PART 1 – GENERAL

1.1 SUMMARY

A. This Section covers the requirements and procedures for projects using Building Information Modeling (BIM) at DFW Airport.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specifications apply to this Section.

1.3 RELATED REQUIREMENTS

1. DFW Building Information Modeling (BIM) Standards Manual
2. Building Information Modeling (BIM) Project Execution Plan (BXP)
3. Section 01 11 00, Summary of Work
4. Section 01 26 13, Requests for Information
5. Section 01 33 23, Shop Drawings, Product Data, and Samples
6. Section 01 78 23, Operation and Maintenance Data
7. Section 01 78 39, Project Record Documents
8. Section 01 45 16.13, Contractor Quality Control

1.4 DEFINITIONS

A. Building Information Model (BIM): BIM is a digital representation of the physical and functional characteristics of the Project and is referred as a Model(s), which term may be used to describe a Model Element, a single Model or technology used to create the Model.

B. Building Information Model (BIM) Execution Plan (BXP): Provides a framework that allows for project communication and efficient collaboration. The plan describes roles and responsibilities for all stakeholders and the detail of the information to be shared and relevant processes. The BXP shall be further developed jointly with DFW Airport and the Contractor to specifically address the administrative steps necessary to provide a comprehensive BIM system before, during and after construction.

C. Building Information Model (BIM) Standards Manual: Establishes specific content criteria for all public infrastructure, terminal buildings and other public facilities owned, operated, or maintained by the Dallas/Fort Worth International Airport Board (hereinafter referred to as "Board"). It also serves as a guide for all other facilities designed and constructed within the boundaries of the DFW Airport.

D. Building Information Model (BIM) Definitions:

1. As-Built Model: The Construction and Fabrication Models have been updated to represent the finished field conditions.
2. Design Model: A Model that has reached the stage of completion that would customarily be expressed by an architect or engineer in two-dimensional Construction Documents.
3. Construction Model: The equivalent of shop drawing and other information useful to construction. A model that consists of data imported from a “Design

Model or", if none exist, from a designer's "Construction Document".

4. Federated Model: Distinct component models "linked" together in such a manner that the linked data sources do not lose their identity or integrity by being so linked.
5. Level of Development (LOD): LoD describes the level of completeness to which a Model Element is developed.
6. Model Element: Is a portion of the BIM representing a component system or assembly within a building or building site.
7. Model Element Author: The party responsible for developing the content of a specific Model Element to the LoD for a particular phase of the Project.
8. Record Model: An updated design model that is completed at the end of the project with the construction Teams provided hand markups, digital markups, sub-contractor fabrication models, and other models that include the As-Built conditions that may vary from the contract documents or better define the as built condition and/or location.
9. Right of Reliance: Transferred models to the Board/DFW Airport must match the 2D contract documents in the equivalent state of development. Models that do not match the 2D documents will be rejected by the Board/DFW Airport.

1.5 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, BIM Standards Manual and BXP, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity. Coordination drawings will be the result of a Contractor driven Spatial Coordination effort as spelled out in the BXP.

B. Field verify all existing dimensions and any as-built dimensions, whether built by the Contractor or others, necessary to produce accurate coordination and working drawings to meet the established LOD 500 requirements.

C. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

1. Use applicable Models/Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
2. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
3. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
4. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.

5. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
6. Indicate required installation sequences.
7. Indicate dimensions shown on the Models/Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to DFW Project Manager indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

D. Coordination Drawing Organization: Using software as in the BXP, the Contractor shall coordinate these systems per floor or zone per BXP, and as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire alarm, and electrical work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
    a. Runs of vertical and horizontal conduit.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switchboard, switchgear, transformer, busway, generator, and motor control center locations.

d. Location of pull boxes and junction boxes dimensioned from column centerlines.

8. Fire-Protection System: Show the following:

a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: DFW Project Manager will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If DFW Project Manager determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, DFW Project Manager will so inform Contractor, who shall make changes as directed and resubmit.

E. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings, unless approved otherwise by DFW Project Manager.

2. File Preparation Format: Provided in the Project BIM Execution Plan operating in Microsoft Windows operating system.

3. File Submittal Format: Submit or post coordination drawing files as required in the Project BIM Execution Plan.

4. The submittal must be logged in accordance with the submittal procedure.

5. For Fire Protection system, provide shop drawing and design calculations as approved by the building department. Submit as-built drawings in format as outline in BXP.

6. For all projects, receiving official variance from the BIM requirements not utilizing BIM, coordination drawings must be submitted in acceptable digital format shall be in an industry recognized 3D AutoCAD model.

7. BIM File Incorporation: DFW Project Manager will incorporate Contractor's coordination drawing files into Building Information Model for Revit as established for Project.

a. Contractor shall lead three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect or other sub-consultants.

8. DFW Project Manager will furnish Contractor one (1) set of digital data files of Models and/or Drawings for use in preparing coordination digital data files.

9. The Design consultants and Contractors and Sub Contractors acknowledge and represent the following Right of Reliance regarding Electronic Models and/or Drawing deliverables:

a. Models may be transferred for allowing the recipients to develop derivative models to develop the means and methods by which to construct the project.

b. It must be clear that each party be able to rely on the fact that the model furnished by others “match the 2D Contract Documents or shop drawings in their equivalent state of development.”

1.6 COORDINATION WITH DFW ASSET MANAGEMENT SYSTEM

A. The full intent is to produce comprehensive record documents integrating existing data in the form of digital files and models, reconciled to actual field conditions, modifications or additions facilities or components of existing facilities according to new Contract Documents, and to produce record documents that could be incorporated into DFW asset management system.

B. Utilize the BIM to link all necessary data content to the model and follow the BXP as collaboratively modified by the Contractor, Designer, and DFW BIM Group and approved by OAR.

C. Provide the following information through the execution of the Contract for all elements and element types that DFW has designated as assets. The information shall include but is not limited to:

1. Project title, number, project manager contact information, contractor and subcontractor contact information.
2. Pertaining shop drawings.
3. Operational Manuals and safety information, MSDS and cut sheets, and any pertinent technical information.
4. Details of all components’ maintenance procedures and requirements.
5. Details of all applicable warranties including, but not limited to, warranty providers, manufacturers information, warranty start and finish dates, contacts, bonding company name, consent of surety.
6. Equipment location (by room number and location description or grid location format acceptable to DFW Project Manager, for civil projects), equipment make, model, serial number, and other asset information as outlined in the DFW BIM Standards Manual.
7. List of all spare parts including but not limited to; equipment make and model, location, submittal number or link, and suppliers reordering information.
8. Commissioning results, acceptance criteria, test reports, and Tab reports.

1.6 REQUEST FOR INFORMATION

A. For all BIM related information refer to 01 26 13 Request for Information Specification

1. The Contractor shall limit the RFI to only one (1) BIM-related question.

1.7 OPERATION AND MAINTENANCE DATA

A. All submittals must be provided in electronic data as indicated by the DFW BIM Standards Manual and as required by the DFW BIM and Asset Management groups.

1.8 PROJECT RECORD DOCUMENTS

A. Follow all the required processes of the approved BXP as approved by DFW for this specific project.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

PART 4 - MEASUREMENT AND PAYMENT

Not Used.

– END OF SECTION –