



EXHIBIT D
BIM REQUIREMENTS FOR CONSTRUCTION MANAGEMENT (CMAR) PROJECTS
REQUEST FOR QUALIFICATIONS

PART A: PRE-CONSTRUCTION SERVICES and
PART B: CONSTRUCTION SERVICES (Construction Management at Risk)

Louisiana State University Library
Louisiana State University
Baton Rouge, Louisiana
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EXHIBIT D

BIM REQUIREMENTS FOR CMAR (CONSTRUCTION MANAGEMENT) PROJECTS

1. PREAMBLE

This section is intended to align the Project Team and its collective interest toward achievement of a successful Project through the elimination of redundancies, errors and waste as well as enable the integration of Project outcomes with Key Project Goals.

The section promotes:

- 1.1. Rewarding desired behaviors;

Alignment of risk and reward with each Party's ability to control risk in separate contracts between Owner and Designer and Owner and CMAR Contractor;

- 1.2. Creating a culture of partnership among all members of the Project Team;

- 1.3. Creating an open environment for information-sharing;

- 1.4. Integrating operating, design and construction knowledge;

- 1.5. Building virtually before building physically through the use of computer modeling and other available technologies for design and construction planning, with focus on:

- 1.5.1. Reducing redundant efforts and conflicts,

- 1.5.2. Improving means and methods, and

- 1.5.3. Increasing opportunities for the use of pre-fabrication and off-site construction;

and

- 1.6. Creating relationships during the design phase with the intention that the relationships and associated commitments will continue through the construction phase and the turnover of the building for occupancy and the end of the warranty period.

2. BUILDING INFORMATION MODELING

- 2.1. Coordination Process. CMAR Contractor and Key Subcontractors shall participate in developing a three dimensional model during various Design Phases, as described in this section, to identify and rationalize routing and access and to eliminate conflicts among the work of the various trades.

- 2.2. Collaboration. In order to achieve the Key Project Goals, design of the Project should proceed with informed, accurate information concerning program, quality, cost and schedule. While each Project Team Member will bring different expertise to each of these issues, all of these issues and the full weight of the entire Project Teams' expertise should be integrated throughout the design process if Key Project Goals are to be attained. None of the parties can proceed in isolation from the others; there should be effective and harmonious collaboration and continuous flow of information.

2.3. Model Coordination. Model coordination shall be a part of the Pre-Construction and Construction progress meeting agenda. Owner, Designer, Designer’s Consultants and CMAR Contractor shall provide input and updates regarding model coordination. Agenda topics of discussion shall include:

- a. Selection of specific web-accessed transfer site; designer “share file site” or other.
- b. Establishing hierarchy of prioritization to be used for clash resolution between disciplines;
- c. Establishing file upload frequency, acknowledging that this may be variable by phase;
- d. Establishing transfer site organizational structure, i.e. file-naming conventions, directory structure, etc.;
- e. Establishing protocol for intra-team sharing of information, communication protocol, coordination meeting frequency, etc.;
- f. Establishing site access and security guidelines; and
- g. Establishing archive procedures.

Transfer Site. Designer shall either host or arrange for a web-accessed transfer site, for the purpose of exchanging and sharing files during development of the design documents.

2.4. The Construction Documents required by the Designer’s Agreement may consist of (i) information that exists only in 2D, and (ii) 2D representations (printouts) of the Design Model(s) that will be extracted directly from the Design Model(s). Designer will make the 3-D Design Model available to CMAR Contractor and its Subcontractors as provided in this section.

2.5. At such times as Designer is required by this section to make available all or portions of the Design Model. At any other time reasonably requested by the Project Team, Designer will upload the Design Model or portions of the Design Model, as 3D (Revit or similar platform) files, to the web-accessed host or transfer site designated for the Project. All project participants, including CMAR Contractor, will be expected to have similar software to support interoperability between software platforms. Each participant may then make a derivative 3D model or convert the uploaded Design Model files from the Designer as needed to work in alternative software platforms.

2.6. Designer shall establish a common point of origin in the Design Model and all Models will be based on this common point of origin.

Extent of Models. The Models, in plan view, will extend beyond the exterior walls of the building, beyond (i) additional Designural elements or structural portions of the Project such as screen walls, canopies, or overhangs, or (ii) the point of interconnection of the Project with any existing structures or infrastructures, to the limits of the Project Site.

Model Components. Designer, Designer Consultants, and other Designers shall include the components listed in the Model. At any stage of design, the Design Models shall have the same level of development as contained in the design documents for the components required. The detail to which each component is modeled will be the level of detail the Designer would typically model on 1/8" scale two-dimensional drawings.

2.7. Designer, Designer's Consultants, and Other Designers shall issue (or reissue) the Models with up-to-date information at the issuance of Design Development, 60%, 90%, and 100% Construction Documents, and within 30 days following Owner acceptance of GMP Proposal.

2.8. Preliminary Design Models.

2.8.1. During the design phase and prior to the issuance of the Construction Documents, Designer will make the in-progress Design Model ("**Preliminary Design Model**") available to CMAR Contractor and its Key Subcontractors on a regular basis as mutually agreed to during the regular progress meetings.

2.8.2. Designer and Construction Manager acknowledge and agree that any Models exchanged by Designer, CMAR Contractor, and the Key Subcontractors and Sub-consultants during the design phase (including the Preliminary Design Model), represent work-in-progress and as such, are in the developmental stage, may not be dimensionally accurate, are subject to change throughout the design phase, and may not contain all of the elements required for complete Construction Documents. Designer shall not be responsible for reliance by others upon the preliminary design information and Models that have not been finalized. Designer and CMAR Contractor use such models at their own risk, and neither party may rely on such in-progress models for any purpose.

2.9. Design Model. In conjunction with the issuance of the Construction Documents for each phase, Designer will provide CMAR Contractor with a copy of the 3D Design Model from which the Construction Documents for that phase were derived. The Model provided by Designer to CMAR Contractor at each phase shall be known as the "**Design Model**" for that phase. The Design Model may be a single model file or multiple linked model files.

2.9.1. The Design Model shall include the content as generally defined herein or developed to the extent required to resolve conflicts between the various building systems. Any deviation from the Design Model parameters included herein shall receive prior approval of the Owner and Designer. Design Model is intended to provide spatial and design intent. Specific details in the Construction Documents shall govern unless noted otherwise.

The Design Model may also contain additional content, including scope issued for construction but less relevant to the modeling process, and in-progress scope that has not yet been completed nor issued for construction.

Designer understands that the CMAR Contractor and its Subcontractors will use the Design Model to plan and coordinate the construction of the Project. As such, Designer agrees that the Construction Documents and the Design Model will be coordinated to a level of care consistent with that necessary to produce the construction documents. Manager shall not be responsible for comparing the Design Model with the Construction Documents to determine conflicts or discrepancies in information contained in both. However, CMAR Contractor acknowledges that some information will be contained in the Construction Documents (e.g., details and notes) that

will not be contained in the Design Model and that CMAR Contractor must carefully review all of the Construction Documents as whole so as not to miss this information. CMAR Contractor also acknowledges that the Design Model will contain some additional information that is not reflected in the Construction Documents or required above, and that Designer shall not be responsible for such additional information contained in the Design Model. Any use of such additional information by CMAR Contractor and its Subcontractors shall be at the user's own risk.

2.9.2. In the event of an Owner requested material change to the scope of the Project after issuance of the GMP Construction Documents, Designer agrees to enter into discussions with CMAR Contractor and Owner regarding possible modifications and the re-issuance of the Design Model. These Designer and CMAR Contractor services would be considered an Additional Service. Any other as-built condition modeled for construction and the final Record (Archive) Drawing deliverables will be at the Designer and CMAR Contractor's expense.

2.10. Construction Model.

2.10.1. CMAR Contractor and its Key Subcontractors will create multiple derivative models from the Design Model to plan and coordinate the construction of the Project. These individual derivative models will collectively represent the "**Construction Model**". Designer shall have no responsibility for content added in any models derived from the Design Model by CMAR Contractor or its Subcontractors. Upon receipt of the Design Model, all model maintenance will become the responsibility of CMAR Contractor and its Key Subcontractors.

2.10.2. As part of the shop drawings and submittals process during construction, CMAR Contractor may elect to submit information or shop drawings from the Construction Model, in electronic format, for Designer to take appropriate action consistent with the Designer's Agreement. Designer agrees to work with CMAR Contractor to create a mutually acceptable process for submitting and annotating such content. Such process shall not alter the rights and responsibilities of either party as related to the typical submittal review and approval processes.

2.11. The Project Team shall regularly review the Models and provide appropriate responses within their respective areas of responsibility to questions and issues that each may identify.

2.12. Nothing in this Section shall convey to the CMAR Contractor, or its Key Subcontractors, any responsibility for the design, or conversely convey to the Designer any responsibility for means and methods associated with construction. Nothing in this Section shall be construed as making CMAR Contractor or its Key Subcontractors in any way responsible for the design, including any accuracy, adequacy, sufficiency, compliance with applicable law, or any error or omission in, any information contained in the Design Model. Similarly, nothing shall be construed as making Designer or its Sub-consultants in any way responsible for the accuracy, adequacy, sufficiency, compliance with applicable law, or safety of, or any error or omission in the means and methods employed by CMAR Contractor associated with the delivery of the completed project. This would include any information contained in the Construction Model that is different from the Design Model content received from Designer.

2.13. Each member of the Project Team shall have a non-exclusive, royalty-free, perpetual license to (a) use the Models for the purposes of performing the Work or as otherwise described in this exhibit and (b) publicly display models for educational and marketing purposes at any time.

2.14. Designer and CMAR Contractor specifically acknowledge that the 3D models are the Owner's property and are to not be shared with any other party except as required to facilitate the design and construction.

2.15. BIM Model Electronic Record Files. At contract closeout, Designer and CMAR Contractor shall turn over separate BIM models to both the Owner and user agency for use and continued BIM maintenance. The Record File models shall include all as-built revisions to reflect the Part B: Construction Services work scope.

2.16. Intent of Record Files. The models provided at contract closeout will be for the Owner's record and should not be construed as sufficient for continued utilization for energy management, lifecycle analyses, scheduling, energy use audits, commissioning, or similar high-end BIM functionality. Any future implementation of the referenced functionality shall be the responsibility of the Owner.

BIM SPECIFICATIONS AND REQUIREMENTS

The following scope shall be included in the Models:

1. Designerural: The following Designerural scope shall be included in the Design Models:

- a. All exterior walls, doors, windows, steps, railings and roofs.
- b. All interior walls (studs and individual layers of drywall need not be modeled).
- c. Risers and sloped floors.
- d. Interior doors and windows.
- e. All interior ceilings, soffits, stairs and railings.
- f. Walls, ceilings and soffits will be modeled as to include the correct height and overall thickness, as well as elevation changes and termination points, but not including supports, kickers, and miscellaneous framework.
- g. Doors, windows and frames will be modeled, including leaves, but excluding hardware.
- h. The overall extent of stairs and loading docks, including railings. Intermediate railing members need not be modeled.
- i. Light fixtures will be modeled to overall height, width, depth and access through interstitial space.
- j. Elevator shaft clear space, including clear width, depth and height only. Elevator cabs, equipment, etc. need not be modeled. Nominal elevator cab size and overrun shall be modeled, including hoist beams and rails.
- k. Additional vertical transportation elements (such as escalators) shall be modeled in similar scope and detail as elevators.
- l. Major fixed equipment.
- m. Casework and millwork.
- n. Finishes such as carpet, paint, wall coverings, tile and running/carpentry trim need not be modeled.
- o. Furniture, including systems furniture, need not be modeled.

2. Structural: The following structural scope shall be included in the Models:
 - a. All cast-in-place concrete, including major penetrations and openings identified in the construction documents. Slab camber need not be modeled. Chamfers at corners need not be modeled.
 - b. Edges of all slabs and major penetrations of structural systems.
 - c. All primary and secondary structural steel members, including standard steel member sizes, major equipment supports and associated kickers. Reinforcing steel and embeds need not be modeled.
 - d. Metal and concrete decks will be modeled as to their overall thickness. Bolts, clip angles, etc. need not be modeled.

3. HVAC: The following HVAC scope shall be included in the Models:
 - a. All ducts and air handling equipment. Ducts will be modeled to the outside face dimension of the flanges/insulation. Duct joints need not be modeled.
 - b. Equipment to its overall height, width and depth. Equipment access zones shall be modeled as solids.
 - c. Any piping associated with mechanical equipment. All other piping larger than 3/4" diameter shall be modeled. Pipes shall be modeled to the outside diameter of the pipe or pipe insulation, whichever is greater. Pipe slope shall be modeled. Fittings and connections need not be modeled.
 - d. Any major electrical associated with mechanical equipment.
 - e. The intent is to show the ductwork and piping in as true a representation of the actual condition at construction completion as is reasonably possible. Even though specific dimensional locations of ductwork and piping are not included in two dimensional construction documents, to the extent that location can be determined from the two dimensional construction documents, the Models shall reflect that location.

4. Electrical: The following electrical scope shall be included in Models:
 - a. Conduits greater than 1".
 - b. Cable tray, access zones and equipment.
 - c. All power feeds to equipment, all switch gear, all switches and outlet locations.

5. Plumbing: The following plumbing scope shall be included in the Models:
 - a. All plumbing and gas piping, including specialty gas, access zones and equipment. Pipes will be modeled to outside diameter of the pipe or pipe insulation, whichever is greater. Pipe slope shall be modeled. Fittings and connections need not be modeled.
 - b. All plumbing equipment to its overall height, width and depth.
 - c. All valves and cleanouts, along with access to valves/cleanouts.

6. Vertical Transportation: See Designerural.

7. Fire Protection (Sprinkler and Alarm): The following shall be provided by the fire protection subCMAR contractor:
 - a. All components of the fire protection system, including (but not limited to) piping, valves, fire pump and sprinkler heads.
 - b. Any access zone requirements.
 - a.