DIVISION 1 GENERAL REQUIREMENTS
CONSULTANT/VENDOR REQUIREMENTS
BUILDING INFORMATION MODELING (BIM) REQUIREMENTS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

1.0.1 Drawings, General Conditions of the Contract and other Divisions of the Specifications apply to, and are impacted by, work of this Section.

1.0.2 Contents of this Section:

Part 1 - General
1.1 Summary
1.2 Definitions
1.3 Level of Development
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Part 2 - Products
2.1 Native Model Software - Minimum Requirements
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3.1 BIM Execution Plan
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3.3 Submittal of Final As-Built Models
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1.1 SUMMARY

1.1.1 The BIM guidelines provide framework for the owner, design team and construction manager to deploy building information modeling (BIM) technology and its best practices on the project.

The Owner’s Design Professionals shall develop and submit to the Owner for approval a Federated Model (Federated Model) of the Project utilizing a Building Information Modeling (BIM) system as defined by this Section. This coordinated model is comprised of input from all designers and is at the stage of completion that would customarily be expressed by a Design Professional in two-dimensional Construction Documents and shall be used for bidding purposes. The Contractor shall:

1.1.1.1

1.1.1.2 Update the Federated Model progressively throughout the construction period to incorporate all construction actions so that the Federate Model (also known as the “as-built” Model) shall be developed to LOD 400/500 construction level, including:

1.1.1.2.1 Shop Drawings:
1.1.1.2.2 Approved Change Orders
1.1.1.2.3 Fabrication, assembly and detailing
1.1.1.2.4 Field Modifications

1.1.1.3 Provide a final “as-built” LOD 400/500 Federated Model to the Owner’s Project Manager as part of the Project Close-Out phase.

1.2 DEFINITIONS

1.2.1 BIM: Building Information Modeling is a process of generating and managing building data (geometry, dimensions, nomenclature, element specifications, material, equipment type, etc.) during a defined life cycle. The process involves 3D virtual construction and associate software encompassing building geometry, spatial relationships, geographic information, quantities and properties of building components.

1.2.2 Model: The term used to describe the 3D virtual representation of a Project and its Objects. The Model is generally an assemblage of several Models produced by various disciplines, each of which is comprised of numerous Objects.

1.2.3 Model Element: A Model Element is a portion of the BIM representing a component, system or assembly within a building or building site.

1.2.4 Model Element Author: The Model Element Author (MEA) is the primary party who will develop the content of a specific Model Element to the LOD listed for a particular phase of the project. Each MEA may use a separate production software and separate/unique content which is based on the method of operation.

1.2.5 Participant: An entity who is a party to the Design-Build agreement, Subcontract, Design Consultant Agreement, or a contract of a lower tier, who has or will provide either information or a deliverable to the BIM Process.

1.2.6 As-Built Model: A Federated Model incorporating all construction phase modifications to a LOD 400 or better.
1.2.7 **BIM Manager**: The individual responsible for managing the modeling and coordination process, including managing the project’s BIM Staff and all other aspects of its BIM requirements.

1.2.8 **BIMF**: BIM Files.

1.2.9 **Collaboration Model**: The term to describe the Federated Model used during the trade coordination phase. The model is comprised of design input from all major designers and integrated according to a spatial relationships, design intent, and means and methods.

1.2.10 **Facility Model**: The term used to describe a 3D model that incorporates all major equipment and components that require service and maintenance.

1.2.11 **Federated Model**: The Federated Model combines different modeled elements or assemblies through the process of linking files from their native platforms, maintaining their native properties. It is a virtual representation of the entire Project developed to a specified LOD. The Federated Model shall consist of the primary disciplines for construction, for example, Civil, Architectural, Structural, Mechanical, Electrical, Fire Protection, and Special Equipment.

1.2.12 **Linking Files**: A process of externally referencing a native file into the Federated Model.

1.2.13 **MEPF**: Mechanical, Electrical, Plumbing, and Fire Protection systems.

1.2.14 **Native Model**: A Model created in a specific CAD platform. For example, a Revit model made in Revit.

1.2.15 **Nomenclature**: This is a term that applies to a system of principles, procedures and terms related to an assignment of a location, object or property.

1.2.16 **Owner Model**: The term used as the final Federated model deliverable integrating the as-built model, collaboration model, and the facility model. It is can be comprised of a Navis?? model and all associated native models, organized and itemized for reference and review.

1.2.17 **Proposal Model**: The term used to describe a Federated Model that is developed by a Project Bidder as a basis of their proposal.

1.2.18 **Transferred Model**: The term used to describe the Native Model(s) and/or Federated Model that are/is provided to the Owner for Owner’s agreed utilization.

1.2.19 **Object**: The term used to describe the 3D virtual representation of each of the separate sub-parts of a Model such as doors, walls, equipment etc. If an Object is, in itself, comprised of several sub-elements, the sub-elements shall be grouped into one virtual representation of that Object. Example: a panel board might be comprised of top, sides, back, and front sub-elements; if so, then those sub-elements shall all be grouped into one selectable and identifiable Object.

1.2.20 **Room**: The term used to describe any space within the encasing walls of the building. The space may be rectangular or more complex. In the case of complex-shaped spaces, the complex space may be sub-divided into several sub-spaces that are separated by Room Separation modeling techniques. Such sub-spaces shall function as individual
Rooms with individual parametric attributes. Examples include without limitation: a long corridor that is best described by its sub-areas; an alcove or foyer adjacent to and serving another space; a large multi-function space that contains several sub-areas or work stations that require individual designation; etc.

1.2.21 Level of Development (LOD): The term used to describe the fullness and definitiveness of the Model; each Model can have a varying LOD depending on the phase of the Project life-cycle, and agreed utilization of the Model. The LOD definition is based on the AIA E 202 – 2008 document and expanded in section 1.3

1.3 LEVEL OF DEVELOPMENT (LOD)

1.3.1 The American Institute of Architects has developed a Level of Development (LOD) system which serves as the basis for this Project with Project-specific modifications as shown in the following requirements.

1.3.2 General: Regardless of LOD, the model(s) shall be capable of being presented in three dimensions, and shall be an object-based parametric database system.

1.3.3 LOD 100: This is the “programming” level. Buildings and/or structures shall be modeled as masses indicative of area, height, volume, spatial location, and orientation.

1.3.4 LOD 200: This is the “planning” level. Buildings and/or structures including major architectural, structural, mechanical, electrical, and plumbing objects shall be modeled as generalized systems or assemblies with approximate quantities, approximate configuration, spatial location, and orientation. Each enclosed space shall be identified as a unique Room with associated parameters.

1.3.5 LOD 300: This is the “design” level. Buildings and/or structures including all objects shall be modeled as specific systems or assemblies with accurate quantities, recognizable configuration, spatial location, and orientation. Each enclosed space shall be identified as a unique Room with associated parameters.

1.3.6 LOD 400: This is the “construction” level. Buildings and/or structures including all objects shall be modeled as specific systems or assemblies with accurate quantities, recognizable configuration, spatial location, and orientation, with complete fabrication, assembly, and detailing information. Each enclosed space shall be identified as a unique Room with associated parameters.

1.3.7 LOD 500: This is the “as-built” level. Buildings and/or structures including all objects shall be modeled as constructed systems or assemblies with accurate quantities, shape, spatial location, and orientation, with complete fabrication, assembly, and detailing information. Each enclosed space shall be identified as a unique Room with associated parameters.

1.4 BIM Staff:

1.4.1 The Owner or its designated representative shall appoint a qualified BIM staff to manage the BIM process and develop the required BIM Execution Plans (BEP). This staff has the responsibility to oversee development of all submittals generated from BIM data and manages the Coordination process. This includes managing the information of the BIM Staff and subcontractors responsible for creating models, analyzing “clashes” and resolving coordination issues.
1.4.2 BIM Support Staff: All Participants shall provide sufficient qualified BIM support staff to model all design elements and coordinate all building systems within the time limits established in the accepted Preliminary Schedule and subsequent schedules.

1.5 BIM SHARE SITE/FILE STORAGE SYSTEM

1.5.1 The Owner shall define a BIM Share Site (also known as the File Storage System) to host all BIM files. Models on this shared site shall be fully accessible on line to all members of the Project Team via assigned site user names and passwords. The Owner’s BIM Manager shall assign users and passwords, shall assure updates to the site on agreed schedules, shall approve of the BIM information that is updated into the shared site, monitor usage and ensure capacity and function of this system. The site will contain revision control capabilities and the Owner’s BIM Manager shall administer read/write rights and hierarchy.

1.6 INTELLECTUAL PROPERTY RIGHTS

1.6.1 Each participant represents that it has the appropriate Intellectual Property Rights to submit its information or Deliverable to the BIM Process and that it has obtained such rights from any of its subcontractors and Design Consultants and lower tier parties whose Information or Deliverable the Participant furnishes. Such Intellectual Property Rights shall conform with Article 4 of DBIA Document No. 565.

PART 2 - PRODUCTS

2.1 NATIVE MODEL SOFTWARE - MINIMUM REQUIREMENTS

2.1.1 General: The Native Model(s) shall be developed to include parametric components of major building and site elements as defined in this Section. All discipline Native Models shall be linked to the Architectural Native Model.

2.1.2 BIM application(s) and software(s) for the Federated Model shall:

2.1.2.1 Use the current version of Autodesk® Navisworks software.

2.1.2.2 For any additional electronic model information that is not supported by the Revit or the primary software solution approved by Project Manager, and for constructing 4D models, the Contractor shall utilize Navisworks software (Manage, Review, Simulate and Freedom) to create and utilize .nwd files.

2.1.3 The Native Model software shall be as listed in the following matrix. The first software listed for each discipline is preferred. Where second or third software is listed, it is only acceptable if the discipline provides the Object Parametric Attributes as required by these specifications. The software shall be fully object-based, parametric, database system, and shall be the most current version available at the start of work on the Project.

2.1.4 In the event that the Native Model Software does not auto generate a UID or Common Name the data shall be entered manually. If manual input is not possible then the data shall be provided via a separate excel spread and tagged to the appropriate object.
### Suggested Native Model Software Matrix

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Native Model Software</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural</td>
<td>Revit Architecture</td>
<td></td>
</tr>
<tr>
<td>Fixtures, and Equipment</td>
<td>Revit Architecture</td>
<td>Applies to stationary items only</td>
</tr>
<tr>
<td>Structural</td>
<td>Revit Structure</td>
<td></td>
</tr>
<tr>
<td>HVAC</td>
<td>Revit MEP</td>
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<tr>
<td></td>
<td>AutoCAD MEP</td>
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<tr>
<td></td>
<td>CAD-Duct</td>
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<td>Plumbing</td>
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<td></td>
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<td></td>
<td>CAD-Pipe</td>
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<td>Fire Protection</td>
<td>AutoSPRINK v 7</td>
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<tr>
<td>Electrical</td>
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<td>Security Electronics</td>
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</tr>
<tr>
<td>Civil</td>
<td>Revit Civil 3D</td>
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<tr>
<td></td>
<td>AutoCAD Civil 3D</td>
<td></td>
</tr>
<tr>
<td>Landscape</td>
<td>Revit Architecture</td>
<td></td>
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</tbody>
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### 2.2 NOMENCLATURE

#### 2.2.1 Object Identification

**2.2.1.1 General:** Every Object in the Model shall have a Unique Identification (UID) parameter and a Common Name parameter attached to it in the Native Model.

**2.2.1.2 Unique Identification:** The UID shall be readable by the user of the Native Model software without additional software applications. The UID may be in the form of alpha, numeric, or alpha-numeric.

**2.2.1.2.1** If the UID form is alpha-numeric, it shall be a consistent string format for all Objects, within its discipline, and shall be readable by any commonly available database. The UID is an “Instance” parameter.

**2.2.1.2.2** If the Native Model software is not a full object-based, parametric, database platform, such as some of the older 3D CAD programs, the UID shall be attached to the Object manually, if necessary, so that it can be read by the user without additional software applications.

**2.2.1.3 Common Name:** In addition to the UID, each Object shall have a Common Name parameter attached to it in the Native Model. The Common Name shall be approved by the DBE prior to modeling. Examples of a Common
Name include such as: door, window, toilet, VAV Box, etc. Typically the Common Name will be generated automatically by the software, but if not, it shall be input manually in the Native Model. The Common Name is an Object “Type” parameter.

2.2.2 Object Parametric Attributes – MINIMUM REQUIREMENTS

2.2.2.1 The following attributes shall be attached to each Object. Note: If a required attribute is not automatically generated by Native Model software, it shall be manually input in the Native Model, or provided in an Excel or Access document that includes the UID.

2.2.2.1.1 Unique Identification
2.2.2.1.2 Common Name
2.2.2.1.3 Omni Code Classification
2.2.2.1.4 Native Model Assembly Code
2.2.2.1.5 Manufacturer (where applicable)
2.2.2.1.6 Model Number (where applicable)

2.2.3 Object Association

2.2.3.1 Every Object in the Model shall be associated with either a Room or a Floor and shall have an association “Instance” parameter attached to it in the Native Model.

2.2.3.2 Room association: Any Object that will be visible in a Room of the completed facility shall be associated with that specific Room. This includes all Objects regardless of responsible discipline; examples include without limitation: electrical switches and outlets, electrical switch gear and panel boards, plumbing equipment and fixtures, access panels to concealed Objects, cabinets, doors and frames, wainscot, light fixtures, HVAC supply and return grilles, fire sprinkler heads and valves, etc.

2.2.3.3 Floor association: Any Object that will be concealed in a wall or interstitial space (but would be visible if the finish surface or item was non-existent) shall be associated with the specific Floor level that it is within. This includes all Objects regardless of responsible discipline; examples include without limitation: electrical conduit, plumbing piping and valves, HVAC supply and return ducts, HVAC equipment, fire sprinkler lines and valves, etc.

2.2.3.4 Objects extending beyond Room boundaries: Floors, walls, and/or ceilings are sometimes modeled as objects that extend beyond individual Room boundaries. Where this occurs, the architectural discipline Native Model shall be modeled as follows:

2.2.3.4.1 Floors: Structural floor Objects may extend beyond Room boundaries, however, finish flooring such as carpet, resilient flooring, etc., shall be modeled as Objects, with extents contained within the Room boundaries, and with appropriate Room association.

2.2.3.4.2 Walls: Structural wall and non-structural partition Objects may extend beyond Room limits, however, the surface material such as gypsum wallboard, wall covering, etc., shall be modeled as
Objects, or scheduled in the Room Finish Schedule, with extents contained within the Room boundaries, and with appropriate Room association.

2.2.3.4.3 Ceilings: Structural ceiling Objects may extend beyond Room limits, however, finish surface material such as gypsum wallboard, acoustical ceiling tiles, etc., shall be modeled as Objects, with extents contained within the Room boundaries, and with appropriate Room association.

2.3 SYSTEM DISCIPLINE MODELS

2.3.1 Civil Systems: The Civil Systems Model shall be a sub-system model linked to the Architectural System Model. The Civil Systems Model shall serve as the basis for project shared coordinates through which the position of building elements on the site will be coordinated. Provide model Objects of:

2.3.1.1 Topography: 1) existing natural and/or graded contours, and 2) new grades and finish contours.

2.3.1.2 Planting: 1) existing major landscaped areas, 2) existing trees to remain, 3) new landscaped areas, 4) new trees, and 5) irrigation lines over 2” diameter.

2.3.1.3 Surface Improvements: 1) pavements, 2) curbs and gutters, 3) retaining walls, and 4) exterior non-building structures such as pools, shade structures etc.

2.3.1.4 Existing Structures: 1) all buildings within the project area intended to remain, 2) buildings intended to be demolished. All existing structures may be modeled exterior surface only; interior elements are not required.

2.3.1.5 Storm Water and Sanitary Sewers: 1) existing lines (over 3” diameter), boxes and structures within project area, 2) all new lines, boxes and structures, and 3) existing public lines, boxes and structures beyond the project area but serving as points of connection for the project.

2.3.1.6 Utilities: 1) existing domestic and fire water main and branch lines (2” and larger diameter) within project area, 2) all new domestic and fire water lines, 3) existing electrical overhead and underground lines within project area, all new electrical lines outside buildings, 4) existing telephone and data lines within project area, 5) all new telephone and data lines outside buildings, 6) existing gas lines within project area, and 7) all new gas lines outside buildings.

2.3.1.7 Roads and Parking: All necessary roadways and parking lots or parking structures, including necessary intelligence to produce accurate plans, profiles and cross-sections

2.3.1.8 Other requirements:

2.3.1.8.1 Quantities: data to reflect accurate quantities of the above elements.

2.3.1.8.2 Schedules: data for installation of the above elements.

2.3.2 Architectural Systems: The Architectural Systems Model shall be the primary model to which others are linked. Provide model Objects of:
2.3.2.1 Spaces: 1) net square footage of all occupied spaces, 2) gross constructed floor area, 3) room names and numbers, and 4) floor, base, wall, and ceiling finishes. NOTE: Model room names and numbers shall match the Owner’s Architectural Program space names and numbers.

2.3.2.2 Exterior Walls and Curtain Walls: 1) type and composition, 2) height, length, and width, and 3) thermal, acoustic, fire, and security ratings.

2.3.2.3 Partitions: 1) type and composition, 2) height, length, and width, and 3) thermal, acoustic, fire, and security ratings.

2.3.2.4 Floors: 1) type and material, 2) thickness and slopes, 3) finishes with manufacturer’s name and product numbers. Link floor structure to the Structural Systems Model.

2.3.2.5 Ceilings: 1) type and composition, 2) height, length, and width, and 3) thermal, acoustic, fire, and security ratings.

2.3.2.6 Roof Coverings and Openings: 1) configuration, 2) drainage system, and 3) penetrations for modeled building components.

2.3.2.7 Exterior Doors, Windows, and Louvers: 1) type and material, 2) height, width, and thickness, 3) thermal, acoustic, fire, and security rating, 4) location, and 5) hardware elements or group.

2.3.2.8 Interior Doors, Windows, and Louvers: 1) type and material, 2) height, width, and thickness, 3) thermal, acoustic, fire, and security rating, 4) location, and 5) hardware elements or group.

2.3.2.9 Stairs and Ramps: 1) stairs and railings, 2) ramps and railings, and 3) handrails and guardrails.

2.3.2.10 Elevators and Escalators: 1) elevator cabs and doors, 2) elevator hoist-way doors and trim, 3) elevator machinery and equipment, 4) escalator belts and railings, and 5) escalator machinery and equipment.

2.3.2.11 Casework and Counters: 1) type and material, 2) height, width, and depth, 3) location, and 4) hardware.

2.3.2.12 Plumbing Fixtures: 1) type and material, 2) location, 3) trim, and 4) finishes. Link fixtures and trim to the Mechanical Systems Model.

2.3.2.13 HVAC Grills and Registers: 1) type and material, 2) location, 3) trim, and 4) finishes. Link fixtures and trim to the Mechanical Systems Model.

2.3.2.14 Electrical Fixtures and Equipment: 1) type and material, 2) bulb type and wattage, 3) location, 4) trim, and 5) finishes. Link fixtures and trim to the Electrical Systems Model.

2.3.2.15 Miscellaneous Fittings: 1) toilet partitions, 2) toilet room accessories, 3) grab bars, 4) personal storage lockers, 5) display cases, and 6) other surface applied quasi-permanent items such as mirrors etc.

2.3.2.16 Other requirements:

2.3.2.16.1 Quantities: data to reflect accurate quantities of the above elements.

2.3.2.16.2 Schedules: data for installation of the above elements.
2.3.3 **Structural Systems**: The Structural Systems Model shall be a sub-system model. Provide model Objects of:

2.3.3.1 Foundations and footings: 1) type and configuration, and 2) depth, length, and width.

2.3.3.2 Slab(s) on-grade: 1) type and configuration, 2) under-slab base and waterproofing, 3) recesses, curbs, pads, closure pours, and 4) major penetrations.

2.3.3.3 Basement Walls: 1) type and composition, 2) height, length, and width, and 3) thermal, acoustic, fire, and security ratings.

2.3.3.4 Elevated Floors: 1) columns and beams, 2) primary and secondary framing members, 3) bracing, 4) connections, and 5) framed, composite, and/or slab decks.

2.3.3.5 Roofs: 1) columns and beams, 2) primary and secondary framing members, 3) bracing, 4) connections, and 5) framed, composite, and/or slab decks.

2.3.3.6 Joints: 1) expansion and/or contraction, and 2) seismic.

2.3.3.7 Stairs and Ramps: 1) openings and framing, and 2) railing supports.

2.3.3.8 Shafts and Pits: 1) openings and framing, and 2) railing supports.

2.3.3.9 Other requirements:

2.3.3.9.1 Quantities: include data to reflect accurate quantities of the above elements.

2.3.3.9.2 Schedules: data for installation of the above elements.

2.3.3.9.3 Fireproofing: Fireproofing is not to be included in the BIM but clash detection studies shall include definition of tolerances for conflict detection.

2.3.3.9.4 Color Code: color code structural steel from other elements.

2.3.4 **Mechanical**: The Mechanical Systems Model shall be a sub-system model. Provide model Objects of:

2.3.4.1 Heating, Ventilating, and Air Conditioning: 1) all heating, ventilating, air-conditioning, exhaust fans, and specialty equipment, 2) air supply, return, ventilation and exhaust ducts, including space-consuming elbows and transitions, 3) fire dampers with ratings, 4) mechanical piping, and 5) registers, diffusers, grills and hydronic baseboards. Coordinate and link fixtures and trim to the Architectural Systems Model.

2.3.4.2 Plumbing: 1) all domestic plumbing piping and fixtures, 2) floor and area drains, 3) valves (regardless of pipe size) and 4) related equipment.

2.3.4.2.1 Piping larger than 3/4” diameter shall be modeled.

2.3.4.3 Roof Drainage: 1) all piping and fixtures, and 2) related equipment.

2.3.4.3.1 Piping larger than 1.5” diameter shall be modeled.

2.3.4.4 Other requirements:

2.3.4.4.1 Quantities: data to reflect accurate quantities of the above elements.
2.3.4.4.2 Schedules: schedule data for installation of the above elements.

2.3.4.4.3 Equipment Clearances: Clearances for major equipment and all M/E/P Equipment and Architecturally Significant Specialty Equipment, as model objects for conflict detection and maintenance access requirements.

2.3.4.4.4 Color Code: separate color code for each type element.

2.3.5 **Electrical:** The Electrical Systems Model shall be a sub-system model. Provide model Objects of:

2.3.5.1 Interior Electrical Power and Lighting: 1) all interior electrical components, 2) lighting, receptacles, special and general purpose power receptacles, 3) lighting fixtures, 4) panel-boards and control systems, and 5) conduit and cable trays.

2.3.5.1.1 Individual conduit larger than 1.5” diameter shall be modeled.

2.3.5.1.2 Grouped or clusters runs, and cable trays of conduit of all sizes shall be modeled.

2.3.5.2 Exterior Building Lighting: 1) all exterior electrical components, 2) lighting, receptacles, special and general purpose power receptacles, 3) lighting fixtures, 4) panel-boards and control systems, and transformers, and 5) utility connection and equipment.

2.3.5.2.1 Individual conduit larger than 1.5” diameter shall be modeled.

2.3.5.2.2 Grouped or clustered runs of conduit of all sizes shall be modeled.

2.3.5.3 Telephone, Data, Television, and Other Low Voltage: 1) all interior low voltage components, 2) outlets, receptacles, special and controls, 3) fixtures, 4) panel-boards, equipment racks, and control systems, and 5) conduit and cable trays.

2.3.5.3.1 Individual conduit larger than 1.5” diameter shall be modeled.

2.3.5.3.2 Grouped or clusters runs of conduit of all sizes shall be modeled.

2.3.5.4 Other requirements:

2.3.5.4.1 Quantities: data to reflect accurate quantities of the above elements.

2.3.5.4.2 Schedules: schedule data for installation of the above elements.

2.3.5.4.3 Equipment Clearances: Clearances for major as model objects for conflict detection and maintenance access requirements.

2.3.5.4.4 Color Code: separate color code for each type element.

2.3.6 **Fire Suppression:** The Fire Suppression Systems Model shall be a sub-system model. Provide model Objects of:

2.3.6.1 Fire Suppression System: 1) valves and risers, 2) all main, branch, and drains lines, 3) sprinkler heads, and fittings, 4) pumps.

2.3.6.2 Fire Alarms: 1) alarm and notification devices, and 2) detection systems.

2.3.6.3 Other requirements:
2.3.6.3.1 Quantities: data to reflect accurate quantities of the above elements.
2.3.6.3.2 Schedules: schedule data for installation of the above elements.
2.3.6.3.3 Equipment Clearances: Clearances for major equipment as model objects for conflict detection and maintenance access requirements.
2.3.6.3.4 Color Code: separate color code for each type element.

2.3.7 Specialty Equipment: The Specialty Equipment Model shall be a sub-system model. Specialty Equipment includes without limitation such specialties as: medical equipment and systems, security equipment and systems, conveyance equipment and systems, manufacturing equipment and systems, etc. Provide model Objects of:

2.3.7.1 Specialty Equipment: 1) equipment 2) related mechanical, plumbing, and electrical requirements.

2.3.7.1.1 Quantities: data to reflect accurate quantities of the above elements.

2.3.7.1.2 Schedules: schedule data for installation of the above elements.

2.3.7.1.3 Equipment Clearances: equipment clearances as model objects for conflict detection and maintenance access requirements.

**PART 3 - EXECUTION**

3.1 BIM Execution Plan (BEP): The Contractor shall develop and implement the required BIM services as defined in these BIM Guidelines.

3.1.1 The Contractor shall develop a draft BIM Execution Plan and submit this draft with its proposal in response to the RFP.

3.1.2 Required Content of the BIM Execution Plan

3.1.2.1 Proposed BIM staff with resumes and references, for both Contractor and Subcontractor teams.

3.1.2.2 Software selections; see section (2.1.5)

3.1.2.3 Schedule of BIM activities

3.1.2.4 Schedule of submittal milestones during construction (see 3.2, 3.3).

3.1.2.5 Include all Submittals generated by BIM, organized by Work Packages.

3.1.2.6 Define Origin Point: Specify the origin point for the project. All models must be in the correct location in 3D Space (x, y, and z coordinates. This includes correct floor elevation(s) (z coordinates). The correct insertion point is critical and ensures that each model will align properly for the master aggregate Model without modification

3.1.2.7 Any additional methodology the Owner or its designated representative wishes to consider.
3.1.3 Required Content of the Final BIM Execution Plan: The Final BIM Execution Plan shall expand on the draft, respond to comments received from the Owner and CM Consultant, and provide the following additional information:

3.1.3.1 File folder structure
3.1.3.2 File Naming Conventions (Nomenclature)
3.1.3.3 Hardware and software for BIM Share Site
3.1.3.4 BIM Data Security Protocol and narrative
3.1.3.5 Responsibilities of appointed BIM Staff to perform all required BIM functions
3.1.3.6 Methodology for ensuring the validation of in-field installation compared to coordinated BIMs
3.1.3.7 Methodology for validating As-Built Models and the Final As-Built Model

3.2 UPDATING THE MODELS DURING CONSTRUCTION

3.2.1 The Federated Model shall be routinely updated / revised to keep it current with construction activity. This shall occur at a minimum on a monthly basis and uploaded to the File Storage System.

3.2.2 After NTP, the Contractor shall:

2. Meet at Project site with installer and representatives of manufacturers and fabricators who are involved in or affected by such Work prior to installation of any Work which requires coordination and interfacing with other Work and review fully coordinated BIM, progress of other Work and preparations for particular Work under consideration.
3. Submit the As-Built BIM and revisions by posting them on a Share Site within 24 hours of each update or revision.

3.3 SUBMITTAL OF FINAL AS-BUILT MODELS

3.3.1 The final, approved updated and revised LOD 400/500 Federated Model and all its discipline systems Native Models shall be submitted to the Owner’s Project Manager as a part of the close-out submittals at the following project milestones:

3.3.1.1 100% completion of construction prior to closeout

3.3.2 The Federated Model and all its discipline systems Native Models shall be:

3.3.2.1 Editable for future expansion or remodel projects.
3.3.2.2 Functioning for use with 3-D Facilities Operations & Maintenance Software.
3.3.2.3 Organized and properly filed in an equivalent Document Control System for archival and reference.
3.4 SUBMITTAL OF OPERATIONS AND MAINTENANCE (O&M) DOCUMENTS

3.4.1 General: The Submittal Section elsewhere in these guidelines governs work of this Section, with additional requirements contained herein.

3.4.2 Electronic O&M Documents: In addition to the submission of hard copy (paper) documents, the Contractor shall provide all required O&M documents in individual Portable Document Format (PDF) files. The O&M documents shall include at a minimum:

3.4.2.1 Object Identification: Unique ID number, and Common Name.
3.4.2.2 Manual: Product data, installation, maintenance, and operating instructions.
3.4.2.3 Shop Drawings: Item data, installation, and maintenance instructions.
3.4.2.4 Warranty: Manufacturer’s warranty, Sub-Contractor’s warranty.
3.4.2.5 Training: special instructions for maintenance work.

3.4.3 Organization of O&M Documents: The documents shall be organized to match the As-Built Federated Model Objects.

3.4.3.1 Common Name: Each O&M document shall be assigned a PDF file name that corresponds to the Object’s Common Name.

3.4.3.2 Individual Documents: O&M documents shall be organized and submitted as individual documents, not as parts of a larger group document. For example: each Object with a “type” parameter Common Name of “Toilet” shall be submitted as an individual document, not grouped with other plumbing fixtures.

3.4.3.3 Quality PDFs: All PDF documents shall be high quality, clean, straight, high contrast documents. Documents shall be created directly from the origin software or document. Copies of copies are not acceptable. Scanned documents are not acceptable unless directly created documents are not available. If scanning is required the resultant PDF quality shall meet the quality criteria described herein.

END OF SECTION