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The [CAD Standards Manual online](#) (LANL internal/external)

1.0 Introduction

1.1 Purpose

The Building Information Modeling (BIM) Standard — [Section 400](#) of the LANL CAD Standards Manual (CSM) — was developed by the Engineering Services Virtual Build Environment Office (VBEO) to establish a formal system of 3D graphical modeling, 2D drawing, and data capture required by multiple LANL sources.¹

The primary purpose of the BIM program is to enable the Design Agency (Architect, Engineer), Constructor, and LANL Owners (e.g., Capital Projects, Engineering, Operations, and Maintenance) to leverage BIM technology to enhance the design and construction process. This technology allows for the resolution of conflicts before construction begins, reducing rework and improving productivity and efficiency throughout the project's development and implementation.

In addition, the BIM program's focus is associated with configuration management and the long-term lifecycle use of BIM for operations and maintenance along with data integration with their computer applications, e.g., GIS (ArcGIS, Trimble e-Builder), CMMS (Asset Suite), portfolio and space management (Archibus), and EDRMS (Documentum).

A. General Applicability

1. Section 400 (this Section) shall be followed when creating or modifying a BIM, and/or drawings or sketches derived from a BIM, for buildings, associated facility systems, infrastructure systems, and their corresponding models.²
2. Compliance with this Section is mandatory for LANL personnel and External Design Agencies, except where responsibilities are specifically identified in this document as LANL scope.
3. Deviation from Section 400 may be permitted with written approval from the LANL BIM Standards POC (or Alternate) or the [VBEO](#) Director.

B. Application to Specific Projects

1. Refer to Table 400-1 to determine when a BIM is required for a project. BIM is also required when specified in the project's Statement of Work (SOW).³

¹ ESM Chapter 1 - General, Section Z10, R15 requires(ed) BIM in limited circumstances and CSM Section 100, R5 and Section 200, R5.2 acknowledged BIM. In addition, [Memo](#) ALDFO-23-24 dated December 22, 2023, from Anderson and Kennedy to Simpkins and Teter, titled *Charter for Institutional Virtual Build Environment Office to Support Total Asset Lifecycle Virtual Information Management Approach*, Appendix 4 *BIM Lifecycle Standards Initiative* is a more recent driver for this BIM standard, as is the Tailored Standards Manual (TSM).

² Section 400, including all other CSM Section requirements specifically referenced within this document, shall apply even when CSM Sections 100–300 are not required for a project. Any differences between CSM Section 400 and CSM Sections 100–300 shall not be considered conflicts. Such differences represent BIM-specific requirements, and in these instances, the requirements of Section 400 shall take precedence.

³ The use of BIM on projects is encouraged on all projects and should be strongly considered during project planning. Project size and complexity are the primary factors used to determine whether BIM is required.

Table 400-1. When BIM is Required based on Project Scope, Size, and Complexity⁴

Project Size	Complexity Level	Use of BIM?	Rationale
Renovation⁵ or Equipment Installation or Modification <u>When a Master BIM Already Exists</u>			
All	All	Required	Maintaining the accuracy of Master BIM files preserves LANL's investment in them and is a cost-effective approach to configuration management.
Renovation <u>When No Master BIM Exists</u> Terms are defined below Table 400-1			
Small (< \$1 million)	Low	Optional	May not be cost-effective for simple, low-budget projects. Traditional design and documentation methods are often sufficient and more cost-effective.
Small (< \$1 million)	Moderate	Recommended	Often cost-effective for low-budget projects of medium complexity.
Small (< \$1 million)	High	Required	Normally cost-effective for complex, low-budget projects. It can also capture new data or update existing data supporting the lifecycle of a facility.
Medium (\$1M-\$5M)	Low and Moderate	Recommended	Helps in visualizing design changes and coordinating between different stakeholders. It can also capture new data or update existing data supporting the lifecycle of a facility.
Medium (\$1M-\$5M)	High	Required	Normally cost-effective for complex, medium-budget projects. It can also capture new data or update existing data supporting the lifecycle of a facility.
Large (≥ \$5M)	All	Required	Enhances coordination, reduces errors, and optimizes project planning and execution. It can also capture new data or update existing data supporting the lifecycle of a facility.
New Construction Including Additions			
Small (< 10,000 sq. ft.)	All	Optional	While BIM can provide benefits such as improved visualization and coordination, the cost and time investment may not always be justified for small projects. Decision-makers should weigh the complexity and specific needs of the project when considering BIM usage.
Medium and Large (≥ 10,000 sq. ft.)	All	Required	For medium projects, BIM aids in design optimization, clash detection, and better project management. It enhances collaboration, improves design accuracy, and aids in efficient project delivery, though it may not be as critical as for large projects. For large projects, BIM is essential for managing complexity, ensuring quality, and improving collaboration. They benefit from BIM's capabilities in managing complexity, ensuring coordination across disciplines, and reducing risks associated with design and construction errors. Projects capture data providing a foundation for BIM use throughout lifecycle of facility operations and maintenance.

⁴ Where the BIM applicability requirements in Table 400-1 differ from those in ESM Chapter 1, Section Z10 (e.g., Rev. 15, paragraph 11.5.B), the requirements of Table 400-1 shall govern when they are more stringent.

⁵ Renovation: A project involving significant architectural modifications to an existing facility and may include associated work by other disciplines. Projects limited to the installation, replacement, or modification of systems or equipment are not considered renovations.

Project Size	Complexity Level	Use of BIM?	Rationale
All ($\geq$ \$50M)	All	Required	BIM aids in design optimization, clash detection, and better project management. It enhances collaboration, improves design accuracy, and aids in efficient project delivery. BIM is essential for managing complexity, ensuring quality, and improving collaboration. The projects benefit from BIM's capabilities in managing complexity, ensuring coordination across disciplines, and reducing risks associated with design and construction errors. Projects capture data providing a foundation for BIM use throughout lifecycle of facility operations and maintenance.

Cost above is Total Project Cost (TPC)⁶.

Complexity levels: For “Renovation-When-No-Master BIM” category above, definitions are:

Renovation Complexity Levels ⁷	
Low	Primarily architectural work with minimal impact on building systems and services. May include minor modifications to doors, windows, hard walls, or non-load-bearing wall systems (e.g., KI GENIUS® wall systems). Limited structural work, such as anchorage, may be required. Projects may include office reconfigurations, systems furniture (partitions/cubicles), furniture installation, and finish or accessory updates.
Moderate	Architectural renovations involving more-than-minor modifications to hard-wall construction and more-than-incidental changes to building systems, including mechanical, electrical, plumbing (MEP), fire sprinkler, fire alarm, or other facility services. Projects may include moderate structural modifications, multiple door and window changes, space reconfiguration, and systems furniture installations.
High	Extensive renovations involving significant space reconfiguration and major modifications to building systems and services. Examples include: • An International Existing Building Code (IEBC) Level 3 Alteration. • Modernization projects — those involving the comprehensive replacement or restoration of most major building systems (plumbing, mechanical, electrical, fire sprinkler, and fire alarm), interior finishes (ceilings, walls, doors, and flooring), and building features, including space reconfiguration or replacement of exterior walls, windows, or roofing systems. • Structural modifications required by the IEBC; TSM or ESM Chapter 5 - Structural, Section I; or other governing design requirements (e.g., RP-8).

1.2 Responsibilities of Design Agency (except as noted)

A. Architects, Engineers, and Designers

1. Ensure the BIM contains physical characteristics, geometry, and data necessary to communicate the design, and support procurement, construction, operations, and maintenance. Model the facility, infrastructure, systems, and equipment to a level of development (LOD) specified in this document.
2. All site plans, floor plans, sections, elevations, schedules and details shall be generated directly from the BIM. Scheduled information shall be derived from the model data associated with BIM. Use BIM objects supplied by manufacturers where

⁶ Since the Design Agency may not have access to project cost information, the SOW should specify BIM requirements in accordance with Table 400-1 whenever possible. If the project cost information becomes available later, it shall be provided as needed to support compliance. Regardless of whether BIM requirements are explicitly identified in the SOW, the applicability criteria in Table 400-1 shall govern and must be followed.

⁷ If there is uncertainty regarding the applicable renovation complexity level, contact Section 400 [POC](#) for guidance.

available; if unavailable, create BIM objects that accurately represent the intended physical dimensions, design characteristics and data.

B. BIM Coordinator

The BIM coordinator will manage and oversee the BIM implementation process throughout the project by:

1. Providing guidance to ensure the BIM files are coordinated among all engineering disciplines and Constructors (e.g., LANL-self-perform and/or Subcontractors).
2. Ensuring consistent use of LANL Autodesk Revit® templates or other engineering model templates.
3. Monitoring the introduction and use of non-LANL-standard elements.
4. Maintaining consistency amongst Autodesk Revit® files across disciplines, facilities, and projects.
5. Overseeing integration of BIM data with other project management tools, systems and engineering model tools.
6. Managing BIM deliverables, including models, drawings, schedules, and required project documentation.
7. Leading development of the Virtual Design and Construction Plan (VDCP) and obtaining approval from the responsible design professionals.
8. Ensuring all BIM files utilize the LANL shared coordinate system in accordance with [ESM Chapter 3 - Civil](#), G10-30GEN or [TSM Chapter 3](#), so that the models are accurately located and coordinated. Refer to Article 4.6 *Revit Template Legends – LANL Revit Guides*, *LANL Revit Guide 02 – Project location and Coordination* for information on how to update the BIM shared coordinates.

C. Model Progression Meetings

Participate in design coordination activities, including but not limited to clash detection, constructability reviews, status meetings, safety reviews, and other project coordination efforts. Present the Project BIM and its development status during both project design review (e.g., 30%, 60%, 90%, and 100% milestones) and execution review meetings. At a minimum, BIM development at each design milestone shall achieve the required LOD consistent with the approved VDCP and the design deliverable schedule defined in [ESM Chapter 1 - General](#), Section Z10, Attachment C, or Project version of same in SOW.

Guidance: Following the start of construction (execution of work), the Design Agency is encouraged to participate in model progression meetings to support 3D coordination, incorporation of approved field changes, and maintenance of the Project BIM.

D. Constructor (Subcontractors and LANL Self-Perform)

Guidance: Constructors are encouraged to perform 3D coordination and clash detection, and to coordinate BIM changes with the Design Agency. BIM-related construction workflows and requirements should be established by the LANL Integrated Project Team and documented in the VDCP.

E. Interface with Constructor

Coordinate BIM files with the project team in accordance with the approved VDCP (see Article 2.1 herein) to ensure that the primary BIM and any additional approved BIM files, including deferred-design and delegated-design models, are updated to reflect field-installed conditions and selected SSCs. Information incorporated into the BIM shall include approved construction changes, submittal data, and as-constructed information necessary for the development of the Record BIM.

1.3 Master BIM Concept, Management, and Maintenance by LANL

Facility and System BIMs are considered living master models or Master BIMs. These BIMs are maintained by LANL and serve as configuration-managed assets that form part of the facility/system technical baseline documents.

- A. **Project BIMs and transition to Master BIMs:** Project design and construction BIM files (**Project BIMs**) shall be developed with the understanding that they will become part of the project's as-constructed **Record BIM** at project completion. Upon delivery, review, and acceptance by LANL, the Record BIM shall be used to update the applicable Master BIM, or, where no Master BIM exists, become the new Master BIM.

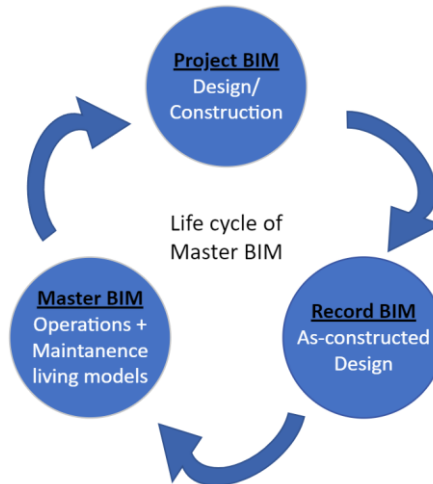


Figure 1. Master BIM Lifecycle

2.0 General Requirements (Design Agency)

- A. Section 400 relies heavily on, and in some cases supplements or modifies, the National CAD Standard (NCS). Unless otherwise specified herein, comply with the latest edition of the NCS.

2.1 Develop and Maintain a Virtual Design and Construction Plan (VDCP⁸)

- A. For each project requiring BIM, the Design Agency in coordination with the LANL Integrated Project Team (IPT) and BIM Coordinator shall develop, prepare, and issue a VDCP at project initiation. The approved VDCP shall supplement the Statement of Work (SOW). The VDCP shall be reviewed, refined, and updated throughout the project, including during Model Progression Meetings at major design review milestones and during construction.
- B. A VDCP defines how BIM and VDC processes will be implemented to meet LANL design, construction, operations and maintenance requirements. The level of detail and complexity of the VDCP shall be commensurate with project size, scope, cost, schedule and team structure.
- C. *Guidance: **AP-350-100-FM12**, VDC Plan (VDCP), may be used as a template for preparing a VDCP. Also, **WI-100-005**, ALDICP Virtual Design and Construction (VDC) Technology Integration, provides guidance for development and implementation of the VDCP.⁹ Both available internally as pdfs [here](#); FM12 Word file in EDRMS [here](#).*

⁸ LANL has adopted Virtual Design and Construction (VDC) Plan (VDCP) as the abbreviation to use for the industry standard BIM Execution Plan (e.g., BxP or BEP, which of which can mean Building Evacuation Plan at LANL).

⁹ The National Institute of Building Sciences (NIBS) [NBIMS-US](#) Standard offers a standardized BEP/VDCP that can also be used as a resource.

- D. LANL in-house design projects requiring BIM shall also develop and maintain a VDCP.
- E. At a minimum, the VDCP shall include the following:
 - 1. **Project Goal or Objective:** Define how BIM will support project success.
 - 2. **BIM Uses:** Identify intended BIM applications, such as drawing production, quantity takeoff, coordination, clash detection, visualization, and construction support.
 - 3. **Project BIM Requirements:** Define BIM deliverables, file formats, data requirements, and required LOD.
 - 4. **Team Roles and Responsibilities:** Identify BIM stakeholders and their roles and responsibilities.
 - 5. **Communication and Collaboration Protocols:** Define method for stakeholders to communicate, exchange, collaborate and manage BIM data.
 - 6. **Technology Infrastructure:** Identify required software, hardware, and collaboration platform for BIM.
 - 7. **Quality Control:** Define procedures for reviewing, validating, approving, and maintaining BIM quality throughout the project lifecycle. The procedures must include steps to ensure accuracy and integrity of BIM data.

2.2 BIM Software and File Formats

- A. Use LANL-approved software, CAD/GIS/Drawing Management platforms, and file formats, as follows:
 - 1. **Autodesk Revit® 2025 or later** (.rvt, .rfa, .rte). Verify the latest approved version available at software.lanl.gov or the [LANL Software Center](#) (LANL internal links).
 - 2. **Autodesk AutoCAD®** (.dwg)
 - 3. **Autodesk Civil 3D®** (.dwg). Civil/Landscape applications only.
 - 4. **Autodesk Interoperability Tools** (.xml). Autodesk Revit Plug-in for Verification & Validation.
 - 5. **Autodesk Navisworks®** (.nwc, .nwd, .nwf)
 - 6. **Configura Designer® CET** (.dwg). Furniture Design Software (optional). [RevLink Add-In](#) plug-in may be used to import Configura furniture layouts (.cmrfl) into Revit models.
 - 7. **Environmental Systems Research Institute (ESRI®)** Geographic Information Systems (GIS) software.
 - 8. **Industry Foundation Class, Version 4.3 or later** (.ifc). Compliant with ISO 16739
 - 9. **LiDAR and point cloud formats:** Autodesk Recap® (.e57, .rcs, or .rcp) or Cloudworx (.lgx)

2.3 Revit Template Files

- A. Project BIM files shall be created using the current LANL Revit templates and shared parameters files. The Revit template files are available on the LANL CAD Standards Manual [webpage](#) associated with Section 400.¹⁰ If a discipline-specific template is not available, it is acceptable to use the template provided by the Design Agency.
- B. LANL Project Engineers shall obtain available Master BIM files from the LANL-internal [VBEO Portal](#) and use them as the technical baseline models for Project BIM development.

¹⁰ Template titles include the Revit version required. E.g., to use a template labeled 25, use Revit 2025 or later.

2.4 Level of Development

- A. The Level of Development (LOD) for BIM files shall comply with the [BuildingSMART BIMForum LOD Specification 2025 Part I and Part II](#). Unless otherwise specified, the BIMForum Specification's LOD 300 shall serve as the minimum design baseline. At LOD 300, model elements shall include sufficient geometry, quantity, size, shape, location, orientation, and associated data that is equivalent to information in traditional construction documents and shop drawings.
 1. **As-Built Exception:** For a limited subset of construction documents that must be verified as-built by LANL per [ESM Chapter 1 - General](#), Section Z10 (e.g., *Code of Record article*)¹¹ or the [TSM Chapter 1 - General](#)¹², actual field conditions and verified data shall be incorporated into the BIM following post-construction walkdowns and validation activities.¹³
- B. Incorporate additional BIM content and appropriate LOD according to the project specifications, SOW, and VDCP.
- C. The BIM Coordinator shall ensure the Design Agency and Constructor understand and comply with the applicable project BIM requirements and provisions of Section 400.
- D. **Modeling Existing facilities:** Use of the BIMForum LOD Specification to model objects and data to LOD 300 applies to new objects added as part of the modification or renovation project. Modeling existing facilities from LiDAR data or existing 2D technical baseline documents is not required to meet LOD 300 unless specifically required by the SOW. At a minimum, model existing facility Structures, Systems, and Components (SSCs) to reflect project design intent and interfaces to existing SSCs on drawings. *The use of LiDAR data, existing technical baseline documentation, field verification, and other available sources is strongly encouraged to improve the accuracy and completeness of existing facilities models.*¹⁴

At a minimum, the SSCs in Table 400-2 shall be included and modeled to LOD 300 for new work:

Table 400-2. Minimum BIM Modeled SSCs Elements for New Work

Structural	
- Foundations - Framing (columns, trusses, beams, braces, etc.) - Floors, roofs - Structural walls - Overall – Plan drawings representing all facility areas for each system type	- Ramps - Grids - Grid lines - Stairs

¹¹ At LANL, the term “as-built” is reserved for “Important documentation (e.g., electrical one-line diagrams, database records) that is (1) verified by physical inspection as depicting the actual physical configuration and (2) verified as consistent with the design requirements.... These are a subset of the entirety of Project Record Documents (PRDs). PRDs not an as-built are therefore just as-designed. [GLOS-COE-1 r3]

¹² Projects shall comply with either the ESM or TSM, as specified by the project's Code of Record for the as-built and other requirements.

¹³ When as-builts are provided for these SSCs, the models element accuracy may approach LOD 500 per the latest BuildingSMART BIM Forum LOD Specification, Model Element Table. Per [BuildingSMART BIMForum LOD Specification Part I \(2025\)](#), “The Model Element is a graphic representation of an existing or as-constructed condition developed through a combination of observation, field verification, or interpolation. The level of accuracy shall be noted or attached to the Model Element... it indicates that the element's geometry is determined through observation of an existing item rather than design of a future item. The LOD 500 definition requires that the model element's accuracy be specified...”

¹⁴ Modeling existing facilities is encouraged to support modification or renovation projects.

Architectural	
- New interior/exterior walls and components within (doors, windows, etc.) - Floor, finish floor, ceiling, and roof - Architectural wall types - Elevators, stairs, and ramps - Railing (handrail and guardrails) - Site Plan (as needed) - Furniture walls in open areas to show cubicle configurations - Rooms	- Furnishings and fixtures (except furniture) - Plumbing fixtures - Equipment - Clearance zones - Casework and shelving - Overall – Plan drawing representing all facility areas for each system type - Areas
Mechanical	
- Equipment - Supply/Return distribution systems - Pipes and ducts with minimum outer diameter (OD) as defined by VDCP	- Clearance zones - Overall – Plan drawing representing all facility areas for each system type - Spaces and zones
Electrical/Telecommunications/Security	
- Interior and exterior transformers and other equipment - Main and distribution panels and switchgear - Equipment and devices - Receptacle and devices	- Feeders and conduit with minimum OD as defined by VDCP - Permanently mounted lighting fixtures - Clearance zones - Overall – Plan drawing representing all facility areas for each system type
Plumbing	
- Waste and vent piping with OD of 2 inches and larger - Fixtures (lavatories, water closets, roof and floor drains, drinking fountains, etc.) - Overall – Plan drawing representing all facility areas for each system type	- Clearance zones - Supply pipes with OD of 2 inches and larger
Fire Protection/Fire Alarm	
- Clearance zones - Sprinkler pipes with OD of 2 inches and larger - Clearance Zones	- Fire protection heads and cabinets - Fire alarm devices and cabinets - Overall – Plan drawing representing all facility areas for each system type
Electrical, Mechanical, Utility Chases, and Corridors	
- All equipment, devices, and systems within room modeled per VDCP stipulated requirements - Pay special attention to areas of piping or conduits where stacked or flat configurations create congestion for coordination	
Civil (Civil 3D or 2D CAD)	
- Site & Utility Plan - Topography – 3D terrain of all sitework	Landscaping elements

3.0 Data Management (Design Agency except as noted)

3.1 Importance of Data Integrity¹⁵

- A. Design Agencies working on LANL projects shall maintain consistency, integrity, accuracy, completeness, and proper nomenclature of all BIM data throughout project development and during data exchange between software applications.
- B. Master BIMs must be maintained by LANL within a data repository that includes backup and recovery capabilities.

3.2 BIM File Types

A. Project BIM Files

1. Project BIM files are developed to support project design, construction or facility modifications using current BIM authoring/engineering modeling software. Project BIMs shall be created using current LANL Revit templates and shared parameter files, or other engineering modeling templates where applicable.
2. For projects involving modification to existing facilities, structures, or infrastructure, LANL IPT shall first determine whether applicable Master BIM files are available through the VBEO and/or the [VBEO Portal](#). Available Master BIM files shall be provided to the Design Agency for use as technical baseline models. The BIM Coordinator will work with Project Team to establish the preferred workflow for integrating the Master BIM files and subsequently creating the Project BIM file.
3. Project BIM File Naming Convention

XXXXXX-TA-BLDG-Y.rvt

Example: 123456-03-0234-A.rvt

where

- **XXXXXX** = Unique project ID number (6-digit), ESR number (5-digit), or as allowed by Section 400 POC; (in the example, XXXXXX is 123456)
- **TA** = 2-digit TA (in the example, TA is 03)
- **BLDG** = 4-digit facility/structure number (in the example, bldg. number is 0234). Use MULT when more than one building is included.
- **Y** = BIM Discipline Initial per Table 400-3 (in the example, BIM Discipline Initial is A for Architecture)
- **.rvt** = File format extension (in lower case)

Table 400-3. BIM Discipline Initials (Y)

BIM Discipline Initial	BIM Discipline Represented	BIM Discipline Description
A	Architecture	Architectural elements
S	Structure	Structural elements
MEP	Mechanical, Electrical, Plumbing	Mechanical, electrical, and/or plumbing elements. These can be separate models each representing their discipline. It is encouraged to model these disciplines together as a single BIM to take advantage of systems integrations within Revit platform

¹⁵ LANL considers facility/structure and infrastructure data to be a strategic asset that must be managed appropriately to maintain its value.

BIM Discipline Initial	BIM Discipline Represented	BIM Discipline Description
M	Mechanical	Mechanical elements
E	Electrical	Electrical elements
P	Plumbing	Plumbing elements
FN	Furniture	Furniture elements; can be represented as part of Arch model
EQ	Equipment	Equipment elements not represented by MEP, Fire, Telecommunication or Security elements or systems. Can be represented as part of Arch model
F	Fire Protection	Fire protection and alarm elements. Can be represented as part of MEP model; add "F" to end of MEP (e.g. MEPF)
J	I&C (Control Systems)	Instrumentation and control systems for operating HVAC equipment, process equipment, and other building services
T	Telecommunication	Telecommunication elements. Can be represented as part of MEP model, add "T" to end of MEP (e.g., MEPT)
X	Security	Security elements. Can be represented as part of MEP model, add "X" to end of MEP (e.g., MEPX)
SP	Space	Room/Area/Space/Zone elements. Room and Area are represented as part of Arch model and Space and Zone are represented as part of MEP model. SPACE BIM files need a minimum of BIM objects represented by Arch or MEP elements to be created
ST(X)	Site/Civil/Utilities	Site/Civil elements. For site utilities in specific disciplines, add a suffix of the specific discipline initial after ST in the optional "X" location; e.g., STE for Electrical such as site lighting)

B. Record BIM Files

- Record BIM files represent the final Project BIM deliverables at project completion. The Design Agency, with support from the BIM Coordinator, shall manage and deliver Record BIM files to LANL. Record BIM files capture all as-constructed field changes and updates during construction (including approved deferred and delegated design BIM). This includes updating the 3D objects physically installed, their physical locations, and model data that reflect as-constructed conditions and information.

- Record BIM File Naming Convention:

Record BIM files shall follow the Project BIM naming convention with the addition of a rollup status designation

XXXXXX-TA-BLDG-Y-ROLLUPSTATUS.rvt

Example: 123456-03-0234-A-NEW.rvt

where

- XXXXXX** = Unique project ID number (6-digit), ESR number (5-digit), or as allowed by Section 400 POC (in the example, XXXXXX is 123456)
- TA** = 2-digit TA (in the example, TA is 03)
- BLDG** = 4-digit facility/structure number (in the example, bldg. number is 0234). Use MULT when more than one building is included.
- Y** = BIM Discipline Initial per Table 400-3 (in the example, BIM Discipline Initial is A for Architecture)

- **ROLLUPSTATUS =**
 - **NEW** for new Project BIM grouped elements and data in exported file
 - **REMOVE** for demolished Project BIM grouped elements and data in exported file
- **.rvt** = File format extension (in lower case)

C. **Master BIM Files** (LANL only)

1. Master BIM files represent the configuration-managed digital assets that form part of the facility/system technical baseline datasets. Master BIM are living models maintained, managed and updated by LANL. Master BIM files are created or updated from Record BIM files submitted by the Design Agency at project completion.

2. Master BIM File Naming Convention:

TA-BLDG-Y.rvt

Example: 03-0234-A.rvt

where

- **TA** = 2-digit TA (in the example, TA is 03)
- **BLDG** = 4-digit facility/structure number (in the example, bldg. number is 0234)
- **Y** = BIM Discipline Initial per Table 400-3 (in the example, BIM Discipline initial is A for Architecture)
- **.rvt** = File format extension (in lower case)

3.3 Spatial Objects and Data

A. **Rooms**

1. Room objects represent architectural spaces and shall include both room names and room numbers.

Rooms shall:

- a. Be created using the appropriate BIM room tool.
 - b. Be associated with bounding elements, including walls, doors, windows, floors, columns, ceilings, and structural decks, as applicable.
 - c. Not overlap with adjacent rooms.
 - d. Be fully enclosed by room-bounding elements.
 - e. Have all unused or unplaced room objects removed from the model.
2. Room Numbering shall comply with [ESM Chapter 4 - Architectural](#), Section C Interiors, Appendix A – *Room Numbering*. LANL will provide a four-digit room numbering scheme after conceptual floor plans have been submitted and approved. Conceptual drawings shall be submitted to fpr_team@lanl.gov for room numbering assignment.

B. **Spaces**

1. Space objects shall be used to define mechanical, electrical, plumbing (MEP) boundaries. The boundaries shall be modified vertically and horizontally to accurately represent the service extents of the associated systems.
2. Space numbers shall be coordinated with corresponding Room objects.

C. Areas

1. Area boundaries and Area objects shall be created as necessary to support Life Safety plans, area calculations, and schedules included in the LANL Revit templates.
Each Area shall be assigned:
 - a. A descriptive area name.
 - b. An occupancy classification.
 - c. A space function.
2. Occupancy classifications and occupant load calculations shall comply with the applicable requirements of the International Building Code (IBC), Chapter 3, *Occupancy Classification and Use*, and Chapter 10, *Means of Egress*, Table 1004.5.

3.4 PEL/MEL Data and Information

- A. Project Equipment List (PEL) information shall be incorporated into the Project BIM using the designated **LANL_O_MEL** shared parameter fields.
- B. PEL information shall comply with [ESM Chapter 1 - General](#), including Sections Z10 and 200, Master Equipment List; Item Numbering and Labeling, and its Attachment 1 *MEL/CMMS Upload Workbook*.
- C. **Record BIM files shall include all required PEL information, updated to reflect approved as-constructed conditions and equipment data provided by the Constructor.**¹⁶
- D. Successful integration of PEL data into MEL data from the Record BIM to the Master BIM requires early coordination among the LANL IPT, Design Agency, Constructor, and facility stakeholders. PEL/MEL data requirements shall be defined in the approved VDCP to ensure that equipment attributes are properly mapped to BIM parameters and consistently populated throughout design, procurement, construction, and turnover.

Guidance: For example, Revit parameters should be reviewed and coordinated with the LANL IPT, System Engineers, Subject Matter Experts (SMEs), and other stakeholders to ensure that required asset management and maintenance information is captured in the appropriate parameter fields and remains consistent throughout the project lifecycle.

4.0 Template Settings (Design Agency)**4.1 Template Settings**

- A. For additional information regarding Template Settings, refer to Article 4.6, *Revit Template Legends – LANL Revit Guides*.

Guidance: LANL discipline-specific Revit templates are provided to promote consistency across all BIM files.

4.2 Project Units

- A. Applicability: All disciplines
- B. Project units shall be established using the settings defined in the applicable LANL discipline-specific Revit templates and table below.

¹⁶ Construction-phase SSC information is primarily obtained by the Design Agency through approved submittals, such as product data and shop drawings. Additional sources of information may include field change requests (FCRs), approved design changes, and other project documents.

Project Unit Format				
Data	Units	Rounding	Unit Symbol	Check Boxes
Length	Feet and fractional inches	To the nearest 1/256"	' - "	Suppress 0 feet, use digit grouping, suppress spaces
Area	Square feet	2 decimal places	SF	Suppress trailing 0s, use digit grouping
Volume	Cubic feet	2 decimal places	CF	Suppress trailing 0s, use digit grouping
Angle	Decimal degrees	2 decimal places	°	Suppress trailing 0s, use digit grouping
Slope	Rise / 12"	To the nearest 1/256"	n/a	Use digit grouping
Currency	Currency	2 decimal places	\$	Suppress trailing 0s, use digit grouping
Mass Density	Pounds per cubic foot	2 decimal places	lb/ft ³	Suppress trailing 0s, use digit grouping
Time	Seconds	1 decimal place	s	
Speed	Miles per hour	1 decimal place	mph	

4.3 Parameters

- A. **Standard Parameters:** Standard parameters are included in all Master BIM files and LANL discipline-specific Revit templates to store, manage, and communicate information associated with BIM elements. Parameters define and modify element characteristics and support the display of model information in tags, schedules, and other project deliverables.

1. Parameters Naming Convention

ZZZZ_Y_Description_X

Example: LANL_A_Fire Rating_S

where

- **ZZZZ** = LANL (in the example, ZZZZ is LANL)
 - **Y** = BIM Discipline Initial per Table 400-3 (in the example, BIM Discipline initial is A for Architecture)
 - **Description** = Parameter description or intended use (in the example, Description is Fire Rating) (see exception below)
Exception: Parameters containing "MEL" within the Description field are associated with the Master Equipment List. Refer to Article 3.4 PEL/MEL Data and Information.
 - **X** = Parameter type (in the example, Parameter type is S for Shared Parameter):
 - **S** = Shared Parameter.
 - **P** = Project Parameter
2. All standard parameters beginning with **LANL** shall be populated with appropriate values when applicable. Responsibility for parameter population shall be defined in the approved VDCP.
3. Current shared parameters and supporting files are available with the LANL Revit templates on the LANL CAD Standards Manual [webpage](#) associated with Section 400.

- B. **Custom Parameters:** Project-specific, manufacturer-specific, or Design Agency-specific custom parameters may be added as necessary to support project requirements. When parameters are created by an External Design Agency, replace the ZZZZ field in the Parameters Naming Convention with the Design Agency's approved abbreviation, initials, or acronym.

Example: XYZ_A_Signage Label_S

where

- **ZZZZ** = External Design Agency identifier (in the example, XYZ is Design Agency name, initials, or acronym)

4.4 Worksets

- A. Standard Worksets are included in all Master BIM files and LANL discipline-specific Revit templates to promote model consistency, improve visibility management, and support overall model health and performance.
- B. For additional information on Worksets in the Revit templates, refer to Article 4.6 *Revit Template Legends – LANL Revit Guides, LANL Revit Guide 03 – Authoring Content*.

4.5 Phasing in BIM Files

- A. **Phasing:** Phasing in BIM Files represent distinct periods in the lifecycle of a facility, structure, or infrastructure asset. The Design Agency shall coordinate phase names and phase descriptions with the Project Team and ensure consistent implementation throughout the Project BIM. LANL discipline-specific Revit templates include the following standard phasing:
1. **Existing Phase:** The existing phase shall be assigned to all model elements representing the existing site, facilities, structures, systems and components.
 - a. Master BIM files typically contain only the Existing phase because they represent the current physical characteristics of the existing facility or SSCs.
 - b. Master BIM files may also contain archived Existing phases associated with previous project identifiers (e.g., PID# or ESR#) to document significant historical renovations or modifications over the lifecycle of the facility or SSCs.
 2. **New Phase:** The new phase shall be assigned to all model elements representing new design components. New elements shall be modeled in accordance with the required LOD specified in Article 2.4. Demolition and temporary work shall also be managed through the new phase.
- B. **Phase Filters:** All BIM elements are assigned a Phase when created and when demolished. Phase filters shall be applied to views to display each distinct phase — new, existing, demolished, and temporary — or a combination of these. For additional information on phasing and phase filters for view management in the Revit templates, refer to Article 4.6 *Revit Template Legends – LANL Revit Guides, LANL Revit Guide 03 – Authoring Content*.

4.6 Revit Template Legends – LANL Revit Guides

- A. Each LANL discipline-specific Revit template includes legend views and guidance identifying modeling requirements and organizational standards for the Project BIM.
- B. These templates define:
- a. Annotation standards
 - b. Symbols and tags
 - c. Text styles

- d. Line types and line weights
- e. View conventions
- f. Family standards
- g. Discipline-specific modeling requirements.
- C. Project teams shall use these guides when developing and maintaining Project BIM files.

Legend Title	Legend Description	Legend Location
LANL Revit Guide 00 – Etiquette	BIM Guidance/Etiquette	All Models
LANL Revit Guide 01 – Project Setup	BIM Project Setup	All Models
LANL Revit Guide 02 – Project location and Coordination	Model Coordinate Alignment Process	All Models
LANL Revit Guide 03 – Authoring Content	Best Practice creating content	All Models
LANL Revit Guide 04 – Coordination and Delivery	Coordination When Sharing and Delivering Models	All Models
LANL Revit Guide 05 – Annotations General	General Sheet Content/Symbols/Info	All Models
LANL Revit Guide 06 – Dimensions	Standard Dimensions Styles	All Models
LANL Revit Guide 07 – Text Styles	Standard Text Styles	All Models
LANL Revit Guide 08 – Line Styles	Standard Line Styles	All Models
LANL Revit Guide 09 – Line Weights	Standard Line Weights	All Models
LANL Revit Guide 10 – Project Navigation	Project Browser Navigation and Naming Conventions	All Models
LANL Revit Guide 11 – MEL and Asset Data	MEL and Asset Data Guidance	All Models

4.7 BIM Objects (Revit Families)

- A. Master BIM files and LANL discipline-specific Revit templates include both Autodesk-provided (out-of-box) and custom LANL-developed BIM objects (Revit Families).
- B. Revit Families represent a group of elements with a common set of Properties or Parameters and a related graphical representation. Many of the custom BIM objects are annotation symbols.
- C. BIM objects shall:
 - 1. Be modeled or created using the appropriate Revit category and family type.
 - 2. Accurately represent the physical characteristics and intended function of the modeled object.
 - 3. Include proper classification and/or data attributes for the project and object type.
 - 4. Support reporting, scheduling, filtering, tagging, and data export functions.
 - 5. Avoid the use of generic geometry or graphic primitives where a proper BIM object category exists.
- D. LANL custom annotation families, text styles, line weights, and related standards shall be used where provided.
- E. Modification of LANL-provided BIM objects or Revit Families in Master BIM files or LANL discipline-specific Revit templates is prohibited unless approved by the LANL BIM Standards Point of Contact (POC).

F. BIM Object (Revit Family) Naming Convention

Revit Family names shall be Title Case with fields separated by underscores. Within each field, spaces and hyphens may be used as appropriate.

ZZZZ_Y_MD_Description1_Description2_Type/Configuration.rfa

Example: LANL_A_08_Door Single_Exterior_HM Frame - HM Panel.rfa

where

- **ZZZZ** = LANL (see exception below) (in the example, ZZZZ is LANL)
- **Y** = BIM Discipline Initial per Table 400-3 (in the example, BIM Discipline initial is A for Architecture)
- **MD** = CSI MasterFormat Division number (in the example, MD is 08 for Openings)
- **Description1** = Object description or intended use (in the example, Description1 is Door Single)
- **Description2** = Location, Manufacturer, or secondary descriptor (in the example, Description2 = Exterior)
- **Type/Configuration** = Type or configuration (in this example Type/Configuration is HM Frame - HM Panel)
- **.rfa** = Revit family file format extension

Exception: Project-specific, manufacturer-specific, or Design Agency-specific BIM objects may be added as necessary to support project requirements. When BIM objects are created by an External Design Agency, replace the ZZZZ field in the BIM Object (Revit Family) Naming Convention with the Design Agency's approved abbreviation, initials, or acronym.

Example: XYZ_A_08_Door Single_Exterior_HM Frame - HM Panel.rfa

where

- **ZZZZ** = External Design Agency identifier (in the example, XYZ is Design Agency name, initials, or acronym)

5.0 BIM Deliverables – Design Reviews, Execution Reviews, and Project Completion (Design Agency)

5.1. Project BIM Deliverables for Design and Execution Reviews

A. BIM Quality Control (QC)

1. A BIM QC check shall be completed, with support from the BIM Coordinator, prior to each design or execution review milestone. Compliance with Section 400 shall be reviewed during each Model Progression Meeting and associated design or execution review.

Guidance: LANL Revit templates establish the baseline requirements for compliance with Section 400. Effective BIM quality management requires ongoing coordination, oversight and periodic reviews throughout the project lifecycle.

2. QC checks shall include, but not be limited to, the following:

Model Review Item	Verification Requirement
File Naming	Correct file naming conventions are used.
Templates	Project browser, views, sheets, legends, and related content comply with LANL Revit templates.
Line Styles and Weights	Standard LANL line styles and weights are used.

Model Review Item	Verification Requirement
Text Styles	Standard LANL text styles are used.
Dimensions	Standard LANL dimension styles are used.
Object Families	Object families comply with naming convention and LANL parameters have a value.
View Templates	Required view templates are applied correctly.
Sheet Standards	Sheet organization, setup, and formatting comply with LANL Revit templates.
Notes	Keyed notes and general notes are used appropriately.
Worksets	Elements are assigned to the appropriate worksets.
Navisworks Views	Coordination and review BIM views (within the Revit files) contain appropriate information.
Sheet Index	Sheet index is complete and accurate.
Project History	Project history information is current and complete.
Images	Required images are properly embedded.
LOD Compliance	Required Level of Development (LOD) has been achieved.
Linked CAD Files	Linked CAD content has been converted to Revit elements where required and appropriately incorporated into the model.
Coordinates	Model is georeferenced and utilizes the correct LANL coordinate system.

3. BIM QC Assessment Checklists

- a. A completed BIM QC Assessment Checklist shall accompany each Project BIM and Record BIM submission. Checklists are available on the LANL CAD Standards Manual webpage with [Section 400](#), including:
 - 1) CSM-400-FM01 Project BIM QC Assessment Checklist
 - 2) CSM-400-FM02 Record BIM QC Assessment Checklist
- b. The assessment forms provide the Design Agency and LANL IPT a structured method for evaluating compliance with Section 400 requirements based on a score and identifying areas requiring corrective action.
- c. Comments and recommendations are encouraged to support continuous BIM quality improvement throughout the project lifecycle.

B. Submission of Project BIM Files

1. Project BIM files and all supporting or linked files submitted for design or execution reviews shall:
 - a. Be QC-checked prior to submission to LANL.
 - b. Comply with all requirements of Section 400.
 - c. Comply with project-specific requirements identified in the SOW, specifications, and approved VDCP.
 - d. Satisfy any additional requirements identified in the [ESM](#) or [TSM](#), as applicable.

C. 2D Deliverables Derived from BIM

1. CAD and PDF Files
 - a. When required by the SOW or Subcontract, 2D drawings and sketches (AutoCAD and PDF) shall be generated directly from the Project BIM.
 - b. AutoCAD and PDF deliverables shall meet the maturity level specified in [ESM Chapter 1 - General](#), Section Z10, [Attachment C](#), *Design Deliverable Schedule*, or Project version of same in SOW.
 - c. Drawing and sketch file naming convention shall comply with [CSM Section 200](#).
2. Additional Data Files
 - a. Additional data files may be exported directly from the Project BIM to support project deliverables and design reviews.
 - b. These data files shall satisfy applicable requirements in [ESM Chapter 1 - General](#), Section Z10, or [TSM](#) as applicable.
 - c. Examples of additional data files include:
 - 1) Project Equipment List
 - 2) Project Document List
 - 3) Life Safety Design Criteria
 - 4) Structural Design Criteria, calculations or component schedules
 - 5) Mechanical, Electrical, Plumbing and other System Design Criteria, calculations or component schedules

D. VDCP Review and Updates:

1. Submit the VDCP for review at each design or execution review milestone.
2. Update, refine, and version-control the VDCP throughout the project to reflect current project requirements, BIM uses, team responsibilities, workflows, and deliverables.

5.2. Record BIM Deliverables at Project Completion

- A. At project completion, the Design Agency, in coordination with the Constructor and supported by the BIM Coordinator, shall transition the Project BIM into a Record BIM.
- B. The Record BIM shall reflect verified as-constructed conditions and incorporate all applicable project information developed during design and construction, including:
 - a. Approved design revisions
 - b. Field Change Requests
 - c. Design Revision Notices
 - d. Construction redlines
 - e. Shop drawings
 - f. Equipment submittals
 - g. Field verification and walkdown information
 - h. Post-construction LiDAR or point cloud data, when obtained.

The completed Record BIM shall provide a comprehensive digital representation of the completed project and shall be suitable for incorporation into an existing Master BIM or establishment of a new Master BIM.

C. Record BIM Quality Control (QC) Check

1. A final Record BIM QC review shall be completed prior to final delivery in accordance with the approved VDCP.
2. At a minimum, the final QC review shall include all checks identified in Article 5.1.A, *BIM Quality Control (QC) Checks*, along with any additional project-specific acceptance criteria.

D. Submission of Record BIM Files

1. Record BIM files and all supporting or linked files shall:
 - a. Be QC checked prior to submission to LANL.
 - b. Comply with all applicable requirements of Section 400.
 - c. Comply with project-specific requirements identified in the SOW, specifications, and approved VDCP.
 - d. Satisfy any additional requirements identified in the [ESM](#) or [TSM](#), as applicable
2. Electronic delivery of Record BIM files shall comply with CSM Section 200 – *CAD Requirements* (refer to Subsection 214 *CAD File Conventions*, Article 3.0, *CAD File Format for Final Electronic Deliverables*).
 - a. Following submission, notification shall be provided to LANL BIM Manager via bim-submissions@lanl.gov.
 - b. For large file transfers, LANLTransfer (<https://transfer.lanl.gov>) shall be used, in accordance with project requirements, to transmit the BIM files to the LANL Document Control and Records Management and LANL BIM Manager.
3. The LANL BIM Manager, or designated representative, shall perform an independent compliance review of the submitted Record BIM files prior to acceptance and incorporation into the Master BIM environment.

6.0 Definitions

Additional definitions are contained in the *Conduct of Engineering Glossary*, [GLOS-COE-1](#). The following are either reproduced from Rev. 3 of that document for convenience or are unique to Section 400; in case of a conflict, the definitions in the Glossary control.

Term	Definition
Building Information Model, or Modeling (BIM)	A digital representation of physical and functional characteristics of a facility, facility systems in or around them, or infrastructure systems. A BIM is 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. [GLOS-COE-1] <i>Virtual Design and Construction (VDC) is a similar concept to VBE and may include virtual reality and 4D (time) simulations to plan, design, and manage construction projects more efficiently.</i>

Term	Definition
BIM Coordinator	With a LANL-in-house-designed project, the BIM Coordinator is responsible for facilitating the implementation and coordination of BIM processes and standards by the design team, supporting the design team in maintaining high-quality BIM models, and facilitating smooth collaboration with all project stakeholders assuring project meets LANL BIM requirements. This may be a part-time or collateral duty fulfilled by a team member with appropriate background or on a consultation basis by the Virtual Build Environment Office (VBEO). Within an external-to-LANL Design Agency (AE), there is also a BIM coordination need (role) for ensuring the effective implementation and coordination of BIM processes within the design agency's projects. Therefore, for simplicity's sake, Section 400 uses the term to mean the person(s) fulfilling that role for the design team without regard to employer, actual job title, or other roles/functions.
BIM Manager (LANL)	An institutional or Division-level role responsible for overseeing the implementation and management of BIM processes and standards across all design, construction, and handover phases for all BIM. This role ensures that BIM is effectively utilized to enhance project delivery, improve coordination, and support LANL's long-term asset management goals for facility operations.
BIM Standards POC (LANL)	Maintains this document (Section 400) and associated resources and references including the BIM template, and who is empowered to grant permission to vary from same in writing. References and resources may be revised by POC independently of Section 400 revisions. <i>POCs are listed on an internal Standards webpage; there may also be Alternate POCs.</i>
BIM Subject Matter Expert – SME (LANL)	SME having sufficient knowledge to review BIM models for compliance with this Section (they may be discipline-specific or multi-discipline)
Clash Detection	The process of locating conflicting spatial data in the BIM files where two elements are occupying the same physical space
Constructor	Entity performing fabrication or physical construction activity. When not LANL self-performed, this is the Subcontractor. <i>Term used primarily in the Engineering Standards but typically not in contract terms and conditions, which use "SUBCONTRACTOR" rather than Constructor, Builder, or General Contractor (GC).</i> [GLOS-COE-1]
Design Agency	The organization [LANL or external subcontractor (A/E)] responsible for the preparation of engineering design and documentation [P342]. <u>Design Agency of Record</u> means the same (see Engineering of Record definition). <u>Design Organization</u>, used in DOE-STD-1189, is similar. [GLOS-COE-1] <i>See also Designer, DPIRC, and EOR in Glossary.</i>
Integrated Project Team (IPT)	A team formed and led by a LANL project manager (when assigned) and comprised of functional experts needed to execute capital asset work, such as engineering, procurement, construction, etc. [GLOS-COE-1]
Master BIM	BIM that is managed, maintained and updated throughout the entire life cycle of a physical facility, from design, construction, operation, maintenance, and decommissioning. The Master BIM is used for analyzing facility data, enhancing decision making, efficiency and sustainability for all stakeholders providing up to date information, better coordination, reducing errors and optimizing facility performance over time. A Master BIM is managed by the LANL BIM Manager and VBEO team. Where they exist, they may be provided to Design Agency to alter.
Model Data	Information applied to BIM or BIM object (element) properties. A model object or element is a discrete object within a BIM; LANL ALDICP document WI-100-005, VDC BEP Work Instruction, may provide discussion.
Project BIM	The BIM that a project team creates, manages and updates throughout project delivery phases representing a new design, renovation or modification of a facility. A Project BIM is coordinated and managed by a Design Agency and supported by a BIM Coordinator. At project completion, a Project BIM becomes a Record BIM.
Project Team	Includes Design Agency, LANL IPT, and Constructor.
Record BIM	Project BIM finalized for delivery at project completion incorporating all as-constructed design and construction updates. A Record BIM can either update a Master BIM or become a new one.

Term	Definition
Virtual Build Environment Office – VBE (LANL internal)	Team or office within Engineering Services (e.g., Operations Group) who's mission is to collaboratively implement VBE workflows in stages across the ALDFO and ALDICP directorates. [CSM Section 400 draft] Goals include (1) defining BIM standards; (2) facilitating technology adoption through communication and training (3) centralizing VBE service requests into a single system for streamlined coordination; (4) establish and maintain an on premise data management solution, (5) managing data, including the establishment of an approved enclave with appropriate partitions segregating non-sensitive from sensitive data on a central server; and (6) laying the groundwork for the compliant and secure implementation of industry-standard cloud-based environments in the next phase.
VDC Plan (VDCP)	A written plan detailing the development and use of, and protocols related to, Process Models and setting forth each of the Design Agencies' responsibilities related thereto. Similar to industry standard BIM Execution Plan.

7.0 Abbreviations

Additional abbreviations are contained in the *Conduct of Engineering Glossary*, [GLOS-COE-1](#).

Term	Definition
AE or A/E	Architect/Engineer (outside of LANL)
BEP	BIM Execution Plan
BIM	Building Information Model or Modeling
CAD	Computer-Aided Design
CSM	CAD Standards Manual, STD-342-300 (LANL)
ESM	Engineering Standards Manual, STD-342-100 (LANL)
GIS	Geographic Information System
IPT	Integrated Project Team
LiDAR	Light Detection and Ranging
LOD	Level of Development
MEL	Master Equipment List
MEP	Mechanical/Electrical/Plumbing (sometimes including fire protection and other services depending on context)
NCS	National CAD Standard (NIBS)
NIBS	National Institute of Building Sciences (e.g., for NCS and NBIMS-US Standard)
OD	Outer Diameter
PEL	Project Equipment List
POC	Point of Contact
QA	Quality Assurance
QC	Quality Control, or quality check
SME	Subject matter expert
SOW	Statement of Work

Term	Definition
SSC	Structure, System, or Component
TSM	Tailored Standards Manual
VBEO	Virtual Build Environment Office
VDCP	Virtual Design & Construction Plan

8.0 Forms and Templates

CSM 400-FM01 Project BIM QC Assessment Checklist
 CSM 400-FM02 Record BIM QC Assessment Checklist
 LANL Revit Template Arch
 LANL Revit Template MEP
 LANL Revit Template Structural
 LANL Revit Template Master Keynotes
 LANL Revit Template Shared Parameters

Note, webposted template titles include the Revit version required. E.g., to use a template labeled 25, use Revit 2025 or later.

9.0 Contact

Please contact the BIM Standards [POC](#) for assistance. LANL users should seek assistance and make suggestions [here](#); otherwise please email bim-submissions@lanl.gov.

10.0 Record of Revisions

Rev.	Date	Description	POC	OIC
0	09/30/2024	Initial issue	Bruce Gunderson, <i>ES-DO</i> (VBEO BIM Manager)	Michael Richardson, <i>ES-DO</i>
1	07/21/2026	General updates to entire Section to make it clear, concise, correct and complete. Updates to 2.1 <i>Develop and Maintain VDC Plan</i> to remove most references to NBIMS-US Standard of BIM Execution Plan (BEP) and promote use of LANL-issued Virtual Design and Construction Plan (VDCP) template. Update to 3.2.B <i>Record BIM File Naming convention</i> to include -New and -Remove to support BIM file configuration and rollup. Updates to 4.3 <i>Parameters</i> to include a new naming convention. Updates to 4.6 <i>Revit Template Legends - LANL Revit Guide</i>, aligning names in BIM Standard with those in the Revit templates. Updates to 5.1 <i>Project BIM Deliverables for Design and Execution Reviews</i> for BIM Quality Control checks, Submission of Project BIM Files at each design/execution review and use of Project BIM and Record BIM QC Assessment Forms.	Bruce Gunderson, <i>ES-SEO</i> (VBEO BIM Manager)	Robert Swickley, <i>ES-DO</i>