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**The Great Lakes Region 5 Standard Template**

**for**

**Building Information Modeling (BIM) Options Statement of Work (SOW)**

**Prospectus & Non-Prospectus - Level Projects**

**Collaborative GC Delivery Method**

**VERSION 4.0**

Released: 7/1/2013

**U.S. General Services Administration**

**Public Buildings Service**

**BIM Enabled Analyses (Options)**

***NOTE: FOLLOWING OPTIONS HAVE BEEN COLLECTED FROM MULTIPLE REGIONS AND ARE OFFERED AS BOILERPLATE/STARTING POINT – EDIT TO SUIT PROJECT NEEDS. REPLACE BLANKS BY IDENTIFYING THE RESPONSIBLE PARTY***

In addition to the BIM coordination process outlined earlier the project will require BIM Enabled Analyses for:

#### A.1 BIM Data Reuse

**Creating BIM from Existing Models**

When available the GSA will provide existing models (as well as record drawings) for areas requiring renovation. Both are provided as a convenience and the AE is responsible to confirm that models accurately reflect existing conditions. GSA in no way warrants the accuracy or completeness of any BIM supplied to the AE.

**Data Preservation**

Existing BIM data is to be preserved and added to as needed. New source data should only be created when there is no existing data currently available. All data values assigned to objects when supplied must remain intact and be updated as needed when the BIM is resubmitted to GSA. GUIDs [[1]](#footnote-1)of individual objects must not be modified in any BIM data received from GSA.

**Updating of Noncompliant BIM Data**

Portions of the model which are to be reused for the proposed work shall be updated to meet current GSA Region 5 BIM Standards at the time of contract signing. A portion of the model is defined as a reasonable, logical delineation of a space. For example if the contracted work covers several rooms on a floor the whole floor is to be updated. If the work to be performed will modify more than %50 of a structure’s BIM the entire BIM is to be updated to current standards.

**A.2** **3D Geometric Model (Design Alternatives)**

The \_\_\_\_\_\_\_\_\_\_ will review any 3D rendered perspectives, virtual animations or interactive live model provided by the AE for visualization and communications with different project stakeholders. The \_\_\_\_\_\_\_\_\_\_ will review the visualization model to ensure that it effectively aids in the presentation of design alternatives and incorporates a level of detail necessary to assist in the selection of design alternatives. The system of measure for modeling renovation and alternation projects shall be soft metric (e.g., designations such as “1 inch (25.4mm)” in which metric equivalents are attached to SI units), unless a waiver is obtained to use English measures. Measurement accuracy must be 3mm (approximately 1/8th inch) per section 8.1.2 of the PBS CAD Standard (March 2004). The AE/\_\_\_\_\_\_\_\_\_\_(s) shall deliver a 3D geometric model, using a 3D computer application(s), of the following systems. \_\_\_\_\_\_\_\_\_\_ shall use 3D geometries (e.g., shapes, solids, surfaces, etc.) to represent building components. Refer to PBS BIM Guides (www.gsa.gov/bim) and National BIM Standards ([www.wbdg.org](http://www.wbdg.org_)). The specific component requirements are to be determined in coordination with the GSA. The geometric model should include, but is not limited to, the following components:

#### D.1 Art in Architecture

#### The BIM model(s) shall include visualizations and dimensions of Art in Architecture pieces scheduled to be produced and installed as a part of the project. Visualizations include at a minimum 3D renderings and perspectives, and may also include virtual animations and interactive live models. The \_\_\_\_\_\_\_\_\_\_ must coordinate with the GSA Regional Fine Arts Officer (RFAO) and the Art in Architecture artist to get the files and file-types they need to perform this service. This coordination must be discussed with the GSA project team and applicable contractors.

**D.2 Geometry Based Zone Analysis**

The \_\_\_\_\_\_\_\_\_\_ shall Include zoning in the 3D geometry such that the model(s) is compatible with a computer-based analysis of zones (e.g., circulation, operations, security, etc.). This model shall be used for customer visualization of the proposed design and analysis of operation flows with respect to zones (e.g., commercial, POV, pedestrian). The \_\_\_\_\_\_\_\_\_\_ shall build upon the components found in the 3D geometric model(s) or BIM(s) and described in the GSA BIM Guide Series

Zones to be modeled are zones for HVAC, electrical, plumbing, data and communications, and security

**D.3 Daylight Model**

The \_\_\_\_\_\_\_\_\_\_ will include 3D geometry or BIM objects such that the model(s) is compatible with daylighting analysis. The AE will build upon the components found in previously created 3D and BIM elements and the GSA BIM Guide Series 5 ([www.gsa.gov/bim](http://www.gsa.gov/bim_)) and include not less than material reflectivity and emissivity, surface roughness, etc

The \_\_\_\_\_\_\_\_\_\_ will perform and coordinate daylight modeling services and manage any efficiencies of data transfer afforded by “object information” included in the model(s). The AE will contact the GSA project team to coordinate specific modeling scenarios and goals. The BIM(s) developed shall be interoperable with the Industry Foundation Classes format (IFC 2x2 or 2x3). The \_\_\_\_\_\_\_\_\_\_(s) shall coordinate with the GSA project team and Office of the Chief Architect to determine the appropriate level of detail and scope to include, as they relate to daylighting analysis

**D.4 Interior Design**

The \_\_\_\_\_\_\_\_\_\_ shall provide a BIM with “Interior Design objects” that embody proper “object information.” Many BIM authoring applications have their own default objects, and this should be used whenever the defaults exist. Building elements to be modeled include but are not limited to furniture, schedules, etc. The \_\_\_\_\_\_\_\_\_\_ will coordinate with the GSA project team and applicable contractors necessary to determine any additional objects that will be included in the model.

**D.5 Project Phasing**

The \_\_\_\_\_\_\_\_\_\_ shall provide a series of 3D diagrams or model snapshots to support the communication of the proposed project phasing, including, but not limited to, all major project phases. For the phasing of MEP systems, the \_\_\_\_\_\_\_\_\_\_ shall develop a phasing schedule to determine when each system will be taken offline, moved, and restored to working capacity. The \_\_\_\_\_\_\_\_\_\_ shall insure that the level of detail for the schedule and 3D model are properly coordinated. The \_\_\_\_\_\_\_\_\_\_ shall coordinate and seek approval from the GSA project team regarding the specific project phases.

**D.6 Tenant Relocation**

The \_\_\_\_\_\_\_\_\_\_ shall provide a series of 3D-based diagrams or model snapshots to support the communication of the proposed tenant relocation including, but not limited to, locations of tenants affected, location of construction work and staging areas.

**D.7 Blast Analysis**

The \_\_\_\_\_\_\_\_\_\_ shall include 3D geometry and BIM objects in addition to the requirements established in above such that the model(s) is compatible

**D.8** **Structural Member Strengths**

The \_\_\_\_\_\_\_\_\_\_ shall include the structural members’ material properties and strengths. Concrete structural members would include the strengths and types of concrete (i.e. lightweight or normal weight), and structural steel members would include the steel strength. Geotechnical information regarding the soil (a basis for foundation and structural design) may be included as well. The \_\_\_\_\_\_\_\_\_\_ will coordinate with the GSA project team and applicable contractors necessary to determine any of these additional objects that will be included in the model.

#### D.9 Site / Campus Analysis

#### The \_\_\_\_\_\_\_\_\_\_ will include the site as the contextual visualizations in every model. The \_\_\_\_\_\_\_\_\_\_ will model any existing buildings on the site as a single mass based on the building footprint as context for the new project. Any other distinguishable features deemed important by the GSA project team should be modeled as well to depict accurate and appropriate context. The \_\_\_\_\_\_\_\_\_\_ shall perform and coordinate models for multiple buildings and/or structures in a campus-like setting, including relevant geo-spatial data, and manage opportunities for analyses (e.g. water runoff, heat island effect, solar exposure etc.), afforded by “object information” in the models. The \_\_\_\_\_\_\_\_\_\_ will coordinate with the GSA project team and applicable \_\_\_\_\_\_\_\_\_\_ necessary to determine any additional objects that will be included in the model

**D.10 Energy Modeling**

The **\_\_\_\_\_\_\_\_\_\_** will include, at a minimum, object representations of all spaces, thermal zones, floor slabs, walls, the building envelope, and mechanical equipment etc, for purposes of an energy simulation. object properties required for energy simulation such as material thermal properties, space loads, space conditioning attributes, equipment operational information, etc. This information, when the option is available, should be contained within the BIM object it references. The BIM(s) developed shall be interoperable with the Industry Foundation Classes format (IFC2x2 or 2x3). The \_\_\_\_\_\_\_\_\_\_(s) shall coordinate with the GSA project team and Office of the Chief Architect to determine the appropriate level of detail and scope to include, as related to building performance analysis. The \_\_\_\_\_\_\_\_\_\_(s) shall build upon the components from previously created 3D and BIM and the GSA BIM Guide 05 - Energy Performance and Operations (www.gsa.gov/bim). The AE shall coordinate with the GSA project team to determine the appropriate level of detail and scope to include, as related to building performance analysis. The energy model(s) shall build upon the components from previously created 3D and BIM and the GSA BIM Guide ([www.gsa.gov/bim](http://www.gsa.gov/bim_)).

The \_\_\_\_\_\_\_\_\_\_ shall perform and coordinate energy modeling services, and manage any efficiencies of data transfer afforded by “object information” included in the model(s). The \_\_\_\_\_\_\_\_\_\_ shall contact OCA and the GSA project team to coordinate specific modeling scenarios and goals.

**D.11 CFD Analysis Compatibility**

The \_\_\_\_\_\_\_\_\_\_ shall include, but is not limited to, object representations of all floor slabs, walls (exterior and interior), ceilings, roofs, façade openings, etc, such that the model(s) is compatible with a CFD (computational fluid dynamics) analysis. Additionally, the \_\_\_\_\_\_\_\_\_\_ shall provide object properties required for CFD analysis such as material thermal properties, surface finishes, ventilation attributes, etc. This information, when the option is available, should be contained within the BIM object it references. The BIM(s) developed shall be interoperable with the Industry Foundation Classes format (IFC 2x2 or 2x3). The \_\_\_\_\_\_\_\_\_\_ shall coordinate with the GSA project team and Office of the Chief Architect to determine the appropriate level of detail and scope to include, as they relate to CFD analysis. The \_\_\_\_\_\_\_\_\_\_ shall build upon the components from previously created 3D and BIM and the GSA BIM Guide 05 - Energy Performance and Operations (www.gsa.gov/bim).

**D.20 Virtual Acoustics Test for Courtrooms**

The proposed acoustics will be tested at the same time as the sightlines. The Virtual Reality Program Expert will do an acoustical study of the courtroom to evaluate its conformance to the US Courts Design Guide criteria. This test will provide an audio rendition of the acoustical performance of the proposed design. This test and presentation of the results will take place at the offices of the Virtual Reality Program Expert. The AE shall participate in the presentation.

**D.21 Virtual Lighting/Interior Finishes Test for Courtrooms**

The lighting tests will evaluate the proposed courtroom lighting performance with the chosen interior finishes and fixtures. The AE shall provide the consulting engineers with all the selected courtroom materials, color samples, finishes, furniture selections, proposed lighting fixtures and lamps, and technical criteria for the lighting fixtures and lamps for scanning and modeling prior to testing. The testing will take place at the Virtual Reality Program Expert’s office

**C.1 Quantity Take Off**

The \_\_\_\_\_\_\_\_\_\_ shall include 3D geometry and BIM objects (in addition to the requirements established above) for Quantity Take Off. This would include, but not limited to, geometries or objects that are not reflected in the model(s) or objects that are present in a typical QTO, but not present in the 3D geometric model(s).

**C.2 Cost Estimating**

The GC, in collaboration with the AE, shall include 3D geometry and BIM objects for cost estimating. This includes, but is not limited to, geometries or objects that are not reflected in the model(s) or objects that are present in a cost database, but not present in the 3D geometric model(s). The level of the cost estimate shall correspond with the appropriate Uniformat Level as defined in PBS 3440.5.

**C.3: Construction Sequencing**

The \_\_\_\_\_\_\_\_\_\_ shall provide a series of 3D diagrams, model snapshots and an interactive 4D model to support the communication of the proposed construction sequencing including, but not limited to, construction and installation of major building components (e.g mechanical equipment, interior walls, etc.). The \_\_\_\_\_\_\_\_\_\_ shall deliver 3D perspectives, collision detection reports, and virtual animations and an interactive live model for visualization and communications with GSA and different project stakeholders. The diagrams or snapshots shall support periodic design coordination, constructability review and 4D schedule visualization. The \_\_\_\_\_\_\_\_\_\_ shall deliver phasing animations or diagrams which describe how all necessary systems will stay in operation throughout the relocation process.

**FM.1 Building Operations**

The \_\_\_\_\_\_\_\_\_\_ shall integrate and provide 3D geometry and additional building information (e.g., manufacturer, product information, operating and maintenance instructions, dimensions, etc) as current and available to enable coordinated commissioning activities and facility management (e.g., maintenance schedules, maintenance coordination, mechanical operation, etc.) across building life-cycle phases. The \_\_\_\_\_\_\_\_\_\_ shall build upon the components found in the 3D geometric model(s) or BIM(s) and the GSA BIM Guide ([www.gsa.gov/bim](http://www.gsa.gov/bim_))

**FM.2 Facility Management**

The \_\_\_\_\_\_\_\_\_\_ shall include additional BIM information (e.g., operations and maintenance schedules, warranty information) for purposes of facility management. The GC and subcontractors are encouraged to utilize high-precision 3D models and/or BIMs for shop drawing development, fabrication, electronic manufacturer product information and other facility ma and to coordinate with GSA building management team for Facility Management.

1. GUID – Globally Unique Identifier, which is a unique code identifying each object/space. [↑](#footnote-ref-1)