THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center
Making Cancer History®

The University of Texas MD Anderson Cancer Center

Project BIM Delivery Standards

Version 1.2 December 2024

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INTRODUCTION

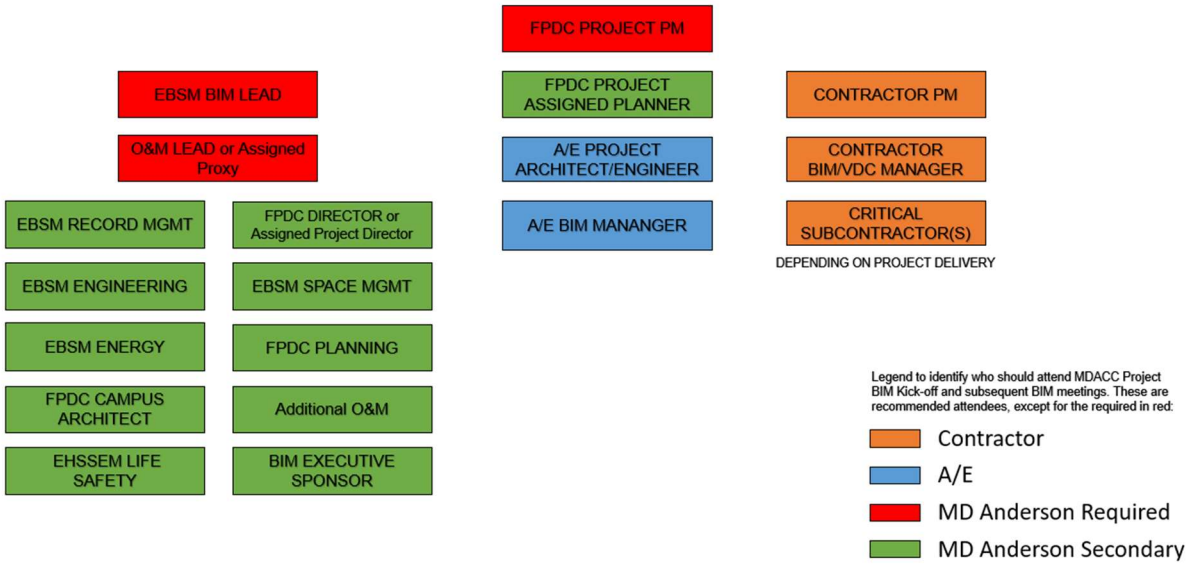
University of Texas MD Anderson Cancer Center is implementing BIM integration to project delivery workflows to support Facility Management operations by capturing and maintaining geometric, spatial, and equipment asset information. The institution's current footprint is over 130 buildings totaling more than 16,292,299 gross SQ FT and a total room area of 14,187,834 SQFT. Stakeholders depend on the most current and accurate data. BIM fosters a shared, virtual space for quicker, more intelligent workflows, with rich data points that can filter downstream into institutional work order management and spatial management systems.

DEFINITIONS

Refer to Building Information Modeling Requirements document in ODGs.

TEAM ROLES:

This section outlines key BIM leadership positions, their roles, responsibilities, and structure. These are focused on the BIM-enabled project delivery and turnover requirements outlined in the BIM Project Delivery document. ***The responsibilities outlined below will not supersede the overall chain of command that exists on a project.***



I. PATIENT CARE PROJECTS:

For Project BIM Kick-off and subsequent BIM project meetings, key MD Anderson members *listed below to attend ad hoc, with exception of required persons noted with an asterisk*

Role	Involvement
FPDC Project Assigned PM*	Required – Project Specific
EBSM BIM Lead*	Required
O&M (PCPF) Lead*	Required
EHSSEM Life Safety	As Needed
FPDC Campus Architect	As Needed
FPDC Assigned Project Director	As Needed
FPDC Planning	As Needed
EBSM Records Management	As Needed
EBSM Executive BIM Sponsor	As Needed
EBSM Space Information	As Needed
Other Specialty Areas	As Needed - Project Specific

II. RESEARCH & ADMIN PROJECTS:

For Project BIM Kick-off and subsequent BIM project meetings, key MD Anderson members listed below to attend ad hoc, with exception of required persons noted with an asterisk

Role	Involvement
FPDC Project Assigned PM*	Required – Project Specific
EBSM BIM Lead*	Required
O&M (RAF) Lead*	Required
EHSSEM Life Safety	As Needed
FPDC Campus Architect	As Needed
FPDC Assigned Project Director	As Needed
FPDC Planning	As Needed
EBSM Records Management	As Needed
EBSM Executive BIM Sponsor	As Needed
EBSM Space Information	As Needed
Other Specialty Areas	As Needed - Project Specific

INSTITUTIONAL BIM GOALS:

- *To create & maintain world-class cancer care facilities, research and support buildings that foster future growth and innovative technologies.*
- *Establish data mapping procedures to aid in future Digital Twin pilots*
- *To capture all managed assets into CMMS system for work order, maintenance and scheduling usage, that can also be used in a bi-directionally, allowing flexibility and accuracy of data.*
- *To contribute to the institutional energy objective of reducing carbon emissions through BIM systems analysis throughout project lifecycle.*
- *To maintain, conform and report life safety and egress criteria as required by State for all major capital buildings.*
- *Track and maintain spatial data that will be used by the institution, fostering efficient data capture, accurate SQFT for annual Space Surveys and asset tracking.*
- *To create a collaborative space where multiple FM division departments can share data that will enhance the workflows and accuracy of design, construction, and maintenance management.*

INSTITUTIONAL BIM USES:

The following BIM Use Cases can be defined as specific BIM-enabled goals, opportunities, and/or processes where BIM will be taken advantage of to complete a project-specific task throughout the ***Plan > Design > Construct > Operate*** continuum of a facility's lifecycle.

BIM Use Table 1 below represents MD Anderson's BIM Uses, with Required BIM Uses denoted as **bold text with asterisk** *. Additional BIM Uses noted should be reviewed, discussed and approved/accepted by project team on a per project basis.

BIM USES TABLE 1 – GREENFIELD, MAJOR CAPITAL PROJECTS:

PLAN	DESIGN	CONSTRUCT	OPERATE
Program +Space Validation	***Design Authoring**	***** Model Authoring (fabrication; trade coordination)**	***Asset/Maintenance Management**
Capture Existing Conditions	Design Reviews / Renderings/Images	***3D Trade Coordination**	***Space Management**
Civil Surface + Utilities	***3D Coordination**	Site Utilization Planning (Logistics)	Building Systems/Energy Management
Control Points + Geospatial	Analyze System Performance (Mech., Lighting, Struct.)	***Clash Detection**	Geographic Information System Mapping (GIS)
Building System/Energy Modeling	Clash Prevention	Model-Based Scheduling (4D Sequencing/Simulation)	***Document Management**
Phase Planning (4D Modeling)	Site Design	*Model-Based Estimating (5D Quantification/Cost Estimates)	***Final Model(s)**
Rendering	Quantity Schedule	Site Analysis	Emergency Management
Virtual Reality	***Space Validation**	***Conformed Model**	
Physical Model	Building System/Energy Modeling	Safety	
Site Analysis	Existing Conditions Documentation & Modeling	***Commissioning Data**	
***Asset Management Preparation**	***Asset Management Preparation**		
	Code Validation		

BIM Use Table 2 below represents MD Anderson's BIM Uses, with Required BIM Uses denoted as **bold text with asterisk** *. Additional BIM Uses noted should be reviewed, discussed and approved/accepted by project team on a per project basis.

For Renovation projects, if project meets following criteria Revit models are required for asset extraction/CMMS purposes: MEP Equipment with high dollar value and/or critical infrastructure with equal to or >10 years lifespan.

BIM USES TABLE 2 – EXISTING/RENOVATION PROJECTS:

PLAN	DESIGN	CONSTRUCT	OPERATE
*** Program +Space Validation**	***Design Authoring**	*** Model Authoring (fabrication; trade coordination)**	***Asset/Maintenance Management**
***Capture Existing Conditions**	Design Reviews / Renderings/Images	***3D Trade Coordination**	***Space Management**
Civil Surface + Utilities	***3D Coordination**	Site Utilization Planning (Logistics)	Building Systems/Energy Management
Control Points + Geospatial	Analyze System Performance (Mech., Lighting, Struct.)	***Clash Detection**	Geographic Information System Mapping (GIS)
Building System/Energy Modeling	Clash Prevention	Model-Based Scheduling (4D Sequencing/Simulation)	***Document Management**
Phase Planning (4D Modeling)	Site Design	***Model-Based Estimating (5D Quantification/Cost Estimates)**	***Final Model(s)**
***Asset Management Preparation**	Quantity Schedule	Site Analysis	Emergency Management
	***Space Validation**	***Conformed Model**	
	Building System/Energy Modeling	Safety	
	***Existing Conditions Documentation & Modeling**	***Commissioning Data**	
	***Asset Management Preparation**		
	Code Validation		

BIM Uses: Planning Phase

PROGRAM + SPACE VALIDATION:

A process in which a spatial program is used to efficiently and accurately assess design performance in regard to spatial requirements. The developed BIM model allows the project team to analyze space and understand the complexity of space standards and regulations. Critical decisions are made in this phase of design and bring the most value to the project when needs and options are discussed with the client and the best approach is analyzed.RE: MD Anderson Building and Room Numbering Guidelines; ODG Element Z2030 – Definitions of Building Areas and ODG Element Z2010 – Design Submittal Requirements..

CAPTURE EXISTING CONDITIONS:

Using 3D information capture approaches and BIM authoring software to develop a 3D model of the existing conditions for a site, facilities on a site, or a specific area within a facility. This model can be developed using various methods, including laser scanning, photogrammetry, or traditional surveying approaches. The model may have varying levels of information depending upon the intended use for the model including 3D geometry and other asset information. Benefits of this use case are: Enhances the efficiency and accuracy of existing conditions documentation; Provides documentation of environment for future uses; Aids in future modeling and 3D design coordination; Provides an accurate representation of work that has been put into place; Real-time quantity verification for accounting purposes; Provides detailed layout information; Pre-Disaster planning; Post-Disaster record; Use for visualization purposes

BIM Uses: Design Phase

DESIGN AUTHORING:

The entire Design Team will utilize Autodesk Revit, from the outset of the project to virtually design, simulate, and construct all facilities at MD Anderson. All Revit models by design teams shall follow Shared Coordinates to align with future UT MD Anderson Geographic Informational System. All Revit models to use the approved Revit version determined at project BIM Kick-off meeting with project team, with the approval by MD Anderson BIM Lead. The approved Revit version and agreed to upgrade plan to be reflected in the project BEP. The creation and use of a BIM will be the basis for collaboration and project deliverables, while its interoperability will facilitate the project's other defined BIM Use Cases. BIM will serve as the foundation for construction documents, leveraging the model geometry for the final two-dimensional (2D) output, RE: *Document Management* BIM Use. The units shall be in imperial feet and fractional inches. All objects must be 3D solids, parametric components, or AEC (Architecture, Engineering, Construction) objects. All files shall be purged prior to final submission.

DESIGN REVIEWS:

The project BIM will be evaluated during Design Reviews based on a set of criteria set by the Owner, which can include: alignment with the project program, compliance with project standards, visual review of space aesthetics, building systems and layout in a virtual environment, and specific requirements such as layout, sightlines, lighting, security, ergonomics, acoustics, textures and colors, among many others. This BIM Use Requirement may be executed via computer software, such as virtual reality applications. Virtual mock-ups can be performed at various levels of detail depending on project needs.

3D COORDINATION:

AEC team to utilize model(s) for ongoing 3D coordination between consultants within a Federated Model(s). Model breakdown/scope to be discussed and reviewed with project team and approved by MD Anderson BIM Lead. Coordination using Revit models are to achieve, but not limited to reduction of project cost; reduction of project schedule; increase in project quality; increase in workforce productivity; reduction of construction waste; reduction of field generated requests for information; increased spatial reliability and improvement of the quality of as-built information. 3D coordination also enables increased levels of prefabrication and modularization and the installation of hangers for MEP or structural elements prior to concrete placement.

BUILDING SYSTEM/ENERGY MODELING:

To support the Institutions decarbonization efforts, leveraging modeling as a tool to support such initiatives. Refer to MD Anderson Decarbonization program led by EBSM Energy team and EBSM Building System department per project basis. These goals, where efforts involve or authored by BIM, are to be captured in project BEP.

SPACE VALIDATION:

Design team to model the respective Rooms in architectural models and Spaces in MEPFP models. These rooms/spaces to be parametrically modeled, not linked in or duplicated, to all models used for project All spaces/rooms must be updated per the approved Room Numbering Control Set per ODG requirements. It is required that the MEP models, and any other model(s) with CMMS tracked assets used for Picklist process, per Asset Management Preparation, the Spaces in MEP models are to be intact and reflect the approved Room Numbering Control set by 95% CDs. This is required such that locations of equipment can be tied directly to spaces in the model.

EXISTING CONDITIONS DOCUMENTATION Maintain **Capture Existing Conditions** Use Case.

ASSET MANAGEMENT PREPARATION Refer to the *MD Anderson Revit Equipment Asset Tracking Procedure* for the institutional BIM Asset Data workflow. This is an MD Anderson developed workflow to start structuring asset data in the models per the MDA Classification system. This structuring of data will be exported to a transfer file, which iis the Equipment Matrix with added columns for BIM. The process requires involvement from the design team, and contractor (depending on project delivery CM@R or design-build entity),. MD Anderson will provide a baseline asset list including but not limited to: large equipment, scheduled equipment, assets involved with sequence of operations and life safety related assets. These are required to follow the Equipment Asset Tracking Procedure. It is recommended that the Picklist (steps 6-8 in the MD Anderson Revit Equipment Asset Tracking Procedure start prior to model groups being created in the Design models. When assigning Assets via Picklist, design teams should be selecting the sub-item. However, if sub-item is not provided or applicable, the main item should be selected. If equipment changes during design and needs a different classification, the design team to ensure to uncheck “blanks Only” will override; otherwise, the revision will not override previous selection. This supports early QAQC of the equipment matrix and future digitization efforts of the institution.

SITE UTILIZATION PLANNING (LOGISTICS):

A BIM-based process in which a 4D model (3D models with the added dimension of time) is utilized to effectively plan the phased occupancy in renovation or retrofit projects, or to show the construction sequence and space requirements on a building site.

Design Team, including GC depending on project delivery, will use GIS software, Design Authoring Software, 4D model integration software, and detailed existing conditions site plan to position the building based on all MD Anderson project design criteria. See also Safety BIM Use case.

BIM Uses: Construction Phase

MODEL AUTHORING:

The GC Team To ensure the project team has standards in place that promote software compatibility, and integrations.

3D TRADE COORDINATION

The GC should use Clash Detection software during the coordination process to determine field conflicts by comparing 3D models of building systems. For MD Anderson Capital and Renovation projects the AEC team must utilize model(s) for ongoing 3D coordination between consultants; Contractor must utilize model(s) for ongoing coordination with fabrication and trade subcontractors. A/E shall be required to coordinate with Contractor to provide clarifications and additional modeling elements should the initial Design model prove to be insufficient. This shall be detailed, as well as Owner's interactions in the process, in the BEP created at the beginning of the Project and modified as needed throughout. To review to ensure equipment/systems are commissionable via 3d Trade Coordination process. Refer to Commissioned Data BIM Use case for more information.

MODEL-BASED ESTIMATING:

The use of Model-Based Estimating will be determined on a per project basis. Taking advantage of the BIM for materials quantification provides the opportunity to bring a greater alignment to the project budget and design/construction process by extracting accurate quantities for their integration with cost estimating applications. This process allows the project team to see the cost effects of their changes, during all phases of the project, which can help curb excessive budget overruns due to project modifications. Also, see Commissioned Data BIM Use case.

4D SCHEDULING/SITE UTILIZATION PLANNING (LOGISTICS):

A BIM-based process in which a 4D model (3D models with the added dimension of time) is utilized to effectively plan the phased occupancy in renovation or retrofit projects, or to show the construction sequence and space requirements on a building site.

For MD Anderson renovation and revitalization projects, views and schedules should be configured to group phases of the project, such as existing, demolished, new construction and other phase for future works, separately within the construction documents set.

CLASH DETECTION:

During the design assist and/or construct phase, construct team members must coordinate the building components, assemblies, and systems to properly fit in their to-be-installed condition without interferences or encroachment with any other building assemblies. This Clash Detection process will be based upon the Trade Coordination BIM components which have progressed to an LOD 350 (and potentially LOD 400) representing the final/actual fabricated geometry and unencumbered routing. MD Anderson recognizes Navisworks as the accepted software.. Clash reports to be sent to MD Anderson Project Manager, BIM Lead and MD Anderson Project Engineer within 2 weeks of the clash detection logs being created. It is expected all clashes to be resolved prior to coordination sign-off drawings are created, which should be stated in project BEP. If clashes require further input, clear strategies to be in place per project BEP to achieve resolution.

CONFORMED MODELING:

Conformed modeling references conforming the 100% Construction Document Design Models through CA, incorporating RFI, ASI, Change Order, Owner Approved Requests updates to model(s) and should, at a minimum, contain information relating to the architectural, structural, and MEP systems. Conformed Modeling enables easier modeling of future renovation; improve documentation of environment for future uses, e.g., renovation, and significantly improves the maintenance of the institution by having more accurate BIM models.

COMMISSIONING:

Reference MDA Specs: 01 91 00- General Commissioning Requirements; 20 08 00-Fire Suppression, Plumbing and HVAC Systems Commissioning; 26 08 00- Electrical Systems Commissioning. Additionally, Model-based Scheduling: to include Cx scheduling (plus contingence time) to ensure Cx activities are completed according to the setup timeline.

BIM Uses: Operation Phase

ASSET/MAINTENANCE MANAGEMENT:

The institution will be using a (CMMS) application. The institution will integrate equipment asset information from the models received into CMMS. This interoperability between models and CMMS will provide integration and improve the ability to share data between multiple user groups as it relates to work orders, access to O&M manuals, preventative maintenance schedules, warranty information, etc. All mechanical, electrical, plumbing, security, telecommunications and all other items or equipment that are part of a System will be linked to both the space it is located within and the zone (groups of spaces and/or zones) that are served by said items or equipment. Systems and their related zones and spaces shall be scheduled within their respective models. Refer to *MDA Revit Equipment Tracking Procedure and BIM Use case Asset Management Preparation for more information.*

SPACE MANAGEMENT:

A process in which BIM is utilized to effectively distribute, manage, and track appropriate spaces and related resources within a facility. Capital and institutional needs are dependent on the quality and accuracy of spatial data turned over at the completion of the design & construction phases and are mandated by UT/State of Texas. The accessibility of this reliable spatial and data repository throughout Operations is critical for current, future capital growth & government reporting. An Operational building information model allows the facility management team(s) to analyze the existing use of the space and effectively apply transition planning management towards any applicable changes. Space and Room data

to be parametric and shared to respective Revit Schedules. MD Anderson uses an FM space application that provides a comprehensive view of space usage, occupancy, and utilization. Additionally, to include requirements from FGI or ASHRAE guidelines as applicable to project.

DOCUMENT MANAGEMENT:

The deliverable file structure is important in allowing for an efficient method of sharing data for building research and subsequent projects, both for internal institutional staff and for external design and construction consultants. Information on naming conventions and structures will follow the structure outlined in TBD document. It includes, but is not limited to Revit model naming, DWGs file naming that are linked into Revit models, exported DWGs from Models, etc. required to be included at project closeout. Refer to ODG Supplemental AutoCAD Standards.

GEOGRAPHIC INFORMATION SYSTEMS (GIS):

The use of Geographic Information Systems will be determined on a per project basis. GIS is a system that creates, manages, analyses, and maps data including information about natural and built environmental assets and other crucial factors considering geography, demography, social economy, and environment. GIS informs BIM by providing the real-time data of an asset's existing environment. This information-rich model can then be used to improvise all the assets within a larger area for operations and maintenance. This helps build a robust model where geographic and infrastructural design information are compiled together.

FINAL MODEL(s):

Refer to Model Lifecycle Diagram for additional clarification. Note this definition will reference Record Model and Final Model interchangeably. The Design models from the Contract Documents that have been professionally electronically generated reflecting the as-built conditions of the Work based upon the information provided by the Contractor as reflected in the Record Documents. These Record Models are to maintain graphical information of the as-built conditions. Models are also to include non-graphical data mapped to equipment/element(s), in the Record Models, based on Owner CMMS requirements. The GUID of the equipment, system or element in the model to be the point of identification in the model, and should be exported, tracked throughout project to Equipment Matrix such that bi-directional updates for that element can be performed in the future. Items that should be both modeled and mapped to CMMS data are listed in the MDA_Revit Maximo Data_Baseline file. As various firms tend to use their own definitions of "model level", MD Anderson is not specifying a "level of model development" as defined by the AIA. MD Anderson's primary focus is to receive data rich models that contains the relevant information and model components necessary for the long term maintenance and future renovations of the facility. To this end overall dimensionally correct physical representations are required, however every technical connection, such as steel connections, gyp board layout, bolt patterns, etc. do not need to be modeled. The physical properties of construction types and methods, finishes, equipment, systems and their corresponding specifications and documentation should be contained within the model(s) when appropriate based upon project scope and as identified in the BEP. Federated REVIT Models shall be pathed and configured in such a manner that they are usable without significant re-pathing.

BUILDING SYSTEMS/ENERGY MANAGEMENT:

The required scheduling and maintenance attributes refer to Appendix xxx. Additional applications from Energy Services and Sustainability will integrate with the Institutions CMMS and BIM applications as well as building simulation tools, electronic billing systems, and energy dashboards. All of these initiatives are focused on the integration of BIM and its data to optimize systems performance while reducing energy consumption across campus.

MODELING REQUIREMENTS:

DATA CONTENT

In order to satisfy the Revit field data requirements, all equipment schedules shall be generated from the parameters embedded in the Revit MEP model objects as opposed to being developed independently of them.

PROJECT SHARE SITE & FILENAMING CONVENTIONS:

Project Workspace to be maintained as primary shared site for project deliverables, and file sharing. Additionally, AEC team will allow MD Anderson stakeholder(s) permissions to their BIM 360/Autodesk Construction Cloud account to view and download from this platform throughout pre-construction and construction phases. MD Anderson can bridge their MDA ACC account to the project ACC account to provide seamless transfer of data, models, content. USB as a file storage is not acceptable by the institution due to security reasons. If design-build delivery, project to utilize a single ACC account for the project.

File naming conventions will be agreed upon by the Design Team and MD Anderson*:*

MDA BUILDING NAME_CONSULTANT NAME MODEL SCOPE

EX. *MDA WOODLANDS_SSA MECHANICAL SHELL AND CORE*

EX. *MDA WOODLANDS_SSA MECHANICAL*

EX. *MDA WOODLANDS_WHR TENANT BUILD OUT*

Note models are not to have Revit version/year in the title to avoid re-linking once version is outdated. Project BEP to also list out Models used for project with description for each model.

CONTROL POINTS AND GEOSPATIAL LOCATION –

All Design models associated with project must be positioned using Shared Coordinates. Shared Coordinates to be based on control points set by civil engineer and coordinated by the Architect. It is the Architect's responsibility for ensuring all members of the design team are using the same base point and survey point in their Revit files. GIS Data to meet the following:

- *Coordinate System: Texas South Central Zone No. 4204 State Plane Grid Coordinates (NAD83); to come from Civil 3D drawing; Revit models to acquire this. Adding the coordinate system is a preferred step for projects already under contract and to be discussed per project basis.*

Additional Modeling Requirements:

- The units shall be in imperial feet and fractional inches.
- All objects must be 3D solids, parametric components, or AEC (Architecture, Engineering, Construction) objects.
- All files shall be purged prior to submission.
- All phases to be placed to EXISTING.
- MEP equipment not be modeled with in-place families as will not work with MDA Picklist process.
- Clearance & access zones should be modeled for all MEP/FP/Telecom/Data elements. If clearance & access zones is separate from Revit family, these should be on its own work set for visibility purposes.
- Grid lines to use COPY/MONITOR as a minimum baseline to ensure structural grid lines remain accurate in location throughout Construction Documentation process; understating with multiple managed models by multiple users, errors and shifts do occur. Mitigation of these errors are expected by the institution for best practices.
- FILE SIZE: To be between 200-400mb. Purge items prior to any milestone modeling deliverable per ODG Building Information Modeling Requirements document.

Coordination Models:

Digital Fabrication—

At a *minimum*, subcontractor trades shall provide fabrication Model(s) to be embedded into the Construction Model by Contractor: MEPFP, Curtainwall, Building Envelope and Structural Steel.

Subcontractors typically use software other than Revit; their coordinate system acceptable to be per x, y, z axis 0,0,0.

LIFE SAFETY:

This section reviews Life Safety modeling requirements per institutional standards.

Rated Wall Pattern Designations

Rated Wall Pattern Designations are to be visible on **all** plans, reflected ceiling and overhead plans, including but not limited to Architectural, Mechanical, Electrical, Plumbing plans and applicable Telecom/Data disciplines.

Rated and Smoke Partitions

To integrate patterns into partition type(s) via .pat files or by specifically designated fire rated / smoke barrier patterns into the wall types. Detail lines or any other 2D component to identify fire rating(s) or smoke barriers are not acceptable to the institution.

Identifying rating by partition tag is also not an acceptable approach to the institution as partition schedules are not always readily available to O&M teams.

Rated & Smoke Partitions can be color coded but cannot depend solely on color identification to be only indicator. Color printers are not always available to O&M teams.

Life Safety plans if at a 1/16” or smaller, to have enlarged areas 1/8” or greater to capture fire rated patterns described above.

Preferred view for Life Safety plans to be set to Coarse.

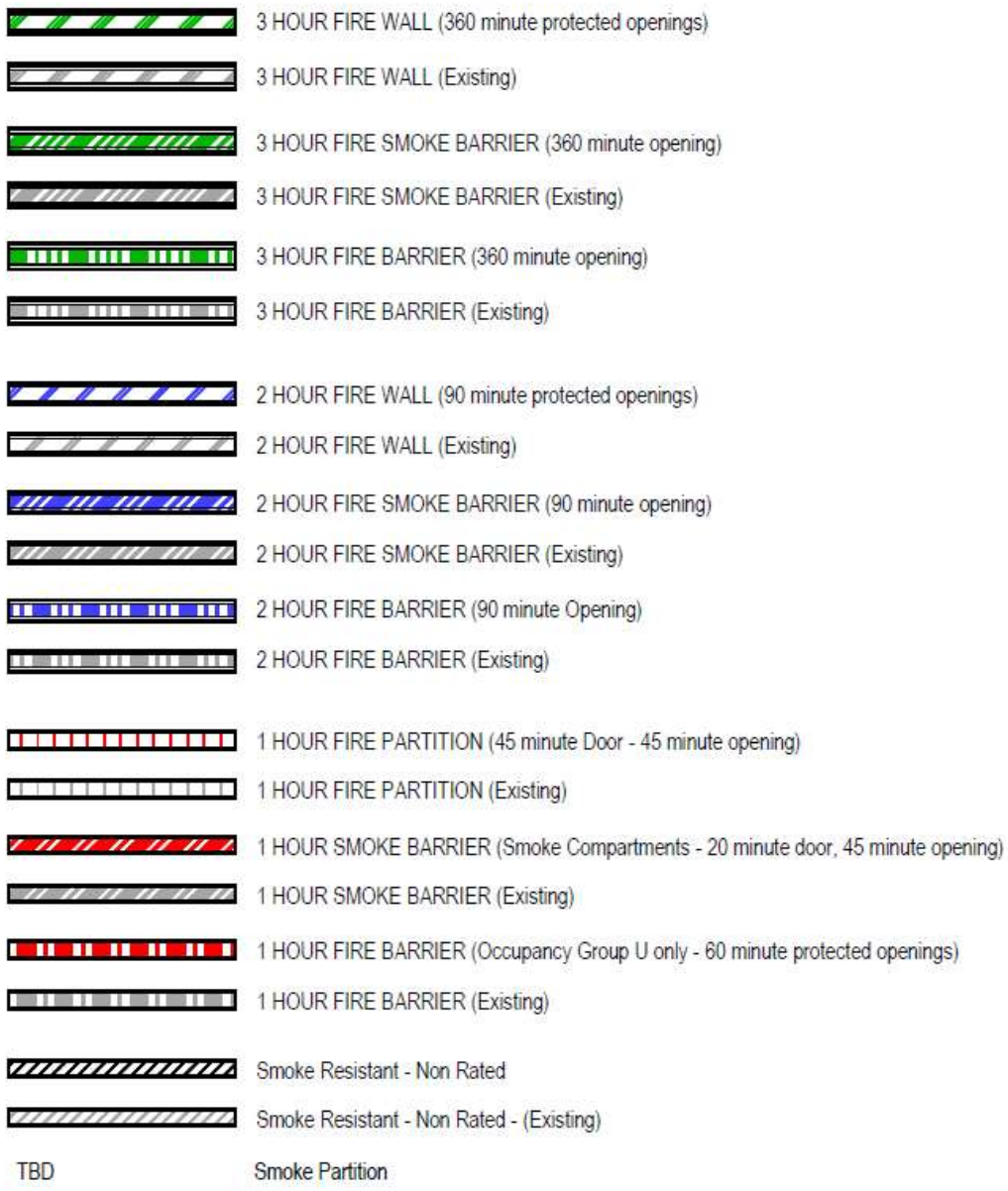
Life Safety Elements

Each individual element, **bolded** below, should be modeled as a Type Instance and will be assigned its own asset number by the institution for Routing Drawings that will be maintained and created by MD Anderson.

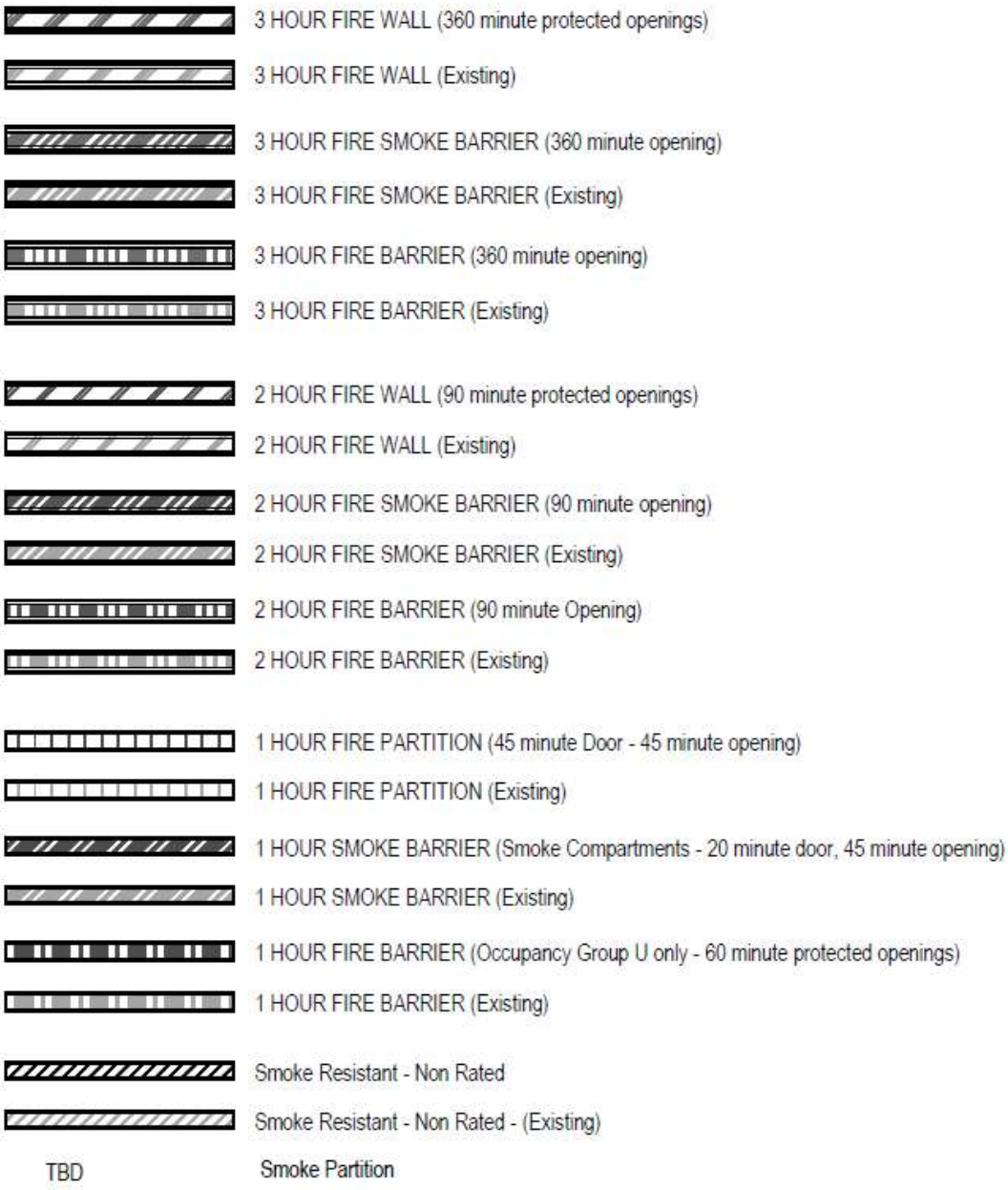
Each individual element, **bolded** below, to be able to link to an associated schedule where the asset number, asset description, level and other attributes needed by MD Anderson to be visible such that model elements are organized for O&M use.

- **Exit Signs**
- **Egress Lighting** – to be type instance
- **Fire Doors – All fire/smoke doors to be type instance in Revit, with ability to have a smart tag indicating asset # (different than door tag). These assets tie to corresponding schedule for Route maintenance.**
- **Life Safety Dampers** – to be type instance
- Rated Partitions - See above description related to visibility and integration to wall type. No 2D or detail lines to represent rating.
- Smoke Barriers - See screen shot sample below. No 2D or detail lines to represent smoke barrier.
- Suite Boundaries – See Smoke Barrier, similar.
- Occupancy Type Shading (+hazard)
- Fire Extinguisher Cabinets – to be parametric.
- Fire Hose Cabinets – to be parametric.

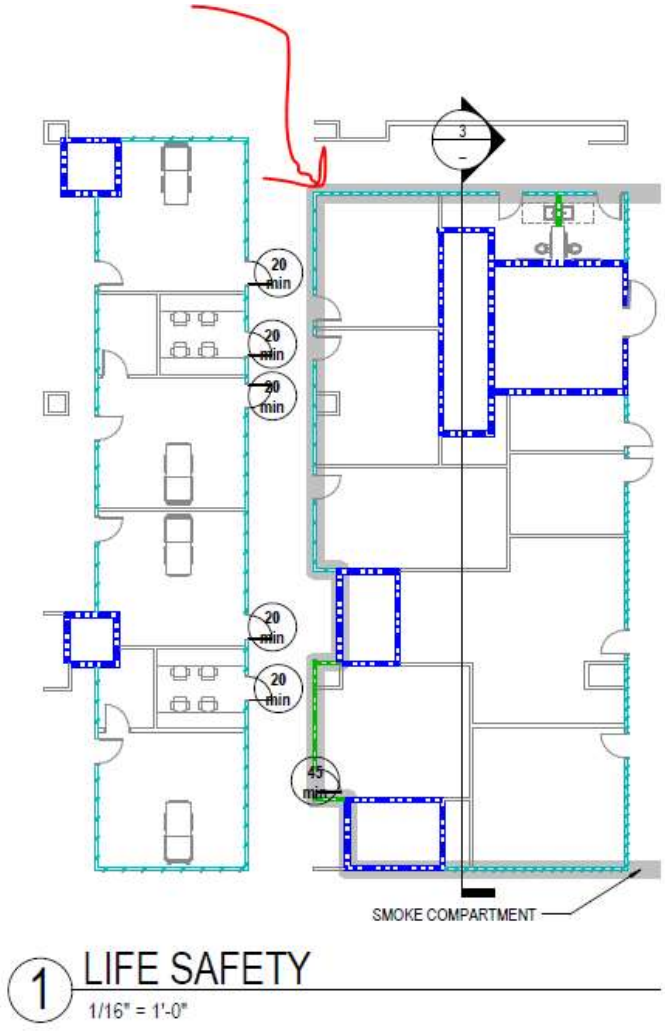
Fire Rating Legend Representative Sample (Color):

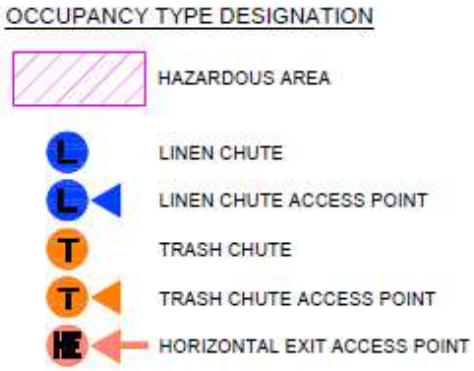


Fire Rating Legend Representative Sample (B/W):



Smoke Barrier/Suite Boundaries = thicker grey linework, see image below for example:





ROOM NUMBERING/ LEVEL DESIGNATIONS:

For Room Naming Guidelines & Level Designation standards, refer to *Building and Room Numbering Guidelines in ODGs.* Note, Room Names are governed by the FPDC Planning Department (FPS).

EXPORTING TO CAD FROM REVIT STANDARDS:

For MDA Cad Layers, refer to Supplemental Exhibit: MDACC All Layers Complete

- Cad files provided to MD Anderson at project closeout must comply with, but not limited to, spec section 01 78 39 PROJECT RECORD DRAWINGS. Moreover, the linework preserve the building system properties of the linework. Linework exported not to all export to a single layer “Ducts” for mechanical drawings, or “Pipe” for plumbing drawings. CAD files with generic layers, missing building system information will not be accepted by the institution.

- View settings for Architecture, MEP (including medical gas) to be set to Coarse, not Fine (single line, no thickness). This helps our Records Management team update master files more seamlessly without having to go through pipe thicknesses or gyp bd thicknesses, for example.

ROOM/SPACE METADATA:

The following are required Room/Space Data attributes that are to be setup parametrically in each respective room, unless noted otherwise by the institution. No simple text/annotation to identify room(s). For MEP models, Spaces, at a minimum are to be populated at 95% CDs to ensure equipment is tied to location per CMMS requirements. At a minimum, the below are to be inputted to the Architectural models respectively:

- Room Number per Approved Room Numbering Control Set
- Department (provided by MDA Project Planner)
- Room Name (provided by MDA Project Planner)
- MDA Room Type (provided by MDA Project Planner)

- Area (SQFT)
- Hazardous/non-Hazardous gas room locations (code characteristics accordingly)
- Neg/Pos Pressurized Rooms (determined by project)

360 PHOTO SERVICE:

MD Anderson recognizes OpenSpace as the approved 360-degree reality capture service for major capital project. Refer to Building Information Modeling Requirements in ODGs Supplemental Resource page for more information of scope and deliverable requirements.

Supporting BIM Documents (posted to ODGs):

- MDA Revit Equipment Asset Tracking Procedure.pdf (start here for MDA Picklist Process)
- MDA_Revit Warehouse Model_R23.rvt
- MDA_Revit Shared Parameters.txt
- MDA_Revit Maximo Data Transfer File.xlsx (This is the Equipment Matrix, with added columns for BIM. As such, **MDA_Revit Maximo Data Transfer File**, **Transfer File** and **Equipment Matrix** are used interchangeably.)
- MDA_Revit Maximo Data Picklist.xlsx (This is the structural document supporting picklist function. Not to be referenced as the asset list, RE: **MDA_Revit Maximo Data_Baseline** for required assets to be modeled and a part of picklist process).
- MDA_Revit Maximo Data_Baseline (List of Equipment Assets to be modeled and assigned via Picklist process)
- MDA_Valve Matrix (To provide clarity which valves MDA requires to be modeled, and CMMS data applied; to clarify which to be a part of Riser Diagrams)
- MDA Revit Space Naming Procedure (For EOR to follow for assigning Spaces to MEP models)

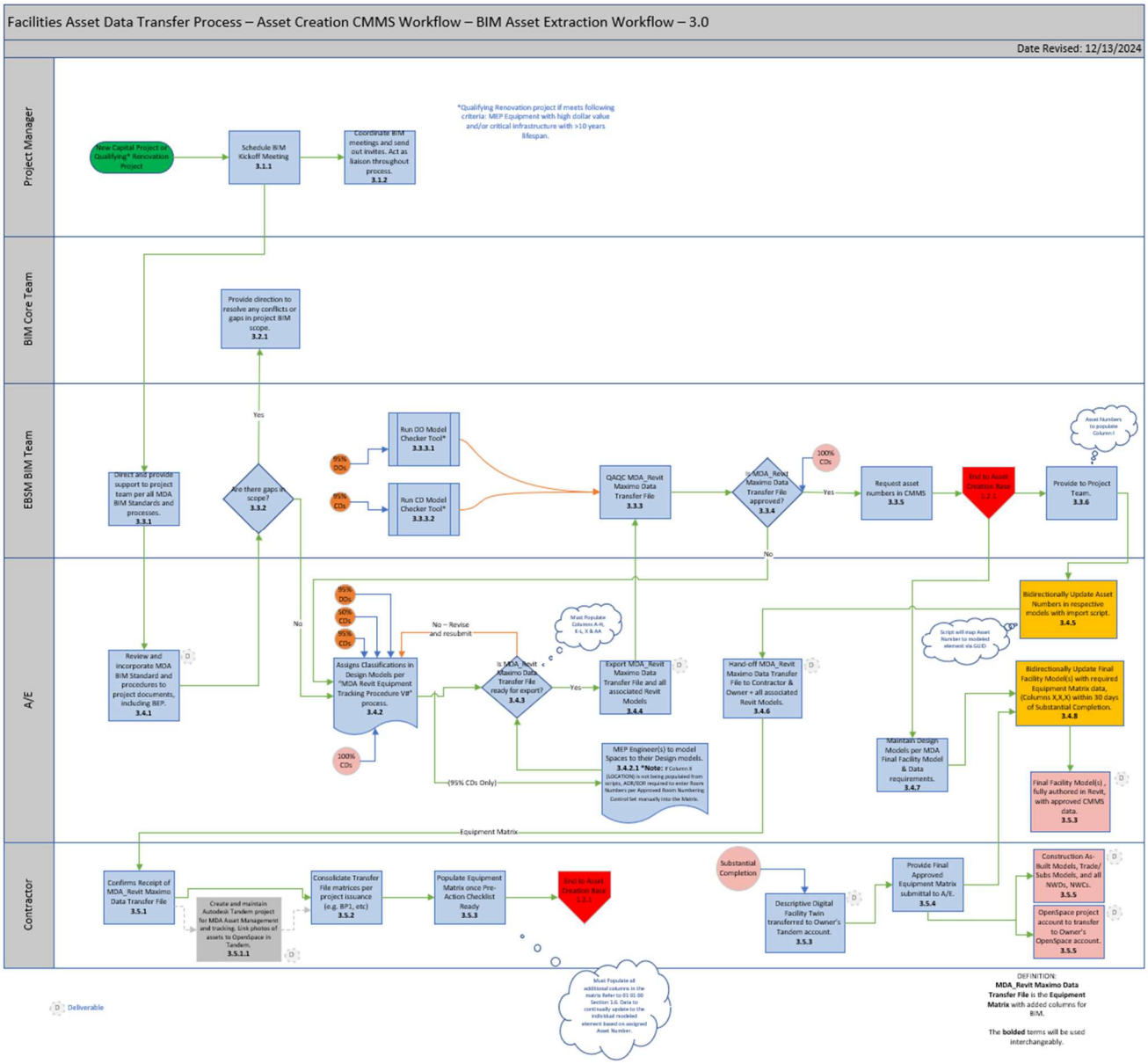
SCRIPTS (posted to ODGs):

- MDA_Revit Maximo Data Export_MEP.dyn (Use for MEP equipment, except for AHU, PUMPs and FANs)
- MDA_Revit Maximo Data Export_AHU.dyn (Use for AHU equipment only)
- MDA_Revit Maximo Data Export_FAN.dyn (Use for FAN equipment only)
- MDA_Revit Maximo Data Export_PUMP.dyn (Use for PUMP equipment only)
- MDA_Revit Maximo Data Export_Architecture.dyn (Use for Architectural elements only)
- MDA_Revit Maximo Data Import_ASSET NUMBER.dyn (Import script mapping data bidirectionally to modeled elements in Revit Model(s), such as Asset Numbers)

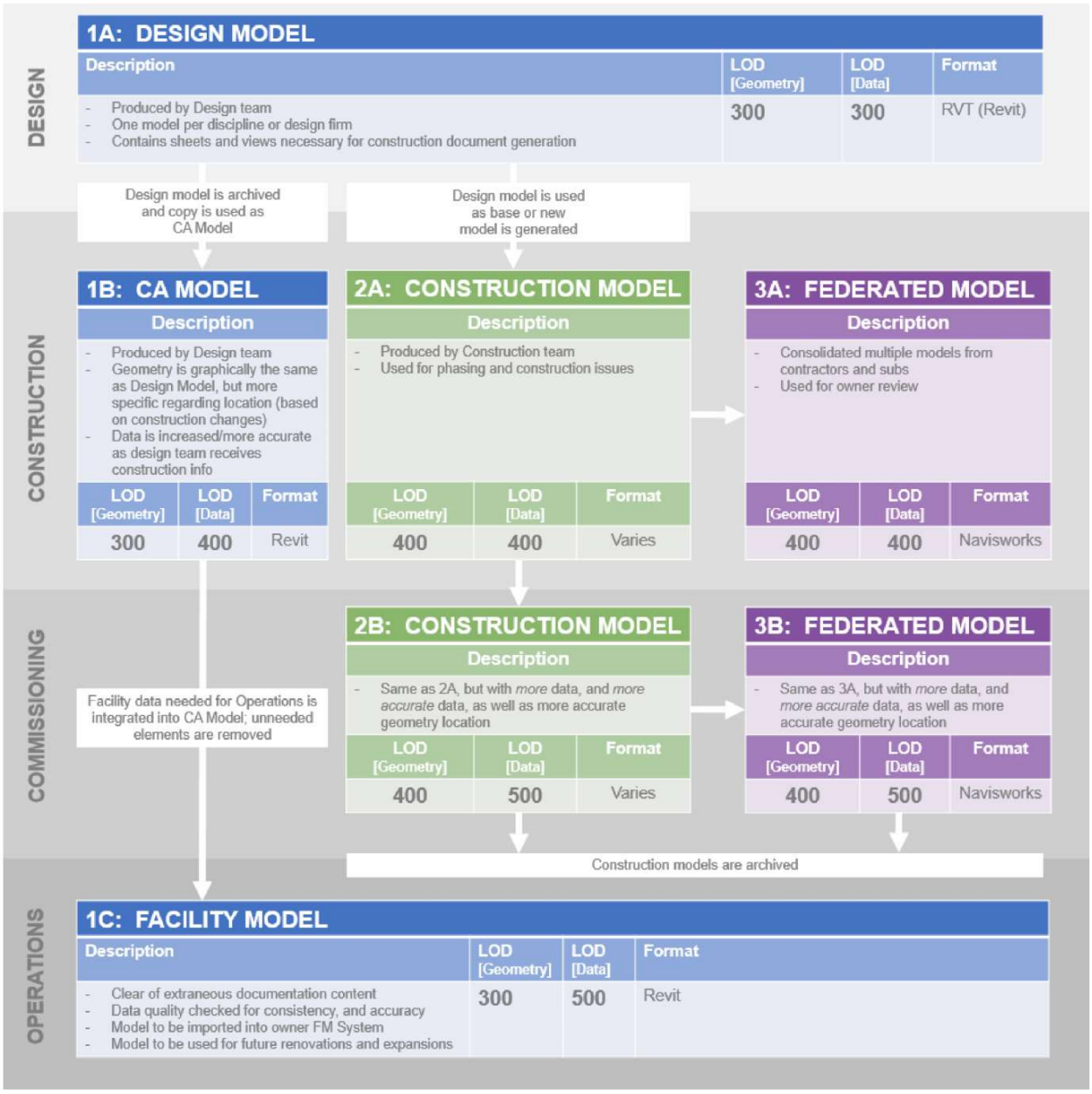
SUPPORTING RELATED DOCUMENTS in ODGs:

- MDACC-CADStd-Manual
- MD Anderson Building and Room Numbering Guidelines

APPENDIX – BIM ASSET EXTRACTION WORKFLOW – 3.0

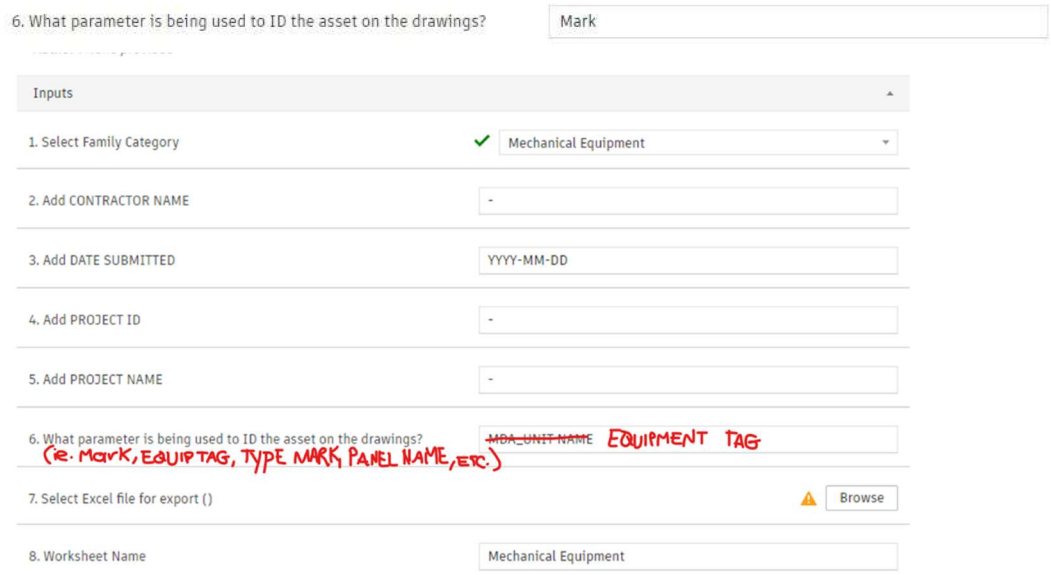


APPENDIX – Model Lifecycle Diagram sample representation:



LESSONS LEARNED:

- UNIT NAME: (Column L) Is not the Maximo Code! **Column L is the Equipment Naming Convention in the Construction Drawings** (i.e. Mark, Equipment Tag, Panel Type, etc) A/E to type in the correct identifier in step #6 in Dynamo Script.
    - Electrical Equipment would typically input "Panel Type"
    - Doors would typically enter "Mark" to reflect the Door Number as assigned in the architectural Door Schedule, for example. See screen shots below for visual:



- Some MEP Equipment are ID'ed with two shared parameters, for example, "EquipmentType" and "EquipmentNumber". We have a separate Dynamo Script if this is the case to capture full UNIT NAME – MDA can provide script if this is the case as it's not posted to ODGs.
- LOCATIONS (Column X) **must be associated with each asset**. We are finding not all MEP models model Spaces in their models and tag the space from the linked in Architectural model(s).
    - We require Spaces to be modeled in each MEP model, and when applicable, the Room Calculation Point to be adjusted to capture the equipment above ceiling, etc. If LOCATION column X is still not picking up the location from the model, A/E required to populate each line item in this column with the Room Number from approved Room Numbering Control Set manually. Best practice to search by Element ID and input the Room/Space for that asset. RE: MDA Revit Space Naming Procedure.
- We are seeing some columns being left out or half way populated, (e.g. column AA in particular). The columns that will be populated from the picklist process are as follows:

A-H,K-L, X*, AA

***Column X (LOCATION) to populated only once the Room Numbering Control Set is APPROVED.**

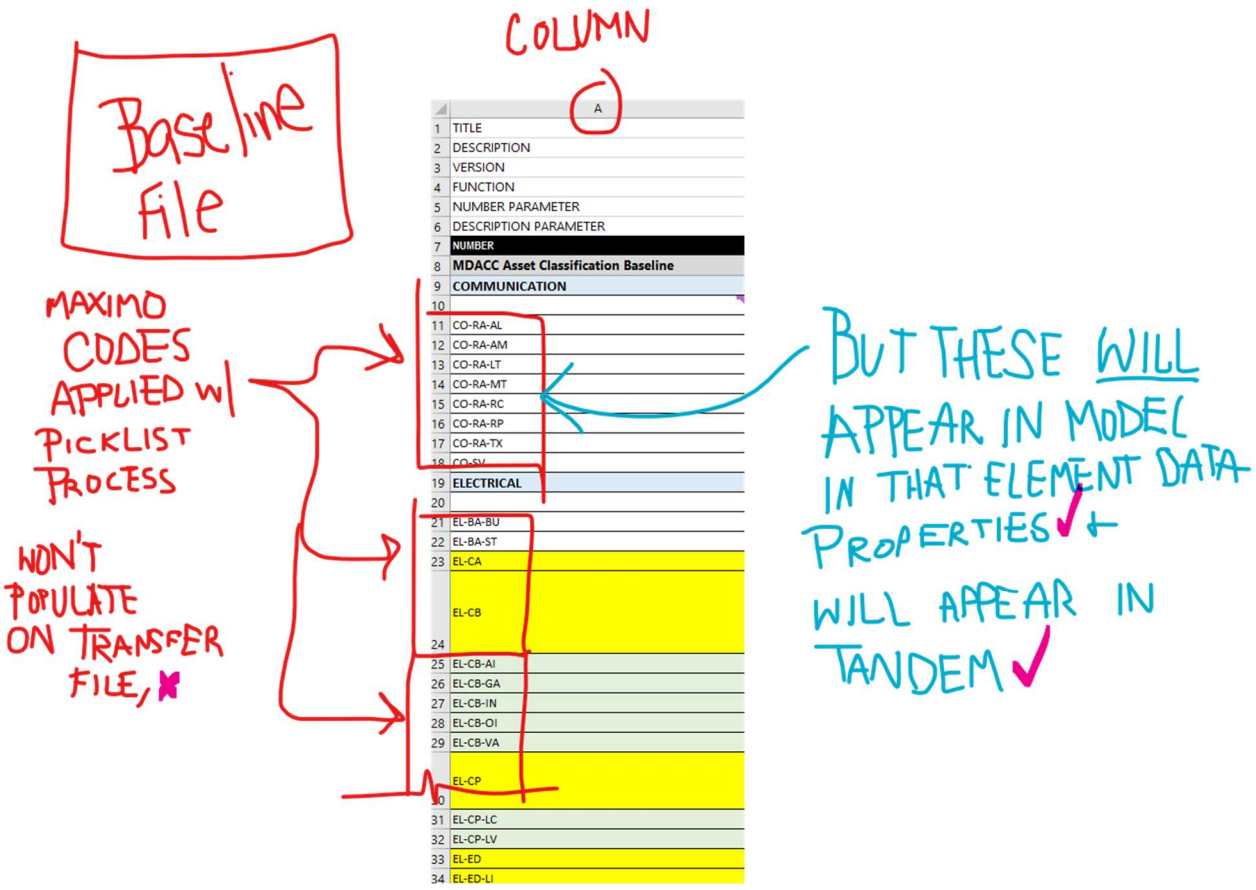
- The columns bolded above are what MDA BIM will be QC'ing, and will need populated in order to do so. Columns beyond that will be vetted by O&M as submittal process begins per 01 91 00.

- CONTRACTOR NAME, PROJECT ID, and PROJECT NAME are commonly inconsistent across individual Excel worksheets and the Maximo Data Asset Class Worksheet schedules in the models. This shouldn't be the case if all team members are given the correct values to input in Dynamo Player. The definitions of these steps are noted in 01 91 00. (Contractor Name = **GC**);

(Project Number = **MDA Project Number, not the A/E project number**

2. Add CONTRACTOR NAME	-
3. Add DATE SUBMITTED	YYYY-MM-DD
4. Add PROJECT ID	-
5. Add PROJECT NAME	-

- Regarding the file, **MDA_Revit Maximo Data_Baseline**, see below screen shot. The Maximo Code in Column A will not populate the Equipment Matrix/Transfer File. It WILL map to the element in the model. This is the intent.



- Also, in the **MDA_Revit Maximo Data_Baseline**, Column E tells you which tab the building equipment/system will populate to during the picklist process. Each worksheet in the Transfer File represent the Revit Category – this is how the scripts will bring data from model to excel. Using the MEP Dynamo Script, 90% of the assets will be automatically brought over to the respective Revit Category worksheet in the Transfer File.

  The last 10% of assets that require an additional step are: AHUs, PUMPs & FANs.

These three asset types have **additional attribute data MDA O&M has created** that have THEIR OWN WORKSHEET IN THE TRANSFER FILE. These three worksheets are already setup in the Transfer File.

The respective **AHU, PUMP and FAN** Dynamo Scripts must be used to bring their data to those worksheets.