the property of the Grantor and they shall be liable and responsible for any reconstruction, maintenance, or adjustment with regard to such fencing."

DB Contractor shall make reasonable and good faith efforts to ensure that the property owners, who have been compensated for fencing of the remainder properties, erect the fence in accordance with the construction schedule.

If necessary to maintain the Project Schedule and to control unauthorized access to the Project ROW by the public or livestock, DB Contractor shall be responsible for providing temporary fencing in cases where the property owner refuses to fence the property within 30 days from the date of closing.

After the property owner's retention period has expired and if any existing fencing remains, DB Contractor shall remove the existing fences from the newly acquired Project ROW and will be responsible for all costs associated therewith.

15.4.10 **Temporary Easements**

DB Contractor shall, at a minimum, restore the temporary easement construction area to its existing condition, unless the temporary easement agreement includes betterment(s).

15.5 **Early ROW Acquisition**

A status report of parcels to be acquired by TxDOT on the Project will be kept up to date generally on a bi-weekly basis and can be found in the Reference Information Documents. This will include parcels TxDOT is currently negotiating, along with the relocation status and eminent domain status.

Completed appraisal packages for Schematic ROW parcels acquired by TxDOT will not be provided to the DB Contractor.

15.6 **Submittals**

All Submittals described in this Item 15 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 15-2. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 15-2: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Copies of all property agreements	Upon Request	For information	15.1
Three samples of previous appraisal work for each appraiser	Prior to performing any appraisals on the Project	For information	15.2.7

Table 15-2: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Meeting Agendas	Three Business Days prior to each meeting	For information	15.2.9
Draft Meeting Minutes	Within five Business Days after the date of the meeting	Review and comment	15.2.9
All specific reports and supporting documentation during the acquisition process for Additional Properties	1. Prior to Acquisition Package submission, Condemnation Package submission, and as often as requested by TxDOT 2. Final reports and supporting documentation to be provided with retirement of all acquisition, relocation, condemnation, and property management files	Approval	15.2.10
Project ROW Acquisition and Relocation cost summaries related to Additional Properties	Monthly	For information	15.2.10
ROW status reports related to Additional Properties	Bi-weekly	For information	15.2.10
ROW status updates related to Additional Properties	Weekly or as requested	For information	15.2.10
Parcel status updates in TxDOTConnect	As required by TxDOT	For information	15.2.10
Subcontractor status report	Monthly or as requested	For information	15.2.10
TxDOTConnect compatible spreadsheet of ROW data related to Additional Properties	Monthly	For information	15.2.10
Completed closeout files of Additional Properties	Within 90 days after the completed ROW parcel activity	Approval	15.2.11
Supplemental or modified Project ROW Maps required for the acquisition of Additional Properties	Part of the Acquisition Survey Document	Approval	15.3.1
Acquisition Survey Document of Additional Properties	As part of any Acquisition Package	Approval	15.3.1
Design certification of Additional Properties	As part of any Acquisition Package	For information	15.3.1
GIS Files	Concurrent with the Acquisition Survey Document and prior to submission of the first Acquisition Package and updates as needed	Approval	15.3.1.1
Monthly parcel report	Monthly	For information	15.3.2
Monthly progress report	Monthly	For information	15.3.2
ROW CADD files	Prior to submission of the first Acquisition Package and updates as needed	For information	15.3.2

Table 15-2: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Title reports, five-year sales history, copies of all underlying documents, plots of all easements	As part of Acquisition Packages	Approval	15.3.3
Title policies	Within 45 days after closing	Approval	15.3.3, 15.4.3
Project ROW property owner list	After ROW Acquisition Management Plan approval	For information	15.3.4
TxDOT introduction letter	After ROW Acquisition Management Plan approval	Approval	15.3.4
Appraisal reports	Prior to, or at the time of submission of the first Acquisition Package, and as requested	Approval	15.3.5
Environmental site assessment reports	As part of Acquisition Packages	Approval	15.3.5.1
Acquisition Packages	Prior to delivering the offer to each property owner	Approval	15.3.6
Administrative settlement Submittals	As necessary, within 15 Business Days following receipt of the administrative settlement request	Approval	15.4.1
Final offer letter	Within two days of delivery to the property owner	For information	15.4.1
Relocation assistance Submittals for Additional Properties	As part of the respective parcel's Acquisition Package or separately	Approval	15.4.2
Relocation Plan	Within 90 days after NTP1, as part of a ROW Acquisition Management Plan update	Approval	15.4.2
Closing Submittals for Additional Properties	Minimum of 24 hours prior to closing	Approval	15.4.3
Condemnation Packages for Additional Properties	Prior to TxDOT submission to TTC for a minute order	Approval	15.4.4.1
Updated appraisals for Additional Properties	As requested	Approval	15.4.4.2
Condemnation support Submittals for Additional Properties	Upon approval of condemnation package	For information	15.4.4.2
Photographs of properties/improvements to be demolished	Following acquisition or possession of any parcel and prior to demolition	For information	15.4.5
Documentation for disposal of improvements	Following acquisition or possession of any parcel	For information	15.4.5
Notification of abandoned personal property remaining in Additional Properties	Following acquisition or possession of any parcel	For information	15.4.5
Notification of completion of demolition and clearance of Additional Properties with photographs of the subject property(ies)	Upon completion	For information	15.4.5

Item 16
Geotechnical & Pavement

16.1 **General Requirements**

Design-Build (DB) Contractor shall perform all investigations, testing, research, and analyses necessary to effectively determine and understand the existing surface and subsurface conditions within the Project Right of Way (ROW) needed to carry out the Work.

DB Contractor shall ensure the geotechnical investigations and analyses are both thorough and complete, to provide accurate information for the design of roadways, pavements, foundations, structures, retaining walls, embankments, excavations, slopes, temporary special shoring, and other facilities that result in a Project that meet the requirements of the Contract Documents.

All geotechnical and pavement work shall be performed in accordance with the TxDOT *Geotechnical Manual - LRFD*, the TxDOT *Pavement Manual*, TxDOT Houston District Guidelines for Foundation Design, TxDOT Engineering Standard Sheets, Houston District standards, and the TxDOT *Houston District Pavement Design Standard Operating Procedure* as provided in the RIDs. The most recent version of TxDOT Engineering Standard Sheets provided on TxDOT's webpage 30 days prior to the Proposal Due Date shall apply to the Project, regardless of the letting dates to which they apply.

In the event of a conflict between TxDOT Engineering Standard Sheets and Houston District standards, DB Contractor shall ensure Houston District standards are met.

DB Contractor shall comply with the TxDOT *Pavement Manual* and this Item 16, for the pavement design and quality acceptance process. Where there is a conflict between the requirements of these documents, the requirements in these Design-Build Specifications shall take precedence.

16.2 **Geotechnical Investigation**

DB Contractor shall prepare and amend as needed Geotechnical Engineering Reports documenting the assumptions, conditions, and results of the geotechnical investigation and analyses in accordance with the TxDOT *Pavement Manual* and the TxDOT *Geotechnical Manual - LRFD*.

16.2.1 **Geotechnical Investigation for Pavement Design**

DB Contractor shall determine the specific locations, frequency, and scope of all subsurface investigations, testing, research, and analyses necessary to design a safe and reliable pavement foundation for the Project in accordance with TxDOT geotechnical requirements in the TxDOT *Pavement Manual* and this Item 16. DB Contractor shall take all soil borings within and along the proposed roadbed alignment. DB Contractor shall submit boring locations and traffic control plans prior to commencing any subsurface pavement investigations for review and approval. Traffic control plans shall be prepared in accordance with Item 26.

DB Contractor shall utilize drilling and field investigation measures that safeguard groundwater from contamination and shall be responsible for any mitigation or restoration associated with the geotechnical investigation work.

16.2.1.1 **Soil Testing Requirements for Pavement Design**

DB Contractor shall use the TxDOT *Pavement Manual* and web soil survey maps to determine the frequency of subgrade soil survey and exploration for use in determining soil characteristics and properties, such as plasticity index, liquid limit, moisture content, organic content, sulfate concentration, and soil classification as it relates to pavement design. Borings for pavement soil investigations shall terminate at a minimum depth of two feet below the top of the proposed untreated subgrade. Sampling shall be performed with Shelby tubes or a continuous sampler system.

DB Contractor shall develop the scope of testing, evaluation, and analysis of the subgrade and the existing pavement structure for inclusion in the Pavement Design Report. DB Contractor shall use the TxDOT test procedures in Table 16-1 to characterize the subgrade soils or borrow material for pavement design:

Table 16-1: Soil Exploration & Testing

Testing	Properties
Falling Weight Deflectometer (FWD) (ASTM D4694 and ASTM D4695)	Deflections and derived pavement layer moduli
Dynamic Cone Penetrometer (DCP) (ASTM D6951)	Stiffness, estimated back calculated subgrade modulus
Soil Classification (Tex-103-E, Tex-104-E, Tex-106-E, Tex-110-E, Tex-142-E)	Moisture content, liquid limit, plasticity, particle distribution, percent binder and soil classification
Soil Mineralogy (Tex-145-E, Tex-148-E)	Sulfate content parts per million (ppm) and organic content (%)
Soil Treatment Design (Tex-114-E, Tex-117-E, Tex-120-E, Tex-121-E)	Target stabilizer content, compressive strength, max. dry density, and optimum moisture content

16.2.1.2 **PVR Requirements for Rigid and Flexible Pavement**

PVR investigations are not required for this project.

16.2.2 **Geotechnical Investigation for Other Elements**

The subsurface investigation shall include, but not be limited to, soil borings, test pits, and pavement coring. If rock is encountered, rock coring shall be performed. DB Contractor shall determine the specific locations, frequency, and depth of test holes in accordance with the guidelines in the TxDOT *Geotechnical Manual - LRFD*. The scope of the subsurface geotechnical investigations shall include field and laboratory testing, research, and analysis that DB Contractor considers necessary to provide a safe and reliable roadway, embankment and cut slopes, bridge foundations, noise and sign structures, drainage structures, temporary and permanent retaining walls, excavation support systems, and any other facilities for the Project.

DB Contractor shall ensure the depth of all test holes are adequate for the anticipated structure foundation type and loading, such as retaining wall design and embankment design, excavation depths, and scour. The soil borings for retaining walls and embankments shall extend a minimum of 35 feet below the footing elevation for walls, ground surface for embankments, or base of cut or deeper as soil conditions warrant. The soil borings for drilled shaft shall extend a minimum of 100 feet below proposed grade or the probable tip elevation of the drilled shaft plus three times the diameter of the proposed drilled shaft, whichever is deeper. DB Contractor shall ensure that the groundwater monitoring methods and durations are adequate to determine groundwater levels and their impacts on the design and construction. DB Contractor shall employ field investigation measures that avoid groundwater contamination and shall be responsible for all mitigation and/or restoration associated with the geotechnical investigations.

Laboratory testing on samples from each boring shall be in accordance with TxDOT and ASTM geotechnical testing standards. DB Contractor shall perform:

- Classification: For each major soil stratum in each boring, tests sufficient to determine classification per the TxDOT *Geotechnical Manual - LRFD* including in clay and silt moisture content (Tex-103-E), Atterberg Limits (Tex-104-E to Tex-106-E), and percent passing the No. 200 (Tex-111-E) sieve and in sand and gravel gradation (Tex-110-E). For the purposes of this section, a major soil stratum is considered any soil stratum thicker than 5 feet.
- Undrained shear strength: Tests in each boring in each major stratum classified as cohesive (i.e., Unified Soil Classification System classification CL, CH, OL, or OH) by either unconfined compression (AASHTO T208 or ASTM D2166) or unconsolidated-undrained triaxial tests (Tex-118-E, AASHTO 296, or ASTM D2850).
- Drained shear strength: Where embankments, cut slopes, retaining walls, or other structures requiring global stability analysis are planned, laboratory testing in each major stratum classified as cohesive (i.e., Unified Soil Classification System classification CL, CH, OL, or OH) shall include drained shear strength testing by direct shear (AASHTO T236 or ASTM D-3080) or consolidated-undrained triaxial (Tex-131-E or ASTM D4767) tests at a range of stress levels representative of those expected pre- and post-construction. This testing shall be performed in the vicinity of each structure, but it is not required in each boring.

- Soil Compressibility/Swell: Where embankments and/or retaining walls are planned near bridge structures supported on deep foundations, laboratory testing in each major stratum classified as cohesive (i.e., Unified Soil Classification System classification CL, CH, OL, or OH) shall be performed to determine soil compressibility/swell testing properties by consolidation (AASHTO T216 or ASTM D2435) and/or swell (ASTM 4546) testing as appropriate. Such testing shall also be performed where structures supported by shallow foundations are planned. Consolidation tests shall include a rebound/reload loop starting a pressure near the current effective overburden pressure suitable for determining the recompression index. This testing shall be performed in the vicinity of each structure, but it is not required in each boring.
- Soil Corrosivity: Where structural members will be in contact with soil or groundwater, testing to determine soil corrosivity shall be performed in each major soil stratum planned to be in contact and within 10 feet below the bottom of the member. Testing shall include soil pH (Tex-128-E or AASHTO T289), soil resistivity (Tex-129-E or AASHTO T288), soil organic content (Tex-148-E), and soil sulfate and chloride (Tex-620-J). Where groundwater will be in contact, testing shall include sulfate and chloride (Tex-619-J). This testing shall be performed in the vicinity of each structure, but it is not required in each boring.
- Sieve Analysis: Sieve analysis for scour analysis shall be performed and include grain size distribution curves with D50 value in each boring within or adjacent to water crossings within each major soil stratum located between the 100-year flood elevation and 20 feet below the bottom elevation of the current channel. Perform gradation analysis (Tex-110-E) for all soils and also perform hydrometer analysis (ASTM D422) for all silt and clay soils.
- Other: Perform other laboratory testing as appropriate.

16.3 Pavement Materials Requirements

DB Contractor shall incorporate the following requirements into the pavement designs, plans, quality control and quality assurance programs, and the field construction procedures. DB Contractor shall conduct all Work in accordance with the requirements of this Item 16 and the TxDOT Standard Specifications.

16.3.1 Subgrade Material Composition

DB Contractor shall analyze subgrade material composition and perform necessary construction procedures to address the following subgrade soil limitations.

- **Sulfate Content.** DB Contractor shall mitigate soluble sulfate induced heave by reducing soluble sulfate concentration to a level under 3000 ppm. DB Contractor shall follow Tex-145-E for measuring sulfate contents. When quantities of soluble sulfates detected are greater than 3000 ppm, DB Contractor shall determine the source of the sulfates and whether there are even greater concentrations in the general proximity or that would be created when materials are pulverized in and surrounding the sampled location. DB Contractor shall use the TxDOT *Treatment Guidelines for Soils and Base in Pavement Structures*, web soil survey maps, and Item 260, *Lime Treatment (Road-Mixed)*; and Item 275, *Cement Treatment (Road-Mixed)*, of the TxDOT Standard Specifications for testing and detection and integrate applicable procedures with construction practices.
- **Organic Content.** DB Contractor shall evaluate subgrade soils for organic content using Tex-148-E and in accordance with general guidelines given in Chapter 3 of the TxDOT *Pavement Manual*, considering soil variability within the Project limits. If the organic content of the soils is greater than 1%, DB Contractor shall determine the appropriate type and quantity of additives to compensate for these organic levels to obtain minimum subgrade treatment requirements. As a minimum, stabilizer contents shall meet the requirements of Tex-121-E, Part III following a minimum seven-day mellowing period of test samples in the laboratory.
- **Density Control.** Subgrade layer shall be compacted using density control only.
- **Proof Rolling.** When treated/untreated subgrade is used on concrete pavements, DB Contractor shall proof roll the untreated subgrade layer in accordance with Item 216, *Proof Rolling*, of the TxDOT Standard Specifications prior to continuing with subsequent layer.

Areas which are determined as unstable or that rut more than ½-inch shall be considered as failure and require corrective action.

16.3.2 **Treated Subgrade**

DB Contractor shall meet the requirements of Tex-121-E, Part I to determine a target lime content to achieve a minimum unconfined compressive strength (UCS) of 50 psi and Part III to verify the target lime content achieves a pH of 12.4.

DB Contractor shall meet the requirements of Tex-120-E, Part I to determine a target cement content to achieve a minimum UCS of 50 psi.

Subgrade treatment shall be in accordance with the TxDOT *Treatment Guidelines for Soils and Base in Pavement Structures.* Any subgrade that does not conform to these treatment requirements shall not be included in the pavement design as a structural layer.

For rigid pavements constructed using slipform paving equipment, DB Contractor shall extend the treated subgrade to at least 2 feet beyond the edge of pavement, including shoulders, on each side to provide a stable area for the slipform paving equipment.

The subgrade treatment depth shall be a minimum of 6 inches and designed to support anticipated construction traffic.

The treated subgrade shall be compacted using density control only.

16.3.3 **Treated Base**

Treated base may be modified with cement, lime or asphaltic emulsions and foamed asphalt.

Base materials to be treated shall meet the specifications for the type and grade specified in accordance with Item 247, *Flexible Base*, of the TxDOT Standard Specifications. Cement treatment (plant-mixed) wet and dry strengths shall meet the strength requirements in Table 16-3. For other stabilizers, DB Contractor shall meet the requirements set forth in the applicable TxDOT Standard Specifications.

When Item 276, *Cement Treatment (Plant-Mixed),* of the TxDOT Standard Specifications is used, DB Contractor shall determine the target cement content meeting the minimum and maximum UCS and 24-hour submerged strength requirements shown in Table 16-3 when tested in accordance with Tex-120-E, Part I.

Table 16-3: Item 276 of the TxDOT Standard Specifications, Cement Treatment (Plant-Mixed), Minimum and Maximum Strength Values to be Achieved by Pavement Type

Pavement Type	Minimum 24-hour submerged strength (psi)	Minimum 7-day UCS (psi)	Maximum 7-day UCS (psi)
Flexible pavement	240	300	500
Rigid pavement	400	500	No maximum

When Item 275 of the TxDOT Standard Specifications is used, DB Contractor shall determine the required cement content using Tex-120-E, Part I to achieve a minimum seven-day UCS of 250 psi. Minimum cement content shall not be less than 2% by total dry weight of base.

When lime is used to treat the base materials, DB Contractor shall determine the required lime content using Tex-121-E, Part I to achieve a minimum UCS of 150 psi.

When asphalt emulsion is used to treat the base materials, DB Contractor shall determine the required asphalt content using Tex-126-E and an approved TxDOT Standard Specification.

For rigid pavements constructed using slipform paving equipment, DB Contractor shall extend the treated base to at least 2 feet beyond the edge of pavement, including shoulders, on each side to provide a stable area for the slipform paving equipment.

Treated base layers shall be compacted using density control.

16.3.4 **Tack Coat**

For any flexible pavements (including widenings, rehabilitations and overlays), DB Contractor shall place a non-tracking tack coat (Tracking Resistant Asphalt Interlayer (TRAIL)) between all hot-mix asphalt (HMA) pavement layers and directly beneath the final surface course in accordance with TxDOT Standard Specifications and TxDOT special specifications. No tack coat shall be required if HMA pavement is placed on a freshly laid seal coat free of objectionable material such as moisture, dirt, sand, organic material, and other loose impediments as determined by the Construction Quality Control Manager (CQCM). Tack coat shall meet the requirements in Item 300, *Asphalts, Oils, and Emulsions*, of the TxDOT Standard Specifications. TRAIL material used on the Project must be a pre-approved product from the TxDOT Material Producer List.

Tack coat will not be required where underseal is used in accordance with Section 16.3.6 below and the underseal has not been subjected to traffic.

16.3.5 **Surface Mix Type**

Where flexible pavement structures are used, the surface mix may be D-GR HMAC TY C, meeting the requirements in Item 341, *Dense-Graded Hot-Mix Asphalt*, of the TxDOT Standard Specifications.

DB Contractor shall obtain components for the surface mix material from a vendor listed at http://www.txdot.gov/business/resources/producer-list.html.

The performance-graded asphalt binder in the asphalt mixture directly beneath the surface mixture shall have the same high temperature performance grade as the asphalt surface layer.

No binder substitution is allowed for the final riding surface mix.

16.3.6 **Underseal**

DB Contractor shall place a one course surface treatment as an underseal directly on top of any untreated or treated base layer and prior to placement of all HMA pavement layers. A prime coat complying with Item 310, *Prime Coat*, of the TxDOT Standard Specifications may be applied to any untreated or treated base layer as an alternative underseal for new HMA paving. DB Contractor shall place underseal complying with TxDOT special specification 3006 (2024)*, Underseal Course,* prior to the placement of a new HMA pavement layer.

16.3.7 **Final Surface**

When HMA is used, Level Up, as referenced in Item 341, *Dense-Graded Hot-Mix Asphalt*, Item 344, *Superpave Mixtures*, and Item 346, *Stone-Matrix Asphalt*, in the TxDOT Standard Specifications, shall not be considered part of the final surface course thickness.

All new concrete pavement shall receive a longitudinal tining texture finish in accordance with requirements in Item 360, *Concrete Pavement*, of TxDOT Standard Specifications.

16.4 **Pavement Design**

16.4.1 **New Pavement**

16.4.1.1 **Design Traffic Considerations**

The corridor traffic data has been provided in the Reference Information Documents (RIDs) and shall be deemed a minimum acceptable traffic volume and composition to be used by DB Contractor for the purpose of pavement design for the mainlanes, frontage roads, and ramps. DB Contractor is responsible for determining appropriate traffic to be used as a minimum for the design of detour, temporary, cross street, and driveway pavements. DB Contractor shall not be entitled to rely on the corridor traffic data in the RIDs for the purpose of meeting the Performance Requirements of these Design-Build Specifications or the Capital Maintenance Agreement (CMA). The final pavement design shall be a DB Contractor risk regardless of whether the actual traffic volume and composition exceeds that identified in the RIDs.

16.4.1.2 **Subgrade Considerations**

For flexible pavement, DB Contractor shall be responsible for determining the design back calculated modulus value for subgrade consistent with methods in the TxDOT *Pavement Manual*. DB Contractor shall obtain TxDOT's approval of the method prior to commencement of construction.

The Independent Quality Firm (IQF) shall ensure the Final Design subgrade modulus for the flexible pavement is achieved during the Construction Work using methods in Section 16.6.

For continuously reinforced concrete pavement (CRCP), DB Contractor will select the subgrade classification of "CH" for the input in the design program unless otherwise approved by TxDOT. The composite K-value for the inputted subgrade classification is hard-coded in the design program. DB Contractor may propose to use a different subgrade classification based on project specific conditions, the use of which shall be subject to TxDOT's approval. When an alternate subgrade classification is proposed it shall be determined for soil at final subgrade elevation from borings distributed throughout the alignment. DB Contractor shall determine the subgrade Unified Soil Classification System soil classification using Tex-142-E Laboratory Classification of Soils for Engineering Purposes. Composite K-value used in TxCRCP-ME program is used for thickness design purposes only and shall not be used for field verification of subgrade design during construction.

16.4.1.3 **Pavement Type Requirement**

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

16.4.1.3.1 **Mainlanes**

Continuously Reinforced Concrete Pavement (CRCP) shall be used for the mainlane pavement. The mainlanes shall be a minimum thickness of 11 inches.

At the southern end of the SH 99 mainlanes, flexible pavement may be used at the tie-in to existing pavement as shown on the Schematic Design.

16.4.1.3.2 **Ramps**

Ramp pavements shall be constructed with the same section (materials and depths including treated subgrade) as the adjacent mainlane pavement.

16.4.1.3.3 **Frontage Roads and U-turns**

The frontage road pavement section (materials and depths including treated subgrade) shall be consistent from major cross street to major cross street. CRCP shall be used for new frontage road pavement and shall be a minimum thickness of 10 inches.

In areas where the pavement will be reconstructed in place (when existing roadway geometry is to be maintained), the frontage road pavement section shall be replaced down through the top 6 inches of treated subgrade. The top layer shall be CRCP over a minimum of 1-inch hot-mix asphalt bond breaker, and lower layers (materials and depths including 6 inches of treated subgrade), shall be consistent with either the existing travel lane pavement structure or the new location frontage road pavement.

16.4.1.3.4 **Cross Streets**

CRCP shall be used for the cross street pavement. The cross street lanes shall be a minimum thickness of 9 inches. Cross street pavement transitions shall be constructed from the proposed section to the existing section within the Maintenance Limits.

In areas where the pavement will be reconstructed in place (when existing roadway geometry is to be maintained), the cross street pavement section shall be replaced down through the top 6 inches of treated subgrade. The top layer shall be CRCP over a minimum of 1-inch hot-mix asphalt bond breaker, and lower layers (materials and depths including 6 inches of treated subgrade), shall be consistent with either the existing travel lane pavement structure or the new location cross street pavement.

16.4.1.3.5 **Cul-de-sacs**

The pavement for the cul-de-sacs shall be constructed to match the existing pavement structures.

16.4.1.3.6 **Shoulders**

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

16.4.1.3.7 **Driveways**

Driveways shall be constructed with reinforced concrete pavement to a depth as follows that is the greater of:

- Matching existing; or
- 6 inches for residential and 7 inches for commercial.

16.4.1.4 **Flexible Pavement Design Requirements**

DB Contractor shall use Flexible Pavement System (FPS) - 21 software as the sole design methodology for flexible pavements. DB Contractor shall check all pavement thickness designs using the Modified Texas Triaxial design method, and other analyses methods necessary to prevent premature failure from subgrade rutting and fatigue. DB Contractor shall use design values recommended by the TxDOT *Pavement Manual*, Chapter 5, except as noted below.

16.4.1.4.1 **Minimum Layer Thickness**

Minimum layer thickness for all unbound materials used in flexible pavement designs shall be 6 inches.

16.4.1.4.2 **Pavement Design Life**

DB Contractor shall use 30 years for flexible pavement types.

16.4.1.4.3 **Minimum Time to First Overlay**

DB Contractor shall use 15 years for mainlane design and ramps, and 12 years for all other lanes.

16.4.1.4.4 **Reliability Level**

DB Contractor shall use Level C (95%) for flexible pavement designs.

16.4.1.4.5 **Design Moduli**

Design moduli shall not exceed the maximum values in Table 16-4, as established from methods and criteria stated below, and in accordance with layer thickness specified in Table 16-4.

Table 16-4: Design Structural Values for HMA Pavements

Material Type	TxDOT Standard or Special Specifications	Modulus for TxDOT FPS 21
Dense-Graded HMA	Item 341	Combined HMA thickness: ≤ 4.0” use 500 ksi > 4.0” use 650 ksi
Permeable Friction Course (PFC) and Thin Bonded Friction Courses (TBFC)	Item 342 and 348	300 ksi
Superpave Mixtures	Item 344	Combined HMA thickness: ≤ 4.0” use 650 ksi 4.0” < T ≤ 6.0” use 750 ksi > 6.0” use 850 ksi
SMA	Item 346	Same as Item 344
TOM	Item 347	Same as Item 344 (maximum thickness of 1.0”)
Flexible Base (Unbound Base)	Item 247, Grades 1- 2 or 5	*70 ksi (no more than 4X the untreated subgrade modulus)
Treated Base	Item 260	*75 ksi
	Item 275	*150 ksi
	Item 276	*150 ksi

Material Type	TxDOT Standard or Special Specifications	Modulus for TxDOT FPS 21
	Items 290 and 291	*200 ksi
	Item 292	*400 ksi
Treated Subgrade or Subbase	Item 260	*35 ksi**
	Item 275	*35 ksi**

* Maximum design values.
**Minimum modulus value for perpetual pavement design must be 35 ksi

16.4.1.5 **Rigid Pavement Design Requirements**

DB Contractor shall use the design procedures outlined in the TxDOT *Pavement Manual* as the design methodology for all rigid pavement design. TxDOT's TxCRCP-ME is the required design procedure for CRCP and the 1993 American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures is the approved design method for Concrete Pavement Contraction Design. DB Contractor shall use design values recommended by the TxDOT *Pavement Manual*, Chapter 8, and the applicable TxDOT Standard Specifications for joint and reinforcement design. DB Contractor shall select one of the two base layer combinations in Section 3.2.8 of the TxDOT *Pavement Manual*, Chapter 8.

DB Contractor shall comply with the requirements in Item 29, "Tolling," for the pavement design at Toll Zones.

Pavement Design Life:

DB Contractor shall use a 30-year pavement design life for all rigid pavement types and locations.

For CRCP design:

DB Contractor shall use the design input values specified in Table 16-5:

Table 16-5: Design Input Values for CRCP

Design Criteria	Input Value
28-day Modulus of Rupture	570 psi
Maximum Number of Punch Outs per mile	10
Maximum Modulus of Layer	500 ksi for cement treated base (CTB) 400 ksi for asphalt treated base (ATB) or HMA

DB Contractor shall use CRCP(1)-24 or CRCP(2)-24, as appropriate, of the TxDOT Engineering Standard Sheets for reinforcement.

16.4.2 **Reserved**

16.4.3 **Reserved**

16.4.3.1 **Reserved**

16.4.3.2 **Reserved**

16.4.4 **Use of Shoulders to Carry Construction Traffic**

DB Contractor shall perform a structural evaluation of all shoulders proposed to carry mainlane traffic during construction. DB Contractor shall use the non-destructive testing and field sampling to characterize the existing structural condition. As a minimum, ground penetration radar (GPR) survey shall be undertaken for this structural evaluation. The Pavement Design Report shall include the results of a shoulder evaluation. Shoulders carrying traffic shall be designed, strengthened or rehabilitated to provide continuous service to traffic without requiring intermittent maintenance during the in-service period.

16.4.5 **Pavement Widenings**

For widening of existing pavement sections, DB Contractor shall provide documentation of criteria and rationale for the construction approaches selected to widen sections. DB Contractor shall comply with the TxDOT *Pavement Manual*, historical performance, and TxDOT Houston District guidelines when designing the widened sections and selecting construction approaches. If DB Contractor's pavement design of the widened section does not match the existing section, DB Contractor shall submit an analysis to address concerns about blocking subsurface moisture flow and to minimize the risk of failure of the construction joint between the different pavement structures. DB Contractor shall maintain positive pavement drainage between the existing section and widened section.

For widened section areas that will be used as a travel lane, DB Contractor shall develop a full Pavement Design Report for that lane in accordance with Section 16.4.6. DB Contractor shall also provide a structural evaluation of the existing travel lanes and existing shoulders to ensure they are adequate to carry the design traffic loads. The design, analysis and structural evaluation requirements of this Section 16.4.5 shall be included in the Pavement Design Report.

Longitudinal construction joints for all pavement layers along the existing and new pavement sections shall be placed within 6 inches from the final in-service lane stripe or the center of the lane. Geotextiles or stress absorbing membrane interlayer may be placed over the widening joint to delay reflective cracking prior to performing asphalt overlays only.

For all widened sections, the interface between the new widened pavement and the existing pavement shall provide a uniform surface of the same material type across all adjacent lanes. In areas where an existing asphalt surface is in place and widening is required, a new surface course overlay will be required over the existing and widened pavements, with the surface HMA longitudinal joint offset from the underlying layers' longitudinal joint by at least 6 inches.

16.4.6 **Required Pavement Design Reports**

The Pavement Design Report developed by DB Contractor shall be signed and sealed by a Licensed Professional Engineer (PE). Each preliminary Pavement Design Report shall include all information and analyses and upon completion and including any later supplements or amendments, shall be submitted to TxDOT for review and comment no later than the date related Design Work is provided for TxDOT review. Toll Zone pavement design shall be submitted separately and shall comply with Item 29.

DB Contractor shall submit each final Pavement Design Report to TxDOT for approval with the Released for Construction Documents submitted for review and no later than 10 Business Days prior to commencement of the applicable Construction Work. In addition to those requirements in the TxDOT *Pavement Manual*, Pavement Design Report(s) shall document the assumptions, considerations, and decisions contributing to DB Contractor's pavement designs, including the following:

- Pavement design details by location, including structural layer materials, general specifications, and thicknesses;
- Basic life-cycle cost considerations as described in Chapter 2 of the TxDOT *Pavement Manual*. Use a life cycle cost analysis (LCCA) tool that allows for input of essential cost items; at a minimum consider future maintenance, resurfacing, reconstruction and other rehabilitation measures, describing what these activities are likely to entail. Do not include user costs.
- Relevant pavement evaluation data (structural and functional) and condition information on adjacent roads (all frontage roads and cross streets);
- Site conditions which might influence the design and performance of pavements;
- Relevant geotechnical data and drainage requirements, including boring logs, laboratory soil test results, and active or passive drainage system design;
- Design criteria used in determining the pavement design(s), including traffic loads, and resulting ESAL projections documenting all assumed input values, pavement material characterization, environmental conditions, and pavement design life;
- Include TxDOT Form 2088 – Surface Aggregate Selection Form as part of flexible pavement design only for determining the appropriate Surface Aggregate Classification (SAC) of the

aggregate used for the final HMA riding surface and any temporary pavement to be in services longer than 90 days;

- Other considerations used in developing the pavement design(s), including subgrade preparations and stabilization procedures; and
- Description for selection of material types and grades.

DB Contractor shall include the proposed permanent, detour, temporary, transition pavement (from concrete to flexible) and rehabilitated pavement designs for the Project in its Final Design and shall indicate the applicable roadway and station limits for each pavement design. DB Contractor shall provide a tabulation of all pavement design software input values for each pavement layer, falling weight deflectometer (FWD) data, TxDOT MODULUS outputs, calculated values and relationships, or other basis for the pavement thickness designs, and include station limits.

16.5 **Geotechnical Design of Other Elements**

The scope of the DB Contractor subsurface geotechnical investigations shall include research and analysis that DB Contractor considers necessary to provide a safe and reliable roadway, embankment and cut slopes, bridge foundations, noise and sign structures, high mast lighting foundations, drainage structures, temporary and permanent retaining walls, excavation support systems, and any other facilities for the Project. Structural design requirements are described in Item 21.

DB Contractor shall use the TxDOT *Geotechnical Manual - LRFD.* For design and construction elements not addressed by the TxDOT *Geotechnical Manual - LRFD*, DB Contractor shall use the AASHTO *LRFD Bridge Design Specifications*.

16.5.1 **Embankments**

All embankment layers shall be compacted using density control only.

16.5.2 **Foundations**

Structure foundation type selection considerations shall be evaluated including suitability of subsurface conditions anticipated loads, scour, and construction staging. As required by the TxDOT *Geotechnical Manual - LRFD,* bridge foundations shall consist of either drilled shafts or piling.

Geotechnical analyses for foundations of drainage structures, bridge structures, sign structures, lighting structures, ITS structures, ETCS structures, retaining walls, Noise Barriers, embankments, and any other structures, shall be performed. The analyses shall include recommended bearing strata, deep foundation length and evaluations of bearing capacities and predicted settlements.

16.5.3 **Retaining Walls**

Applicable retaining wall types shall be evaluated for each location to be used including geometry, site constraints, aesthetics, and constructability considerations. DB Contractor shall perform this evaluation for temporary and permanent retaining walls. DB Contractor shall ensure the retaining walls are evaluated and designed in accordance with the TxDOT *Geotechnical Manual - LRFD* and the associated TxDOT Standards for the wall type considered.

All retaining walls shall be provided with drainage behind the wall to control groundwater levels. Where pavement drainage in front of the wall is provided by storm sewer system the retaining wall drainage shall tie into the storm sewer system.

Retaining wall analyses shall include external stability, global stability, and settlement analysis. Analyses shall include computation of the factor of safety for bearing capacity, global stability, overturning and sliding. Global stability shall be evaluated for short term (undrained) and long term (drained) conditions and for rapid drawdown conditions if the base of wall is below the 100-year frequency event water surface elevation. If required, the drawdown assumed shall be the greater of 3 feet or the height of the water surface elevation of the 100-year frequency event above the base of the wall. The design required for short-term and long-term global stability of all slopes and retaining walls shall be in accordance with the TxDOT *Geotechnical Manual - LRFD*.

In addition, DB Contractor shall evaluate allowable bearing pressure, passive earth pressure, friction factor, settlement and lateral earth pressure in the analysis of the retaining walls. All backfill shall meet the

requirements of Section 2.4 of Item 423, *Retaining Walls*, of the TxDOT Standard Specifications. Item 132, *Embankment*, as referenced in Item 423, shall be amended by special provision 132-001. For non-select backfill, the wet unit weight shall be consistent with the material used and shall not be assumed less than 115 pounds per cubic foot. Bearing capacity analysis shall account for the presence of utility trench excavations or slopes in front of the wall. Where retaining walls are used for cut sections the p-y curve type and related parameters for each major stratum shall be provided.

Additional requirements for retaining walls are described in Item 21.

16.5.4 **Slope Stability Analysis**

Slope stability analyses shall be performed by the DB Contractor for embankment and excavation, including roadway cut and fill sections, bridge end slopes, 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. If the base of embankment or excavation is below the 100-year frequency event water surface elevation, the slope shall be evaluated for rapid drawdown conditions. If required, the drawdown assumed shall be the greater of 3 feet or the height of the 100-year frequency event water surface elevation above the base of the slope. The design required for short-term and long-term global stability of all slopes shall be in accordance with the TxDOT *Geotechnical Manual - LRFD*. 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.

16.5.5 **Settlement**

DB Contractor shall perform quantitative settlement analyses to determine the post-construction settlements at the finished ground surface. These analyses shall consider both total and differential settlements. Quantitative settlement analyses shall consider the compressibility of the proposed fill and the underlying soil and rock and their potential for settlement due to the weight of the fill, the weight of proposed structures, and any permanent lowering of the groundwater table that may result from the Construction Work. These evaluations shall consider, but not be limited to, immediate settlement, primary consolidation, secondary compression, hydro-compression, and expansion.

DB Contractor shall perform settlement analyses for all embankments and retaining walls. Where differential settlement between retaining walls or embankments and adjacent bridge structures exceeds 1 inch, measures to reduce settlement of the retaining wall and approach embankment shall be provided such that differential settlement is reduced to 1 inch or less at the interface with the bridge abutment.

Allowable total and differential settlement of retaining walls and other structures shall be determined for each structure based on guidance provided in the AASHTO *LRFD Bridge Design Specifications*.

Where fills greater than 10 feet tall will be constructed over existing subsurface Utilities, the settlement of the Utility due to the fill shall be calculated and the need for protective measures shall be assessed.

16.5.6 **Corrosion**

DB Contractor shall 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. DB Contractor shall provide recommendations to mitigate the effects of corrosion consistent with the requirements of ACI 318 and the design life of the facility.

16.5.7 **Ground Improvement**

DB Contractor shall design and construct ground improvements as needed to bring discrete and differential settlements within tolerances, to control swelling and expansive soils, and to protect structures for both a design life and service life as required in applicable sections of these Design-Build Specifications. Calculated movements with the potential to damage or cause a failure to meet the performance standards of these Design-Build Specifications for Project retaining walls, Noise Barriers, pavement, embankment, and other structures shall be mitigated with ground improvements. Movement calculations for walls shall include vertical, horizontal, and rotational displacement, and movement calculations for embankments and roadbeds shall include vertical displacement.

To the extent that ground improvements are required or recommended, DB Contractor's design shall conform to the AASHTO *LRFD Bridge Design Specifications* and to the relevant FHWA *Geotechnical Engineering Circular. 13 – Ground Modifications Methods Reference Manual*.

16.5.8 **Instrumentation and Monitoring**

DB Contractor shall provide recommendations for instrumentation and monitoring of settlement, stability, vibrations, etc. during Construction Work as required to achieve safe and reliable construction staging and to ensure safety of existing facilities and traveling public.

16.5.9 **Geotechnical Reports for Other Elements**

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

- Descriptions of field investigations and laboratory test results used to characterize subsurface conditions. Boring logs shall be provided including descriptions of the soil/rock, standard penetration test results, in-situ test results, and percent recovery and rock quality designation (RQD) for rock cores.
- Plan view of field sampling locations (field test plan) with proposed structures and project centerline shown, boring logs and other field data, laboratory test results, calculations, and analyses that support design decisions. DB Contractor shall provide state plane coordinates and elevations of every coring or boring location.
- The geology of the Project area, including soil and/or rock types, and drainage characteristics.
- A discussion of surface and subsurface site conditions and testing results with reference to specific locations on the Project.
- Design and construction parameters resulting from the geotechnical investigation and analysis. For major strata classified as cohesive (i.e., Unified Soil Classification System classification CL, CH, OL, or OH) parameters shall be determined based on laboratory testing including unit weight, moisture content, plastic limit, liquid limit, plasticity index, undrained shear strength, drained cohesion and angle of internal friction (if tested), consolidation properties (including initial void ratio, pre-consolidation pressure, over-consolidation ratio, compression index, recompression index, and coefficient of consolidation, if tested), and swell properties (including free swell and swell pressure, if tested). For major strata classified as cohesionless (i.e., Unified Soil Classification System classification ML, MH, SW, SP, SM, SC, GW, GP, GM or GC) parameters shall include estimated unit weight, angle of internal friction based on correlation with standard penetration test results, and D50 value based on laboratory test results for scour analysis (if tested). For major strata classified as rock parameters shall include unit weight, percent recovery, RQD, and drilling rate based on field data and unit weight and UCS based on laboratory test results.
- Documentation showing that adequate investigation, testing, analysis, design, mitigating measures and construction planning are applied to assess and provide for the effects of swell pressures from expansive soil and rock materials on foundations, pipes, and earth retaining structures.
- Geotechnical engineering analyses performed and the recommendations for design and construction of the facilities addressed in the report.
- Provide recommendations to mitigate the effects of corrosion consistent with the requirements of ACI 318 and the design life of the facility.

Each preliminary Geotechnical Engineering Report, upon completion and including any later supplements or amendments, shall be submitted to TxDOT for review and comment no later than 10 Business Days prior to commencement of the applicable Design Work.

DB Contractor shall submit each final Geotechnical Engineering Report to TxDOT for approval with the Released for Construction Documents provided for review and no later than 10 Business Days prior to commencement of the applicable Construction Work. Each report shall be signed and sealed by a PE.

16.6 Construction Quality

The IQF shall perform independent material testing, inspection, and audits as required by the Construction Quality Management Plan.

All testing required in the TxDOT Standard Specifications and the TxDOT Guide Schedule of Sampling & Testing for Design-Build Projects by the Independent Quality Firm (IQF) shall be conducted for each pavement layer, except where superseded by these Design-Build Specifications. DB Contractor shall also ensure that the design assumptions are met by the testing requirements described in this Section 16.6.

When performing Construction Work under or adjacent to existing structures or Utilities, 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, DB Contractor shall coordinate excavation activities in accordance with Item 13 and Item 14. For those occurrences involving TxDOT's structures and Utilities, DB Contractor shall coordinate excavation activities with TxDOT.

16.6.1 Field Verification of Design Subgrade Modulus for Flexible Pavements

The IQF shall perform the following field testing for field verification of the design subgrade modulus.

16.6.1.1 100 Percent Coverage Testing

The following two options are permitted for coverage testing of the compacted subgrade (both treated and untreated) layer. The 100-percent coverage testing shall be completed prior to performing Point Specific – Testing using DCP test per Section 16.6.1.2. For untreated subgrade, the IQF shall complete the testing within 24 hours of the completion of compaction. On treated subgrade layers, the IQF shall allow the compacted material to cure a minimum of three days before testing.

Option 1 Proof Rolling: IQF shall follow the requirements of Item 216, *Proof Rolling*, of the TxDOT Standard Specifications. All areas which are determined as unstable or that rut more than 0.5 inch shall be considered as failures and require corrective action.

Option 2 Intelligent compaction (IC): To be performed on top of the compacted subgrade or treated subgrade. The IQF shall develop a color-coded "proof-mapping" chart in accordance with criteria listed in Table 1 from TxDOT special specification 2304 (2004), *Intelligent Compaction of Soil and Flexible Base*, provided in the RIDs. Red-mapped areas constituting locations not achieving at least 25% of the Intelligent Compaction Measured Value shall be further evaluated by the IQF with the DCP to determine depth of weak material for corrective action.

16.6.1.2 Point Specific - Testing

When using proof rolling, the IQF shall perform one DCP test in accordance with ASTM D6951 for every 250-linear foot section of roadbed to estimate the subgrade elastic modulus (E) using the equation listed in the TxDOT *Pavement Manual*. The IQF shall use ASTM D 3665 to select one random location for each 250-foot section. All locations shall be greater than 1 foot from the future edge stripe.

When using proof-mapping IC data of the compacted layer, the IQF shall perform one DCP test in accordance with ASTM D6951 for every 250 linear foot section of roadbed for those locations classified as "red-mapped," or as directed by TxDOT. The IQF shall perform one DCP test for every 1000-linear foot section of roadbed for non-"red-mapped" locations. The IQF shall use ASTM D 3665 to select one random location for each test section. All locations shall be within and greater than 1 foot from the future edge stripe.

The process for the IQF shall be as follows:

- Perform DCP tests to a depth of 3 feet. If a test location meets refusal, then select an alternate location within 2 to 5 feet to begin a new test. Refusal is defined as slow or no penetration progress where the penetration rate is less than 1 inch in a 10-blow set anywhere within the top 1 foot of subgrade material. If refusal is met after penetrating at least 1 foot, then the results to the depth of refusal shall be used.
- Convert the DCP data for each test to an estimated subgrade E for each 6-inch interval of penetration using the equations given in the TxDOT *Pavement Manual*.
- Compare subgrade E for each 6-inch interval of penetration in the section to the design value.

- If the subgrade E for each 6-inch interval of penetration in the section meets or exceeds the design value, then review proof rolling. If proof rolling passes, then accept section.
- If no estimated subgrade E result for any 6-inch interval of penetration is below 50% of the design value, take the average of results for all 6-inch intervals and compare to design value. If the average subgrade E for all intervals is computed to be higher than the design value, then accept the section provided proof rolling passes. If the computed average is less than the design value, perform two additional DCP tests (one on either side) 10 feet longitudinally from the original test to determine the extent of the weak area. Continue testing at additional 10-foot increments until results no longer show weakness. DB Contractor shall determine a course of action to correct the weak areas. The IQF shall reevaluate following DB Contractor's corrective action.
- If subgrade E for any 6-inch interval of penetration in the section is below 50% of design value, take two additional DCP tests (one on either side) 10 feet longitudinally from the original test to determine the extent of the weak area. Continue testing at additional 10-foot increments until results no longer show weakness. DB Contractor shall propose options to address these failed areas. The IQF shall reevaluate following DB Contractor's corrective action.

If corrective action is required, DB Contractor shall develop options for consideration. These could include:

- Calcium-based treatment;
- Reworking failing areas;
- Excavating existing subgrade and replacing with material meeting requirements in Section 16.3, to a depth that meets requirements; or
- Other options as recommended by DB Contractor with TxDOT approval.

Additional pavement thickness shall not be considered corrective action.

16.6.2 **Smoothness Specification**

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

All travel lanes (including newly constructed or rehabilitated) within the Project limits and areas identified as travel lanes in the facility's ultimate configuration shall be tested in accordance with TxDOT Standard Specifications as travel lanes. Exceptions to Type B testing requirement include pavement described in articles 585.3.1.1.2 through 585.3.1.1.5.

Article 585.3.1.1.1. Frontage roads and Ramps. Use Surface Test Type B on all frontage roads and on ramps greater than 2,500 feet.

Article 585.3.3. Acceptance Plan and Payment Adjustments. DB Contractor shall evaluate profiles for determining acceptance and corrective action. The entire section is voided and replaced by the following:

Article 585.3.3.1. Surface Test Type A. Use diamond grinding or other approved work methods to correct surface areas that have more than 1/8-inch variation between any two contacts on a 10-foot straightedge. For flexible pavements, fog seal the aggregate exposed from diamond grinding in accordance with Item 315, *Fog Seal*, of the TxDOT Standard Specifications and apply the mixture when precipitation is not expected within the first three hours after opening to traffic. Following corrective action, retest the area to verify compliance with this Item 16. Diamond grinding is not allowed on the final HMA riding surface except for localized areas as approved by TxDOT.

Article 585.3.3.2. Surface Test Type B. International roughness index (IRI) values will be calculated using the average of both wheel paths using Department Ride Quality software. Localized roughness will be determined using the individual profile from each wheel path using an inertial profiler in accordance with Tex-1001-S. A Nonconformance Report (NCR) and a 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 85 inches per mile for rigid pavements, in excess of 65 inches per mile for flexible pavements, or for correction of localized roughness. For the outside lane on frontage roads directly adjacent to curb and gutter, corrective action is not required to correct IRI; these lanes are not exempt from corrective action for localized roughness.

Use diamond grinding or other approved work methods to correct IRI deficient sections and localized roughness.

After making corrections, re-profile the pavement section to ensure that corrections have achieved the required level of smoothness. It is recommended to conduct profiler measurements when an HMA layer is directly below the final surface to identify need for corrective action prior to final HMA lift in order to obtain desired IRI on final surface. For flexible pavements, DB Contractor shall fog seal the aggregate exposed when diamond grinding is used in accordance with Item 315 of the TxDOT Standard Specifications and apply the mixture when precipitation is not expected within the first three hours after opening to traffic. Diamond grinding is not allowed on the final HMA riding surface except for localized areas as approved by TxDOT.

When diamond grinding is used on concrete pavements, ensure thickness and clear cover requirements are met in conjunction with corresponding specification. When diamond grinding is used on concrete pavements, groove the pavement longitudinally when grinding in curves, on banked pavement, on long stretches (>100'), or when directed by the TxDOT.

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

16.7 **Verification of the Design Modulus**

For both rigid and flexible pavements, DB Contractor shall perform FWD testing to verify the design modulus of permanent materials. FWD testing shall be performed on the right wheel paths and the data shall be stored in raw format (.FWD files), including Global Positioning System (GPS) coordinates for each drop. DB Contractor shall provide the FWD data in the required format to TxDOT within 48 hours of test completion. FWD testing is not required on temporary materials.

For rigid pavements, FWD testing shall be conducted on top of the asphalt base or cement treated base prior to placing the asphalt bond breaker, and prior to placement of any concrete. For flexible pavements, FWD testing shall be conducted on top of the base layer prior to placement of any hot-mix asphalt or prime material. For treated bases, DB Contractor shall allow a minimum of three days following final compaction before testing. Testing shall be conducted at 100-foot intervals in each travel lane.

The FWD shall conform to TxDOT Standard Specifications as described in the TxDOT *Pavement Manual* (seven sensors at 1-foot spacing). The test load shall be as close as possible to 9000 pounds.

After collecting FWD data, the IQF shall have a PE review the data to evaluate the results. Based on this evaluation, the IQF shall report to the DB Contractor any areas that require re-evaluation and shall coordinate with TxDOT to discuss and determine a path forward.

16.8 **Submittals**

All Submittals described in this Item 16 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 16-6. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 16-6: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Boring plan and traffic control plans associated with subsurface pavement investigations	Prior to performing any investigations	Approval	16.2.1
Preliminary Pavement Design Reports	No later than the date related Design Work is provided to TxDOT for review	Review and comment	16.4.6

Table 16-6: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Final Pavement Design Reports	With the Released for Construction Documents submitted for review and no later than 10 Business Days prior to commencement of the applicable Construction Work	Approval	16.4.6
Toll Zone Preliminary Pavement Design Reports	No later than the date related Design Work is provided to TxDOT for review	Approval	16.4.6
Toll Zone Final Pavement Design Reports	With the Released for Construction Documents submitted for review and no later than 10 Business Days prior to commencement of the applicable Construction Work	Approval	16.4.6
Preliminary Geotechnical Engineering Reports	No later than 10 Business Days prior to commencement of the applicable Design Work	Review and comment	16.5.9
Final Geotechnical Engineering Reports	With the Released for Construction Documents provided for review and no later than 10 Business Days prior to commencement of the applicable Construction Work	Approval	16.5.9
FWD data	As part of the daily Quality Control inspection and test reports described is the TxDOT Quality Assurance Program for CDA/Design-Build Projects (QAP) and upon TxDOT request	For information	16.7

Item 17
Land Surveying

17.1 **General Requirements**

Design-Build (DB) Contractor shall provide accurate and consistent land surveying and mapping necessary to support Right of Way (ROW) acquisition, 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 as required to complete its Work. DB Contractor is responsible for the precision, accuracy, and comprehensiveness of all survey and mapping.

17.2 **Administrative Requirements**

17.2.1 **Standards**

DB Contractor shall ensure that all surveying conforms to the TxDOT *Survey Manual,* the TxDOT *Surveyors' Toolkit*, and the Texas Board of Professional Engineers and Land Surveyors (TBPELS) *Texas Engineering and Land Surveying Practice Acts and Rules Concerning Practice and Licensure.* DB Contractor shall obtain TxDOT approval for any variance to standards as described in TxDOT *Survey Manual* and TxDOT *Surveyors' Toolkit* in place at the time of Proposal Due Date. DB Contractor shall ensure that any person in charge of a survey field party is proficient in the technical aspects of surveying.

17.2.2 **Right of Entry (ROE)**

DB Contractor shall secure written permission from the property owner, utilizing the form from the TxDOT *Surveyors' Toolkit*, prior to entering any private property outside the Project ROW. It shall be DB Contractor's sole responsibility to negotiate and obtain this permission and DB Contractor shall be responsible for any and all damages and claims resulting from that ingress. DB Contractor shall maintain proper documentation of ROE at all times and shall provide ROE documentation to TxDOT upon request.

17.2.3 **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 adjoining project regarding planned Construction Work. DB Contractor shall notify TxDOT within two Business Days if TxDOT stakes and marks are altered or disturbed.

17.3 **Design Requirements**

17.3.1 **Survey Control Requirements**

DB Contractor shall base all additional horizontal and vertical control on the Level 2 and Level 3 control provided by TxDOT. DB Contractor shall be responsible for tying into TxDOT continuously operating reference stations (CORS) vertical control and local monumentation. DB Contractor shall verify owner provided survey control and provide verification results to TxDOT monthly after Notice to Proceed 2 (NTP2).

DB Contractor shall establish and maintain additional survey control, as needed, and Project ROW monumentation throughout the Term. DB Contractor shall tie any additional horizontal and vertical control for the Project to the TxDOT-supplied Primary (Level 2) or Secondary (Level 3) control network. If DB Contractor chooses to use Global Positioning System (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 Primary survey control provided by TxDOT. All survey control points shall be set or verified, as applicable, by a Registered Professional Land Surveyor (RPLS) licensed in the State.

DB Contractor shall establish and maintain a permanent survey control network. The control network should consist of, at a minimum, monuments set in indivisible pairs at spacing of no greater than 3 miles.

Monuments shall be set and marked as directed by the TxDOT *Survey Manual*. DB Contractor shall replace all existing survey monuments and control points disturbed or destroyed during execution of the Work. 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.

17.3.2 **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 condition of survey as defined in the TxDOT *Survey Manual* and the TxDOT *Surveyors' Toolkit*.

Vertical control is to be established as defined in the TxDOT *Survey Manual* and the TxDOT *Surveyors' Toolkit*.

17.3.3 **ROW Surveys**

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

DB Contractor shall coordinate with TxDOT regarding the assignment of ROW control section job (RCSJ) numbers for each new mapping project.

The documents produced by DB Contractor, or its Subcontractors, are the property of TxDOT, and release of any such document must be approved by TxDOT. All topographic mapping created by DB Contractor shall be provided to TxDOT in digital terrain model format using the software and version thereof being used by TxDOT at the time the mapping is developed. Subject to Section 15.2.4 and Section 15.3.1, DB Contractor shall provide two sets of all mapping to TxDOT, unless otherwise directed by TxDOT. DB Contractor shall obtain and address all TxDOT comments to TxDOT's satisfaction prior to signing maps.

In preparing the property description, the following will be required:

- Scanned copies of the deeds on universal serial bus flash drive and a graphics file of the abstract map; and
- Scanned copies of the field notes, control sketches, and a graphics file of all field survey data.

DB Contractor shall submit the following interim mapping products:

- A Preliminary ROW layout to determine if there are any changes to the proposed ROW; and
- An initial copy of the ROW map for review purposes.

17.3.3.1 **ROW Survey Accuracy Standards**

In performing ROW surveys consisting of boundary locations, DB Contractor shall perform surveys in conformance to rules of the TBPELS, and shall meet the accuracy standards of the appropriate level of survey as defined in the current Texas Society of Professional Surveyors (TSPS) *Manual of Practice*.

17.3.4 **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. The report shall provide control from adjoining, incorporated, or crossed roadway projects that are currently in design, and show a comparison of the horizontal and vertical values. DB Contractor shall provide survey records and reports to TxDOT monthly.

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 by DB Contractor 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 monthly.

17.3.5 **Units**

All survey Work shall be performed in units system of measurement and scale factors as defined in the TxDOT *Survey Manual* and the TxDOT *Surveyors' Toolkit*. Work shall conform to Texas State Plane

Coordinate System, South Central Zone (4204), NAD83 (2011) adjustment Epoch 2010.00. The surface adjustment factor for the Project is 1.00013.

17.4 Construction Requirements

17.4.1 Construction Surveys

DB Contractor shall perform all construction surveys in accordance with the applicable TxDOT Standards, TxDOT *Survey Manual*, TxDOT *Surveyors' Toolkit*, and as set forth in the Contract Documents.

Prior to the start of Construction Work, including clearing, grubbing and removals, DB Contractor shall provide, protect and maintain staking with project centerline stationing signage to be utilized by TxDOT and its consultants for documentation of locations in the field. Staking shall be at intervals not to exceed 1,000 feet. These stakes shall be removed following Substantial Completion or as approved by TxDOT.

17.4.2 ROW Monuments

Upon final submittal from DB Contractor of the Project ROW documents to TxDOT, DB Contractor shall cause the surveyor to set, using permanent and stable monuments as described in Section 138.87 of the TBPELS *Texas Engineering and Land Surveying Practice Acts and Rules Concerning Practice and Licensure*, all significant points along all ROW lines of the Project including, but not limited to, the following:

- Point of curvature (PC)s;
- Point of tangency (PT)s;
- Point of intersection (PI)s;
- Point of compound curvature (PCC)s;
- Point of reverse curvature (PRC)s;
- All intersecting crossroad ROW lines and all property line intersections with the ROW line; and
- All beginning and ending points of control of access (denied) lines.

DB Contractor shall ensure that upon completion of the ROW acquisition and all Construction Work, such that the final Project ROW lines will not be disturbed by construction, DB Contractor shall replace all rod-and-cap monuments located on the final Project ROW line at all PCs, PTs, PIs, PCCs, and PRCs, and all intersecting crossroad Project ROW lines, with TxDOT Type II monuments (constructed according to the TxDOT ROW manuals and the TxDOT *Survey Manual*), unless otherwise directed by TxDOT. DB Contractor shall monument with a TxDOT Type II monument all final Project ROW lines where the distance between such significant Project ROW line points exceeds 1,500 feet. Project ROW line intersections with intersecting crossroad Project ROW lines shall be monumented by 1/2-inch iron rods, driven just below surface level, capped by a TxDOT-labeled aluminum cap (rod-and-cap monument). Project ROW line intersections with property lines shall remain monumented by a 5/8-inch iron rod with a TxDOT aluminum cap (rod-and-cap monument). A TxDOT Type II monument shall be set on the Project ROW lines, perpendicularly left and right of each significant centerline point, regardless of the relative orientation of the final Project ROW line. DB Contractor shall ensure that the Project ROW monuments shall be set by a survey crew working under the direction of a RPLS, licensed to practice in Texas.

DB Contractor shall purchase all materials, supplies, and other items necessary for proper survey monumentation. DB Contractor may purchase Type II monuments from TxDOT. TxDOT shall make available for pick-up by DB Contractor Type II monuments within 75 days after TxDOT receives from DB Contractor a written order, specifying the number of monuments to be purchased. Payment for TxDOT-supplied monuments shall be due within 30 days after TxDOT delivers to DB Contractor a written invoice. DB Contractor shall use these monuments only for this Project and shall be responsible for proper storage thereof.

Subject to the requirements in Section 15.3.1, DB Contractor shall submit updated ROW maps with the ROW monumentation information. (This is for final monumentation set, for example, type II, and type of monuments set, etc.).

17.4.3 Record Documents

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

- A listing of all primary and secondary control coordinate values, original computations and other records, including GPS observations and analysis made by DB Contractor;
- Copies of all survey control network measurements, computations, unadjusted and adjusted coordinates, and elevation values;
- Survey records and survey reports;
- Parcels for the ROW maps in Bentley OpenRoads Designer (ORD) format;
- Electronic files and paper copies of the ROW maps; and
- The final ROW maps consisting of the graphics files and two sets of the paper copy of the ROW maps, exhibits showing the metes and bounds description and parcel plat, signed and sealed by the surveyor. The required geo-referenced parcel data (features) for all existing and revised parcels shall be submitted in ArcGIS 10 format or the version in use by TxDOT at the time of the submittal, and in the format of TxDOT ROW Geo-Database Template "ROW_Parcels_Edits."

DB Contractor shall produce reports documenting the location of the as-built alignments, profiles, structure locations, utilities, and survey control monuments as part of the Record Documents as a condition of Final Acceptance. 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.

17.5 Submittals

All Submittals described in this Item 17 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 17-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 17-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
ROE documentation	Upon request	For information	17.2.2
Verification of owner provided survey control	After Notice to Proceed 2 (NTP2)	For information	17.3.1
Interim mapping products	Prior to signing Final ROW maps	Review and comment	17.3.3
A horizontal and vertical control report	Monthly	For information	17.3.4
Survey records and reports	Monthly	For information	17.3.4
Copies of all field notebooks	Monthly	For information	17.3.4
Updated mapping with any ROW monumentation information	Upon completion of the ROW acquisition and all Construction Work	For information	17.4.2
Record Documents	As a condition of Final Acceptance	For information	17.4.3

Item 18
Earthwork

18.1 General Requirements

Design-Build (DB) Contractor shall conduct all Work necessary to meet the requirements for grading, including clearing and grubbing, excavation and embankment, removal of existing buildings, concrete slabs, pavement and miscellaneous structures, subgrade preparation and stabilization, dust control, aggregate surfacing, and earth shouldering in accordance with the requirements of this Item 18 and the TxDOT Standard Specifications.

18.2 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 shall be submitted to TxDOT for approval prior to Notice to Proceed 2 (NTP2).

Subject to Section 15.4.5, DB Contractor shall demolish or abandon in place all existing structures within the Project Right of Way (ROW) no longer required for service, including, but not limited to: pavements, bridges, and headwalls. Any features that are abandoned in place shall be removed to an elevation at least the lower of 2 feet below the final finished grade or 1 foot below the pavement subgrade and drainage structures. DB Contractor shall ensure that abandoned structures are structurally sound after abandonment.

TxDOT reserves the right to require DB Contractor to, at any time, salvage and deliver TxDOT-owned equipment and materials, including Intelligent Transportation System equipment and materials, in an undamaged condition to a location designated by TxDOT. The location shall be within the TxDOT District in which the Project is located.

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.

18.3 Slopes and Topsoil

DB Contractor shall comply with the TxDOT *Roadway Design Manual* and roadway design criteria in Item 19 regarding design limitations and roadside safety guidelines associated with the design of slopes along roadways. In the event of conflicting design requirements, criteria in Item 19 shall supersede the TxDOT *Roadway Design Manual*.

DB Contractor shall perform finished grading and place topsoil to a minimum depth of 4 inches 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, and DB Contractor shall stabilize these slopes in accordance with Section 18.4. 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. DB Contractor shall provide stable slopes.

For designated construction easements and other approved Project Specific Locations outside DB Contractor's limits of maintenance, DB Contractor shall provide stable slopes.

DB Contractor shall not use slopes steeper than 4:1 (H:V) unless required due to constructability constraints. For those cases where slopes are proposed steeper than 4:1 (H:V), 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 prior to Final Design Submittal. DB Contractor shall pave slopes steeper than or equal to 2:1 with concrete riprap.

Slopes that are to remain unpaved must accommodate 10-foot-wide tractor-mounted mower access from the Project roadways. In areas where there are no frontage roads, DB Contractor may utilize access for mowing and maintenance operations directly from the mainlane shoulder. In areas where there are frontage roads

but where access for mowing and maintenance operations cannot be provided from the frontage road, slopes must be paved with concrete riprap unless DB Contractor receives prior approval from TxDOT for an alternative access point. DB Contractor shall pave areas less than 2 feet in width, shaded areas under or immediately adjacent to structures where vegetation is not easily established and maintained, drip lines below structures, and areas below structures with less than 10-foot vertical clearance with concrete rip rap.

Drip lines below structures shall be constructed using "RR9" as defined in TxDOT Engineering Standard Sheet "MS-CRR-24".

18.4 **Stabilizing Disturbed Areas**

DB Contractor shall establish and maintain all erosion and sediment controls in accordance with the approved storm water pollution prevention plan, and the condition of the erosion and sediment controls shall be in good working order throughout construction of the Project. DB Contractor shall stabilize disturbed areas on which Construction Work has ceased temporarily or permanently, within 14 days unless they are scheduled to resume construction within 21 days. The areas adjacent to creeks and drainage ways have priority followed by devices protecting storm sewer inlets. Block sod shall be placed at a six-foot width along the edge of pavement including back of curb, bridge drip edges, headwalls, wingwalls, culverts, inlet edges, ground box edges, and manhole edges. DB Contractor shall ensure any fabric associated with rolled block sod is removed prior to placement. Unless otherwise noted in this Item 18 or elsewhere in the DB Specifications, all seeding requirements shall conform to the *Houston District Seeding and Sodding for Erosion Control Policy* included in the RIDs.

18.5 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 18 and the TxDOT Standard Specifications.

18.6 **Submittals**

All Submittals described in this Item 18 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 18-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 18-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Demolition and Abandonment Plan	Prior to NTP2	Approval	18.2
Slope stability analysis	Prior to Final Design Submittal	Approval	18.3

Item 19
Roadways

19.1 **General Requirements**

Design-Build (DB) Contractor shall coordinate roadway design, construction, and maintenance with other elements of the Project to achieve the Project objectives. The requirements contained in this Item 19 provide the framework for the design and construction of the roadway improvements to help attain the Project objectives.

Where changes to the roadway geometrics result in revisions to the Project Right of Way (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 acquisition services that are necessitated by proposed changes in accordance with the Contract Documents.

19.1.1 **Lead Roadway Design Engineer**

DB Contractor shall employ a Lead Roadway Design Engineer responsible for ensuring the design of the roadway is completed and design criteria requirements are met. The Lead Roadway Design Engineer shall be a Licensed Professional Engineer (PE) and be responsible for coordinating interdisciplinary design reviews in cooperation with leaders of other disciplines. The Lead Roadway Design Engineer or a PE reporting directly to the Lead Roadway Design Engineer shall be the Engineer of Record for the design of the roadway elements.

19.2 **Design Requirements**

DB Contractor shall complete the design of the Project roadways in accordance with the Basic Configuration as defined in Exhibit 1 of the Design-Build Agreement and the Schematic Design. Deviations from the Schematic Design shall be requested in accordance with Section 5.2.2.2.1 of the General Conditions.

DB Contractor shall design roadways to be consistent with the design of all other Elements of the Project, including, but not limited to, 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 TxDOT *Roadway Design Manual*.

DB Contractor shall design all Elements in accordance with the TxDOT *Roadway Design Manual,* American Association of State Highway and Transportation Officials (AASHTO) and TxDOT's policies, TxDOT Engineering Standard Sheets, Houston District standards, applicable design criteria, and Good Industry Practice based on the Design Speeds as shown in the Contract Documents. The most recent version of TxDOT Engineering Standard Sheets provided on TxDOT's webpage 30 days prior to the Proposal Due Date shall apply to the Project, regardless of the letting dates to which they apply.

In the event of a conflict between TxDOT Engineering Standard Sheets and Houston District standards, DB Contractor shall ensure Houston District standards are met.

DB Contractor shall design the Project roadways to incorporate roadway appurtenances, including but not limited to fences, barriers, and hazard protections as necessary to promote safety and to mitigate visual and noise impacts on neighboring properties.

All roadside safety devices and barrier systems used on the Project and as needed for Construction Work beyond the Project limits shall meet current crash test criteria as specified in the AASHTO *Manual for Assessing Safety Hardware (MASH)*, TxDOT *Bridge Railing Manual*, and other safety requirements and in accordance with TxDOT Engineering Standard Sheets. Metal beam guard fence (MBGF) shall only be used as protection end treatments for concrete barriers and shall not be used as the primary barrier system along any Project roadways.

19.2.1 **Control of Access**

Unless identified in and shown to be denied in the Schematic Design, DB Contractor shall maintain all existing property accesses, including those not shown on the Schematic Design, and shall not revise control of access without TxDOT review and the written agreement of the affected property owner. DB Contractor shall design new and revised exit and entrance ramps to meet the desirable spacing requirements between ramps and driveways, side streets, or cross streets listed in TxDOT *Roadway Design Manual* and TxDOT *Access Management Manual*. In locations where the desirable spacing cannot be achieved, DB Contractor shall submit to TxDOT for approval a demonstration why the spacing cannot be achieved and a request for permission to design and implement channelization methods per the TxDOT *Roadway Design Manual* and TxDOT *Access Management Manual*.

DB Contractor shall coordinate with landowner when tying-in to private property; shall replace necessary signs, mailboxes, fences, landscape features, and any other appurtenance; and shall coordinate all access.

19.2.2 **Design Criteria**

19.2.2.1 **Geometric Design Criteria**

DB Contractor shall design the elements of the Project to meet the geometric design criteria in Table 19-1 (Geometric Design Criteria), with the exclusion of the roadway design Deviations listed in Section 19.2.2.3 in order to meet the Project objectives.

Table 19-1: Geometric Design Criteria (see Note 1)

	SH 99 / SH 35 Mainlanes (See Note 10)	SH 99 / SH 35 Frontage Roads	Cross Streets
Functional Classification	Urban Freeway/Rural Arterial	Urban/Rural Collector	See Attachment 19-1
Design Speed	70 mph	45 mph	See Attachment 19-1
Stopping Sight Distance	730 ft	360 ft	305 ft
Horizontal Alignment Criteria:			
Maximum Curvature (Min Radius)	2,040 ft	643 ft	See Notes 5,6
Superelevation – e(max)	6%	6%	N/A
Maximum Curvature (Min Radius) w/o Superelevation	14,100 ft	6,480 ft	N/A
Vertical Alignment Criteria:			
Maximum Gradient	3%	7% (Urban) 6% (Rural)	7% (Urban) 6% (Rural)
Minimum Gradient (Uncurbed Pavement)	0.50% (See Note 2)	0.50% (See Note 2)	0.50% (See Note 2)
Crest (min K-Value)	247	61	See Note 7
Sag (min K-Value)	181	79	See Note 7
Maximum Algebraic Difference w/o Vertical Curve	0.5%	1%	1%
Min Vertical Clearance – Roadway	16 ft 6 in	16 ft 6 in	16 ft 6 in
Min Vertical Clearance – THFN	18 ft 6 in	18 ft 6 in (See Note 9)	18 ft 6 in (See Note 9)
Min Vertical Clearance – Over Railroad	23 ft 6 in	23 ft 6 in	23 ft 6 in
Cross Section Criteria:			
Lane Widths	12 ft	12 ft	12 ft
Inside Shoulder Widths	6 ft	4 ft (uncurbed)	See Attachment 19-2
Outside Shoulder Widths	10 ft	8 ft (uncurbed)	See Attachment 19-2
Pavement Cross Slope	2%	2%	2%
Side Slope Within Clear Zone	6:1 (See Notes 8, 13)	4:1	4:1

Side Slope Outside Clear Zone	6:1 usual 4:1 max	4:1 usual 3:1 max	6:1 usual 4:1 max
Curb Offset	N/A	1 ft	See Attachment 19-2
Clear Zone Width	30 ft	10 ft (See Note 11)	See Attachment 19-1
Intersection Horizontal and Vertical Criteria:			
Corner Radii	N/A	50 ft min	50 ft min
Design Vehicle (Intersection)	N/A	WB-62	See Attachment 19-1
Preferred Corner Geometry	N/A	Curve w/ taper	Simple Curve
Minimum Gradient	N/A	0.30%	0.30%

Table 19-1: Geometric Design Criteria (continued) (see note 1)

	Ramps (See Note 12)	Direct Connectors (See Note 10)	U-Turns
Functional Classification	Freeway Ramp	Freeway Ramp	Urban/Rural Collector
Design Speed	50 mph	50 mph	20 mph
Stopping Sight Distance	425 ft	425 ft	115 ft
Horizontal Alignment Criteria:			
Maximum Curvature (Min Radius)	833 ft	833 ft	2 ft
Superelevation – e(max)	6%	6%	2%
Maximum Curvature (Min Radius) w/o Superelevation	7,870 ft (See Note 3)	7,870 ft (See Note 3)	50 ft
Vertical Alignment Criteria:			
Maximum Gradient	5%	5%	6%
Minimum Gradient (Uncurbed Pavement)	0.50% (See Note 2)	0.50% (See Note 2)	0.50% (See Note 2)
Crest (min K-Value)	84	84	7
Sag (min K-Value)	96	96	17
Maximum Algebraic Difference w/o Vertical Curve	0.5%	0.5%	1.0%
Min Vertical Clearance – THFN	18 ft 6 in (See Note 9)	N/A	18 ft 6 in (See Note 9)
Min Vertical Clearance – Over Roadway	16 ft 6 in	16 ft 6 in	16 ft 6 in
Min Vertical Clearance – Under Roadway	16 ft 6 in	16 ft 6 in	16 ft 6 in
Min Vertical Clearance – Over Railroad	23 ft 6 in	23 ft 6 in	23 ft 6 in
Cross Section Criteria:			
Lane Widths	14 ft (one lane) 12 ft (two lanes)	14 ft (one lane) 12 ft (two lanes)	25 ft (from FOC to FOC)
Inside Shoulder Widths	4 ft	4 ft (See Note 4)	N/A
Outside Shoulder Widths	6 ft	8 ft (See Note 4)	N/A
Pavement Cross Slope	2%	2%	2%
Side Slope Within Clear Zone	6:1	6:1	6:1
Side Slope Outside Clear Zone	6:1 usual 4:1 max	6:1 usual 4:1 max	6:1 usual 4:1 max
Curb Offset	N/A	N/A	N/A
Clear Zone Width	16 ft	16 ft	6 ft
Clear Zone Width Behind Curb	N/A	N/A	4 ft (from FOC)
Gore Width - Entrance	4 ft min	4 ft min	N/A

Gore Width - Exit	4 ft min	4 ft min	N/A
Intersection Horizontal and Vertical Criteria:			
Corner Radii	N/A	N/A	N/A
Design Vehicle (Intersection)	N/A	N/A	WB-62
Preferred Corner Geometry	N/A	N/A	Simple Curve
Minimum Gradient	N/A	N/A	0.30%

Notes:

1. Any conflict between the TxDOT *Roadway Design Manual* and Table 19-1, then Table 19-1 shall govern.
2. Flat or level grades can be used when, in accordance with the TxDOT *Roadway Design Manual*, the pavement is adequately crowned to drain the surface laterally and does not have a curb or barrier rail impeding the flow laterally and superelevation transitions are not co-located. Minimum gradients for curbed pavements shall be 0.30%.
3. A 2-degree curve may be used for mainlane exit ramp, mainlane entrance ramp, and direct connector baselines with the gore areas without superelevation, in which case the mainlane cross slope or superelevation may control through the gore area when the ramp (or direct connector) and mainlane curvature are in the same direction.
4. In those areas where sight distance criteria is not met, an inside shoulder width of 8 feet and outside shoulder width of 4 feet may be used. The shoulder widths shall remain constant on each side when inside and outside shoulder widths are reversed.
5. For design speeds <45 mph, maximum curvature shall be in accordance with the TxDOT *Roadway Design Manual*, Table 4-4.
6. For design speeds ≥45 mph, maximum curvature shall meet the "Usual Minimum" per the TxDOT *Roadway Design Manual*, Table 4-6, where e(max)=6%. Frontage road cross slopes at cross street intersections may be implemented in accordance with TxDOT *Roadway Design Manual*, Table 4-4.
7. Crest and sag values shall be in accordance with TxDOT *Roadway Design Manual* Figures 4-6 and 4-7 for the applicable design speeds found in Attachment 19-1 (Cross Street Design Criteria).
8. Where four-lane sections of divided highway are constructed, the inside shoulders shall include a 2-foot berm at a 3% slope beyond the edge of the paved shoulder.
9. THFN minimum vertical clearance requirements only applies to the SH 35 footprint.
10. The horizonal curve "SH99-6" shown in the Schematic Design, including the limits of the horizontal curve "SH99-6" superelevation transitions, shall be considered to fall under "Direct Connector" design criteria.
11. Clear zone width for frontage roads with curbs shall be 4 feet from face of curb.
12. Reverse curves without tangents for ramp alignments along the SH 35 footprint are allowable in constrained areas to maintain existing connectivity. In these such cases, transition lengths shall be adjusted to ensure that the roadway cross slopes are in proper direction for each horizontal curve.
13. 6:1 side slopes are desirable within the clear zone. Slopes that are steeper than 6:1 up to 4:1 within the clear zone are only allowable in constrained locations. For slopes steeper than 4:1, DB Contractor shall utilize applicable roadside barrier protections as described in Sections 19.2 and applicable subsections.

19.2.2.2 **Superelevation**

In areas where proposed roadways and ramps are to connect to existing pavement at the Project limits or at connections to existing cross streets, DB Contractor's design may retain existing plan superelevation to achieve transition to existing pavement. 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 on longitudinal grades flatter than 0.35%.

When existing pavement is being widened, DB Contractor shall design to prevent hydroplaning.

19.2.2.3 **Roadway Design Deviations**

DB Contractor shall design the Project to meet the criteria in Table 19-1 with the exception of those identified in Tables 19-2, 19-3, 19-4, 19-5, 19-6, and 19-7.

DB Contractor may use the design speed identified in Table 19-2 to meet or exceed the required vertical clearance or horizontal curve radii, as applicable, in Table 19-1.

Table 19-2: Design Deviations for Design Speed

No.	Design Deviation Element	Location	Minimum Design Speed
1	Design Speed	Between E House St and SH 6 Northbound (Station 26211+45.00 to Station 26231+92.50) Southbound (Station 16209+45.13 to Station 16209+60.00)	40 mph
2	Design Speed	SH 99 EBFR approaching FM 646 Eastbound (Station 26767+07.30 to Station 26770+21.28)	20 mph

DB Contractor may reverse the inside and outside shoulder widths at the curves identified in Table 19-3, to meet or exceed the required stopping sight distance for the applicable design speed criteria in Table 19-1.

Table 19-3: Design Deviations for Shoulder Width

No.	Design Deviation Element	Location	Minimum Shoulder Width
1	Shoulder Width	SBML Curve SH99-1	Reverse inside/outside shoulder widths
2	Shoulder Width	NBML Curve SH99-5	Reverse inside/outside shoulder widths
3	Shoulder Width	NBML NBEXT SH 35	Reverse inside/outside shoulder widths
4	Shoulder Width	SBML SBENT SH 35	Reverse inside/outside shoulder widths

DB Contractor may design the entrance gore widths in accordance with the minimum entrance gore width criteria specified in Table 19-4, at the locations identified in Table 19-4.

Table 19-4: Design Deviations for Gore Entrance Widths

No.	Design Deviation Element	Location	Minimum Gore Width - Entrance
1	Gore Width - Entrance	NBEXT HOUSE	2 feet
2	Gore Width - Entrance	NBENT FM 517	2 feet
3	Gore Width - Entrance	SBEXT SOUTH	3 feet
4	Gore Width - Entrance	SBENT SH 35	3 feet
5	Gore Width - Entrance	NBEN STEELE	1 feet

DB Contractor may design the exit gore widths in accordance with the minimum exit gore width criteria specified in Table 19-5, at the locations identified in Table 19-5.

Table 19-5: Design Deviations for Gore Exit Widths

No.	Design Deviation Element	Location	Minimum Gore Width - Exit
1	Gore Width - Exit	NBEXT FM 517	2 feet
2	Gore Width - Exit	NBENT FM 517	2 feet
3	Gore Width - Exit	SBEXT SOUTH	2 feet
4	Gore Width - Exit	SBEXT SH 6	2 feet
5	Gore Width - Exit	SBEXT FM 517	2 feet
6	Gore Width - Exit	SBENT SH 35	3 feet
7	Gore Width - Exit	DCSE	3 feet

DB Contractor may deviate from the minimum sag (k-values) specified in Table 19-1 at the locations identified in Table 19-6 using the minimum sag (k-values) specified in Table 19-6, provided the design is governed by comfort control criteria in accordance with the AASHTO Green Book and the TxDOT *Roadway Design Manual*.

Where the sag vertical curve is designed based on comfort control (i.e., headlight sight distance does not govern), the DB Contractor shall provide safety lighting within the curve limits to maintain adequate nighttime visibility and operational safety. The lighting design shall conform to applicable TxDOT roadway illumination standards and shall ensure the required stopping sight distance is effectively achieved under nighttime conditions.

If the DB Contractor utilizes the minimum sag (k-values) identified in Table 19-6 at these locations, DB Contractor shall document in its Preliminary Design Submittal the controlling criterion (comfort, headlight sight distance, or drainage) for each sag curve and provide supporting calculations demonstrating compliance with this requirement.

Table 19-6: Design Deviations for Sag K-Values

No.	Design Deviation Element	Location	Minimum Sag (K-value)
1	Sag (min K-value)	SBEXT SOUTH	54
2	Sag (min K-value)	SBENT HOUSE	54
3	Sag (min K-value)	NBEXT HOUSE	54
4	Sag (min K-value)	NBENT SH 6	54
5	Sag (min K-value)	NBEXT FM 517	54
6	Sag (min K-value)	NBENT FM 517	54
7	Sag	NBEXT SH 35	54

Table 19-6: Design Deviations for Sag K-Values

No.	Design Deviation Element	Location	Minimum Sag (K-value)
	(min K-value)		
8	Sag (min K-value)	NBEX FM 528	54
9	Sag (min K-value)	Calder Road Intersection	19

19.2.2.4 **Design Exceptions**

There are no identified design exceptions associated with the Schematic Design.

19.2.2.5 **Design Waivers**

DB Contractor shall design the Project to meet the criteria in the TxDOT *Roadway Design Manual* with the exception of those identified in Table 19-7.

DB Contractor shall use the approved minimum values identified in Table 19-7 to meet or exceed the required spacing requirements in the TxDOT *Roadway Design Manual*.

Table 19-7: Design Waivers

No.	Design Waiver Element	Location	Description	TxDOT RDM Minimum Value	Approved Minimum Value
1	Access control spacing	Between SH 99 NBEXT FM 517 to FM 517	Access control does not meet the minimum separation spacing of 250 feet between the exit ramp and existing driveway shown in TxDOT *Roadway Design Manual*, Figure 8-9. Geometric design here is maximized to incorporate braided ramp configuration within constrained existing SH 35 intersections layout.	250 ft	135 ft
2	Ramp spacing	Between E South St and E House St	Southbound auxiliary lane between exit and entrance ramp (Scenario EN-EX, weaving on frontage road) does not meet minimum 1,000 feet spacing as required in TxDOT *Roadway Design Manual*, Figure 15-32. A traffic model was developed to support the current design.	1,000 ft	790 ft (Southbound)
3	Ramp spacing	NB and SB ramps at Steele Rd	Auxiliary lanes between entrance and exit ramps (Scenario EN-EX, weaving on main lanes) do not meet minimum 1,600 feet spacing as required in TxDOT *Roadway Design Manual*, Figure 15-32. A traffic model	1,600 ft	1,305 ft (Northbound) 1,331 ft (Southbound)

Table 19-7: Design Waivers

No.	Design Waiver Element	Location	Description	TxDOT RDM Minimum Value	Approved Minimum Value
			was developed to support the current design.		
4	Ramp spacing	Between EB Calder ramp and DCEN and between WB Calder ramp and DCNW	Auxiliary lanes between entrance and exit ramps (Scenario EN-EX, weaving on main lanes) do not meet minimum 1,600 feet spacing as required in TxDOT *Roadway Design Manual*, Figure 15-32. A traffic model was developed to support the current design.	1,600 ft	800 ft (Eastbound) 750 ft (Westbound)

19.2.3 **Miscellaneous Design Requirements**

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

DB Contractor shall place rumble strips in accordance with Section 4.10.6, "Rumble Strips", of the TxDOT *Roadway Design Manual* at the following locations: (i) along mainlane pavement outside shoulder throughout the full length of the Project limits unless otherwise specified by TxDOT, and (ii) along the centerline (Station 6041+11.48 to 6084+00.00) of the mainlane where there is two-way traffic adjacent to one another.

The border width, measured from the back of curb to ROW line, along proposed frontage roads and crossing streets shall be 20 feet minimum, unless otherwise shown on the Schematic Design. For crossing streets, DB Contractor shall incorporate the design criteria in Attachment 19-1 (Cross Street Design Criteria).

The roadway crown on all frontage roads shall slope toward the ROW line (away from the mainlanes) for the purposes of drainage, unless a reverse crown is dictated by superelevation needs.

The shoulder widths on bridge structures shall be measured in accordance with Section 21.2.7.

Concrete paving, landscape pavers, and/or rock riprap shall be used in areas that are not accessible to tractor mowing equipment, are hard-to-reach mowing areas (typically less than two foot in width), or are adjacent to or under structures where areas of low light will not permit vegetation to be established and maintained. These areas include, but are not limited to, areas of low sunlight, areas between, near, or next to guard fence posts, bent columns, retaining walls, freeway ramp gores, paved ditches, flumes, bridge drip edges, and ditch inlets. Concrete paving, landscape pavers, and/or rock riprap are to be used to improve roadway appearance and maintenance. Landscape pavers shall be used in accordance with Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges – Wave Scheme*, provided in the RIDs.

19.2.3.1 **Mainlanes**

DB Contractor shall provide a minimum 48-foot or 52-foot median for all four-lane divided mainlane roadways in accordance with the locations outlined in DBA Exhibit 1, Sections 3.1 and 4.1.

DB Contractor shall provide a continuous rigid traffic barrier (or bridge rail, as appropriate) on at least one side of the roadway separating the mainlane roadways. The guidelines for placement of the continuous rigid traffic barrier (or bridge rail, as appropriate) can be found in TxDOT *Roadway Design Manual* – Section 17.7, "Median Barrier" and TxDOT Engineering Standard Sheets. The median dimension shall be measured between the two innermost lanes and includes shoulders. DB Contractor shall be prohibited from utilizing

TxDOT Houston District standard drawing "Precast Single-Slope Concrete Barrier (J-J Hook Connection)" (PSSCB-JJ (HOU)).

DB Contractor shall design the mainlane cross slope such that the roadway crown is located at the centerline of the cross-section. In superelevated sections, cross slope transitions and crown locations shall be designed in accordance with the TxDOT *Roadway Design Manual* to ensure geometric continuity. To avoid conflicts with reserved cross-section needs within the 48-foot or 52-foot median, as applicable, the proposed profile and cross-sectional geometry shall be developed such that no re-grading or re-profiling of the existing pavement is required.

DB Contractor shall ensure the vertical clearance requirements in Table 19-1 will be achieved from the projected cross slope of the future pavement expansion (3+3 mainlanes).

The entire 48-foot or 52-foot median, as applicable, shall remain free of all bridge bents, retaining walls, and other structures other than a four-foot encumbrance in the center (two feet on each side) of the 48-foot median or an eight-foot encumbrance in the center (four feet on each side) of the 52-foot median, as applicable, for column and lighting placement. Traffic barrier may be placed within the median, outside these encumbrances.

19.2.3.2 **Driveways**

DB Contractor shall design and construct driveways impacted by the Work that are existing, permitted or otherwise shown on the Schematic Design as of the Proposal Due Date. The design and construction of existing or permitted driveways shall be functionally adequate for existing land use of adjoining property and approved permits. The design and construction of all other driveways shown on the Schematic Design shall be functionally adequate for TxDOT's operations and maintenance of the Project. This shall be in accordance with the guidelines specified in TxDOT *Roadway Design Manual* – Chapter 16, "Driveways" and TxDOT Houston District standards, provisions of which will be requirements for use on this Project. In the event of a conflict between the TxDOT *Roadway Design Manual* and TxDOT Houston District standards, DB Contractor shall ensure TxDOT Houston District standards are met.

19.2.3.3 **Steel Casings**

19.2.3.3.1 West Boulevard

DB Contractor shall coordinate, design, obtain necessary temporary construction easements, and install two 24-inch steel casings (one on each side) from ROW to ROW along future West Boulevard, as depicted on the Schematic Design, to allow for the future permitting, installation, and exclusive use of water and wastewater facilities by a Utility Owner that will be subject to Section 4.5.8 of the General Conditions.

19.2.3.3.2 Bay Area Blvd

DB Contractor shall coordinate, design, obtain necessary temporary construction easements, and install two 24-inch steel casings from ROW to ROW along future Bay Area Boulevard, as depicted on the Schematic Design and as more specifically depicted on the RID exhibit entitled "Grand Bargain Offsite Facilities – Exhibit (Bay Area Blvd Culverts & Waterlines; Lloyd Tract)", to allow for the future permitting, installation, and exclusive use of water and wastewater facilities by a Utility Owner that will be subject to Section 4.5.8 of the General Conditions.

19.3 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 19 and the TxDOT Standard Specifications.

Subject to approval by TxDOT, alternate material specifications and construction requirements may be proposed by DB Contractor provided the objectives of the Project are met and equivalent requirements to this Item 19 are provided.

19.4 **Submittals**

All Submittals described in this Item 19 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 19-8. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 19-8: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Control of Access Channelization	As part of the Preliminary Design Submittal, if applicable	Approval	19.2.1
Documentation of the controlling criterion with supporting calculations demonstrating compliance for each sag curve in Table 19-7 that requires safety lighting	As part of the Preliminary Design Submittal, if applicable	Review and comment	19.2.2.3

Item 20
Drainage

20.1 General Requirements

In the design of the drainage facilities, Design-Build (DB) Contractor shall account for all sources of runoff that may reach the Project, whether originating within or outside the Project Right of Way (ROW).

DB Contractor shall design the Project, including all drainage facilities, such that the revised or newly constructed drainage system will not increase flooding to properties outside the Project ROW. If existing drainage patterns or flows are modified during the Term, DB Contractor shall design and implement a solution that does not have adverse impacts to property owners outside the Project ROW. Adverse impacts for the purposes of this Item 20 are defined as impacts that have the potential to increase risk to health and human safety, cause or exacerbate flooding of developed properties or structures, or increase water surface elevations (WSEL) on undeveloped properties.

DB Contractor's drainage design shall include assessments of pre- and post-construction conditions, as well as assessments of conditions during all phases of construction. Assessments shall include identification of existing and proposed flow patterns, ponding widths, and temporary drainage requirements based on the Traffic Control Plans. DB Contractor shall ensure and demonstrate by performing such assessments that its drainage design does not cause any adverse impact to off-site property owners. DB Contractor shall identify and obtain any necessary drainage easements at its own cost if such easements are deemed necessary and have not previously been obtained by TxDOT. Grading activities and drainage structures needed outside of the Project ROW require a temporary easement or perpetual drainage easement as appropriate.

DB Contractor designated perpetual drainage easements shall be considered DB Contractor-Designated ROW in accordance with the terms and conditions of the Design Build Contract. Any temporary easements shall be subject to Section 4.4.1.4 of the General Conditions. Should DB Contractor be unable to obtain temporary or perpetual easements, DB Contractor shall design and construct the Project such that requirements of this Item 20 are fulfilled without improvements necessary beyond the Project ROW.

DB Contractor shall meet the requirements specified in this Item 20 along with the requirements of the TxDOT *Hydraulic Design Manual*. DB Contractor shall not use inverted siphons within the drainage design.

20.2 Administrative Requirements

20.2.1 Data Collection

To establish a drainage system that complies with the requirements of this Item 20, DB Contractor is responsible for collecting all necessary data, including those elements outlined in this Section 20.2.1.

DB Contractor shall collect all applicable data identifying all water resource related issues, including water quality requirements as imposed by State and federal government regulations; national wetland inventory and other wetland/protected waters inventories; in Federal Emergency Management Agency (FEMA) floodplains; and official documents concerning the Project, such as Environmental Approvals or other drainage and environmental studies. Water resource related issues include areas with historically inadequate drainage evidenced by frequent flooding or citizen complaints, environmentally sensitive areas (e.g., wetland and wildlife habitat), localized flooding, groundwater seepage onto the roadway, maintenance problems associated with drainage, and areas with potential to pollute surface water and groundwater resources. DB Contractor shall also identify watershed boundaries, protected waters, locations of all outfalls from Project ROW, floodplains, and boundaries between regulatory agencies (e.g., watershed districts and watershed management organizations) that may impact the Project.

DB Contractor shall acquire all available and applicable municipal or other local drainage plans, watershed management plans, and records of citizen concerns. DB Contractor shall acquire all pertinent existing storm drain plans and existing survey data, including data for all culverts, drainage systems, and storm drain systems within the Project limits.

DB Contractor shall obtain photogrammetric and Geographic Information Systems (GIS) data within the Project limits that depicts the "Outstanding National Resource Waters" and impaired waters as listed by the Texas Commission on Environmental Quality (TCEQ). DB Contractor shall conduct surveys for information not available from other sources.

DB Contractor shall create an inventory of all existing drainage facilities including structures, culverts, ditches, outfalls, and storm drains within the Project corridor. The inventory must include the condition, size, year built, material, location, status, videos or photos, and other pertinent information of the facilities.

The data collected shall be used in the design of the drainage facilities.

20.2.2 **Coordination with Other Agencies**

DB Contractor shall coordinate all water resource issues with affected stakeholders and regulatory agencies, including counties, municipalities and drainage districts which include, but may not be limited to, Brazoria County, Galveston County, City of Alvin, City of Friendswood, City of League City, Brazoria County Conservation and Reclamation District 3, and Galveston County Consolidated Drainage District. DB Contractor shall document the resolution of water resource issues.

All requests for a Conditional Letter of Map Revision (CLOMR) or Letter of Map Revision (LOMR) shall meet FEMA requirements and the required documentation to be submitted with the request shall be signed and sealed by a Professional Engineer (PE) and a Registered Professional Land Surveyor (RPLS), as applicable. DB Contractor shall be responsible for submitting and obtaining CLOMR/LOMR approval from FEMA.

DB Contractor shall coordinate with the local floodplain administrator and provide information related to all drainage crossings and outfalls for their information, in accordance with TxDOT *Hydraulic Design Manual*.

DB Contractor shall obtain all stormwater related permits applicable to the Project. Environmental Approvals and requirements are described in Item 12.

In areas surrounding railroad facilities, DB Contractor shall coordinate the drainage design with TxDOT and the appropriate railroad owner in accordance with Item 22.

In areas surrounding irrigation canal facilities, DB Contractor shall coordinate drainage design with TxDOT and the appropriate canal owner.

DB Contractor shall notify TxDOT in writing at least five Business Days in advance of all coordination meetings with Governmental Entities and provide TxDOT representatives the opportunity to attend.

20.2.3 **Third Party Coordination**

DB Contractor shall coordinate with adjacent property owners and assist TxDOT in coordination activities in accordance with Section 5.8 of the General Conditions. Any references in this Item 20 to existing conditions and existing drainage includes proposed third-party drainage infrastructure described in Section 5.8 of the General Conditions.

20.3 **Design Requirements**

DB Contractor shall design all elements of the drainage facilities in accordance with this Item 20, the applicable design criteria, Good Industry Practice, the TxDOT *Hydraulic Design Manual*, TxDOT *Roadway Design Manual*, TxDOT *Bridge Project Development Manual*, TxDOT Standard Specifications, and applicable FHWA *Hydraulic Engineering Circulars (HEC)*.

DB Contractor's base hydrologic model shall reflect the existing development condition or pre-Project condition.

DB Contractor shall evaluate drainage features of the roadway facility and confirm no adverse impacts will result from the construction of the Project to adjacent and surrounding properties, both upstream and downstream of the Project. The flood damage potential (e.g., flow and/or water surface elevation (WSEL)) for the Project, while under construction and when completed, shall not exceed pre-Project conditions for flood frequency events up to and including the 100-year event. At a minimum, adverse impacts shall be assessed and documented in the Drainage Design Report using the following processes for each Project outfall:

- Hydrologic impacts: The hydrologic impacts at each outfall shall be evaluated by comparing the pre-Project and post-Project peak flows at a junction at the downstream Project ROW and/or easement limits.
- Hydraulic impacts: The hydraulic impacts at each outfall shall be evaluated by comparing the pre-Project and post-Project WSELs at the upstream and downstream Project ROW and/or easement limits. A rise can usually be considered as having no adverse impact if it is contained within the Project ROW. Rise outside the Project ROW is not allowed. Increase in WSEL shall be mitigated and contained within the Project ROW.
- Sheetflow impacts: Sheetflow impacts to natural drainage patterns shall be evaluated and mitigated within the Project limits. The roadway design and the drainage design shall provide accommodations to maintain the existing drainage patterns. The roadway shall not limit the ability of adjacent property to drain. Impacts due to rerouting of sheetflow shall be mitigated to existing or pre-Project conditions.
- Impacts to outfalls: Outfalls shall be assessed to ensure they do not increase local erosion; otherwise, DB Contractor shall provide erosion and/or energy dissipation treatments.
- Floodplain storage impacts: The loss of effective floodplain storage volume shall be quantified and offset with compensatory storage for each outfall, consistent with applicable jurisdictional requirements. The floodplain storage volume shall be referenced to the Atlas 14 100-year event modeling developed for the project.
- Other Impacts: The following impacts shall be assessed, and narrative description shall be provided: impacts to adjacent properties and the receiving stream and impacts to developed properties and structural improvements.

The design of temporary and proposed drainage systems shall meet the performance requirements as defined in this Item 20. DB Contractor may make use of drainage facilities that are in place during the Term, provided overall drainage requirements for the Project are achieved and the combined drainage system functions as required. Should a temporary or proposed drainage system tie to an existing drainage system, that connection to the existing system shall also be designed and reconfigured, as necessary, to ensure the temporary or proposed system meets the performance requirements as defined in this Item 20 or Item 21 while maintaining or improving the performance of the connected existing drainage system as necessary to reach such requirements.

Drainage structures that may remain in place are listed in Section 20.3.4. DB Contractor shall verify that all other existing drainage components within the Project ROW meet the hydraulic and structural capacity as defined in this Item 20 and Item 21. If a drainage structure is not listed in Section 20.3.4, and it cannot meet the requirements of Items 20 and 21, then DB Contractor shall either upgrade or replace the drainage structure to meet the requirements of Item 20 and Item 21.

Modifications to existing drainage patterns should be minimized and shall not create adverse impacts to receiving outfalls and adjacent to properties. DB Contractor bears full responsibility for the Final Design and its effects on property owners outside the Project ROW.

While coordinating design with TxDOT, DB Contractor shall ensure the Project is designed in a manner that does not require CLOMR and LOMR. DB Contractor shall submit to TxDOT calculations and documentation to demonstrate that the Project design does not warrant a CLOMR/LOMR. If a CLOMR/LOMR is found to be warranted, DB Contractor shall prepare the required documentation, perform the necessary calculations and design, and submit the information to FEMA for its approval of a CLOMR/LOMR as described in Section 20.2.2. The local floodplain administrator(s) can be a source of valuable data and may have the knowledge of a CLOMR submitted to FEMA by others, or other changes to the area.

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

DB Contractor shall provide a drainage system that maintains or improves the existing drainage and meets the hydrologic and hydraulic design criteria specified in TxDOT *Hydraulic Design Manual* and this Item 20.

DB Contractor shall identify and delineate existing and proposed condition drainage areas that contribute to the highway drainage system and the estimated runoff used for design of the system. DB Contractor shall

calculate the peak discharge for both existing and proposed conditions and determine water surface profiles for design and check flood per requirements in this Item 20.

DB Contractor shall utilize TxDOT Houston District drainage standard sheets on the project unless specifically stated elsewhere in these Design-Build Specifications. For all other details, DB Contractor shall utilize the TxDOT statewide precast drainage standard sheets for inlets, manholes, and additional details as shown in the TxDOT Engineering Standard Sheets.

20.3.1 **Hydrology**

20.3.1.1 **Design Frequencies**

DB Contractor shall use the design frequencies listed in Table 20-1 below.

Table 20-1: Design Criteria for Drainage Facilities

Design Element	Reference	Toll / General Purpose Lanes	Ramp	Direct Connector	Frontage Road[1]	Cross Street[2]	Application Notes[3]
Minimum Roadway Elevation at Allowable Head Water	HDM – Ch 4, Sec 6	100-yr	25-yr	100-yr	10-yr	10-yr	Applies to cross drainage and parallel floodplain WSEL. Does not apply to storm drain HGL
Storm Drain Inlets and Pavement Drainage	HDM – Ch 4, Sec 6	10-yr	10-yr	10-yr	5-yr	5-yr	Applies to ponded widths in gutter and inlet capacity.
Storm Drain Conduits[4]	HDM – Ch 4, Sec 6	10-yr	10-yr	10-yr	5-yr	5-yr	Size conduit for non-pressure flow (Design flow Q ≤ full flow capacity). Check mainlane storm sewer HGL for 100-year capacity
Culverts[5]	HDM – Ch 4, Sec 6	50-yr	25-yr	50-yr	10-yr	Match Existing	Design upstream WSEL below allowable headwater at low point in roadway profile. Check for 100-year.
Bridge Waterway Crossing[5, 6]	HDM (Ch 4, Sec 6; Ch 9, Sec 3)	100-yr	25-yr	50-yr	10-yr	Match Existing	1.5' or greater freeboard for the design event. Check for 100-year.
Outfall Ditches	TxDOT	Design for no impact to 100-yr WSEL. Use applicable standard details by others for outfalls and related construction within channels and ponds under local or other entity jurisdiction.					
Separation Ditches*	TxDOT	10-yr	10-yr	10-yr	N/A	N/A	*Separation ditches are those in medians between adjacent roadbeds.
Roadside Ditches*	TxDOT	N/A	N/A	N/A	2-yr**	2-yr***	* Roadside ditches are those between the roadbed and right-of-way line. **If required outside curb line. ***Or match existing capacity.
Detention Ponds	HDM – Ch 4, Sec 6; TxDOT	100-year design. Provide Detention Summary w/area serviced. Detention Storage Volume Required, Detention Storage Volume Provided (at top of bank), Maximum Design WSEL, Maximum Outflow Rate Allowed, Maximum Outflow Rate Provided, and Restrictor Size.					

Design Element	Reference	Toll / General Purpose Lanes	Ramp	Direct Connector	Frontage Road[1]	Cross Street[2]	Application Notes[3]
Depressed Roadway[7] Storm Sewer (gravity drainage without pump)	TxDOT	50-yr	10-yr	50-yr	10-yr	10-yr	Depressed sections where no overland flow can pass is not allowed unless approved by TxDOT.
	1 Includes TxDOT on-system crossing roadways. 2 Applies to off-system roadways only. 3 Structures and roadways should be serviceable (not inundated) up to the design standard. All facilities, including storm drain systems, must be evaluated for the 1% Annual Exceedance Probability (AEP) (100-year) flood event as a check flood. The purpose of the check flood evaluation is to help ensure the safety of the drainage structure and off-site (outside Project ROW) development by identifying significant risk to life or property in the event of capacity exceedance. 4 The design frequency storm applied to design of storm drain systems is for non-pressure/gravity conduit flow (i.e., the stated design frequency is NOT for pressure flow computations), unless approved by TxDOT. 5 For structures extending underneath both mainlanes and frontage roads the structure shall be designed to the mainlane design AEP. 6 See the TxDOT Geotechnical Manual - LRFD, Hydraulic Design Manual, and TxDOT Scour Analysis Guide for required scour calculations. 7 A roadway in a sag vertical curve is classified as 'depressed' where no overland drainage route is available, even when flood levels exceed the curb height or highest pavement surface within the sag.						

20.3.1.1.1 Reserved

20.3.1.2 **Hydrologic Analysis**

DB Contractor shall design drainage structure capacities for the frequencies and hydrologic conditions as described in Table 20-1.

DB Contractor shall design drainage structures that intercept and convey off-site (i.e., outside Project ROW) runoff through the Project accounting for the more restrictive of (a) the contributing drainage area at existing development conditions or (b) the area within 150 feet adjacent to the Project ROW, assuming developed as commercial 65% impervious cover. Peak flows from existing development with compensatory on-site stormwater detention should consider the flow reduction benefits of stormwater detention.

DB Contractor shall follow Chapter 4 of the TxDOT *Hydraulic Design Manual* in developing runoff calculations, including, but not limited to, its policies and standards, study requirements, and method selection and application.

DB Contactor shall obtain and use design rainfall data sourced from National Oceanic and Atmospheric Administration (NOAA) Atlas 14 as follows. Rainfall intensity for "Rational Method" calculations shall use the TxDOT Hydraulic Design Manual Equation 4-21.

$$I = \frac{b}{(t_c + d)^e}$$

Where:
I= design rainfall intensity (in./hr.)
Tc = time of concentration (min.)
e, b, d = coefficients based on rainfall IDF data.

The design IDF data for Galveston County, Texas shall be used as noted in Table 20-2.

Table 20-2: Rainfall Intensity-Duration-Frequency Coefficients for Galveston County, Texas

	Design Annual Recurrence Interval					
Coefficient	**2-year**	**5-year**	**10-year**	**25-year**	**50-year**	**100-year**
e	0.7913	0.7730	0.7563	0.7363	0.7200	0.7060
b	68.8179	81.6113	90.8592	103.2734	111.1010	120.5173
d (min)	13.1446	13.1879	13.2490	13.4256	13.4454	13.8637
Source: EBDLKUP-2019-vC6.2.10.xlsm, using partial duration series, for Galveston County						

Rainfall data for development of runoff hydrographs shall use the values provided in Tables 20-3 and 20-4.

Table 20-3: Rainfall Data for Dickinson and Magnolia Bayou Watersheds

	Annual Recurrence Interval						
	Rainfall Depth (inches)						
Duration	**2-year**	**5-year**	**10-year**	**25-year**	**50-year**	**100-year**	**500-year**
5-min	0.60	0.75	0.88	1.07	1.21	1.37	1.76
10-min	0.94	1.19	1.40	1.70	1.94	2.18	2.76
15-min	1.20	1.50	1.76	2.13	2.42	2.72	3.48
30-min	1.72	2.14	2.50	3.01	3.40	3.81	4.95
60-min	2.29	2.88	3.38	4.09	4.65	5.25	6.98
2-hr	2.87	3.72	4.49	5.63	6.58	7.64	10.60
3-hr	3.23	4.26	5.23	6.71	7.98	9.42	13.40
6-hr	3.87	5.22	6.55	8.59	10.40	12.50	18.20
12-hr	4.56	6.24	7.88	10.40	12.60	15.20	22.80
24-hr	5.30	7.33	9.30	12.30	15.00	18.00	27.20
Source: Lower Clear Creek and Dickinson Bayou Flood Mitigation Plan and HCFCD (Region 3)							

Table 20-4: Rainfall Data for Mustang Bayou Watershed

Duration	Annual Recurrence Interval						
	Rainfall Depth (inches)						
	2-year	**5-year**	**10-year**	**25-year**	**50-year**	**100-year**	**500-year**
5-min	0.60	0.74	0.86	1.02	1.16	1.29	1.62
10-min	0.95	1.17	1.36	1.63	1.84	2.06	2.54
15-min	1.20	1.48	1.72	2.04	2.30	2.57	3.20
30-min	1.72	2.11	2.44	2.89	3.24	3.60	4.55
60-min	2.29	2.83	3.29	3.93	4.42	4.94	6.42
2-hr	2.87	3.60	4.28	5.29	6.15	7.12	9.81
3-hr	3.22	4.08	4.92	6.23	7.39	8.73	12.40
6-hr	3.84	4.95	6.10	7.92	9.59	11.60	17.00
12-hr	4.50	5.93	7.39	9.69	11.80	14.20	21.30
24-hr	5.27	7.05	8.83	11.60	14.10	17.00	25.40
Source: 24-hour values from Brazoria County Drainage Criteria Manual. Rainfall data from NOAA Atlas 14, Volume 11, Version 2 Point Precipitation Frequency Estimates at Latitude: 29.4808°, Longitude: -95.3903°							

Exceptions must be approved by the District Hydraulic Engineer (DHE) and noted on applicable plans or Drainage Design Report.

DB Contractor shall use the following criteria in developing rational method runoff calculations:

- Run-off Coefficients:
  - Pavement (Asphalt) = 0.90
  - Pavement (Concrete) = 0.90
  - Unpaved areas within the Project ROW = 0.35
  - Unimproved Agricultural = 0.20
  - Parks, Cemeteries, Rail Yards = 0.30

- Residential Rural = 0.35
- Residential Single Family, Residential Large Lot = 0.40
- Residential Multi Family = 0.60
- Light Industrial / Business = 0.65
- Heavy Industrial / Business= 0.80
- Detention Basin = 0.90
- For conditions not listed, use the methods in Chapter 4 of the TxDOT *Hydraulic Design Manual* for calculating the Run-off Coefficients

- Minimum Time of Concentration, Tc = 10 minutes; Note: Actual Tc should be used in the modeling programs, and the user should allow the program to default to the minimum Tc to allow for correct rational method computations and sizing.

20.3.2 **Hydraulic Analysis and Design**

DB Contractor shall use available hydraulic models which best represent pre-Project conditions as design base models. For areas mapped as FEMA Special Flood Hazard Area (SFHA), DB Contractor shall comply with TxDOT *Hydraulic Design Manual* procedures, including coordination with the local floodplain administrator(s) and use of FEMA effective models to develop corrected effective, existing, and proposed (post-Project) models. DB Contractor shall coordinate with designers of any adjacent developments that are pursuing a LOMR which would revise FEMA effective models affecting the Project.

In addition, DB Contractor shall use HEC-RAS to develop an existing and proposed model that represents Atlas 14 10-year, 50-year, and 100-year riverine and overland sheet flow conditions. For Dickinson Bayou watershed the model shall be a 1D/2D HEC-RAS model; for Magnolia and Mustang Bayou watersheds 1D HEC-RAS model is acceptable. The project models will determine the potential project impacts (floodplain fill and water surface elevation increase) and be used to show no significant impact.

DB Contractor shall design storm drain systems, inlets, gutters, conduits (culverts and bridges) in accordance with the TxDOT *Hydraulic Design Manual*.

DB Contractor shall design the drainage system to accommodate flow rates associated with the Ultimate Project Configuration described in DBA Exhibit 1. The drainage system for the Ultimate Project Configuration includes catchment of flow into the Project ROW from the concurrent I-45 Interchange DBB, and any catchment of flow from the future extension on the southern end of the Project (Segment B-2).

DB Contractor shall also design and construct the drainage system to accommodate flow rates associated with the future Project expansion configurations as described in the “Grand Parkway (SH 99) Segment B-1 Preliminary Drainage Impact Study” provided in the RIDs. The drainage system for the future Project expansion configurations include impervious pavement for two additional planned lanes (one in each direction) and widened shoulders in the SH 99 median from the southern terminus of the Project through Station 6260+00 and from Station 6352+00 to the eastern terminus of the Project.

DB Contractor shall design mainlanes and shoulders such that each is above the WSEL of the design year flood.

20.3.2.1 **Storm Drainage Systems**

Where precluded from handling runoff with ditches by physical site constraints, or as directed in this Item 20, DB Contractor shall design enclosed storm drain systems to collect and convey runoff to appropriate discharge points.

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

- 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, land use with design runoff coefficient (or curve number or impervious cover, as applicable), discharges, velocities, ponding, and hydraulic gradeline data.
- Location and tabulation of all existing and proposed pipe and drainage structures. These include size, class or gauge, inlet spacing, detailed structure designs and any special designs.

- Specifications for the pipe bedding material and structural pipe backfill on all proposed pipes.
- Complete pipe profiles, including pipe size, type, gradient, station, offset from the roadway, length of pipe, class/gauge of pipe, hydraulic gradeline data, and numbered drainage structures with coordinate location and elevations.

DB Contractor shall design all storm drain systems such that the hydraulic grade line for the design frequency event is no higher than 1 foot below:

- Gutter depression for curb inlet;
- The top of grate inlet; and
- The top of manhole cover.

Runoff shall be conveyed in accordance with applicable Laws and permits.

The gutter depression used for curb or curb and grate combination inlets shall not encroach into the travel lane if the gutter depression slope exceeds the normal cross slope.

DB Contractor shall place access holes (manholes) or combination access holes and inlets to current design standards. Refer to Chapter 10 of the TxDOT *Hydraulic Design Manual* for access hole spacing criteria.

The use of slotted drains will not be allowed. The use of trench drains will be allowed at ramp gore locations.

The use of slotted barriers that allow storm water runoff to flow into adjacent travel lanes will not be allowed for permanent barriers. In addition, slotted barriers are prohibited in any configuration from Station 6748+50 to Station 6750+50. Slotted barriers may be used only for temporary conditions during construction, except as otherwise restricted above.

DB Contractor shall not be permitted to mitigate impacts by using restrictor plates for in-line detention facilities.

20.3.2.1.1 Inlets

20.3.2.1.1.1 Inlet Design Criteria

DB Contractor shall design inlets in accordance with the criteria shown below and the TxDOT *Hydraulic Design Manual*.

Table 20-5: Inlet Design Criteria

Storm Drain Inlets	
Inlet Locations	• On-grade: Place inlets to keep gutter ponding less than or equal to maximums, as defined in Section 20.3.2.1.1.2. Maximum carryover is 1 cfs. • Low points: Inlet shall be located at low point of vertical curve, not (necessarily) at PI station. Place flanking inlets both sides of low point at a maximum spacing of 100 feet from low point. • Redundant inlets: Inlets shall be located at ends of curb returns at intersections. Redundant inlets are not required at residential and commercial driveways. • 100% flow interception: On pavement at end of Retaining Wall, at ramp gores, and upgrade from intersections. • Area inlets shall be placed outside the travel lane pavement including planned expansion of the travel lanes as identified on the Schematic Design and in the Grand Parkway (SH 99) Segment B-1 Preliminary Drainage Impact Study provided in the RIDs.

Design sag or low point inlets in pavement sections using the following criteria:

- Maximum ponding depth shall be a function of the allowable ponding width for the design frequency.
- Area reduction factor = 0.5
- Perimeter reduction factor = 0.5 (for grate inlets)

Design drop inlets in ditches using the following criteria:

- Maximum ponding depth shall be 0.5 feet below the top of the ditch for the design frequency. The top of the ditch can be no higher than the pavement subgrade.
- Area Reduction Factor = 0.5
- Perimeter Reduction Factor = 0.5

20.3.2.1.1.2 Gutter Ponding

DB Contractor shall design drainage systems to limit ponding to the widths defined in Table 20-6 below for the design frequency event:

Table 20-6: Allowable Ponding Widths by Roadway Classification

Roadway Classification	Design Storm Allowable
Interstate, Controlled Access Highways	Shoulder width
Ramps, Direct Connectors	Shoulder width
Frontage Roads (with multiple lanes)	One travel lane width
Minor Cross Streets	One travel lane width

20.3.2.1.2 Conduits

Storm drain conduits shall be designed and constructed to sustain all external loads in accordance with Chapter 14 of the TxDOT *Hydraulic Design Manual*, and shall have positive seals at the pipe joints.

All conduits shall be reinforced concrete pipe (RCP) with the exception of under driveways. DB Contractor may use thermoplastic pipe instead of RCP under driveways, subject to satisfaction of the following conditions:

- DB Contractor shall design and construct the thermoplastic pipe in accordance with the TxDOT *Structural Design Considerations for Specifying Thermoplastic Pipe* (https://ftp.txdot.gov/pub/txdot/brg/specifying-thermoplastic-pipes.pdf), and Item 468, *Thermoplastic Pipe Culverts and Drains*, of the TxDOT Standard Specifications; and
- DB Contractor shall require the manufacturer to be on site for one initial training on the manufacturer's installation specifications prior to construction of the first thermoplastic pipe, and perform additional on-site visits as requested by TxDOT. The IQF, TxDOT, and/or TxDOT's representative shall be given the opportunity to attend the training.

On mainlanes, ramps, frontage roads, driveways, and cross-streets, the minimum RCP size inside diameter shall be 24 inches and, for driveways only, the minimum thermoplastic pipe inside diameter shall be 18 inches). The maximum thermoplastic pipe inside diameter shall be 48 inches. If the system is connecting to an existing downstream system that is 18 inches, the minimum RCP size inside diameter may be 18 inches, however the downstream system shall be in good condition and of adequate size to convey the flow.

Storm drain conduit design will be non-pressure flow (i.e., gravity-flow system), with full flow conduit capacity ≥ design flow unless otherwise approved by TxDOT. The use of siphons will not be allowed for TxDOT maintained storm drains.

Other storm drain conduit design criteria includes:

- Conduit depth of cover: 2-foot minimum outside of pavement; 6 inches minimum (top of conduit to bottom of treated subgrade) if underneath pavement
- Conduit slope: ≥0.20% desirable; 0.10% minimum
- Conduit flow velocities: 2 fps minimum; 12 fps maximum, calculated using Manning's equation based on pipe-full flow for the conduit geometry, roughness and slope
- Conduit outfall velocity criteria: </= 6 fps desirable; If > 6 fps, provide outfall protection; for existing velocities greater than 6 fps but not increased, DB Contractor shall check shear stress in accordance with the TxDOT *Hydraulic Design Manual* for outfall protection requirements

Storm drain conduit connections and joints criteria:

- Match soffit elevations at conduit size changes, if possible. Matching flowlines is acceptable if grade is limited.
- RCP lateral stub-in to RCB requires 2-foot minimum diameter to depth differential.
- RCP to RCP stub-in requires 3-foot minimum size differential.
- RCP lateral stub-in connections not meeting the above depth differentials can utilize a concrete collar or special detail of the connection.
- Other conduit connections require inlet, manhole, or junction box.
- Bends acceptable up to 30-degree angle.

For any existing storm drain conduits considered for expansion, extension, modification, or reuse, DB Contractor shall investigate and verify structural integrity and suitability of use per current design loading standards, and submit a report, as part of the Drainage Design Report, summarizing the findings for TxDOT review and approval. Conduit liners are not allowed, such as plastic or Kevlar liners that reduce internal friction to increase the capacity or increase the longevity of the culvert.

20.3.2.1.3 Ditches

DB Contractor shall be responsible for the design of normal and special ditch sections, as needed. When necessary, ditch linings shall be designed by DB Contractor according to FHWA HEC-15, the TxDOT *Hydraulic Design Manual,* and the TxDOT *Roadway Design Manual*. Ditches shall be designed to minimize erosion and sedimentation.

DB Contractor shall use the following drainage ditch design criteria:

Ditches between roadways:

- Flat-Bottom Ditch = Follow roadway design criteria and typical sections
- V-Ditch = Follow roadway design criteria and typical sections
- Minimum ditch slope = 0.1% concrete-lined 4-foot-wide pilot channel, 0.5% grass-lined
- Maximum velocity for grass-lined ditch = 6 fps

Ditches next to ROW line:

- Flat-Bottom Ditch = Follow roadway design criteria and typical sections
- V-Ditch = Follow roadway design criteria and typical sections
- Minimum ditch slope = 0.1% grass-lined, constructed with a 6-foot-width of block sod along the flowline. Basin DR-1 may be 0.08%. Existing outside ditches that are along the SH 35 frontage road pavement that is being reconstructed-in-place with a slope less than 0.1% may retain their existing grade following placement of 6-feet of block sod along the flowline.
- Maximum velocity for grass-lined ditch = 6 fps

Minimum 0.5 feet of freeboard shall be provided to the bottom of treated subgrade or to top of ditch, whichever is lower. However, exceptions shall be permitted at median ditches, at merging and diverging ramp gores, and similar constrained locations.

Ditches shall meet the above geometric criteria, however, to avoid over-excavation, ditches shall not be deeper or wider than hydraulically required.

In constrained locations where the drainage ditch design criteria are too restrictive to accommodate the DB Contractor's proposed design, DB Contractor may submit a request for Deviation to use an alternate ditch geometry at the constrained location. DB Contractor shall include in each request the location, a description of the constrained conditions and reasons for initiating the request for consideration by TxDOT of alternate ditch geometry at that location, and the proposed ditch configuration.

20.3.2.2 **Culverts**

DB Contractor shall analyze existing and proposed culverts impacted, replaced, or created by the Project, for any localized flooding. The culvert hydraulic analysis shall include an investigation of field conditions and

survey data to develop hydraulic models to evaluate WSELs, velocities and floodplain boundaries. DB Contractor shall coordinate with the local floodplain administrator and FEMA to ensure compliance with applicable floodplain requirements as described in Section 20.2.2. Where culvert design is influenced by upstream storage, the analysis of the storage shall be incorporated into the hydrologic analysis and hydraulic design of the culvert.

All culverts shall be reinforced concrete box (RCB) and shall be installed in accordance with TxDOT Houston District standards.

On mainlanes, ramps, frontage roads, driveways, and cross-streets, the minimum RCB inside depth shall be 2 feet.

DB Contractor shall use the following criteria for culvert design:

- Allowable headwater:
    - The Design AEP headwater elevation shall be no higher than the top of the treated subgrade, at the lowest roadway elevation within the area served by the culvert.
- Culvert outlet velocity, based on pipe-full flow conditions: Culverts shall be designed to maintain a minimum outlet velocity of 3 feet per second. Culverts shall be designed to achieve a maximum outlet velocity of 12 feet per second in the culvert.
    - DB Contractor shall submit concepts for velocity-reducing approaches for TxDOT approval prior to the submission of the first relevant design submittal package. DB Contractor may request Deviations in accordance with Section 4.1.2.2.4 of the General Conditions during final design if velocity-reducing approaches are not required.
- Minimum culvert dimension: The minimum box culvert inside height dimension for all proposed box culverts shall be 2 feet. The minimum RCP culvert inside diameter shall be 24 inches. The minimum thermoplastic pipe inside diameter shall be 18 inches, and the maximum thermoplastic pipe inside diameter shall be 48 inches.

For existing culvert crossings, DB Contractor shall analyze the existing structure using the proposed flows to ensure upstream WSEL does not exceed allowable headwater elevation, as defined in this Section 20.3.2.2. If the proposed flows at an existing structure do exceed the allowable headwater elevation, DB Contractor shall design and construct a replacement structure with sufficient capacity to pass the required design frequency flows. DB Contractor shall ensure the maximum headwater elevations for the Design AEP and 1% AEP events do not exceed the corresponding allowable headwater.

For any existing culverts considered for expansion, extension, modification, or reuse, DB Contractor shall investigate and verify culvert structural integrity and suitability of use per current design loading standards, and submit a report, as part of the Drainage Design Report, summarizing the findings for TxDOT review and approval. Structural analysis and design requirements for existing bridge class culverts are described in Item 21. Conduit liners are not allowed, such as plastic or Kevlar liners that reduce internal friction to increase the capacity or increase the longevity of the culvert.

Bridge class culverts hydraulic analysis shall be performed using HEC-RAS. Other culverts may be analyzed and designed using HY8, HEC-RAS, or other modeling tool approved by TxDOT. DB Contractor shall analyze and design any culvert located in a FEMA-studied floodplain using HEC-RAS.

20.3.2.2.1 Culverts near Bay Area Boulevard

DB Contractor shall coordinate, design, obtain necessary temporary construction easements for, and install one 8-foot by 5-foot box culvert and backfill the temporary conveyance channel at approximate station 6617+43 as more specifically depicted on the exhibit entitled “Grand Bargain Offsite Facilities – Exhibit (Bay Area Blvd Culverts & Waterlines; Lloyd Tract)” included in the RIDs. This box culvert shall be for the exclusive use and conveyance of drainage by the landowner. Analysis is not required if these minimum culvert sizes described in this Section 20.3.2.2.1 are used or if such sizes are exceeded.

20.3.2.2.2 Culverts near Historic Farm Ditches Across the Right of Way

For new culvert crossings that serve only to continue the existing drainage function of historic farm ditches across the Project ROW (as described in Section 5.4.2 of the "Grand Parkway (SH 99) Segment B-1 Preliminary Drainage Impact Study" provided in the RIDs, and including the anticipated crossing near Station 6617+00 to accommodate proposed private development), the use of siphons on culverts will only be allowed under the following conditions:

- The use of a siphon shall not collect and convey runoff from impervious surfaces within the Project ROW;
- There is no feasible alternative to avoid a vertical conflict between the culvert at the existing grade of the historic farm ditches and the storm drain system;
- The culvert discharge shall be considered a temporary condition until (i) the development of land occurs in the historic farm ditch tributary drainage area, or (ii) 180 days prior to Substantial Completion, whichever occurs first; and
- Upon termination of the temporary condition, DB Contractor shall abandon the siphon by flow-filling the culvert.

20.3.2.2.3 GCWA Culverts

DB Contractor shall coordinate, design, obtain necessary temporary construction easements, and install (i) three 12-feet by 10-feet box culverts for the main canal and (ii) two 6-feet by 4-feet box culverts for the seepage ditch in accordance with the GCWA Agreement provided in the RIDs.

DB Contractor shall coordinate, design, and install 3-inch-deep crushed gravel over the GCWA box culverts throughout the state's right of way limits in accordance with the GCWA Agreement provided in the RIDs.

DB Contractor shall coordinate, design and construct a 15-foot-wide and 12-inch-deep crushed gravel road in accordance with the GCWA Agreement provided in the RIDs.

20.3.2.3 **Bridges**

All bridge hydraulic computations, designs, and recommendations shall be consistent with previous studies and use the available hydraulic models most representative of pre-Project conditions as base models for design of the Project, as noted in this Item 20.

Where bridge design is influenced by upstream storage, the analysis of the storage shall be considered in the design of the bridge.

When designing a bridge over waterways, DB Contractor design shall minimize changes to the existing channel. Bridge waterway design shall maintain the existing channel morphology through the structure. An existing bridge spanning a waterway shall not be replaced with a structure of a lesser total span than the original structure, unless the reduced bridge length is outside 100-year floodplain limits of the waterway, and/or unless approved by TxDOT. New bridges spanning a waterway shall not result in a narrowing of the existing channel.

DB Contractor shall design abutment protection in accordance with the procedures outlined in FHWA HEC-23. For bridge abutments in urban areas, DB Contractor shall install protection in accordance with the Project's aesthetic plan.

20.3.2.3.1 **Bridge Deck Drainage Systems**

DB Contractor shall design bridge deck drainage systems in accordance with Chapter 9 of the TxDOT *Hydraulic Design Manual*. Pavement drainage flowing toward the bridge shall be intercepted upgrade from the approach slab.

Controlled free fall drainage is preferred if ground footprint, lower roadway, and user restrictions permit. Open deck drains and slotted rail are not permissible for new bridges within limits over railroad ROW, waterways with environmental or permitting restrictions, or other roadways.

If a closed desk system is required to meet ponding width limits, DB Contractor shall ensure the bridge drainage system is in compliance with the following requirements:

- Bridge deck inlet locations shall provide gutter drainage meeting allowable ponding requirements in this Item 20 and as presented in Table 20-6.
- Use PVC pipe for bridge deck drain pipe assemblies and downspouts, and subsurface connections to RCP or RCB storm drain conduits.
- Promote minimal maintenance intervention and ease of cleanout.
- Have long-term durability considering corrosion, ultraviolet exposure, and thermal effects.
- Be hidden from direct view where possible for aesthetics.
- Runoff must be conveyed in a closed system through the bridge columns to the roadway drainage system below. Promote sufficient water velocities to be self-cleaning and avoid debris accumulation.
- Outlet at the bottom of the substructure either into a storm drain system or into a ditch with erosion protection at the outlet. In no case shall storm water be discharged against any part of the structure. If used, subsurface PVC pipe connections shall be 12 inches minimum diameter; shall include cleanouts at ground level and be of minimal length to be conveyed to an RCP or RCB pipe.
- Runoff from bridge deck drainage shall be treated as required by TCEQ and other applicable regulation prior to discharge to the natural waters of the State.

20.3.2.3.2 **Bridge Scour**

DB Contractor shall conduct scour evaluations in accordance with the TxDOT Scour Evaluation Guide, TxDOT Scour Analysis Guide, and the TxDOT *Geotechnical Manual - LRFD*. Scour analyses for span bridges must consider the scour design flood frequency and scour design check flood frequency. If both of these frequencies result in overtopping, DB Contractor shall also consider the flood frequency associated with incipient overtopping. Unless otherwise directed by TxDOT, the governing flood frequency for scour is that which results in the most severe calculated scour depths at the bridge opening. If necessary, DB Contractor shall provide countermeasures for any instability and scour problems in accordance with FHWA HEC-23 – *Bridge and Scour and Stream Instability Countermeasures Experience Selection and Design Guidance* and Good Industry Practice. DB Contractor shall design scour countermeasures for the governing flood frequency for scour or the 100-year flood, whichever event is less extreme. DB Contractor shall complete a scour summary sheet for each bridge-class culvert and provide to TxDOT with the scour analysis results, disregard depths, and the bridge layouts prior to construction of foundations over waterways or water retention facilities.

20.3.3 **Stormwater Quantity Mitigation and Quality Management**

20.3.3.1 **Stormwater Storage Facilities (SWSF)**

DB Contractor shall complete design of the SWSF to meet requirements for water quality, water quantity, and flow rate control, as set forth in the Design-Build Specifications. Types of SWSF include detention or retention ponds, basins, and any other facilities employed to detain or retain storm water.

An analysis was performed to determine preliminary number and sizing of SWSF. The results are reported in the hydrologic and hydraulic (H&H) Report contained in the Reference Information Documents (RIDs).

DB Contractor shall be responsible for determining the size, number and locations of SWSF. DB Contractor shall perform analyses including a hydrologic routing analysis within hydrologic computer models such as stormwater management model (SWMM) and/or HEC-HMS as the basis for SWSF design.

Notwithstanding the inclusion of over-sized storm drains as in-line detention, other use of underground SWSF for mitigation of adverse impacts is prohibited.

DB Contractor shall be prohibited from eliminating existing SWSF within the Project ROW, with the exception of the Dominion Church's recently expanded SWSF from approximate Station 6746+00 to Station 6748+80.

DB Contractor shall restore the Dominion Church's SWSF to pre-expansion conditions as identified in "Dominion Church Detention Pond Expansion" provided in the RIDs. DB Contractor shall coordinate with the

landowner to design and construct a six-foot (top of slope to top of slope) concrete pilot channel across the Project ROW in the Dominion Church's SWSF at approximately Station 6749+88.

DB Contractor shall not place drainage outfalls into the Dominion Church's SWSF passing through State-owned ROW.

DB Contractor shall be prohibited from sharing SWSF with adjacent landowners.

20.3.3.1.1 **Design Criteria**

DB Contractor shall analyze and identify SWSF locations and all applicable SWSF information and coordinate these with TxDOT. DB Contractor shall develop SWSF designs that manage Project storm water in accordance with applicable local, State, and federal regulations, and coordinate with the appropriate floodplain administrator.

The maximum outflow rate shall be limited to no more than the existing peak inflow for the same AEP.

SWSF side slopes shall not be steeper than 4(H):1(V), and depth shall not exceed 15 feet. In addition, DB Contractor shall comply with the rules contained in the Aggregate Quarry and Pit Safety Act.

A minimum of 1 feet of vertical freeboard shall be provided on SWSF and shall be measured from the 1% AEP WSEL to the lowest top of the basin bank. All SWSF shall have an overflow spillway sized to convey events for and/or in excess of the 1% AEP.

DB Contractor shall include all inlet and outlet details, overflow spillway designs, concrete pilot channels, and other appurtenances in the design. Design shall address safety and measures to secure access to SWSF. Once required storage is estimated and facility shape is determined, DB Contractor shall develop an inflow hydrograph, a stage vs. storage curve, and a stage vs. discharge curve (i.e., performance curve), as part of preliminary design computations.

Design Criteria for SWSF:

- The design frequency, and rainfall data shall be consistent with TxDOT Standards and local requirements.
- The size, shape, and depth must provide sufficient volume to satisfy the Project storage requirements. The bottom shall be designed with a low flow channel.
- Wet-bottom SWSF are not allowed, with the exception of SWSF located between West Road and Maple Leaf Drive. At these locations where wet-bottom SWSF are allowed, DB Contractor shall design and construct rigid traffic barrier and associated safety end treatments on the sides of each pond adjacent to the frontage roads and cross streets, while providing access for inspection and maintenance.

Maintenance and Accessibility:

- Every effort shall be made to minimize the amount and frequency of regular maintenance at the SWSF. All efforts shall be made to eliminate the need for emergency or extraordinary maintenance.
- In order for proper maintenance to be performed, SWSF components shall be accessible to both maintenance personnel and their equipment and materials with a minimum of 10 feet of vertical clearance.

20.3.3.1.2 **Regulatory Requirements and Documentation**

DB Contractor shall perform flood routing analyses and submit calculations in the Drainage Design Report prepared in accordance with Section 20.4 to TxDOT and applicable reviewing authorities.

DB Contractor shall include special analysis and documentation for SWSF affected by environmental issues in the Final Design, such as hazardous waste, high groundwater table, or groundwater pollution.

DB Contractor shall include a graphic showing the drainage areas from which flow outfalls to SWSF and may receive treatment. DB Contractor shall provide design calculations to TxDOT. The display must also show drainage areas from which flow is not treated, if applicable.

20.3.4 **Existing Drainage Structures to Remain in Place**

The following bridge class culverts may remain in place and are not required to meet the hydraulic requirements of this Item 20 or the structural capacity requirements as defined in Item 21. The other drainage structures listed below are not required to meet the hydraulic requirements of this Item 20:

Table 20-7: Drainage Structures to Remain in Place

Structure Number (NBI #) or Culvert #	Feature Crossed	Facility Carried
120200D00660001	Drainage Channel	S. Johnson St.
120200017802036	Dickinson Bayou Tributary 4	SH 35
120200017803040	Mustang Bayou	SH 35
120200017803041	Mustang Bayou	SH 35

DB Contractor shall verify that all existing drainage components listed above that are physically impacted by the Work meet the hydraulic requirements as defined in this Item 20, and for bridge class culverts, the structural capacity requirements as defined Item 21. Notwithstanding that Table 20-7 lists drainage structures that may remain in place, if any existing elements of these existing systems are physically impacted by the Work and do not comply with the hydraulic and applicable structural requirements of Items 20 and 21, DB Contractor shall repair or replace those elements to meet such requirements.

Physical impact in the context of this Item 20 shall mean: (i) any modification to an existing drainage component as a result of the Work, including any extension, realignment, or adjustment that changes the hydrologic and hydraulic characteristics of the existing drainage component, that results in an "adverse impact," as defined above, or (ii) the placement of any additional structural loads on the existing drainage structure that compromises the structural integrity of the existing drainage component, such as embankment that exceeds the original structural design capacity of the component, settlements, and/or other structural impacts associated with the Project as further described in Section 21.2.10.

20.4 **Submittal Requirements**

DB Contractor shall make available to TxDOT, as part of the Submittals, all native design files used in the hydrologic and hydraulic analyses to prepare computations and plans. Such native design files shall include the following:

- Hydrologic analysis computations and supporting data,
- Hydraulic analysis computations and supporting data,
- Input and output data from design and modeling software including but not limited to SWMM, HEC-HMS, HEC-RAS, or HY-8 models, and
- Drainage area maps, drainage structure layouts, and drainage reports.

The native files for the models and analysis should represent the record set submitted.

20.4.1 **Drainage Design Report**

DB Contractor shall submit a preliminary Drainage Design Report with the Preliminary Design Submittal. The preliminary Drainage Design Report shall include at a minimum:

- Detailed table of contents and narrative of design approach and methodology;
- Record set of all drainage computations, both hydrologic and hydraulic, and all support data including all geospatial data. If computations are in electronic format, the original format in which the computations were executed shall be submitted, such as XLSX for Microsoft Excel or XMCD for Mathcad;
- Hydrology/Hydraulic notes, models, and tabulations. Models are to be submitted in the original electronic format (e.g., OpenRoads Designer, HEC-RAS – PRJ, Project files for HEC-HMS and HEC-RAS). Please note some programs such as HEC-HMS generate multiple files which are

essential to the overall model. All files shall be included with the Submittal to ensure the results match those in the record set;

- Storm drainage design report;
- Stream crossing drainage report;
- SWSF designs, including graphic display of treatment areas and maintenance guidelines for operation;
- Complete documentation of DB Contractor's assessment of the potential for the Project to cause adverse impacts, including how adverse impacts are mitigated (if needed), and reasonable substantiation that the Project will not cause or increase damage to properties outside the Project ROW;
- Documentation that DB Contractor has obtained appropriate drainage easements;
- Correspondence files including but not limited to:
    - Meeting minutes pertaining to drainage and floodplain; and
    - Documentation of coordination with the local floodplain administrator and Governmental Entities, as applicable, pertaining to drainage and drainage studies;
- Drainage system data (location, type, material, size, and other pertinent information) in an GIS data format for the existing system to remain in place and the proposed system constructed in conjunction with this Project; and,
- Exhibits demonstrating the drainage design includes capacity for the future expansion configuration. Refer to Exhibit 1 to the DBA, Section 5 (Ultimate Project Configuration), the Schematic Design, and the "Grand Parkway (SH 99) Segment B-1 Preliminary Drainage Impact Study" provided in the RIDs for details of the future expansion configuration and the associated compatibility requirements of drainage design.

Prior to construction of any drainage element, DB Contractor shall submit a final Drainage Design Report to TxDOT. The final Drainage Design Report shall address preliminary Drainage Design Report review comments provided by TxDOT.

As part of the Record Documents, DB Contractor shall submit a supplement to the final Drainage Design Report to TxDOT, which shall be a complete documentation of all components of the Project's drainage system, including photos of the constructed drainage elements. The supplement to the final Drainage Design Report shall document all changes to the drainage design made during construction.

20.4.2 Storm Drainage Design Report

DB Contractor shall prepare a storm drain drainage design report, signed and sealed by a PE, encompassing all storm drain systems that contains, at a minimum, the following items:

- Detailed table of contents and narrative of design approach and methodology;
- Drainage area maps for each storm drain inlet with pertinent data, such as boundaries of the drainage area, best available topographic contours (including source and resolution of data), time of concentration values, soil types, and land use descriptions, design runoff coefficients (i.e., C), and/or design curve number (CN), and computed discharges for design and check flood storm events;
- Storm drain inlet and conduit hydraulic design data including, but not limited to design runoff, inlet and conduit sizes, types, and capacities, inlet carryover, velocity, allowable design and gutter ponding, and hydraulic grade line data;
- Tabulation of all existing and proposed conduit and drainage structures, including location, size, class and gauge, detailed structure designs, and all special designs;
- Specifications for the conduit bedding material and structural backfill on all proposed conduits and conduit alternates, or reference to applicable TxDOT Standard Specifications;
- Complete conduit profiles, including conduit size, type, and gradient; station offsets from the controlling alignment of the roadway; length of conduit; class/gauge of RP; TxDOT Standard Reference for RCP; and numbered drainage structures with station/offset location and elevations; and

- Ditch design data and hydraulic design supporting calculations.

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

20.4.3 **Stream Crossings Drainage Report**

DB Contractor shall prepare a drainage report containing hydrology and hydraulic design data for each stream crossing. Major stream crossings are defined as those crossings over waterways listed as a FEMA SFHA or requiring a bridge or bridge class structure. Any other waterway crossing will be a minor stream crossing.

The report shall include detailed calculations, electronic and printed copies of the computer software input and output files, a discussion about hydrologic and hydraulic analysis, description of adverse impacts and mitigation, summary of conclusions, and reasons for the design recommendations. The report shall follow the hydraulic report documentation guidelines referenced and outlined in Chapter 3 of the TxDOT *Hydraulic Design Manual*. At a minimum, the stream crossings drainage report shall include:

- Detailed table of contents and narrative of design approach and methodology;
- Description of existing and proposed conditions;
- Description of FEMA SFHA
    - Floodplain map displaying floodway width, federal insurance rate map (FIRMette), and LOMR;
    - FEMA flood insurance study (FIS);
    - Discussion of SFHA and implications; and
    - Documentation of coordination with the local floodplain administrator.
- Description of Atlas 14 1D or 1D/2D HEC-RAS model floodplain
    - Floodplain map;
    - Discussion of floodplain limits, depth, fill volume and design implications; and
    - Documentation of mitigation of potential project impacts.
- Hydrology
    - Drainage area maps with watershed characteristics/parameterization including topography (including source and resolution of data), both hardcopy and electronic (computer aided drafting and design (CADD), GIS, etc.) format;
    - Hydrologic calculations, including discharge (where computer software is used, both hardcopy and electronic input and output files); and
    - Historical or Site data used to review computed flows.
- Hydraulics and Recommended Waterway Opening and/or Structure
    - Photos of the waterway opening and/or structure (pre-Project);
    - General plan, profile, and elevation of proposed waterway opening and/or structure;
    - Water surface profiles and velocity data;
    - Calculations – hardcopy and electronic input and output files for computer models used for analysis, and summary of modeling results;
    - Cross-sections of waterway; and
    - Channel profiles.
- Scour Evaluation
    - Identification of non-erodible channel materials, if present (refer to Chapter 3 of the TxDOT Scour Evaluation Guide). If the foundations are adequately protected by non-erodible channel materials (refer to Chapter 7 of the TxDOT Scour Evaluation Guide), the DB Contractor may elect to use the TxDOT Form 538 - Scour Vulnerability Screening in lieu of a detailed scour evaluation;
    - Channel cross-sections at the upstream face of bridge and upstream of the contraction zone leading to the bridge, each showing demarcation of overbank areas, ineffective flood areas, roughness coefficients, and WSELs;

- Identification of method(s) and equation(s) used for calculating scour depths, detailed calculations, clearly stated assumptions, and justification for all assumptions;
- Channel cross-section at bridge showing calculated scour envelope and/or a table summarizing calculated contraction and pier scour depths (only for the governing flood frequency for scour) for each abutment and bent;
- Completion of Scour Summary Sheet (TxDOT Form 2605 for span bridges over water; TxDOT Form 2606 for culverts). It is permissible to assume zero observed scour for the as-built condition;
- Discussion of review of long-term degradation/aggradation and other geomorphic hazards, including but not limited to, lateral channel migration and headcutting;
- Recommendation for abutment protection (refer to Chapter 11 of the TxDOT Scour Evaluation Guide); and
- Recommendations for pier protection and/or channel protection, if warranted.

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

DB Contractor shall provide bridge hydraulic summary sheets and bridge scour envelope sheets with projected scour calculation summaries for every bridge crossing a waterway in the Record Documents.

20.5 Construction Requirements

DB Contractor shall design drainage to accommodate construction staging. The design shall include temporary erosion control measures and other Best Management Practices needed to satisfy National Pollutant Discharge Elimination System and other regulatory requirements. DB Contractor shall conduct all Work necessary to meet the requirements for this Item 20 and the TxDOT Standard Specifications.

20.5.1 Temporary Drainage

DB Contractor shall provide all temporary drainage facilities during construction. The Traffic Control Plans shall include a description of the roadway and drainage design for each phase and stage of construction, including temporary drainage elements. DB Contractor shall maintain all travel lanes during Construction Work in accordance with Item 27.

Temporary drainage or other roadway modifications within Project ROW shall provide equivalent or better drainage performance to any existing drainage system it is replacing.

20.6 Submittals

All Submittals described in this Item 20 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 20-8. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 20-8: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Notification in writing of all coordination meetings with Governmental Entities	At least five Business Days in advance of meeting	For information	20.2.2
All native design files used in the hydrologic and hydraulic analyses to prepare computations and plans	Upon request	Review and comment	20.3
Storm sewer drainage report, or document within plans encompassing all storm sewer systems	As part of the Preliminary Design Submittal	Review and comment	20.3.2.1

Table 20-8: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Structural integrity and suitability report for any existing storm drain conduits considered for expansion, extension, modification, or reuse	As necessary	Approval	20.3.2.1.2
Request for Deviation to use an alternate ditch geometry at a constrained location	If needed, as part of the Preliminary Design Submittal	Approval	20.3.2.1.3
Structural integrity and suitability report for any existing culverts considered for expansion, extension, modification, or reuse	As necessary	Approval	20.3.2.2
Scour summary sheet for each bridge-class culvert	Prior to construction of foundations over waterways or water retention facilities	Review and comment	20.3.2.3.2
Calculations of flood routing analyses	As part of the Preliminary Design Submittal	Approval	20.3.3.1.2
Hydraulic summary sheets and bridge scour data sheets and forms with projected scour calculation summaries for every bridge crossing a waterway	As part of the Record Documents	Review and comment	20.4.3
Preliminary Drainage Design Report	As part of the Preliminary Design Submittal	Review and comment	20.4.1
Final Drainage Design Report, including supporting calculations	Prior to construction of any drainage element	Review and comment	20.4.1
Supplement to the final Drainage Design Report	As part of Record Documents	Review and comment	20.4.1

Item 21
Structures

21.1 General Requirements

The structural Elements of the Project, including bridges, culverts, drainage structures, signage supports, illumination assemblies, traffic signals, retaining walls, and Noise Barriers, shall be designed and constructed in conformance with the requirements of the Contract Documents, Houston District standards, TxDOT Engineering Standard Sheets, American Association of State Highway and Transportation Officials (AASHTO) *Load and Resistance Factor Design (LRFD) Bridge Design Specifications* except where directed otherwise by the TxDOT *Bridge Design Manual – LRFD,* TxDOT *Geotechnical Manual - LRFD,* TxDOT *Bridge Project Development Manual*, TxDOT *Bridge Design Guide*, TxDOT *Bridge Detailing Guide,* TxDOT *Structure Design – Corrosion Protection Guide,* and TxDOT bridge design policy and information listed at https://www.txdot.gov/inside-txdot/division/bridge.html. The most recent version of TxDOT Engineering Standard Sheets provided on TxDOT's webpage 30 days prior to the Proposal Due Date shall apply to the Project, regardless of the letting dates to which they apply.

In the event of a conflict between TxDOT Engineering Standard Sheets and Houston District standards, DB Contractor shall ensure Houston District standards are met.

Design-Build (DB) Contractor shall design bridges, retaining walls, Noise Barriers, and sign structures in conformance with the approved aesthetic schemes, requirements, and standards as identified in Item 23. High visibility bridges, as defined and identified in Section 23.2.3.1, shall utilize the aesthetic treatments in accordance with the Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges* included in the RIDs, the applicable "Wave Column Details" provided in the RIDs, and corresponding Houston District standards.

Throughout the Term, DB Contractor shall allow access to TxDOT and TxDOT contracted inspectors performing National Bridge Inspection Standards (NBIS) inspections. DB Contractor shall coordinate with TxDOT 90 days prior to opening any portion of a new or rehabilitated bridge to traffic to allow for the initial NBIS inspection by TxDOT or TxDOT contractors.

21.1.1 Lead Structural Engineer

DB Contractor shall provide a Lead Structural Engineer, who is employed by the Lead Engineering Firm or a Subcontractor to the Lead Engineering Firm, and who is responsible for overseeing the design and construction of all structural elements of the Project such that each element is complete and design requirements are met. The Lead Structural Engineer shall be a Licensed Professional Engineer (PE) responsible for coordination of interdisciplinary design reviews in cooperation with leaders of other disciplines. The Lead Structural Engineer or a PE under the direct supervision of the Lead Structural Engineer shall be the Engineer of Record for the design of all structural elements on the Project.

21.2 Design Requirements

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 Corridor Structure Type Study and Report. The Corridor Structure Type Study and Report shall clearly define DB Contractor's action to achieve a durable structure compatible with the AASHTO *LRFD Bridge Design Specifications* (or extended life if otherwise called for in Contract Documents) for new Project bridges, walls, culverts and miscellaneous structures. A durable structure shall achieve both a 75-year design life and 75-year service life for Project bridges, retaining walls, Noise Barriers, culverts and miscellaneous structures. Evaluation of existing structures within the Project limits that will be retained shall be included in the Corridor Structure Type Study and Report. The Complex Structures Criteria Report described in Section 21.2.1.1 shall be a separate report from the Corridor Structure Type Study and Report.

Bridges crossing over the Project shall, at a minimum, be designed to accommodate the configurations described in Attachment 19-1 (Cross Street Design Criteria) and Attachment 19-2 (Cross Street Typical Sections) including location of abutments, retaining walls, foundations, and substructures.

21.2.1 **Complex Structures**

DB Contractor shall provide Submittals as described in Section 21.2.1.1 for structures defined as Complex Structures in accordance with Section 1.2.2 of the General Conditions.

21.2.1.1 **Complex Structures Submittals**

DB Contractor shall submit the following Submittals for Complex Structures:

- Draft of Complex Structures Criteria Report shall be provided a minimum of three Business Days in advance of the initial Complex Structures workshop in accordance with Section 21.2.1.2. DB Contractor shall utilize the workshop to demonstrate progress and content of the Complex Structures Criteria Report in advance of submittal to TxDOT.

- Complex Structures Criteria Report that describes design methods, analytical approaches, and tolerances including but not limited to loads, geometrics, fabrication, and erection, includes a list of software and design tools to be used for each member and model, and provides sufficient details to analyze DB Contractor's design. DB Contractor shall list all applicable AASHTO, TxDOT, and FHWA references to be used. DB Contractor may propose other written references backed by research for implementation for TxDOT approval, in its sole discretion. DB Contractor shall submit the Complex Structures Criteria Report for approval. DB Contractor shall not submit the Preliminary Design Submittal for the Complex Structures until the Complex Structures Criteria Report has been approved by TxDOT. Preliminary Design Submittals for Complex Structures may be submitted separately from Preliminary Design Submittals for other Elements of the Project.

- Complex Structures Modeling Data that includes complete inputs of structure geometry, section properties, member sizes, plate thicknesses, material properties, joint coordinates, boundary conditions, eccentricities, and erection sequence, and provides sufficient details to analyze DB Contractor's structural model for the Complex Structures Plans. Complex Structures Modeling Data shall be submitted to TxDOT for review and comment prior to submitting the Complex Structures Plans. DB Contractor shall provide data and sketches in spreadsheets, pdf, or other formats mutually agreed upon by TxDOT and DB Contractor. If TxDOT determines data and sketches are insufficient for TxDOT to prepare a Complex Structures analytical model, DB Contractor shall submit additional information requested by TxDOT.

- Complex Structures Plans that include complete construction and erection plans with specifications and an erection manual conforming to the Complex Structures Criteria Report, Contract Documents, Governmental Approvals, Law, and in accordance with the Professional Services Quality Management Plan. Complex Structures Plans for separate Complex Structures shall be submitted a minimum of 30 days apart. Complex Structures Plans shall be subject to TxDOT approval. TxDOT will respond to each complete Complex Structures Plans submittal by the later of (i) 60 days after submitting the Complex Structures Plans or (ii) 90 days after the Submittal of the Complex Structures Modeling Data. DB Contractor shall not incorporate Complex Structures Plans into Final Design Submittals until approval of the Complex Structures Plans. Final Design Submittals for Complex Structures may be submitted separately from Final Design Submittals for other Elements of the Project.

21.2.1.2 **Complex Structures Workshops**

DB Contractor shall conduct an initial Complex Structures workshop a minimum of 10 Business Days before submission of the Complex Structures Criteria Report. DB Contractor shall submit a draft of Complex Structures Criteria Report and an agenda a minimum of three Business Days in advance of the initial workshop.

DB Contractor shall continue to conduct Complex Structures workshops at least monthly until approval of all Complex Structures Plans. DB Contractor shall present structural responses, loads, erection sequences, progression of models, comparative parameters, progressed work products, and other key structural design elements. TxDOT may request other pertinent information that TxDOT deems appropriate which may include DB Contractor progressed design products in accordance with the Complex Structures Criteria Report, clarification of Complex Structures Modeling Data, and clarification of content provided within Complex Structures Plans. DB Contractor shall prepare an agenda for each workshop at least three Business Days in advance of workshop and incorporate content requested by TxDOT.

21.2.2 **National Bridge Inventory (NBI) Reporting Procedures**

Upon completion of the bridge layout during the design phase, DB Contractor shall coordinate with the appropriate TxDOT District Bridge Engineer or Bridge Inspection Coordinator to obtain permanent structure numbers for all bridges and bridge class culverts. This will require an approved bridge layout and completion of the permanent structure number request form. The NBI numbers shall be shown on the applicable layout sheets of the Final Design Submittal.

DB Contractor shall place NBI signs on all bridges and bridge class culverts in accordance with NBIS Standard. DB Contractor shall also stencil bent numbers on all bridges with four or more spans. The NBI numbers and bent numbers shall be placed at locations as directed by TxDOT.

21.2.3 **Design Parameters**

Unless otherwise noted, design for all roadway structural elements shall be based on the LRFD methodology included in the TxDOT *Bridge Design Manual – LRFD*, TxDOT bridge design policy and information listed at https://www.txdot.gov/business/resources/highway/bridge.html and the AASHTO *LRFD Bridge Design Specifications*.

Design of Project structures, foundations, embankments, walls, excavations, retained structures, slopes, bridges, and other related design features as well as soil exploration frequencies and boring requirements shall be in compliance with provisions of the TxDOT *Geotechnical Manual - LRFD* and in accordance with the provisions of Item 16.

Bridge widths shall meet the typical sections shown on the Schematic Design. Bridge span lengths shall span the typical section widths of the roadways below including appropriate horizontal clear distance unless otherwise shown on the Schematic Design or approved by TxDOT.

Steel bridge design shall comply with TxDOT *Preferred Practices for Steel Bridge Design, Fabrication, and Erection*. DB Contractor shall design bridge units without uplift at supports under all load conditions.

Corrosion protection measures shall be in accordance with TxDOT Bridge Division and the respective District's practices. Specific corrosion protection measures can be found at https://ftp.dot.state.tx.us/pub/txdot-info/brg/design/corrosion-protection-guide.pdf and District-specific requirements can be found in the TxDOT *Structure Design – Corrosion Protection Guide*. The Project resides in the "mild" environment classification per Figure 2 of the TxDOT *Structure Design – Corrosion Protection Guide*.

Segmental bridges shall conform to the requirements of the AASHTO *LRFD Bridge Design Specifications* except where directed otherwise by the TxDOT *Bridge Design Manual – LRFD*.

Falsework, shoring, and other temporary supports shall be designed in accordance with the AASHTO *Guide Design Specifications for Bridge Temporary Works*.

DB Contractor shall ensure that bridges crossing over waterways shall meet the structural load and resistance requirements as required by the TxDOT *Geotechnical Manual - LRFD*, Chapter 5, Section 6. DB Contractor shall ensure all requirements of FHWA hydraulic engineering circulars (HECs) are met for bridge structures.

Unless otherwise directed, DB Contractor shall ensure at least 1.5 feet of clearance between the design event water surface elevation and the low chord of bridges crossing over waterways for new structures only. DB Contractor shall also ensure the low chord of new bridges crossing over waterways meets or exceeds the 100-year frequency water surface elevation. Hydraulic design shall be in accordance with Item 20.

During design and construction, the DB Contractor shall submit all electronic and paper copies of files and design calculations no later than the start of construction of all Elements. All files and calculations (bridge design notes) shall be submitted with the Record Documents in accordance with Bridge Division's Procedure for Archiving Bridge Design Notes in Chapter 6 of the TxDOT *Bridge Design Manual - LRFD* and other requirements of the Design-Build Agreement (DBA). DB Contractor shall submit load rating calculations including input and output files for all new or widened bridges and all new or widened bridge class culverts.

Sidewalks, bicycle lanes, and shared use paths shall be provided on bridge structures as shown on the Schematic Design and in accordance with the provisions of Item 19 and Item 28. DB Contractor shall design sidewalks to meet the criteria of the AASHTO *A Policy on Geometric Design of Highways and Streets* and the AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, and *Green Ribbon Project: Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges – Wave Scheme*, provided in the RIDs. Pedestrian bridges shall additionally conform to the requirements of AASHTO *LRFD Guide Specifications for the Design of Pedestrian Bridges*.

Nonredundant Steel Tension Members (NSTM) shall not be permitted.

Box girders and caps (substructure) shall be accessible without impacting traffic below, DB Contractor shall make concrete box girders and caps (substructure) with a minimum inside depth of 6 feet to facilitate interior inspection. DB Contractor shall include a minimum access opening of 2 feet wide by 2 feet 6 inches high for exterior doors and 1 foot 6 inches wide by 2 feet 6 inches high for interior diaphragm openings (diaphragm openings shall ideally be 1 foot 9 inches above bottom plate) in 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).

DB Contractor shall embed all conduits within the structure. DB Contractor shall not embed conduit in bridge beams unless specifically approved by TxDOT. No exposed conduit will be allowed on bents, columns, outer face of exterior bridge beams, bridge slab overhangs, retaining walls, or any other visible surface unless specifically approved by TxDOT. DB Contractor shall provide conduit chases through inverted-t bent caps for conduits suspended between beams passing between bridge spans.

21.2.4 Bridge Design Live Loads and Load Ratings

All roadway bridges, pedestrian bridges, and bridge class culverts shall be designed to accommodate the following live loads:

- New Construction: Design load designated HL-93 as defined in the AASHTO *LRFD Bridge Design Specifications* shall be utilized for bridges. Sidewalks of vehicular bridges shall be loaded in accordance with requirements in the AASHTO *LRFD Bridge Design Specifications*.
- Existing Bridge Structures and Bridge Class Culverts: Load rating with an operating rating factor of 1.0 for all Texas and Federal legal loads. Structures failing to meet this standard shall be rehabilitated to an operating rating factor of 1.0 for all Texas and Federal legal loads or replaced using LRFD design and HL-93 loading.
- Existing Bridge Widenings: HL-93 as described in the TxDOT *Bridge Design Manual - LRFD* for widening and an operating rating factor of 1.0 for all Texas and Federal legal loads for existing portion. Designate both existing and widening loading on bridge layouts. Existing structures with load rating exceeding operating rating factor of 1.0 for all Texas and Federal legal loads shall not have their existing load rating reduced in the process of widening.
- Pedestrian Bridges: Load in accordance with requirements in the AASHTO *LRFD Bridge Design Specifications* and the AASHTO *Guide Specifications for the 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*, to account for maintenance and emergency vehicles.

DB Contractor shall provide to TxDOT both an inventory and an operating rating of the constructed structures using Form 2731 "New Bridge Load Rating Summary". Load ratings shall be in accordance with AASHTO's *Manual for Bridge Evaluation* and shall be submitted for review and approval by TxDOT with the Preliminary Design Submittal.

For load rating, legal loads shall meet the requirements of 23 CFR 658.17, Texas Transportation Code §621.101, the AASHTO *Manual for Bridge Evaluation* and the TxDOT *Bridge Inspection Manual*.

21.2.5 **Bridge Decks and Superstructures**

The type of bridge substructure and superstructure shall be restricted to those identified within the TxDOT *Bridge Design Manual – LRFD*. For bridge superstructures with I-girders, the minimum number of girders in any roadway width is four. For I-girders and steel I-beam/girders utilizing empirical deck design, the maximum beam spacing shall be 10 feet. For I-girders and steel I-beams/girders utilizing traditional deck design, spacing exceeding 10 feet shall be per *AASHTO LRFD Bridge Design Specification* Article 9.7.3.

Joints shall be in compliance with the TxDOT Engineering Standard Sheets. All grade separation, mainlane, ramp, and direct connector bridges shall use TxDOT Engineering Standard Sheet SEJ-M for joints on concrete beam superstructures. Modular joints shall not be used without TxDOT approval. DB Contractor shall minimize the number of bridge deck joints subject to a maximum deck unit length of 400 feet for concrete superstructure units. Deck units utilizing concrete I-girders should not exceed allowable lengths per table located on the TxDOT IGCS standard. DB Contractor shall locate joints to provide for maintenance accessibility and future replacement.

DB Contractor shall provide conduit in caps (substructure) for future illumination. No exposed conduit will be allowed on bents, columns, bridge beams, retaining walls, or any other visible surface.

DB Contractor shall provide reinforcing steel in accordance with TxDOT provisions for corrosion protection measures. Existing coated and uncoated reinforcing exposed in a bridge widening shall be repaired in accordance with requirements of the TxDOT *Concrete Repair Manual* including applying an approved coating over the entire surface of the exposed reinforcing. DB Contractor shall perform all work in accordance with manufacturer's specifications. Cleaning and coating operations must be performed no more than seven days prior to placement of the concrete. If duration exceeds seven days, DB Contractor shall apply a second coating of the same material one day prior to placement of concrete.

In addition, DB Contractor shall not waive the air entrainment requirement for all bridge deck, approach slabs, and rails except as permitted by TxDOT in accordance with the District's corrosion protection measures.

DB Contractor shall make bridge superstructures, joints, and bearings accessible for long-term inspection and maintenance. DB Contractor shall make open-framed superstructures accessible by walkways, ladders, or under-bridge inspection trucks.

Steel tub girders shall meet the guidelines in the TxDOT *Preferred Practices for Steel Bridge Design, Fabrication, and Erection*. Twin steel tub girders shall meet the system redundancy requirements in Chapter 3 Section 17 of the TxDOT *Bridge Design Manual*.

Segmental bridges shall additionally conform to the following:

- 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 minimize cracking and develop adequate bond strength with the superstructure.
- If monolithically cast overlay is used as part of the deck protection system, DB Contractor shall develop fully engineered design guidelines for the thickness of the monolithic concrete to be 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.
- All expansion joints shall be sealed or drained.
- External tendons, if used, shall be protected per Item 426, *Post-Tensioning*, of the TxDOT Standard Specifications.
- The design, detail and construction of segmental bridges shall provide additional ducts or other means to allow for future post-tensioning. Flexible fillers are not permitted.

21.2.6 **Bridge Substructure and Foundation**

Integral abutments, where the superstructure is structurally framed (either completely or partially) into the abutment, shall not be used unless approved by TxDOT. 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 wide flange terminals with approach pavement shall be designed and constructed at all bridge abutments. Embankments at bridge approaches shall be constructed with cement stabilized backfill in accordance with special provision 132-001 and complying with the Houston District standards. Other settlement mitigation measures, if approved by TxDOT, shall be designed and constructed to mitigate settlement immediately behind abutment backwalls.

At cross streets, overpass bridge structures shall clear span all intersection pavement including through lanes and turn lanes on the Project and proposed configurations as identified in Attachment 19-1 (Cross Street Design Criteria) and Attachment 19-2 (Cross Street Typical Sections). Bridge foundations and columns may be located between the cross street pavement and U-turns.

All final bridge layouts over stream crossings that utilize drilled shafts shall document column heights, "H", for each column along each bent line based on actual field conditions following the same sequencing as beam layouts.

Spread footing foundations are not allowed.

DB Contractor shall designate a concrete element as mass concrete in the Plans when any of the following apply:

- Least dimension of a concrete element, or the diameter of drilled shafts, is 5 feet or greater using non-high performance concrete;
- Least dimension of a concrete element, or the diameter of drilled shafts, is 6 feet or greater using high performance concrete; or
- Concrete element uses Class H concrete with a concrete strength greater than 6,000 psi.

For a concrete element designated as mass concrete, DB Contractor shall perform an analysis using TxDOT ConcreteWorks, or an equivalent method approved by TxDOT, to verify if mass concrete protocols are needed. DB Contractor shall verify the mix design meets the criteria for temperature differential and maximum temperature for the pour.

DB Contractor shall construct elements designated as mass concrete in accordance with Item 416, *Drilled Shaft Foundations,* Item 420, *Concrete Substructures*, and Item 421, *Hydraulic Cement Concrete*, of the TxDOT Standard Specifications.

DB Contractor may use reinforced concrete, prestressed concrete, or structural steel for straddle bents for bridge substructure design and construction. Non-standard straddle bent cap designs shall be subject to TxDOT approval. Control of service level cracking is required in reinforced concrete straddle bents to avoid appearance issues or long-term deterioration. DB Contractor shall not use precast straddle bent cap designs that include voided regions at any time. Structural steel straddle bents shall not be NSTM.

DB Contractor shall avoid using NSTM members for bridges substructures. Single steel box and plate substructure caps are typically considered NSTM by the definition of load path redundancy. DB Contractor may use steel box or plate substructure caps only if DB Contractor submits to TxDOT and FHWA prior to design and construction, for review and approval, sufficient criteria and analytical methods to demonstrate the bridge substructure will have structural redundancy to achieve the goal of avoiding in-service NSTM inspections. Demonstration of structural redundancy shall use criteria and analytical methods developed by DB Contractor. DB Contractor shall meet the requirements set forth in AASHTO *Guide Specifications for Analysis and Identification of Fracture Critical Members and System Redundant Members* and in *AASHTO Guide Specifications for Internal Redundancy of Mechanically-Fastened Built-Up Steel Members*. Non-load path redundant steel tension members with structural redundancy shall conform to the fracture control plan requirements of AASHTO and American Welding Society (AWS).

Steel H-piles are not allowed.

Pre-cast pilings shall not be used between the following locations:

- FM 2403 to East of Clifford Street (Station 6041+11 to Station 6363+00)
- McFarland to West end of ramps at Bay Area (Station 6499+00 to Station 6538+00)
- East end of ramps at Landing Street to Walgreens (Station 6681+00 to Station 6776+00)
- Landing of SH 99 to North of FM 528 (Station 1292+00 to Station 1346+00)

21.2.6.1 **Bridge Substructure and Foundation Requirements at GCWA Canal**

At the Gulf Coast Water Authority canal located at approximate station 6408+75, overpass bridge structures shall span the canal and seepage ditch from station 6407+88 to station 6409+18. DB Contractor shall construct box culverts from ROW to ROW for the GCWA Canal, seepage ditch, and drainage ditch in accordance with the GCWA Agreement provided in the RIDs.

21.2.7 **Bridge Railing and Barriers**

All barrier systems used on the Project shall meet current crash test criteria as specified in the AASHTO *Manual for Assessing Safety Hardware (MASH),* TxDOT *Bridge Railing Manual,* 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 the TxDOT *Bridge Railing Manual*. DB Contractor shall protect sidewalks on bridges with design speed over 45 mph from vehicular impact by using TxDOT-approved bridge railings.

DB Contractor shall utilize SSTR where TL-4 MASH rated rails are required, unless otherwise approved by TxDOT. DB Contractor shall provide and utilize 42-inch high combination rails in areas between pedestrians or bicyclists and traffic. DB Contractor shall not utilize traffic rails with steel elements unless required for compliance with Item 22 and Item 28. When the actual physical dimension of bridge rail exceeds the "nominal face of rail" dimension provided in the TxDOT Bridge Railing Manual, the shoulder widths on bridge structures shall be measured from the innermost physical edge of the barrier to the edge of the traveled way.

For railing on top of retaining walls, DB Contractor shall utilize a moment slab design in accordance with TxDOT Engineering Standard Sheet RW(TRF) or develop rebar into adjacent concrete pavement.

21.2.8 **Retaining Walls**

The type of retaining wall shall be restricted to those pre-approved by TxDOT, unless DB Contractor requests and is granted approval of an alternative system by TxDOT.

Other types and components of retaining walls may be used, but will be allowed only if:

- DB Contractor can demonstrate that the design of the wall type and components shall meet the functional requirements of the Project; and
- DB Contractor provides the appropriate certifications from the Professional Services Quality Assurance Firm and Independent Quality Firm verifying that an independent review of the walls has been performed and that the walls have been designed and constructed to engineering standards appropriate to the Site conditions.

Modular walls employing interlocking blocks shall not be used where surcharge loads from vehicular traffic are present.

Metal walls, including bin walls and sheet pile walls, recycled material walls, and timber walls are not allowed.

DB Contractor shall not utilize perched walls (i.e., retaining walls founded in non-in situ soil, embankment fill, or manmade subgrade).

The design of wall structures shall take into account live load surcharges. DB Contractor shall apply the appropriate live loading condition (vehicular, heavy rail, transit, etc.) to which each wall is subjected. These live load surcharges shall be based on AASHTO *LRFD Bridge Design Specifications*, American Railway Engineering and Maintenance-of-Way Association (AREMA) *Manual for Railway Engineering*, or the requirements of the specific railroad and transit owner/operator.

The retaining wall layout shall address slope maintenance above and below the wall by detailing surface drainage, underdrain locations, directions of flow and ground surface treatments on each side of the wall. Riprap shall be used to channel water from flume behind wall to outlets and to avoid soil erosion at ends of walls. Retaining wall design shall capture storm water flow to prevent flow from passing over the retaining wall coping, free-falling down the face of the retaining wall, seeping through face of wall, or seeping through wall appurtenances.

DB Contractor shall design and construct components of the Project to provide earthen embankments without the use of retaining walls. Where earthen embankments are not feasible, DB Contractor shall use retaining walls. Retaining walls shall be located and designed to accommodate the configurations described in Attachment 19-1 (Cross Street Design Criteria) and Attachment 19-2 (Cross Street Typical Sections).

If pipe culverts are to extend through the retaining walls, the pipe shall be installed so that no joints in the pipe are located within 2 feet of face of wall. Slip joints shall be placed on either side of the pipe and a headwall shall be placed over the portion of the pipe exiting the wall when any portion of the pipe exits the wall above finished grade.

Pipe for storm drain systems shall not run longitudinally within the MSE retaining wall earth reinforcement zone unless approved by TxDOT.

No weep holes through the face of the retaining walls will be permitted, except at the base of the walls.

Underdrains are required and shall be a minimum of 8 inches with cleanouts at a maximum of 300-foot spacing unless an alternative is approved by TxDOT. Underdrains shall be sloped to drain to permanent outfalls. Outfalls and underdrain flowlines shall be shown on the retaining wall layouts.

The top of the retaining wall leveling pad shall be located a minimum of 2 feet below finished grade, unless approved by TxDOT.

Unless otherwise set forth in this Section 21.2.8, DB Contractor shall use approved MSE panel systems found at https://www.txdot.gov/business/resources/highway/bridge/approved-systems/mechanically-stabilized-earth.html, except for wall systems utilizing extensible earth reinforcement, which are not permitted.

The length of earth reinforcements for MSE retaining walls shall be a minimum of either 8 feet or 70% of the wall height (top of leveling pad to top of wall), whichever is greater. Earth reinforcement length is measured perpendicular to the wall. Adjust skewed earth reinforcements as necessary to obtain required length in accordance with the requirements of this Item 21 and Item 16. Wall height is the distance from the top of the leveling pad to the finished grade at the top of the wall.

DB Contractor shall provide specific minimum lengths of soil reinforcement for MSE retaining walls. DB Contractor shall follow FHWA Geotechnical Engineering Circular (GEC) No. 11, Chapter 4 when performing global and compound stability analysis for simple structures. DB Contractor shall not model the reinforcement zone as infinite strength for complex MSE walls. DB Contractor shall provide detailed global and compound stability analysis for complex MSE wall structures as defined in FHWA GEC No. 11, Chapter 6.

Retaining walls shall end as close as practical to proposed finished grade within limits of fabrication heights of wall panels.

21.2.9 Noise Barriers

Noise Barriers shall be designed and constructed in accordance with the traffic noise mitigation and noise workshops described in Section 12.2.5.1. TxDOT has conducted noise workshops with affected property owners based on the Schematic Design. The results of the workshops are as follows:

- Noise Barrier 1: Huntington Oaks Apartments (not approved)
- Noise Barrier 2: Steeplechase Apartments (not approved)
- Noise Barrier 3: Watermark Subdivision (approved)
    - Height: 18 feet
    - Texture facing roadway: Green Ribbon Wave Scheme (Blue Wave)
    - Color of roadway side: two-tone; Softer Tan panels with Bracing Blue columns and coping
    - Texture facing residential: Tollway Ashlar Stone
    - Color of residential side: Softer Tan
- Noise Barrier 4: Lakes in Bay Colony Subdivision (approved)
    - Height: 14 feet

- Texture facing roadway: Green Ribbon Wave Scheme (Blue Wave)
- Color of roadway side: two-tone; Softer Tan panels with Bracing Blue columns and coping
- Texture facing residential: Tollway Ashlar Stone
- Color of residential side: Softer Tan

"SH 99 Segment B-1 Noise Barrier RID Exhibit" provided in the RIDs depicts the approximate locations, textures, and colors as approved by the affect property owners.

DB Contractor shall determine final placement of Noise Barriers and shall ensure that sufficient access is provided for construction and maintenance of the Noise Barrier as well as to not interfere with ingress or egress of emergency personnel. Noise Barrier layouts showing final placement of the Noise Barriers shall be submitted to TxDOT for approval.

DB Contractor shall design and construct all Noise Barriers to achieve the decibel reduction requirements in the TxDOT-Provided Approvals and meet the aesthetic requirements in Item 23.

DB Contractor shall design and construct Noise Barriers in accordance with the TxDOT Traffic Noise Toolkit and AASHTO LRFD *Bridge Design Specifications.*

Any damage to Noise Barriers caused by DB Contractor-Related Entities shall be repaired in accordance with TxDOT Standard Specifications. Damage caused by third parties shall be repaired in accordance with the Design-Build Contract.

Panel design and construction shall limit the risk of falling debris resulting from traffic impacting the noise wall.

Timber Noise Barriers are not allowed.

If any portion of an existing Noise Barrier needs to be temporarily disassembled for any reasons during construction, the Noise Barrier shall be reassembled and restored to its existing condition. DB Contractor shall repair all existing Noise Barriers that are damaged during construction within the Project limits.

If pipe culverts are to extend through the Noise Barriers, the pipe shall be installed so that no joints in the pipe are located within 2 feet of the face of Noise Barrier.

21.2.10 Drainage Structures

In developing the design of drainage structures, DB Contractor shall account for maximum anticipated loadings for both the Project and configurations as identified in Attachment 19-1 (Cross Street Design Criteria) and Attachment 19-2 (Cross Street Typical Sections).

Energy dissipaters, if used, shall be considered structural Elements.

DB Contractor shall analyze existing drainage systems for structural capacity and condition, including third party drainage infrastructure described in Section 5.8 of the General Conditions. As necessary, retrofit or replace elements to accommodate required hydraulic capacity, and any additional loads, settlements, and/or other structural impacts associated with the Project. Drainage requirements are described in Item 20.

21.2.11 Sign, Illumination, and Traffic Signal Supports

Requirements related to signs, luminaires, and traffic signals are described in Item 24. DB Contractor shall provide structural design of signs, luminaires, and traffic signals in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*.

DB Contractor shall design foundations for signs, luminaires, and traffic signals using the methods shown in the TxDOT *Geotechnical Manual - LRFD*, TxDOT Engineering Standard Sheets, and Houston District standards. DB Contractor shall design overhead and cantilever sign supports to accommodate both the Project and configurations as identified in Attachment 19-1 (Cross Street Design Criteria) and Attachment 19-2 (Cross Street Typical Sections). Cantilever and sign bridge supports shall be placed outside the clear zone or shall be otherwise protected by appropriate safety measures. Sign supports shall be provided at locations necessary to meet the signing requirements of the Project. Type O (overhead) signs shall not be mounted on bridges. DB Contractor shall place bridge mounted illumination poles in accordance with the bridge lighting details in the TxDOT Engineering Standard Sheets.

Large signs as defined by the TxDOT Standard Specifications shall not be mounted on bridges unless approved by TxDOT.

21.2.12 **Rehabilitation of Structures to be Widened, Extended, or Reused**

Rehabilitation, modification, or widening of existing bridges and bridge class culverts will not be allowed unless approved by TxDOT.

The following structures are to be widened, extended, or reused and shall be rehabilitated:

Table 21-1: Bridges/Bridge Class Culverts to be Rehabilitated

Structure Number (NBI #)	Feature Crossed	Facility Carried
120200D00660001	Drainage Channel	Existing: S. Johnson St. Proposed: Pedestrian
120200017802036	Dickinson Bayou Tributary 4	SH 35

Bridge Condition Rating Summary located in the RIDs contains a table that provides the most current condition ratings for structures.

Any component with a condition rating less than 7 and any other defects discovered by DB Contractor shall be rehabilitated. Rehabilitation must achieve a minimum condition rating of 7 for each structural component at Substantial Completion.

For existing structures identified in Table 21-1 to be widened, extended, or rehabilitated outside the reconstruction limits, the following shall apply:

- DB Contractor shall add vehicle deflection walls to existing two-column bents for structures to be reused, in accordance with the TxDOT *Bridge Design Manual* and AASHTO *LRFD Bridge Design Specifications*. (Not applicable to S. Johnson St. pedestrian bridge.)
- DB Contractor shall provide pier protection for existing substructures using load and load combinations for vehicular collision force in accordance with AASHTO *LRFD Bridge Design Specifications* and in accordance with the TxDOT *Bent (Pier) Protection Guide.* (Not applicable to S. Johnson St. pedestrian bridge.)
- DB Contractor shall upgrade any superseded rail or barrier.
- DB Contractor shall clean and repair existing expansion joints and provide new full width seals, including adding seals to all existing open joints.
- DB Contractor shall inspect all existing bridge bearings. As necessary, DB Contractor shall rehabilitate, repair, or replace existing bridge bearings to accommodate design loads and expansion.
- DB Contractor shall patch and repair concrete spalls, and concrete delaminations, clean and repair exposed reinforcing, seal cracks and repair or replace structurally damaged elements. This work shall be performed in accordance with the TxDOT *Concrete Repair Manual.*

DB Contractor shall remove rust, clean, and paint all existing steel bridge superstructures and associated steel bridge bearings to remain. DB Contractor shall perform a paint condition assessment for all painted structures prior to any rehabilitation activities. Recommendations to leave any existing coatings intact shall be submitted to TxDOT for approval.

Full bridge deck replacements shall consist of a minimum of 8.5-inch-thick Class S concrete bridge deck. Bridge beams/girders and substructures shall be rehabilitated or replaced as required to support the new bridge deck load in combination with live load specified in Section 21.2.4. Bridge widenings shall utilize 8.5-inch-thick deck regardless of the deck thickness of existing bridge. Existing decks less than 8.5-inch-thick may only remain in place when meeting bridge design load and rating criteria specified in Section 21.2.4.

Regardless of the rehabilitation, DB Contractor shall maintain, at minimum, the existing vertical clearance.

21.2.13 **Existing Structures to Remain in Place**

The following bridges and retaining walls may remain in place and are not required to meet the structural capacity requirements as defined in this Item 21. Bridge class culverts that may remain in place, and associated requirements, are listed in Item 20.3.4.

Table 21-2: Structures to Remain in Place

Structure Number (NBI #)	Feature Crossed	Facility Carried
120200D00660001	Drainage Channel	S. Johnson St.
120200017802036	Dickinson Bayou Tributary 4	SH 35
120200017803040	Mustang Bayou	SH 35
120200017803041	Mustang Bayou	SH 35

DB Contractor shall verify that all structures listed above that are impacted by the Work meet the structural capacity requirements as defined in this Item 21. Notwithstanding that Table 21-2 lists structures that may remain in place, if any existing elements are impacted by the Work and do not comply with the structural requirements of Item 21, DB Contractor shall repair or replace those elements to meet such requirements.

21.3 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 21 and TxDOT Standard Specifications.

Subject to approval by TxDOT, alternate material specifications and construction requirements may be proposed by DB Contractor provided the objectives of the Project are met and equivalent requirements to this Item 21 are provided.

21.3.1 **Concrete Finishes**

All concrete surfaces that do not have aesthetic treatments shall have a uniform texture and appearance. Painting or coating, where required as an aspect of the aesthetic treatment of the concrete, shall be uniform in appearance. Where the following do not have aesthetic treatments as identified in Item 23, Ordinary Surface Finish as defined by Item 427, *Surface Finishes for Concrete*, Sections 420.4.13 and 427.4.1.1, of the TxDOT Standard Specifications shall be applied as a minimum:

- Inside and top of inlets;
- Inside and top of manholes;
- Inside of sewer appurtenances;
- Inside of culvert barrels;
- Bottom of bridge slabs and between girders or beams;
- Vertical and bottom of surfaces of exterior concrete beams or girders;
- Wingwalls and headwalls;
- Riprap, mowstrips and flumes; and
- Traffic railing.

21.3.2 **Steel Finishes**

All structural steel shall have a protective coating. The color for structural steel paint shall conform to the aesthetic schemes of the Project. Paint all structural steel using protective “System IV" paint in accordance with Item 446, *Field Cleaning and Painting Steel*, of the TxDOT Standard Specifications. Interiors of tub girders and closed boxes shall be painted per Section 446.2.2 of the TxDOT Standard Specifications.

21.3.3 **Structure Metals**

Welding shall be in accordance with the requirements of the AASHTO/American Welding Society D1.5 *Bridge Welding Code* and Item 448, *Structural Field Welding*, of the TxDOT Standard Specifications.

21.3.4 **Steel Erection**

Steel Erection shall be in accordance with AASHTO/National Steel Bridge Alliance Steel Bridge Collaboration *Steel Bridge Erection Guide Specification*. Inspection of steel erection will include oversight by the Independent Quality Firm. TxDOT reserves the right to perform oversight of steel erection in accordance with the TxDOT Standard Specifications.

DB Contractor shall prepare steel erection drawings in accordance with the requirements of Item 441, *Steel Structures*, of the TxDOT Standard Specifications and shall submit the drawings to TxDOT for approval prior to steel erection. DB Contractor shall ensure comprehensive design and erection engineering is performed for steel bridges. The steel bridge designer shall provide comprehensive design calculations for final design conditions and evaluation of loading conditions under their proposed erection sequence. The DB Contractor's erection contractor shall provide evaluation of the structural adequacy and stability of construction of the bridge system for each stage and step of steel erection and concrete slab placement. Prior to construction, both design and erection engineering calculations shall be submitted to TxDOT. Signed and sealed plans and calculations shall clearly specify the responsible engineer for both design and erection engineering prior to any field erection activities. Should the erection contractor's sequencing result in different loading conditions for the final in-place structure, the Design Firm shall affirm under sign and seal that the Record Drawings are fully compliant with AASHTO LRFD requirements.

21.4 **Submittals**

All Submittals described in this Item 21 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 21-3. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 21-3*:* Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Corridor Structure Type Study and Report	Prior to the design of bridges, walls, bridge class culverts, sign structures and other miscellaneous structures	Review and comment	21.2
Design calculations and bridge structural details for future widened typical sections	As part of the Preliminary Design Submittal	Approval	21.2.3
Draft of Complex Structures Criteria Report	Three Business Days in advance of initial Complex Structures workshop	For information	21.2.1.1
Complex Structures Criteria Report	Must be submitted so that review and comment process is completed in advance of submittal of Preliminary Design Submittal	Approval	21.2.1.1
Complex Structures Modeling Data	Prior to submittal of Complex Structures Plans	Review and comment	21.2.1.1
Complex Structures Plans	After submittal of Complex Structures Modeling Data	Approval	21.2.1.1
Complex Structures workshop agenda	Three Business Day in advance of each workshop	Review and comment	21.2.1.2
Permanent structure number request form for all bridges and bridge class culverts	Upon completion of the bridge layout during the design phase	Review and comment	21.2.2
Load rating calculations	Upon request and no later than the start of construction of Elements related to the request	Review and comment	21.2.3

Table 21-3: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	
All electronic and paper copies of files and design calculations	Upon request and no later than the start of construction of Elements related to the request	For information	21.2.3
Inventory and load rating of the constructed structures using Form 2731 "New Bridge Load Rating Summary"	As part of the Preliminary Design Submittal	Approval	21.2.4
Foundation Testing	Prior to performing testing activities	Review and comment	21.2.6
Drilled shaft load testing results	As part of the Preliminary Design Submittal	Approval	21.2.6
Drilled shaft TIP testing results	After drilled shaft installation and before column placement	Approval	21.2.6
Criteria and analytical methods to demonstrate substructure structural redundancy	As part of the Preliminary Design Submittal	Approval	21.2.6
Type of existing retaining wall and plan of removal	As part of the Preliminary Design Submittal	Approval	21.2.8
Rehabilitation report for existing structures	Prior to performing rehabilitation activities	Approval	21.2.12
Recommendations to leave any existing coatings intact	Prior to any rehabilitation activities	Approval	21.2.12
Steel erection drawings and calculations	Prior to steel erection	Approval	21.3.4

Item 22
Rail

22.1 **General Requirements**

This Item 22 defines the criteria required to design and construct rail corridors, rail facilities, rail structures, and rail line crossings within the Project Right of Way (ROW).

The Project includes a rail corridor crossing within the Project ROW as depicted on the Schematic Design. TxDOT executed a Construction and Maintenance Agreement (C&M Agreement) with the BNSF Railway Company on June 24, 2025. Design-Build (DB) Contractor shall prepare a geometric design for the rail corridor in accordance with the executed C&M Agreement. DB Contractor's Project Management Plan (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.

DB Contractor shall ensure that the Project does not negatively impact the safety of railroad operations. DB Contractor shall coordinate the Work with the railroad to avoid impacts to railroad operations, except as specifically approved by the railroad.

22.2 **Administrative Requirements**

22.2.1 **Railroad Agreements**

DB Contractor shall be responsible for cooperating and coordinating with TxDOT, including by providing any schematics, plans or other information within 14 days of a request by TxDOT or the railroad for such schematics, plans or other information. Except for the C&M Agreement included in the RIDs, DB Contractor shall be responsible for obtaining any required approvals, permits, and agreements (including any approvals, permits, and agreements or exhibits contemplated by the C&M Agreement) as required for the Work, including any railroad-related Work or temporary haul roads, if needed.

In accordance with Section 6.10 of the DBA, DB Contractor shall be responsible for obtaining approved C&M Agreement(s) or modifications thereto, as applicable, necessary to incorporate or address any DB Contractor's changes to the Schematic Design. DB Contractor shall coordinate all communications with the railroad through TxDOT. Additional information regarding C&M Agreements can be found in the TxDOT *Rail-Highway Operations Manual*.

For any preliminary activities on railroad ROW, DB Contractor shall be responsible for executing any necessary agreements with the railroad to enter railroad property and to authorize the railroad to provide flagging or to pay for a railroad approved flagging vendor.

Current approved templates for TxDOT/railroad agreements are available from the TxDOT Rail Division at https://www.txdot.gov/business/resources/railroad-highway-crossing.html.

The executed C&M Agreement includes the following:

- Exhibit A Plan Set – includes project layout, general notes and sequence of construction, traffic control plans, BNSF removal and back fill detail and estimated quantities, plan and profile BNSF tracks, southbound and northbound mainlanes and frontage road bridge layout and typical sections, fencing details for railroad overpass, railroad scope of work (project details for bridge construction), railroad requirement for bridge construction, BNSF typical sections, culvert L-H-20 plan and hydrologic and hydraulic data sheets, railroad scope of work (project specific details for bridge construction projects), and railroad requirements for non-bridge construction.

  This plan set has been reviewed and approved by the railroad as preliminary plans and specifications and the railroad has adopted this plan set as the plans and specifications.

  DB Contractor shall not commence any work on the railroad's property involving such plans until the RFC Documents have been approved in writing by the railroad.

DB Contractor shall prepare the 30% submittal, prepare the 60% submittal, and prepare the Final Design Submittal. Upon TxDOT approval of the Final Design Submittal, DB Contractor shall submit to the railroad the associated RFC Documents for the Work within the railroad ROW for written approval by the railroad.

No changes to the RFC Documents applicable to the Work within the railroad ROW shall be made without the prior written approval of such changes by both TxDOT and the railroad. DB Contractor shall not perform any Construction Work within the affected railroad ROW until written approval of by railroad.

- Exhibit B Railroad's Force Account Cost Estimate – includes project inspection estimate, signal work estimate, and track work estimate.

  DB Contractor's cost responsibility for the railroad's cost is set forth in Section 6.10 of the DBA.

- Exhibit C Railroad's Contractor's Right of Entry (CROE) Agreements – In order to enter the railroad's ROW to perform the Work with railroad ROW, DB Contractor or its Subcontractor shall prepare and execute the railroad CROE agreement and shall coordinate the arrangements of the agreement directly with the railroad.

  DB Contractor shall submit insurance and C&M Agreement CROE to Tim Huya (tim.huya@bnsf.com).

  DB Contractor shall be responsible for all CROE fees, insurance, inspection, and flagging costs associated with the CROE agreement.

- Exhibit D Area Map – includes a crossing area map of the BNSF railroad crossing.

TxDOT has submitted and received conditional approval of an Exhibit A and Application for Pipeline for drainage and an Exhibit A and Application for Wire Line for ITS. The Exhibit A and Application for Pipeline for drainage and the Exhibit A and Application for Wire Line for ITS are provided in the RIDs. In accordance with the application process, DB Contractor is responsible for coordination with railroad to complete and execute the contract/pipeline licenses for construction of proposed drainage and ITS. DB Contractor shall submit contract/pipeline license for drainage CROE insurance, ACCORD 25 Forms, and Environmental Compliance Plan (ECP) to the railroad with a copy to TxDOT and Carlie Hennig (carlie.hennig@jll.com). DB Contractor shall submit contract/pipeline license for ITS CROE insurance and ACCORD 25 Forms to the railroad with a copy to TxDOT and Carlie Hennig (carlie.hennig@jll.com). DB Contractor is responsible for all costs of progressing, submitting, and obtaining railroad approval and execution of the contract/pipeline licenses to construct the proposed drainage and ITS.

If the DB Contractor desires a temporary haul road across the railroad track(s), the DB Contractor shall be solely responsible for acquiring the railroad approval including any and all fees.

All executed agreements shall be submitted to TxDOT in their entirety as part of the Record Documents.

22.2.2 **Review and Approval of DB Contractor Submittals**

Unless otherwise noted in this Item 22, DB Contractor shall prepare and submit to TxDOT for review and comment all railroad required documentation, including plan Submittals, applicable to Work within the railroad ROW. TxDOT will transmit Submittals to the railroad for approval after all comments have been incorporated and satisfactorily resolved.

22.2.3 **DB Contractor ROE Agreement**

DB Contractor shall cooperate and coordinate with all operating railroads for access by the operating railroad and/or their agents to the railroad ROW as necessary for rail maintenance and operations activities, inspection, repair and emergency responses.

22.2.4 **Additional Insurance Requirements**

If any railroad impacted by the Project requires insurance in addition to that required by the Contract Documents as described in Section 3.5.4 of the General Conditions, DB Contractor shall procure such additional insurance at its own cost and submit copies of insurance policies to TxDOT prior to any entry upon

operating railroad property and shall maintain such insurance until Final Acceptance and through any Capital Maintenance Contract Term.

22.2.5 **Utilities Within Railroad Right of Way**

Investigation activities for locating Utilities within the railroad ROW will need to be coordinated with the railroad. The Utility Strip Map is contained in the RIDs and reflects railroad ROW where railroad-owned signal cables may exist. Requirements for Utility Adjustments are described in Item 14.

22.3 **Design Requirements**

DB Contractor shall avoid placement of temporary or permanent project components inside railroad ROW to the extent possible, unless covered by an approved C&M Agreement. Any such placements inside railroad ROW require approval of the operating railroad. DB Contractor shall be responsible for obtaining required approvals.

DB Contractor shall not encroach on horizontal and vertical clearances as shown in the executed C&M Agreement. Any changes to the design depicted in the executed C&M Agreement that requires coordination with the railroad entity will be the responsibility of the DB Contractor.

22.3.1 **Railroad Design Standards**

The design for all railroad elements of the Project shall be based on the American Railway Engineering and Maintenance-of-Way Association (AREMA) *Manual for Railway Engineering* and the requirements of the operating railroad. DB Contractor's design shall minimize service interruptions to existing rail lines.

All Work involving railroad companies, Work on railroad ROW, and the development and execution of railroad programs shall be in accordance with:

- The respective railroad;
- State and federal Law; and
- The practices, guidelines, procedures, and methods contained in TxDOT *Rail-Highway Operations Manual*.

Additionally, the requirements of the owner of each facility crossed shall be compared to the requirements in the TxDOT *Rail-Highway Operations Manual* and the most restrictive criteria shall be utilized. DB Contractor shall comply with the TxDOT railroad requirement sheets and railroad scope of work sheets, which can be found here: https://www.txdot.gov/inside-txdot/division/rail/requirements.html

DB Contractor shall adhere to practices and guidelines established in the BNSF Railway – Union Pacific Railroad Guidelines for Railroad Grade Separation Projects, found at the following site:

https://www.bnsf.com/bnsf-resources/pdf/in-the-community/uprr-bnsf-joint-guidelines-railroad-grade-separation-projects.pdf

At highway-rail grade crossings, the roadway and drainage design parameters shall be maintained at the crossing with exception for the cross slope of the pavement, which may be transitioned to match the grade across the railroad tracks.

The structural design of any Utilities, including drainage structures, installed by DB Contractor and crossing a railroad ROW, shall be in accordance with the operating railroad's design criteria. DB Contractor shall coordinate with the operating railroad the design and construction of the construction staging, including any shooflies.

22.4 **Construction Requirements**

DB Contractor shall comply with all construction requirements and specifications set forth by the operating railroad and shall invite the appropriate railroad to pre-construction meetings for work to be performed within the railroad's ROW. DB Contractor shall be responsible for scheduling the work to be completed by the operating railroad, as well as the work to be completed by its own forces. DB Contractor shall be responsible for all costs associated with its performance of the obligations in the railroad agreements, including any amendments, change orders, or force account work under such agreements.

The operation of the railroad and the affiliated railroads (those running through the railroad property in particular), and the operations of the lessees, licensees, and other lawful occupants of the railroad property,

shall have absolute priority over the performance of construction for the Project. DB Contractor shall coordinate with the railroads to coordinate the Work with the operations of the railroads.

22.4.1 **Operation Safety**

DB Contractor shall arrange with the operating railroad for railroad flagging as required, to ensure the safe passage of rail traffic throughout the Project limits. 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 and shall maintain current registration prior to working on railroad property.

If not detailed in the respective railroad's contractor ROE, C&M Agreement, or if not directed otherwise by the respective railroad, DB Contractor shall notify the respective railroad representative at least 10 Business Days in advance of DB Contractor commencing its Work and at least 30 Business Days in advance of any Work by DB Contractor in which any person or equipment will be within 25 feet of any track, or will be near enough to any track that any equipment extension such as, but not limited to, a crane boom will reach within 25 feet of any track. No Work of any kind shall be performed, and no person, equipment, machinery, tool(s), material(s), vehicle(s), or thing(s) shall be located, operated, placed, or stored within 25 feet of any track(s) unless authorized by the railroad. Upon receipt of such 30-Business Day notice, the railroad representative will determine and inform DB Contractor whether a flagman need be present and whether DB Contractor needs to implement any special protective or safety measures.

22.5 **Submittals**

All Submittals described in this Item 22 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 22-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 22-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
30% submittal for C&M Agreement(s)	In accordance with the DB Contractor's Project Schedule	Approval	22.2.1
60% submittal for C&M Agreement(s)	In accordance with the DB Contractor's Project Schedule	Approval	22.2.1
Final Design Submittal for C&M Agreement(s)	In accordance with the DB Contractor's Project Schedule	Approval	22.2.1
Railroad required documentation for execution of C&M Agreement, including the associated RFC Documents and required insurance	Upon TxDOT approval of the Final Design Submittal for C&M Agreement(s)	Approval	22.2.1
Fully executed railroad agreements	As part of the Record Documents	For information	22.2.1
Copies of all additional or modified insurance policies	Prior to any entry upon operating railroad property	For information	22.2.4

Item 23
Aesthetics and Landscape Development

23.1 **General Requirements**

This Item 23 defines requirements with which Design-Build (DB) Contractor shall design and construct treatments for the roadway, structures, drainage, 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 settings, and be consistent with TxDOT policies and guidelines from the Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges – Wave Scheme*, provided in the RIDs.

This Item 23 presents minimum aesthetics and landscape design requirements for Project designs. For purposes of this Item 23, the following list of items will be considered the aesthetics elements of the Project design:

- Material, finish, color, shape, and texture of bridge elements;
- Materials, texture, finish, and color of barriers and railings;
- Paved slope treatments;
- Finish, color, and texture of retaining walls and Noise Barriers;
- Contour grading, slope rounding, channel treatments, and drainage;
- Sculptural and artistic features of structures;
- Sidewalks, medians, or pedestrian specialty paving, including material, finish, and color;
- Hardscape at interchanges and intersections;
- Gateway and wayfinding markers;
- Fencing;
- Signage – structure and signs including overhead, attached, and ground-mounted;
- Any permanent building construction within the Project, including ancillary and operational support;
- Light fixture, ambient light colors, and general layout conditions; and
- Landscape plant materials.

A landscaping allowance has been established for the Project as described in DBA Exhibit 9. The landscape allowance shall be limited to furnishing and installing landscaping elements, but shall not include topsoil, seeding of grass, and sodding. All design tasks including but not limited to developing the conceptual landscape plan, detailed landscaping plans, estimating and pricing any alternates, and re-design of detailed landscape plans to accommodate the landscape allowance budget are excluded from the landscaping allowance. All other aesthetic elements are excluded from the landscaping allowance including the cost of furnishing and installing hardscape, cost of furnishing and installing irrigation systems, cost of installing water lines, permits and the cost to water and/or irrigate, etc. Costs related to maintenance of landscaped areas is also excluded from the landscaping allowance, as is cost for replacement of dead or distressed plant materials and all costs and materials associated with replacement. Other than landscape plant materials, aesthetic elements as identified in this Item 23 shall not be included in the landscaping allowance.

Not less than one half of one percent (1/2%) or more than two percent (2%) of the landscape allowance shall be utilized for the planting or seeding of wildflowers within the Project ROW. This is a dedicated allotment of a portion of the landscape allowance for wildflowers; it is not a separate amount in addition to the landscape allowance. DB Contractor shall coordinate and take direction from the TxDOT Houston District Landscape Architect at the commencement of landscape design with regard to their respective desires for dedicating any higher proportion of the budgeted landscape allowance for wildflower plantings.

Selection and planting of wildflowers, trees, seeding, and shrubs shall be in accordance with the following (i) Attachment 23-1 *Planting, Establishment, and Maintenance Layout*, (ii) Guidance – *Addressing the Monarch Butterfly in a TxDOT Species Analysis* as provided in the RIDs, and (iii) Nationwide Candidate Conservation

Agreement with Assurances (CCAA)/Candidate Conservation Agreement (CCA) for Monarch Butterfly on Energy and Transportation Lands (Agreement), as provided in the RIDs.

23.1.1 Aesthetics Concepts

Aesthetic elements shall be designed as corridor-wide enhancements. To the extent practicable, the aesthetic elements shall remain consistent in form, materials, and design throughout the length of the Project where applied.

DB Contractor shall adhere to the aesthetics concepts described in the approved Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges – Wave Scheme*, contained in the RIDs. It shall be understood that with TxDOT approval, the concepts for components of the Project corridor may need to be adapted to the Site-specific conditions of the Project.

23.1.2 Aesthetics and Landscape Plan

DB Contractor shall prepare an Aesthetics and Landscape Plan for approval by TxDOT. The Aesthetics and Landscape Plan shall provide guidelines and requirements for the aesthetics design of the Project that incorporate the aesthetics concepts described in Section 23.1.1.

The Aesthetics and Landscape Plan shall include all elements to fully communicate the proposed aesthetic treatment to TxDOT. The Aesthetics and Landscape Plan shall meet the requirements of all standards and documents identified or otherwise specified within this Item 23.

The Aesthetics and Landscape Plan shall serve as the primary standard guidance necessary to produce the intended aesthetic form, function, and appearance of this Project. TxDOT approval of the Aesthetics and Landscape Plan is required prior to construction of any elements affected by this plan.

23.1.2.1 Aesthetics and Landscape Enhancements

If requested by TxDOT, DB Contractor shall provide adjacent Governmental Entities the opportunity to enhance aesthetics and landscape features consistent with the requirements herein. The capital and maintenance costs of any TxDOT approved adjacent Governmental Entity improvements (aesthetics and landscape enhancements) shall be the responsibility of the adjacent Governmental Entity. At TxDOT's request, DB Contractor shall coordinate the necessary arrangements directly with the appropriate local Governmental Entity for aesthetics and landscape enhancements within the local Governmental Entity's jurisdiction.

Aesthetics and landscape enhancements shall be incorporated into the Aesthetics and Landscape Plan to be submitted to TxDOT for approval.

23.1.2.2 Aesthetics

DB Contractor shall provide:

- All plans, sections, elevations, perspectives, isometrics, etc., as needed to fully communicate the aesthetic treatment and approach to aesthetic elements, including: walls, Noise Barriers, bridges, traffic rail, landscape pavers, and signage structures;
- A master plan that will convey the layout of the various roadway conditions (e.g., depressed sections, elevated sections, at-grade roadways, bridges, cantilevered structural sections);
- Drawings showing locations of Site-specific elements (e.g., fences, signage, aesthetics lighting, potential locations of TxDOT approved community improvement opportunity areas, gateway markers, bridge enhancements, and landscaping); and
- Drawings showing color schemes and their locations.

23.1.2.3 Landscape Development

DB Contractor shall provide:

- A plan that indicates plant palettes, plant size and locations, plant specifications, planting specifications and staking details, soil preparation plan, and planting dates in accordance with Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges*;

- A 365-day establishment program that meets the requirements of Item 193, Landscape Establishment, of the TxDOT Standard Specifications;

  A 365-day maintenance program that meets the requirements of Item 192, Landscape Establishment, which shall be additionally approved by the City of League City, City of Alvin; and
- Composite drawings of all utilities and easements that would interfere with landscaping, markers, or any other identified enhancements.

The Aesthetics and Landscape Plan shall include all plans, elevations, perspectives, isometrics, details, etc., as needed to fully convey the aesthetic treatment. Soil preparation plans, landscape staking, mulching, and other aspects of plant installation and maintenance of the Project shall comply with the TxDOT Standard Specifications, Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges – Wave Scheme*, as provided in the RIDs and Good Industry Practice.

23.1.3 Personnel

DB Contractor shall provide a landscape architect that meets the requirements of TxDOT Work Category 16.3.1, registered in the State, with experience in designing aesthetics and landscaping elements for roadway projects of similar scope and size to develop the Aesthetics and Landscape Plan, in coordination with lead design engineers for the various disciplines (e.g., roadway, structures, illumination, drainage). DB Contractor's landscape architect shall remain involved from the beginning of the Aesthetics and Landscape Plan, through construction, and shall ensure continuity and compliance with the Aesthetics and Landscaping Plan, applicable TxDOT Standards, applicable TxDOT District standards, and these Design-Build Specifications.

23.2 Design Requirements

23.2.1 Aesthetics Principles and Strategies

DB Contractor shall follow the guidelines and requirements of the approved Aesthetics and Landscape Plan, as well as the aesthetics principles, requirements, and strategies established by TxDOT for the Project design, including the following:

- Aesthetics shall not interfere with safety, constructability, or maintenance requirements;
- The Project design shall minimize impact on the existing natural environment to the extent possible;
- The Project design shall emphasize and enhance the existing natural context and landscape to the fullest extent possible;
- Simple geometric shapes for structures shall be used to the extent possible for continuity along the entire length of the Project;
- All bridges and other structures shall be simplified in their design, and to the greatest extent possible, kept small in size, bulk, and mass;
- All structures shall be carefully detailed so as to achieve the greatest level of aesthetic quality and conform to the approved Aesthetic and Landscape Plan;
- Color, texture, and form shall be used appropriately for all structures;
- Graphics, signage, and lighting shall be consistent along the entire length of the Project;
- Existing native trees and established naturalized trees and natural features shall be preserved to the greatest extent possible, and TxDOT consent will be required in order to use a natural feature for erosion control;
- Aesthetic elements shall be fully integrated with the overall structure and landscape design;
- Visual quality of the landscape shall be consistent along the entire length of the Project;
- Native-area and/or naturalized plant materials that exhibit good drought tolerance shall be used to the extent possible;
- Aesthetic elements shall be easy to maintain and resistant to vandalism and graffiti; and
- Aesthetic elements shall conform to the approved Aesthetics and Landscape Plan.

23.2.2 Noise Barriers, Retaining Walls and Sign Columns

DB Contractor shall design Noise Barriers to be similar in color, texture, style, and aesthetic treatment to retaining walls and consistent with the approved Aesthetics and Landscape Plan. DB Contractor shall apply aesthetic treatments to the vertical surfaces of retaining walls and Noise Barriers where the surface is visible from the roadway or adjacent residential dwelling units. Consistent treatments shall be used for retaining walls, Noise Barriers and exposed concrete column sign support structures that articulate the design themes established. DB Contractor shall clearly detail and identify how wall patterns shall be incorporated into the chosen design solution.

For any cross street underpasses that lie within the City of Alvin, DB Contractor's design shall include the City of Alvin logo at each of the four corners of the cross street intersection facing the ramps and frontage roads as depicted in the "City of Alvin Logo for MSE Walls Panel" document provided in the RIDs.

For any cross street underpasses that lie within the City of League City, DB Contractor's design shall include the City of League City logo at each of the four corners of the cross street intersection facing the ramps and frontage roads as depicted in the "City of League City Logo for MSE Walls Panel" document provided in the RIDs.

23.2.3 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, abutments, bridge rails, and other structures shall be consistent in form and texture with similar shapes and details used for all bridges, in accordance with the approved Aesthetics and Landscape Plan.

Unless otherwise described in the locations below, concrete beam spans shall be of constant depth throughout the structure. For superstructures where both steel girders and concrete beams are used, such as at direct connection structures and braided ramps, transition from concrete beams to steel girders may be accomplished by dapped end girders and concrete beam spans shall be of constant depth throughout the structure. Bridge spans with allowable girder depth changes not to exceed an 8-inch difference from girders in adjacent span are as follows:

- At bridge spans as shown on Schematic Design; and
- SH99 WBML and EBML over GCWA Canal and ditch (approximate Station 6409+00).

23.2.3.1 Low and High Visibility Bridges

Low visibility bridges do not require substructure aesthetic treatments and can be designed and constructed using standard TxDOT bent caps, standard TxDOT round columns, standard TxDOT overhangs, and sloped concrete riprap at abutments. The low visibility bridges for this Project are:

- Ditch near S. Johnson St. (all three structures) (approximate Station 6083+00)
- Dickinson Bayou Tributary 4 (all four structures) (approximate Station 6352+00)
- Future Thoroughfare/Dickinson Bayou Tributary 5/Dickinson Bayou (both structures) (approximate Station 6388+00)
- Unnamed Tributary Channel (westbound structure only) (approximate Station 6750+00)
- Magnolia Bayou (westbound structure at approximate Station 6775+00)

Aesthetic treatments for superstructure and all other components of the structures shall be applied to all other bridges in accordance with the Aesthetics and Landscape Plan.

23.2.3.2 Allowable Deviations from Green Ribbon Aesthetics on Bridge Structures

The following clarifications to and allowable deviations from the Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges – Wave Scheme* are made for the design and construction of bridge structures:

- I-shaped girders (i.e. TxGirders) may be utilized. DB Contractor shall omit end walls on caps when utilizing I-shaped girders.

- Inverted-t bridge caps shall be utilized at bent locations adjacent to roadways (and u-turns) crossing beneath bridges where vertical clearance is less than 20 feet at such adjacent roadway (and u-turns). Vertical clearance for this criterion is measured from roadway surface to bottom of beam at adjacent roadways crossing beneath the bridge. DB Contractor shall provide plumb ends of caps when utilizing inverted-t style caps with I-shaped girders. Rectangular caps may be utilized at all other bent locations.
- DB Contractor shall not mix column types within the same bent structure without TxDOT approval.
- DB Contractor shall not remove a single side of flare on flared columns. When required to maintain design clearances, a constant column section without flare shall be used.

23.2.4 **Trees, Shrubs, and Other Plant Materials**

All trees, shrubs, deciduous vines, and perennials shall comply with the applicable requirements of *American Standard for Nursery Stock (ANSI Z60.1)*. DB Contractor shall consult with the agricultural extension agent of the applicable county and TxDOT for recommended plant species lists. DB Contractor shall utilize plant species native to or naturalized in the Project region. The overall landscape design, including plant types, sizes, density, and locations, shall be approved by TxDOT. Plants shall be selected considering the soil conditions, slopes and watering requirements. In order to monitor and control weeds, DB Contractor shall provide weed control measures in the Aesthetics and Landscape Plan.

Vegetation provided, other than grassing, and erosion control measures, shall be placed in accordance with TxDOT minimum clearance zones. Trees shall be placed in the Project ROW between mainlanes and frontage roads. Trees shall be a minimum of 6 feet tall and shall have a 3-inch caliper minimum.

See Item 18 for sodding and seeding requirements.

The mature tree canopy shall not overhang the travel lane or shoulder of any part of the roadway.

23.2.5 **Riprap, Paving, and Pavers**

Concrete riprap or landscape pavers shall be used in hard-to-reach mowing areas as described in Section 18.3, Section 21.2.3 and in this Section 23.2.5, in areas less than 2 feet in width, or under structures such as, but not limited to, areas between, near, or next to guard fence posts, bent columns, retaining walls, freeway ramp gores, paved ditches, flumes, cable barrier, and ditch inlets to improve roadway appearance.

Concrete riprap and landscape pavers shall be applied per the approved Aesthetic and Landscape Plan, approved Geotechnical Engineering Report, approved Drainage Design Report, and in conformance with the Released for Construction Documents. DB Contractor shall not use landscape pavers that have intentional openings that promote vegetation growth within the landscape paving system; such as, but not limited to grass-block pavers, turf-block pavers, or grow-through pavers.

23.2.6 **Color Palette**

DB Contractor shall submit a plan that indicates where each color is to be applied as part of the Aesthetics and Landscaping Plan. This plan can be diagrammatic in nature, but shall list each element and its colors. In addition to integrated colors, painting, and staining, DB Contractor may use colored lighting in selected areas to add color.

DB Contractor shall conform to all standards and documents identified or otherwise specified within this Item 23 including those published by TxDOT on www.txdot.gov.

23.2.7 **Aesthetics Lighting**

This section is omitted since the Project is using standard lighting.

23.3 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 23 and the TxDOT Standard Specifications.

DB Contractor shall provide TxDOT sample panels 30 days in advance of starting construction of textured concrete surfaces and landscape pavers. DB Contractor shall construct sample panels in accordance with Item 427, *Surface Finishes for Concrete,* Section 427.4.3.5, of the TxDOT Standard Specifications that

comply with the principles, requirements, and strategies established by TxDOT and the approved Aesthetics and Landscape Plan and TxDOT District standards. TxDOT must review and approve the sample panels before any construction form liners, paint, or landscape pavers may be ordered, obtained, or used. DB Contractor shall provide sample equivalent to the size of the panels that will be installed when constructed 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 TxDOT approval prior to the coating operation.

All sample panels shall be representative of the actual panel that will be placed. Primary, secondary, and accent colors shall be displayed.

DB Contractor shall coordinate with the Utility Owner(s) and ensure power service is initiated and provided/maintained for all Highway Service Systems and aesthetics lighting within the Project during the Term. No exposed conduit will be permitted.

23.4 **Submittals**

All Submittals described in this Item 23 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 23-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 23-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Alternate aesthetic concept	Prior to developing the Aesthetics and Landscape Plan	Approval	23.1.1
Aesthetics and Landscape Plan	Prior to construction of any elements affected by this plan	Approval	23.1.2
Color Palette Plan	As part of Aesthetics and Landscaping Plan	Approval	23.2.6
Panel samples	Prior to starting construction of textured concrete surfaces and landscape pavers	Approval	23.3
Coating samples	Prior to start of coating operation	Approval	23.3

Item 24
Lighting, Signing, Markings, and Signals

24.1 **General Requirements**

This Item 24 includes requirements with which Design-Build (DB) Contractor shall design, construct, and maintain, all signs, delineation, pavement markings, signals, and lighting for the Project.

24.2 **Administrative Requirements**

24.2.1 **Meetings**

DB Contractor shall arrange and coordinate all meetings with local Governmental Entities that will assume responsibility for maintaining and operating traffic signals and 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 may attend such meetings.

DB Contractor shall arrange and coordinate all meetings with Governmental Entities or other Persons requesting special signs.

24.3 **Design Requirements**

DB Contractor shall design all signing, delineation, pavement markings, and signalization in accordance with the *Texas Manual on Uniform Traffic Control Devices* (TMUTCD) (2025 Edition, as adopted), TxDOT *Standard Highway Sign Designs for Texas* (SHSD), TxDOT *Freeway Signing Handbook,* TxDOT *Sign Crew Field Book,* TxDOT *Procedures for Establishing Speed Zones,* TxDOT *Traffic Signals Manual,* TxDOT Engineering Standard Sheets, TxDOT Standard Specifications, TxDOT special specifications, "TxDOT Houston District Pavement Marking Policy" memo dated October 21, 2025, as provided in the RIDs, Houston District standards, and Good Industry Practice.

DB Contractor shall design all illumination (lighting) in accordance with the TxDOT *Highway Illumination Manual*, National Electrical Code (NEC), American Association of State Highway and Transportation Officials (AASHTO) *Roadway Lighting Design Guide*, TxDOT Engineering Standard Sheets, Houston District standards, TxDOT Standard Specifications, TxDOT special specifications, TxDOT Departmental Material Specifications, and Good Industry Practice.

The most recent version of TxDOT Engineering Standard Sheets provided on TxDOT's webpage 30 days prior to the Proposal Due Date shall apply to the Project, regardless of the letting dates to which they apply. In the event of a conflict between TxDOT Engineering Standard Sheets and Houston District standards, DB Contractor shall ensure Houston District standards are met.

DB Contractor shall provide all proposed locations of metered electrical services for lighting, ITS, signals, and tolling within the Final Design to TxDOT for approval.

DB Contractor's design shall also incorporate the following requirements:

- Install warning signs W8-13aT (48 inches x 48 inches) "BRIDGE MAY ICE IN COLD WEATHER" in advance of all bridges;
- Install object markers OM-2Y under the route marker assembly located at the entrance ramp gore between the frontage road and mainlanes;
- Install object markers OM-1 on each leg of large ground mounted signs where the signposts are not protected by concrete barrier or metal beam guard fence, similar to the exit sign at the exit gore;
- Install advisory exit speed limit sign W13-2 (48 inches x 60 inches) on the mainlanes in advance of each exit ramp;
- Design guide sign details according to the SHSD for Texas, TMUTCD (2025 Edition, as adopted) and TxDOT current standard drawings "Typical Sign Requirements";

- Supplemental overhead speed limit signs shall be 72 inches x 90 inches;
- Center all proposed overhead sign panels on the overhead sign structure truss;
- The bottom of the proposed overhead sign panels facing the same direction of traffic shall be on the same horizontal plane;
- Small roadside signs shall use a triangular slipbase system in accordance with TxDOT standard drawings "Sign Mounting Details Small Roadside Signs Triangular Slipbase System SMD(SLIP-1) thru SMD(SLIP-3)-08" and shall use anchor type "SA";
- Design all large ground mounted signs for Zone 1 (Type 90) which is 90 mph wind zone (See TxDOT drawing "Large Roadside Sign Support Post Selection Worksheet Zone 1 – 90 MPH" SMD(LRSS-1)-24); and
- At newly constructed intersections DB Contractor shall design and install signing including general signs, street name signs, pedestrian signs, regulatory signs, warning signs, and guide signs.

24.3.1 Preliminary and Final Layouts

DB Contractor shall submit, for TxDOT approval, a preliminary operational signing schematic that includes signing, delineation, pavement markings, and signalization. The design of these elements shall be based on the approved Schematic Design. DB Contractor shall prepare a preliminary lighting layout, in a roll type format with photometric curves, and submit this to TxDOT for approval prior to commencing Final Design.

Before placing any signs, delineation, sign structures, pavement markings, traffic signals, and lighting infrastructure, DB Contractor shall provide TxDOT final layouts indicating the proposed location of such items. DB Contractor shall provide TxDOT advance notice of changes or revisions to sign locations included in the preliminary operational signing schematic.

24.3.2 Signing and Delineation

DB Contractor shall design and install all signs as shown on the Released for Construction Documents. Signs include new sign panels and sign structures, as well as modifications to existing sign panels and sign structures.

DB Contractor's design shall include the locations of ground-mounted and overhead signs, graphic representation of all signs, proposed pavement markings, 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 (DMSs), lighting, and structures.

DB Contractor shall ensure that signs are located in a manner to provide adequate sight distance for legibility and proper driver response, provide clear direction and information for users, and comply with all applicable TMUTCD (2025 Edition, as adopted) requirements.

Subject to Section 24.3.4, DB Contractor shall review with TxDOT all requests for new signs, including traffic generators, or modifications of existing sign legend. Such requests are subject to TxDOT approval.

DB Contractor's design and placement of delineators and object markers shall comply with the requirements of the TMUTCD (2025 Edition, as adopted), SHSD for Texas, and TxDOT Engineering Standard Sheets.

Signs shall meet the requirements of SHSD for Texas.

DB Contractor shall replace signs, including school signs and flashers, affected by any local street improvements.

DB Contractor shall ensure all existing street name signs for cross streets are replaced or relocated and proposed street name signs are installed according to TMUTCD (2025 Edition, as adopted) requirements.

24.3.3 Project Signs – Outside the Project ROW

For signs located outside the Project Right of Way (ROW) but within a public ROW, DB Contractor shall install the signs in existing ROW controlled by local Governmental Entities or other State Governmental Entities. DB Contractor shall coordinate with appropriate Governmental Entities for DB Contractor's design and installation of such signs.

24.3.4 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 TxDOT will retain sole authority for approving installation of these signs. All costs associated with fabricating and installing these signs will be borne by the sign applicant. If approved by TxDOT, TxDOT may require DB Contractor to fabricate and/or install these signs in accordance with Section 4.6 of the General Conditions.

DB Contractor shall maintain existing third party signs in the Project ROW and shall not remove, adjust, or relocate third party signs without approval of the third party and TxDOT. Existing third party signs that must be relocated due to the DB Contractor's design shall be the responsibility of the DB Contractor, and the Price shall include the costs of such relocations, including new sign mounts, if required.

24.3.5 Sign Support Structures

DB Contractor shall determine foundation types and design sign foundations based upon geotechnical surveys/tests using Good Industry Practice. Designs for sign supports shall also comply with requirements in Item 21 and Item 23.

DB Contractor shall design sign support structures to provide a vertical clearance of not less than 25 feet from the highest point of the roadway to the centerline of the truss. Additionally, there shall be a vertical clearance of not less than 19 feet - 6 inches between any point on the roadway and the bottom of the sign, light fixture, or walkway.

Unless otherwise noted in this Item 24, DB Contractor shall design all overhead sign structures for Zone 1, 100 mph wind zone as shown in the Wind Velocity and Ice Zones of the TxDOT Engineering Standard Sheets.

Guide signs, except supplemental and traffic generator signs, shall not be ground-mounted alongside roadways with more than two lanes in a given direction. More than two lanes in a given direction shall include through lanes and auxiliary lanes.

Guide signs shall not be mounted to bridges without TxDOT approval (this excludes signs shown as bridge-mounted on the Schematic Design).

DB Contractor's design shall also incorporate the following requirements:

- Except as noted in the bullet below, all overhead sign structure towers shall be concrete with the standard truss as shown on TxDOT Engineering Standard Sheets and Houston District standards. DB Contractor shall coordinate the overhead sign structure elevation details with the overhead sign structure concrete column design; and
- All the overhead sign structure towers installed on bridge structures shall be steel pipe with the standard truss as shown on TxDOT Engineering Standard Sheets.

24.3.6 Pavement Markings

DB Contractor shall ensure that the design and installation of all pavement markings comply with applicable TMUTCD (2025 Edition, as adopted) requirements, TxDOT Standard Specifications, TxDOT special specifications, TxDOT Engineering Standard Sheets, "TxDOT Houston District Pavement Marking Policy" memo dated October 21, 2025, as provided in the RIDs, and TxDOT Houston District standards as described below.

DB Contractor shall use contrast markings for skip lines on the controlled access mainlanes where light-colored pavement does not provide sufficient contrast with the markings. Contrast markings consist of black background in combination with standard TMUTCD (2025 Edition, as adopted) marking colors as indicated in the Contrast and Shadow Pavement Markings CPM (1)-23 of the TxDOT Engineering Standard Sheets.

DB Contractor's design shall also incorporate the following requirements:

- Pavement marking shields, cardinal direction (WEST, EAST, NORTH, SOUTH), and arrows shall be used on the mainlanes approaching major interchanges to identify existing and

through traffic lanes. Install these pavement markings within approximately one mile of the interchange; and

- All signing and pavement markings at the exit ramps and frontage roads shall be in accordance with TxDOT Engineering Standard Sheet FPM(6)-22 and Houston District standards ER-FR (1)-24 or ER-FR (2)-24, as applicable. Exit gore pavement markings shall not require 12-inch diagonal pavement markings as shown on FPM (1)-22 through FPM (5)-22. Exit gore pavement markings on mainlanes shall include exit number gore markings that match the exit number as shown on standard FPM (5)-22.

24.3.7 Signalization

Traffic signal designs and modifications to existing traffic signals shall be completed in accordance with TxDOT Standard Specifications, the TMUTCD (2025 Edition, as adopted), and the requirements of the appropriate Governmental Entity.

24.3.7.1 Traffic Signal Warrants

DB Contractor shall collect traffic data for all intersections within the Project ROW and prepare signal warrant studies for all proposed signalized intersections not signalized at the time of Notice to Proceed 1 (NTP1), including intersections requiring new permanent traffic signals listed in Section 24.3.7.2 and shall submit these signal warrant studies to TxDOT for review prior to advancing to Final Design and prior to submitting traffic signal plans for review. New signal warrants will not be required for existing signalized intersections. The warrant studies shall address all signal warrant criteria in the TMUTCD (2025 Edition, as adopted). DB Contractor shall make recommendations for new traffic signal installations, modifications to existing traffic signals, as well as removal of existing traffic signals, based on the traffic data and warrant studies in consultation with TxDOT and the appropriate Governmental Entities. TxDOT will reasonably determine if a new traffic signal, modification or removal is required, based upon the traffic data and warrant study. For intersections where traffic signals are warranted at Substantial Completion or are warranted within three years of Substantial Completion, DB Contractor shall design and construct traffic signals at these intersections in accordance with Section 24.3.7 prior to Substantial Completion. Traffic signals or traffic signal infrastructure shall not be designed or constructed for intersections where traffic signals are warranted more than three years after Substantial Completion.

All requests for signals within the Project ROW throughout the Term shall be subject to TxDOT approval. Requests for signals shall include supporting signal warrant studies.

Signal warrant studies shall be based on actual traffic and/or opening year traffic projections. If actual traffic volumes are not available, but opening year traffic is available, DB Contractor shall use the procedure in Chapter 3 of the TxDOT *Traffic Signals Manual* to determine the volumes to be analyzed.

24.3.7.2 Traffic Signal Requirements

DB Contractor shall design and install new or modified existing fully-actuated temporary and permanent traffic signals at all TxDOT-authorized intersections within the Project limits that are impacted by the Traffic Control Plan and/or Final Design. DB Contractor shall maintain all signals modified by DB Contractor from the time at which it is modified through Final Acceptance. DB Contractor shall coordinate with TxDOT and the appropriate Governmental Entities to define appropriate traffic signal design requirements, local agency oversight of DB Contractor's Work, inspection and testing requirements, and final acceptance of traffic signals. DB Contractor shall coordinate with the appropriate Governmental Entities for synchronization of traffic signal networks. DB Contractor may propose alternative intersection designs to be reviewed and approved at TxDOT's sole discretion.

DB Contractor shall prepare traffic signal plans in accordance with the TMUTCD (2025 Edition, as adopted), TxDOT *Traffic Signals Manual*, TxDOT Engineering Standard Sheets and TxDOT Standard Specifications, Attachment 24-1 (City of League City, Signal Requirements and to be Furnished Signal Equipment) and submit to TxDOT for review and comment.

Signal mast arms shall consist of single hinged mast arms and shall not be placed in a location to interfere with adjacent poles, existing structures, or Utilities.

DB Contractor shall provide both pedestrian and vehicle detectors at all traffic signals within the Project limits complying with the accessible pedestrian signals guidelines described in the TxDOT *Traffic Signals Manual*.

DB Contractor's design shall also incorporate the following requirements:

- Design mast arms, poles, heads and foundations in accordance with TxDOT Engineering Standard Sheets, TxDOT Standard Specifications, and Attachment 24-1 (City of League City, Signal Requirements and to be Furnished Signal Equipment), as applicable;
- Use black Polycarbonate signal heads (no fewer than one signal head per lane) with light emitting diode (LED) signal indications and black backplates with a yellow fluorescent retroreflective border in accordance with the TxDOT Engineering Standard Sheets and Attachment 24-1 (City of League City, Signal Requirements and to be Furnished Signal Equipment), as applicable;
- Use timber poles and span wire only for temporary signals;
- Install video image vehicle detection system (VIVDS) presence and advance vehicle detection systems, for City of League City-maintained intersections in accordance with Attachment 24-1 (City of League City, Signal Requirements and to be Furnished Signal Equipment), with advance detection only required for approaches with posted speed limits greater than or equal to 45 mph and presence detection required for all approaches;
- Install radar presence and advance vehicle detection systems for TxDOT-maintained intersections (within City of Alvin limits), with advance detection only required for approaches with posted speed limits greater than or equal to 45 mph and presence detection required for all approaches;
- Use LED safety lighting where required on traffic signal poles;
- Design electrical system powering the signal equipment in accordance with the Utility Accommodation Rules (UAR) for proper cover of conduit;
- Comply with Electrical Detail (ED) sheets of the TxDOT Engineering Standard Sheets, TxDOT Standard Specifications, TxDOT Departmental Material Specifications, and NEC;
- Use new or modified traffic signal equipment that is compatible with existing equipment currently used by TxDOT or the City of League City, as applicable;
- Use controllers, cabinets, and battery backup units purchased from the TxDOT *Traffic Signals Material Producers List*, and in accordance with Attachment 24-1 (City of League City, Signal Requirements and to be Furnished Signal Equipment), as applicable.
- Use Type D ground boxes;
- Vehicular signal indications shall be 12-inch LED;
- Pedestrian signal heads shall be LED and have countdown indications;
- Locate signal cabinets between the frontage roads between the columns of the mainlane overpass, as applicable. Locate on the CTMS-cabinet side, if present;
- Single left turn lane to have single 4-section signal head with "<R<R<Y<G" centered over left turn lane;
- Dual left turn lanes to have two 3-section signal heads with "<R<Y<G" centered over each left turn lane;
- Through lane signal heads are to be 3-section signal heads closest to the stop bar of the one-way frontage "<R<Y<G" centered over each through lane for two through lanes and on the lane lines for three or more through lanes;
- For the cross street approaches, the 3-section signal closest to the stop bar of the one-way frontage road shall have an R6-1L (R) "one way" sign mounted beneath it;
- For dual left turn lanes on the cross streets, provide an R3-8 VAR lane assignment sign on the mast arm;
- Use radar detection for permanent signals to be maintained by TxDOT and VIVDS for permanent signals to be maintained by League City. Use temporary VIVDS for temporary signals; For electrical services greater than 300 feet in distance from the controller, provide a Type T service at the controller as an electrical service disconnect;
- Show luminaires on top of signal poles (two for each frontage road direction). Use LED luminaires;

- Use 1/C #4 XHHW for all power cable;
- Use 1/C #8 bare for grounding of all conduits containing power cable;
- Use 1/C #8 bare for grounding of all conduits containing non-power cable;
- Use 2/C #14 AWG Type C for all loop detector cable;
- Use 25 PAIR #22 AWG for copper interconnect, where applicable;
- Use 12 STRAND (SM) for fiber interconnects, where applicable;
- Use Schedule 80 for all PVC conduits;
- Use rigid metal conduit between all ground boxes and signal/pedestal poles;
- Use rigid metal conduit between all ground boxes and controllers;
- Use rigid metal conduit between all ground boxes and electrical services;
- Minimum 3-inch conduit for bores or conduit beneath proposed pavement;
- Run power cable in separate conduit with separate ground boxes;
- Run signal cable in separate conduit;
- Run 4/C #12 TRAY cable for safety lighting in same conduit as signal cable;
- Illumination cable to bypass the controller;
- Use 2/C #12 AWG Type A for all pedestrian pushbutton cable;
- Use 4/C #12 AWG Type A for all pedestrian signal head cable;
- Use 7/C #12 AWG Type A for all traffic signal head cable;
- Install battery back-up system for signal cabinets per TxDOT special specification 6007 (2024), *Battery Back-Up System for Signal Cabinets*;
- Install two wire pedestrian accessible signals (APS) units; and
- Locations of new electrical service shall be located within 500 feet of the intersection.

Unless otherwise noted, DB Contractor shall purchase and install traffic signals that meet the requirements of TxDOT and the City of League City, as applicable. Signal equipment designated to be optionally furnished by the City of League City will be provided at no cost to DB Contractor. A list of to be furnished signal equipment is included in Attachment 24-1 (City of League City, Signal Requirements and to be Furnished Signal Equipment). DB Contractor shall install all signal equipment furnished by the City of League City and shall purchase and install any additional signal equipment necessary for traffic signal operation that is not furnished by the City of League City.

DB Contractor shall provide training for city staff on all new accessible pedestrian signal units.

TxDOT authorized intersections requiring new (or full replacement) permanent traffic signals are:

- FM 2403 (Connector);
- E House Street;
- Wheeler Drive;
- Clifford St;
- Georgetown Parkway;
- West Blvd;
- Longfellow Dr;
- McFarland Rd;
- Maple Leaf Dr;
- Bay Area Blvd;
- Landing Street;
- Calder Dr; and
- SH 99 Eastbound Frontage Road at FM 646.

DB Contractor shall modify other existing traffic signals, when appropriate and as necessitated by the Project. This includes:

- FM 1462/South Gordon Street (SH 35 Business);

- FM 1462/Childress;
- Mustang Road;
- CR 369/Fairway Drive;
- East South Street;
- SH 6;
- Dickinson Road/FM 517;
- FM 528; and
- Brookport Drive.

24.3.7.3 **Traffic Signal Support Structures**

DB Contractor shall coordinate with TxDOT and the appropriate Governmental Entities to determine the type of traffic signal support structures. DB Contractor shall obtain the appropriate Governmental Entities' approval of traffic signal support structures to be used on new and modified signal installations.

Traffic signal support structures shall be designed for 100 mph wind zone.

Designs for traffic signal support structures shall also comply with requirements in Item 21.

24.3.7.4 **Traffic Signal Systems**

DB Contractor shall provide interconnection between new or modified signals and the City of League City or City of Alvin, as applicable, for traffic signal monitoring and control. DB Contractor shall ensure continuous communication with these new or modified signals.

For intersections listed in Section 24.3.7.2, DB Contractor shall provide interconnection systems between new or modified signals and any other signal system within one mile of the Project ROW as required by TxDOT or the appropriate Governmental Entity. DB Contractor shall make existing signal systems compatible with the proposed interconnections. DB Contractor shall ensure continuous communication with the traffic signal system within the Project ROW, and shall provide all communication hardware/equipment for TxDOT or the appropriate Governmental Entity to communicate with the signal systems within the Project ROW. Connectivity shall be established to Houston TranStar for traffic signal monitoring and control.

DB Contractor shall provide to TxDOT an acceptance test plan (ATP) for all traffic signals as part of the Final Design Submittal. This ATP shall also be submitted to the appropriate Governmental Entity. The ATP shall include the inspection process and procedures for all new or modified traffic signals. DB Contractor shall notify TxDOT 14 days prior to any testing and inspection to allow coordination with TxDOT or Government Entity inspectors or contractors. DB Contractor shall conduct testing in accordance with the ATP and document those results to show conformance.

24.3.7.5 **Traffic Signal Timing Plans**

DB Contractor shall design signal timing plans for all new and modified traffic signals. DB Contractor shall coordinate and implement signal timing plans that optimize traffic flows (both vehicular and pedestrian) and provide signal coordination with adjacent intersections and arterials for all new, modified, and interconnected signals. Unless timing maintenance is otherwise provided by a Governmental Entity pursuant to a Third Party Agreement, DB Contractor shall be responsible for updating signal timing as necessary to maintain optimized flow. Signal timing and phasing plans at diamond interchanges shall conform to the coordinated signal phasing and timing of the corridor.

DB Contractor shall submit its signal timing plan design for all new and modified traffic signals to TxDOT or City of League City, as applicable, for approval.

DB Contractor shall provide copies of all final implemented signal timing plans to TxDOT or City of League City, as applicable.

24.3.8 **Lighting**

DB Contractor shall perform locates on existing, temporary and proposed illumination infrastructure. TxDOT will not perform any locates after Notice to Proceed 2 (NTP2).

DB Contractor shall provide lighting designs, including safety lighting where warranted, to meet criteria listed in the TxDOT *Highway Illumination Manual* on all traveled roadways to be illuminated. Traveled roadways include: mainlanes, interchanges, ramp terminals, and frontage road intersections with cross streets. All design and construction shall comply with the NEC, latest TxDOT Engineering Standard Sheets, TxDOT Departmental Material Specifications, and TxDOT Standard Specifications. At all times during the Term, DB Contractor shall maintain safe lighting conditions along the Project roadway. DB Contractor shall develop temporary illumination plans as part of the Final Design process that demonstrate that existing lighting conditions will be maintained throughout construction until permanent lighting is constructed. DB Contractor shall submit a computer-generated light level array for all lighted areas within the Project limits to TxDOT for review as part of the Final Design.

DB Contractor shall provide lighting along cross streets in locations where lighting systems are currently provided within the Project limits. All third-party requests for lighting within the Project limits shall be subject to TxDOT approval including a Third Party Agreement covering responsibilities for operation and maintenance of the finished lighting, in accordance with Item 13.

Continuous illumination is not required throughout the Project.

DB Contractor shall provide LED fixtures for high mast lighting, conventional roadway lighting and under bridges at underpass/overpass locations throughout the Project. Underpass lighting will be limited to locations with existing underpass lighting or to locations with new structures (or widened structures) greater than or equal to 100 feet in width. Existing non-LED light fixtures to remain shall be replaced with LED light fixtures.

High mast and conventional lighting shall meet the photometric level requirements as stated in TxDOT Engineering Standard Sheets RID (1)-(3)-20, HMID (1)-(7)-24 and the AASHTO *Roadway Lighting Design Guide*. DB Contractor shall design the lighting, where necessary, through the entire Project limits to minimize measurable spillage outside the Project ROW and onto the adjacent properties using either cut-off shields or tightly-controlled photometrics combined with appropriate mounting height. DB Contractor shall submit a lighting plan and photometric data results (light spillage measurements/contours) for the entire Project limits to TxDOT for review and approval as part of the Final Design Submittal, including information required in Section 23.2.7. In addition, the overflow of light onto any surface area outside of the Project ROW shall be designed in accordance with the TxDOT *Highway Illumination Manual* and ANSI/IES *RP-8 Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting*. The Final Design Submittal shall include all input data for the photometric analysis.

Conventional luminaire poles and breakaway bases shall be designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* and TxDOT Engineering Standard Sheets. For conventional luminaire poles located within the clear zone of the roadways, DB Contractor's design shall incorporate breakaway devices that are pre-qualified by TxDOT. All high mast lighting poles to be used within the Project limits shall meet the requirements of TxDOT Engineering Standard Sheets and TxDOT Standard Specifications.

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 Intelligent Transportation System cables, fiber-optic lines, traffic 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 luminaire mast arms on traffic signal poles.
- 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 Federal Aviation Administration (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, relocate, or redesign 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. DB Contractor shall coordinate with the FAA regarding the installation of obstruction lights, if any, on a case-by-case basis. DB Contractor shall submit to TxDOT records of documentation of coordination with FAA.

DB Contractor shall provide to TxDOT an ATP for all illumination as part of the Final Design Submittal. This ATP shall also be submitted to the appropriate Governmental Entity. The ATP shall include the inspection process and procedures for all illumination. DB Contractor shall notify TxDOT 14 days prior to any testing and inspection to allow coordination with TxDOT or Governmental Entity inspectors or contractors. DB Contractor shall conduct testing in accordance with the ATP and Item 616, *Performance Testing of Lighting Systems*, of the TxDOT Standard Specifications and document those results to show conformance.

24.3.8.1 **Lighting Infrastructure**

At a minimum, all underground conduits shall be Schedule 80 polyvinyl chloride (PVC) and not less than 2 inches in diameter.

The conductor size for lighting shall be in accordance with the NEC. All wire gage must be calculated based upon electrical load design. DB Contractor shall not use duct cable for illumination purposes.

DB Contractor shall place bridge mounted illumination poles in accordance with the bridge lighting details in the TxDOT Engineering Standard Sheets.

For additional information concerning lighting and its associated conduit attached to structures, see Item 21.

Non-standard light pole design shall be submitted to TxDOT for approval. For light poles with a base 25 feet above the elevation of surrounding terrain, DB Contractor shall electronically submit design calculations and shop drawings to TxDOT Bridge Division.

Dimensions for ground boxes shall be as shown on TxDOT Engineering Standard Sheet ED (4)-14.

Ground box covers shall be 2-inch-thick (nominal), non-conducting material and labeled "Danger High Voltage Illumination."

Riprap aprons shall be provided around all ground boxes and high mast light poles not otherwise protected with concrete.

All proposed illumination electrical services shall be metered electrical services. Any existing non-metered illumination systems to remain shall be converted to a metered electrical service. Illumination related electrical service meters shall have an identification tag denoting a contact person or office in case of Emergency or for maintenance, and the address and telephone number.

Electrical part of the installation shall be designed and installed in conformance with the NEC, TxDOT Engineering Standard Sheets and TxDOT Standard Specifications.

DB Contractor shall seal all conduit ends with lighting circuits with expandable foam seal or by other methods approved by TxDOT that will not adversely affect other plastic materials or corrode metals – alternate methods of wire theft prevention may be submitted for approval.

In order to prevent copper theft, DB Contractor shall seal ground boxes for lighting circuits with locking box covers (e.g., LockJaw, NewBasis) or polyurethane foam approved by TxDOT that will not adversely affect other plastic materials or corrode metal – alternate methods of wire theft prevention may be submitted for approval.

DB Contractor shall:

- Place bridge lighting brackets in accordance with TxDOT Engineering Standard Sheets.
- Ensure minimum inside dimensions for ground boxes shall be 15.25 inches (width) by 28.25 inches (length) by 20 inches (depth).

- Ensure 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.
- Not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes instead of the cast iron junction boxes shown on standard sheets CTBI (3), CTBI (4), AND SSCB (4). Mount the junction boxes flush (+ 0 inch, - ½ inch) with concrete surface of concrete barrier. Mount the polymer concrete junction boxes shown on the concrete safety barrier standard sheets recessed (- ¼ inch, - ¾ inch) and weld a ¼ inch steel plate to the captive bolts so that it is flush (+0 inch, - ¼ inch) with surface of concrete barrier.

24.3.9 **Visual Quality**

Notwithstanding the requirements of Section 24.3.8, DB Contractor shall:

- Provide luminaires of equal height along the roadway when using conventional poles.
- Not use timber poles for permanent installation.
- Re-sod or re-seed areas of construction disturbed by the installation of signs, traffic signal systems, or lighting systems after final installation.
- Ensure high-mast lighting shall not infringe into residential areas adjacent to the Project ROW.
- Coordinate with the FAA regarding installation of obstruction lights, if any, on a case-by-case basis.

24.4 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 24 and the TxDOT Standard Specifications.

Costs for utility-owned power line extensions, connection charges, meter charges, consumption charges, and any other charges related to electrical services shall be paid for by the DB Contractor.

24.4.1 **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 for approval 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 workday.

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 for inclusion into the Maintenance Management System (MMS).

All signs within the Project limits are required to meet the minimum retroreflectivity values specified in TMUTCD (2025 Edition, as adopted), Table 2A-5 (Minimum Maintained Retroreflectivity Levels).

24.4.2 **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 any time after three days, but not later than 10 days after application:

- Type I, thermoplastic pavement markings
  - White markings: 250 millicandelas per square meter per lux (mcd/m2/lx)
  - Yellow markings: 175 mcd/m2/lx
- Type II, paint and beads
  - White markings: 175 mcd/m2/lx
  - Yellow markings: 125 mcd/m2/lx
- Type III, multipolymer pavement markings

- White markings: 400 mcd/m2/lx
- Yellow markings: 250 mcd/m2/lx

The Independent Quality Firm (IQF) shall measure retroreflectivity values for all pavement markings in accordance with the TxDOT Standard Specifications to confirm the compliance.

24.4.3 **Permanent Signalization**

DB Contractor shall coordinate with the Utility Owner(s) and ensure necessary metered power service is initiated and maintained for Highway Service Systems. DB Contractor shall stake each pole location in the field and provide TxDOT 72 hours' notice for approval prior to installation of any foundation.

Separately metered electrical service shall be installed for permanent signals. When safety lighting is installed by the State in an incorporated city as part of a traffic signal installation, a separate electrical service is not required for this safety lighting. All other elements of the Work requiring electrical service shall be separately metered from the traffic signals.

During the test period, DB Contractor must provide a contact that can handle emergency calls 24 hours/day for all new signals.

24.4.4 **Permanent Lighting**

DB Contractor shall coordinate with the Utility Owner(s) and ensure metered power service is initiated and maintained for Highway Service Systems. Where the Work impacts existing lighting, DB Contractor shall maintain existing 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 for approval prior to installation of any foundation.

DB Contractor shall remove all unused existing illumination-related cable and conduit that does not have existing pavement or riprap above it; any unused existing illumination-related 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 label on each metered electrical service indicating service address as well as all required information shown on the Electrical Detail (ED) sheets of the TxDOT Engineering Standard Sheets and TxDOT Departmental Material Specifications.

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 for inclusion in the Maintenance Management System (MMS). The identification decal shall denote a contact name, phone number, and address in the event of Emergency or necessary maintenance.

Existing conductors shall be removed from abandoned conduit.

24.4.5 **Reference Markers**

DB Contractor shall place reference markers at approximately 2 miles apart in accordance with the TxDOT *Sign Crew Field Book* and the "Reference Marker Location" document provided in the RIDs. DB Contractor shall place mile markers along interstate highways at approximately one mile apart in accordance with the Texas reference marker (TRM) system. DB Contractor shall set reference markers and/or mile markers according to the TMUTCD (2025 Edition, as adopted). Once placed, DB Contractor shall inventory and record reference markers with Global Positioning System (GPS). DB Contractor shall provide this information to TxDOT in Microsoft Excel format.

24.5 **Submittals**

All Submittals described in this Item 24 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 24-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 24-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Notification of meetings with local Governmental Entities	48 hours prior to the start of Governmental Entity meeting	For information	24.2.1
All proposed locations of metered electrical services	Within the Final Design	Approval	24.3
Preliminary operational signing schematic	Prior to commencing Final Design	Approval	24.3.1
Preliminary lighting layout	Prior to commencing Final Design	Approval	24.3.1
Signs, delineation, sign structures, pavement markings, traffic signals, and lighting infrastructure final layouts	Prior to placement	Review and comment	24.3.1
Signal warrant studies	Prior to advancing Final Design and prior to submitting traffic signal plans for review	Review and comment	24.3.7.1
Traffic signal plans	As part of the Final Design	Review and comment	24.3.7.2
ATP for all traffic signals	As part of the Final Design Submittal	Review and comment	24.3.7.4
Signal timing plans	As part of the Final Design	Approval	24.3.7.5
Copies of all final implemented signal timing plans	With Record Drawings	For information	24.3.7.5
Light Level Array	As part of the Final Design Submittal	Review and comment	24.3.8
Third Party requests for lighting within Project limits, including lighting agreements for operations and maintenance	As part of the Final Design Submittal	Approval	24.3.8
Temporary illumination plans	As part of the Final Design Submittal	Review and comment	24.3.8
ATP for all illumination	As part of the Final Design Submittal	Review and comment	24.3.8
Lighting plan and photometric results (light spillage measurements/contours)	As part of the Final Design Submittal	Approval	24.3.8
Photometric analysis input files	As part of the Final Design Submittal	Approval	24.3.8
Records of documentation of coordination with FAA	As part of the Final Design Submittal	For information	24.3.8
Non-standard light pole design	As part of the Final Design Submittal	Approval	24.3.8.1
Electronic design calculations for light poles with a base 25 feet above the elevation of surrounding terrain to TxDOT, Bridge Division	As part of the Final Design Submittal	Approval	24.3.8.1
Alternate methods of wire theft prevention	As part of the Final Design Submittal	Approval	24.3.8.1
Notice to TxDOT of staking each sign location in the field	At least 72 hours prior to installation of any sign	Approval	24.4.1
Sign identification record	After placement of all signs Submittal	For information	24.4.1

Table 24-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Notice to TxDOT of DB Contractor staking each pole location for permanent signalization in the field	At least 72 hours prior to installation of any foundation	Approval	24.4.3
Notice to TxDOT of DB Contractor staking each pole location for permanent lighting in the field	At least 72 hours prior to installation of any foundation	Approval	24.4.4
Reference marker record	After placement of all markers	For information	24.4.5

Item 25
Intelligent Transportation Systems

25.1 **General Requirements**

An Intelligent Transportation System (ITS) is necessary for monitoring the Project's traffic flow and performance both temporarily during construction and as a permanent installation after roadway opening to traffic. 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 Users.

Design-Build (DB) Contractor shall connect the Project ITS that it provides to the existing ITS network while fulfilling all requirements herein. The Project ITS must be compatible with such in-place system(s) that TxDOT and other entities (government or private) 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 any existing ITS functionality to include communications networks within the Project until Final Acceptance, except during Force Majeure Events, periods of system maintenance or system crossovers, or other periods approved by TxDOT. All planned outages as a result of system maintenance or system crossovers must be approved by TxDOT.

DB Contractor shall abide by TxDOT's information security standards:

- Access to the TxDOT network can be granted to DB Contractor where there is a demonstrated business need;
- TxDOT follows the principals of "least privilege," where the access granted should be the minimum necessary to perform legitimate business functions; and
- Access to the TxDOT network or system for DB Contractor is granted by issuing each individual that requires such access a unique email address, requiring the individual to certify that they understand and agree to abide by TxDOT acceptable use standards, and authenticating the user through TxDOT's active directory system.

During construction, DB Contractor shall maintain the existing fiber or wireless ITS communication network. DB Contractor shall produce temporary ITS plans detailing how connectivity and functionality will be maintained throughout construction, including connectivity with other appropriate Governmental Entities which have existing connections. DB Contractor shall submit the temporary ITS plans to TxDOT for approval. DB Contractor may propose to use temporary aerial fiber to maintain ITS connectivity during construction. DB Contractor shall not use a temporary wireless network in areas with an existing fiber communication network without prior approval by TxDOT.

The Project ITS shall conform to TxDOT Engineering Standard Sheets and Houston-Galveston Regional ITS Architecture and with the Regional Data and Video Communications System and have physical connections with the existing TxDOT ITS communications network on major freeways. 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, testing, and operations support of safe and functional ITS for the Project using Good Industry Practice. The Project ITS shall be planned and designed using a systems engineering approach, including the performance of a systems engineering analysis for the Project as required by 23 CFR § 940.11. All components of the ITS shall conform to the provisions of the National Transportation Communications for ITS Protocol (NTCIP), Houston District TSMO Program Plan, and the statewide Transportation Systems Management and Operations (TSMO) Strategic Plan, available at https://www.txdot.gov/inside-txdot/division/traffic/tsmo.html.

The Project ITS shall operate under the Houston-Galveston Regional ITS Architecture. Houston TranStar shall be the main Traffic Management Center (TMC) for this Project, and DB Contractor shall maintain ITS interoperability with the TMC and other Governmental Entities over the Term. Communication and interoperability shall be achieved with other TMCs in the region, 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).

25.2 **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 the systems of TxDOT in the manner described in this Section 25.2 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.

Prior to beginning ITS efforts, DB Contractor shall conduct an ITS workshop with TxDOT, and affected Governmental Entities (per TxDOT's direction) to:

- Confirm TxDOT's operational requirements;
- Review DB Contractor's survey of existing ITS infrastructure and condition assessment;
- Discuss concepts, identify potential resolutions for Site-specific issues (as identified by DB Contractor);
- Develop a tabulated geocoded inventory of poles along with pole numbers for all ITS-related poles;
- Determine communication requirements;
- Determine requirements for design;
- Determine requirements for construction including security considerations (burying of ground boxes, welding ground boxes shut, etc.);
- Determine requirements for construction and coordination of activities with adjacent roadways;
- Confirm requirements of other affected parties and Governmental Entities; and
- Address other topics as needed to ensure the design meets all requirements herein.

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 Item 25, DB Contractor shall determine the number and specific locations of all ITS components. The ITS shall consist of all equipment necessary to implement the ITS described in this Section 25.2.

DB Contractor shall provide safe ingress/egress areas and structures to accommodate authorized personnel access to ITS components for maintenance and operation activities. Unless approved by TxDOT, ITS components shall be placed in locations that allow maintenance without a Lane Closure.

All components of the ITS shall conform to the provisions of the NTCIP and be compatible with the latest version of TxDOT's advanced traffic management system LoneStar™ software that is operational at Houston TranStar.

ITS devices may be co-located on the same ITS pole, provided that they can function independently for the portion of the facility for which they are intended (i.e. existing mainlanes or proposed elevated structure).

DB Contractor is responsible for designing and constructing lightning protection, grounding, and surge suppression for each ITS structure and equipment cabinet. Ground mounted equipment cabinets next to ITS support structures will not be allowed and must be mounted to the support structure.

DB Contractor shall be responsible for the design, installation, and provision of power required to operate the Highway Service Systems. DB Contractor shall provide a tabulated list of meter locations and addresses at a minimum 30 days prior to Substantial Completion for primary power establishment.

All ITS devices and associated mountings shall meet the 100-mph wind load design standards.

The installed ITS equipment shall provide TxDOT accurate and reliable data and quality video images, and accurate control of field devices from Houston TranStar on a real-time basis, 24 hours a day, seven days a week. Real-time is defined as correct data being available at Houston TranStar within 30 seconds of being processed or the correct response of a field component within 1 millisecond of the command being sent.

DB Contractor shall be responsible for ensuring the CCTV, DMS, and vehicle detection systems meet the reliability requirements specified in the Houston District standards. Those elements not addressed by

Houston District standards shall comply with statewide standards. In the event of a conflict between statewide and Houston District standards, DB Contractor shall ensure Houston District standards are met.

Any recommended modifications to the specifications shall be presented by DB Contractor to TxDOT and shall be subject to TxDOT approval.

25.2.1 **DB Contractor ITS Communications Requirements**

DB Contractor shall provide a communications network that has redundant routing capabilities. 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.

The current TxDOT communications network backbone is a 10 GB multiple protocol label switching ethernet network / single-mode fiber optic cable network / other.

Each field network switch shall provide a primary and secondary fiber path of two fibers each from the field cabinet to separate satellite buildings. The maximum number of Layer 2 field network switches forming a network path between an end device (TxDOT ITS) and a satellite building based data aggregating Layer 3 network switch shall not exceed 12. The calculated data throughput assigned to any sub-network path shall not exceed 50% of the path's throughput capacity. Calculations for band usage shall be provided during the preliminary design efforts.

New devices and any existing devices interconnected during Project implementation shall not be assigned within the same network path or otherwise daisy-chained to avoid possible inconsistencies in communication protocols.

DB Contractor shall install a 144-strand single mode fiber optic cable in the duct bank. The trunk line fiber may only be spliced at the communication hubs unless approved by TxDOT. Pull boxes shall be spaced at each ITS device location, Toll Zone, satellite building and a maximum of every 700 feet along the Project corridor. DB Contractor is responsible for confirming that 144-strands of fiber can support the proposed ITS deployment and providing additional fiber at no cost to TxDOT, as needed, to ensure that no more than 50% of the throughput capacity of a sub-network path is exceeded. Type 1 ground boxes with aprons shall be utilized unless otherwise approved by TxDOT.

DB Contractor shall provide terminal servers, video encoders, media converters, and modems to establish communications as required. Video encoding shall meet MPEG-4 standards and be compatible with TxDOT's advanced traffic management system Lonestar™ software requirements for TxDOT CCTV.

DB Contractor shall submit proposed fiber termination charts to TxDOT for approval.

25.2.2 **Conduit**

DB Contractor shall submit, for TxDOT's concurrence, the type, quantity, and design of the conduit above and below ground, ground boxes, all communication cables, and electrical conductors to support the ITS network and operations as part of the Final Design Submittal. ITS devices shall be powered by dedicated services which are separate from traffic signals, illumination, and other devices. No exposed conduit sections will be permitted. Rigid metal conduits hung between girders and only visible from a location under a bridge are considered not to be exposed. All sections shall have a minimum of 48 inches of cover over all ITS conduit except:

- Where boring is required to cross under intersections; and
- In the case of large bridge crossings, built into the bridge structure.

DB Contractor shall install bored conduit below the base layer of pavement structure. TxDOT approval will be required for any placement on existing structures. DB Contractor shall provide separate conduits for tolling and toll-related ITS communication, tolling and toll-related ITS power, general ITS communication and general ITS power. One spare 3-inch Schedule 40 conduit for future expansion shall be provided. The location of the one spare conduit shall be coordinated with TxDOT during design. A #14 bare electrical conductor wire for trace wire shall be placed in both trunk lines. All conduit shall have end to end pull tape.

Conduit shall be 3-inch diameter. The conduit shall support a minimum of 144-strand fiber optic cable and be in a different duct bank than conduit for tolling elements.

DB Contractor shall repair each existing communication cable or electrical conductor that is severed or otherwise rendered not usable within 72 hours.

DB Contractor shall provide materials and use construction methodology that, at a minimum, meets the most current or applicable TxDOT Standard Specifications and TxDOT Houston District standards, including placement of a trace wire within the conduit, placing locator tape and installing above ground markers, and providing the required 48 inches or more of cover. DB Contractor shall provide alternatives to TxDOT to improve TxDOT's current practices for securing ground box lids and are subject to TxDOT approval.

25.2.3 Closed Circuit Television (CCTV) Cameras

DB Contractor shall install CCTV cameras obtained from the State for Incident or Emergency verification and traffic 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.

25.2.3.1 Equipment

Subject to Section 25.2.3, DB Contractor shall provide all necessary CCTV equipment, including camera controls, cables, and connections. DB Contractor shall provide all the equipment necessary for TxDOT control of all CCTV cameras. The method of control shall be in accordance with TxDOT Engineering Standard Sheets, TxDOT Standard Specifications and TxDOT special 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 at Houston TranStar, and if necessary convertible for use by TxDOT's in-place ITS network.

25.2.3.2 Placement

DB Contractor shall provide overlapping roadway coverage by CCTV cameras for all highway lanes and intersecting cross streets within the Project limits to provide redundant camera field of view. CCTV cameras shall be placed to enable TxDOT to monitor traffic conditions on highway lanes, access roads, connecting facilities, entrance and exit ramps, and messages displayed on any remotely controlled DMS in the Project area. To provide a stable video image, DB Contractor shall mount cameras on ITS poles unless otherwise approved by TxDOT. CCTV cameras are not to be mounted on DMS structures. Permanent locations of CCTV camera poles shall be submitted prior to commencing Final Design and subject to TxDOT approval.

Distance between CCTV cameras shall not exceed 0.5 miles; however, DB Contractor is responsible for placing cameras to ensure 100% coverage. 100% coverage shall be defined as no blind spots for any reason, including, but not limited to: trees, bridge structures, horizontal or vertical alignment, overhead or side mounted sign structures. Additionally, each CCTV camera shall be able to view the CCTV camera immediately upstream and downstream from itself unless otherwise approved by TxDOT.

The CCTV site shall be accessible in all weather conditions. Access pads shall be provided.

25.2.3.3 Video Requirements

Subject to Section 25.2.3, DB Contractor shall provide CCTV cameras that meet the requirements of the applicable TxDOT Engineering Standard Sheets, TxDOT Standard Specifications and TxDOT special specifications or TxDOT Houston District standards. If at any time prior to Final Acceptance, should any CCTV cameras fail to meet the latest TxDOT Engineering Standard Sheets, TxDOT Standard Specifications and TxDOT special specifications and TxDOT Houston District standards in effect at the time of design, DB Contractor shall replace such cameras within 48 hours of discovery of lack of compliance.

25.2.3.4 Operating Requirements

Subject to Section 25.2.3, DB Contractor shall provide cameras with built-in heaters, mounting structure, and related equipment capable of operating within the following weather conditions:

- Wind load of 100 mph without permanent damage to mechanical and electrical equipment;
- Ambient temperature range of -35 degrees Fahrenheit to +140 degrees Fahrenheit;

- Relative humidity range not to exceed 95% within the temperature range of +40 degrees Fahrenheit to +110 degrees Fahrenheit; and
- Humidity range of 0 to 100% condensing.

25.2.3.5 **Control Requirements**

DB Contractor shall supply CCTV equipment on this Project which is fully compatible with the existing CCTV control systems operated from Houston TranStar. In order to prove compatibility and operability of CCTV systems submitted for use on this Project, DB Contractor shall deliver one complete set of CCTV equipment to TxDOT for testing by Houston TranStar information technology personnel as part of the equipment submittal and approval process. DB Contractor shall test CCTV equipment prior to installation. A minimum of 30 days prior to testing, provide to TxDOT the proposed test procedure for review and comment. DB Contractor shall invite TxDOT to observe testing and shall coordinate with TxDOT personnel schedules to enable TxDOT observation. The equipment being tested must be fully assembled and in a fully operational condition. DB Contractor shall configure all equipment being tested as is intended for use on the Project. Prototype equipment is not permitted. The equipment will be interconnected to the existing CCTV control system and must be fully operational using that system. No modifications to the existing CCTV control system will be made to accommodate the CCTV equipment being tested. To be considered fully operational, the equipment must, at a minimum, correctly respond to the following commands:

- Pan left
- Pan right
- Focus near
- Focus far
- Tilt up
- Tilt down
- Iris open
- Iris close
- Iris override
- Zoom in
- Zoom out
- Camera power (latching)
- Pan tilt position preset

Upon completion of installation, DB Contractor shall test the communications link installed between the satellite building and the CCTV field equipment locations. DB Contractor shall perform the test at all CCTV locations on the Project.

DB Contractor shall use a test signal generator and a video monitor to demonstrate the ability of the video signal link to transmit a National Television System Committee compliant video signal from the CCTV cabinet to the satellite building. After completion of testing with the signal generator, DB Contractor shall connect the CCTV camera to the link and use a video monitor at the satellite building to verify the presence of a National Television System Committee compliant video signal. No degradation of the video signal shall be discernible using the video monitor.

DB Contractor shall supply all test equipment, cabling, and connectors necessary for performing the tests by DB Contractor.

The equipment must be fully operational using the existing control system from Houston TranStar Equipment which in any manner is not fully operational with the control system will be considered as not passing the test. DB Contractor shall be permitted one opportunity to retest equipment which does not pass the initial test. The retest must occur within 30 days after the initial test. All issues of non-compliance and all discrepancies shall be resolved prior to commencing the second test. Equipment which is not able to be retested within 30 days, or which does not pass the second test, shall not be used on the Project. DB Contractor shall not be entitled to additional time or compensation on account of the testing of the CCTV equipment. Successful testing of the CCTV equipment must be completed prior to any construction activities

at the CCTV locations. No camera poles, cabinets, or any other CCTV related equipment shall be installed until CCTV equipment testing is successfully completed.

25.2.4 **Vehicle Detection**

DB Contractor shall provide permanent, high definition microwave radar detection in each highway lane of the Project that measures vehicle classification, vehicular volume, lane occupancy, and vehicle speed information on the roadway. The detectors shall be non-intrusive to the roadway users. Spacing for the permanent vehicle detection shall be no greater than one mile in each highway lane in the Project, and, at a minimum, provide detection for all highway lanes at one location between interchanges, each entrance ramp lane, and each exit ramp lane. For sensors which are not placed in the pavement, DB Contractor shall locate the devices on the side of the Project nearest the largest shoulder so as to limit the potential interference by the concrete traffic barrier on detecting vehicles and collecting information. Vehicle detection devices are not required for the frontage roads.

DB Contractor shall also install Bluetooth readers every 2 miles and/or at locations approved by TxDOT. These readers will be used to determine average speeds and travel times. The Bluetooth readers must be compatible with existing systems at Houston TranStar.

Vehicle detection sensors shall determine vehicle speed for each vehicle passing the sensor. The sensors shall provide raw speed data (volume, speed, lane occupancy, and vehicle classification counts) and direction of travel for all lanes. Additionally, the sensors (or the software controlling the sensors) shall be capable of determining vehicles traveling in the wrong direction. For sensors that collect data across multiple lanes of traffic, data shall be collected and provided by lane. In areas where a sensor would have to collect data on more than 12 lanes of traffic, including shoulders or over distances/widths greater than 250 feet, DB Contractor shall provide additional detectors as required. DB Contractor shall provide detectors that allow TxDOT to adjust the frequency rates that the data files are provided by device.

DB Contractor may attach detection units to existing or proposed structures or ITS poles with prior concurrence from TxDOT. Where an existing structure is not available, or in lieu of attaching the detection 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 the TxDOT Engineering Standard Sheets and the TxDOT Standard Specifications for CCTV mounting poles and must adhere to minimum vertical clearance requirements. DB Contractor shall provide all necessary support structures, equipment, including, but not limited to, vehicle detection system devices, controls, cables, cabinets and connections. Permanent locations of vehicle detector poles shall be subject to TxDOT approval.

25.2.5 **Dynamic Message Sign (DMS)**

DB Contractor shall provide a comprehensive network of electronic DMS as needed to satisfy the operational requirements using only light emitting diode (LED) display technology. The DMS shall operate as part of an overall regional system. DB Contractor shall provide TxDOT with full control of DMS messaging prior to Final Acceptance.

DB Contractor shall position each DMS to allow motorists to safely view the messages being displayed. DB Contractor shall locate the DMS to comply with large guide sign spacing stated in the TMUTCD (2025 Edition, as adopted).

Location and placement of DMS shall be approved by TxDOT.

DMS shall be mounted using a T-mount and located so that mainlane closures are not needed to maintain the sign. DMS site shall be accessible in all weather conditions. Access pads shall be provided, if necessary, to support maintenance. DB Contractor shall provide full color DMS that use LED display technology and support full matrix graphics.

DB Contractor shall provide all necessary DMS, support structures and equipment, including, but not limited to, DMS devices, controls, cables, cabinets, and connections.

DB Contractor shall maintain any existing DMS functionality within the Project during construction and shall not impact the operation of any existing DMS within the Project during construction absent approval from TxDOT.

A DMS shall also be placed at one mile before the approach prior to any mainlane tolling facility. The DMS is not required to be dedicated for toll facility use. DMS shall have the ability to be controlled using the latest TxDOT's DMS operating system being used at Houston TranStar.

25.2.6 **Communications Hub Enclosures, Communications Cabinets, Environmentally Controlled Communications Buildings**

DB Contractor shall coordinate with TxDOT on the connection of all new ITS components to any existing ITS communication hub enclosures and communication cabinets covering the Project or adjacent to the Project such that regional communications, including connectivity to Houston TranStar, can be established.

Connectivity to Houston TranStar will be facilitated by fiber connectivity to the south of the Project limits extending to an existing network at I-45. TxDOT will make necessary arrangements for dark fiber allocation outside the Project limits. DB Contractor shall make use of the dark fiber extending to I-45 to establish project ITS connectivity with Houston TranStar and provide all necessary network switching hardware as required.

DB Contractor shall provide four communications hub buildings within the Project limits. A preliminary, conceptual layout of the building locations is provided in the Signing Schematic Layout provided in the RIDs. The buildings depicted outside of the Project limits will be provided by others.

25.2.7 **Reserved**

25.2.8 **Reserved**

25.2.9 **Reserved**

25.3 **Construction Requirements**

25.3.1 **General**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 25 and the TxDOT Standard Specifications.

DB Contractor shall notify TxDOT, at a minimum, 30 days in advance of making connections to the existing TxDOT system.

DB Contractor shall maintain any existing ITS communications functionality during construction activities. Required functionality can be accomplished by phasing construction to establish new equipment locations prior to removal of existing location, allowing minimal service interruption of no more than four hours for any disruption associated with communications and 72 hours for the transfer of devices from existing to new locations, or by use of portable equivalents for ITS devices, such as trailer mounted DMS, sensors or CCTV, positioned to allow removal of devices while new locations are constructed. To maintain detection accuracy, DB Contractor shall reconfigure vehicle detectors throughout the duration of the Project to correspond with any changes in roadway geometry.

DB Contractor shall coordinate with Utility Owner(s) and ensure that power service is available for Highway Service Systems.

The following list includes, but is not limited to, ITS elements and the corresponding special specifications to be utilized:

- ITS System Support Equipment – SS6009 (2004), SS6003 (2014);
- ITS Fiber Optic Cable (Single Mode) – SS6007 (2014);
- Intelligent Transportation System (ITS) Ground Mounted Cabinet – SS6008 (2014);
- Closed Circuit Television (CCTV) Field Equipment – SS6010 (2014);
- Camera Pole Structure w/Cabinet – SS6064 (2014);
- Fiber Optic RS-232 Data Modem – SS6015 (2014);
- Environmentally controlled Communications Building – SS6499 (2004);
- Communications Hub Building – SS6017 (2014);
- Fiber Optic Video Transmission Equipment – SS6035 (2014);
- Dynamic Message Sign System – SS6028 (2014); and
- Radar Vehicle Sensing Device – SS6304 (2014).

25.3.2 **Existing ITS Relocation**

DB Contractor shall relocate any existing ITS components, including communication hubs, environmentally controlled communication buildings, satellite buildings, CCTV cameras, DMSs, detection devices, and fiber-links, as required to continue service from the existing components. DB Contractor shall sequence construction and relocation of existing ITS components, facilities, and systems to prevent lapses in TxDOT's receipt of video or data within the Project area. The existing physical links and the proposed physical links shall be in separate physical conduits.

Before removing existing ITS items and before beginning construction of segments without existing ITS, DB Contractor shall perform all activities necessary to maintain system operations during construction, including installing new ITS items, relocating or replacing existing ITS items, and connecting such ITS items to the existing network.

DB Contractor may reuse during construction existing vehicle detection devices and CCTV cameras that are operational and meet current TxDOT requirements, but DB Contractor shall replace these components with new equipment prior to the Substantial Completion Deadline.

Existing general purpose ITS satellite buildings impacted by the Project shall be relocated and shall retain all existing functionality and fiber connectivity to Houston TranStar.

25.3.3 **ITS Implementation Plan**

DB Contractor shall provide an ITS Implementation Plan for approval as part of the Final Design Submittal to demonstrate system interoperability with other TMCs in the region, as well as compatibility with the operational procedures for command and control of devices, sharing of data, and priority control that various parties will assume under different operating conditions of the corridor and surrounding roadway system. The ITS Implementation Plan shall include the following:

- Functional design plan;
- Communications analysis report;
- Operational and requirements report;
- Applicable updates to the regional ITS architecture; and
- Acceptance test plan (ATP).

The functional design plan shall show each device's relationship in the overall functional design of the ITS and proposed roadway system. This functional design plan shall include the location of devices, technology and functional specifications of devices, and any unique design elements that are necessary to achieve the desired functionality or space restrictions.

The communications analysis report shall document the communications design. This report shall show all ITS field devices, their flow through all communications mediums, and throughput within the ITS. This shall include communications between any involved Governmental Entities. The report shall contain a narrative describing the information to be transmitted, as well as a high-level plan for its use. Communications diagrams shall be provided showing the location of any communication hubs (existing or proposed), any planned fibers (source as well as identification tag), modem/transceiver equipment planned at field equipment cabinets, and other equipment deemed necessary to functionally operate the ITS.

The operational and requirements document for the ITS shall describe the functional capability of the system and the method and level of integration. The document shall describe in detail the design of the system, hardware and software to be utilized, functional capabilities, command and control, data sharing capabilities, and priority use of devices by multiple agencies. In developing the operational and requirements document, DB Contractor is required to hold scoping meetings with TxDOT, such that requirements are defined to achieve interoperability with other TMCs, and priority logic and information for command, control, and data sharing is created to enable effective management and Incident response along the corridor, as well as regionally.

For each component of the ITS, an ATP shall assure proper operation, control, and response of each device meeting the functional requirements. DB Contractor shall implement the ATPs and provide certified documentation that its requirements have been met prior to operational use of the ITS.

As part of the ATP, DB Contractor shall prepare a system acceptance procedure prior to start of construction to assure proper operation, control, and response of each device as part of the overall ITS, including the overall operating system and software. DB Contractor shall conduct the procedure and provide certification that the ITS effectively meets the required functional requirements. DB Contractor shall submit this certification to TxDOT prior to Substantial Completion.

25.3.4 **End-to-End Testing**

DB Contractor shall provide notice and coordinate with TxDOT Houston TranStar to allow for end-to-end testing of the ITS. Testing for ITS fiber will occur during the 21 Day period prior to Substantial Completion and DB Contractor shall provide TxDOT, and Houston TranStar staff with an opportunity to conduct full system tests, conduct daily operations to confirm operation plans and standard operating procedures, and to otherwise prepare for operational use of the facility. End-to-end testing will also occur after hours and on weekends. DB Contractor shall coordinate to ensure that there will be no conflicts between TxDOT, and their affiliated contractors, and DB Contractor's staff.

DB Contractor shall not commence end-to-end testing until the following conditions have been met: DB Contractor and TxDOT shall have successfully completed all their testing, DB Contractor has completed training of all relevant TxDOT staff, and DB Contractor has met all acceptance requirements for DB Contractor installed ITS devices, satellite buildings, communication and electrical networks, and generators.

DB Contractor shall be responsible, at a minimum, for the following:

- Coordinating the end-to-end testing with TxDOT to ensure that there will be no conflicts between TxDOT, their affiliated contractors, and DB Contractor's staff;
- Providing temporary advance signing (if needed) stating that the facility is closed and testing is occurring;
- Providing maintenance of traffic / traffic control at all necessary locations for a maximum of five full days, which could include evenings and weekends and are not required to be consecutive;
- Providing access to the facility for authorized TxDOT staff and contractors; and
- Repairing any issues found with DB Contractor's work within one day unless otherwise approved by TxDOT.

DB Contractor shall not expect to have access to, nor conduct work within, the Project during the end-to-end testing, with the exception of providing the services as described above, or to meet other maintenance safety or emergency requirements of the Design-Build Contract (DBC). TxDOT may, at its sole discretion, provide DB Contractor access to the Project to conduct work outside the services described above.

DB Contractor shall compile and provide the results of the end-to-end testing to TxDOT as a submittal within 10 Days of completing the end-to-end testing.

25.3.5 **Record Documents**

The Record Documents shall include one combined submittal of the construction drawings with Global Positioning System (GPS) locates and a keyhole markup language (KMZ) file, documentation of end-to-end testing, as well as catalog sheets for all equipment and components.

For each component of the ITS, all computer codes and software shall be available to TxDOT.

25.3.6 **Salvaging Existing Items**

DB Contractor shall salvage any existing good and reusable ITS equipment removed during construction of the Project, deliver to the TxDOT Houston District headquarters, and stockpile as requested by TxDOT, all in an undamaged condition.

25.4 **Reserved**

25.5 **Submittals**

All Submittals described in this Item 25 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 25-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise required.

Table 25-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
All planned outages as a result of system maintenance or system crossovers	Prior to commencing construction activities	Approval	25.1
Tabulated list of meter locations and addresses	Minimum 30 days prior to Substantial Completion	For information	25.2
Temporary ITS plans	Prior to commencing construction activities	Approval	25.2.1
Termination charts	Prior to implementation	Approval	25.2.1
Type, quantity, and design of the conduit above and below ground, ground boxes, all communication cables, and electrical conductors to support the ITS network and operations	As part of the Final Design Submittal	Review and comment	25.2.2
CCTV camera pole locations	Prior to commencing Final Design	Approval	25.2.3.2
Proposed CCTV equipment test procedure	30 days prior to testing	Review and comment	25.2.3.5
Notification in advance of making connections to the existing TxDOT system	Minimum 30 days in advance	Approval	25.3.1
ITS Implementation Plan	As part of the Final Design Submittal	Approval	25.3.3
Certification that the ITS effectively meets the required functional requirements	Prior to Substantial Completion	For information	25.3.3
Notice of end-to-end testing	Prior to implementation	For information	25.3.4
Results of the end-to-end testing	10 days after testing is completed	For information	25.3.4
All computer codes and software for each component of the ITS	As part of the Record Documents (Prior to Final Acceptance)	For information	25.3.5

Item 26
Traffic Control

26.1 **General Requirements**

Design-Build (DB) Contractor shall design, construct, and maintain the Project, in conformance with the requirements stated in this Item 26, 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. All road users including bicyclists and pedestrians must be considered in the development of the Traffic Control Plans (TCPs). DB Contractor is responsible for gaining approval from TxDOT, the appropriate Governmental Entity and property owner for each intersecting street or driveway closure.

26.1.1 **Lead Maintenance of Traffic (MOT) Design Engineer**

DB Contractor shall employ a Lead MOT Design Engineer responsible for ensuring the TCPs are prepared in accordance with the Contract Documents. The Lead MOT Design Engineer shall be a Licensed Professional Engineer (PE) with relevant experience overseeing the development of TCPs during the design and construction phase of highway projects similar in size and scope as the Project. Lead MOT Design Engineer shall be responsible for signing and sealing the TCPs, details, and all revisions to the TCPs in accordance with the plan submittal requirements. Lead MOT Design Engineer shall be available through the duration of the Project and work with the Lead MOT Implementation Manager to coordinate with TxDOT, DB Contractor, and appropriate Governmental Entities.

26.1.2 **Lead MOT Implementation Manager**

DB Contractor shall employ a Lead MOT Implementation Manager responsible for:

- Ensuring the TCPs are adhered to during their implementation;
- Ensuring quality control of the TCPs is performed;
- Working closely with the Lead MOT Design Engineer to implement and manage Project TCPs; and
- Identifying and coordinating design changes to the TCPs.

The Lead MOT Implementation Manager shall be available through the duration of the Project and report jointly to TxDOT and the Construction Manager. The Lead MOT Implementation Manager shall have the authority to stop Work. Lead MOT Implementation Manager shall have relevant experience overseeing the implementation of TCP during the construction phase of highway projects similar in size and scope as the Project. Lead MOT Implementation Manager shall coordinate with TxDOT, DB Contractor, and appropriate Governmental Entities. Refer to Section 2 of Attachment 4-2 of the General Conditions for a detailed description of the responsibilities of the Lead MOT Implementation Manager.

26.2 **Design Requirements**

26.2.1 **Traffic Control Plans**

DB Contractor shall use the procedures in the Traffic Management Plan (TMP), to develop detailed TCPs that provide for all construction phasing, as well as all required switching procedures, in accordance with the *Texas Manual on Uniform Traffic Control Devices* (TMUTCD) (2025 Edition, as adopted), the TxDOT Engineering Standard Sheets, and the TxDOT Standard Specifications. The most recent version of TxDOT Engineering Standard Sheets provided on TxDOT's webpage prior to the Proposal Due Date shall apply to the Project, regardless of the letting dates to which they apply.

In the event of a conflict between TxDOT Engineering Standard Sheets and Houston District standards, DB Contractor shall ensure Houston District standards are met.

TCPs are required for the Work during the Term and for the duration of the Warranty Term. The TMP requirements are described in Section 4.2.10 of the General Conditions.

DB Contractor shall provide to TxDOT for approval a TCP concept presentation at or near preliminary design status but prior to TCP plan sheet development. DB Contractor shall utilize Microsoft PowerPoint and roll plots to convey this concept at a TCP concept presentation meeting. Approval of the concept does not indicate automatic approval of the subsequent plan sheets, nor does it authorize DB Contractor to implement the concept in the field.

DB Contractor shall produce a TCP for 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 required to implement the plans. TCPs shall be designed, signed, sealed, and dated by a PE.

26.2.1.1 **Traffic Control Plan Requirements and Restrictions**

Each TCP shall be submitted to TxDOT for review and good faith approval a minimum of 14 days prior to implementation. This requirement is increased to 21 days for Full Roadway Closures. The TCP shall include a completed Attachment 26-1 (Request for Approval of Traffic Control Pan) or TxDOT approved alternative along with details for allowable time and duration of Lane Closure, all detours, traffic control devices, striping, and signage applicable to each phase of construction. DB Contractor shall request approval for each Lane Closure before being implemented, regardless of whether or not the Lane Closure is shown in the TCP, as further described in Exhibit 15 to the Design-Build Agreement (DBA). Information included in the TCPs shall be of sufficient detail to allow verification of design criteria and safety requirements, including typical sections showing lane width, concrete traffic barrier and barrel placement, alignment, striping layout, drop off conditions, and temporary drainage.

The TCPs 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. DB Contractor should have no expectation that speed limit reductions will be granted and should design the Project in such a way as to allow for existing posted speed limits to remain in place during construction. DB Contractor shall use advisory speed plaques as appropriate.

DB Contractor shall utilize appropriate traffic control devices to ensure that opposing traffic on a divided roadway is separated in accordance with Good Industry Practice and TMUTCD (2025 Edition, as adopted) based on roadway design speed. Approved traffic control devices can be found in TxDOT *Compliant Work Zone Traffic Control Device List*. Traffic control that involves the physical separation of contiguous lanes of the same roadway component (i.e., general purpose or access road lanes) traveling in the same direction will not be allowed.

DB Contractor shall identify a designated route for trucks/hazardous cargo. DB Contractor shall use the registry from the Federal Motor Carriers Safety Administration under the National Hazardous Materials Route Registry. DB Contractor shall place required signage for the purpose of rerouting the traffic away from restricted roads.

DB Contractor shall maintain signing and striping continuity on all active roadways within or intersecting the Project at all times. DB Contractor shall maintain existing overhead signing within the Project throughout the Term. DB Contractor shall use temporary overhead signing structures when existing overhead signing structures cannot be maintained or the use of existing overhead signing structures would result in signs not being above the travel lanes. DB Contractor shall design and install signing compliant with TMUTCD (2025 Edition, as adopted), TxDOT *Freeway Signing Handbook*, and Item 24.

Throughout the Term, DB Contractor shall ensure that all streets and intersections remain open to traffic except as shown on the pre-approved TCPs by constructing the Work in phases. 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 Term.

DB Contractor shall coordinate with the respective landowners and tenants and also secure written permission prior to disrupting access to parking facilities, unless the written permission is previously provided by TxDOT.

DB Contractor shall prepare public information notices, in accordance with Item 11, in advance of the implementation of any Lane Closures, detours, or traffic switches. These notices shall be referred to as traffic advisories. DB Contractor shall also notify the traveling public by placing changeable message signs a minimum of seven days in advance of any roadway closure or major traffic modifications. Where available

and when possible, DB Contractor shall coordinate and utilize dynamic message signs (DMS) on the regional intelligent transportation system (ITS).

DB Contractor shall utilize law enforcement personnel to effect Lane Closures. DB Contractor shall meet the requirements for law enforcement personnel as described in Item 7, *Legal Relations and Responsibilities*, of the TxDOT Standard Specifications. DB Contractor is responsible for noting the requirement for law enforcement personnel in the TCPs when Lane Closure is applied. DB Contractor is responsible for coordinating, scheduling, and the costs associated with the use of law enforcement personnel.

26.2.1.2 **Design Parameters for Traffic Control Plans**

Design Vehicle. Turning movements on all local streets and driveways shall be designed to provide the same operational characteristics as their existing conditions or better.

Design Speed. On all roadways, interstate and U.S. highways, for all alignments, including the general purpose lanes, elevated lanes, frontage roads, and cross streets, the minimum design speed shall be 10 mph under the existing posted speed limit if utilizing the TxDOT Roadway Design Manual for horizontal and vertical alignments or the posted speed if utilizing National Cooperative Highway Research Program (NCHRP) Report 581 for horizontal and vertical alignments, except for major alignment transitions, where the design speed may match that of the existing alignment geometry. TCPs meeting this design speed standard do not require a change in the posted speed limit.

Lane Widths. During construction, the minimum lane width shall be (i) 12 feet, (ii) 11 feet when the existing condition is less than 12 feet, or (iii) 11 feet at cross street intersections and existing bridges, when approved by TxDOT. TxDOT may, in its sole discretion, allow 10-foot lanes in limited circumstances, for short distances, after reviewing DB Contractor's proposed TCP. When DB Contractor shifts lane alignments through intersections, DB Contractor shall use shifting tapers corresponding to the width of offset and the required design speed for the roadway.

Shoulders. DB Contractor shall provide shoulder widths in accordance with Table 19-1 to the greatest extent possible and where feasible. DB Contractor shall, at a minimum, provide the following shoulder widths in areas where the travel lane is adjacent to the temporary traffic barrier, portable traffic barrier or a permanent barrier system, and in curves if lanes are less than 12 feet width;

Mainlanes:

- Minimum 2 feet inside shoulder; and
- Minimum 4 feet outside shoulder.

Frontage roads and cross streets:

- Minimum 1 foot inside shoulder; and
- Minimum 2 feet outside shoulder.

DB Contractor may provide shoulder widths less than the minimum widths described above in the following areas:

- Where space is limited due to the adjacent temporary or permanent retaining walls, temporary shoring, or drainage structures;
- Where length of barrier is less than 2000 feet with minimum 250 feet before next barrier;
- On bridges when temporary widening would be required;
- On bridge class culverts when temporary widening or lengthening would be required; or
- If clearly shown in the Schematic Design and associated with approved Design Exceptions

Minimum Temporary Vertical Clearance. DB Contractor shall provide and maintain the existing vertical clearance along all roadways throughout the duration of construction. For new construction over existing roadways, DB Contractor shall maintain a minimum temporary vertical clearance of 15 feet – 6 inches, or as approved by TxDOT.

26.2.1.3 **Lane Closure Requirements**

DB Contractor shall inform the TxDOT public information office of any lane closures in accordance with Exhibit 15 of the DBA. Requirements regarding the following elements are set forth in Exhibit 15 to the DBA:

- General requirements for Lane Closures
- Non-Chargeable Lane Closures and Chargeable Lane Closures
- Allowable Lane and Roadway Closures
  - Mainlanes
  - Frontage Roads
  - Crossing Streets
- Holidays
- Special Events
- Liquidated Damages for Lane Closures and Lane Rental Charges
- Incidents and Emergencies

26.2.2 **Driveway Closures**

DB Contractor is responsible for coordinating with the affected property owner(s) on 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.

26.3 **Construction Requirements**

DB Contractor shall ensure implementation of the traffic control elements is in accordance with DB Contractor's TMP, the approved TCP, the manufacturer's directions or recommendations where applicable, and the applicable provisions of the TMUTCD (2025 Edition, as adopted).

DB Contractor shall ensure traffic control elements are inspected, maintained and replaced in accordance with the TMP and the Construction Quality Management Plan (CQMP).

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 26 and the TxDOT Standard Specifications.

For the duration of the Construction Work, temporary, new and existing ITS equipment, illumination, and traffic signals shall be functional, interconnected and interoperable per District and local governmental requirements and standards and specifications. DB Contractor shall develop and adjust temporary traffic signal timing per Item 24. DB Contractor shall observe signal operations for 48 hours and adjust temporary traffic signal timing plans as needed for optimal vehicular and pedestrian traffic flow.

DB Contractor shall provide and maintain temporary illumination throughout the duration of Construction Work for all roadways and intersections that have existing illumination. DB Contractor shall furnish and install safety illumination at all existing and new signalized intersections and at all mainlane merge points. DB Contractor may use portable, temporary, permanent, or existing illumination to provide safety illumination. The use of portable light units in accordance with TxDOT special specification 6412 (2014), *Portable Roadway Illumination,* is allowed. All temporary illumination shall meet or exceed existing illumination levels.

DB Contractor shall install permanent illumination during Construction Work as soon as practicable to enhance safety and benefit the traveling public but in no event later than Substantial Completion.

26.3.1 **Work Zone Safety**

DB Contractor shall incorporate specific additional safety measures, as described in this Section 26.3.1, into the Project.

A Safety Allowance has been established for this Project for the sole use of TxDOT in accordance with Exhibit 9 of the DBA. TxDOT may, in its sole discretion, request additional work zone enhancements beyond the additional safety measures required by this Section 26.3.1 to improve the effectiveness of any Traffic Control Plan.

26.3.1.1 **Portable Roadway Illumination Unit(s)**

In addition to the temporary illumination requirements in Section 26.3, DB Contractor shall furnish and install six additional portable roadway illumination unit(s) in accordance with TxDOT special specification 6412 (2014), *Portable Roadway Illumination*, during Construction Work. TxDOT will direct the DB Contractor on placement location of the unit(s) system. DB Contractor shall adjust and maintain the unit(s) system at the designated locations to accommodate traffic control and Construction Work. DB Contractor shall relocate the unit(s) system as necessary to accommodate the TCPs. TxDOT may request, without additional cost to TxDOT, DB Contractor to relocate each unit system during Construction Work up to three times per year. Any additional relocations requested by TxDOT, beyond those permitted by the previous sentence, shall be subject to payment through the Safety Allowance. DB Contractor shall place temporary illumination units such that luminaires are not directed at the traveling public.

26.3.1.2 **Reserved**

26.3.1.3 **Reserved**

26.3.1.4 **Reserved**

26.3.1.5 **Temporary Construction Equipment Alert System**

If warranted per this Section 26.3.1.5, DB Contractor shall furnish and install a temporary construction equipment alert system(s) in accordance with TxDOT special specification 6309 (2014), *Temporary Construction Alert System*. DB Contractor shall use the "Go/No Go decision Tree" found in the TxDOT Smart Work Zone Guidelines to determine if the temporary construction equipment alert system should be incorporated into Construction Work. System communication with the TMC is not required.

26.3.1.6 **Reserved**

26.3.2 **DB Contractor Responsibility**

If at any time TxDOT determines DB Contractor's traffic control operations do not meet the intent of the TMP or the specific TCP, DB Contractor shall immediately revise such operations to correct the deficient conditions or discontinue such operations until the deficient conditions are corrected. Prior to implementing any corrective work done on any such TCP deficiencies, DB Contractor shall obtain TxDOT approval.

DB Contractor shall provide TxDOT the names of the Lead MOT Implementation Manager and support personnel, including a backup coordinator in the event the primary coordinator is unavailable, and the phone number(s) where they can be reached 24 hours per day, seven days per week.

DB Contractor shall submit a weekly summary of all active Lane Closures and phases/stages of the Traffic Control Plan utilized each day denoting limits of each and usage during either day or night shift or both.

26.3.3 **Access**

DB Contractor shall maintain existing bicycle and pedestrian access and mobility. Access to existing transit stop locations shall be maintained during construction or reasonable alternative locations shall be coordinated with and approved by transit operators.

26.3.4 **Detours**

DB Contractor shall maintain all detours in a safe and traversable condition. DB Contractor shall provide a pavement transition, suitable for the posted speed and accounting for the vertical and horizontal geometry of the section at all detour interfaces.

DB Contractor shall use State routes for detour routes, wherever applicable. If State routes are unavailable, DB Contractor shall use local streets provided that DB Contractor has obtained the necessary permits from the Governmental Entity having jurisdiction. DB Contractor shall take necessary action to restore or rebuild all detour routes to as good as or better than pre-construction condition in accordance with the requirements of the Governmental Entity having jurisdiction.

DB Contractor shall provide detour signs to guide the traffic around the construction, detouring around specific construction sites, and traveling through the construction areas. This shall include the installation and maintenance of temporary detour signs and changeable message signs to divert traffic around the Project.

26.3.5 Changes to Roadway Height and Width Restrictions

DB Contractor shall report any changes in the height or width of roadway restrictions during the Term of the Design-Build Contract. The reporting shall be made via email to the TxDOT Project Manager (PM) using the TxDMV Permit Restriction form shown in Attachment 26-2 (Motor Carrier Division Permit Restriction Application). TxDOT's PM will review and submit to HOU.OSOW.Permits@txdot.gov who will submit to MCD_Permit-Restriction@txdot.gov email addresses. Any reduction of the height or width roadway restriction requires a minimum of 14 days advance notice while expansion or removal of the restriction must be reported no later than the next business day following the change.

Upon placement of the first beam over a roadway, DB Contractor shall notify the TxDOT PM, Area Office, District Bridge Section, and the local Governmental Entities of the field measured vertical clearance of newly set beams no later than the following business day.

The height and width measurements shall be reported in feet and inches, and the distances in miles to the nearest 0.25 mile or from the nearest intersection.

DB Contractor shall provide advance signing for vertical clearance reflecting a clearance height three inches less than field measured clearance along traveled roadway, or as dictated by the requirements of the current TxDOT policy.

26.3.6 Local Approvals

DB Contractor shall communicate all roadway and ramp closures and staging analyses with each Governmental Entity having jurisdiction for roads that may be affected by the Project. When roadway and ramp movements are diverted or detoured along existing roads, DB Contractor shall be responsible for any and all costs and schedule risk. This may include traffic operation analysis, temporary traffic control devices, and road user costs. DB Contractor is responsible for obtaining the necessary approvals from any Governmental Entity having jurisdiction over the routes used. At DB Contractor's request, TxDOT will reasonably assist DB Contractor in meetings with a Governmental Entity to coordinate closures or detours necessary along existing roads for completion of the Work.

26.3.7 Pavement Markings and Signing

DB Contractor shall remove existing pavement markings and/or signs that conflict with temporary or permanent pavement markings. These pavement markings and signs shall be removed by any method that does not materially damage the existing elements or facilities. Pavement marking removal by over-painting is prohibited. DB Contractor shall not use temporary tape at any time during the Term.

DB Contractor is responsible for temporary signing outside of the Project limits required for the Project.

DB Contractor shall utilize existing, temporary, or proposed overhead sign structures to mount temporary or proposed guide signs above freeway mainlanes where there are at least three mainlanes in a given direction, per TMUTCD (2025 Edition, as adopted) requirements. DB Contractor shall maintain existing overhead signing within the Project throughout the construction duration.

DB Contractor shall maintain safe traveling conditions of all roadways used outside the Project limits including routes to fabrication facilities, plants and haul roads.

26.3.8 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, DB Contractor shall restore the pavement to a structure acceptable to TxDOT or the Governmental Entity having jurisdiction over the affected area and restore it to a riding surface equal to or better than the existing surface.

26.3.9 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.

DB Contractor shall use rubber-tired equipment for moving dirt or other materials along or across paved surfaces. Excess dirt or debris shall be swept or removed from the job site with regular cleaning and sweeping at least twice a day.

In the event that 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. Damage caused by DB Contractor shall be repaired at the expense of DB Contractor.

DB Contractor shall only use haul routes utilizing any street of an adjacent Governmental Entity after coordinating with the appropriate Governmental Entity.

26.3.10 **Final Clean-Up**

DB Contractor shall clear and remove from the Project all surplus and discarded materials and debris of every kind and leave the entire Project in a clean, smooth, and neat condition after each construction process.

26.3.11 **Stockpiles**

DB Contractor shall place barricades and warning signs at stockpiles to adequately warn motorists of a hazard in accordance with TxDOT Engineering Standard Sheets and the TMUTCD (2025 Edition, as adopted). DB Contractor shall not locate any material stockpiles within the clear zone of any traveled lane, unless positive protection is provided.

26.4 **Submittals**

All Submittals described in this Item 26 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 26-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 26-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
TCP concept presentation (meeting)	Prior to TCP plan sheet development	Approval	26.2.1
Traffic Control Plans	At least 14 days prior to implementation, except for full closures which required TCPs be submitted 21 days prior to implementation	Good Faith Approval	26.2.1, 26.2.1.1
Names and phone numbers of the Lead MOT Implementation Manager and support personnel, including a backup coordinator	Prior to start of any construction activities	For information	26.3.1
Notice of any decrease to the height or width of the roadway restrictions	At least 14 days prior to the change	For Information	26.3.4
Notice of any increase to or removal of the height or width of the roadway restrictions	The next business day following the change	For Information	26.3.4
The vertical clearance of newly set beams	The next business day following placement	For Information	26.3.4
Summary of all active lane closures and phases/stages of the traffic control plan	Weekly	For Information	26.3.2

Item 27
Construction Maintenance

27.1 **General Requirements**

27.1.1 **General Maintenance Obligations**

Throughout the period between Notice to Proceed 2 (NTP2) and Final Acceptance, Design-Build (DB) Contractor shall be responsible for and shall carry out Maintenance Work within the Maintenance Limits. DB Contractor shall conduct all Maintenance Work necessary to meet the requirements for this Item 27 and the TxDOT Standard Specifications.

DB Contractor shall establish and maintain an organization that effectively manages all Maintenance Work in a manner set forth in the approved Maintenance Management Plan (MMP) and the requirements of the Contract Documents. DB Contractor shall:

- Coordinate activities of other entities with interests or activities within the Maintenance Limits;
- Conduct daily patrols of all lanes of the Project within the Maintenance Limits to identify conditions that are unsafe or have the potential to become unsafe, and conditions that could threaten the infrastructure, and to attend to existing or changing conditions;
- Minimize delay and inconvenience to Users and, to the extent DB Contractor is able to control, users of related transportation facilities;
- Develop, maintain and implement a Maintenance Management System (MMS) to record the category, status, intended action and repair for all Defects;
- Facilitate access to such system by TxDOT to allow the notification and categorization by TxDOT of Defects that TxDOT identifies in the course of its maintenance inspections;
- Mitigate hazards and permanently repair all Defects, including those identified by TxDOT, DB Contractor and third parties within the specified periods;
- Identify and correct all Defects and damages from Incidents;
- Monitor and observe weather and weather forecasts to proactively deploy resources to minimize delays and safety hazards due to high winds, severe thunderstorms, tornadoes, heavy rainfall and flooding, hail, snow, ice, or other severe weather events;
- Remove debris, including litter, graffiti, animals, and abandoned vehicles or equipment from the Project Right of Way (ROW);
- Minimize the risk of damage, disturbance, or destruction of the ITS fiber duct bank through the adjacent Segment B-1 design-bid-build project to the existing hub building at I-45S;
- Minimize the risk of damage, disturbance, or destruction of third-party property during the performance of Maintenance Work;
- Report to TxDOT the status of its Maintenance Work including Nonconforming Work;
- 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;
- Perform Maintenance Work, including inspections, Incident response, traffic control, and routine maintenance in accordance with the MMP and the Contract Documents; and
- Promptly investigate reports or complaints received from all sources.

27.1.2 **Scope of Maintenance Work and Interfaces with TxDOT and Third Parties**

The Maintenance Work shall apply to all Elements as identified in Attachment 27-1 (Performance and Measurement Table During Construction). TxDOT will retain maintenance responsibilities for Elements within the Maintenance Limits (the “existing Elements”) until NTP2.

TxDOT's maintenance responsibilities from the Proposal Due Date until NTP2 will be limited to routine maintenance of each existing Element and will not include preventive maintenance or major maintenance as such items are defined in TxDOT *Maintenance Management Manual*.

DB Contractor shall coordinate with TxDOT to achieve a smooth transition of maintenance activities from TxDOT in the period between Notice to Proceed 1 (NTP1) and NTP2. Starting at NTP2, DB Contractor shall perform all necessary Maintenance Work within the Maintenance Limits to comply with the Performance Requirements.

DB Contractor shall coordinate Maintenance Work with TxDOT and other Governmental Entities having adjacent maintenance responsibilities to minimize disruption to Users. DB Contractor shall coordinate with TxDOT to ensure a smooth transition of the maintenance responsibilities to relevant parties after Final Acceptance.

27.1.3 Maintenance Limits

DB Contractor shall prepare and submit Maintenance Limits drawings consistent with DB Contractor's then-current design as part of the MMP. The Maintenance Limits drawings shall be consistent with the principles and extents shown in Attachment 27-3 (Maintenance Limits). DB Contractor shall periodically validate that the Maintenance Limits are correctly and clearly identified by physical delineation and shall liaise with TxDOT and Governmental Entities as necessary to review the Maintenance Limits, identify any jurisdictional gaps or inefficiencies and recommend solutions to TxDOT. Within the Maintenance Limits, DB Contractor shall allow adjacent landowners to cross under bridges at breaks in control of access.

27.2 Maintenance Management

27.2.1 Maintenance Management Plan

DB Contractor shall prepare and submit the MMP in accordance with Section 4.2.11 of the General Conditions, update the MMP as required, and shall submit it to TxDOT for approval in TxDOT's good faith discretion. The requirements for the MMP are set forth in Attachment 27-4 (MMP Template).

27.2.2 Reserved

27.2.3 Design and Construction (D&C) Maintenance Manager

DB Contractor shall make a D&C Maintenance Manager available on an as-needed basis who shall be responsible for:

- Implementing the maintenance obligations in this Item 27 and the MMP;
- Causing the Maintenance Work to be performed in accordance with the Contract Documents;
- Causing all maintenance personnel and resources performing Maintenance Work to be available and properly trained;
- The health and safety of personnel delivering the Maintenance Services and the general public affected by the Project; and
- Coordinating with TxDOT and other entities during Incidents and Emergencies.

The D&C Maintenance Manager shall meet or exceed the following qualifications and experience:

- Must have a minimum of three years of experience performing maintenance on projects; and
- Must have a minimum of two years of managerial experience in maintenance on any road project of similar size, scope and complexity.

The D&C Maintenance Manager shall have an active role in the review of Design Work to ensure that maintenance activities can be safely and efficiently performed for the Project and that necessary life cycle activities have been taken into consideration. The D&C Maintenance Manager shall be available whenever Maintenance Work is performed.

27.3 Performance Requirements

27.3.1 Performance Sections

As part of the MMP, DB Contractor shall prepare drawings identifying the Performance Sections and shall submit and update these drawings with the applicable part of the MMP. The drawings shall identify the

boundaries of each Performance Section and shall cross reference to an inventory describing each Element of the Project contained within each Performance Section. Where Performance Sections need to be revised to take into consideration the progression from an existing facility to the then-current design, DB Contractor shall phase in the new Performance Sections in a logical manner so that new Performance Sections are in place as the Work progresses.

DB Contractor shall use the applicable TxDOT reference markers system to establish Performance Sections.

27.3.2 **Performance and Measurement Table During Construction**

DB Contractor's performance of the Maintenance Work shall be governed by the Performance and Measurement Table During Construction as may be updated in accordance with Section 27.3.3. The Performance and Measurement Table During Construction shows for each Element:

- Performance Objectives that each Element is required to meet or exceed;
- The Defect Repair Periods for each Defect;
- Inspection and Measurement Methods that DB Contractor shall use to determine compliance; and
- Measurement Records that DB Contractor shall establish and maintain based upon inspections and measurements.

DB Contractor shall record a separate Defect upon failure to achieve any of the requirements set forth in the Performance Objective or Measurement Record columns of the Performance and Measurement Table During Construction. DB Contractor shall address each Defect within the specified Defect Repair Period as further described in this Item 27.

The Defect Repair Period set forth in the Performance and Measurement Table During Construction shall commence upon the earlier of: (i) the date and time DB Contractor became aware of the Defect; or (ii) the date and time DB Contractor should have known of the Defect.

27.3.2.1 **Baseline Inspections**

DB Contractor shall perform the inspections and/or tests to determine the condition of each Element (the "Baseline Inspections") and the preparation of the Baseline Element Condition Report (BECR). DB Contractor shall perform the inspections and/or tests in accordance with Attachment 27-2 (Baseline Inspection Requirements).

DB Contractor shall submit to TxDOT for approval the proposed scope of Baseline Inspections, the methodology proposed for the inspections and/or tests.

Upon TxDOT approval of the scope of the Baseline Inspections, DB Contractor shall provide to TxDOT a minimum of 14 Days' notice to witness the inspections and/or tests.

27.3.2.2 **Baseline Element Condition Report**

DB Contractor shall prepare the BECR and shall submit to TxDOT for approval as part of the MMP no later than 30 days prior to NTP2. No modifications shall be made to the BECR after approval thereof from TxDOT. The BECR shall comply with the following requirements:

- The BECR shall include a 1080p at a minimum video recording of each traffic lane, shoulder, parkway, and border width for its full length within the Project limits, at a resolution and speed sufficient for TxDOT to discern the condition of the Project.
- The BECR shall include a record of the condition of each Element shown in Attachment 27-2 (Baseline Inspection Requirements).
- Each photographic record and /or measurement shall be associated with a location accurate to the nearest 10 feet.
- The condition of each Element shall be recorded such that there is a minimum of one record for each Performance Section within which the Element is represented.
- Where the condition of an Element varies within a Performance Section, the BECR shall include sufficient records to demonstrate the range of conditions and a reference condition for the Element shall be recorded for each Performance Section.

DB Contractor shall cause the BECR to include the results of the most recent Specialist Inspections undertaken by TxDOT, including the results of the annual survey of pavement condition for the entire Project, including mainlanes, ramps, frontage roads, cross streets and direct connectors as applicable undertaken using automated condition survey equipment.

27.3.2.3 **Use of BECR to Establish Performance and Measurement Table During Construction Requirements**

The results of the BECR shall be used to establish the Performance Objective and Measurement Record for each Element in Attachment 27-1 (Performance and Measurement Table During Construction). The use of the BECR to establish these requirements is demonstrated in the following example: Referring to Element Ref. 1.2: "edge drop-off," the Performance Objective is that: "all roadways shall be free from edge drop-offs exceeding the measurement record thresholds." Measurement Record 1.2.1 requires: "no edge drop-off greater than the reference condition (on a location-specific basis) in the BECR." If, within a given Performance Section, the maximum edge drop-off recorded in the BECR is 2.5 inches and an edge drop-off of 3 inches is measured within the same Performance Section after NTP2, the requirement of the Measurement Record would not be achieved, resulting in a Defect. If the Defect is a Category 1 Defect, this would trigger a 24-hour hazard mitigation period and a 28-day permanent repair period.

27.3.2.4 **Defects between Baseline Inspections and NTP2**

No later than 14 days after NTP2, DB Contractor shall submit details (if any) of instances of damage or deterioration that, in the opinion of DB Contractor, occurred between the completion of the Baseline Inspections and NTP2. DB Contractor shall identify the Maintenance Work required to cause each such Element to be in compliance with the applicable Performance Objective and Measurement Record, including an estimate of the cost of performing such Maintenance Work. TxDOT may implement one or more of the following: (a) cause Elements to be in compliance with the requirements using its own forces; (b) instruct DB Contractor to perform Maintenance Work that would enable Elements to be in compliance with applicable requirements by means of a Change Order; or (c) agree to a revision to certain Performance Objectives or Measurement Records in Attachment 27-1 (Performance and Measurement Table During Construction).

27.3.3 **Updates of Performance and Measurement Table During Construction**

DB Contractor may propose changes to the Performance and Measurement Table During Construction for TxDOT approval. DB Contractor shall propose for TxDOT approval such amendments to the Inspection and Measurement Method and Measurement Record as necessary to cause these to comply with Good Industry Practice and this Item 27. TxDOT may, at any time, require DB Contractor to adopt amendments to the Inspection and Measurement Method and Measurement Record where such updates are required to comply with Good Industry Practice and this Item 27. In this case, the new Inspection and Measurement Method or Measurement Record shall be determined using the principle that it shall achieve no less than the standard of maintenance that would have been achieved through DB Contractor's compliance with the original Inspection and Measurement Method and Measurement Record.

DB Contractor shall annually perform a video recording of each traffic lane within the Project. The video shall be at the same resolution, and speed, and of the same Elements as described in Section 27.3.2.2.

27.4 **Defect Identification, Recording and Categorization**

27.4.1 **Definitions**

For Defects shown on the Performance and Measurement Table During Construction:

- Hazard mitigation is an action taken by DB Contractor with respect to a Category 1 Defect to mitigate a hazard to Users or imminent risk of damage or deterioration to property or the environment such that the Category 1 Defect no longer exists;
- Permanent repair is an action taken by DB Contractor with respect to any Defect to restore the condition of an Element to a condition such that no Defect exists.

27.4.2 **Sources of Defects and Status**

DB Contractor shall identify and record Defects through inspections described in Section 27.4 and reports or complaints by third parties. DB Contractor shall accurately record the status of Defects from all sources in the MMS in accordance with Section 27.6. Where multiple instances of Defects exist in an Element (for example simultaneous failure to repair damaged guardrail in multiple locations), a separate Defect shall be recorded

for each instance where the Performance Objective or Measurement Record requirements for the applicable Element are not achieved.

Where Defects are identified in the field during the course of any inspection that DB Contractor is required to attend, DB Contractor shall upload information related to such Defects to a storage system accessible by TxDOT. Information shall include description, date-time of identification and categorization. Any such upload of Defect information with Category 1 Defect status shall trigger immediate automatic e-mail notification of TxDOT and the D&C Maintenance Manager.

27.4.3 **Defects Categorization**

DB Contractor shall categorize each Defect, based upon its determination as to whether:

- It represents an immediate or imminent health or safety hazard to Users or road workers;
- There is a risk of immediate or imminent structural failure or deterioration;
- There is an immediate or imminent risk of damage to a third party's property; or
- There is an immediate or imminent risk of damage to the environment.

Should a Defect meet any of the above criteria, DB Contractor shall record it as a Category 1 Defect. DB Contractor shall provide training to all relevant personnel on the categorization of Defects. DB Contractor shall maintain a record of the circumstances of the Defect and how it was categorized. DB Contractor shall facilitate the review by TxDOT of Maintenance Records in the MMS associated with DB Contractor-categorized Defects and shall enable TxDOT to flag any Defect where TxDOT disagrees with any attribute or categorization assigned by DB Contractor.

27.4.4 **Permanent Repair of Defects**

Where action is proposed to repair any Defect, DB Contractor shall promptly create a Maintenance Record that identifies the nature of the proposed repair.

DB Contractor shall take necessary action to avoid any recorded Defect that is not currently a Category 1 Defect from becoming a Category 1 Defect. DB Contractor shall monitor all Defects to verify the condition of the affected Element prior to permanent repair and shall inform TxDOT immediately should any such Defect deteriorate to a Category 1 Defect.

For all Defects not recorded as Category 1 Defects, DB Contractor shall complete the permanent repair within the Defect Repair Period unless an earlier repair is required to prevent deterioration to a Category 1 Defect.

27.4.5 **Hazard Mitigation of Category 1 Defects**

DB Contractor shall immediately implement hazard mitigation of any Category 1 Defect in an Element of which it is aware through its own inspections, from a third party or through notification by TxDOT to DB Contractor (through the MMS or by other means) that TxDOT requires DB Contractor to perform hazard mitigation for a Category 1 Defect.

For Category 1 Defects, DB Contractor shall take necessary action such that any hazard to Users is mitigated within the Defect Repair Periods specified in the Performance and Measurement Table During Construction. DB Contractor shall continue hazard mitigation and/or temporary repair until a permanent repair has been completed.

27.5 **Inspections**

27.5.1 **General Inspections by DB Contractor**

DB Contractor shall establish inspection procedures and frequency as well as a plan to implement a program of inspections necessary for the Maintenance Work. Inspection procedures shall ensure:

- The Project is safe for Users;
- Category 1 Defects are identified and repaired such that the hazard to Users is mitigated within the applicable Defect Repair Period; and
- All Defects are identified and permanently repaired within the applicable Defect Repair Period.

In performing inspections to identify Defects, DB Contractor shall, for any Element, conform at a minimum to the inspection standards set forth for that Element in the column entitled "Inspection and Measurement Method" in Attachment 27-1 (Performance and Measurement Table During Construction).

DB Contractor shall perform general inspections in accordance with the MMP so that the repairs of all Defects are included in planned programs of work.

DB Contractor shall record details of the manner of inspection (e.g., center Lane Closure or shoulder), the weather conditions, and any other unusual features of the inspection on inspection records in respect of general inspections.

DB Contractor shall submit to TxDOT Non-conformance Reports within seven Days of issuance and shall notify TxDOT of Nonconforming Work within two Days of discovering the Nonconforming Work. TxDOT will issue a Non-conformance Report if TxDOT discovers any Nonconforming Work. DB Contractor's responsibility to correct Nonconforming Work is set forth in the Contract Documents.

27.5.2 **Inspections by TxDOT**

TxDOT may undertake specialist inspections as follows during the Term and if such inspections are performed will make the results available to DB Contractor:

- Annual survey of pavement condition for the entire Project, including mainlanes, ramps, and frontage roads, undertaken using automated condition survey equipment to measure all necessary criteria including: ruts, skid resistance and ride quality according to the "Inspection and Measurement Method" set forth in the Performance and Measurement Table During Construction.
- Routine inspections, to the extent required, for all structures within the Maintenance Limits in compliance with the latest FHWA/National Bridge Inspection Standards (NBIS) and TxDOT requirements.

Upon receipt of TxDOT specialist inspections, DB Contractor shall use the results of specialist inspections to prioritize Maintenance Work and immediately identify all Defects within each Performance Section established by the inspections and enter these Defects in the MMS with the appropriate Defect Repair Period.

27.6 **Maintenance Management System (MMS)**

DB Contractor shall implement an MMS to store all the following Maintenance Records:

- Description, location, date-time of identification and categorization of Defects;
- Planned actions and date-time for permanent repair of all Defects;
- Details including date-time of actual repairs performed;
- Complaints and reports received from TxDOT and third parties; and
- Accidents and incidents relating to the Maintenance Work.

Maintenance Records shall be located by Performance Section. When an Element is constructed, installed, maintained, inspected, modified, replaced or removed, DB Contractor shall create and store a Maintenance Record no later than three days after completion of such work. All Defects shall be recorded in the MMS after coming to the attention of DB Contractor. All other recording requirements shall be recorded on the MMS within 15 days of completion or occurrence of the relevant activity.

DB Contractor shall provide TxDOT real-time, remote access to the Maintenance Records for the duration of the Term.

27.7 **Maintenance Obligations**

A Safety Allowance has been established for this Project for the sole use of TxDOT in accordance with Exhibit 9 of the DBA. TxDOT may, in its sole discretion, direct DB Contractor to implement additional or modified work zone enhancements beyond the requirements of this Section 27.7 to improve the effectiveness of DB Contractor's maintenance obligations. Such additional or modified enhancements may include supplemental devices, upgrades, adjustments to existing measures, or new measures not expressly identified herein.

27.7.1 **Incident and Emergency Management**

As part of the MMP for Maintenance Work, DB Contractor shall prepare and implement an Incident and Emergency Management Plan (IEMP). Refer to Attachment 27-4 (MMP template) for the required contents of the IEMP.

Where an incident meets one or more of the criteria set forth in FHWA Order 5181.1C, DB Contractor shall report incident details to TxDOT in accordance with the requirements of FHWA Order 5181.1C and follow emergency communication protocol set forth by TxDOT (may vary by district).

Where an Incident or Emergency has an effect on the operation of the Project, DB Contractor shall clear obstructions and repair damage to the Project under the supervision of the relevant Emergency Services if necessary, such that the Project is returned to normal operating standards and safe conditions as quickly as possible in accordance with the requirements of Section 4.2.3 of the General Conditions.

Where liquid or soluble material spills are involved, DB Contractor shall take all necessary measures to minimize pollution of watercourses or groundwater. Where structural damage to structures is suspected, DB Contractor shall ensure that a suitably qualified bridge engineer or specialist inspector is available to evaluate the structure and to advise on temporary repairs and shoring needed to provide safe clearance of the Incident or Emergency. Where such an Incident or Emergency involves a personal injury, DB Contractor shall not remove any vehicle or other item that may assist a potential investigation by Emergency Services until authorized to do so by such agency or agencies.

27.7.2 **Weather-related Events**

DB Contractor shall report to TxDOT information on weather-related events which may cause unsafe driving conditions such as ice, sleet, snow, floods or high winds. DB Contractor shall use available resources to maintain the roadway in as safe a condition as possible during weather-related events. DB Contractor shall be responsible to remove debris and water from the roadway resulting from weather-related events in accordance with Attachment 27-1 (Performance and Measurement Table). DB Contractor shall set up and maintain traffic control to shut down any Project roadways that are flooded in accordance with Attachment 27-1 (Performance and Measurement Table).

27.7.2.1 **Snow and Ice Control**

DB Contractor shall maintain the travel way free of snow and ice in compliance with the Performance Requirements and shall implement the requirements of the Snow and Ice Control Plan (SICP). Requirements for the SICP are contained in Attachment 27-4 (MMP template). The presence or forecast of snow or ice shall be assessed as a Category 1 Defect (Hazard Mitigation) and shall be addressed immediately by DB Contractor upon detection or upon being informed of the condition(s).

27.7.3 **Severe Weather Evacuation**

DB Contractor shall prepare and train its staff for evacuation and shall assist TxDOT in the event that an evacuation is implemented, in accordance with the Severe Weather Evacuation Plan (SWEP). Requirements for the SWEP are contained in Attachment 27-4 (MMP template).

27.7.4 **Safety**

DB Contractor shall establish and implement safety and health procedures for Maintenance Work in compliance with Section 4.2.3 of the General Conditions and in accordance with the Maintenance Safety Plan. Refer to Attachment 27-4 (MMP template) for the required contents of the Maintenance Safety Plan.

27.7.5 **Communication**

DB Contractor shall establish and implement communication procedures for Maintenance Work in compliance with Sections 4.2.5 of the General Conditions, Item 11 and Item 26.

27.7.6 **Hazardous Materials Management**

DB Contractor shall establish and implement Hazardous Materials Management procedures for Maintenance Work in compliance with Section 4.2.4.4 of the General Conditions and in accordance with the Hazardous Materials Management Plan (HMMP). Refer to Attachment 27-4 (MMP template) for the required contents of the HMMP.

27.7.7 **Environmental Compliance and Mitigation**

DB Contractor shall establish and implement environmental compliance and mitigation procedures for Maintenance Work in compliance with Section 4.2.4.2 of the General Conditions and Item 12 and shall follow the requirements described in Attachment 27-4 (MMP template).

27.7.8 **Traffic Management**

DB Contractor shall establish and implement traffic management procedures for Maintenance Work in compliance with Item 26 and shall follow the requirements described in Attachment 27-4 (MMP template).

27.7.9 **Existing Pump Station**

DB Contractor shall maintain the existing pump station along existing SH 35 and BNSF railroad until it is decommissioned by DB Contractor in accordance with the Project Schedule. DB Contractor shall establish inspection and start up procedures for the pump station within the MMP. DB Contractor shall use the Pump Station Inspection Checklist, Pump Station Electrical Controls Functional Tests and the Weekly Checklist documents provided in the RIDs to develop these procedures. DB Contractor shall undertake a weekly inspection of the pump station as well as an inspection of the pump station immediately prior to and following a local rainstorm.

27.7.9.1 **Decommissioning of Existing Pump Station**

DB Contractor shall be responsible for decommissioning the existing pump station along existing SH 35 and BNSF railroad. Decommissioning of the existing pump station includes the complete removal and disposal of all elements (concrete, mechanical, electrical, metal or otherwise) that make up the control room and generator building including, but not limited to, the slab, wet well, outfall chamber, metal walkways, railings, trash baskets, concrete pad within the fenced area, concrete steps leading to outfall channel, fencing, bollards, driveway, electrical services, and natural gas services. Any remaining reinforced concrete pipe from the incoming drainage system shall be removed or properly backfilled with flow fill. Wet well and outfall chamber concrete top, walls and floors, as applicable, shall be removed to a minimum of two feet below finished grade before re-seeding or placement of new riprap for the future detention pond outfall location.

27.8 **Maintenance Records**

For all Maintenance Records, DB Contractor shall follow the document storage and retrieval requirements set forth in Section 4.2.1.2 of the General Conditions. DB Contractor's electronic content management system (ECMS) shall be compatible with TxDOT's ECMS.

DB Contractor shall cause all Maintenance Records and Project-related documents to be stored in a manner that allows retrieval of such data and records by reference to the applicable TxDOT reference marker system and Performance Section.

Maintenance Records shall be kept and shall be provided to TxDOT in accordance with Section 5.13.4 of the General Conditions. All records obtained during the Warranty Term shall be kept and provided to TxDOT at the end of the Warranty Term.

27.9 **Submittals**

All Submittals described in this Item 27 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 27-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise required.

Table 27-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Maintenance Limits Drawings	After NTP1	Review and comment	27.1.3
Maintenance Management Plan (MMP)	After NTP1	Approval	27.2.1
MMP Updates	As required	Approval	27.2.1
Performance Section Drawings	After NTP1	Review and comment	27.3.1

Table 27-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Proposal scope and methodology of Baseline Inspections	Prior to the Baseline Inspections	Approval	27.3.2.1
Notice of Baseline Inspections and/or tests	14 days prior to the Baseline Inspections	For information	27.3.2.1
BECR	30 days prior to NTP2	Approval	27.3.2.2
Details of the Maintenance Work to cause each Element to be in compliance with applicable requirements	No later than 14 days after NTP2	Review and comment	27.3.2.4
Updates to Performance and Measurement Table During Construction	As required	Approval	27.3.3
Notification of Nonconforming Work	Within two days of discovering the Nonconforming Work	For information	27.5.1
Nonconformance Report	Within seven days of notification issuance	Review and comment	27.5.1
Information on weather-related events	As required	For information	27.7.2

Item 28
Bicycle and Pedestrian Facilities

28.1 **General Requirements**

This Item 28 includes requirements with which Design-Build (DB) Contractor shall design and construct all bicycle and pedestrian facilities for the Project. DB Contractor shall coordinate the Elements of this Project with the existing and approved trails and other facilities of Governmental Entities for pedestrians and cyclists including Brazoria County and their active transportation plan.

28.2 **Design Requirements**

DB Contractor shall design and construct all bicycle and pedestrian facilities consistent with TxDOT policies and guidelines, the TxDOT *Roadway Design Manual*, the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities*, the AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, the Federal Highway Administration (FWHA) *Bikeway Selection Guide,* FHWA's *Separated Bike Lane Planning* and *Design Guide* and the FHWA *Bicycle and Pedestrian Planning, Program and Project Development guidance.*

Any variation from the location and limits of the bicycle and pedestrian facilities shown on the Schematic Design will be subject to the approval of both TxDOT and any Governmental Entities with jurisdiction. Any deviation from the minimum design criteria for a bicycle or pedestrian facility will require a Design Exception, Design Waiver, or Design Variance as specified in the TxDOT *Roadway Design Manual*.

DB Contractor shall maintain connectivity or provide approved detour routes for bicycle and pedestrian movements during construction and throughout the Term. All proposed bicycle and pedestrian detours, temporary routes or temporary facilities to maintain connectivity of existing bicycle and pedestrian facilities or routes shall be submitted to TxDOT for approval as part of the TCP concept presentation prepared in accordance with Section 26.2.1. DB Contractor shall ensure that all bicycle and pedestrian proposed detours, temporary routes or temporary facilities are intuitive, Americans with Disabilities Act (ADA)-compliant, feasible and reasonable, and have equal or better accessibility than any existing bicycle and pedestrian facilities.

Final Design of each detour or temporary facility for bicycle and pedestrian connectivity shall be submitted to TxDOT for approval a minimum of 21 days prior to implementation and DB Contractor shall not implement any detour or temporary facility until TxDOT approval is obtained. The Submittal shall include details for time of detour or temporary facility operation, all detours, striping, and signage applicable to each phase of construction. The Submittal shall include sufficient detail to allow verification of design criteria and safety requirements, including typical sections, facility widths, barrier or fencing, wayfinding devices, alignment, striping layout, drop off conditions, and temporary drainage.

DB Contractor shall refer to Item 24 for additional information regarding requirements for signals, pavement markings, and lighting related to pedestrian and bicycle facilities.

28.2.1 **Bicycle Facilities**

DB Contractor shall design bicycle facilities to be consistent with TxDOT's and Governmental Entities' requirements for bicycle facilities, including existing and future bicycle and pedestrian plans, and accommodate existing bicycle paths and crossings, and on-street bicycle facilities. DB Contractor shall coordinate with Governmental Entities and TxDOT to ensure the bicycle facility design results in consistency between existing, planned, and proposed bicycle facilities.

DB Contractor shall design and construct new concrete shared use paths as shown in the Schematic Design. Shared use paths shall be a minimum of 10 feet wide, and the concrete section shall be a minimum of 6 inches thick.

As part of the re-alignment and reconstruction of South Johnson Street shown on the Schematic Design, the pre-existing South Johnson Street pavement from approximate STA 6084+00 left to STA 6089+00 left, shall be converted into a bicycle facility with restricted vehicle access. Restricted access bollards shall be added to

either end of the re-purposed pavement and the bridge guardrail shall be replaced to comply with the requirements of this Item 28.

Facilities shall incorporate the following elements, where applicable, relating to bicycle facilities into the Design:

- Alignment, profile, cross-section, and materials;
- Points of connection to existing and proposed bicycle facilities;
- Bicycle movements through intersections and conflict points and intersection treatment details;
- Signing, signalization, and pavement markings;
- Separation between bicycle facilities and the nearest travel lane;
- Methods of illumination indicating light fixture locations and types;
- Methods of separation, including buffer, barrier and/or fence type and height; and
- Requirements of the Aesthetics and Landscape Plans.

28.2.2 **Pedestrian Facilities**

Sidewalks and pedestrian facilities shall comply with the Americans with Disabilities Act (ADA), Standards (2010) adopted by the U.S. Department of Justice (DOJ), the ADA Standards (2006) adopted by the U.S. Department of Transportation (DOT), the Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) and Texas Department of Licensing and Regulation (TDLR) Texas Accessibility Standards (TAS). DB Contractor shall coordinate with Governmental Entities and TxDOT to ensure consistency with existing, planned, and proposed pedestrian facilities.

DB Contractor shall design and construct new concrete sidewalks as shown in the Schematic Design. DB Contractor shall remove, replace, or modify existing concrete sidewalks, within the Project limits, including the locations shown on the Schematic Design and where any existing sidewalk within the Project ROW is not in compliance with ADA, PROWAG, and TDLR requirements. The Work shall also include any necessary modifications to existing driveways along the frontage roads for the sidewalks to comply with ADA, PROWAG, and TDLR.

DB Contractor shall remove existing crosswalk striping at the following locations:

- Westside of Brookport Drive at FM 646
- Northside of FM 1462 at SH 99

DB Contractor shall install pedestrian signals and curb ramps at new (or full replacement) signalized intersections and intersections requiring modification within Project limits as identified in Section 24.3.7.2. In areas along the frontage road or cross streets where only mill and overlay is required, DB Contractor shall remove and replace any pedestrian signals and curb ramps not in compliance with ADA, PROWAG, and TDLR.

DB Contractor shall use enhanced visibility measures at intersections, including FHWA *Proven Safety Countermeasures*. DB Contractor shall provide a box crosswalk wherever feasible (except at diamonds or T intersections) and shall provide channelized right turn median islands for pedestrian refuge. DB Contractor shall not utilize yield triangles for pedestrian crossings except for pedestrian hybrid beacon (PHB) or rectangular rapid flashing beacons (RRFBs) crossings.

DB Contractor's facilities shall meet the requirements of the AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, and shall include the following elements, where applicable, relating to pedestrian facilities:

- Alignment, profile, cross-section, and materials;
- Points of connection to existing and proposed pedestrian facilities;
- Crosswalk and curb ramp locations and details;
- Signing, signalization, and pavement markings;
- Separation between pedestrian facilities and the nearest travel lane;
- Methods of illumination indicating light fixture locations and types;

- Methods of separation, including buffer, barrier or fence type and height; and
- Requirements of the Aesthetics and Landscape Plan.

In addition, all facilities shall be designed and constructed in accordance with TxDOT Houston District standards. TxDOT Houston District standards can be found at https://www.dot.state.tx.us/hou/specinfo/specs.htm.

The five-foot usual sidewalk width may be reduced only in areas where ROW is insufficient or where a five-foot sidewalk would require widening of an existing structure not otherwise impacted by the Work, as long as PROWAG requirements are met.

DB Contractor is responsible for obtaining TDLR reviews, approvals, and any required variance applications of pedestrian facility design and construction.

28.3 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 28 and the TxDOT Standard Specifications.

In areas of conflict between pedestrian facilities and construction, DB Contractor shall provide for the installation, maintenance, and removal of temporary sidewalk along alternate routes during construction. The temporary sidewalk along the alternate route shall be ADA compliant with a minimum width of 60 inches and have 60-inch x 60-inch passing zones every 200 feet. Temporary sidewalks shall be constructed with 3-inch thick Type B concrete (unreinforced, any class) or Type D hot mix. All material testing requirements are waived for temporary sidewalk construction. A detectable barrier along the edge of the sidewalk is required if a drop-off condition exists adjacent to the path. DB Contractor shall provide a box crosswalk wherever feasible (except at diamonds or T intersections) and shall provide channelized right turn median islands for pedestrian refuge. DB Contractor shall not utilize yield triangles for pedestrian crossings (except for PHB or RRFB crossings).

If there is evidence of pedestrian traffic, such as unpaved pedestrian paths (also known as “worn paths”), that are shown to become fully paved sidewalks in the Schematic Design and conflict between pedestrian facilities and construction, DB Contractor shall provide for the installation, maintenance, and removal of temporary sidewalk along alternate routes during construction in accordance with this Section 28.3.

28.4 **Submittals**

All submittals described in this Item 28 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 28-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 28-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Proposed bicycle and pedestrian detours, temporary routes or temporary facilities to maintain connectivity	As part of the applicable TCP concept submitted under Section 26.2.1	Approval	28.2
Final Design of each detour or temporary facility for bicycle and pedestrian connectivity	21-days prior to implementation	Approval	28.2

Item 29
Tolling

29.1 **General Requirements**

TxDOT will enter into a separate contract with a tolling Systems Integrator to provide and install the Electronic Toll Collection System (ETCS) and ETCS Elements for the Project. Design-Build (DB) Contractor shall support the installation of the ETCS by the Systems Integrator as described herein.

A listing of DB Contractor and Systems Integrator responsibilities is provided in Attachment 29-1 (Toll Facility Responsibility Matrix).

DB Contractor shall design and construct all Toll Zone Work for the Phase 1 Toll Zones and Phase 2 Toll Zones in accordance with requirements set forth in the Contract Documents, applicable Items 10 through 28, this Item 29, TxDOT Standards, TxDOT Engineering Standard Sheets, TxDOT Standard Specifications, and applicable TxDOT special specifications adopted by TxDOT for statewide use, including TxDOT special specification 6007 (2014), *ITS Fiber Optic Cable*.

29.1.1 **DB Contractor's Coordination Responsibilities**

DB Contractor shall perform all Toll Zone Work for the Phase 1 Toll Zones and Phase 2 Toll Zones and coordinate all design and construction activities to enable the Systems Integrator to install, test and implement the permanent ETCS and ETCS Elements, by providing the Systems Integrator Unobstructed Access to the Project upon Phase 1 Toll Zone Completion for the Phase 1 Toll Zones and upon Phase 2 Toll Zone Completion for the Phase 2 Toll Zones while the Systems Integrator is performing installation and testing activities.

DB Contractor shall meet bi-weekly (or as directed by TxDOT) to coordinate the design and construction with TxDOT and Systems Integrator to ensure the Project Schedule incorporates the time required to design, procure, install, integrate, test, and implement all ETCS Elements to be used during tolling operations and maintenance of the Project. This coordination will include coordinating and providing traffic control needs of the System Integrator during installation, testing and implementation through the first 90 days of opening to traffic of all ETCS and ETCS Elements.

DB Contractor's coordination responsibilities include, but are not limited to, the following:

- DB Contractor shall coordinate bi-weekly (or as directed by TxDOT) with TxDOT, Systems Integrator, and the applicable Utility Owners, to ensure the DB Contractor's design and construction corresponds with the Systems Integrator's requirements.
- DB Contractor shall coordinate with TxDOT, the Systems Integrator, and the applicable Utility Owners, throughout the design and construction phases of the Project and shall provide notice of any changes in design within or in close proximity of any Toll Zone or ETCS Element location.
- DB Contractor shall incorporate the Toll Zone Work into the Project Schedule and provide updates in the monthly Project Schedule Updates in accordance with Item 8 of the General Conditions and Section 2.4.3 of the Design-Build Agreement.
- DB Contractor shall provide traffic control plans, traffic control devices and safe working conditions for the Systems Integrator during the installation, testing and implementation through the first 90 days of opening to traffic of all ETCS and ETCS Elements.
- DB Contractor shall coordinate construction schedules with TxDOT and Systems Integrator for Work taking place within the limits of the Toll Zones, which may impact ETCS Elements, with specific regard for and protection of conduit, toll gantry overhead structures, and grounding under structures and in-pavement loop sensors.
- DB Contractor shall be responsible for incorporating sufficient time into the Project Schedule for controlled testing of all ETCS and ETCS Elements by TxDOT and the Systems Integrator related to tolling operations in accordance with Section 2.4.3 of the Design-Build Agreement.

Prior to Substantial Completion, TxDOT and the Systems Integrator will perform a controlled test of all ETCS and ETCS Elements required for the tolling operations.

29.2 **Design Requirements**

DB Contractor shall be responsible for designing all civil, electrical, and communications infrastructure at each Toll Zone and each ETCS Element location. DB Contractor shall coordinate with TxDOT to determine each Toll Zone and ETCS Element location. DB Contractor responsibilities include, but are not limited to the following:

- Pavement design (Toll Zone pavement, pavement transitions, and Toll Zone maintenance driveways)
- Pavement markings / Striping
- Concrete traffic barrier / railing and foundation
- End treatments
- Toll gantry structures, foundations, and toll equipment mounting hardware
- Concrete pad foundations, bollards around backup generator concrete pad foundation, and riprap around concrete pad foundations for the Toll Zones and roadside ETCS Elements
- Lightning protection system for the Toll Zones and roadside ETCS Elements
- Electrical conduit and conductors, except as otherwise noted in Attachment 29-1 (Toll Facility Responsibility Matrix)
- Tolling communication conduits, fittings, junction boxes, and expansion joints
- Tolling communication cables and fiber optic cable road marker, except as otherwise noted in Attachment 29-1 (Toll Facility Responsibility Matrix)
- Concrete encased duct bank
- Ground boxes, cable rack, and j-hooks
- Fiber optic trunkline cable, hub buildings, tolling communication termination cabinets, fiber optic drop cable, splice enclosure, pre-terminated fiber patch panel, tracer wire, splicing kits, fiber optic cable caps, connectors, moisture/water sealants, terminators, splice trays, pig tails, fiber interconnect housing, and accessories necessary to complete the fiber optic network.
- Power and communications services
- General grading and earthwork, including excavation and embankment
- Flexible base
- Retaining walls
- Drainage
- SW3P
- Traffic Control
- Other typical roadway items included in DB Contractor's Work to support the Systems Integrator's ETCS Elements

DB Contractor shall design concrete traffic barriers to be adjacent to the roadside toll equipment cabinet pads, equipment pads for complete backup power systems, and toll gantry columns and foundations on roadways. The design of maintenance driveways shall permit safe use by maintenance personnel and their vehicles. The design of toll maintenance areas shall ensure they are free of ditches or other obstructions which could damage or diminish the function of the ETCS Elements. For general guidance, details, and responsibilities, see Attachment 29-1 (Toll Facility Responsibility Matrix) and Attachment 29-2 (Typical Toll Zone Layout). Design and geometric constraints may dictate that the design of the Toll Zone and ETCS Elements deviates from the general guidance. In these instances, DB Contractor's design shall be coordinated with TxDOT to ensure that the design and construction of the Toll Zone meets the Systems Integrator's specifications.

As used in this Section 29.2, the term Toll Avoidance means the act of a motorist impermissibly departing a toll facility in advance of a Toll Zone or impermissibly entering a toll facility after a Toll Zone, resulting in the avoidance of a Toll Zone and toll charge. Toll Avoidance does not include traveling on permissible non-tolled

entrance and exit ramps. To mitigate Toll Avoidance, as well as alleviate safety concerns created by unsafe driving behavior related to Toll Avoidance (i.e. driving around a Toll Zone onto an unpaved surface), DB Contractor shall be responsible for designing and constructing civil infrastructure to mitigate against Toll Avoidance.

To confirm this requirement is met, the DB Contractor shall conduct an evaluation of each Toll Zone along the corridor, as shown in the Schematic Design, to identify areas downstream and upstream of each Toll Zone that present opportunities for Toll Avoidance. No later than 90 days prior to the submission of the Final Design Submittal, DB Contractor shall submit a Toll Avoidance Evaluation Report that reflects the final Toll Zone locations and proposed Toll Avoidance mitigation elements for TxDOT review and approval. At a minimum, the Toll Avoidance Evaluation Report shall include the following: 1) a list of all Toll Zones that present Toll Avoidance opportunities upstream and downstream of a Toll Zone; 2) recommendations for design elements to mitigate Toll Avoidance; 3) layouts of all affected Toll Zones showing where opportunities for Toll Avoidance exist and 4) layouts showing DB Contractor's proposed design elements to mitigate Toll Avoidance and improve driver safety. Upon TxDOT approval of the Toll Avoidance Evaluation Report, DB Contactor shall incorporate approved Toll Avoidance mitigation elements into the final corridor/roadway design plans for TxDOT's review and approval.

DB Contractor shall design Toll Zones in accordance with this Item 29 and supporting attachments, including the requirements for: toll gantry structure; Toll Zone maintenance driveway; sidewalk from driveway to pads; concrete pads for roadside toll equipment cabinets, generators, and fuel tanks; riprap, ETCS equipment power and communications; electrical and communication conduit; and other elements identified in Attachment 29-2 (Typical Toll Zone Layout) as being provided by DB Contractor. TxDOT shall be responsible for the Systems Integrator's work. TxDOT will provide the applicable Systems Integrator's Toll Zone in-pavement loop sensors layouts for each Toll Zone to DB Contractor during the design phase.

The concrete pad foundation for the roadside toll equipment cabinet shall be designed and placed to provide for a maximum cable run length of 150 feet between roadside toll equipment cabinet pad and the furthest tolled lane solid stripe. The maximum cable run length shall account for both the horizontal and vertical distance that is spanned. The location of the concrete pad foundation for the roadside toll equipment cabinet shall be coordinated throughout the design process with TxDOT and Systems Integrator. The concrete pad foundation shall be within line of sight to the toll gantry. The backup generator shall be surrounded by bollards for theft deterrence. For general guidance on concrete pad foundation and bollard design, see Attachment 29-5 (Toll Zone Equipment Pad Details). The Systems Integrator shall be responsible for providing and installing the roadside toll equipment cabinets.

The tolling communication termination cabinet shall be placed to provide for a maximum cable run length of 150 feet between the roadside toll equipment cabinet and the tolling communication termination cabinet. The maximum cable run length shall account for both the horizontal and vertical distance that is spanned.

DB Contractor shall work closely with the Systems Integrator, as directed by TxDOT, to identify the detailed specifications for each element of System Integrator work and the Work. DB Contractor shall incorporate the Systems Integrator's ETCS Element requirements into the civil, electrical, and tolling communications designs and submit the designs to TxDOT and the Systems Integrator for concurrent review.

29.2.1 Toll Signing

DB Contractor shall be responsible for all signing including static toll rate signs, toll entrance ramp signs, maintenance driveway signs, and advance toll information signs in accordance with Item 24. DB Contractor shall coordinate with TxDOT to determine the locations for advance toll information signs to be installed for the Project. At a minimum, DB Contractor shall install advance toll information signs at the following locations:

- At all locations where there is a change in toll policy such as the transition between segments of the tolled facility operated by TxDOT and abutting tolled lanes not operated by TxDOT.
- At all locations where an existing roadway provides public access to the tolled facility.
- Prior to all entrance ramps to the tolled facility.

DB Contractor shall provide TxDOT with the preliminary and final operational toll signing schematic for review and approval. DB Contractor shall submit any toll signing design revisions to TxDOT for review and approval.

29.2.2 **Toll Gantry and Overhead Support for Toll Equipment**

DB Contractor shall provide toll gantries and overhead support structures for Toll Zones and ETCS Elements in accordance with Attachment 29-4 (Toll Gantry Requirements). Each Toll Zone shall include a pair of toll gantries consisting of simple span or cantilevered overhead sign bridges aligned perpendicular to the roadway or lanes. DB Contractor shall design and coordinate toll gantry locations with TxDOT and the Systems Integrator throughout the design process. Toll gantries shall not be placed on elevated sections unless approved by TxDOT. DB Contractor shall avoid Toll Zone locations on elevated roadway sections due to bridge structures or retaining walls; roadway horizontal curves; excessive vertical alignments; and any locations that are in close proximity to electric power lines and cell transmission towers. Final toll gantry locations are subject to TxDOT approval. Any change to the final toll gantry locations shall be approved by TxDOT. All design and construction of structural foundations, geotechnical analysis, lightning protection, aesthetic treatment columns/towers, overhead spans, and toll equipment mounting hardware shall be the responsibility of the DB Contractor. Aesthetic treatments shall be in accordance with Green Ribbon Project: *Houston District Design Guidelines for the Construction of Highways, Streets, & Bridges* included in the RIDs, and corresponding Houston District standards. DB Contractor shall ensure toll gantries meet Systems Integrator's specifications for:

- Spacing between toll gantries
- Vertical clearance
- Conduit on/within the gantry column
- Spacing and placement of toll gantries relative to the roadside toll equipment cabinet
- Weight of overhead toll equipment, mounting hardware and conduit
- Avoiding interference by any devices or signing mounted to the toll gantry span
- Vibration
- Equipment mounting hardware and locations

DB Contractor shall determine foundation types and design foundations based upon geotechnical surveys/tests using Good Industry Practice. Designs for gantry support structures shall also comply with requirements in Item 21, Item 23, and Item 24.

DB Contractor shall design the lightning protection system to encompass the toll gantry structures and concrete pad foundation for the toll equipment cabinet, tolling communication termination cabinet, and backup power systems in accordance with Attachment(s) 29-2 (Typical Toll Zone Layout) and 29-6 (Typical Lightning Protection System Details).

Lightning protection shall be installed immediately following the construction of each gantry in accordance with the Toll Zone Work. DB Contractor shall provide TxDOT and Systems Integrator with lightning protection shop drawings for review. Lightning protection certifications meeting UL standards and grounding system test results shall be provided to TxDOT and Systems Integrator upon completion of each gantry.

DB Contractor shall provide concrete barrier or railing for the toll gantries or shall integrate the toll gantries directly into the concrete barrier or railing as needed based on physical constraints.

29.2.3 **Pavement**

DB Contractor shall provide Toll Zone pavement in accordance with Attachment 29-3 (Toll Zone Pavement Details). All non-pavement reinforcing steel within the 110-foot Toll Zone pavement shall be epoxy-coated; this includes items such as barriers or railing, retaining walls, ties, chairs, etc. Pavement reinforcement within the 110-foot Toll Zone may be epoxy-coated steel or glass fiber reinforced polymer bar that is separated from the in-pavement loop sensors per Attachment 29-3 (Toll Zone Pavement Details). No grooved pavement or metal-tine texture surface finish shall be allowed within the Toll Zone.

DB Contractor shall avoid routing underground Utilities, including water, wastewater, sanitary and stormwater lines and drains, power conductors and communication cables, within the 110-foot Toll Zone pavement.

DB Contractor shall provide conduit stub-ups in the pavement and in-pavement loop sensor conduit. TxDOT will provide Systems Integrator's in-pavement loop sensors layout with stub-up locations for DB Contractor to incorporate into the Toll Zone pavement design. No construction joints shall be allowed within the 110-foot Toll Zone pavement or across pavement loops. The locations of the longitudinal and transverse expansion

joints shall be coordinated with the Systems Integrator to ensure conflicts do not exist with the loop pavement sensors in the Toll Zones.

29.2.4 **Tolling Conduit**

DB Contractor shall provide all conduit for tolling communication cable and electrical conductor at each Toll Zone in accordance with Item 25.

DB Contractor shall provide one concrete encased duct bank for the length of the corridor in conformance with applicable TxDOT Statewide and District-wide Standards and Specifications and shall include a minimum of two 3-inch dedicated conduits for tolling. DB Contractor shall provide 3-inch tolling communication cable conduit from the fiber trunk line to the Systems Integrator's ETCS equipment. All loop sensor conduit and stub ups shall be 2-inch.

29.2.5 **Tolling Communications Requirements**

DB Contractor shall provide tolling trunkline communication cable consisting of a minimum of four strands of single mode communication fiber per Toll Zone (e.g., 24 Toll Zones would require 96 trunkline fiber strands). To access the existing TxDOT Houston District tolling communications network, when applicable, DB Contractor shall coordinate with TxDOT and provide a connection of the proposed tolling communication cable to existing or planned TxDOT hub buildings located on the northside of the FM 646 overpass at I-45 south, as well as on the west side of the SH 6 overpass at SH 99, as shown in the RIDs. Daisy-chaining of fiber, defined as having the same fibers going into multiple Toll Zones and carrying the data for multiple Toll Zones, is not allowed.

DB Contractor shall provide a drop cable strand count of a minimum of eight strands at each Toll Zone. DB Contractor shall provide tolling communication cable (e.g. fiber drop cable, splice enclosure, splice tray, splice kit) from the duct bank ground box to a tolling communication termination cabinet located near the roadside toll equipment pad. The other end of the tolling communication cable shall be terminated inside a tolling communication termination cabinet with an appropriately sized fiber optic pre-terminated patch panel provided by the DB Contractor (all items in accordance with TxDOT special specification 6007 (2014), *ITS Fiber Optic Cable*). DB Contractor shall coordinate additional splicing details with the Systems Integrator. DB Contractor shall provide a minimum of 100-feet (in addition to slack requirements) of tolling communication cable coiled inside the tolling communication termination cabinet. The TxDOT approved tolling communication termination cabinet shall be provided by DB Contractor and mounted on a DB Contractor provided concrete pad foundation and sized to accommodate the fiber drop cable, slack and a patch panel termination (e.g. splice tray, splicing kit). DB Contractor shall splice all strands of the fiber drop cable onto the pre-terminated patch panel pigtail (e.g. twelve fiber optic drop cable strands spliced to twelve fiber optic strands of pigtail in splice tray). The connectors shall be duplex Lucent Connectors. DB Contractor shall provide power to the tolling communication termination cabinet in accordance with the TxDOT Standards and TxDOT Standard Specifications applicable for the cabinet.

DB Contractor shall provide physically redundant tolling communications infrastructure, including one concrete encased duct bank with a conduit and communication cable to be used for the Project and a redundant conduit and communication cable for future tolling use, for the tolling communications network. DB Contractor shall provide toll network diagrams and fiber cable splice diagrams for tolling infrastructure to TxDOT for review and comment.

Systems Integrator shall be responsible for providing tolling communication cable from the tolling communication termination cabinets to Systems Integrator's ETCS equipment. Systems Integrator shall terminate all tolling communication cable from roadside toll equipment cabinets to Systems Integrator's ETCS equipment.

All tolling communication cable and conduit designed and constructed by DB Contractor for the ETCS and Toll Zone Work shall be separate from those used for ITS and shall be exclusive to the ETCS and Toll Zone Work. This shall also include pull boxes and pull strings, fiber optic markers, test stations, concrete encased conduit duct bank, and tracer wire.

29.2.6 **Tolling Electrical Service**

At each Toll Zone, DB Contractor shall be responsible for providing the electrical conduit and conductor between the metered power service and the roadside toll equipment pad as shown in Attachment 29-2

(Typical Toll Zone Layout). DB Contractor shall design metered power services with branch circuit breakers that meet power requirements and specifications for Systems Integrator's equipment at each Toll Zone. A 120/240 VAC 2P-125A Circuit shall be provided at each Toll Zone.

DB Contractor shall develop a tolling electrical service layout, showing the location of each of the electrical service elements shown in Attachment 29-2 (Typical Toll Zone Layout) for each Toll Zone for TxDOT approval. Unless otherwise approved by TxDOT, metered power service shall be located within Project ROW and 1,000 feet maximum distance from the concrete pad foundation for roadside toll equipment at the Toll Zone, in accordance with Attachment 29-2 (Typical Toll Zone Layout).

Systems Integrator shall be responsible for providing electrical conductor from the roadside toll equipment cabinet to Systems Integrator's ETCS equipment as shown in Attachment 29-2 (Typical Toll Zone Layout). Ground box type and other requirements are detailed in Item 25. Should buried ground boxes be approved by TxDOT, DB Contractor shall provide GPS coordinates for any buried ground boxes. Systems Integrator will terminate all electrical conductor from roadside toll equipment cabinets to the Systems Integrator's ETCS equipment.

29.2.7 **ETCS Infrastructure Requirements**

29.2.7.1 **Mainlane and Ramp Tolling**

Mainlane and ramp tolling shall consist of ETCS at the tolling locations indicated on the Schematic Design and in the RID documents.

29.3 **Construction Requirements**

DB Contractor shall coordinate Construction Work with TxDOT and Systems Integrator to determine construction requirements specific to the Toll Zones and ETCS Elements. DB Contractor shall provide Unobstructed Access to allow for Systems Integrator's work to occur concurrently with DB Contractor's Work.

Once a toll gantry or other overhead structure has been erected, DB Contractor shall provide a temporary safety warning system, to be approved by TxDOT, placed at a minimum of 500 feet in advance of each overhead structure to warn of the toll gantry and/or the ETCS Element clearance requirements. DB Contractor shall leave the temporary safety warning system in place until Substantial Completion. DB Contractor shall ensure the Toll Zones are free of obstructions and closed to through traffic during the Systems Integrator's installation and testing of all Toll Zones.

DB Contractor shall coordinate with Systems Integrator to ensure that there are no power lines or radio frequency elements that could cause interference to the ETCS Elements and toll systems. The clearance between power lines and ETCS Elements shall meet NEC requirements. DB Contractor shall provide Systems Integrator with a list of radio frequency elements and their associated frequencies to ensure no conflict exists.

DB Contractor shall ensure the lightning protection system components comply with the requirements of the latest edition of the National Fire Protections Association (NFPA) 70, NEC, NFPA 780 Standard for Installation of Lightning Protections Systems, and the Underwriters Laboratory Standard UL 96. Lightning protection certifications meeting UL standards and grounding system test results shall be provided to TxDOT and Systems Integrator upon completion of each gantry.

Additionally, DB Contractor shall coordinate with Systems Integrator to ensure that the following do not exist in the 110-foot Toll Zone pavement areas reserved for in-pavement loop sensors:

- Surface drains or grates within six feet of sensors
- Buried drains or water pipes in the area reserved for sensors to a depth of six feet
- Underground power lines or buried Utilities beneath the Toll Zone that could cause interference to the toll systems
- Non-coated rebar (glass fiber reinforced polymer bar or epoxy-coated steel with separation requirements are acceptable)
- Construction joints

29.3.1 **Pavement**

DB Contractor shall provide Unobstructed Access for Systems Integrator at each Toll Zone and ETCS Element during Systems Integrator's pavement sensor installation, equipment installation and toll systems testing. DB Contractor shall provide a minimum of 500 feet of Unobstructed Access, as illustrated in Attachment 29-2 (Typical Toll Zone Layout), from each end of the 110-foot Toll Zone pavement section to allow for Systems Integrator's testing of the toll systems for the main lane Toll Zones. These 500-foot sections are not required to be constructed using the special Toll Zone pavement section defined in Attachment 29-3 (Toll Zone Pavement Details). During the Systems Integrator's testing of the toll systems, the pavement within the limits of the Unobstructed Access shall be free of DB Contractor equipment, materials, or other obstacles in the DB Contractor's control. At each ETCS Element, an area of 30 feet around all equipment enclosures, equipment pads, and structures shall be clear of DB Contractor equipment, materials, or other obstacles in the DB Contractor's control, unless otherwise approved by "the System Integrator's onsite personnel. For Toll Zones on ramps, Unobstructed Access shall be provided for the entire length of the ramp.

29.3.2 **Tolling Communication Cable Testing**

DB Contractor shall install and test the tolling communication cable in accordance with TxDOT special specification 6007 (2014), *ITS Fiber Optic Cable*. Testing shall include bi-directional optical time domain reflectometer (OTDR) pre-installation tests of each fiber strand followed by bi-directional post-installation testing of each fiber strand. Bi-directional post termination testing shall be performed after the cable is terminated or spliced. DB Contractor shall perform bi-directional final end-to-end testing using OTDR and Power Meter and Light Source (PMLS) prior to the Phase 1 Toll Zone Completion Deadline. DB Contractor shall provide notice of DB Contractor's testing schedule to TxDOT and Systems Integrator no later than 60 days prior to the Phase 1 Toll Zone Completion Deadline. DB Contractor shall provide testing results to TxDOT no later than 30 days prior to the Phase 1 Toll Zone Completion Deadline.

DB Contractor shall allow TxDOT and Systems Integrator to perform additional testing as deemed necessary by TxDOT during the 30 day period prior to the Phase 1 Toll Zone Completion Deadline for confirmation of provided results.

During Systems Integrator's testing, DB Contractor shall be responsible, at a minimum, for the following:

- Coordinating with TxDOT and Systems Integrator to ensure that there will be no conflicts between TxDOT, Systems Integrator, and DB Contractor's staff;
- Providing temporary advance signing (as needed) stating that the facility is closed, and testing is occurring;
- Providing maintenance of traffic / traffic control (as needed) at all necessary locations for a maximum of five full days at each location, which could include evenings, nights and weekends and may not be consecutive;
- Providing Unobstructed Access to the facility for authorized TxDOT staff and contractors;
- Repairing any issues found with DB Contractor's work within one Day unless otherwise approved by TxDOT; and
- Performing additional testing to document effectiveness of any repairs.

During System Integrator's testing prior to Phase 1 Toll Zone Completion, DB Contractor shall not expect to have access to, nor conduct Work within, the specified testing length of the Phase 1 Toll Zones and Phase 2 Toll Zones, ITS, ETCS and all elements that would interfere with testing while the Systems Integrator is performing its OTDR and PMLS testing, with the exception of providing services as described above.

29.3.3 **Power to Tolling Facilities**

DB Contractor shall coordinate with the Utility Owner(s) and ensure power service is initiated, energized and maintained for all Toll Zones and ETCS Elements prior to Phase 1 Toll Zone Completion for the Phase 1 Toll Zones and prior to the Phase 2 Toll Zone Completion for the Phase 2 Toll Zones. DB Contractor shall be responsible for the installation and access to power required to operate the Toll Zones and ETCS Elements, including all Utility costs until Final Acceptance. DB Contractor shall have completed all testing and acceptance requirements for electrical networks for the Phase 1 Toll Zones and Phase 2 Toll Zones 30 days prior to the applicable Toll Zone Completion.

29.4 **Submittals**

All submittals described in this Item 29 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 29-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 29-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Civil, electrical, and communications designs that incorporate the Systems Integrator's ETCS requirements.	As part of Preliminary and Final Design Submittals	Review and comment	29.2
Toll Avoidance Evaluation Report	90 days prior to Final Design Submittal	Review and approval	29.2
Notice of any changes in design that would affect the design, operation or Toll Avoidance of the Toll Zones and/or ETCS elements	90 days prior to Final Design Submittal	Review and comment	29.1.1 29.2
Preliminary and final operational toll signing schematic	Prior to Preliminary and Final Design Submittals, respectively	Approval	29.2.1
Toll signing design revisions	As required	Approval	29.2.1
Toll gantry locations	Prior to Preliminary and Final Design Submittals	Approval	29.2.2
Toll gantry and mounting hardware shop drawings	Prior to starting construction of overhead toll gantries	Approval	29.2.2
Lightning protection shop drawings	Prior to starting construction of overhead toll gantries	Review and comment	29.2.2
Lightning protection certification	Upon Completion of Each Gantry	Review and comment	29.2.2
Toll network diagrams and fiber cable splice diagrams for tolling infrastructure	As part of Preliminary and Final Design Submittals	Review and comment	29.2.5
Tolling electrical services layout	Prior to starting construction of tolling electrical services	Approval	29.2.6
List of RF elements and their associated frequencies	As part of Final Design Submittal	Review and comment	29.3
Notice of tolling communication cable testing	60 days prior to Phase 1 Toll Zone Completion Deadline	For information	29.3.2
Tolling communication cable testing results	30 days prior to Phase 1 Toll Zone Completion Deadline	Review and comment	29.3.2