Facilities Construction Commission



State of Ohio BIM Standards | OHIOBIMS

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1. Overview of BIM

Building Information Modeling (BIM) represents a fundamental shift in how building projects are planned, designed, constructed, and operated. The National BIM Standard, United States Version 4 (NBIMS-US V4), defines BIM as "a digital representation of physical and functional characteristics of a facility" that serves as "a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life cycle; defined as existing from earliest conception to demolition".

BIM moves the architecture, engineering, and construction (AEC) industry away from a traditional document-centric approach toward a data-centric approach. Rather than producing separate, disconnected drawings and specifications, BIM creates an integrated information model where building components are represented as intelligent objects containing both geometric properties (shape, size, location) and non-geometric data (manufacturer, model number, performance specifications, maintenance requirements).

The Owner BIM Standard (OHIOBIMS) establishes a consistent framework for the creation, delivery, and management of BIM models across Ohio Owner capital projects. This standard addresses the significant variation in BIM maturity across agencies including Owner, the Department of Administrative Services (DAS), Ohio Department of Transportation (ODOT) ,the Department of Veterans Services (DVS), the Department of Rehabilitation and Correction (DRC), the Department of Youth Services (DYS), and Ohio Department of Natural Resources (ODNR)) by providing a flexible, scalable approach that accommodates agencies ranging from no current BIM implementation to advanced workflows with building automation system integration.

OHIOBIMS applies to projects whose procurement and execution of contract documents incorporate it. The procurement package identifies the applicable editions, BIM Uses, model deliverables, AIR tier and project-specific requirements.

1.1. BIM Goals and Benefits

The implementation of BIM across Ohio Owner projects is designed to achieve specific, measurable improvements in project delivery and facility operations. These goals are grounded in documented challenges from the needs assessment conducted in Ohio in 2025-2026, and validated benefits from industry case studies, including Ohio State University's successful 10-year BIM program.

Primary Goals

Reduce Asset Information Onboarding Time

It may require up to 1-2 years to populate facility management systems with asset information after project completion. BIM implementation targets reduction to 2-3 months through automated data exchange, eliminating manual transcription errors and enabling faster response to maintenance needs.

Establish Standardized Information Delivery

The absence of consistent data formats across projects forces agencies and contractors to create project-specific solutions, increasing costs and preventing information sharing between agencies. OHIOBIMS creates a single standardized delivery format that contractors learn once and can apply across all Ohio state projects, thereby building industry competency and competitive advantage.

Enable Data-Driven Facility Management

Owners currently operate with reactive maintenance approaches due to incomplete asset information and lack of spatial context. BIM provides the foundation for preventive and predictive maintenance by delivering complete equipment specifications, warranty information, maintenance requirements, and visual spatial location accessible on mobile devices in the field.

Support Full Lifecycle Information Management

Building information created during design and construction is typically lost or inaccessible during the operational phase, which represents 80-85% of total facility lifecycle costs. BIM ensures that information persists from earliest planning through operations, renovations, and eventual decommissioning. The BIM process supports more-efficient capital planning, space management, energy optimization, and regulatory compliance.

Documented Benefits

For Owner Owners

- Work order closure time improvements with enhanced asset/system location data
- Reduced asset downtime from enhancement to preventive maintenance planning
- Improved capital planning with data-driven facility condition assessments
- Enhanced training for new maintenance staff using visual spatial information
- Better coordination between design and operations teams
- Ability to share information across agencies when needed

- Foundation for future digital twin and loT sensor integration

For Design Professionals

- Clear, upfront expectations that reduce risk and enable more accurate cost estimation
- Single standardized workflow for all Ohio state projects
- Reduced coordination conflicts through clash detection and interference checking
- Automated quality validation at 30%, 60%, and 90% milestones
- Better documentation of design intent and Request for Information (RFI) responses integrated into record models
- Competitive advantage with agencies adopting BIM standards For Contractors
- Standardized requirements across all state projects enabling established workflows
- Reduced rework and field conflicts through coordination modeling
- Improved fabrication and prefabrication opportunities
- Better schedule optimization and labor efficiency
- Clear acceptance criteria preventing disputes
- Elimination of vague specifications requiring conservative bidding For Facility Operations Staff
- Visual wayfinding to locate equipment and system components
- Immediate access to manufacturer information, model numbers, and specifications
- Clear system connectivity understanding for troubleshooting
- Mobile device access to building information in the field
- Reduced learning curve for new staff
- Better emergency response with critical system information readily available

1.2. BIM Implementation Approach

The Ohio BIM Standard employs a phased, scalable implementation strategy designed to deliver immediate value while building toward advanced capabilities. This approach is informed by lessons learned from the National BIM Standard framework, Ohio State University's extensive BIM deployment, best BIM practices learned from Federal agencies (the General Services Administration (GSA) and the Department of Veterans Affairs (VA)), and the specific needs and constraints identified across Ohio Owners. Compliance with Federal, State and Private Industry Best Practices OHIOBIMS is developed in direct response to and full compliance with Ohio Revised Code Section 153.01, as amended by House Bill 96 (effective September 30, 2025), which authorizes the Owner and the State Agency ("Owner") to require architects and engineers on public works projects valued at $200,000 or more to use a Building Information Model system based on a nationally recognized standard. OHIOBIMS satisfies this statutory requirement by adopting the NBIMS-US V4, 2023, published by the National Institute of Building Sciences (NIBS), as its foundational framework.

From a private industry perspective, OHIOBIMS incorporates best practices drawn from Ohio State University's decade-long BIM implementation journey – the most successful owner- driven BIM program in the state – which demonstrated that consistency, contractual enforcement, and industry participation in standards development are the critical factors that transform BIM from an optional tool into a reliable, scalable program. For a project expressly adopting the State-defined classification pathway, use the approved State asset, space, system and element code lists identified by edition in the project AIR. Publish the corresponding FIM field mappings and validation rules before enforcement. Firms may retain classifications they are authorized to use internally when deliverables map to that approved baseline.

Together, these alignments ensure that OHIOBIMS is not an isolated state program, but a fully integrated part of the national BIM ecosystem interoperable with federal agency requirements, enforceable under Ohio law, grounded in documented Owner needs, and built on proven private sector practices. Information-centric BIM Approach / Prioritizing Data Over Geometry Following industry best practices, OHIOBIMS prioritizes structured asset data over geometric detail. With this approach, the main focus is to enable the BIM model to serve as a vehicle for data collection and spatial organization. This enables the BIM to be used not just for construction- phase clash detection, but for long-term asset

maintenance over the facility lifecycle. OHIOBIMS requires that asset information is able to:

- Persist independently of 3D geometry
- Be extractable in standardized format (agency-neutral)
- Map to each agency's specific CMMS requirements
- Include clear data ownership (who captures, when in lifecycle, who maintains post-delivery)
- Be validated at each project milestone, not only at closeout

As noted above, for Owners with limited BIM experience, OHIOBIMS allows for a Minimum Viable BIM model to be used to support this asset data, with the geometrical detail left to be determined by the needs of the design and construction managers.

Technology-Agnostic Approach

OHIOBIMS is deliberately technology-agnostic regarding software platforms, as this standard:

- Specifies open, non-proprietary exchange formats — including Industry Foundation Classes (IFC) for graphical/relational data, the State of Ohio Facility Information Matrix (FIM) tabular schema for asset information, and gbXML for energy/analytical data — ensuring interoperability across platforms and vendors
- Allows agencies to maintain existing CMMS platforms
- Focuses on data content and structure, not software choice
- Future-Adaptable Design: The OHIOBIMS approach requirements are designed to easily adapt to and actively encourage new technologies. The use of standardized data in particular enables rapid evaluation of new technologies, for example:
    - Digital twin platform software is designed to consume standardized data
    - Internet of Things (IoT) integration systems are designed for standard formats
    - Augmented Reality/Virtual Reality (AR/VR) applications work with open data structures
    - Artificial Intelligence (AI) and analytics tools require consistent data schemas

Note:

Although the OHIOBIMS are technology-agnostic, Section 3.0 "Building Information Modeling Standards" and the "BIM Practical Guide" do provide detailed implementation details on how to conform to these standards using the Autodesk Revit software platform. This standard recognizes that the majority of Delivery Teams will be using this software. A non-Revit pathway may be accepted when its IFC-compliant deliverables satisfy the project AIR and documented geometry, coordinate, identifier, property and exchange checks. Record the pathway and validation evidence in the BEP. Product-specific authoring arrangements are implementation guidance unless expressly required by the project contract.

2. Building Information Modeling Standards

The following sections describe the standards and procedures which architects, contractors and consultants must follow in order to conform to the OHIOBIMS Standards. The architects, contractors, consultants and any of their subcontractors are collectively referred to in this document as the "Delivery Team."

2.1. Project BIM Requirements

2.1.1. Project Deliverables

All projects require the following deliverables:

- BIM Execution Plans (BEP) utilizing the Owner Project BEP Template. The procedures and milestones for delivery of each required deliverable shall be specified in the BEP .
- All BIM model deliverables will conform to the requirements defined in 3.0 Building Information Model Standards and, if applicable, 4.0 State Agency Specific BIM Requirements.
- Data deliverables are defined in the Owner Asset Information Requirements (AIR).

2.1.2. Quality Management

Governance and Roles

Each project's BEP requires the Delivery Team to identify the BIM representative, project BIM manager, and discipline/trade BIM leads, with explicit responsibility for Quality Assurance/Quality Control(QA/QC) of models and data exchanges.

BEP and Quality Planning

The Delivery Team is responsible for complying with the Quality Control procedures they have submitted in the Project BEP . The Project BEP will document the procedures followed to assure that the model deliverables conform to the Owner Building Information Model Standards and the State Agency Specific BIM Requirements (described in Sections 3.0 and 4.0, respectively). The Project BEP is reviewed by the Owner for approval prior to project kick off.

The BEP must document how BIM will be implemented, coordinated, and checked, including a dedicated QA/QC section describing how quality will be planned, assured, and controlled.

Quality Assurance (QA)

QA defines the required and recommended modeling processes. Each QA task must identify a named responsible team member in the BEP , and QA expectations should be incorporated into project contracts. Required QA activities:

- Definition and validation of a testing/prototyping process to confirm that models meet minimum modeling requirements before full production.
- Validation that resources (skills, staff, tools) are available and capable of performing required modeling and coordination.
- Review of information exchange definitions so that deliverables are clearly defined, unambiguous, and aligned with contract requirements. Recommended QA activities:
- Periodic reviews of modeling procedures to confirm they remain consistent with the BEP .
- Documentation of the final modeling process for future reference and continuous improvement. Quality Control (QC) QC tests verify that BIM deliverables meet the Owner and Owner Specific requirements (Sections 3.0 and 4.0). Required QC checks on all model/data deliverables:
- Verification of metadata against BEP requirements, including date of submission, file type and name, access instructions, content description, data schema, and relevant exchange standards.
- Validation that the submitted files use the correct type, naming convention, software version, and coordinate system, and that all models share a common coordinate basis.
- Validation of content against information exchange standards by:
- Manual sampling of elements to confirm structure and accuracy .
- Visual inspection of models to check general completeness and obvious errors.
- Verification that clashes have been resolved per BEP-defined tolerances and criteria. Recommended QC practices:
- All team members must "check what they receive" (incoming models/files) for valid fields and expected information and report any anomalies to the project BIM Manager.
- Maintain a Project Data Submission Log, to be reviewed regularly by the BIM Manager, capturing submissions, noncompliance issues, and corrective actions.

2.1.3. Information Security

A project Security Plan shall be submitted within 30 days of contract unless otherwise specified. the Owner BIM projects will be managed within the requirements mandated by the Ohio Office of Information Technology (OIT) ITS-SEC-02 Enterprise Security Controls Framework. Where any personal information may be documented, Ohio Revised Code (ORC) 1347 requirements must also be followed. Security and Cybersecurity Security Plans shall address:

- Compliance with Ohio IT security policies
- Data encryption standards for file transfers
- Access control procedures for the CDE
- Cybersecurity protections consistent with State IT requirements

Confidential, Unclassified, or Sensitive Information

The Security Plan shall include the definition of how the project team will manage controlled and sensitive information. If the project includes controlled or sensitive information, access to this information shall be limited to specified roles and shall be segregated in the CDE. Handling procedures shall comply with Ohio Revised Code 149.433 and applicable Owner data classification policies.

Data Separation

The Security Plan shall include data separation requirements. The contractor shall establish and maintain a list of shared content and access rights. Should anyone leave the project, their access credentials should be immediately removed.

Sensitive information

For projects involving sensitive facility information (e.g., security systems, infrastructure vulnerabilities), the Owner shall designate which data elements are controlled and require segregated access per ORC 149.433 (public records exemptions for security records).

Data Storage Requirements

The Security Plan shall include a definition of data storage requirements. Cloud-based storage platforms must be approved by the Owner's IT department and follow Ohio IT policies. In addition, there may be agency-specific data storage policies.

Continuation of Operations and Disaster Recovery

The continuity and disaster-recovery plan shall identify backup responsibilities and frequency, restoration procedures, agreed recovery objectives, recovery-test arrangements, incident contacts and continuity of access to issued information. The BEP shall include or reference the approved Information Security Plan/Data Security Protocol rather than maintaining conflicting parallel plans.

2.2. Management Processes and Oversight

The State of Ohio BIM Standards Management Processes and Oversight requirements conform with the structures outlined in NBIMS-USv4 as well as with existing the Owner contracting requirements.

2.2.1. BIM Lifecycle Management

Across the project lifecycle, BIM shall be used in a sequenced and connected way, with models and data progressively developed and reused. This should be guided by the project specific BIM use cases defined in the BEP . Essential lifecycle BIM Uses shall include at least: Existing Conditions, Design Authoring, Design Review, 3D Coordination, and Record Modeling. Enhanced and owner-related uses (such as cost estimating, 4D planning, asset management, and space management) shall be selected based on State Agency goals and documented in the BEP .

Planning and Existing Conditions:
Develop existing condition models and site information using appropriate methods (survey, scan, legacy drawings) to support early feasibility and programming.

Design:
Use design authoring models as the basis for construction documents, coordination, analysis, and model-based reviews.

Construction:
Develop construction and trade/fabrication models from the design intent models for coordination, clash detection, and construction planning.

Turnover:
Produce as-built and record models, plus structured operations and maintenance data, as defined in the BEP .

Operations:
Use record models and associated project data to support asset management, space management, maintenance scheduling, and other owner-related BIM Uses.

2.2.2. Model Definitions and Expectations

Model types and their relationships shall be defined so that information can progress logically between phases.

Design Intent Model:

Primary design model prepared by the design team, used to generate contract documents and support coordination and analysis.

Construction Model:

Models developed from the design intent model by the construction team and trades, reflecting fabrication and installation details and higher Level of Development (LOD) where needed.

As-Built Model:

Models capturing conditions at completion of construction, based on design intent and construction information, updated as work is completed.

Record Model:

Lightweight, operations-focused models derived from the design intent model and updated with verified as-built and commissioning information for long-term use.

Operations and Maintenance Data Model:

The Operations and Maintenance Data Model, when requested, is intended to be used by the Owner for facility management purposes after project delivery. It will include an as-built BIM optimized for operations, as well as structured tabular asset inventories conforming to the State of Ohio Facility Information Matrix (FIM) schema that include asset identifiers, location, classification, manufacturer, model, serial number, warranty, and maintenance attributes.

2.3. BIM Execution Plan (BEP)

The BEP is a management document which defines the process for Owner and Delivery Team Members to develop a Project BIM model. The BEP outlines the use cases to support further operations of a facility or asset(s); the process for information development and use; the definition and scheduling of information deliverables; and the clear definition of roles and responsibilities of the parties.

The BEP shall address the complete facility lifecycle from planning through design, construction, commissioning, operations, and eventual renewal, consistent with the State of Ohio's goal to integrate BIM data into facility management systems for asset management, space management, preventive/predictive maintenance, and energy management.

The BEP addresses the project's contracted BIM Uses and information exchanges across the applicable lifecycle stages. It does not independently expand a party's services, liability, compensation or contractual scope.

Requirement of Use and Participation

The Delivery Team shall define all BIM Uses in accordance with the Owner and Owner-specific requirements, and document them within the BEP . The BEP shall be delivered as defined in the Deliverables section of the contract. All members of the Delivery Team shall be required to adhere to the processes defined in the BEP after it has been approved by the Owner.

Required BEP Elements

The Owner BEP template includes all required elements to conform to NBIMS-USv4 BEP Module, including:

1. Project information and contacts
2. Project milestones and schedule
3. BIM goals and objectives
4. Organizational roles and BIM responsibilities
5. BIM Use Cases and implementation phases
6. MET defining authorship and Level of Development (LOD) progression
7. Collaboration procedures and meeting schedule
8. Technology infrastructure and software platforms
9. CDE framework
10. Quality control procedures and reporting
11. Information exchange requirements and formats
12. Deliverables schedule
13. Detail final turnover requirements

The Owner BEP template will also include:

- Identification of the Ohio State Plane Coordinate System zone
- Mapping of model data to the State of Ohio Facility Information Matrix (FIM), which defines the required worksheets, field names, data types, and relational keys for asset information delivery
- Procedures for data handover to state facility management systems
- Integration approach for BIM-GIS workflows where applicable

Prepare the BEP as soon as practical after the contract date and when new BIM Users are added, subject to the project's stated submission deadline. Modifications to the BEP and incorporated standards shall follow the applicable contractual change procedure. Under Exhibit §3.1.4.1, adjustment claims arising from received BEP protocols require notice to the Contracting Authority and Owner within 30 days of receipt; failure to give notice waives those claims. The workflow demonstration occurs within 30 days after BEP acceptance, unless amended under the Contract. Required demonstration-related revisions are resubmitted within 10 business days. These are separate from the 30-day receipt/notice period.

BEP Deliverable Approval Process

Within thirty (30) days after the acceptance of the BEP , a demonstration from the Delivery Team shall be given to the Owner to review the BEP for clarification, and to verify the functionality of BIM technology workflow and processes. If modifications are required, the responsible Delivery Team members shall complete the modifications and resubmit the final BEP for acceptance within 10 business days.

The BEP approval demonstration should include:

- Walkthrough of the CDE structure and access controls
- Demonstration of file naming conventions and version control
- Review of model checking workflows and QC procedures
- Confirmation of coordinate system alignment
- Review of data export procedures for facility management integration

2.3.1. Roles and Responsibilities

The Delivery Team shall document all Roles and Responsibilities in the BEP . This includes identifying a BIM Manager or multiple BIM Managers who will oversee the Model Authors' compliance with the modeling requirements and the BEP. The BIM Manager(s) will also schedule and manage BIM related meetings and oversee BIM QA/QC. At a minimum, these roles will include:

State Agency Project Manager

Defines Owner's Project Requirements, BIM goals, BIM deliverable requirements, and organizational standards. Coordinates with the State of Ohio BIM Manager throughout the project and approves interim and final BEP documents.

State of Ohio BIM Manager

The Owner technical resource who reviews BIM Deliverables for compliance. Also facilitates the handover to CMMS/CAFM/AM systems for the Owners. Is responsible for coordinating with State Agency Contracting Authorities to plan, develop and coordinate projects with BIM requirements and will work with State Agency Project Managers to assist with reviewing and approving BIM deliverables on those projects.

The State of Ohio BIM Manager is also responsible for BIM closeout activities — managing the data handover and asset information verification, coordinating the integration of commissioning data into the FIM and SAID, verifying that the closeout data package is compliant with State Owner requirements, and accepting the final handover from the Delivery Team.

Delivery Team BIM Managers

The Delivery Team is the State Agency-engaged firm with primary contractual responsibility for a defined scope of information delivery on a project, together with all architects, engineers, contractors, sub-contractors, consultants, and specialty trades that firm engages in support of that scope. The Delivery Team is led on design contracts by the Lead Design Professional and on construction contracts by the General Contractor or Construction Manager. Multiple Delivery Teams may exist on a single project — one per State Agency contract — and each is responsible for delivering BIM and asset information to the State Agency in conformance with this Standard and the Project BEP. The Delivery Team concept used here aligns with the NBIMS-US v4 information-management framework without introducing additional contractual vocabulary.

Each Delivery Team designates the BIM management roles defined below — the Design BIM Manager, the Construction BIM Manager, and the Discipline BIM Managers — to execute its information-delivery responsibilities under this Standard and the Project BEP. Closeout activities are managed by the State of Ohio BIM Manager, with the Delivery Team providing the handover package and supporting data as required.

Design BIM Manager

The individual designated by the Lead Design Professional, subject to State Agency approval, who serves as the primary BIM management point of contact for the Delivery Team during the design phase. The Design BIM Manager is responsible for developing and maintaining the design-phase BEP; administering the Common Data Environment (CDE) on behalf of the Delivery Team; coordinating BIM activities across the architects, engineers, and design consultants engaged under the design contract; enforcing the modeling and data requirements of this Standard against design deliverables; managing geospatial coordination, design-phase clash detection, and the production of construction documents from BIM; and serving as the Delivery Team's primary liaison to the State of Ohio BIM Manager and the State Agency Project Manager for all BIM-related matters during design.

Construction BIM Manager

The individual designated by the General Contractor or Construction Manager, subject to State Agency approval, serves as the primary BIM management point of contact for the Delivery Team during the construction phase. The Construction BIM Manager is responsible for updating and maintaining the BEP for the construction phase; administering the CDE on behalf of the construction-phase Delivery Team; coordinating BIM activities across the contractors, sub-contractors, and specialty trades engaged under the construction contract; enforcing the modeling and data requirements of this Standard against construction deliverables; managing construction-phase clash detection and resolution; overseeing the integration of asset and metadata content required by the Facility Information Model (FIM) schedules; and serving as the Delivery Team's primary liaison to the State of Ohio BIM Manager, the State Agency Project Manager, and the Design BIM Manager for all BIM-related matters during construction.

Discipline BIM Managers

Responsible for coordination of specific discipline models with the overall construction federated BIM. Each Discipline BIM Manager manages discipline-specific BIM content, submission and exchange of models, and management of the discipline model through the construction process. The Discipline BIM Manager is also responsible for ensuring that any discipline-specific 2D construction plans are generated from the BIM.

BIM Users

Responsible for the execution of their assigned BIM Uses, coordinating with other BIM Users to integrate their BIM work products with the overall federated BIM, reviewing and validating their work products. Model Element Authors (MEAs) shall be identified for all major element categories so that responsibility for content and updates is transparent at each stage.

The BEP shall include a project-specific organizational chart identifying these roles and the individuals assigned to each. Project teams may also identify BIM Coordinators and BIM Users with specific roles and responsibilities.

2.3.2. Common Data Environment (CDE)

Each project shall utilize a CDE as the single, authoritative source for all BIM models and related digital project information for the duration of the Project. All Participants who create, modify, review, or rely on BIM-related information shall use the CDE in accordance with these requirements and the BEP.

Guidance is provided for best practices using Revit/Forma to deliver projects in compliance with OHIOBIMS. Delivery teams may use other platforms internally, provided required exchanges and contractual submissions are published to the designated CDE with the required permissions, version history and audit trail.

Roles and Responsibilities in the CDE

The roles listed below will be assigned in the BEP, as described in the previous section, and will have – at a minimum – the CDE-related responsibilities listed below. Additional roles may also be assigned as the project requires.

State Agency Project Manager

- Designates the CDE platform, sets minimum CDE requirements, and approves the BEP .
- The State of Ohio BIM Manager will act as the primary Owner contact for CDE use and compliance.

State of Ohio BIM Manager

- Ensures Owner requirements are met by the CDE (security, format, backups).
- Reviews and approves BIM and data deliverables submitted through the CDE.
- Approves any material changes to folder structure, access rules, or metadata requirements.

Design BIM Manager or Construction BIM Manager

- Configures the CDE folder structure in alignment with the BEP, with Owner approval, including at minimum: administrative and contractual documents; discipline-specific model folders; shared/coordination model folders; drawings/PDFs and record documents; submittals and reference information; and turnover/closeout data.
- Documents the folder structure and naming scheme in the BEP and pre-populates the CDE at project initiation.
- Administers the CDE in accordance with the BEP.
- Maintains folder structure, permission sets, and workflow rules, and defines and enforces file naming and metadata requirements.
- Manages versioning, archiving, and milestone snapshots.
- Monitors compliance and reports persistent non-conformance to the State of Ohio BIM Manager.

Discipline / Trade BIM Managers

- Ensure that their organization's models and documents are uploaded to the correct CDE folders, with correct naming and metadata.
- Control write access for their discipline's content and coordinate timely publication of Work in Progress (WIP), Shared, and Published information.
- Verify that models issued to other parties via the CDE meet the quality and completeness requirements of the BEP.

All BIM Users

- Use the CDE as the authoritative source for current models and documents; ad hoc exchanges outside the CDE are prohibited unless explicitly authorized in writing.
- Keep CDE access to credentials secure and comply with all data security provisions in the BEP and Data Security Protocol.

Participation Rules

Use of CDE

- All project-related BIM models, PDFs of contract documents, reports, and structured data deliverables shall be stored and shared via the CDE.
- Working, Shared, and Published status (or equivalent) shall be managed using designated folders and/or BIM 360 status fields as defined in the BEP.

Access and Permissions

- Write (edit/upload) permissions shall be granted only within an organization's assigned discipline folders; other users shall have read-only access unless otherwise agreed.
- Administrative/root-level folders shall be controlled by the Owner and the Design BIM Manager or Construction BIM Manager.
- Any request for elevated permissions must be approved by the Design BIM Manager or Construction BIM Manager and recorded in the BEP or CDE configuration log.

Version Control and Archiving

- CDE versioning shall remain enabled; files shall not be overwritten outside the CDE versioning mechanism.
- Deletion of files or versions is prohibited except under an Owner-approved archive policy.
- At defined milestones, the Design BIM Manager or Construction BIM Manager shall create milestone "snapshots" per BEP to preserve issued models and documents.

Coordination and Review

- Models used for cross-discipline coordination must reside in the designated Shared/Coordination folders.
- Only models and documents with status "Shared" or "Published" (as defined in the BEP) may be used for formal coordination, design decisions, or construction activities. Metadata Requirements General All files uploaded to the CDE shall include, at a minimum, the metadata specified below, captured either through BIM 360/ACC attributes or equivalent fields, and maintained current for all versions.

Required Metadata Fields (All Files)

At a minimum, each file shall include:

- Project title.
- Project location.
- Contract or project number.
- Discipline.
- Author or responsible individual.
- Author organization (company).
- Date created and date last modified.

- Version or revision identifier.
- Status (e.g., WIP , Shared, Published/Issued).
- Description of content (e.g., "Level 02 architectural floor plan," "MEP coordination model," "CD issue set").
- Data classification (e.g., public, internal, restricted/sensitive) where applicable.

Additional Metadata for Formal Transmittals and Submittals

For files forming part of a formal transmittal or submittal package, the following metadata shall also be recorded in the CDE transmittal/submittal record:

- Intended recipients.
- Purpose of issue (e.g., review, coordination, pricing, construction, record). Linked specification section(s) or submittal reference(s), if applicable.
- Any Owner- or project-specific tags required by the BEP (e.g., building, phase, zone, system). Responsibility for Metadata The uploading organization (through its Discipline/Trade BIM Lead) is responsible for entering and validating required metadata at each upload or revision. The Design BIM Manager or Construction BIM Manager shall periodically audit metadata completeness and consistency and may reject or require correction of non-compliant uploads.
- File naming requirements shall be defined in the BEP , consistent with the National CAD Standard (NCS) or Owner standards and applied to all CDE content. At a minimum:
    - Model file names shall include a discipline designator and other attributes as defined in the BEP (e.g., A-BLDG21-FP02.rvt)
    - Sheet file names (e.g., PDF) shall include the sheet number and conform to NCS sheet naming (e.g., A-303.pdf).

Component and parameter naming, where managed at file level (e.g., Revit family libraries, parameter schedules), shall follow the conventions documented in the BEP . Data Transmittals and Submittal Packages All formal data transmittals shall be executed through the CDE using BIM 360/ACC transmittal or submittal workflows, or through designated "Transmittals" folders, as defined in the BEP . Each transmittal shall clearly record, within the CDE:

- Contents of the transmittal (file list).
- Version/revision of each file.
- Author and sender organization.

- Recipient(s) and date of transmittal.
- Purpose of issue. Submittal packages stored in the CDE shall include all associated support, source, reference, and linked files necessary to maintain file integrity.

2.3.3. Collaboration Requirements

This section describes the required collaboration roles and processes to perform work for the the Owner which has BIM deliverables. Roles and Points of Contact The State of Ohio BIM Manager will represent State of Ohio requirements, serve as the primary liaison on BIM-related issues, and review and approve BIM deliverables.

The Lead Design Professional shall designate a Design BIM Manager, subject to State Owner approval, responsible for coordinating BIM processes, maintaining the BEP , administering project quality management and data security for BIM, and facilitating model- based reviews and data distribution. Each discipline and major trade (including, but not limited to, architecture, structural, mechanical, electrical, plumbing, fire protection, and key specialty trades) shall designate a Discipline/Trade BIM Lead responsible for:

- Acting as the primary BIM point of contact for that discipline/trade.
- Managing the creation, coordination, and exchange of the discipline/trade model(s).
- Maintaining the integrity and timeliness of discipline/trade BIM content.

Contact details for the State of Ohio BIM Manager, the Design BIM Manager or Construction BIM Manager, and all Discipline / Trade BIM Managers shall be listed in the BEP and kept current throughout the Project. BIM Project Execution Plan and Collaboration Protocols The Design BIM Manager or Construction BIM Manager, with active participation from the Owner and the Project BIM Team, shall develop a BEP that documents how the team will collaborate using BIM throughout the project lifecycle.

At a minimum, the BEP shall define:

- The Collaboration structure, including roles, responsibilities, and reporting relationships for BIM activities.
- File sharing and model-sharing requirements, including systems used to exchange, merge, and visualize models.
- The schedule and frequency of model updates and clash detection checks.
- Tools and processes used for clash detection and coordinated drawing generation.

- Reference the Information Security Plan/Data Security Protocol, including access, data segregation, secure exchange, backup, restoration and archiving. Use one controlled plan with identified reviewers and approval status.

As a condition of participating in the BIM process, all modeling participants shall acknowledge and agree to comply with the BEP , including the collaboration protocols and information exchange requirements. Coordination Meetings and Communication Design kick-off Meeting The Design BIM Manager and the State Agency Project Manager will schedule a BIM kick-off meeting within 30 business days after contract award. BIM Managers and Discipline BIM Managers will attend the kick-off meeting to discuss their particular workflows and requirements for inclusion in the BEP . Construction Kick-off Meeting The Design BIM Manager, the State Agency Project Manager, and the Construction BIM Manager will schedule a kick-off meeting within 15 business days after construction contract award. BIM Managers and Discipline BIM Managers will attend the kick-off meeting to discuss their particular workflows and requirements for updating the BEP .

The Design BIM Manager or Construction BIM Manager shall schedule regular BIM coordination meetings at intervals appropriate to project phase and complexity, during which participants:

- Review the individual discipline models and the federated (combined) models together .
- Discuss design and construction issues using the model as a shared resource.
- Review and resolve identified clashes and coordination issues. Confirm upcoming modeling tasks, deadlines, and responsibilities.

The BEP shall specify:

- Minimum meeting frequency by phase (e.g., biweekly during design coordination, weekly during major construction coordination).
- Required attendees by meeting type.
- Standard agenda items, including status of models, clashes, issues, and upcoming milestones.
- Requirements for meeting minutes and issue/action logs. Key decisions, clash resolutions, and agreed modeling changes arising from coordination meetings shall be recorded and made accessible to all participants through the agreed collaboration platform or document repository. Model Sharing, Access, and Version Control The Project shall use a model-sharing system, as defined in the BEP , that supports:

- Centralized access to current discipline and federated models.
- Automated or managed versioning of models.
- Permission-based access control (write access limited to responsible parties, read access for others).
- Maintenance and archiving of prior model versions. At the outset of the Project, the agreed folder structure shall be established within the collaboration platform, with discipline and shared folders pre-populated according to the Owner BIM standard structure. All electronic project information (models and related files) shall conform to the naming conventions and folder structures defined in the BEP and, where applicable, the Owner of Ohio BIM Standards Manual, to ensure reliable linking and coordination. Participants shall not alter central file names, shared coordinate systems, or core folder structures without prior written approval from the Design BIM Manager or Construction BIM Manager and notification to the State of Ohio BIM Manager. Information Exchange and Data Transmittals All BIM-related data transmittals shall include, at a minimum:
- Project title, location, contract or project number.
- Originating organization and responsible individual.
- Date created, date modified, and version identifier.
- Description of contents, including discipline(s) and purpose.
- Any classifications, sensitivity flags, or other metadata required by the Owner or BEP .

The BEP shall define:

- Exchange formats (native, open-standard, and review formats) for interim coordination and for contractual submissions.
- The schedule or triggers for exchanges (e.g., prior to coordination meetings, at design milestones, prior to key construction activities).
- Responsibilities for compiling federated or composite models for coordination and review. Each Participant shall check any models or data received from others to verify that the exchanges open correctly, contain expected content, and are free of obvious errors. Any significant issues shall promptly be reported to the originating party and the Design BIM Manager or Construction BIM Manager.

Data Security and Access Management

As part of the BEP , the Project BIM Team shall prepare a Data Security Protocol (DSP) describing:

- User access rights and permissions aligned with defined roles.
- Measures for protection against accidental loss, corruption, misuse, unauthorized conveyance, or deliberate attack.
- Exchange, maintenance, backup, and archiving procedures for BIM data. The DSP shall be approved by the Owner prior to significant BIM work commencing, and all Participants shall comply with the DSP for the duration of the Project.

Collaboration for Coordination and Clash Detection

The Design BIM Manager shall be responsible for setting up and managing interdisciplinary interference checks during design using agreed tools (e.g., Revit interference checks and Navisworks clash detection) and shall ensure that major interferences are identified and resolved prior to issuing construction documents. During construction, contractors and trade partners shall integrate their models into the federated model and participate in clash detection and coordination meetings, resolving clashes in accordance with tolerances and criteria established in the BEP . Standard clash detection settings, discipline color schemes, and test sets shall be defined in the BEP and applied consistently by all Participants to promote clarity and comparability of clash reports.

Onboarding, Training, and Changes in Team Composition

The BEP shall include onboarding procedures to ensure that any new Participant joining the Project (including replacement staff or new subcontractors) is briefed on the BIM collaboration protocols, folder and naming standards, and current model status before starting work.

Each organization is responsible for ensuring that its personnel have adequate training and competency with the BIM tools and collaboration processes required by the Contract and BEP . Changes in key BIM roles (State of Ohio BIM Manager, the Design BIM Manager or Construction BIM Manager, Discipline / Trade BIM Managers) shall be communicated promptly to the Owner PM and the Project BIM Team, and the BEP shall be updated accordingly.

2.4. Modeling and Data Requirements

The Owner Modeling and Data Requirements conform to NBIMS-USv4 recommendations, U.S. National CAD Standards, and the Owner's specific requirements for ease of integration with their facility and asset management systems.

2.4.1. BIM Uses and Applications

The following BIM Uses may be defined for use in the BEP. Full per-Use definitions — including Definition, Typical Phase, Responsible Party, Deliverables, and Owner Value — are maintained in the standalone OHIOBIMS BIM Use Definitions document published as part of this standard. The Owner Implementation Guide and the Delivery Team Implementation Guide both reference the same standalone document so the State of Ohio BIM Use catalog is defined in one place.

- Capture Existing Conditions - (for renovation/addition projects)
- Establish Project Requirements Author Design
- Generate Estimates
- Analyze Design (value engineering, design for maintainability)
- Coordinate Design and Construction Review Design
- Produce Construction Documentation Generate Fabrication Details - (if applicable)
- Sequence Construction (4D modeling if required)
- Layout Construction (if required)
- Compile Record Deliverables
- Manage Assets (asset data handover for CMMS integration)
- Manage Space (space and tenant management data)
- Monitor Performance (energy management data)
- Author Temporary Work Digital Fabrication
- 3D Control and Planning (surveying/layout)
- Digital Construction Management

2.4.2. Model Requirements

All Model Elements shall be created in accordance with the State of Ohio BIM Standards and any Owner specific modeling requirements for the project. Document any exceptions to the Owner's modeling requirements in the BEP .

Coordinate System:

- Record the full horizontal CRS, datum realization, units, zone, vertical datum/geoid, survey control and local-to-shared transformation in the BEP.
- All final models, site plans, and associated construction drawings shall be delivered in the Ohio State Plane Coordinate System (SPCS) zone within which the project is located
- The project shall utilize the North American Datum of 1983 (NAD83)
- The specific SPCS zone shall be identified in the BEP (Ohio has two zones: North Zone 3401 and South Zone 3402)
- Survey control points and project base point shall be documented in the BEP
- Coordinate system information shall be embedded in model metadata to ensure interoperability with Ohio GIS systems

File Naming Convention:

Use a stable working model base name with associated file extension based on project requirements.

Format: [Project Number][Building ID][Discipline Code][Floor Area/Room][Revision Number].RVT

Example: Owner 260014_BLDG123_ARCH_01_R2.RVT

Where Project Number is Owner 260014, Building is BLDG123, Discipline Code is ARCH, Floor Area is 01, and Revision is 02.

Discipline Codes:

- ARCH - Architecture
- STRUC - Structural
- MECH - Mechanical
- ELEC - Electrical
- PLUMB - Plumbing
- FP - Fire Protection
- CIVIL - Civil/Site
- LAND - Landscape EQUIP - Equipment Model Organization:
- Separate models by discipline (not by floor unless project size requires)
- Use linked reference models for coordination (do not model other disciplines' scope)

- Building elements shall be modeled in their appropriate discipline model (e.g., structural engineer models structural elements, MEP engineer models MEP systems)

Model Tolerances:

Define model geometry tolerances by discipline, phase, source accuracy and authorized downstream use in the BEP. Distinguish survey/reality-capture accuracy, modeling tolerance, clash-test tolerance, required physical clearance and construction tolerance. Do not apply ±1/16 inch uniformly to design-phase MEP or fire protection. Use the approved drawing unit and precision settings without implying unsupported accuracy; fractional Imperial dimensions are permitted. Any tighter project requirement shall be expressly scoped and coordinated with the MET.

- All models shall use U.S. Imperial units (feet and inches) unless otherwise specified
- Metric units may be used for projects with international equipment but shall be clearly documented Model Views:
- Standard views (plans, sections, elevations, 3D) shall be configured in model files
- View templates shall maintain consistency across disciplines where possible Data Schema:
- Shared parameters, item types, and property definitions shall be documented in the BEP
- Custom parameters required by the Owner shall be defined in the Owner Facility Information Matrix (when published) or project-specific requirements Linking and Referencing:
- Procedures for linking/referencing discipline models shall be documented in the BEP
- File paths for linked models shall use relative paths or CDE-based links (not absolute local paths) BIM-GIS Integration: For projects requiring GIS integration, models shall include metadata to support export to GIS formats (e.g., IFC to CityGML, model to Esri ArcGIS)

2.4.3. Modeling Asset Requirements

The Delivery Team's models shall include all elements listed in the Owner MET for the project. If the Owner has not yet created a Facility Standard MET that can be used on a project, Delivery Team shall create a MET and submit it to the Owner as part of the BEP .

Organize the MET using the approved, versioned element-classification list stated in the project requirements. Identify modeled scope, author, milestone and required LOD/information for each element.

2.4.4. Coordinate System

All BIM model deliverables must be accurately georeferenced to the correct state plane coordinate systems. All final models, site plans, and associated construction drawings shall be delivered in the respective Ohio State Plane Coordinate System (SPCS) zone within which the project is located:

- The project shall utilize the North American Datum of 1983 (NAD83)
- The specific SPCS zone shall be identified in the BEP (Ohio has two zones: North Zone 3401 and South Zone 3402)
- Survey control points and project base point shall be documented in the BEP
- Coordinate system information shall be embedded in model metadata to ensure interoperability with Ohio GIS systems

Select Ohio State Plane North (FIPS 3401) or South (FIPS 3402) by county under ORC 157.01, not by a latitude shortcut. Franklin and Licking are South; Allen, Auglaize, Mercer and Shelby are North. Record the full horizontal CRS, datum realization, units, applicable EPSG identifier, vertical datum/geoid, survey control and local-to-shared-coordinate transformation in the BEP. For example, NAD83(2011) / Ohio North (US survey feet) uses EPSG:6549 and the corresponding South system uses EPSG:6551; these are examples, not a blanket datum selection. Preserve georeferencing while keeping authoring geometry within the selected platform's supported local-coordinate range.

2.4.5. Model Tolerances and Dimensioning

This section defines the dimensional tolerances shown on construction drawings and the accuracy requirements for BIM models used to support design, coordination, construction, and operations. The tolerances specified on the contract documents remain the controlling requirement for construction; the BIM shall be a consistent and accurate representation of those dimensions and shall not serve as an independent source of dimensional control.

Model Accuracy

Model geometry shall be developed to an accuracy appropriate to the project phase, level of development, and intended BIM Uses. The model shall not imply a higher level of precision than is supported by the source survey, design documentation, field verification, or as-built information. All modeled elements shall be located and dimensioned with sufficient accuracy to support the required uses of the model, including coordination, quantity takeoff, construction planning, and facility operations.

Tolerances

Dimensional tolerances shown on the construction drawings shall govern the work and shall be

reflected consistently in the BIM. Model tolerances shall be appropriate to the element type, model purpose, and project phase, and shall be clearly defined in the BIM Execution Plan when project-specific requirements apply. Where tighter tolerances are required to support fabrication, prefabrication, or digital layout, those requirements shall be specifically identified and documented by the responsible project team members.

Dimensioning Requirements

Use the approved units and drawing precision without implying unsupported accuracy; fractional Imperial dimensions are permitted. Resolve model/document discrepancies through the Contract's procedure, applying the Exhibit's dimensional rule and designated-model status rather than a newly created blanket 2D priority. Dimensions in the BIM should use the same unit conventions and rounded values shown on the construction drawings and should not introduce unnecessary decimal precision or arbitrary fractions that exceed the practical tolerances of the work. Dimensioning shall be based on established project controls such as grids, control lines, centerlines, finished faces, and other approved reference geometry as defined in the project documentation.

Coordination and Resolution

Where discrepancies occur between model dimensions and the contract documents, the contract documents shall govern until the issue has been reviewed and resolved by the design professional of record or other authorized party. Once resolved, the BIM shall be updated so that model geometry and published documentation remain aligned. All project participants shall model and dimension their work in a manner that supports interdisciplinary coordination and minimizes ambiguity during construction and turnover.

2.4.6. Level of Development

The Owner adopts the BIMForum Level of Development (LOD) Specification 2025 (current version) as the standard framework. The following LODs are defined per project milestone by the MET and LOD may vary by element type. Survey/reality-capture accuracy, modeling tolerance, clash-test tolerance and physical clearance are separate requirements stated in the BEP. Numerical scanning tolerances apply only to expressly scoped work

Level of Development (LOD) Requirements by Project Phase

- Pre-Design/ Programming I LOD 100 I Conceptual massing models for site assessment, facility size and structure, early design options
- Schematic Design I LOD 200 I Generic model elements with approximate size, shape, location, and orientation. Basic system concepts defined.
- Design Development I LOD 300 I Specific model elements with precise geometry, quantity, size, shape, location, and orientation. Elements suitable for generating accurate quantities.
- Construction Documentation I LOD 350 I Elements modeled with specific assemblies, details, fabrication, and installation information. Sufficient for coordination and interference checking.
- Construction/ Fabrication I LOD 400 I Elements modeled as specific products with complete fabrication, assembly, and detailing information. Suitable for shop drawings and fabrication.
- As-Built/ Record I LOD 500 I As-constructed verification. Model elements represent actual size, shape, location, quantity, and orientation with field-verified information.

Level of Information (LOI)

The Owner MET will define the asset and metadata information, and the progression requirements during the lifecycle of the project.

Level of Accuracy (LOA)

When performing laser scanning for existing conditions capture or for as-built verification the following standards will apply unless otherwise arranged with the Owner Project Manager, and documented in the BEP. LOA for projects will use US Institute of Building Documentation (USIBD) V3.0 specification formats.

- General Architectural as-builts for design require model elements within +/-10mm of point cloud or actual conditions

- Where high-precision scanning is required, such as prefabrication or preserving historical details for preservation purposes, tolerance requirements may be 1-5mm.

2.4.7. Data Requirements

The State of Ohio BIM Standards data requirements specify how metadata and data attributes must be applied to files and model elements. The project AIR will define the State-defined classification pathway, use the approved State asset, space, system and element code lists identified by edition in the project AIR. Publish the corresponding FIM field mappings and validation rules before enforcement. Firms may retain classifications they are authorized to use internally when deliverables map to that approved baseline. The MET defines modeled scope and authorship; the AIR defines required asset information; the FIM defines the exchange schema.

Classification System

The Owner is implementing a national classification system derived from ISO 12006 - OmniClass. The following tables are provided only as a reference. Asset data structure and attributes will be defined in the project AIR.

- OmniClass Table 21 (Elements - UniFormat): Used for early cost estimating and organizing building information by major construction systems.
- OmniClass Table 22 (Work Results - MasterFormat): Used for consistent specification writing and defining work results.
- OmniClass Table 23 (Products - OmniClass): Used for asset tracking, data deliverables, and detailed product-level information. Additional tables may be identified and used as agreed upon with the Owner.

File Metadata

All files stored in the CDE shall carry metadata that meets the requirements of ISO 19650-2:2018. At a minimum, file-level metadata shall include:

- File Name (per naming convention)
- File Type/Format
- Description
- Revision number
- Status (WIP / Shared / Published / Archived)
- Discipline
- Project Phase

- Author
- Date Created and Date Modified
- Approver (if applicable)

Data Attribution Requirement

All model elements designated for asset management shall include the data attributes defined in the Model Element Table (MET). The MET shall conform to the State of Ohio Facility Information Matrix (FIM) as the authoritative data exchange schema for asset information deliverables. The FIM specifies the required worksheets, field names, data types, value lists, and primary/foreign key relationships needed to support the Owner's CMMS/CAFM systems. The MET defines modeled scope, author, LOD and milestone; the AIR defines asset information requirements; Appendix B defines the FIM exchange structure; the SAID is the delivered dataset. Alternate-format conversion uses a published version-specific crosswalk with documented transformations, required inputs and limitations.

Minimum Data Attributes Spaces (Rooms):

- Room Number, Room Name
- Room Type/Category (per Owner space standards)
- Department/Tenant
- Gross Area (square feet), Net Area (square feet)
- Ceiling Height
- Floor Finish, Wall Finish, Ceiling Finish
- Occupancy Type
- Accessibility Compliance (ADA)

Equipment (MEP, specialty, etc.):

- Equipment ID/Tag Number (unique identifier)
- Equipment Name/Description
- Equipment Type/Category
- Manufacturer Name, Model Number, Serial Number (for installed equipment, during commissioning), Installation Date
- Warranty Start Date, Duration (months), Expected Service Life (years), Maintenance Frequency

- Preventive Maintenance Procedures (reference to O&M manual)
- Technical Specifications
- Operating Parameters (voltage, capacity, flow rate, etc.)
- Location (Room Number)
- Asset Management System Classification Code (if provided by State)

Components (for equipment requiring component-level tracking):

- Component ID, Component Name, Equipment ID
- Manufacturer, Model Number
- Replacement Schedule

Systems (MEP systems, life safety, etc.):

- System Name
- System Type/Category Description
- Related Equipment IDs

Assemblies/Types:

- Type, Name, Description, Manufacturer, Model Number
- Material specifications
- Performance criteria
- Submittals/Cut sheets Connections: For equipment requiring utility connections, document connection types (electrical, plumbing, HVAC, data, etc.)

Documents:

Apply the published AIR requirement matrix by milestone and asset applicability. Provide actual installed and commissioning information when due, not as invented design values. Link required documents through valid FIM references to the controlled CDE records.

- O&M Manuals
- Submittal Data
- Product Data Sheets
- Warranty Documents
- Commissioning Reports
- Training Materials

Data Standard Reference

Deliver asset data classified under the approved project AIR code lists and mapped to the FIM in Appendix B. The project AIR-to-FIM mapping identifies fields, types, units, keys, milestone requirements and validation rules; the MET separately defines modeling responsibility and development.

3.Building Information Model Standards

This section establishes the Building Information Model as a coordinated collection of interlinked files that store information without duplication. It provides the specific standards that define how to set up, collaborate, and organize the digital project environment for consistent and efficient project execution. Many of the instructions and graphics below are for the Autodesk Revit software environment. As noted at the end of Section 1.0, project Delivery Teams may use other software if approved by the State Agency Project Manager, provided all OHIOBIMS and any Owner-specific requirements are met. The guidance in this section provides best practices for delivering projects to OHIOBIMS requirements. Delivery teams may use other platforms internally, provided required exchanges and contractual submissions are published to the designated CDE with the required permissions, version history and audit trail.

3.1. Common Data Environment (CDE)

A CDE serves as the single authoritative source for all project information containers, providing a secure, structured, and audited environment for the creation, sharing, review, approval, and archiving of documents, models, and data throughout the asset lifecycle. All project participants shall access and exchange information exclusively through the CDE using agreed naming conventions, metadata standards, and workflow states so that information is uniquely identifiable, traceable, and version-controlled at all times.

3.1.1. Setting Up the Common Data Environment Using Autodesk

The CDE for projects shall be established within the Autodesk Forma platform provided or designated by the Owner. Each project shall be created with the Docs, Design Collaboration, and Model Coordination services enabled. Project-level settings, including time zone and localization, shall be defined at the time of project creation to ensure consistent timestamping of all actions recorded in the system audit log. Project participants shall upload information containers (files) to the CDE only in accordance with the approved project naming convention. Information containers that do not comply with the established naming rules shall not be published to the CDE. Access to the CDE shall be administered using a role-based permission model.

Permissions for viewing, creating, and editing content shall be assigned exclusively at the Company or Role level. Individual user-level permission assignments are not permitted.

3.1.2. Project Setup and File Management

Data within the CDE shall be organized on a project basis. A separate project shall be established in the CDE for each new construction, renovation, or capital improvement initiative. Information containers intended for long-term facility operations shall be maintained within a dedicated operations project, where required by the Owner. Within each project, team-specific folders shall be established under the Project Files directory. Each project team shall store its models and documentation exclusively within its designated disciplinary folder to ensure clear segregation of information. The creation of ad hoc, user-defined, or non-standard folder structures is not permitted. Additional directories, including archive or special-purpose folders, may be created only in accordance with the approved project governance procedures.

All information containers shall comply with the approved project file naming convention to ensure unique identification and traceability within the system. The naming format shall consist of

[Project Number] [Building Identifier] [Discipline Designator] [Floor Area] [Revision].

Revit model linking shall be performed using approved external reference methods to ensure stable and consistent relationships between model files. The use of local file paths or Desktop Connector-based RVT-to-RVT links is not permitted. Shared project resources, including templates and libraries, shall be stored in centralized locations separate from active project folders. Supplementary materials such as schedules, reports, or analysis outputs may be stored on external platforms; however, the CDE shall remain the sole authoritative source of BIM data for the project. To maintain an up-to-date coordination environment, project teams shall publish their working models to the CDE on a regular basis, and at a minimum once per week.

3.1.3. Collaboration

Model authoring shall be performed using Revit Cloud Worksharing to enable concurrent access and parallel development by multiple project participants. Project Teams shall be established in alignment with the approved project organization structure. Each Project Team shall develop and maintain discipline-specific working files within its designated Work-In-Progress (WIP) area. Access to WIP areas shall be restricted to members of the corresponding team.

Interdisciplinary coordination shall be conducted through the shared area of the CDE, which is accessible to all project participants. Project Teams shall regularly publish updated versions of their discipline models to the shared area for coordination purposes. Files made available in the shared area shall be treated as coordination references and shall not be modified directly.

Project communication and issue management shall be conducted using the collaboration tools available within the CDE. Discipline-level coordination shall utilize native CDE capabilities, including issue tracking, comments, view and file references, and activity logs. The use of additional coordination platforms or tools is permitted only when explicitly defined in the BEP . Coordination deliverables, including federated models, Navisworks files, reports, and coordination meeting records, may be hosted on approved external platforms where required by the project workflow.

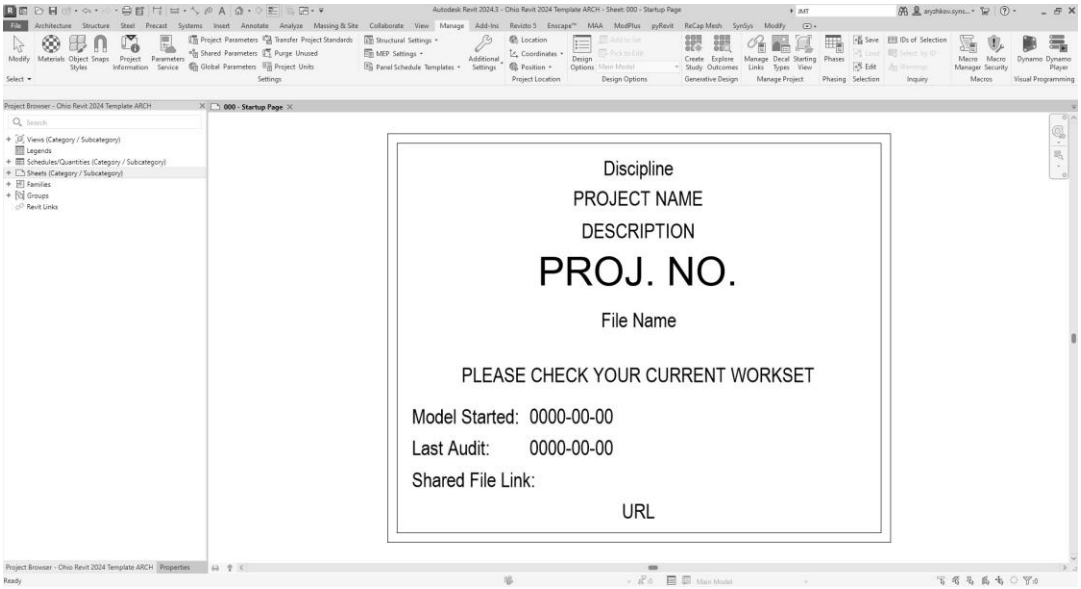
3.2. General Model Requirements

All Revit Files model should be created using the approved Project Template and maintained in accordance with the structural configuration defined in this section. Consistency of coordinate systems, model browser organization, and workset structure is mandatory to ensure reliable data integration across all disciplines.

3.2.1. Revit Template

Revit project templates (*.rte) are provided for as a convenience but their use is not required. Template selection shall be determined by the project discipline and the software version specified in the BEP or equivalent project documentation.

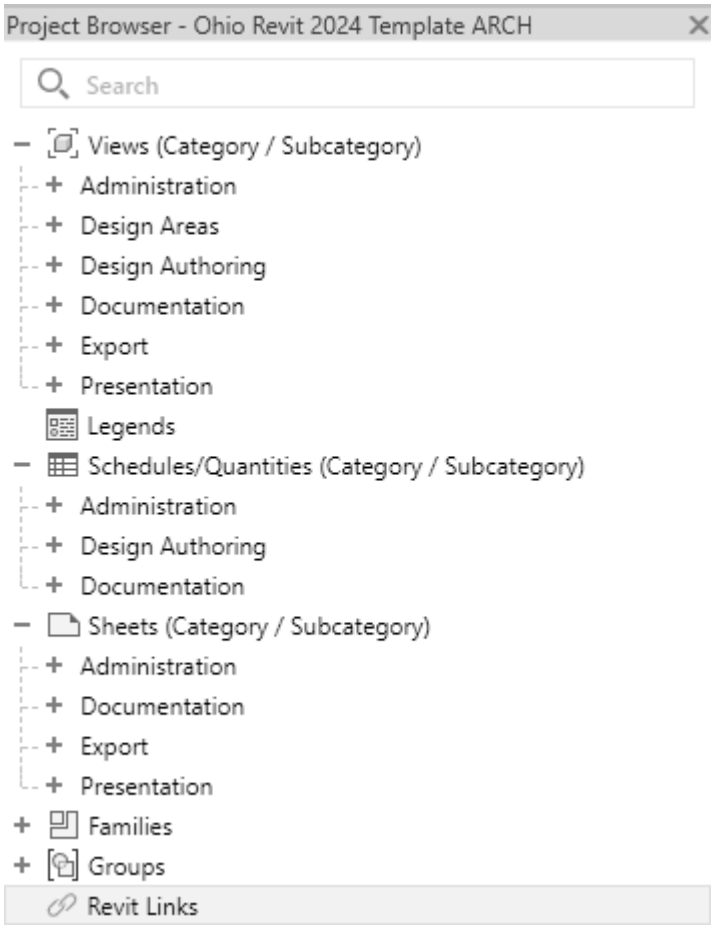
The approved template shall define the standard Project Browser organization, system family libraries, shared parameters, annotation styles, and view filter configurations. Modifications to template-based project settings are permitted only through an established project governance process. Any changes in the template must be coordinated with the Owner's BIM Manager and documented in the BEP. Unauthorized changes to the model structure, global parameters, or standard configurations are not permitted.



Revit project template configuration.

3.2.2. Project Browser Organization

The Project Browser structure shall be configured to provide clear and consistent navigation across views, sheets, and schedules. Browser Organization shall be based on a hierarchical grouping strategy using the Category Name and Subcategory Name parameters.



Project Browser hierarchy by Category and Subcategory.

3.2.2.1 Views

Views Browser Organization The following Browser Organization settings for Views are strongly recommended for use on all projects.

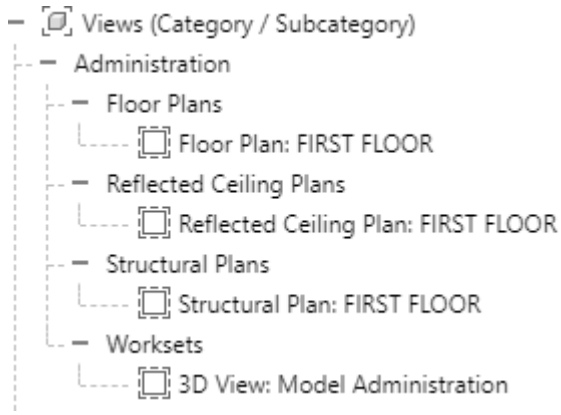
Name	Filtering			Grouping				Sorting	
	Filter By	Rule	Value	Group by	Then by	Then by	Then by	Sort by	Order
all									
Category / Subcategory	None			Category Name	Subcategory Name			Associated Level	Ascending
Category / Subcategory / Group	None			Category Name	Subcategory Name	Group Name		Associated Level	Ascending
Category / Subcategory / Group / Sheet Number	None			Category Name	Subcategory Name	Group Name	Sheet Number	Associated Level	Ascending
Coordination	Category Name	Equal to	Coordination	Category Name	Subcategory Name			Associated Level	Ascending
Documentation	Category Name	Equal to	Documentation	Category Name	Subcategory Name			Associated Level	Ascending
Phase / Category / Subcategory	None			Phase	Category Name	Subcategory Name		Associated Level	Ascending
Subdiscipline / Category / Subcategory	None			Subdiscipline	Category Name	Subcategory Name		Associated Level	Ascending
Subdiscipline / Category / Subcategory / Group	None			Subdiscipline	Category Name	Subcategory Name	Group Name	Associated Level	Ascending

Recommended View Browser Organization settings.

Administration Views

Administration views are used for file model management and optimization. These views should not be used for modeling, annotation, or design. This category includes, but is not limited to, the following subcategories:

- Levels: Plan views, Reflected Ceiling Plans, Structural Plans associated with model levels. View names shall correspond to level names and update automatically when level names change. One Floor Plan, Reflected Ceiling Plan, and Structural Plan shall be created for each Building Story level present in the model.
- Project Information: Views, primarily 2D Drafting Views, containing project management information, references to the Project Execution Guide, and related content.
- Worksets: Dedicated 3D views for each user-created workset.
- Categories: Dedicated 3D view for each MEP System Type.
- Systems: Dedicated 3D view for each MEP system



Administration Views: Levels, Project Information, Worksets, Categories, Systems.

Design Authoring

Coordination Views are working views used for active modeling and spatial coordination between disciplines. These views may include coordination dimensions, reference lines, and temporary CAD backgrounds required for layout verification, system routing checks, building sections, and grid alignment. Coordination Views are not intended for printing, formal documentation, or design review.

Recommended subcategories:

- Elevations

- Floor Plans
- Isometric
- Reflected Ceiling Plans Design Areas This section divides views by building areas such as Vestibule, Stair 1, Loading Dock, etc.

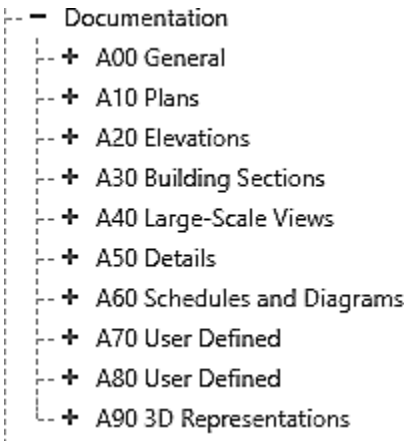


Design Authoring view categories: Coordination Views and Design Areas.

Documentation Views

Views that are placed on the Documentation Sheets are reserved exclusively for the preparation of final, publish-ready graphics and printed deliverables. These views are used for visibility and graphic configuration, and show the placement of documentation dimensions, tags, and keynotes. All modeling activities are strictly prohibited within Documentation Views – the use of temporary linework, temporary dimensions, or construction aids is not permitted. Documentation Views must remain print-ready at all times, and reflect only verified and approved file model content. Recommended subcategories (by sheet series):

- A00 General A10 Plans
- A20 Elevations
- A30 Building Sections A40 Large-Scale Views AS0 Details
- A60 Schedules and Diagrams A90 3D Representations

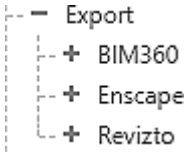


Documentation Views organized by sheet series.

Export Views

Views configured specifically for export purposes, including coordination and data submissions. Both 2D and 3D views may be included. Recommended subcategories (list below is shown only as examples of exports)

- Revizto
- ACC / FORMA
- Enscape

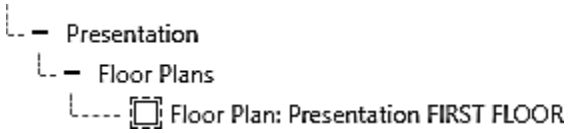


Export Views configured for coordination platforms (Revizto, ACC / FORMA, Enscape).

Presentation Views

Views used for presentation materials, including booklets, presentations, and posters. These views may be placed on Presentation Sheets.

- Floor Plans
- Elevations



Presentation Views: Floor Plans and Elevations.

3.2.2.2 Schedules

Schedules are dynamic table views that display and manage data directly from the building information model, providing a structured list of elements such as doors, rooms, equipment, or materials with their associated parameters like size, type, and quantities. Because they are live views of the model, any change made to elements in the model is immediately reflected in the schedule, and in many cases edits made in the schedule also update the model, making them a powerful tool for quantification, quality control, and documentation.

Firm-standard schedules and formatting may be used. Required data content and export fields shall satisfy the AIR/FIM mapping and milestone requirements. The illustrated schedule setup is a Revit example.

Schedules Browser Organization

The following Browser Organization settings for Schedules are strongly recommended for use on all projects. Any modification to the Schedule Browser Organization structure or the introduction of a new configuration shall require approval from the Owner's BIM Manager, and shall be documented in the BEP . A justification for the change shall be provided.

Name	Filtering			Grouping				Sorting	
	Filter By	Rule	Value	Group by	Then by	Then by	Then	Sort by	Order
all									
Category / Subcategory	None			Category Name	Subcategory Name			Sheet Name	Ascending
Subdiscipline / Category / Subcategory	None			Subdiscipline	Category Name	Subcategory Name		Sheet Name	Ascending

Recommended Schedule Browser Organization settings.

Categories

Schedules shall be organized into categories to separate data management activities from documentation workflows.

Administration

Administration schedules are used for model management and optimization.

Subcategories shall be based on the Revit element category included in the schedule. Typical subcategories include Rooms (Spaces), Mechanical Equipment, Walls, and Pipes.

Coordination

Working schedules are used for file model analysis and coordination. These schedules are not intended for printing or as deliverables. Subcategories are defined by schedule purpose.

Documentation

Documentation schedules are placed on sheets for the issuance of project documentation. Subcategories are defined by schedule purpose.

Naming Convention

For all schedule categories, except those placed directly on sheets, schedule names shall follow a consistent naming convention. Each word in the schedule name shall begin with a capital letter, with the exception of prepositions such as “of”, “in”, “on”, and “for”. The use of the suffix "Copy" in schedule names is strictly prohibited. When multiple schedules with identical displayed titles are required on sheets, a custom title shall be defined manually using the "Title on Sheet" parameter or header formatting. In such cases, the automatic link between the schedule view name and the displayed title must be removed to avoid duplication and ambiguity.

Schedules placed in Documentation, Presentation, or Design Review categories shall be named using ALL CAPITAL LETTERS to ensure consistency across printed documentation.

3.2.2.3 Sheets

Sheets Browser Organization

The following Browser Organization settings for Sheets are strongly recommended for use on all projects.

Firm-standard sheet organization, tags, symbols, fonts and revision clouds are permitted when published documents are legible, consistent and coordinated. Preserve required project/sheet identification and model-derived documentation obligations.

Name	Filtering			Grouping				Sorting	
	Filter By	Rule	Value	Group by	Then by	Then by	Then by	Sort by	Order
all									
Category / Subcategory	None			Category Name	Subcategory Name			View Name	Ascending
Subdiscipline / Category / Subcategory				Subdiscipline	Category Name	Subcategory Name		View Name	Ascending

Recommended Sheet Browser Organization settings.

Categories

Sheets shall be organized into functional categories in order to clearly separate workflows related to model administration, design coordination, formal documentation issuance, and presentation. This structure ensures consistency, clarity, and efficient navigation across all project deliverables.

Administration

The Administration category includes sheets used for overall model and project management. This category may contain subcategories such as Project Information (which hosts sheets with general project data), references to the Project Execution Guide, and other management-related information.

Design Review

The Design Review category is intended for sheets used to support the design development process and coordination with external stakeholders. Subcategories within this category are the same as the subcategory of the views placed on the sheets, ensuring alignment between review content and view organization.

Documentation

The Documentation category contains sheets prepared for the formal issuance of project documentation. Subcategories are defined according to the documentation section codes, ensuring a clear and standardized structure aligned with contractual deliverables.

Presentation

The Presentation category includes sheets used for presentation purposes, such as color-coded floor plans, diagrams, and three-dimensional views prepared for brochures, reports, or presentations. Subcategories within this category are defined based on the specific intent of the presentation content, for example perspective views or sectional perspectives.

3.2.3. Coordinate System

Deliver models with the approved full CRS and local-to-shared transformation. Keep authoring geometry within the platform's supported local-coordinate range and test federation/export alignment against survey control. Do not equate a particular internal-origin arrangement with georeferencing compliance.

Georeferencing to real-world coordinates and absolute elevations shall be implemented using Shared Coordinates, specifically Ohio State Plane coordinates (either North or South, depending on County), and North American Datum 1983. For each project, a dedicated Site discipline file shall be created to define the project coordinate parameters, including the location of the Survey Point and the orientation of True North. All building model files shall acquire coordinates exclusively from the Site file.

All other project files shall be linked into the Site file using Shared Coordinates. Absolute elevation (height above sea level) shall be defined solely through the Survey Point. Once coordinates are established, the Survey Point shall be pinned to prevent unintended modification.

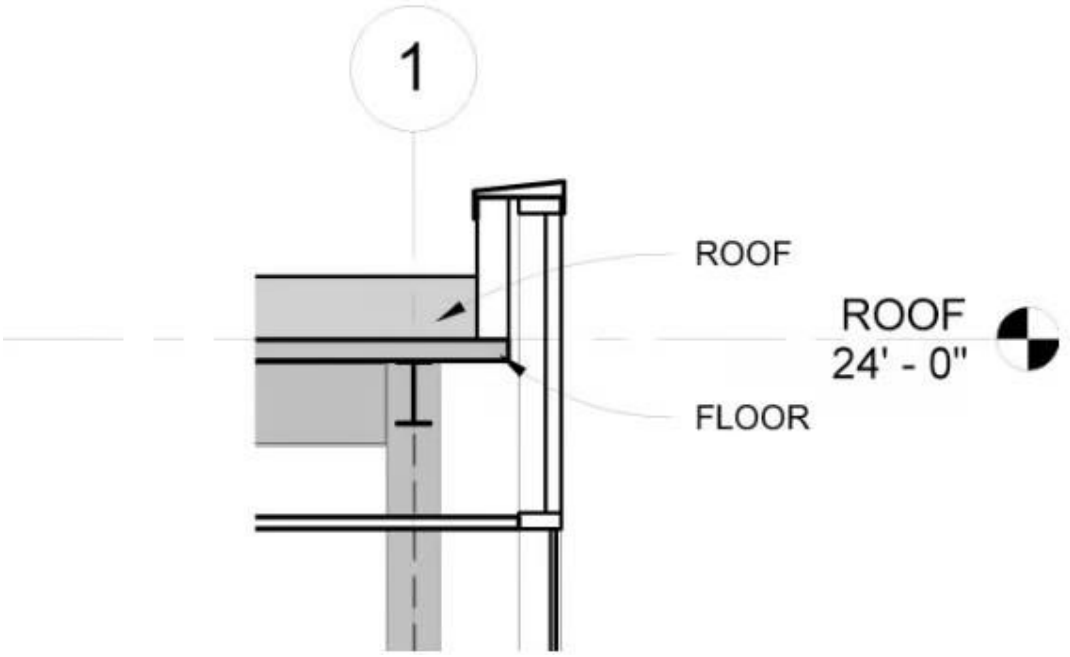
Linking between discipline model files for the same building shall be performed using the Auto - Internal Origin to Internal Origin positioning method.

3.2.4. Levels and Grids

Revit levels and grids are datum elements that form the primary reference framework of a building model, defining where geometry is placed vertically and horizontally. Levels establish key horizontal planes such as floors, roofs, and foundation elevations, while grids provide a coordinated layout for columns, structural walls, and major partitions, ensuring that all disciplines align their models to a shared structural "skeleton."

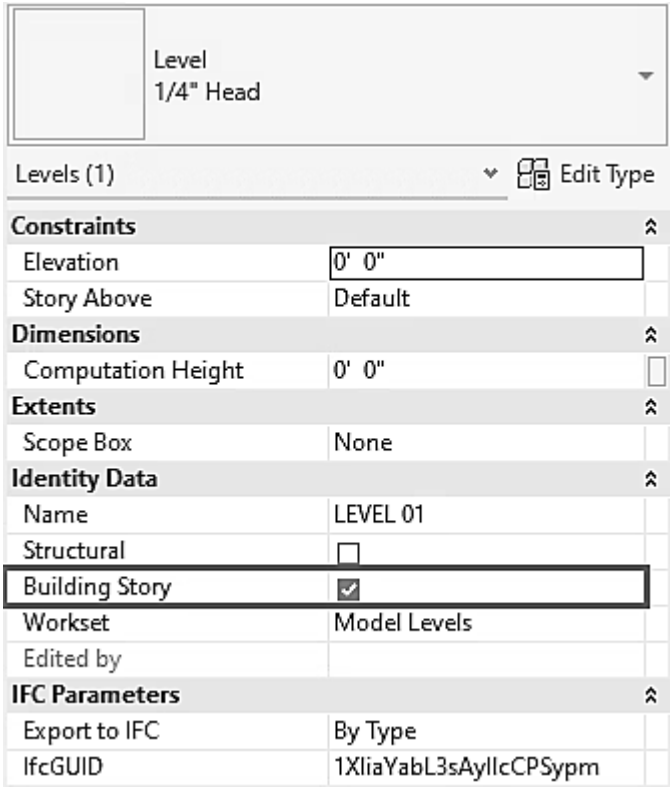
Levels

Levels define the vertical organization of the project. Level elevations shall correspond to the Top of Structural Slab (TOSS). Each project shall include a base level at a relative elevation of 0.000, aligned with the vertical position of the Internal Origin. Absolute elevations are defined exclusively through the Shared Coordinates system.



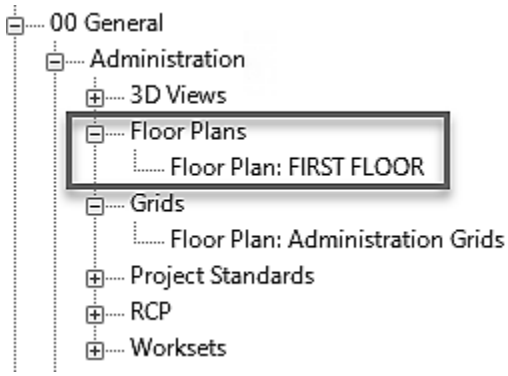
Project Levels referenced to Top of Structural Slab (TOSS).

Levels are classified as primary (main building floors) and secondary (technical or auxiliary). The Building Story parameter shall be enabled only for primary levels and disabled for secondary levels. Primary levels shall follow the naming convention "LEVEL FIRST". Secondary levels shall be named according to their functional purpose.



Primary and Secondary Levels with the Building Story parameter.

To preserve data integrity, Administrative Views are used to manage plan representations. This allows working plan views to be renamed without modifying the system-defined level names. In a worksharing environment, level-related elements shall be assigned to the designated worksets Model Levels - Primary and Model Levels - Secondary.

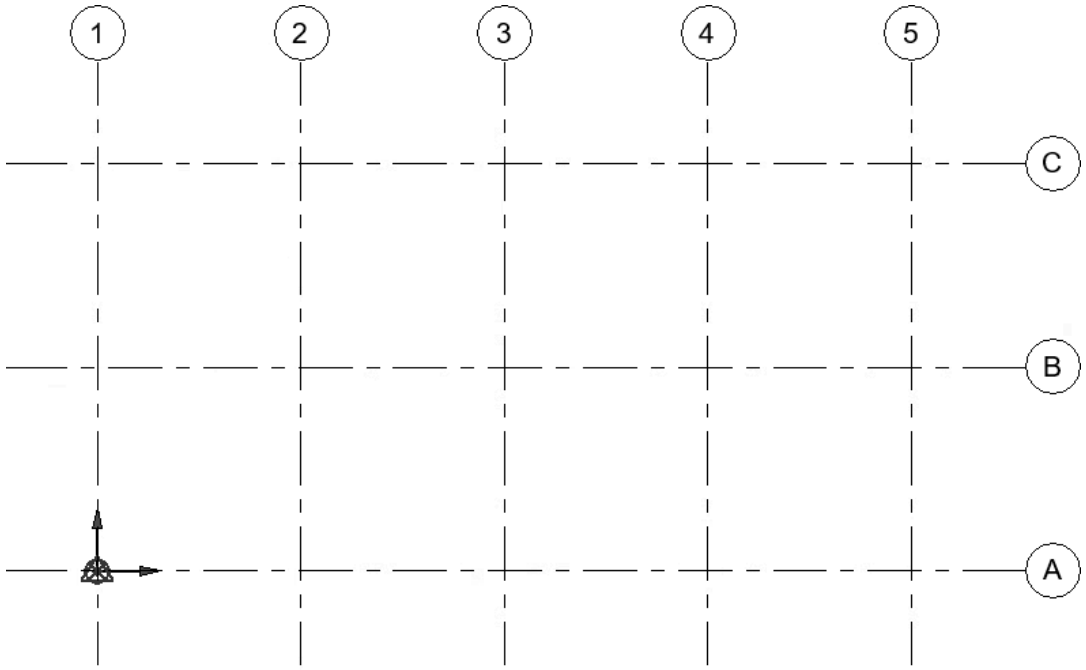


Administrative Views used to manage Plan representations independently of system-defined level names.

Grids

Grids serve as the primary coordinate lines for the horizontal positioning of model elements. The project's starting grids must intersect strictly at the Internal Origin, ensuring a fixed geometric reference for the entire building structure. All grid lines must be Pinned. Shifting the intersection of the main grids relative to this origin point is prohibited, even in cases involving offset grids located outside the main building contour.

In a worksharing environment, grids must be placed exclusively within a dedicated workset (i.e., Model Grids), strictly excluding their placement in component-based or general project worksets.



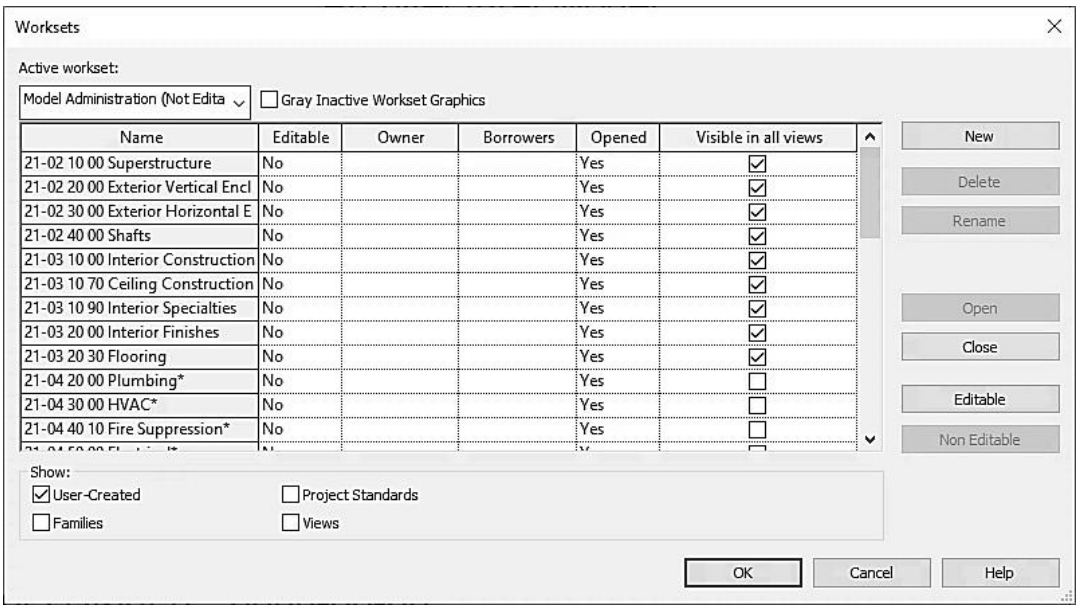
Project Grids pinned at the Internal Origin and placed on a dedicated Model Grids workset.

3.2.5. Worksets Organization

Revit worksets are a worksharing tool that let multiple team members safely edit the same model by dividing it into logical, controllable chunks such as disciplines, building zones, or major systems. Each workset is a collection of elements whose visibility can be toggled and whose ownership can be managed, so users can open only the portions they need for better performance, and “check out” specific worksets or borrow elements to avoid editing conflicts while they synchronize changes back to the central model.

Workset organization forms the basis of model structuring in Revit. Revit provides four internal categories of worksets:

- User-Created Worksets -Used to organize and manage 3D model elements. Family Worksets used to store all loaded and system families.
- Project Standards Worksets - Used to store project-wide definitions and settings.
- View Worksets -used to store 2D, view-specific elements, including lines, dimensions, and tags.



Revit internal workset categories.

> Note: 2D annotation elements increase the physical file size regardless of their on-screen visibility. The use of 2D elements shall be minimized. When creating view copies, the use of Duplicate with Detailing is generally not recommended.

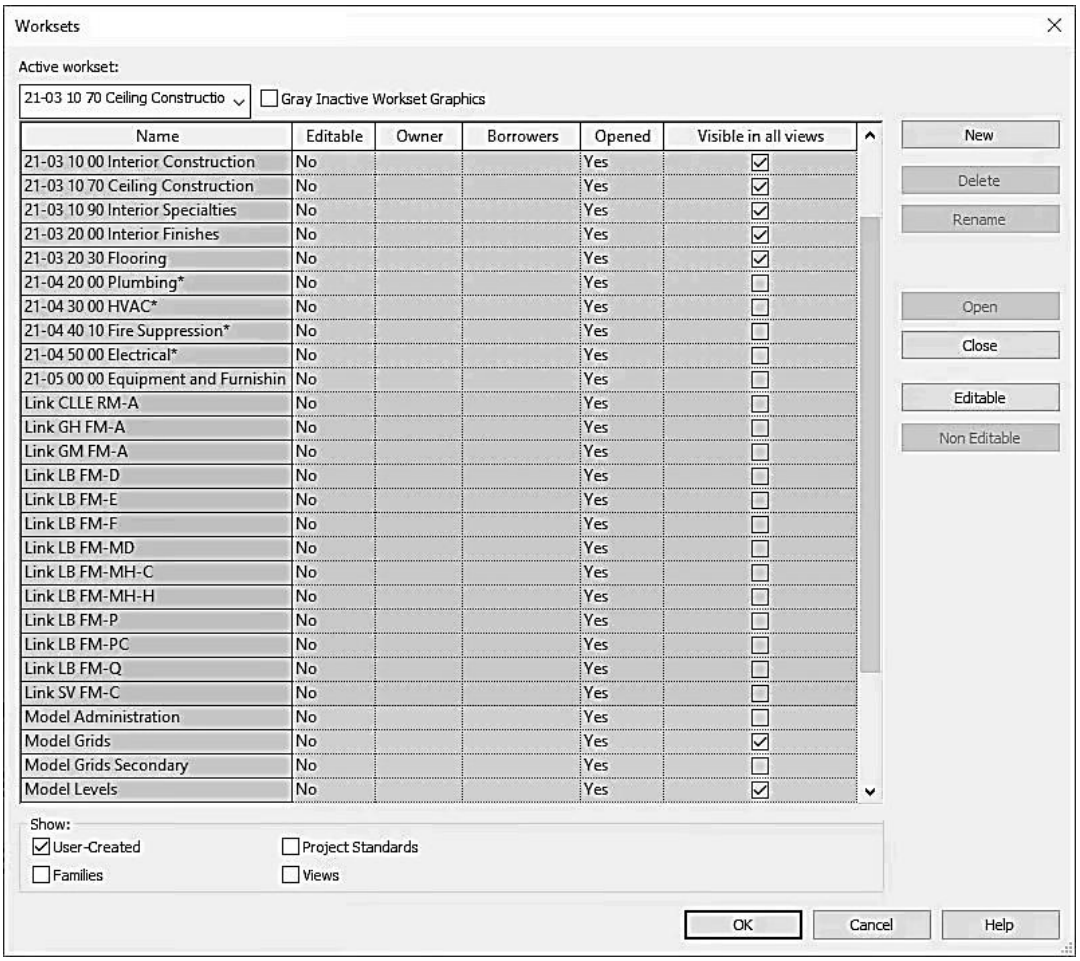
The requirements of this standard apply exclusively to User-Created Worksets, as system worksets are managed by the software and are not subject to manual configuration.

User-Created Worksets

The baseline list of User-Created Worksets shall be approved at Project initiation and documented in the BEP . The list may be updated or expanded during Project execution as required. User-Created Worksets shall be grouped into the following three categories:

Physical Model Elements – Used to host physical building components, these worksets shall be organized and named in accordance with OmniClass Table 21.

Non-Physical Model Elements – These worksets are used for datum and auxiliary elements that do not represent physical construction, including Levels, Grids, Rooms, and model administration elements.



Example workset organization in a project model.

Linked Files – Used to host linked Revit models and 3D CAD files; each linked Revit file shall be placed on a separate workset.

Workset Management Rules

Ownership

Assigning an owner to a workset is permitted only when strictly necessary. Locking a workset grants exclusive editing rights and restricts access for other team members, and shall not be used in routine workflows. Ownership assignments are permitted only for bulk administrative operations.

Visibility

The “Visible in all views” parameter shall be used only for elements that must appear in all project views. By default, this parameter shall be disabled for worksets containing linked files, model administration elements, and secondary grids. Visibility control shall be managed at the view level using view properties and templates.

Open / Closed Status

The “Opened” status controls whether a workset is loaded into memory and is set individually by each user when opening the file. Worksets not required for current tasks shall remain closed to optimize performance.

Naming Standards

Based on the three workset groups, the following naming conventions shall be applied.

Group 1. Physical Building Elements

- Definition: Physical model elements in Revit are the 3D components that represent real building objects such as walls, floors, roofs, doors, windows, columns, beams, ducts, pipes, and equipment.
- Naming: When creating worksets based on these elements, names should clearly indicate both Omniclass Table 21 designation and code description.

Workset Code: Minimum of four numeric groups from OmniClass Table 21. For top-level classifications the filename should start with 00; for deeper classifications, use the full five- group code. Code Description: The official title corresponding to the selected OmniClass Table 21 entry. Format: **[Workset Code][Code Description]** Example: 21-03 10 70 Ceiling Construction

Group 2. Non-Physical Model Elements

- Definition: In Revit, non-physical model elements are the datum and reference objects that do not represent real-world building components but instead define the project’s

coordinate and documentation framework, such as levels, grids, reference planes, and reference lines.

- Naming: Begin with model type, specifically a fixed prefix typically descriptive of the discipline
- Workset Description: Brief description of the elements contained in the Workset
- Format: **[Model][Workset Description]**
- Example: Model Levels

> Non-Physical Model Element workset naming example. Begin with the model type prefix (typically descriptive of the discipline), followed by a brief workset description. Format: **[Model][Workset Description]**. Example: Model Levels.

Group 3. Linked 3D RVT Files

- Description: Revit linked files are external models (such as architectural, structural, MEP , civil, or consultant models) that are attached into a host file for coordination, documentation, and referencing while remaining independently maintained.
- Naming: They should follow a simple, human-readable naming convention that encodes project, discipline, and purpose.
- Link: A fixed prefix typically descriptive of the discipline
- File Name: Short name of the linked Revit file consistent with the Owner BIM Standards naming convention
- Format: **[Link][File Name]**
- Example: MEP 17018 LB A

3.2.6. Rooms and Spaces

Within the project, the use of two types of Revit analytical zones -Rooms and Spaces- is permitted. Although visually similar, Rooms and Spaces serve different disciplines and perform distinct functions within model files. The use of Rooms and Spaces shall correspond to their intended purpose and the applicable project stage.

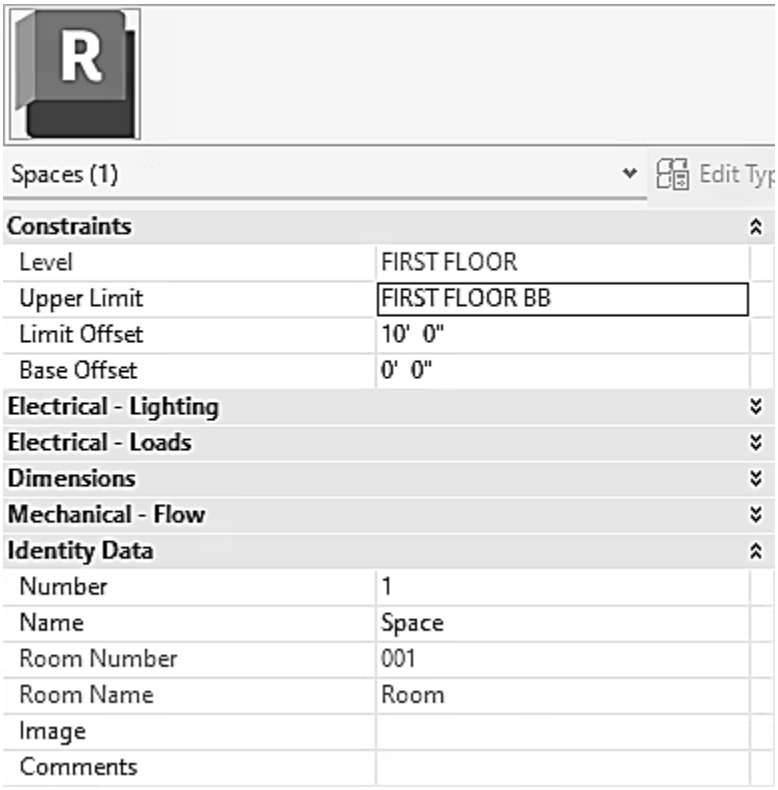
Rooms shall be used in architectural model files to define functional building areas. Room boundaries shall be established using architectural bounding elements and, where

required, Room Separators.

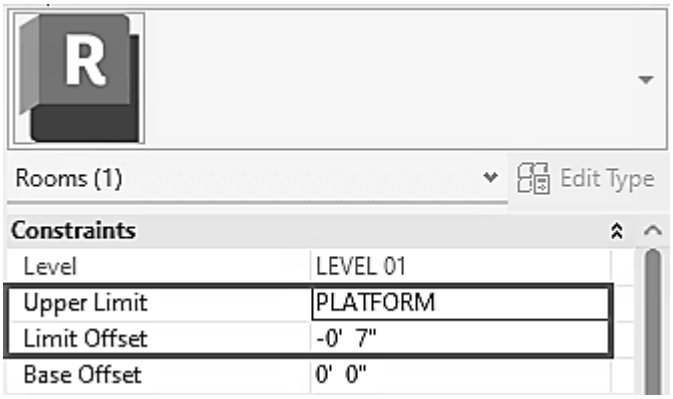
Engineering analytical Spaces may intentionally differ from architectural Rooms where needed for system analysis, load sizing or zoning. Document the purpose and Room-to-analytical-Space mapping in the BEP; preserve the owner-facing Room/Space identifiers and boundaries used by the FIM.

Spaces shall be used in engineering model files for system analysis and calculations. Spaces shall be created based on architectural geometry obtained through linked model files. Architectural elements forming Space boundaries shall have the Room Bounding property enabled.

Spaces shall be placed only when an up-to-date architectural model file is available to ensure correct boundary definition. Any discrepancy between Room and Space boundaries shall be considered a model file quality issue and shall be resolved prior to data publication to the CDE.



Rooms used in architectural models for functional building areas.



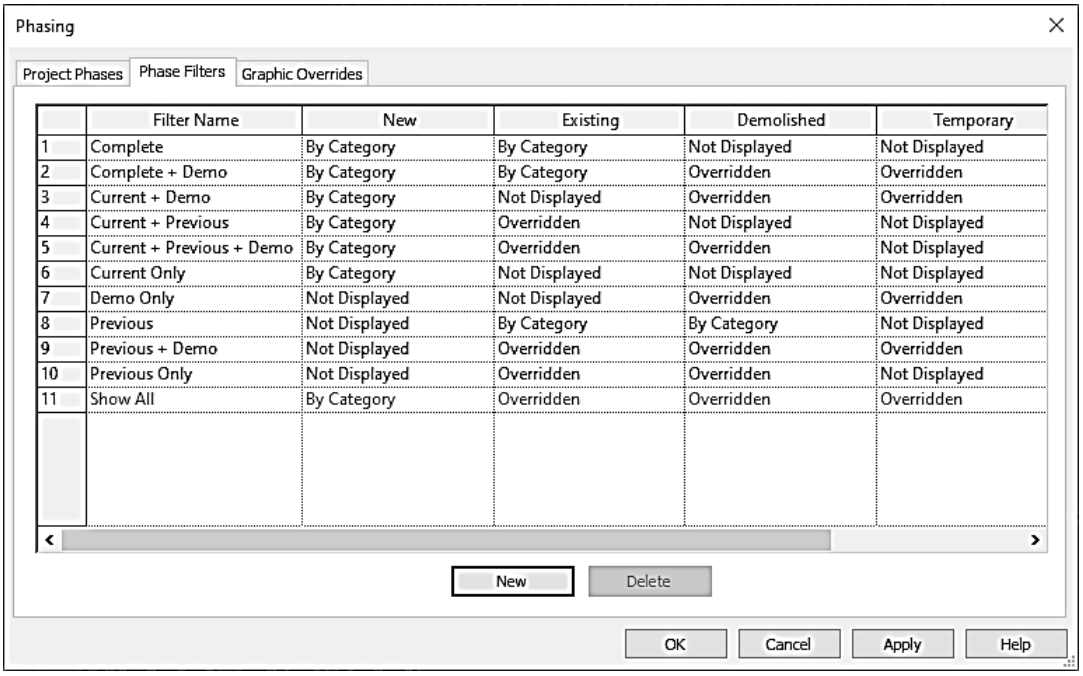
Spaces used in engineering models for system analysis and calculations.

3.2.7. Phases

Represent project phases and existing/new/demolition scope consistently in delivered views and data. The following Revit phase/filter configurations are examples; equivalent internal naming and presentation are permitted where phase meaning and published outputs remain unambiguous.

Project Phases

Project temporal structure shall be managed using the Revit Phases tool. The status of model elements - Existing, New, or Demolished - shall be defined exclusively through the Phase Created and Phase Demolished parameters. To control graphical representation and schedule calculations across different stages of work, Phase Filters shall be applied. The use of phasing and phase filters is mandatory for renovation projects and for the production of phased construction and demolition documentation.



Revit Phases tool: Existing, New Construction.

The Project template shall include two predefined phases: Existing and New Construction;

- The Existing phase shall contain elements representing the verified as-built condition of the facility prior to the commencement of design activities.
- The New Construction phase shall be used for the development of design solutions corresponding to the current scope of work. For facilities with complex construction histories, a chronological subdivision of the Existing phase (for example, by construction period) is permitted. Where a project is delivered in multiple stages, additional sequential phases shall be created to represent each subsequent stage of construction.

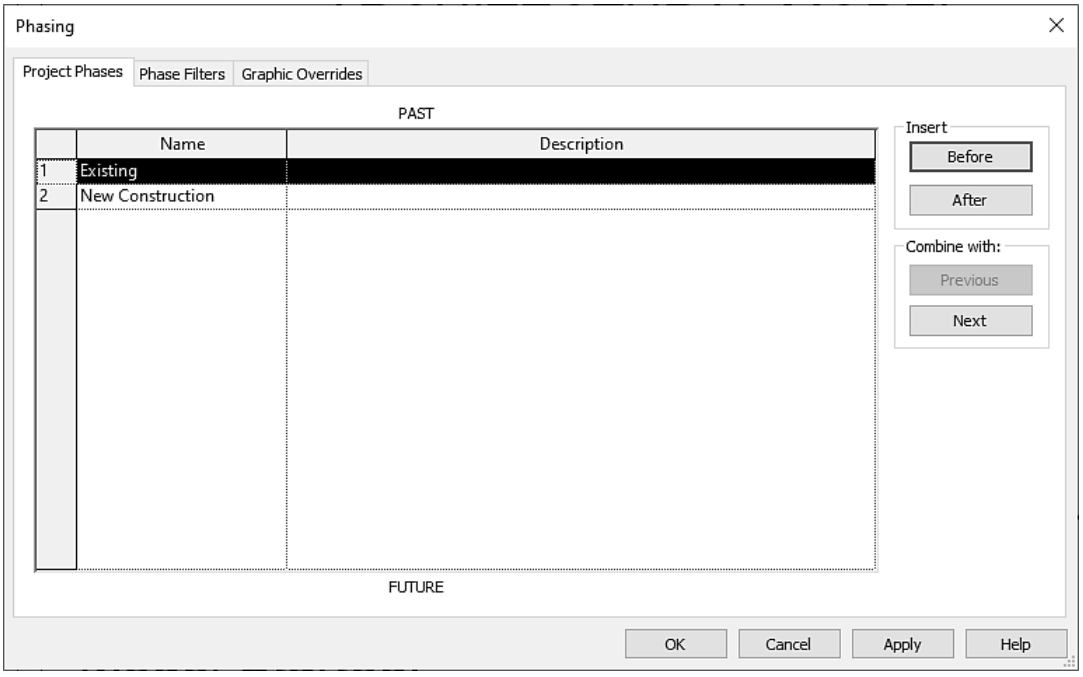
> Demolition Requirements: The creation of a dedicated "Demolition" phase is strictly prohibited. Demolition is executed within the current phase (e.g., New Construction) by setting the "Phase Demolished" parameter to the current phase. Consequently, the visualization of demolished structures on drawings is controlled exclusively through Phase Filter settings.

Element Status Definitions

Within the project phasing system, element status is determined by the relationship between Phase Created and Phase Demolished. These status definitions form the basis for controlling both graphical representation and data behavior throughout the Project lifecycle. The following status definitions are used consistently across all models and documentation:

- Current (New) Elements created within the scope of the active project phase.
- Previous (Existing) Elements created in any preceding phase that remain in place and continue to exist within the current project context.
- Demolished (Demo)

Elements created in previous phases that are designated for removal during the active phase through the Phase Demolished parameter.

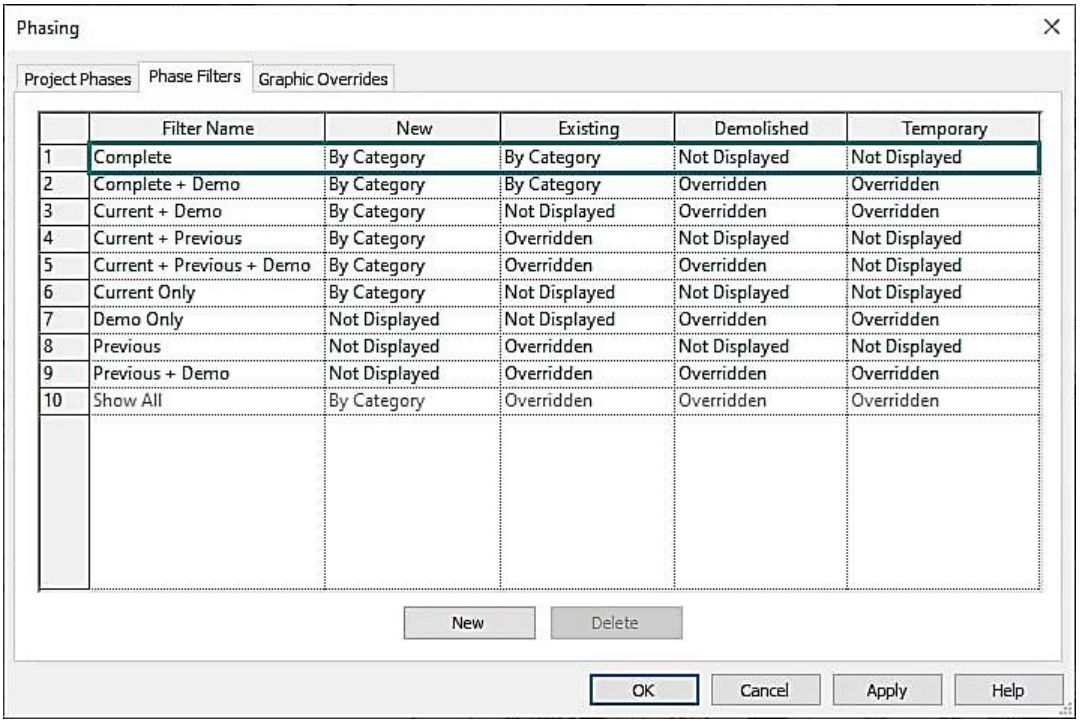


Phase Created and Phase Demolished parameters control element status.

Phase Filters

Phase Filters regulate element visibility and graphical overrides based on element status. They are used to manage how existing, new, and demolished elements are displayed on views and drawings, as well as how they are included in schedules and analytical outputs. Standardized Phase Filter configurations are applied to ensure consistent interpretation of project stages across all disciplines and documentation sets.

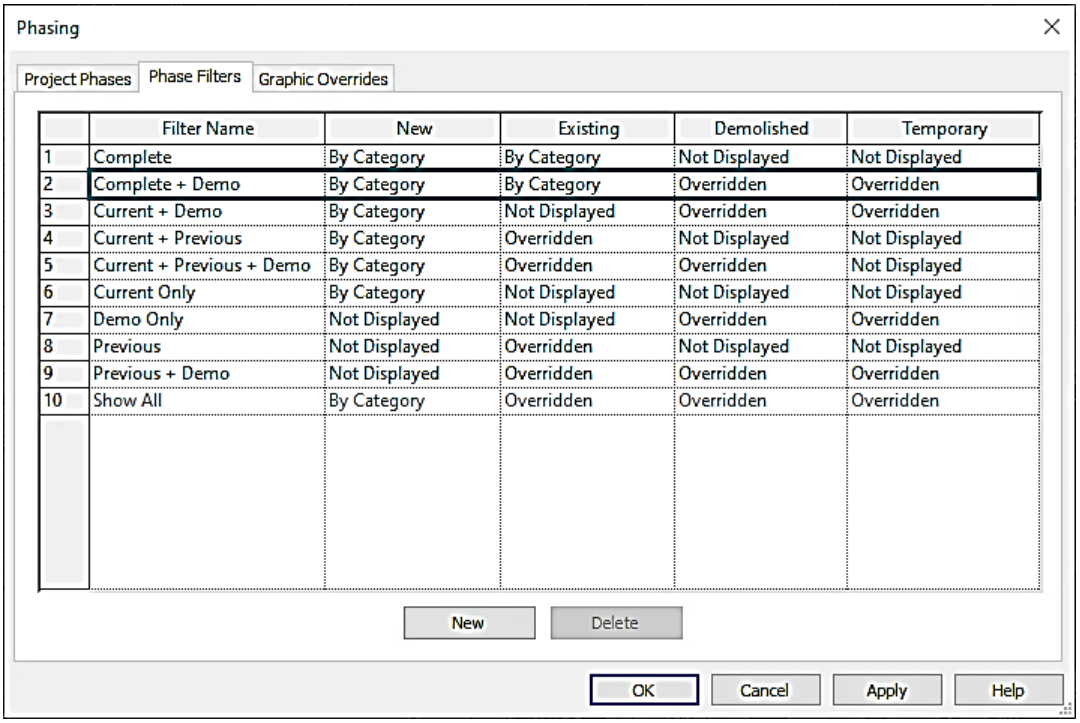
- Complete: Displays the final project condition after completion of work. Elements from the current and all previous phases are shown using standard graphics without overrides. Demolished elements are hidden.



	Filter Name	New	Existing	Demolished	Temporary
1	Complete	By Category	By Category	Not Displayed	Not Displayed
2	Complete + Demo	By Category	By Category	Overridden	Overridden
3	Current + Demo	By Category	Not Displayed	Overridden	Overridden
4	Current + Previous	By Category	Overridden	Not Displayed	Not Displayed
5	Current + Previous + Demo	By Category	Overridden	Overridden	Not Displayed
6	Current Only	By Category	Not Displayed	Not Displayed	Not Displayed
7	Demo Only	Not Displayed	Not Displayed	Overridden	Overridden
8	Previous	Not Displayed	Overridden	Not Displayed	Not Displayed
9	Previous + Demo	Not Displayed	Overridden	Overridden	Overridden
10	Show All	By Category	Overridden	Overridden	Overridden

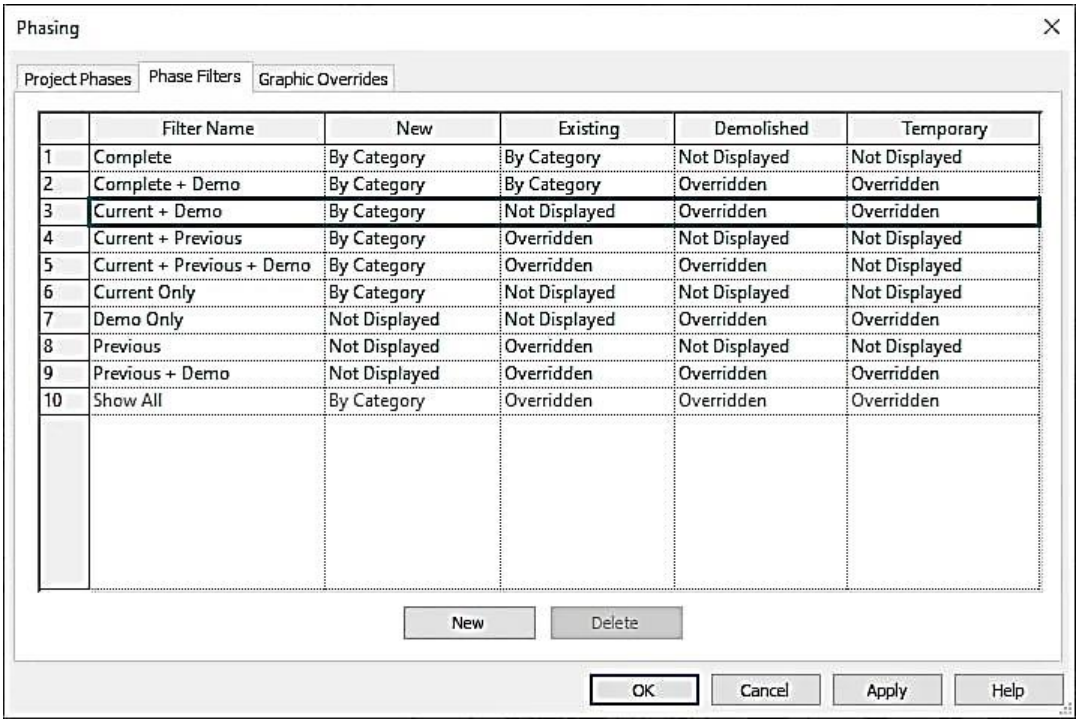
Phase Filter: Complete.

- Complete + Demo: Displays the final condition of the facility, including existing and new elements, while simultaneously showing elements designated for demolition. This filter is used for visual verification of design solutions in relation to demolition scope, and for coordination of complex renovation conditions.



Phase Filter: Complete + Demo.

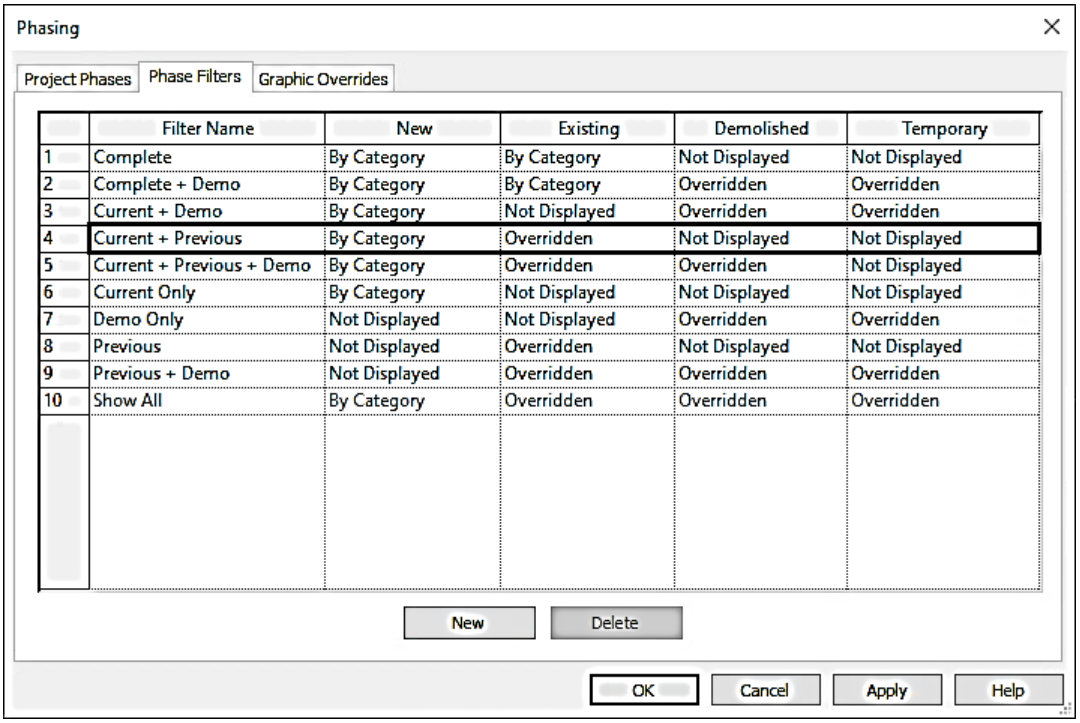
- Current + Demo: Displays only the scope of change for the active phase, including newly constructed elements and elements designated for demolition. Elements from previous phases are hidden. This configuration is used to analyze the full volume of construction and demolition work without background context.



	Filter Name	New	Existing	Demolished	Temporary
1	Complete	By Category	By Category	Not Displayed	Not Displayed
2	Complete + Demo	By Category	By Category	Overridden	Overridden
3	Current + Demo	By Category	Not Displayed	Overridden	Overridden
4	Current + Previous	By Category	Overridden	Not Displayed	Not Displayed
5	Current + Previous + Demo	By Category	Overridden	Overridden	Not Displayed
6	Current Only	By Category	Not Displayed	Not Displayed	Not Displayed
7	Demo Only	Not Displayed	Not Displayed	Overridden	Overridden
8	Previous	Not Displayed	Overridden	Not Displayed	Not Displayed
9	Previous + Demo	Not Displayed	Overridden	Overridden	Overridden
10	Show All	By Category	Overridden	Overridden	Overridden

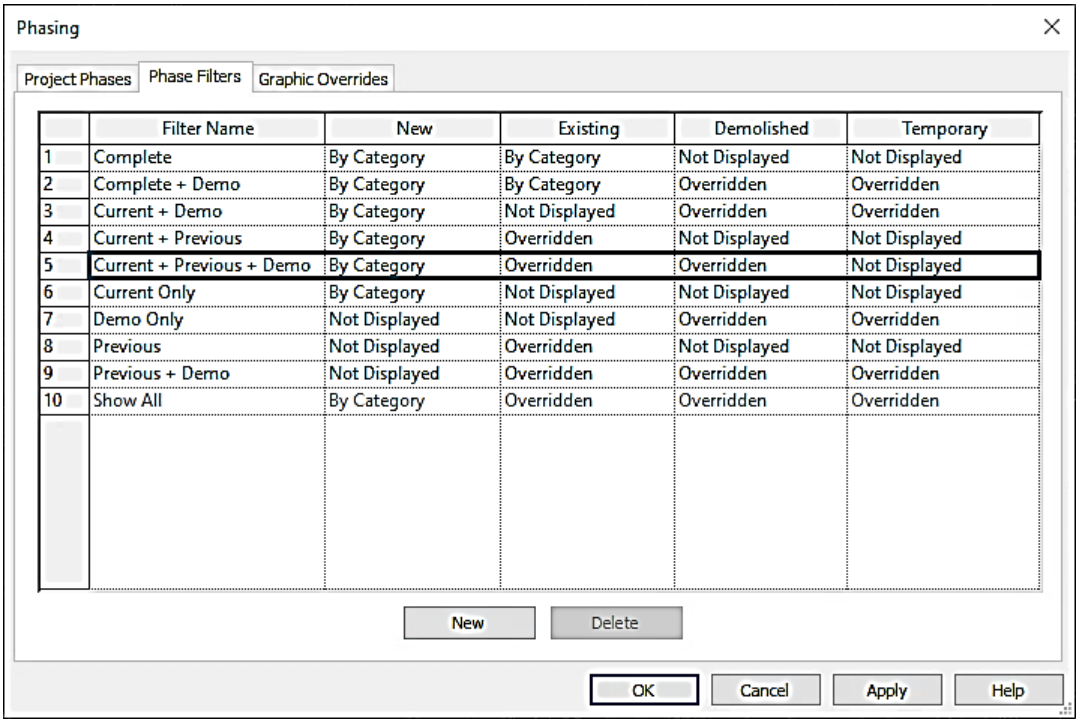
Phase Filter: Current + Demo.

- Current + Previous: Displays the combined set of existing and newly constructed elements. Demolished elements are hidden. This filter is applied to working plans where contextual information is required but demolition representation is not necessary.



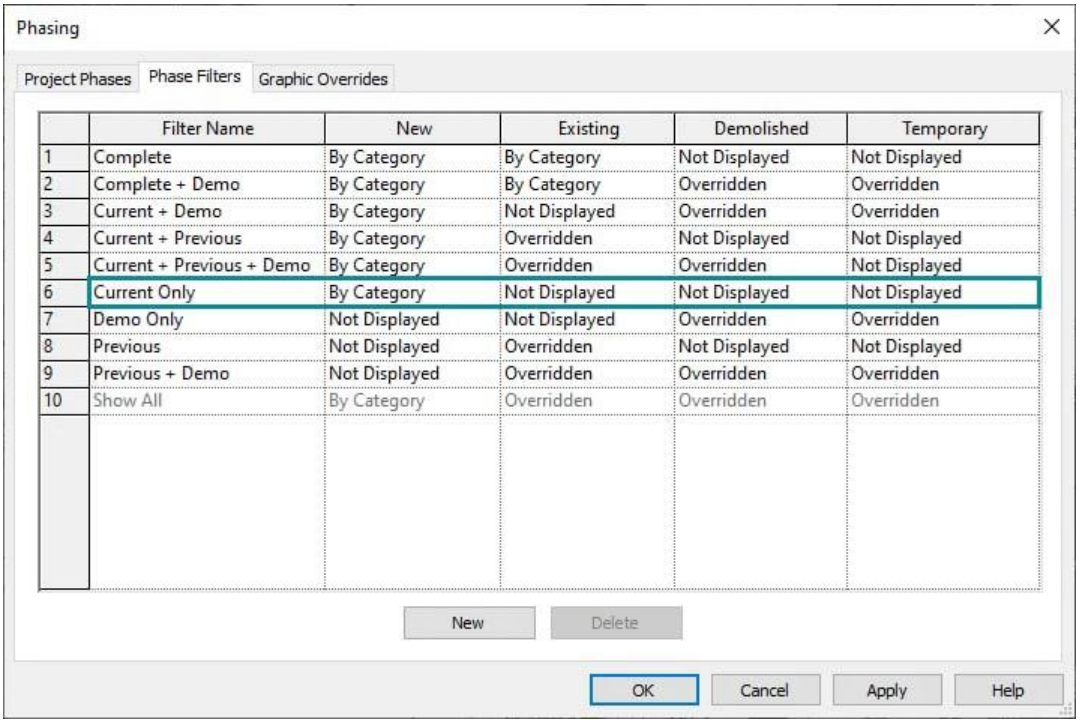
Phase Filter: Current + Previous.

- Current + Previous + Demo: Displays the complete dataset of model elements, including existing conditions, new construction, and elements designated for demolition. This configuration is used for comprehensive design analysis, spatial conflict detection, and overall visual control of all changes within a single context.



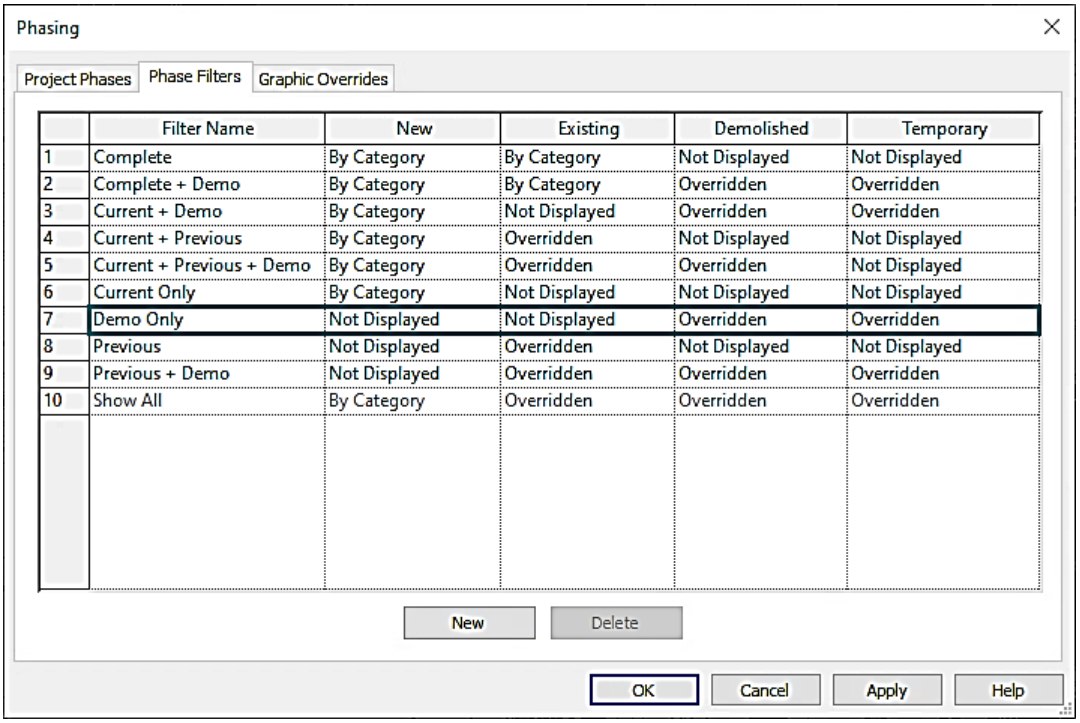
Phase Filter: Current + Previous + Demo.

- Current Only: Displays exclusively elements created in the active phase. Elements from previous phases and demolished elements are hidden. This filter is used for generating schedules of new equipment and materials, as well as for installation and assembly documentation that does not require background context.



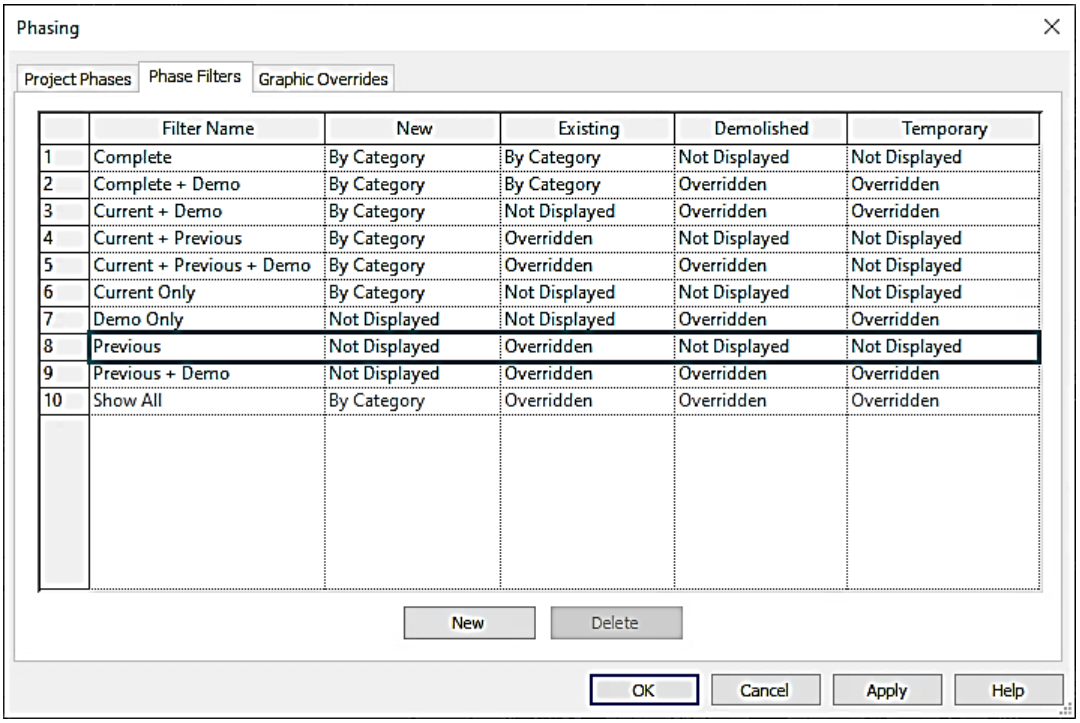
Phase Filter: Current Only.

- Demo Only: Displays exclusively elements designated for demolition in the active phase. Existing and newly constructed elements are hidden. This configuration is used for visual control of demolition scope and for generating demolition-specific schedules.



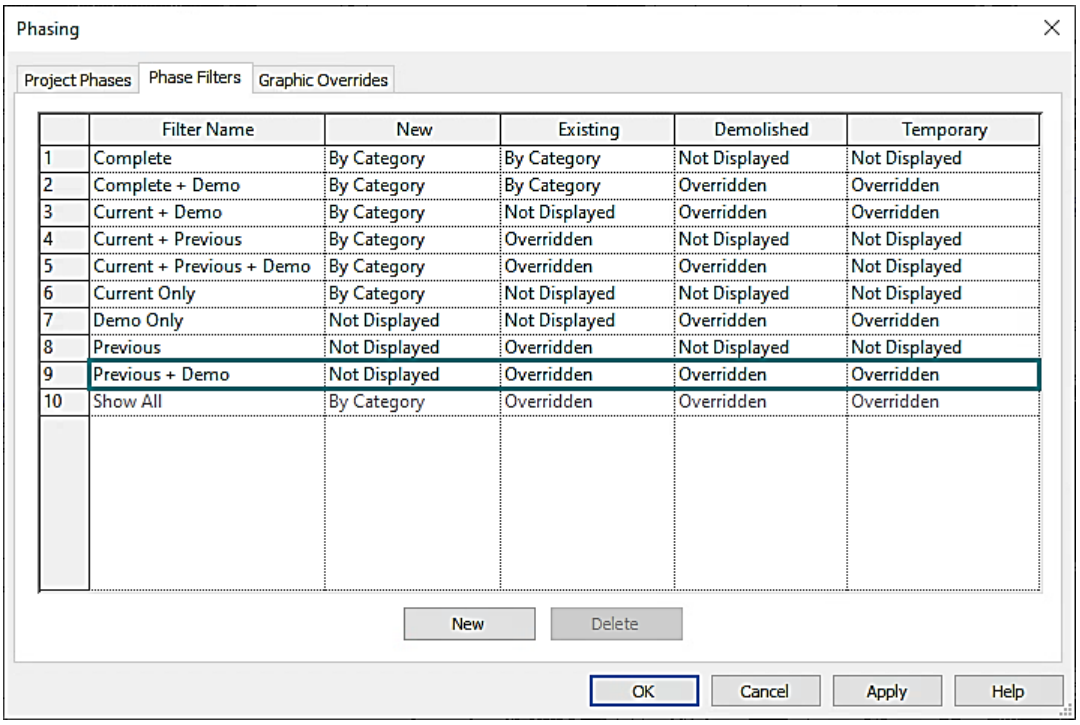
Phase Filter: Demo Only.

- Previous: Displays unchanged elements from previous phases. Elements created or demolished in the active phase are hidden. This filter is used to generate background underlays where existing context must be shown without displaying project modifications.



Phase Filter: Previous.

- Previous + Demo: Displays the condition of the facility prior to the start of construction for the active phase, while graphically highlighting elements designated for demolition. Newly constructed elements are hidden. This filter serves as the primary configuration for demolition drawings.



Phase Filter: Previous + Demo.

3.2.8. Materials

Material management is centralized. All physical model elements shall have an assigned material. By Category or temporary Generic materials are permitted during Schematic Design and early Design Development. Assign specific materials at CD where required for contracted BIM Uses and data outputs. Material-library organization may follow the approved authoring workflow while preserving consistent delivered material information. During early design stages, when specifications are not yet defined, the temporary Generic material (RGB 240, 240, 240) may be used.

The information container serves as the single source of materials. New materials shall be created only within this container and then used in project files. Direct creation of materials within active project files is not permitted to prevent duplication and non-compliance with standards.

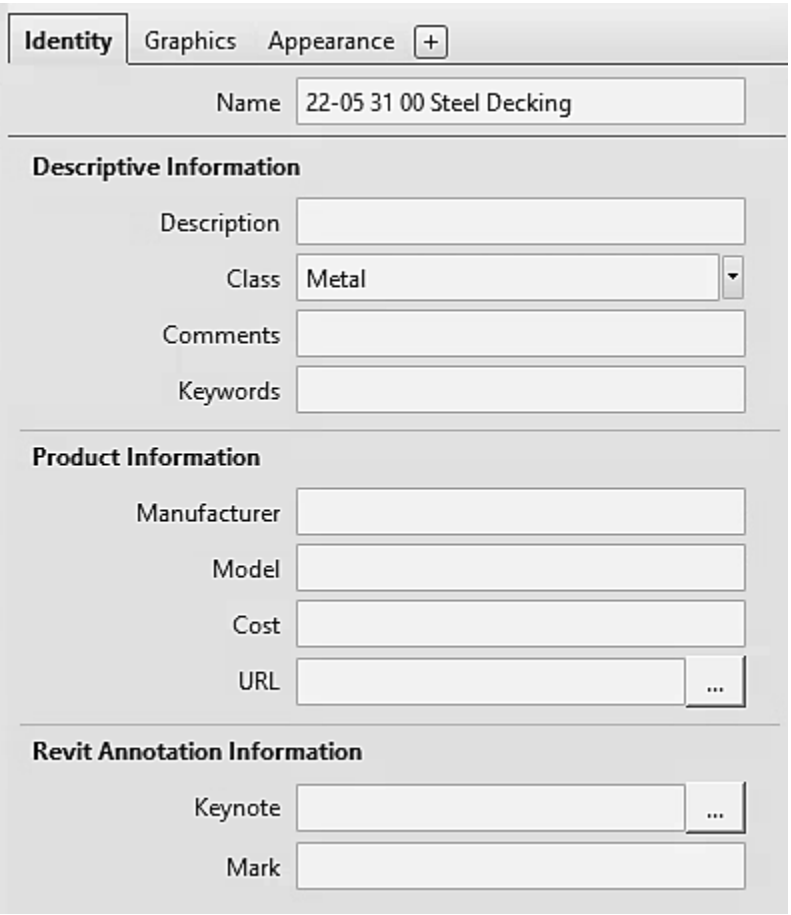
System materials used for phasing (Phase - Demo, Phase - Exist) and analytical surfaces are protected and shall not be renamed or deleted.

Identity

The Identity tab serves as the link between model geometry and project schedules. Field population must strictly adhere to the classification tables. The Name field is generated according to the Naming Standard, the Description must provide detailed characteristics

for specifications, and the Keynote field is utilized for automated tagging on drawings.

The Class field must be populated strictly by selecting the standard Revit dropdown list (e.g., Concrete, Metal, Wood); the creation of custom classes is discouraged to ensure filter compatibility. Manufacturer data (Manufacturer, Model, URL) is populated during the Construction Documentation stage upon the approval of specific vendors.



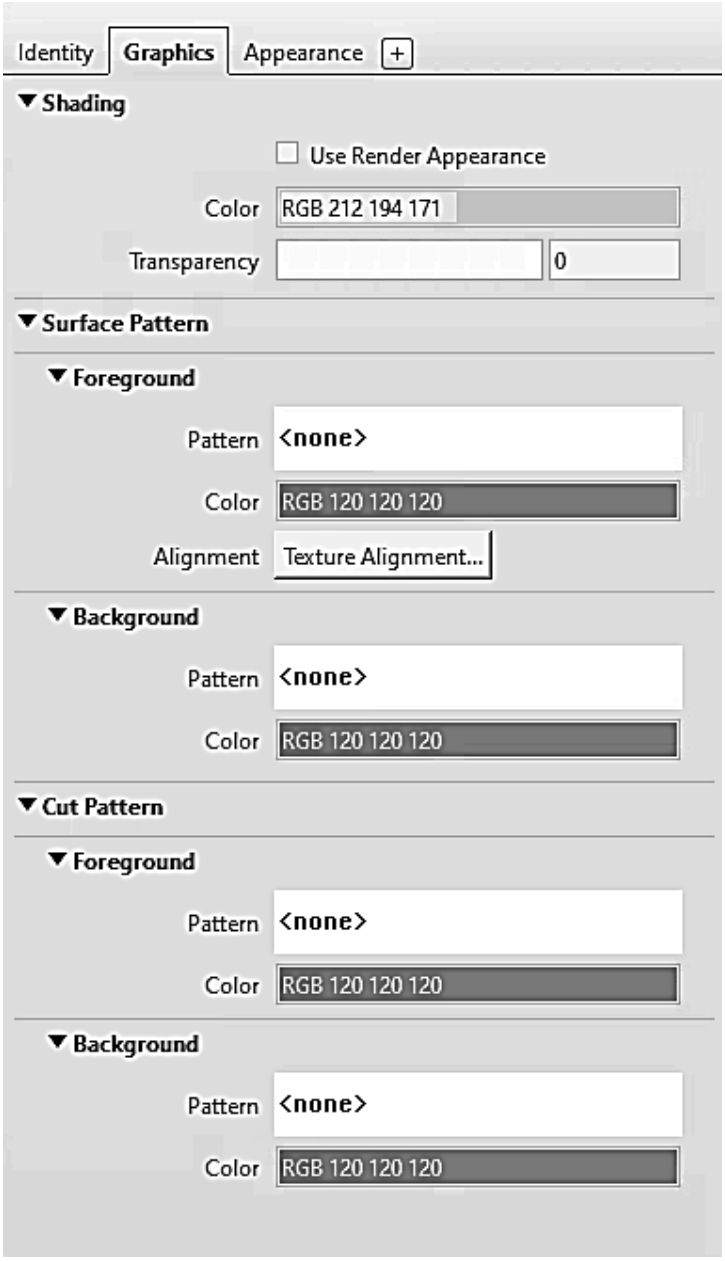
Material Identity tab: Name, Description, Class, Keynote fields.

Graphics

The Graphics tab controls the display of elements across all documentation views, including plans, sections, and elevations. A critical requirement is that the "Use Render Appearance" option must remain disabled. Fill patterns and colors for construction documents must be configured independently of render settings to ensure legibility during black-and-white printing.

Shading colors are defined using RGB or HSL values. Surface Patterns must exclusively utilize Model Patterns to guarantee correct texture scaling-such as tile, brick, or wood-relative to the geometry when view scales change; the use of Drafting Patterns for

physical materials is strictly prohibited. Transparency values must reflect the material's physical properties (e.g., glass, polycarbonate) while maintaining visual clarity in overlapping views.



Material Graphics tab: Shading, Surface Patterns, Transparency.

Appearances

Image maps utilized for textures, relief patterns, or perforations must be seamless and of high resolution. All texture assets must be stored in a centralized network folder accessible to all project participants. The use of local file paths (e.g., C: drive) is strictly prohibited, as this results in missing textures for other users accessing the model.

Material Naming

Use consistent, understandable material and appearance names. Deliver the classifications required by the approved project AIR mapping. Internal material names need not reproduce CSI codes or titles unless that licensed pathway is expressly retained.

Appearance Naming

Appearance assets are not classified (classifiers are not used for naming). Names must be short and easy for users to understand, consistent with the conventions of Revit's default appearance assets. The use of symbols, abbreviations, or numbering is prohibited, except for the hyphen.

Name: Material Type

Descriptor: Appearance short description

Format: [Name]-[Descriptor]

Example: Stainless Steel-Polished

3.2.9.Building Systems

To support facility operations, model engineering systems as logically connected networks. Define connectivity, analytical outputs and system data to the extent required by contracted BIM Uses and the AIR. In-model HVAC calculations are not mandatory; approved third-party tools may be used with documented input/output reconciliation. Geometric gaps, disconnected elements, or components that are nominally grouped but not physically connected are not permitted. System integrity is a mandatory requirement to ensure the correct operation of analytical functions, including calculations, connectivity validation, and flow tracing. The structure, classification, and naming of systems and subsystems shall comply with the Owner's established facility and engineering standards. System hierarchy and naming conventions shall be applied consistently across all projects governed by this standard.

3.2.10. Loadable Families

The host family functions as a container for reference planes, lines, and connectors, while 3D geometry is housed within nested families. Single nested elements utilize the name "Geometry", whereas complex structures require compound names (e.g., Geometry Frame, Geometry Panel). Nested components requiring scheduling or tagging must be created as Shared. Geometry is modeled at the Medium detail level, requiring mandatory unification of objects sharing the same material using the Join tool.

The Generic Model template serves as the foundation, with exceptions only for specialized architectural categories. Geometry is modeled relative to the center of reference planes; Face-based templates are permitted exclusively for surface-mounted elements. For reinforcement and MEP accessories, a "Left-to-Right" connector orientation must be observed. Dimensional parameters are constrained strictly to reference planes or lines; automatic sketch dimensions and direct constraints to geometry are prohibited.

Delivery Teams may use compliant firm content. Required parameters, identifiers, geometry and exchange behavior shall pass the approved checks. The following nesting, connector and naming patterns are Revit examples. Manufacturer-specific content shall reflect procurement status and approved substitutions.

Format: [AssetType] [Manufacturer] [Model] [Equipment Type]

Asset Type: The asset type classification.

Manufacturer: The equipment manufacturer or brand (not the supplier). If unknown, this field is omitted.

Model: Manufacturer's model designation, where known and applicable at the submission milestone. Early-design By Category or Generic materials are permitted until more specific material information is required for the contracted output.

Equipment Type: The type of equipment (supplementary field).

Material parameters of nested components are associated with parent family parameters named "Material" (or with qualifiers, e.g., "Material Frame"). The use of "Default" or "By

Parameter names must not duplicate the element category; letter suffixes (e.g., Width A, Width B) are used to distinguish similar values. Connectors are hosted exclusively on reference lines; placement on geometry faces is unacceptable. Circular connectors must be defined using a "Diameter" parameter, as the use of radius is prohibited.

3.3. Design Model Requirements

The Design Model Requirements define how Revit models must be organized, authored, and coordinated during the Design Phase to support reliable documentation, clash coordination, and downstream data use. It establishes standards for template selection, levels and grids, worksets, linked files, views, schedules, and naming conventions so that all disciplines structure their models in a consistent, predictable way. By following these requirements, design teams create models that are efficient to work in, straightforward to review, and ready to progress into construction coordination and asset information delivery without rework or remodeling.

3.3.1. Title Blocks and Sheet Composition

All Sheets within Model Files shall comply with the Clean Model methodology. A Sheet functions exclusively as a container for prepared Views within a Model File.

The use of Detail Lines directly within the Sheet environment of Model Files is not permitted. Firm-standard tags, symbols, fonts, revision clouds and coordinated annotation content are permitted. Maintain model/document consistency and required sheet identification. All Drawings remain subject to the Exhibit's Extractions provision; any specialty-document exception must be resolved in the Contract/Exhibit, not inferred from this allowance. All graphic information shall reside within Views. Sheets shall not be used for manual graphic corrections or visual adjustments of documentation content.

All textual and annotation information within Title Blocks shall be parametric and driven by

Sheet Parameters through Tags and Labels. Manual duplication of parameter-driven data is not permitted. Importing CAD blocks, CAD drawings, or any external 2D content into Model Files for placement on Sheets is prohibited.

All Sheets shall be configured at a 1:1 scale to ensure correct printing output.

Title Blocks shall be created exclusively as native Revit Families, and shall be included in the approved Project Template. The use of imported CAD-based Title Blocks is not permitted. Standard Title Blocks are included in the Project Template; adaptation to specific Owner requirements is permitted, provided that the parametric structure and data integrity are maintained.

3.3.2. Detailing and Development of Details

Detailing within Model Files shall be organized to maintain file performance, graphic clarity, and clear separation between 3D geometry and 2D annotation content. For Views with a scale up to 1/4" = 1'-0", including general Floor Plans and Sections, detail representation shall be based primarily on fully modeled 3D Components contained within Model Files.

For Views with a scale of 1" = 1'-0" and larger, including enlarged details and technical nodes, 2D Families (Detail Items) shall be used. The use of excessive 3D geometric detailing within Model Files for small-scale details should not be used where 2D representation is sufficient.

Details may be developed within Drafting Views, or as annotation overlays within Model Views, provided that background geometry visibility is appropriately controlled. Model geometry within Model Files shall not be modified solely for documentation purposes.

This methodology ensures portability of details between Projects, prevents graphic conflicts between Model Elements and annotation content, and supports consistent reuse of standard detail libraries across Model Files.

3.3.3. Use of Design Options

The Design Options tool may be used within Model Files during early Project Stages, including Conceptual Design and Schematic Design, for the evaluation of alternative design solutions.

All Design Option Sets within Model Files shall be assigned Clear and Descriptive Names reflecting their design intent. Generic naming without contextual clarification is not permitted.

Prior to final issuance of Model Files, file transfer, or publication to the CDE, all Design Options shall be resolved. The Primary Option shall be accepted using the Accept Primary

function, and all non-selected options shall be removed from the corresponding Model Files. Retention of unresolved Design Options within issued Model Files is prohibited, as this may result in database inconsistencies, incorrect Schedule calculations, and coordination errors across the Model.

3.4. Design Coordination Model Requirements

The Design Coordination Model is a coordinated set of discipline-specific files exported from Revit prepared to verify spatial compatibility of building systems during the design stage. Its purpose is to demonstrate that at least one feasible system layout solution exists that can be implemented without requiring major design revisions during construction.

View Configuration and Content

Each Revit file shall include dedicated three-dimensional views configured specifically for coordination export, with one coordination view provided for each major system or logical system grouping. Coordination views shall display only the three-dimensional model elements required for spatial coordination and clash detection. Annotation categories, two- dimensional drafting elements, scope boxes, and any temporary, placeholder, or construction-only geometry shall be excluded from coordination views to prevent the inclusion of content that cannot be coordinated. Linked Revit models and CAD files shall be unloaded or hidden prior to export to avoid duplication of geometry, except where a linked file is required solely to provide spatial context, and is not otherwise exported by another discipline.

Design Coordination Model Composition

The Design Coordination Model is a collection of discipline-specific files exported from Autodesk Revit and combined for spatial coordination purposes. Each discipline-specific file shall include system geometry developed to a level sufficient to support coordination activities, and to identify major spatial conflicts between disciplines. Geometry is provided for coordination purposes only and shall not include fabrication-level detail, shop modeling, or elements intended solely for construction or installation. The required LOD for files contributing to the Design Coordination Model shall be defined in the BEP. Non-graphic information included in the coordination model shall be limited to the data necessary for element identification, system classification, and coordination review.

Coordinate Configuration

Design Coordination files shall be exported using the coordinate settings defined in the BEP. For projects consisting of a single building, Project Coordinates may be used when exporting discipline-specific files. For projects with multiple buildings, Shared Coordinates shall be used to ensure proper alignment of discipline files from different buildings within a common project coordinate system.

File Naming and Classification

Exported Design Coordination files shall follow a consistent naming convention that includes the Project Number and system classification in accordance with OmniClass Table 21. File names shall generally match the corresponding Revit Workset names. When needed for coordination clarity, systems may be split into separate coordination files. File names shall remain unchanged throughout the project lifecycle. Updates shall be issued by overwriting existing files to maintain continuity in coordination and version tracking.

Navisworks Export Configuration

The "Convert Element IDs" option must be enabled to support issue tracking and reliable element traceability between Revit and Navisworks. The "Convert Element Properties" option must also be enabled to ensure that relevant parameter data is available for search sets and clash detection rules.

Update and Publication Requirements

Coordination files shall be updated and published on a regular schedule defined in the BEP . All project participants shall coordinate against the most current published coordination files.

3.4.1. Clash Coordination Environment

Interdisciplinary 3D coordination is generally performed using Autodesk Forma Model Coordination and Autodesk Navisworks Manage when delivering projects with Revit. The coordination environment utilizes discipline-specific files exported in NWC format, which are used together to perform spatial coordination and compatibility checks.

Access to the coordination environment is restricted to designated project participants in accordance with the roles defined in the BEP . The coordination platform shall support version management of coordination files and enable comparison between iterations to monitor the progress of clash resolution.

3.4.2. Conflict Detection and Resolution

Clash detection shall be performed with analysis including Hard Clashes (geometric intersections) and Soft Clashes (clearance and maintenance zone violations). Approved tolerance values are applied; intersections falling within tolerance limits are not classified as clashes.

Clash resolution follows the established system priority structure, in which gravity-based systems and structural elements take precedence over pressurized and flexible systems. All clash resolution actions shall be performed exclusively within the native discipline authoring files. Direct modification of coordination or aggregated models is prohibited. A clash is considered resolved only after the responsible discipline file has been updated, re-exported, and successfully validated through a subsequent automated clash test.

3.5. Construction Model Requirements

Construction Models are developed by the Project Delivery Team as a coordinated set of discipline-specific model files, and may be authored using software platforms appropriate for fabrication and shop drawing production, including Revit, Tekla Structures, Civil 3D, and Autodesk Fabrication. The choice of authoring tools is at the Delivery Team's discretion (and with approval of the Owner during the BEP review process, provided that all model files remain compatible with the Project coordination environment and approved workflows.

All files comprising the Construction Model shall be delivered in NWC format compatible with Autodesk Navisworks, together with the corresponding native authoring formats for record, coordination, and handover purposes.

Level of Development Requirements

Deliver the contracted native authoring files and the approved coordination exchange. Define element-specific geometry, associated information, authorship and authorized uses in the MET/BEP. LOD 350 interfaces and LOD 400 fabrication detail apply only to the identified scope. Excessive geometric detailing beyond the defined project needs is deprecated.

In contrast to Design Models, Construction Models shall include fully defined physical geometry required for execution, including flanges, valves, hangers, supports, insulation

thicknesses, and installation clearances.

Model Updates and Status

Construction Models shall be updated on a regular basis to reflect approved design changes, fabrication decisions, and construction progress. Each update must supersede the previous issued version and be redistributed through the CDE in accordance with the BEP .

Relationship to Other Models

Upon completion and acceptance, the Construction Model supersedes the Design Model for the corresponding disciplines. Use construction-model content only for the authorized uses and versions stated in the BEP and Contract. Acceptance of a construction or coordination model does not itself amend or supersede the designated Contract Documents. Changes to the approved Construction Documents Model follow the contractual modification procedure.

3.6. Construction Coordination Model Requirements

Federate approved discipline exchanges in the agreed coordination environment and submit a controlled published reference for Owner review. Preserve geometry, shared coordinates, identifiers, properties and issue traceability. Navisworks formats are examples where that pathway is selected.

This federated model serves as the primary tool for interference checking and installation planning. For Owner verification and review, a published NWD file must be submitted, capturing the frozen coordination status at the time of delivery. File naming must strictly adhere to the protocols defined in the BEP . To facilitate visual identification and navigation, the model must utilize a standardized color-coding scheme for each trade and contain organized Search Sets based on system classifications.

3.7. As-Built Model Requirements

The As-Built Model is a comprehensive digital record derived directly from the final Construction Coordination Model. Delivered in non-editable Autodesk Navisworks (NWD) format, this model serves as a static archive reflecting the absolute physical condition of the facility at the time of completion. The model geometry must be updated to incorporate all field modifications, approved Request for Information (RFI) resolutions, and red-line markups, ensuring that the virtual representation aligns precisely with the installed reality. As a read-only deliverable, the As-Built Model represents the final "snapshot" of the construction phase, and must be submitted simultaneously with the official As-Built Drawings to validate the accuracy of the completed works.

3.8. Record Model Requirements

Record deliverables incorporate documented approved changes and field-verified conditions within the agreed scope, method and tolerances. Record limitations and unresolved exceptions. The construction team supplies verified substitution and installed-product data; the designated author updates affected models, with design-professional review where contractually required. Certification, sealing and compensation remain governed by the applicable contract. Deliver the approved published as-built format and required native editable record format. Ownership and licenses remain governed by Exhibit §1.3, including its regularly used standard-element exception. Neither guide-created certification nor blanket 2D precedence is added.

3.9. Facility Model Requirements

The Facility Model is an operations-focused derivative prepared to the project AIR; retain the required record and contract archives separately. MV-BIM-FM uses the essential geometry and structured data required for the contracted operational uses, independent of authoring platform.

The Facility Model is a streamlined, data-centric iteration of the project model, specifically optimized for integration with Asset Management (AM) and Computer-Aided Facility Management systems. To ensure maximum performance in Digital Twin environments, this model must be stripped of all heavy documentation artifacts, including 2D detailing, sheets, annotation views, and temporary construction schedules. The geometry should remain accurate but simplified, focusing on the location and identification of maintainable assets rather than fabrication detail. The Facility Model serves as the geometric backbone for the Owner's long-term operations, providing a lightweight yet information-rich interface for maintenance planning, space management, and system monitoring throughout the building's lifecycle.

3.10. Minimum Viable BIM for Facility Management (MV-BIM-FM)

Minimum Viable BIM for Revit is a lean modeling approach in which the project team delivers only the essential geometry and data needed to support clear documentation, coordination, and asset handover, rather than attempting to model every detail or capture every possible parameter up front. In practice, this means creating clean, well-structured Revit models with accurate levels, grids, major systems, and a focused set of shared parameters (such as type, location, and key asset IDs), while pushing non-critical or frequently changing information into external databases that can be linked later, keeping the Revit model lightweight, maintainable, and easier to update over the facility lifecycle.

Purpose and Scope

For Owner BIM projects, Minimum Viable BIM for Facility Management (MV-BIM-FM) provides Owners with the ability to develop BIM for their facilities that is detached from design and construction workflows. This may be applied when:

- An existing facility is being retroactively documented for FM use.
- A facility management team is assuming operational responsibility for a BIM previously produced under a design or construction contract.
- A completed facility is being handed over to an Owner or FM operator with a BIM-based deliverable.

Specific options will be defined by the Project BEP and AIR documents.

Spatial Model Requirements

The spatial model is the geometric foundation of the MV-BIM-FM. Its purpose is to provide a navigable and searchable representation of the facility that allows facility managers to locate spaces and assets without reference to paper records. Define required development for spaces and assets in the MET according to the operational use; do not impose an undefined LOD 250 category. Floor elevation is relative to the project datum identified in the BEP and FIM, including zero where valid.

Spatial Hierarchy

The model shall reflect the following spatial hierarchy, consistent with the Owner's FM naming standards to facilitate information exchange between the BIM and their FM system:

Site › Building › Floor / Level › Space / Room › Asset

Every asset included in the MV-BIM-FM shall be assigned to a parent space (room, hallway, lobby, parking lot, yard, etc.), and every space shall be assigned to a floor.

Floor / Level Objects

The BIM shall provide distinct vertical levels for the facility, including basement levels, occupied floors, mechanical levels, roofs, and site. Each floor object shall carry at minimum:

- Floor name and number consistent with building signage and the Owner's FM system.
- Elevation above finished floor (AFF) datum.
- Gross floor area derived from the model geometry.

Space and Room Objects

Spaces are the primary unit of FM spatial management. Every occupiable and maintainable area of the facility shall be represented as a discrete space object in the model. Rooms

shall generally be defined by enclosing walls; spaces within open-plan areas shall be defined by logical boundaries consistent with the Owner's occupancy naming and management approach. Each space object shall carry the following minimum attributes:

- Unique Space ID — consistent with physical room signage and the Owner's CAFM/CMMS system.
- Space name and category (e.g., office, corridor, mechanical room, restroom, storage).
- Net area, calculated directly from model geometry.

Room numbering shall be unique within each building so that the combination of Building ID and **Room ID** defines a single unambiguous location.

Zone Objects

If requested by the Owner, the model may require the grouping of spaces into zones for FM operational purposes. Required zone types typically include:

- HVAC zones (spaces served by a common air handling or thermal zone).
- Electrical zones (spaces served by a common distribution panel).
- Fire / life safety zones (spaces within a common fire compartment or notification zone).
- Leasing or departmental zones (spaces allocated to a common tenant or cost center).

Each zone shall be assigned a unique Zone ID, zone type, and associated system or organizational reference.

Asset Information Delivery — AIR / FIM / SAID

This section establishes the three-part framework that governs asset information delivery in OHIOBIMS.

Asset Information Requirements (AIR)

AIR specifies the requirement. FIM defines the schema in Appendix B. SAID is the delivered dataset conforming to that schema and the project AIR.

Facility Information Matrix (FIM)

The FIM defines the worksheets, field names, data types, value lists, and primary/foreign key relationships that structure asset information. The FIM is the State's authoritative schema, defined in Appendix B.

Structured Asset Information Deliverable (SAID)

The SAID is the tabular dataset the Delivery Team hands over at each AIR milestone, conforming to the FIM schema. The SAID is the artifact the Owner reviews and validates. The chain reads: the AIR specifies the requirement › the FIM defines the structure › the SAID is the delivered file.

Asset information delivery is the non-graphical data component of MV-BIM-FM. It shall be delivered as a Structured Asset Information Deliverable (SAID) conforming to the State of Ohio Facility Information Matrix (FIM), or in a CAFM/CMMS-importable equivalent pre-approved in writing by the Owner. The SAID replaces unstructured paper-based handover processes by extracting structured asset data directly from the BIM model at defined handover milestones. The FIM schema is structured such that each worksheet, field, and key relationship corresponds one-to-one with widely adopted facility-handover data exchange formats; the Owner may therefore generate equivalent industry-format files from any compliant SAID through a deterministic field-level mapping, without modification to the underlying data. AIR tier is established before design and may change only through the applicable contractual change procedure.

AIR Delivery Tiers

Asset Information Requirements are delivered in one of two tiers. The applicable tier is selected once within the Project BIM Requirements (PBR) template and is inherited by the BIM Execution Plan (BEP) and the project QA/QC checklist. Tier selection is established prior to design and is not renegotiated during construction.

Essential Tier. Default for State of Ohio capital projects. Requires twelve per-asset fields covering identification, location, manufacturer information, installation and warranty dates, expected service life, replacement cost, and asset status. Validation is performed with form-level required-field validation and Agency BIM Coordinator review..

Extended Tier. Required for mission-critical or large facilities (including hospitals, data centers, airports, central plants, and research laboratories), for projects exceeding twenty-five million dollars in total construction value, or where a state agency opts in. Requires approximately twenty-five to thirty per-asset fields and adds five structured data categories: Systems, Zones, Spares, Documents, and Spaces. Validation is with form-level validation, and Agency BIM Coordinator review.

The tier framework supplements, but does not replace, the FIM-conformant SAID. The tier defines the minimum per-asset field set and validation expectations. The FIM defines the worksheet schema into which that data is structured for ingestion by the Owner's CMMS and CAFM systems. Both layers are required for an accepted AIR submission.

Essential Tier Required Fields

A single zipped delivery package shall be submitted, containing the OHIOBIMS OmniClass Asset Data Form (one row per maintainable asset instance with all twelve required fields populated), the auto-generated CSV export for system ingestion, the auto-generated PDF for archival and submittal. The twelve Essential fields are:

Instance Name. Unique identifier for the specific asset (for example, AHU-01-A). Shall be unique within the facility and shall follow the project naming convention defined in the BEP.

Asset Classification. Code identifying the asset type.

Space. Room or space identifier where the asset is located. Shall match a Space ID in the Revit room or space schedule.

Manufacturer. Company that manufactured the asset. Sourced from submittal or nameplate.

Model. Manufacturer's model number. Sourced from submittal or nameplate.

Serial Number. Manufacturer's unique serial number for this instance. Sourced from the nameplate.

Tag / Barcode. Owner's asset tag or barcode applied at commissioning, in accordance with the Owner's asset tagging program.

Install Date. Date the asset was installed, in YYYY-MM-DD format. Sourced from construction records.

Warranty Start Date. Date warranty coverage begins, in YYYY-MM-DD format. Sourced from the submittal or contract.

Expected Life (years). Manufacturer or industry-standard service life, sourced from ASHRAE service-life tables or manufacturer data.

Replacement Cost (USD). Estimated cost to replace at end of life, provided by the contractor at handover.

Asset Status. One of: In Service, Spare, Removed, or Future. Verified by the commissioning agent.

Extended Tier Additional Fields

In addition to the twelve Essential fields, the Extended tier may also document additional requirements in the AIR:

Asset identification and classification: Asset System (references the Systems register), Asset Family (the Revit family used to model the asset, supporting model-to-data traceability), and OmniClass Description (the human-readable description of the OmniClass code).

Commissioning and warranty: Warranty Duration in months from the Warranty Start Date; Warranty Type (Parts, Labor, Parts plus Labor, or Extended); Commissioning Status (Not Started, In Progress, Complete, or Deferred); Commissioning Date; and TAB Report Reference (document identifier for the Test, Adjust, Balance report).

Performance and ratings: Capacity / Rating (the primary performance rating, for example 10 tons, 75 kilowatts, or 50 gallons per minute), Capacity Units, and Service Voltage and Phase for powered equipment.

Operations and maintenance support: PM Frequency (Monthly, Quarterly, Semi-Annual, or Annual); Spares Reference (references the Spares register, blank if no spares are provided); O&M Manual Reference (document identifier linking to the O&M Manuals register); and Manufacturer Contact (name, phone, and email of the manufacturer or local representative).

Recommended for Extended tier: Sustainability Rating (ENERGY STAR, AHRI, or applicable certification); Refrigerant Type for refrigerant-bearing equipment; and Disposal Notes covering special handling for end-of-life materials such as lamps, refrigerants, and batteries.

Extended Tier Additional Registers

The Extended tier adds five structured registers in addition to the per-asset record set.

Systems register. Lists each engineered system in the facility. Required fields: System ID, System Name (for example, AHU-1 Supply Air System), System Type (HVAC, Electrical, Plumbing, Fire, Security, or Technology), Description, Member Assets (list of Instance Names), Serving Spaces (list of Space IDs), and Drawing References where applicable.

Zones register. For facilities with HVAC zoning, fire compartmentation, or security zoning. Required fields: Zone ID, Zone Name, Zone Category (HVAC, Fire, Security, Acoustic, or Lighting), Member Spaces (list of Space IDs), and Controlling Asset (Instance Name) where applicable.

Spares register. Inventory of spare parts and components delivered at handover. Required fields: Spare ID, For Asset (Instance Name or Type), Description, Manufacturer, Part Number, Quantity Delivered, Storage Location, and Delivery Date.

Documents register. Manifest of all handover documents linked to assets, systems, or the facility. Required fields: Document ID, Document Title, Document Type (O&M Manual, Submittal, TAB Report, Cx Report, Warranty, Cut Sheet, or As-Built Drawing), Related Assets or Systems (list of identifiers), File Path in the CDE, Date Issued, and Issued By.

Spaces register. The Essential tier requires each asset to reference a Space. The Extended tier additionally requires a structured Spaces register so that spaces themselves carry the data the Owner needs. Required fields: Space ID, Space Name, Floor / Level, OmniClass Table 13 code (Space by Function), Gross Area in square feet, Occupancy Type, and Occupant Load where applicable.

Extended Tier Delivery and Acceptance

The Extended tier uses the same form-driven approach as the Essential tier, with additional tabs in the OHIOBIMS form for Systems, Zones, Spares, Documents, and Spaces. The package delivered at each milestone contains the expanded Asset Data Form, the Systems Form, the Zones Form, the Spares Form, the Documents Form (with linked file paths in the CDE), the Spaces Form, a consolidated CSV export of all of the above, a consolidated PDF print of all of the above.

AIR Tier Standards Alignment

The AIR tier framework is structurally compatible with NBIMS-US v4 concepts and ISO 19650 AIR principles. The Asset Data Form aligns with the NBIMS-US v4 / COBie v3 Type and Component tables and OmniClass Table 23. The Systems, Zones, Spaces, Spares, and Documents registers align with the corresponding NBIMS-US v4 / COBie v3 tables, with the Spaces register additionally aligned to OmniClass Table 13. The twelve Essential fields constitute a subset of the COBie v3 required fields together with the full ISO 19650 AIR concept. This alignment is structural, not contractual: the State of Ohio does not require a COBie spreadsheet deliverable under this version of the AIR.

AIR Tier Roles and Responsibilities

Design team. Establish OmniClass codes for specified equipment within the design models and populate Space identifiers in Revit.

General contractor. Coordinate subcontractor data collection and aggregate it into the Asset Data Form.

MEP subcontractors. Provide Manufacturer, Model, Serial Number, Install Date, and

Warranty Start Date at submittal and commissioning.

Commissioning agent. Verify Asset Status, confirm that the Tag or Barcode has been applied

Owner / Agency BIM Coordinator. Accept the AIR deliverable and archive the deliverables in the CDE. For Extended-tier deliverables, the Agency BIM Coordinator additionally performs the cross-reference review.

AIR Tier Versioning and Maintenance

The AIR document is owned by the OFCC BIM Technical Manager and is reviewed annually in alignment with the OHIOBIMS roadmap.

Asset Information Delivery Scope

Asset information delivery is required for all maintainable assets — defined as any component subject to a scheduled or reactive maintenance task. The Owner shall publish an AIR document prior to handover that identifies the specific asset categories in scope. At minimum, the following asset categories shall be included:

- HVAC equipment (air handling units, fan coil units, Variable Air Volume (VAV) boxes, exhaust fans, chillers, boilers, cooling towers).
- Plumbing equipment (water heaters, backflow preventers, pumps, pressure reducing valves).
- Electrical equipment (switchgear, distribution panels, transformers, emergency generators, UPS units).
- Vertical transportation (elevators, escalators, platform lifts).
- Life safety equipment (fire alarm control panels, sprinkler risers, fire pumps, extinguishers).
- Building envelope maintainable elements (roof access hatches, overhead doors, exterior expansion joints).

Required SAID Worksheets

The following SAID worksheets, defined by the State of Ohio Facility Information Matrix (FIM) and specified in detail in Appendix B, shall be fully populated at handover. Fields designated as required in this section shall not be left blank or populated with placeholder values.

SAID Worksheet TAB	Minimum Required Fields	FM Purpose
Facility	Name, description, gross area, site address	Portfolio record and area baseline
Floor	Name, elevation, gross area	Vertical navigation and area reporting
Space	Name, space ID, floor reference, net area, category, department	Space management, occupancy, lease
Zone	Name, zone type, space references	Systems mapping and cost allocation
Component	Name, type reference, space location, install date, serial number, tag ID	Asset registry and work order routing
Type	Manufacturer, model number, warranty start/end, replacement cost, expected life	Warranty tracking and capital planning
Document	Document name, type, file reference or URL, associated component or type	O&M manuals, warranties, submittals

Unique Asset Identification and Completeness Threshold

Every maintainable asset in the MV-BIM-FM shall be assigned a **Unique Asset Identifier (UAI)** that is identical across the BIM model object, the corresponding Component row in the FIM-conformant SAID, and the Owner's CMMS/CAFM system. The UAI format shall be defined in the AIR. Where a physical asset tagging program exists, the physical tag (barcode, Quick Response (QR) code, or Radio-Frequency Identification (RFID)) shall correspond to the UAI. For example, Air Handler Unit unique asset identifiers may be designated as **AHU-1**, **AHU-2**, and so forth.

Completeness Threshold. The SAID shall not be accepted as MV-BIM-FM compliant unless:

- 100% of in-scope asset categories defined in the AIR are represented in the Component worksheet.
- 100% of Component rows include a valid Space reference consistent with the spatial hierarchy in this section (i.e., a reference that includes building, floor, and space, locating the asset within the spatial hierarchy).
- Zero Component rows reference a Space ID that does not exist in the Space worksheet.

Handover and Acceptance

The MV-BIM-FM spatial model and the SAID shall be submitted to the Owner for the project for review and acceptance prior to final project closeout or FM contract commencement. The State of Ohio BIM Manager shall verify completeness against the AIR and return a written acceptance or deficiency log. Deficiencies shall be corrected and resubmitted within a timeframe agreed upon in the project contract.

4. State Agency Specific BIM Requirements

This section is reserved for future state-agency-specific BIM and Asset Information Requirements (AIR) that facilitate asset handover to agency facility and asset management systems. Agency-specific requirements added under this section will extend, not override, the general requirements in Sections 1 through 3, and additional State Agency Specific BIM Requirements may be published in the future.

5. Terms and Definitions

This section defines key terms used in this document, consistent with ISO 19650 and NBIMS-US™ Version 4. It establishes a common understanding of roles, processes, and data concepts – such as the Owner, delivery team, BEP, CDE, and Model Element – to ensure clarity and consistency in applying these standards.

4D Modeling

In addition to the three dimensions expected in a model, BIM can use time as a fourth dimension, showing views of a Project over time (e.g., existing conditions, demolition, Phase 1 Construction, Phase 2 Construction, Final Construction).

AIR Essential Tier

The default State of Ohio asset information delivery tier. Requires twelve per-asset fields delivered through the OHIOBIMS OmniClass Asset Data Form with CSV and PDF exports.

AIR Document

The published project-level document expressing the Asset Information Requirements for the specific project, including in-scope asset categories, UAI format, AIR delivery tier, accepted physical SAID formats, and the project-specific milestones at which each deliverable is required. The AIR Document is referenced by the BEP and is the contractual basis for SAID acceptance.

AIR Extended Tier

The asset information delivery tier required for mission-critical or large facilities (hospitals, data centers, airports, central plants, research labs), for projects exceeding $25M, or where an operating agency opts in. Extends the Essential structure with approximately 25–30 per-asset fields and adds Systems, Zones, Spares, Documents, and Spaces registers.

AIR Milestones

The three contractually defined points at which a SAID is delivered and validated against the AIR: sixty percent Construction Documents, Substantial Completion, and Final Handover. Additional project-specific milestones may be defined in the AIR Document.

Asset Information Model (AIM)

The structured information set — graphical models, structured asset data, and linked documents — assembled and maintained for an asset during the operational phase. Derived from the PIM at handover and updated throughout the asset life cycle.

Asset Information Requirements (AIR)

The detailed information needs for operating and maintaining an asset once it is in service, covering technical, commercial, and management information required by the Owner's operations and facilities teams.

Autodesk Forma (ACC)

Autodesk Forma is an example of project/authoring platforms. The designated CDE and approved authoring pathway are stated in the project Contract/BEP. AIR classification follows the approved project code lists and their published FIM mapping

BEP / BIM Project Execution Plan (BIM PxP)

The plan developed by the Project Delivery Team that describes how BIM and information management will be carried out on the project, including BIM Uses, roles and responsibilities, authoring tools, CDE configuration, standards, workflows, and information exchanges.

BIM Use

A defined application of BIM during a project or asset phase to achieve a specific objective, such as design authoring, 3D coordination, quantity takeoff, 4D scheduling, cost estimating, analysis, or facility management.

Building Information Model (BIM Model)

The structured data set, including geometric and non-geometric information, created using BIM authoring tools that describes the built asset or a portion of it at a given point in time.

Building Information Modeling (BIM)

The use of a shared digital representation of a built asset (including its physical and functional characteristics) to support design, construction, and operation processes and to form a reliable basis for decisions throughout its life cycle.

Clash Detection / Spatial Coordination

The process of using software tools to identify, assess, and manage physical interferences and spatial conflicts between elements in different discipline models, and to track and resolve them prior to construction or installation.

Cloud Worksharing

Cloud Worksharing: a supported authoring collaboration method where selected; not a universal condition of CDE compliance. Element Status: the lifecycle/phase state recorded through the approved authoring workflow and mapped to required delivered data; Revit Phase Created/Phase Demolished are implementation examples.

Common Data Environment (CDE)

The shared digital environment used as the single source of truth for collecting, managing, and distributing project information, with defined folder structures, permissions, workflows, and version control.

Common Data Environment (CDE) States

The four information states defined in ISO 19650 — Work in Progress (WIP), Shared, Published, and Archived — that govern how information moves through CDE workflows from authoring to acceptance.

Computer-Aided Facility Management (CAFM)

The Owner's software system for managing space, occupancy, moves, and lease information. A typical downstream consumer of the spatial data delivered in the SAID.

Computerized Maintenance Management System (CMMS)

The Owner's software system for tracking maintainable assets, work orders, preventive maintenance schedules, parts inventories, and labor. The typical downstream consumer of the SAID and AIR data.

Delivery Team Member

A Delivery Team Member is any person or organization contracted to provide information, goods, or services for the project, such as a designer, contractor, consultant, or subcontractor.

Element Status

The lifecycle state of a Revit element, expressed through Phase Created and Phase Demolished settings. Status values (Existing, Demolished, New, Temporary) are interpreted consistently across all OHIOBIMS models.

Exchange Information Requirements (EIR)

The document, typically issued by the Owner, that specifies the information to be provided by project participants at defined stages, including what information, in what format, level of detail, and for what purpose.

Facility Information Matrix (FIM)

The asset/facility exchange schema in Appendix B. Facility Model: the geometry-focused operational derivative specified by the project. The SAID conforms to the FIM; it is not the MET or AIR itself. Conversion to other formats is governed by validated version-specific crosswalks and their limitations, not a universal no-transformation guarantee.

Federated Model

A model created by linking or referencing multiple discipline, system, or area models together within a coordination environment, without merging them into a single authoring file.

Federation Strategy

The documented approach in the BEP describing how discipline models are linked or referenced into a coordinated whole, including link directions, file-naming conventions, and coordination cadence.

Final Handover

The contractual milestone at which the Delivery Team turns over the completed asset and all closeout deliverables — including the Record Model, and SAID.

Industry Foundation Classes (IFC)

An open, vendor-neutral data schema and file format standardized as ISO 16739, used to describe, share, and exchange building and infrastructure information between software applications.

Information Exchange

The transfer of a defined information set between parties, systems, or project phases, in an agreed format and at agreed milestones, to support particular processes or decisions. Examples include downloads of asset data from a BIM to a CMMS.

Information Management

The planning, creation, checking, sharing, use, and storage of information about a built asset to ensure that information is accurate, timely, and accessible to authorized parties throughout the project and asset life cycle.

Internal Origin

The authoring-platform internal reference. Record the approved local-to-shared coordinate transformation and preserve survey control. LOD: an element-development requirement assigned by the MET; it does not independently confer contractual status or authorize a use beyond the Contract/BEP.

ISO 19650

The international standard for the organization and digitization of information about buildings and civil engineering works using BIM, published in multiple parts. Provides the information-management framework underpinning this Standard.

Lead BIM Organization

The organization (for example, prime design consultant, construction manager, or general contractor) designated in the contract to manage and coordinate BIM and information production across multiple teams for its scope of work.

Level of Development (LOD)

A measure of the reliability and completeness of a model element at a particular point in the project, indicating how much its geometry and associated information can be relied upon for specific uses (for example, LOD 100 conceptual, LOD 200 approximate, LOD 300 detailed design, LOD 400 fabrication/installation, LOD 500 field-verified).

Level of Information (LOI)

The degree to which the non-geometric information (properties, attributes, and documentation) associated with a model element is defined at a particular point in the project.

Model

A structured digital representation of the Project, or a defined part of the Project, comprising Model Elements and their associated geometric and non-geometric information, developed and maintained for the BIM Uses identified in the BIM Execution Plan (BEP). A Model may be discipline-specific or federated and may be contained in one or more coordinated digital files.

Model Element

An individual component within a BIM (for example, wall, beam, slab, duct, pipe, or

equipment) that has geometry and related properties and can be referenced in downstream processes.

Model Element Table (MET)

An Owner-issued matrix that assigns each model element or system to a responsible party, a phase, a Level of Development, and a Level of Information. Conforms to the State of Ohio MET baseline templates and is referenced by the BEP.

Model Portion

An identifiable subset of a Model consisting of one or more Model Elements and their associated information. A Model Portion may be identified by discipline, system, building, floor, area, phase, authorship, or another division established in the BEP. It may exist within a Model file or be maintained in a separate file that is linked or referenced as part of the Model.

NBIMS-US v4

The National BIM Standard — United States, Version 4, published by the National Institute of Building Sciences in 2023. The reference standard with which the State of Ohio BIM Standards aligns.

Ohio State Plane Coordinate System (SPCS)

The county-appropriate Ohio State Plane zone with the full horizontal CRS, realization, units, applicable EPSG identifier and vertical reference stated in the BEP. OmniClass: a classification system used only where the approved project pathway requires it; State-defined pilot classifications use the published project code lists and mappings.

OmniClass Construction Classification System

The multi-table classification system maintained by the Construction Specifications Institute. Theses include OmniClass Table 13 (Spaces), Table 21 (Elements / UniFormat), Table 22 (Work Results / MasterFormat), and Table 23 (Products) for asset tracking, classification, and worksheet organization.

Owner

The BEP identifies the Contracting Authority's BIM Manager and the A/E- or AOR-designated BIM Closeout Coordinator separately. Model status and authorized reliance follow the executed Contract and Exhibit.

Project Base Point

The Revit point used as the project-local reference for dimensions and elevations shown on construction documents, distinct from the Survey Point that carries real-world coordinates.

Project BIM Requirements (PBR)

The Owner-issued document, attached to the procurement or contract package, that states the project-specific BIM and information requirements (BIM Uses, AIR tier, MET, deliverables, CDE platform) the Delivery Team must address in the BEP.

Project Information Model (PIM)

The structured information set assembled and maintained during the design and construction phases of a project, transferred to the Owner at handover to seed the AIM.

Project Information Requirements (PIR)

The project-specific information needs that define what information is needed to support project decision-making across the life cycle.

Project Life Cycle

The full period from the initial conception of a project through planning, design, construction, commissioning, operation, maintenance, modification, and eventual decommissioning or demolition.

Quality Assurance / Quality Control (QA / QC)

QA is the set of planned, systematic processes the Delivery Team applies to prevent information defects. QC is the inspection-based activity that verifies deliverables meet the BEP and OHIOBIMS requirements before each information exchange.

Record Model

The native-format model (typically Revit RVT) that captures field-verified as-built conditions at Final Handover and seeds the Owner's Asset Information Model.

Shared Parameter

A Revit parameter definition stored in an external file and applied across families and projects so that tagged values are consistent and machine-readable for data extraction. State of Ohio shared parameters are documented in the templates.

Structured Asset Information Deliverable (SAID)

The non-graphical, tabular asset-information dataset delivered at defined project milestones, containing data about facilities, floors, spaces, zones, components, types, systems, and supporting documents required for facility management and maintenance systems. The SAID schema is defined by the State of Ohio Facility Information Matrix (FIM).

Substantial Completion

The contractual milestone at which the Owner can occupy or use the work for its intended purpose. One of the three AIR delivery milestones (60% CD, Substantial Completion, Final Handover).

Survey Point

The Revit point that establishes the real-world position, elevation, and rotation of the model relative to the project coordinate system (typically Ohio State Plane). Pinned once coordinates are set.

True North / Project North

True North is the geographic north of the site. Project North is the rotated reference used for plan presentation. Both are documented in the BEP and the Reference Coordinate System sheet of the BEP Workbook.

Unique Asset Identifier (UAI)

The single identifier shared by a maintainable asset's BIM object, its Component row in the SAID, its physical tag (barcode, QR code, or RFID), and the corresponding record in the Owner's CMMS or CAFM system. The UAI format is defined in the project AIR Document and is unique across the Owner's entire portfolio, not merely within a single facility.

Workset

A Revit construct that partitions a model file for concurrent multi-user editing and visibility control. The State of Ohio templates predefine worksets aligned to OmniClass Table 21 for top-level model organization.

6. Attachments and Templates

The following attachments, guidelines and templates provide supporting tools for the implementation of the State of Ohio BIM Standards.

A.1 BIM Execution Plan Template (BEP)

Attachment: OHIOBIMS-BEP-Template.PDF

Attachment: OHIOBIMS-BEP-Template.html (fillable HTML version)

Standard Owner BEP template used to define BIM goals, uses, roles, deliverables, coordination processes, and quality checks for each project.

A.2 Revit Templates

Attachment: Ohio Revit 2024 Template ARCH.RTE

Attachment: Ohio Revit 2024 Template MEP.RTE

Preconfigured Revit project and family templates that align modeling practice with the Owner standards for levels of detail, naming, views, and sheet setup.

A.3 OHIOBIMS Model Element Table Facilities-Template

Attachment: OHIOBIMS-Model-Element-Table-Facilities-Template.html (fillable HTML form)

Authoring template that specifies which party models each element, at what phase, and to what level of development (LOD) for a given facility type.

A.4 BIM Use Definitions

Attachment: OHIOBIMS-BIM-Use-Definitions-v1.0.PDF

Standalone OHIOBIMS BIM Use Definitions document. Reference set of standardized BIM Uses, aligned with NBIMS-USv4 BIM Use Definitions (BUD), that Owners can select and include in their BEP to match project objectives. Provides Definition, Typical Phase, Responsible Party, Deliverables, and Owner Value for each BIM Use, plus a facility-type selection table. Referenced by OHIOBIMS Section 2.4.1, the Owner Implementation Guide, and the Delivery Team Implementation Guide.

A.5 AIR – Revit Shared Parameter Mapping

Attachment: Owner OmniClass Table 23 (Products).XLS

Attachment: Owner Attributes Master Table.XLS

Mapping of the AIR per-asset fields using OmniClass Table 23 (Products / Equipment) classifications and to Revit Shared Parameters. Includes guidance for generating the Revit Shared Parameter file required to support the Owner BIM Standard asset-attribute requirements for AIR. The full SAID workbook and Asset Data Form are published in Appendix A.

7. BIM Guidelines

OHIOBIMS has provided guidance for Owners, and their BIM Delivery Teams, on how to properly implement the State of Ohio BIM Standards. These are provided as guidance only and do not prevent Owner and Delivery Teams from implementing similar processes and workflows which still conform to the State of Ohio BIM Standards and lead to BIM deliverables which meet these standards. The guidance documents are available on the Owner website accompanying these BIM Standards.

- OHIOBIMS Owner Implementation Guide
- OHIOBIMS Delivery Team Implementation Guide

Appendix A — SAID Workbook and Asset Data Form

Companion appendix to State of Ohio BIM Standards (OHIOBIMS)

A.1 Purpose and Scope

This appendix publishes the Structured Asset Information Deliverable (SAID) Workbook and the companion Asset Data Form used by Delivery Teams to capture the Asset Information Requirements (AIR) defined by the Owner. The SAID is the tabular dataset handed over at each AIR milestone (sixty percent Construction Documents, Substantial Completion, and Final Handover) and is validated against the Facility Information Matrix (FIM) schema in Appendix B and the AIR specified in the project AIR Document. The SAID is the artifact the Owner reviews; the FIM is the schema against which it is reviewed.

A.2 Structure

The SAID Workbook is organized around the OmniClass Construction Classification System and the eleven FIM worksheets: Facility, Floor, Space, Zone, Type, Component, Document, System, Assembly, Connection, and Attribute. The workbook supplies one tab per FIM worksheet, with header rows matching the field names defined in Appendix B Section B.4. Per-asset fields are tagged with the applicable AIR delivery tier (Essential or Extended) so a single workbook can serve both tiers.

A.3 Published Files

The following files are published alongside this Standard. Filenames are normative; revisions follow the FIM Revision and Governance rules in Appendix B Section B.9.

Attachment: OHIOBIMS-SAID-Extended-Workbook.xlsx

Attachment: OHIOBIMS-SAID-Extended-AssetDataForm.html (fillable HTML form)

A.4 Delivery Package

A SAID submission shall contain the following items, zipped into a single archive named with the project number and milestone:

1. The OHIOBIMS OmniClass Asset Data Form, with one row per maintainable asset instance and every required field populated.
2. The auto-generated CSV export of the Asset Data Form for system ingestion.
3. The auto-generated PDF rendering of the Asset Data Form for archival and submittal.
4. The SAID Workbook (XLSX) when the project AIR specifies Extended Tier or when project-specific worksheets beyond the Essential field set are required.

A.5 Validation and Acceptance

SAID submissions are validated in two layers. First, the FIM Validator confirms conformance to the schema in Appendix B (worksheets, fields, data types, identifiers, relational rules, and completeness thresholds).

Tier selection is established once in the Project BIM Requirements (PBR) template and is inherited by the BEP and the project QA/QC checklist. The Essential Tier is the default for State of Ohio capital projects. The Extended Tier is required for mission-critical or large facilities — hospitals, data centers, airports, central plants, research laboratories — for projects exceeding $25 million in total construction value, or where an operating state agency opts in. Tier selection is not renegotiated during construction.

A.6 Revision and Governance

The SAID Workbook and Asset Data Form are published and maintained by the Ohio Facilities Construction Commission. Substantive changes follow the same governance process defined for the FIM schema in Appendix B Section B.9: version bump, updated validator release with at least a twelve-month backward-compatible transition period, updated COBie v3 crosswalk where applicable, and a migration note in the OHIOBIMS Change Summary. Non-substantive changes (clarifications, typographical corrections, example additions) may be published as a minor version increment.

Appendix B — Facility Information Matrix (FIM) Schema

Companion appendix to State of Ohio BIM Standards (OHIOBIMS)

B.1 Purpose and Scope

The Facility Information Matrix (FIM) is the State-owned, technology-agnostic asset and facility data schema referenced by the OHIOBIMS standard. The FIM defines the worksheets, fields, data types, identifiers, relational rules, and completeness thresholds that govern owner-facing asset deliverables for OFCC capital projects. The FIM is the normative schema against which the Structured Asset Information Deliverable (SAID) Workbook in Appendix A is validated.

> The FIM is field-level mappable to COBie v3 (see §B.8) but is not COBie. Where Owner requirements diverge from COBie, the FIM is authoritative for State of Ohio deliverables. The FIM is referenced by §2.4.7 (Asset Information Requirements) and §3.10 (Minimum Viable BIM for Facility Management).

B.2 Schema Conventions

The FIM uses a consistent set of conventions for field notation, reserved values, identifier formats, and units of measure. These conventions apply across every worksheet defined in §B.3 and every field defined in §B.4.

B.2.1 Field Notation

Field names use PascalCase (e.g., FacilityId, SpaceArea). Data types are one of: String, Integer, Decimal, Date (ISO 8601 YYYY-MM-DD), DateTime (ISO 8601 with timezone), Boolean (true/false), URI (RFC 3986), Enum (closed value list), or FK (Foreign Key — referential pointer to another worksheet's primary key). Required status is one of: R (Required, must contain a non-reserved value), R* (Required if applicable / required when the parent worksheet row is in scope), or O (Optional).

B.2.2 Reserved Values

A required field shall contain a valid value of its declared type; placeholder tokens such as tbd or unknown shall not satisfy required final values. Numeric zero is allowed where valid for that field, including an elevation at the project datum. Optional fields may be null or blank when not applicable or not supplied. Define field-specific numeric ranges and enumerations instead of a global zero ban. Conditional fields are required only when their documented applicability condition is met.

B.2.3 Identifier Format

Primary key and foreign key identifiers use ASCII letters, digits, hyphens, and underscores. Identifiers are 1–64 characters in length, case-sensitive, and unique within their scope. The Unique Asset Identifier (UAI) used as ComponentId follows the OHIOBIMS UAI specification and is unique across the Owner's entire portfolio.

B.2.4 Units of Measure

The FIM uses US customary units: feet (ft) and inches (in) for length; square feet (sf) for area; cubic feet (cf) for volume; pounds (lb) for mass; degrees Fahrenheit (°F) for temperature; United States dollars (USD) for currency. Where SI units are required by an Owner agency, the conversion is performed at the report layer; the FIM data store remains in US customary units.

B.3 Worksheet Inventory

The FIM is composed of 11 worksheets. Cardinality is expressed relative to the Facility row. Required status indicates whether the worksheet is present in every deliverable (R), required if the worksheet's scope applies to the project (R-if-in-scope), or conditional based on contracted scope (Conditional).

Worksheet	Cardinality	Required
Facility	1	R
Floor	1..n	R
Space	1..n	R
Zone	0..n	R-if-in-scope
Type	1..n	R

Component	1..n	R

Worksheet	Cardinality	Required
Document	1..n	R
System	0..n	R-if-in-scope
Assembly	0..n	Conditional
Connection	0..n	Conditional
Attribute	0..n	Conditional

B.4 Field Definitions

The following subsections define the required and optional fields for each FIM worksheet. **PK** denotes the primary key; **FK** denotes a foreign key reference to another worksheet's primary key.

B.4.1 Facility

The Facility worksheet defines the top-level building or site. Exactly one Facility row is required per deliverable. PK: FacilityId.

Field	Type	Required	Notes
FacilityId	String	R	PK; unique identifier for the facility
Name	String	R	Owner-assigned facility name
Description	String	R	Short description of the facility
Category	Enum	R	OmniClass Table 11 (Construction Entities by Function) classification
ProjectName	String	R	OFCC project name
SiteName	String	R	Site or campus name
Address	String	R	Street address
City	String	R	City
StateRegion	String	R	State or region (e.g., OH)
PostalCode	String	R	ZIP or postal code
Country	String	R	Country (default USA)
GrossArea	Decimal	R	Gross floor area in square feet
NetArea	Decimal	O	Net area in square feet

ProjectStartDate	Date	R	Project start date

Field	Type	Required	Notes
ProjectEndDate	Date	O	Project end date if known
AreaMeasurementStandard	String	R	e.g., BOMA, IFMA, AIA D101

B.4.2 Floor

The Floor worksheet defines each occupied and non-occupied level of the Facility. **PK**: FloorId. **FK**: FacilityId. Elevation may equal 0 where it represents the project datum. Space Category uses the approved project space-classification list and published field binding. Do not change IDs or relational keys through a taxonomy label edit.

Field	Type	Required	Notes
FloorId	String	R	PK; unique within the Facility
FacilityId	FK	R	Reference to Facility
Name	String	R	Floor name (e.g., Level 1, Basement)
Description	String	R	Short description
Category	Enum	R	Floor, Roof, Site, Mezzanine, Foundation
Elevation	Decimal	R	Elevation above project datum (ft)
Height	Decimal	R	Floor-to-floor height (ft)
GrossArea	Decimal	R	Gross floor area (sf)
NetArea	Decimal	O	Net area (sf)
ExtIdentifier	String	O	External system identifier if applicable
Created	DateTime	R	Record creation timestamp

B.4.3 Space

The Space worksheet defines each enclosed or designated space within the Facility. PK: SpaceId. FK: FloorId. Space Category uses OmniClass Table 13 (Spaces by Function).

Field	Type	Required	Notes
SpaceId	String	R	PK; unique within the Facility
FloorId	FK	R	Reference to Floor

Name	String	R	Room number or space name
Description	String	R	Space description
Category	Enum	R	OmniClass Table 13 code and title
RoomTag	String	R	Owner-facing room tag

Field	Type	Required	Notes
UsableHeight	Decimal	O	Clear ceiling height (ft)
GrossArea	Decimal	R	Gross area (sf)
NetArea	Decimal	O	Net area (sf)
OccupancyCount	Integer	O	Design occupant load
OccupancyType	String	O	IBC occupancy classification
HVACZone	String	O	Conditioning zone reference
LightingZone	String	O	Lighting control zone
AcousticRating	String	O	STC or NRC rating
DepartmentAssignment	String	O	Owner department
ExtIdentifier	String	O	External system identifier

B.4.4 Zone

The Zone worksheet defines logical groupings of Spaces — fire compartments, security zones, HVAC zones, evacuation zones, and similar. **PK**: ZoneId.

Zone membership shall identify the Zone and every member Space using the published multiple-membership encoding. Type Category uses the approved asset-classification list. Manufacturer/model requirements follow the milestone matrix rather than forcing unknown procurement data at design.

Field	Type	Required	Notes
ZoneId	String	R	PK
Name	String	R	Zone name
Description	String	R	Zone description
Category	Enum	R	Fire, Security, HVAC, Evacuation, Other
ExtIdentifier	String	O	External system identifier
Owner	String	O	Owning agency or contact

Created	DateTime	R	Record creation timestamp

B.4.5 Type

The Type worksheet defines each unique equipment, fixture, or product type installed in the Facility. Each Component row in §B.4.6 references a Type. PK: TypeId. Category uses OmniClass Table 23 (Products).

Field	Type	Required	Notes
TypeId	String	R	PK; unique within the Facility
Name	String	R	Type name
Description	String	R	Short description
Category	Enum	R	OmniClass Table 23 code and title
AssetType	Enum	R	Movable, Fixed, Maintainable, Non-Maintainable
Manufacturer	String	R	Manufacturer name
ModelNumber	String	R	Manufacturer model number
WarrantyDurationParts	Integer	R*	Parts warranty in months
WarrantyDurationLabor	Integer	R*	Labor warranty in months
WarrantyDurationUnit	Enum	R*	months / years
ReplacementCost	Decimal	O	Replacement cost (USD)
ExpectedLife	Integer	O	Expected service life (years)
NominalLength	Decimal	O	Nominal length (ft)
NominalWidth	Decimal	O	Nominal width (ft)
NominalHeight	Decimal	O	Nominal height (ft)
Shape	Enum	O	Rectangular, Cylindrical, Other
Color	String	O	Visible color
Finish	String	O	Surface finish
Material	String	O	Primary material
Constituents	String	O	Sub-components or constituent materials
Features	String	O	Notable type features
AccessibilityPerformance	String	O	ADA/ABA compliance notes
CodePerformance	String	O	Code compliance notes
SustainabilityPerformance	String	O	LEED or sustainability notes

B.4.6 Component

The Component worksheet defines each installed instance of a Type within the Facility. ComponentId is the portfolio-unique UAI; TypeId and SpaceId resolve to valid records. Physical Tag and CMMS AssetIdentifier may differ if their mapping is unambiguous. Installed dates and serial numbers are required when due under the milestone matrix. **PK**: ComponentId. **FK**: TypeId, SpaceId.

Field	Type	Required	Notes
ComponentId	String	R	PK; the UAI
Name	String	R	Component name
Description	String	R	Short description
TypeId	FK	R	Reference to Type
SpaceId	FK	R	Primary space the component occupies
Tag	String	R	Field-visible asset tag
BarCode	String	O	Bar code or QR code value
AssetIdentifier	String	O	Owner CMMS identifier if different from UAI
SerialNumber	String	R*	Manufacturer serial number
InstallationDate	Date	R	Installation date
WarrantyStartDate	Date	R	Warranty start date
TagNumber	String	O	Owner tag number
OperatingPosition	String	O	Open/closed/auto, normal operating position
ExtIdentifier	String	O	External system identifier

B.4.7 Document

The Document worksheet defines each document, drawing, manual, or record associated with the Facility, a Floor, a Space, a Type, a Component, a System, or an Assembly. **PK**: DocumentId.

Supply Document rows and resolvable links required by Appendix B and the project AIR. If a tier/milestone permits absence, state that in the normative requirement matrix and validator rather than as a guide-only exception.

Field	Type	Required	Notes
DocumentId	String	R	PK
Name	String	R	Document name
Description	String	R	Short description
Category	Enum	R	Specification, Submittal, Drawing, O&M Manual, Warranty, Certificate, Other
ApprovalBy	String	O	Approval authority
Stage	Enum	R	Required Submission, As-Built, Owner-Provided

Reference	String	R	Document number or reference
URI	URI	R	URL or relative path to document
RowReference	String	R	Worksheet and PK of the linked row (e.g., Component:UAI-123)

Field	Type	Required	Notes
FileFormat	String	R	File format (PDF, DOCX, DWG, RVT, IFC, etc.)
FileSize	Integer	O	File size in bytes
RevisionDate	Date	R	Revision date
RevisionNumber	String	R	Revision identifier

B.4.8 System

The System worksheet defines each functional building system (HVAC, plumbing, fire suppression, electrical distribution, etc.). Category uses a structure aligned similar to OmniClass Table 21 (Elements). **PK:** SystemId.

Field	Type	Required	Notes
SystemId	String	R	PK
Name	String	R	System name
Description	String	R	System description
Category	Enum	R	OmniClass Table 21 code and title
ExtIdentifier	String	O	External system identifier
Created	DateTime	R	Record creation timestamp

B.4.9 Assembly

The Assembly worksheet defines hierarchical groupings of Components — e.g., a packaged air-handling unit containing a fan, coil, filter, and damper as sub-components. Conditional on contracted scope. PK: AssemblyId.

Field	Type	Required	Notes
AssemblyId	String	R	PK
Name	String	R	Assembly name
Description	String	R	Assembly description

AssemblyType	Enum	R	Composed-of, Connected-to, Other
ParentComponentId	FK	R	Parent component (assembly head)
ChildComponentId	FK	R	Child component (member)

Field	Type	Required	Notes
Sequence	Integer	O	Position within the parent assembly

B.4.10 Connection

The Connection worksheet defines functional connections between Components (e.g., a pipe segment connecting two valves, a duct connecting a VAV box to a diffuser). Conditional on contracted scope. PK: ConnectionId.

Field	Type	Required	Notes
ConnectionId	String	R	PK
Name	String	R	Connection name
Description	String	R	Connection description
ConnectionType	Enum	R	Mechanical, Electrical, Hydraulic, Data, Other
RowName1	String	R	First endpoint component
RowName2	String	R	Second endpoint component
Port1	String	R*	Port identifier on first endpoint
Port2	String	R*	Port identifier on second endpoint
RealizingElement	String	O	Pipe segment, duct segment, conductor, etc.
ExtIdentifier	String	O	External system identifier

B.4.11 Attribute

The Attribute worksheet provides an extensible name-value mechanism for fields that are not enumerated in the worksheets above — including zone memberships, system memberships, manufacturer-specific properties, performance data, and Owner-defined attributes. Conditional. **PK:** composite (RowReference, Name).

Field	Type	Required	Notes
RowReference	String	R	Worksheet:PK reference (e.g., Component:UAI-123)

Name	String	R	Attribute name
Value	String	R	Attribute value
Unit	String	R*	Unit of measure if numeric
Description	String	O	Attribute description

Field	Type	Required	Notes
AllowedValues	String	O	Enumeration of allowed values
Category	Enum	R	Membership, Performance, Property, Owner-Defined

B.5 Relational Integrity Rules

The following rules govern relational integrity across FIM worksheets. The FIM Validator enforces every rule. Rows that fail integrity checks are rejected from the deliverable.

1. Single Facility. Exactly one Facility row is required per FIM deliverable.
2. Floor›Facility. Every Floor row must reference a valid FacilityId. Floors without a parent Facility are rejected.
3. Space›Floor. Every Space row must reference a valid FloorId. Spaces without a parent Floor are rejected.
4. Zone membership. Zone-to-Space membership is expressed via Attribute rows with Category = Membership and a RowReference pointing to the Space. Orphaned Zone rows with no member Space are permitted but flagged.
5. Type before Component. Every Component row must reference a valid TypeId. The corresponding Type row must exist before the Component is loaded.
6. Component›Space. Every Component row must reference a valid SpaceId. Components without a parent Space are rejected.
7. System membership. System-to-Component membership is expressed via Attribute rows with Category = Membership and a RowReference pointing to the Component.
8. Assembly hierarchy. Every Assembly row's ParentComponentId and ChildComponentId must reference valid Component rows. A Component must not be its own ancestor (no cycles).
9. Connection endpoints. Every Connection row's RowName1 and RowName2 must reference valid Component rows. Self-loops are permitted only where the Connection represents an internal port-to-port loop.

10. Document linkage. Every Document row's RowReference must resolve to a valid row in the referenced worksheet.

11. Attribute linkage. Every Attribute row's RowReference must resolve to a valid row in the referenced worksheet.

12. UAI uniqueness. Every ComponentId (UAI) must be unique across the Owner's entire portfolio, not merely within the Facility.

13. Tag/UAI consistency. The field-visible Tag on a Component must resolve unambiguously to its ComponentId (UAI). Duplicate Tags within a Facility are rejected.

B.6 Completeness Thresholds

A FIM deliverable is accepted when it meets the following completeness thresholds.

C-1 In-scope coverage. Every in-scope Type defined in the project AIR must have at least one corresponding Component row.

C-2 Spatial location. Every Component row must have a valid SpaceId reference (no spatially-unresolved components).

C-3 Referential integrity. 100% of foreign-key references must resolve. Any unresolved FK rejects the deliverable.

C-4 Required fields. 100% of fields marked R (and R* where applicable) must contain a non-reserved value.

C-5 Type coverage. Every Type row must reference a valid Asset Type, with manufacturer and model number populated.

C-6 Document coverage. Every Component row whose Type requires an O&M manual, warranty, or submittal must have at least one linked Document row of the corresponding category.

C-7 Classification. Every Space row must reference a valid Space Type. Every System row must reference a valid System Name.

B.7 Delivery Formats

FIM deliverables may be submitted in any of the following formats based on the project requirements and as agreed in the BEP. The XLSX workbook is the default and authoritative format for OFCC deliverables.

1. XLSX. The Structured Asset Information Deliverable (SAID) Workbook in Appendix A. One worksheet per FIM worksheet, with header rows matching the field names in §B.4.

2. CSV bundle. One CSV file per FIM worksheet, packaged in a single .zip archive. UTF-8 encoded, comma-delimited, double-quote-escaped.

3. IFC4. An IFC4 file conformant with the buildingSMART IFC4 Reference View. The FIM-to-IFC4 mapping is published separately by OFCC.

4. JSON. A JSON document conformant with the FIM JSON Schema. One top-level object per worksheet, with a rows array of typed objects.

5. Relational database export. A SQL dump or relational database export conformant with the FIM relational schema published separately by OFCC.

B.8 COBie v3 Crosswalk (Non-Normative)

This crosswalk is non-normative and version-specific. Confirm each target worksheet/field, transformation and required input against the applicable COBie edition before representing the mapping as complete or lossless. A COBie deliverable is required only where expressly contracted. Where Owner requirements diverge from COBie, the FIM is authoritative.

B.8.1 Worksheet Mapping

The FIM and COBie v3 worksheet structures are 1:1 mappable, with one exception: COBie v3 has no equivalent to the FIM Zone worksheet (modeled in COBie via the Zone tab, which the FIM Zone maps to directly).

FIM Worksheet	COBie v3 Worksheet	Cardinality
Facility	Facility	1:1
Floor	Floor	1:1
Space	Space	1:1
Zone	Zone	1:1
Type	Type	1:1
Component	Component	1:1
Document	Document	1:1
System	System	1:1
Assembly	Assembly	1:1
Connection	Connection	1:1
Attribute	Attribute	1:1

B.8.2 Field-Level Mapping (Examples)

The following table provides representative field-level mappings. The full crosswalk is published as a separate workbook (fim-to-cobie.xlsx).

FIM Field	COBie v3 Field	Notes
Facility.FacilityId	Facility.Name	COBie uses Name as PK
Facility.AreaMeasurementStandard	Facility.AreaMeasurement	Same enumeration
Space.RoomTag	Space.RoomTag	Direct
Type.AssetType	Type.AssetType	Same enumeration
Component.ComponentId	Component.Name	COBie uses Name as PK
Component.Tag	Component.TagNumber	Direct
Document.RowReference	Document.SheetName + Document.RowName	COBie splits the reference
Attribute.RowReference	Attribute.SheetName + Attribute.RowName	COBie splits the reference

B.8.3 Reference Crosswalk Tooling

The following reference tools support the FIM <—> COBie v3 crosswalk and are published separately by OFCC:

fim-to-cobie.xlsx — full field-level crosswalk workbook

fim-to-cobie.py — reference Python script converting a FIM XLSX deliverable to a COBie v3 XLSX deliverable

cobie-to-fim.py — reference Python script converting a COBie v3 XLSX deliverable to a FIM XLSX deliverable

B.9 Revision and Governance

The FIM schema is published and maintained by OFCC. Substantive changes to the FIM (worksheet additions, field additions, field removals, required-status changes, enumeration changes, or relational-rule changes) require all of the following:

1. A version bump of the FIM schema and a corresponding version bump of the OHIOBIMS standard.

2. An updated FIM Validator release supporting the new schema version, with backward-compatible validation against the prior schema for a transition period of not less than 12 months.

3. An updated COBie v3 crosswalk workbook reflecting the schema change.

4. A migration note in the OHIOBIMS Change Summary describing the change, the migration path for in-flight projects, and the effective date.

Non-substantive changes (clarifications, typographical corrections, example additions) may be published as a minor version increment without the migration requirements above.