BIM EXECUTION PLAN

Queen's University

December 2022

BIM EXECUTION PLAN AGREEMENT

The Prime Consultant hereby agrees to the adoption of this BIM Execution Plan (BxP found at: https://www.queensu.ca/facilities/building-design-standards) by affixing their signature below. They are also committed to deploying the BIM approach, and ensuring adherence by stakeholders, in the start-up, planning, and implementation phases of the project.

Name	Title	Signature	Date
	Prime Consultant		

BIM Execution Plan Highlights

- Project Shall be managed in Queen's ACC
- Revit model shall be hosted in Queen's ACC
- Revit shall be used for energy simulations. Energy simulation submissions shall be included in, but are not limited to, the 33%, 66% and 99% design submissions.
- Revit shall be used for model checker analysis. Model checker submissions shall be included in, but are not limited to, the 33%, 66% and 99% design submissions.
- An as built record Revit model shall be submitted at project closeout with an energy simulation and a 100% pass model checker.

1. Contents

PRESENTATION OF THE DOCUMENT

1.1. Purpose of the document

The intent of this BIM Execution Plan (hereinafter referred to as BxP), is to provide a framework that will accompany and guide designers, estimators, managers, and any other person affected by BIM for the duration of the project. This plan outlines the roles and responsibilities of each party, the detail and scope of information to be shared, relevant business processes and supporting software.

In addition, this document will aim to:

- Standardize the BIM process
- Control the quality of deliverables as well as the review and approval process
- Ensure good BIM practices during the Project
- Define document exchange platforms and file formats
- Establish the frequency of exchanges / revisions
- Establish the principles of collaboration and coordination
- Identify the levels of development (LOD) of the models according to the phases
- Define modeling, scheduling, and estimation methods, processes, and tools

1.2. Data Utilization and Ownership

It is important to Queen's University (QU) to own, reuse, and properly manage building data throughout the facility lifecycle. QU places significant importance on the accurate creation, management, and stewardship of building information during the design and documentation process. The design process shall allow refinements during and after the construction process, with the goal of delivering project data in support of the owner, and utilization in facility management. QU shall have ownership of all CAD files, BIM Models, and Facility data developed for the Project. QU may make use of this data following any deliverable.

The authors of these models and their related data, referred to as the Model Element Authors (MEAs), agree to grant the use of their models for the purpose of designing, constructing, operating, maintaining, and performing other tasks stipulated or implied in the project contract to all project members.

1.3. Document Instructions & Applicability

The use of this template is required for BIM utilization on all QU projects. The Project Team led by the Prime Consultant shall review this template and acknowledge the BIM project requirements herein.

1.4. Current BIM Status

At the outset of each project, QU will confirm the existence and status of the current building model available for all involved parties, including current model's software version. All parties must agree on software version for the project before starting.

1.5. Project Standards

All projects must adhere to current Queen's University Building Standards.

2. PROJECT INFORMATION

2.1. Project Description

All project specific information is to be obtained from the RFP.

2.2. Project Milestones/Phases

All project specific information is to be obtained from the RFP.

3. BIM OBJECTIVES and USES

3.1. BIM objectives for the Project Team

Here are the BIM objectives we want to achieve for this project:

BIM OBJECTIVE		RESPONSIBILITY	OBJECTIVE MET IF…
Improve communication through use of standardized BIM software to present, review, track, and manage project data	OWNER	Provide and facilitate information and standards required by stakeholders	All stakeholders, within reason, have access to and understand use of provided platform.
	STAKEHOLDER	Utilise owner provided platform and standards to complete project.	All data and documentation can be traced to project start. Reports generated for records.
Achieve optimum, cost-efficient design solutions for building systems such as mechanical, electrical, and structural.	OWNER	Request and review building analysis reports and participate in decision making	Building performance analysis has been completed and coordination with responsible parties has led to design alterations based on data obtained.
	STAKEHOLDER	Complete analysis and provide reports to owner.	
Provide a thorough and concise description of the building through accurate and consistent documentation	OWNER	Provide clear requirements for all project phases and facilitate communication between responsible parties.	Documentation review demonstrates that adherence to standards laid out in contract documents and issues have been taken into consideration for future.
	STAKEHOLDER	Adhere to owner requirements and standards, meet deadlines	Deadlines have been met, standards for documentation have been followed and recorded, issues regarding standards have been raised for future improvement.
Accurate documentation of building systems and geometry for maintenance and operations of the facility	OWNER	Define parameters required for facility operations data	Record models obtained, with 100% as-managed components containing required parameters for operational management.
	STAKEHOLDER	Site measure existing elements, ensure all changes to original design are included in Record Model	

Use of Record Model to track, analyze, and report proposed and current use of space and related resources within facility	OWNER	Define information required for sufficient analysis of space and their uses	Record models obtained, (with 100% as-managed components verified within acceptable tolerance), available to be used for next project
	STAKEHOLDER	Ensure full BIM related area and space related meta-data is provide	Documentation provided related to area usage according to local standards, verified within acceptable tolerance.
Use of Record Drawings to enhance internal BIM data specific to QU	OWNER	Maintain BIM library and identify information to be added, improved, updated, or removed.	Interrogate and incorporate all Record Models and elements and document updates to library.
	STAKEHOLDER	Provide record models, include all changes to design intent and improve upon existing data.	Record models obtained, with 100% as-managed components verified within acceptable tolerance.

3.2. BIM Uses

BIM requirements defined below are for typical project setup. Additional uses should be discussed per project.

PLAN		DESIGN		CONSTRUCTION		OPERATE	
X	Programming	X	Design Authoring		Site usage planning		Building maintenance scheduling
	Site Analysis	X	Design Review	X	Construction system design		Building system analysis
X	Sustainability (LEED)	X	3D Coordination (clash)	X	3D Coordination (clash)	X	Asset management
X	3D Rendering at Feasibility Stage	X	Structural analysis		Digital Fabrication	X	Space management / tracking
		X	Lighting analysis	X	3D control and planning		Disaster planning
		X	Energy analysis	X	Record modeling	X	Record modeling
		X	Mechanical analysis				
			Other analysis				
		X	Sustainability (LEED)				
			Validation code	X	Drones and 3D scanning		
	Phase planning (4D)		Phase planning (4D)	X	Phase planning (4D)		Phase planning (4D)
X	Cost estimate	X	Cost estimate	X	Cost estimate		Cost estimate
	Existing conditions modeling		Existing conditions modeling		Existing conditions modeling	X	Existing conditions modeling

3.3. Energy Analysis Requirements

All new projects will be required to provide energy analysis documentation at 33%, 66% ad 99% review submissions in .pdf format. Revit Annual Building Energy Simulation will be the standard requirement and any additional software required must be coordinated and confirmed with the Prime Consultant.

Results of the analysis will be reviewed alongside the design. Online software within the AEC Collection, such as Insight, shall be used to review and modify design choices as necessary, with the goal being to design towards optimal energy performance.

Other analysis within Revit, such as Solar and Lighting, can be undertaken and results coordinated with the Prime Consultant as necessary.

Existing buildings will also undergo Energy Analysis as needed per scope of the project.

All Energy Analysis requirements to be included within RFP documents.

4. INDIVIDUAL ROLES AND RESPONSIBILITIES

4.1. Table of responsibilities

Summary of the different levels of responsibility according to the roles.

	Direction					Management				Production		
	Support for the preparation of contractual documents	Research and development, Technology watch	Processes and procedures	Implementation and deployment	BIM Execution Plan	Project Review	Training	Model Coordination and Model Exchange	Model Review, Integrity	Content creation	Modeling	Deliverables
BIM Director/Prime Consultant	■	■	■	■	■	■	■					
BIM Manager	■	■	■	■	■	■	■	■	■			
BIM Coordinator						■	■	■	■	■		
BIM Modeler									■	■	■	■

4.2. Organizational Roles

4.2.1. Prime Consultant

The Prime Consultant is responsible for directing the team's efforts and technologically overseeing the project. They will ensure compliance with the BIM Execution Plan is observed. The Prime Consultant must ensure that BIM objectives are met.

Here is the non-exhaustive list of responsibilities for BIM project management from Queen's University.

- Organize the BIM kick-off meeting focusing mainly on the BIM Execution Plan and is responsible for the schedule, meetings, and minutes of meetings, all of which are to be saved to the project folder on the Autodesk Construction Cloud (ACC).
- Organizes BIM Coordination meetings if necessary, including all professionals.
- BIM Execution Plan
    - Implementation of the BxP, drafting, and updating
    - Chair and coordinate BxP meetings and take minutes.
    - Ensure that their team complies with the BxP
- Ensure that BIM goals and objectives are met.
- Point of contact with Autodesk and other vendors, as needed, to facilitate the smooth running of the project.
- Monitor conflict resolution and interdisciplinary technical coordination under the responsibility of professionals.
- Participate in the multidisciplinary coordination of BIM processes and BxP.

- Identify the need for common interdisciplinary shared parameters.
- Follow up on interference reports with the team for possible corrections.
- Manage software, plug-ins, and service pack versions with the IT department and ensure that all stakeholders have the same version.
- Exchange files (by uploaded to a common data platform) and collaborate with other disciplines on a regular basis.
- Act as the main contact for BIM-related issues with all relevant project stakeholders and oversee collaboration between all stakeholders.
- Provide support to BIM Managers from a strategic point of view and act as the main contact for all stakeholders and manage BIM collaboration between them.
- Coordinate with the project team to ensure that final BIM model deliveries are complete and BxP compliant.
- Technology watch, research, and development.
- Ensure installation and maintenance of computer equipment, both mobile and fixed, where applicable.
- Coordinate the delivery of the models of each stakeholder, especially those of the contractors and subcontractors, for their construction models and shop drawings and those that will follow.
- Track the exchange of models via the project site and track their progress, especially at the final handover and provisional acceptance.
- Track all issues in the Issues list of the ACC Docs module, and ensure open issues are closed by the end of the project.
- Verify the level of detail and control as defined for each phase of the project.
- Manage Revit Links between the models.
- Review, correct, or delegate critical warnings to modelers.
- Identify the needs and actions required on the models and ensure their follow-up.
- Quality control and verification of project files.
- Check the level of development and control as defined for each phase of the project.
- Participate in design review and model coordination sessions.
- Verify that the models are properly organized in the document management system.
- Ensure that 2D documents extracted from the BIM models of their discipline comply with the requirements of this BxP.
- Defines the model Coordinates and is responsible for the discipline central file
- Validate 3D coordination by visual review and interference detection
- Addition of information to the models provided for 4D and 5D analysis, to be determined during the construction phase with the General Contractor.
- Site Logistics (4D)
- Model-based quantification to estimate costs (5D)
- Verify the level of detail and control as defined for each phase of the project.
- Control the creation of new models.
- Create federated models if required. (Federated models combine the working MEP, ARCH, etc. models into one model)

5. COLLABORATION

5.1. Meetings

Meetings for interdisciplinary BIM coordination are required and must be carried out throughout the duration of the project per the direction of the Prime Consultant. Refer to contract documents for required list of meetings. The Prime Consultant will act as a facilitator and is responsible for including appropriate BIM representation at all meetings. The presence of project managers may be relevant from time to time.

5.2. Collaboration Requirements

Standard model exchange will take place weekly on the ACC platform. Additional exchanges will be at the discretion of the Prime Consultant in cooperation with participating stakeholders (to be discussed at the first BxP meeting). Once the Subcontractors are involved, they will share their models/documentation via **Autodesk Construction Cloud (ACC)**.

When a team publishes a package, it is the responsibility of each other team to review and consume this package in a timely manner. All published models are available to all project stakeholders through the Shared folder. These models are for review and markup only. All versions are maintained on the platform and can be reviewed and compared at any time.

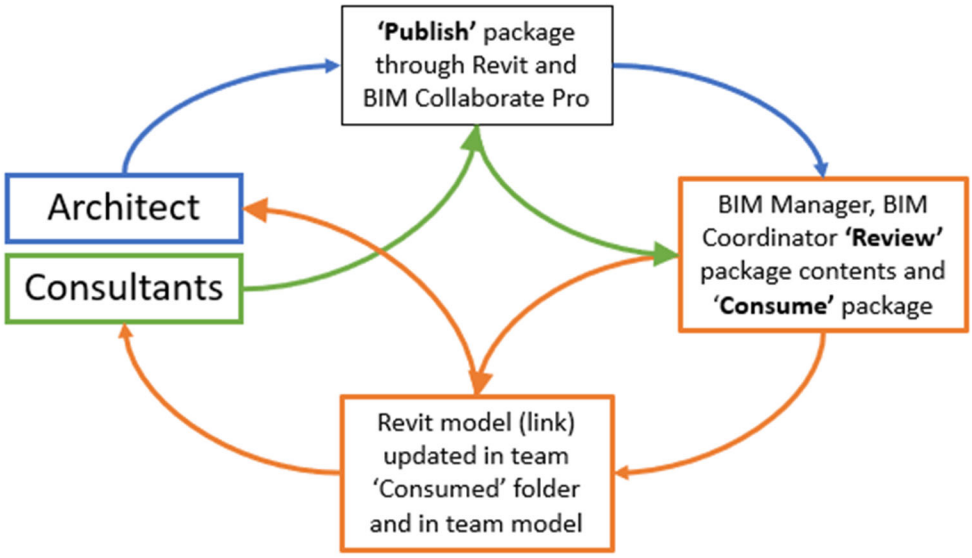
The Prime Consultant will be responsible for overseeing collaboration and resolving BIM related questions or issues as required.

Software version to be used on the project should be the most recent and must be agreed upon prior to documentation start. Use of alternate versions will be at the discretion of the Prime Consultant.

SOFTWARE	STORAGE TYPE	COLLABORATION USE	PROJECT MEMBER
Autodesk Revit	ACC Docs/ Collaborate Pro	Design Authoring, design review, visual 3D coordination	Design consultants and client
Autodesk Civil 3D	ACC Docs/ Collaborate Pro	Master Coordinates and 3D Topography	Civil Consultant
Autodesk AutoCAD	ACC Docs/ Collaborate Pro	Early schematic design	Consultants not using Revit
Autodesk Navisworks Manage	ACC Docs /Collaborate Pro	3D Clash detections, federated models	Design Consultants and GC

5.3. Model Sharing method

All models shall be shared according to standard ACC publishing standards (see image below). The method of cross-discipline file linking will be standard Consumed content unless otherwise directed by the Prime Consultant

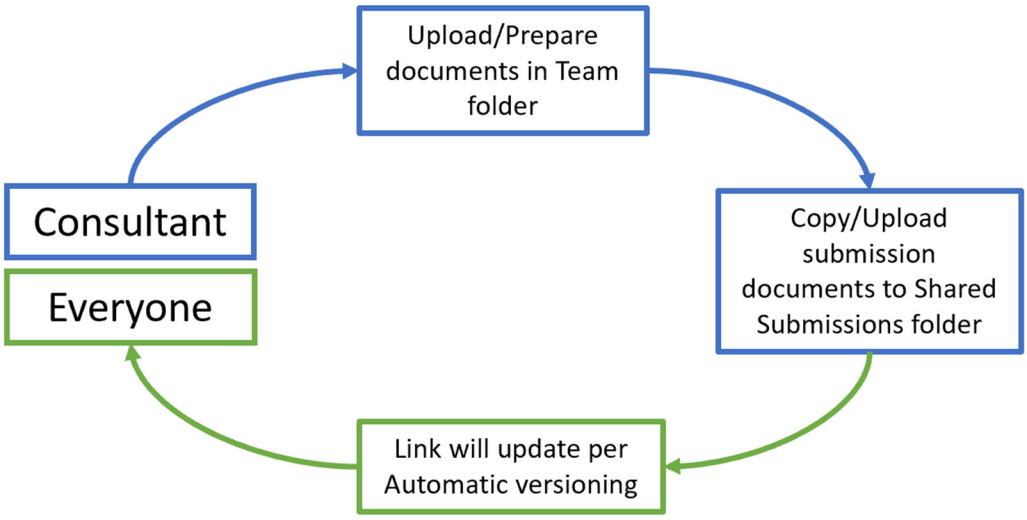


5.3.1. Non-Revit Document Submission Workflow

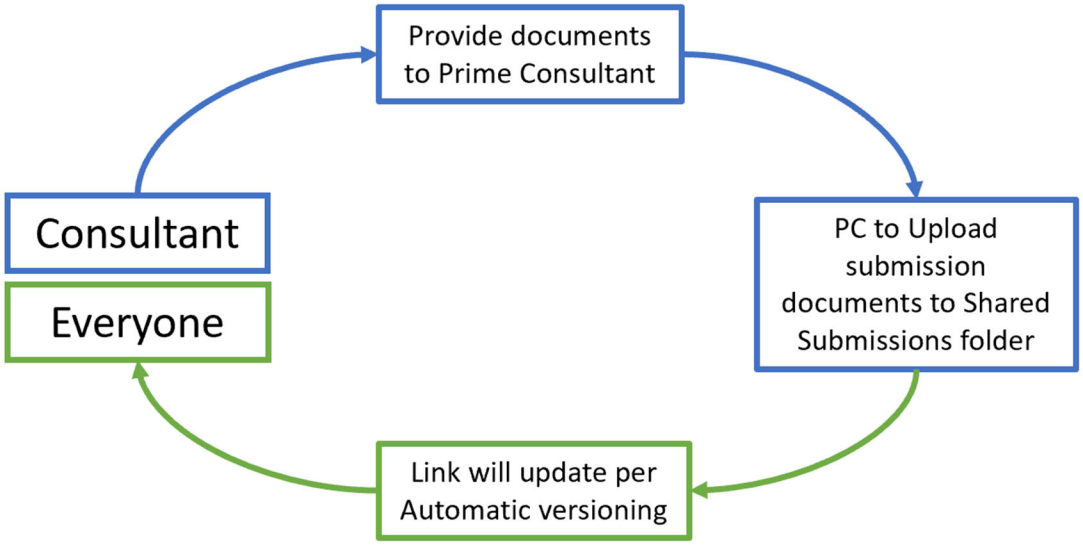
Any team not using the typical Revit ACC workflow (eg. AutoCAD) will submit weekly coordination packages per the Shared Submissions folder where all other teams will have access. All teams will review and link to these document sets as necessary for coordination.

The following workflows apply:

If a team is working within the ACC platform, but not in Revit:

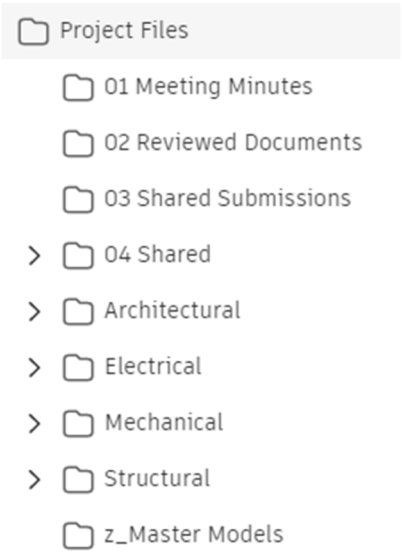


Or, if the team is *not* working within the ACC Platform:



5.4. Document management

Project folder structure will include, but is not limited to, one folder per discipline/consultant, and additional folders as follows:



01 Meeting Minutes

All meeting minutes, regardless of software used to record initially, shall be uploaded by the Prime Consultant to **01 Meeting Minutes** folder in PDF or Microsoft Word format.

02 Reviewed Documents

This folder is for project documents that have been approved in the 99% Design Review workflow. All documents reviewed in a 99% review will be copied here and will be regarded as the most current document set.

03 Shared Submissions

This folder is for documents originating outside of the ACC environment through direct submission or communication with the Prime Consultant, such as Shop Drawings or other subcontractor documents.

04 Shared

This folder is a default folder, accessible by Everyone. It will automatically collect the latest of all published package documentation.

Discipline Folders

These folders are to be accessible only to the people directly related to each discipline. These permissions will be assigned by the Queen's Project Manager as directed by the Prime Consultant and/or each discipline.

Each discipline will have complete control over the internal structure of their team folder.

5.4.1. z_Master Models Folder

This folder is for the initial transfer of Queen's University current record models from the 001 Master Buildings project. Each discipline shall download their discipline model from the z_Master Models folder and workshare it back to their team folder to begin project work.

5.5. Access Rights

Queen's University staff will have Account Administrative and Project Administrative Access to all projects on their Hub. Each discipline will have at least one user with Folder Control access to the project folder. The Queen's Project Manager will be responsible for adding the Prime Consultant and all Queen's staff to the project. The Prime Consultant will be responsible for inviting and assigning roles to all other project participants. Standard roles and their permissions are outlined below:

ROLE	PERMISSION SET
Queen's BIM Manager	Project Admin, Folder Control
Queen's Electrical Engineer	Project Admin, Folder Control
Queen's Mechanical Engineer	Project Admin, Folder Control
Queen's Project Manager	Project Admin, Folder Control
Queen's Sustainability	Project Admin, Folder Control
<All other Queen's Staff/roles>	Project Admin, Folder Control
Prime Consultant	Project Admin, Folder Control

Project Manager (discipline)	Project Member, Folder Control (discipline)
BIM Manager (discipline)	Project Member, Folder Control (discipline)
BIM Coordinator (discipline)	Project Member, Folder Control (discipline)
BIM Author	Project Member, View+Download+Upload+Edit

For the addition of any users not outlined above, confirm with Prime Consultant or Queen's Project manager as to the access required by the new user.

5.6. Coordination of Deliverables

Each discipline will manage its own submissions within the ACC Platform. Those not using ACC will coordinate directly with the Prime Consultant.

Production work requiring links to other discipline models/files will be done using standard Low Trust file linking or as specified in RFP documents. Prime Consultant to coordinate.

Creation of static milestone documentation shall be coordinated by the Prime Consultant.

5.6.1. Model Linking Methods

The typical Design Collaboration method for linking models between disciplines is accomplished using the "low trust" method of linking a published document from a Consumed folder. This method is outlined in section 5.3.

In the event that this workflow is insufficient or more involved than necessary given the scope of the project, the Prime Consultant can authorize the use of a "high trust" linking method, whereby all authoring model source files are linked directly into each disciplines' production model. This method facilitates immediate visibility into ongoing work by all teams thereby removing the necessity to wait for scheduled published packages to be reviewed and consumed.

This method will require each team folder to be accessible by each other discipline in order to be able to link directly to the production model. The Prime Consultant will be responsible for permission sets.

5.6.2. Imported Files

Absolutely no files should be Imported into the project, such as CAD (dwg) or PDF files. All files *must* be linked unless approved by the Prime Consultant. Upon the approval of an imported file, under no circumstances should that import be exploded into the main model file. *This will cause irreparable damage to the model.*

6. QUALITY CONTROL

6.1. General

Each discipline is responsible for auditing their work before all official submissions. Additionally, the BIM Manager of each discipline must verify the model meets the standards and BIM objectives contained within the Revit BIM Interoperability Tools Model Checker check set provided by Queen's University.

Results in the form of a .pdf file will be provided with each standard submission (i.e., 33%, 66%, 99%, per contract documents). Only the Record Model submission must reach 100% pass rate. All other submission scores are for internal quality control and progress tracking. Record Model scores that do not meet 100% pass rate will be subject to the review of the Prime Consultant and require resubmission after revisions.

6.2. Interference check

Detection of collisions between different modeled elements using Navisworks or ACC Model Coordination is required. BIM Manager of each discipline shall check their own models prior to publishing. Each team will create a Coordination Space within the ACC Platform in order to clash specific disciplines. Prime Consultant will be responsible for organization and distribution of clash detection related Issues.

Prime Consultant will determine format and distribution of any required clash detection reports. Clashes are to be created as Issues and managed from the ACC platform as well as within Revit and Navisworks.

Use this matrix to make interference detections in the correct order.

DISCIPLINE	ARCHITECTURE	STRUCTURE	HVAC	PLUMBING	ELECTRICAL
ARCHITECTURE	PREREQUISITE				
STRUCTURE	1_A-S	PREREQUISITE	2_V-S	4_T-S	8_E-S
HVAC	3_A-V		PREREQUISITE	5_T-V	9_E-V
PLUMBING	6_A-T			PREREQUISITE	10_E-T
ELECTRICAL	7_A-E				PREREQUISITE

This table indicates the ideal order in which the checks should be done (1 first, followed by 2 etc). The letters following the numbers are a summary of the two disciplines involved. For example, 1_A-S = First Check of Architecture with Structure; 2_V-S = second check, HVAC and Structure.

The Prime Consultant remains responsible for the total coordination of the project.

7. DELIVERABLES AND PROCESSES

7.1. General

The following table proposes different deliverables related to the role responsible in relation to the various stakeholders involved.

The Prime Contractor is in charge of monitoring the Queen's-owned **ACC DOCS** environment, checking conflicts between disciplines, users who have access, their access levels, and the history of their activities. When packages are "published", the version in the Shared folder is updated. Version tracking is done automatically, and it is possible to compare changes between two versions and access the history of all versions.

7.2. Deliverables Matrix

Deliverable	Construction Manager	Architecture	Structure	MEP	Civil
BIM Execution Plan	■				
Architectural Models and Plans		■			
Structural Models and Plans			■		
MEP Models and Plans				■	
Models and Civil Plans					■
Templates and Site Maps		■			
Specialized and Manufacturing Contractors' Plans and Models	■				
Creation and maintenance of families (by discipline)		■	■	■	■
3d scan or Drone during construction	■				
As constructed (point cloud)	■				
Models as built	■				
IFC Model for Verification		■	■	■	■
IFC Model for Archiving		■	■	■	■

7.3. Calendar of deliverables

The schedule of deliverables should be coordinated with the project completion schedule.

Refer to RFP document(s).

7.4. Format of deliverables

For the purpose of assisting construction, the BIMs developed by the consultant will be used, evolved, and transferred in the following sequence:

1. BIM Tender Model (BTM): to the owner for their records in the form of native BIM format.
2. To the RFP candidates at 100% CD Development for the purpose of completing the working drawings and specifications for the preparation of a formal written bid.

Note: The BTM may be amended during the bid process via addenda.

3. The BIM Record Model (BRM) shall be transferred to the owner by the consultant in native BIM format.

4. The owner shall retain the right to use the BIM model, the BTM, the BIM Issue for Construction Model (BIFCM), and the BRM as necessary through life maintenance, repair, and modification of the building without recourse to the consultant and / or Constructor.
5. The last Revit file sent to the owner to be purged and compacted and a procedural document explaining how the model works, how to navigate it, etc., must be provided at the same time. All unnecessary or unused elements (view templates, view filters, tables, families, views, unnecessary work planes, etc.) should be removed from the document.
6. A Federated Revit file is also requested in native format (rvt) and Navisworks (nwc)

7.5. Required file formats

The following file formats are required at all major releases and milestones, such as for bid, construction, as built, etc.

- PDF, DWG, RVT, NWC.

8. BIM MODEL MANAGEMENT

8.1. List of Software and Versions

All Software used is on the latest version available except where indicated.

BIM usage	Software Requirements	Software of the professional's choice
Architecture	Revit (current version)	
Structure	Revit (current version)	
MEP	Revit (current version)	
Civil	Compatible with Revit (Civil 3D)	Choice of the professional
Estimating		Navisworks Manage, Revit, or equivalent
3D Scan		Recap 360 Pro, Realworks or equivalent
4D Planning		Synchro 4D / Navisworks
Visualization	Revit Cloud Rendering	
Clash Detection		Navisworks Manage, ACC, Revit
Site management		ACC, MS Project, Procore
Revit Plug-ins		CTC Tools, PowerPack
Collaboration	Autodesk BIM Collaborate Pro/ ACC Docs	
Communication	ACC and emails	
Documentation Management	ACC Docs	

Software updates during the project will be coordinated by the Prime Consultant. No firm can change version or update without the approval of the Prime Consultant who will coordinate the change for everyone to avoid versioning or other problems.

8.2. Model Requirements

8.2.1. Design Model

The design Model is to be made available for the Owner's analysis and audit. The model will be uploaded and submitted to the Owner by using the ACC platform at milestones and specific intervals. The model is to be coordinated with all major disciplines as defined in this document.

The model must be used as an analytical tool to investigate architectural solutions while exploring elements of the design. It should assist in the functional program development and validate with

regards to space distribution and functionality. It should facilitate investigations of buildings and energy performance while providing the process for building systems integration.

The BIM model should assist the team with sustainable and green strategies. Material and methods analysis should be an integral process and incorporated into the BIM and related processes.

The Design model is to be made available to inform and assist the construction process.

8.2.2. Tender Model

The Tender model will be submitted to the owner via the ACC platform. They will be made available by the Owner to the bidding teams for reference.

Note: The Tender model may be amended by the Owner during the bid process via addenda.

8.2.3. Construction Model

The Issued for Construction model represents the final Design Model. It will be in Revit and Navisworks format compiled and prepared by the Consultant team. It will be given to the owner and construction manager as part of the Issued for Construction documents. The Construction model will be an editable working model fit for use by the construction manager. The Navisworks model is free to be shared as deemed necessary by the Owner and General Contractor as it is read only.

8.2.4. As-built Model

The As-built Model will be a BIM file compiled and prepared by the Construction Manager.

8.2.5. Record Model

The Record Model will be in Revit and Navisworks format compiled and prepared by the Consultant team. Each discipline will document all RFIs to their discipline. As-built changes marked-up by the Construction manager and issued by the Owner during the construction phase will be captured by the General Contractor. Scope of As-built changes to be agreed upon between Owner and Consultant team. The completed model will be given to the Owner as the Record model upon substantial completion.

8.2.6. Reference file

The goal of Queen's University is to maintain a full campus map of each building and surrounding landscape. This file will contain links to each campus building model together in a master project. This model will be updated as projects are completed. The campus map will contain master site coordinates which will be synchronized with each campus building model. Each new project will start from the existing building model and will contain any necessary site coordinates, structural grids, and datum levels which should not be altered.

All disciplines not already contained in the building model at the beginning of a project must obtain coordinates, grids, and levels from the Architectural model.

The Project Manager to manage project start and confirm the most up to date model is being used and ensure preservation of coordinates, grids, and levels.

8.3. Naming Conventions

8.3.1. Model file nomenclature

Here are examples of descriptions by Discipline, their letter being in parentheses.

In order to standardize the way files are named, here are the nomenclature rules.

Building Number_Discipline_Subdiscipline_Building_RevitVersion.rvt

Note: Each section must be separated by an underscore.

Example of nomenclature:

194_M_PL_PAC_R20.rvt

1st section – Building Number
2nd section – Discipline 1 letter (see tables below).
3rd section – Sub-discipline 2-3 letters (only if necessary; see tables below).
4th section – Indicates the building
5th section – Indicates the version of Revit

ARCHITECTURE (A)	
ENVELOPE	ENV
FURNITURE (IF REQUIRED)	FUR
SITE	SITE

STRUCTURE (S)	
STRUCTURE	STR

ELECTRICAL (E)	
LIGHTING	LG

MECHANICAL (M)	
GENERAL (LEGEND, DETAILS, DIAGRAMS)	GM
VENTILATION AND REGULATION	VR
VENTILATION	VE
REGULATION	RE
PLUMBING	PL
FIRE PROTECTION	FP
HEATING AND COOLING	HC

8.3.2. Nomenclature of worksets

Worksets should be named in a consistent and logical manner to provide an adequate control over the efficiency of the model, allowing for members of design teams to collaborate with clear intent. Workset complexity will be subject to project type and will be at the direction of the Prime Consultant in coordination with disciplines. The use of levels or zones may not be necessary based on the size of the project.

8.3.3. Principles

- Workset1 must not be renamed or used under any circumstances.
- All grids and levels in each model shall be placed on the Shared Levels and Grids workset.
- No special characters and no accents in workset names.
- Each discipline will begin its own Workset names with the single letter defined in section 8.2.1
- Each linked file will be placed on an individual Workset where the letter "L" will follow discipline letter.
- In order to be able to identify them easily, Worksets that do not need to be opened by other disciplines must begin with the letter Z. *(Z will take priority over all other nomenclature)*
- Each building is to be divided, horizontally or vertically, into levels or zones. *(Must be coordinated between all project participants)*
- Workset content description will follow all above naming conventions.

Example: **Z-L-discipline-level and/or zone-content description**

WORKSET NAME	EXAMPLE OF USE
A L01 CORE	Core elements on Level 1 within the Architectural model
Z S L ARCH MODEL	Linked Architectural model within the Structural model, not necessary to be opened by others
M DUCTS	Mechanical workset containing ducts, small project, no zone, or level required
A L04 EAST INTERIORS	Architectural model, Level 4, East zone, interior partitions (incl. doors)
A WEST CORE	Architectural model, West zone, vertical core elements spanning all levels

8.3.4. Nomenclature of Parameters & Parameter Data

It is understood that the general families of the project will not have rules of global nomenclature and that each discipline will be able to use its own families. All families brought into the Queen's University Revit template will have project parameters applied to them and it is the responsibility of the disciplines to ensure all required parameters contain the relevant information. Some parameter values will be reviewed by the Model Checker.

The parameters will present themselves within the Instance Properties of the elements and will have the prefix "QU_". Discipline specific parameter names will have a 2-letter abbreviation of the discipline following the "QU_", e.g., QU_EL_ for Electrical. All parameters will be present in the Revit Template at project start and no additional parameters shall be necessary unless specifically required on a per project basis. Prime Consultant to authorize all new parameters.

If a new parameter is required, such as any parameter not included in the Queen's parameters list, it must follow the nomenclature outlined here:

QU_Discipline_ParameterName

Note: Each section must be separated by an underscore.

Example of nomenclature:

QU_GE_InstallationDate

Discipline	Abbreviation
Mechanical	ME
Electrical	EL
General	GE

8.3.4.1. Date Format

All parameters requiring a date entry must follow YYYY/MM/DD format.

E.g., 22/06/27

8.3.4.2. Equipment Tags

All Equipment Tag (QU_GE_EQUIPMENT TAG) values must be unique. In the case of multiple pieces of identical equipment, a number will be added to individually identify each instance. E.g., AHU1 & AHU2

For details on equipment abbreviations refer to Queens University Naming Conventions Standards documents: https://www.queensu.ca/facilities/building-design-standards.

8.3.5. Titleblocks

Queens University maintains three titleblock sizes – 24x36, 18x24, and 11x17. These will be provided as part of the Queen's University Revit Template and shall be used by all disciplines.

8.4. Native object components

Model components shall be native to the Revit platform. Unless otherwise agreed, components shall not consist of .DWG, .SKP, .OBJ, .SAT imports, etc, within Revit components, as this can increase risk of unstable families and corruption of the project file.

8.5. Detail items

Unless otherwise stated in the Level of Development below, detail lines, filled regions, and detail items shall not be used for defining any objects in the model (only at detail level). Symbolic lines or Detail items within families may be used (as component report counts and data). Also, 3D Generic geometry may be used in some locations, but shall always occupy the maximum dimensions of the object it's representing.

8.6. Space and Room naming

Numbering and naming are to be determined by architect in consultation with Prime Consultant.

8.7. Model Phases

Shall be the same for all disciplines and be agreed upon in the BIM Execution Plan meetings.

8.8. Project lineweights

Lineweights are defined in Queen's University Revit template.

8.9. Level of Development (LOD)

We define the level of development of the models according to the type of deliverable. Typically, the closer you get to the submission for construction, the higher the level of development of the models will be. The progress of a BIM model is therefore measured according to its level of development. (ref: BIM forum 2021, GSA). Refer the additional LOD document...