Alberta Infrastructure

Digital Project Delivery
Building Information Modelling
Consultant Requirements

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Building Information Modelling Objective

The Province's objective for the use of Building Information Modelling (BIM) is to deliver higher value in quality, timeliness, cost, and a useable product for Facility Management (FM) at the end of the project construction lifecycle. While the objective of BIM is to have information contained in a model, the asset information associated to elements in a Record Model is contained in the COBie file.

1. BIM Manager

.1 The Consultant shall designate one individual, the BIM Manager, who is accountable to the Province for:

.1 Ensuring compliance with the Province's BIM Consultant Requirements.

.2 Coordinating and attending the BIM kick-off meeting with the Province within two (2) weeks of project award.

.3 Developing, maintaining, updating, distributing, and providing clarifications to the BIM Execution Plan (BEP).

.4 Facilitating the implementation of BIM procedures as detailed in the BEP and ensuring the reliability of information in the Consultant's deliverables.

.5 Creating the Record Model by coordinating updates to the Design Models.

.6 Leading and facilitating all BIM project meetings with project team members, including the Province.

.7 Executing quality control (QC) processes for proper modeling, standards adherence, and classification of all required elements.

2. BIM Execution Plan (BEP)

.1 The BEP is a process management document created by the Consultant in consultation with the Province. The BEP shall define how the Consultant teams use BIM to meet the Province's Requirements. The Consultant shall:

.1 Use the BEP template (GOA-AI-TSB-SPE_BEP_Template) provided by the Province as the basis for the BEP, with additional modifications according to the needs of the Consultant.

.2 Submit the BEP to the Province within 30 days following project award for review and confirmation of acceptance.

.3 Resubmit the BEP to the Province for review and confirmation of acceptance whenever it is revised.

3. Model Requirements

3.1 General

.1 All elements within the scope of work shall be modelled at a Level of Development (LOD) defined by the Consultant in the BEP.

.2 All schedules, detailing, and annotations shall be created natively in the model authoring software. Dimensions shall not be overridden.

.3 All existing conditions for renovation or retrofit projects shall be modeled and include all disciplines affected by the proposed work.

3.2 BIM Software

.1   The Province is vendor neutral regarding the use of specific model authoring software. Model authoring software shall:

  .1   Support the most current ISO 16739 standard (Industry Foundation Classes (IFC) for data sharing in the construction and FM industries).

  .2   Have parametric modelling capabilities.

  .3   Be used as intended. All elements shall be modeled or created using the tool within the software that is designated for that specific element or purpose.

3.3 Level of Development

.1   The Consultant shall develop a project specific LOD matrix that includes:

  .1   Element geometry at all project phases.

  .2   Element data at all project phases.

  .3   Element tolerances for the Record Model.

  .4   Assignment of responsibility for elements.

.2   The LOD defined for each project design phase shall effectively communicate design intent.

3.4 Geo-referencing

.1   All models shall be referenced to one of the following coordinate systems:

  .1   NAD83 3TM 114 for projects in Edmonton and Calgary.

  .2   NAD83 10TM 115 for projects in the remainder of Alberta.

.2   All buildings shall have a project base point (defined origin 0,0,0) and be related to a survey point (such as a geodetic survey marker).

.3   All elements shall be modeled at true scale and at true elevation above sea level.

.4   All elements shall be oriented in accordance with the geographical north orientation (true north).

3.5 Rooms and Spaces

.1   All rooms and spaces shall be generated with the appropriate tool and associated with bounding elements.

.2   There shall be no space gaps in the model.

.3   Bounding boxes shall be used to represent rooms and spaces.

.4   Project rooms and spaces shall be named and numbered consistently across all models.

.5   All rooms and spaces shall be classified according to the Province's Asset Classification Standard.

.6   Any exceptions to the above shall be outlined and justified in the BEP.

3.6 Model Structure

.1 Models shall be separated by discipline. Each discipline model shall contain the elements that relate to their discipline's design.

.2 Model divisions shall be documented in the BEP.

.3 Elements shall not be duplicated across discipline models.

3.7 Mechanical, Electrical, Plumbing (MEP) Systems

.1 The model shall be structured such that any individual MEP System and all its elements are connected and can be traced and isolated throughout the facility.

.2 The systems list shall be agreed upon by the Consultant and the Province and documented in the BEP.

3.8 Element Properties

.1 All elements shall be assigned the correct categorization. Exceptions to element categories based on software limitations shall be outlined in the BEP.

.2 All elements shall be classified in accordance with the Province's Asset Classification Standard. There shall be no exceptions to element classifications.

.3 Schedules shall be derived from the properties of the model and remain unaltered. Schedules shall not be augmented with unconnected data.

.4 Element properties shall be populated with accurate information of the specified or designed assets.

.5 Additional element properties shall include the following properties as listed in Table 1:

Table 1: Additional Element Property Classifications

Property	Definition	Applies to
AI_Type_Class	Defines the Province's classification of asset types	COBie assets
AI_System_Class	Defines the Province's classification of Systems	All elements
AI_Space_Class	Defines the Province's classification of spaces and rooms	Spaces and rooms

3.9 Coordination

.1 The Consultant shall use the models to perform spatial coordination and interference checks at all design phases.

.2 Define the coordination and interference review process in the BEP.

3.10   Record Modelling

.1 The Consultant is not required to migrate asset data contained in the Construction Operations Building information exchange (COBie) file to the Record Model.

.2 The Consultant shall update the model geometry throughout the construction phase of the project to reflect approved project changes, including:

    .1 Project change orders.

    .2 Site instructions.

    .3 RFI responses and clarifications.

    .4 Shop drawings.

    .5 As-Built Drawings.

.3 The Consultant shall provide evidence of updates to the design model to the Province upon request.

.4 The Record Model shall contain the accurate representation of all assets in the COBie file, including:

    .1 The as-built quantity and size.

    .2 The actual orientation, location, elevation, and routing of major services.

    .3 The connection to the appropriate system in the model as per the As-Built Drawings.

.5 The LOD for the Record Model shall, at a minimum, be equivalent to the LOD specified at final design phase.

.6 The Record Model shall not include the original manufacturer's data parameters.

.7 All views and sheets produced to create contract drawings for the project shall remain in the model.

.8 The Record Model shall be submitted within 30 days of project Substantial Performance.

.9 The Record Model shall be submitted within one version year of the current model authoring software release.

.10 The Consultant shall update the COBie file, provided by the Province, with a unique element identifier from the model as per the Province's COBie Requirements (GOA-AI-TSB-SPE_COBie Requirements).

.11 The Consultant shall submit the updated Record COBie file within 30 days of receipt of the Construction COBie file from the Province.

4. Model Availability

.1 The Consultant shall submit all project models to the Province at a frequency defined in the BEP.

5. Delivery Requirements

5.1 Model Delivery

.1 All model files shall be delivered in the native model authoring format at the designated project phases documented in the BEP.

.2 The Consultant shall deliver an IFC (2x3 coordination view V2.0) file to the Province upon request.

.3 The model delivery package shall include:

   .1 A Model Submittal Report (the Province shall provide Model Submittal Report Template).

   .2 All model files.

   .3 All linked/referenced files.

   .4 Any additional setting file that is necessary to extract or print any information from the model.

.4 All models delivered at designated project phases shall be cleaned of extraneous working material before being delivered. This extraneous material may include:

   .1 Abandoned design.

   .2 Unused elements.

   .3 Empty layers.

   .4 Inaccurate content which may be produced in BIM production.

5.2 Drawing Delivery

.1 All drawing submissions shall be produced directly from the model authoring software.

.2 All drawings shall be contained in the model and display all views, model elements, schedules, and annotations used to produce the drawings.