E/A Design Division BIM Standard

TABLE OF CONTENTS

1.0   E/A DESIGN DIVISION BIM STANDARD MANUAL

The Port Authority of New York and New Jersey (PANYNJ) Building Information Model (BIM) Standard Manual describes the processes and procedures required for the preparation and submission of BIM Models for Port Authority of NY & NJ projects.

1.1   INTRODUCTION

BIM is the current industry standard that is changing the way planning, design, construction and facility operations are conducted. BIM uses computer-based simulations to study and validate project design and construction before they are built.

BIM is far more than basic 3D modeling; BIM is a business approach that integrates multiple streams of project-related information. BIM moves users away from the traditional "document-centric" approach, which only addresses the capital construction side of a facility, toward a "data-centric" approach, which supports the facility lifecycle operation. Resulting in a more effective holistic approach for the design, estimating, scheduling, and the construction phases.

BIM breaks down traditional barriers related to interdisciplinary collaboration, facilitating off-site prefabrication, improving design options, and most importantly, reducing: risk, rework, and cost. BIM also allows for the integration of construction phasing through project scheduling software, automated quantity takeoffs, automated material takeoffs, and green building analysis, among many others.

1.2   PURPOSE

The Port Authority of NY & NJ BIM Standard Manual ensures that the Engineering Department will produce, release and receive data in a consistent format. This will maintain an efficient exchange of data between disciplines and the compatibility of each discipline's model(s) and the compatibility with various out-side consultants.

1.3   APPLICABILITY

Regardless of size, the BIM application can progressively build and update comprehensive models of any Port Authority of NY & NJ facility. This benefits the Port Authority of NY & NJ by leveraging smaller projects that consultants and contractors are otherwise unable to justify on an individual project basis. The BIM repositories of each facility would contain new and updated information supplied via design/construction projects, significant renovations, and routine maintenance and operations systems, which in return offers a valuable life cycle tool to operate the Organization's facilities.

1.4   HOW TO USE THIS MANUAL

This manual contains all agency wide BIM Requirements and Standards and its meant to provide an overall understanding of the requirements common for all E/AD Stages. Refer to CMD BIM Standard Manual for CMD BIM specific requirements.

> **NOTE:**
> **E/AD Stages:**
> > Stage I – Schematic Design
> > Stage II – Design Development
> > Stage III – Construction Documents
> **CMD Stages:**
> > Stage IV – Construction

Any deviations from this standard must be documented in the Project BIM Execution Plan, which shall be the definitive document ruling the BIM aspects of the project. Refer to **Section 1.24 Appendix A – BIM Execution Plan for E/AD.**

1.5   E/AD BIM PROJECTS WORKFLOW

This section describes The Port Authority of NY & NJ BIM Project Workflow based on Agency BIM Master Plan.

1.5.1   DISCIPLINE LEVEL

The project workflow at the Discipline Level is as follows: (with minor variations, and depending on which disciplines are involved in the project)

1. A Site Model (SM) file is created for each Revit project. This is created by The Port Authority BIM/CAD Support group. This Site Model file has a combination of Aerial Photometry and CAD Files based on The Port Authority of NY & NJ BMMS (Base Map Management System). This file holds the project coordinate system and controls the location, rotation, and elevation of all Revit-based Models (Architectural, Electrical, Mechanical and Structural) linked to it. All models need to be linked by Shared Coordinates and coordinated with the Site Model.

2. The Architectural Group will start a project by creating the Levels and Grids. The group will then create their model, which might contain Structural elements such as columns. Once the Design targets a Milestone and/or Level of Development, the Architectural Group will share their Model with the Structural Group.

3. The Structural Group will link the Architectural Model and take ownership of the Grids. Then the Structural Group will create their own top of slab Levels. This group will determine the Structural elements by making changes to the structural elements and Grids based on the Architectural Design if appropriate. Once the Design targets an appropriate Milestone and/or Level of Development, the Structural Group will share their Model with the Architectural Group.

4. The Architectural Group will link the Structural Model into their Architectural model. They will then erase any instance of Structural elements they originally created and will monitor the Structural top of slab Levels and Grids to their own to enable notifications and coordination. The Architectural Group will continue their design effort by adding Lighting and Plumbing Fixtures intended as placeholders. Once the Design gets to an appropriate Milestone and/or Level of Development, the Architectural Group will share their Model with the Electrical and Mechanical Groups.

5. The Electrical Group will link the Architectural and Structural Models and Copy/Monitor at least the Structural Grids and the Architectural Levels. The Electrical Group will start their design effort by laying out their Corrosion Protection, Electrical and/or Electronics components based on the placeholders determined by the Architectural Group. Once the Design gets to an appropriate Milestone and/or Level of Development, the Electrical Group will share their Model with the rest of the Team.

6. The Mechanical Group will link the Architectural and Structural Models and Copy/Monitor at least the Structural Grids and the Architectural Levels. The Mechanical Group will start their design effort by laying their Fire Protection, HVAC and Plumbing components based on the placeholders determined by the Architectural Group. Once the Design gets to an appropriate Milestone and/or Level of Development, the Mechanical Group will share their Model with the rest of the Team.

7. The Architectural Group will link the Electrical and Mechanical Models and erase any instances of Lighting and Plumbing Fixtures they originally placed.

1.5.2 PROJECT LEVEL

A Project Information Model (PIM) file is created for each Revit project. This file has a combination of all the Revit-based Models and all the AutoCAD-based (Civil 3D) Models (Civil, Environmental, Geotechnical and Traffic Disciplines). These models are the Navisworks files. These files will be combined at the completion of the Project and are the basis of the Facility Information Model described in **Section 1.5.3 – Facility Level.**

1.5.3 FACILITY LEVEL

The Facility Information Model (FIM) file stores the latest and most current version of the Facility 3D Model; completed projects are uploaded here. The following image shows the workflow for BIM projects at The Port Authority of NY & NJ. The FIM is stored as a Navisworks File Set (*.nwf) file and composed of Navisworks Cache (*.nwd) files. Image (See <u>Figure 1.5-1: Facility Information Model flow chart</u>) below illustrates the workflow.
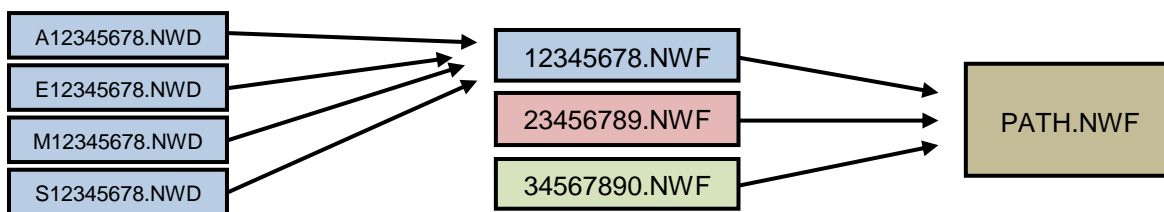
Figure 1.5-1 Facility Information Model Flow Chart

At the completion of each project, the Site Model (which contains all the Revit-based Models) along with the individual AutoCAD based Models will be uploaded into the Project Information Model (PIM) file. The PIM file is uploaded into the Facility Information Model, which over time will have the entire Facility in 3D.

1.6 BIM EXECUTION PLAN

At the start of every new BIM project, a BIM Execution Plan must be submitted to the Port Authority BIM/CAD Support group.

Once approved by the Authority, BEP shall become the ultimate compendium on BIM requirements, methodologies and workflow for a specific project.

The BEP is considered a "living" document, in the sense that it will likely be updated throughout the project. Situations that may trigger a revision on the BEP by the Contractor include, but are not limited to:

- Changes in Staff, that directly affect the BIM processes and/or deliverables
- Changes in processes
- Changes in requirements
- Changes in BIM Schedule (Coordination sign-off dates, LOD milestones, etc.)
- If required by the Port Authority

> **NOTE**
>
> For Stages I to III, refer to **Section 1.24 Appendix A – BIM Execution Plan Template for E/AD** at the end of this document as a template to document E/AD project's BIM roadmap.
>
> For Stage IV projects, refer to CMD BIM Standards Manual.

1.7 BIM ROLES AND RESPONSIBILITIES

This section describes the Roles and Responsibilities of the different Team Members involved in Port Authority of NY & NJ BIM Projects. These Roles and Responsibilities might vary depending on the Project specifics and might change as the use of BIM Technology is spread throughout the different Port Authority of NY & NJ Departments.

> **NOTE**
>
> This section contains de roles and responsibilities that applies for projects during Design Stages (I to III).
>
> For Stage IV projects, refer to CMD BIM Standards Manual.

1.7.1 BIM/CAD SUPPORT GROUP

The BIM/CAD Support Group is responsible for creating and maintaining all BIM Support Files and Documentation along with providing the appropriate support to the E/A Design Division.

In addition to its other Roles and Responsibilities, the BIM/CAD Support Group will:

- Maintain the E/A Design Division BIM Standard Manual.
- Create and maintain all Port Authority of NY & NJ BIM content and support files.
- Provide a **Project BIM Kickoff Seminar**.
- Provide Discipline Specific Seminars.
- Create and maintain the Facility Information Model.
- Create and maintain the Project Information Model.
- Create and maintain the Project Site Model.
- Review model's compliance with BIM Standards on every submission.

1.7.1.1 PROJECT BIM KICKOFF SEMINAR

At the beginning of each project, the BIM/CAD Support Group will provide a BIM Standard Orientation Seminar for in-house staff as well as for outside consultants and contractors. This seminar needs to be scheduled by the LEA.

1.7.2 BIM LEAD COORDINATOR

Each Project has a BIM Lead Coordinator who is responsible for the following:

- Notifying the BIM/CAD Support Group if a New BIM Project is coming.
- Notifying the BIM/CAD Support Group if changes are required to the Site Model.
- Coordinate Clash Detection Meetings.
- Notifying the BIM/CAD Support Group when the Project needs to be Reviewed.
- Notifying the BIM/CAD Support Group when the Project needs to be Archived.

> **NOTE**
>
> Most of the times the Project BIM Lead Coordinator is the Project's LEA and he or she might have a dual responsibility not only as the Project's BIM Lead Coordinator, but also as the Discipline BIM Coordinator.

1.7.3 BIM COORDINATORS

Each Discipline has a BIM Coordinator who is responsible for the following:

- Manage other BIM Users within the Discipline.
- Coordinate any BIM related issues with the rest of their Discipline Team.
- Create Discipline Specific BIM Content.
- Run Discipline Specific Clash Detection.
- Export the Model for Inter-Disciplinary Clash Detection.
- Archived Disciplines Specific Folders under SUBMITTALS.

> **NOTE**
>
> Most of the times the Project BIM Coordinator is the Discipline's Task Leader and he or she might have a dual responsibility not only as the Discipline's BIM Coordinator, but also as the Discipline BIM Modeler.

1.7.4 BIM USERS

Each Discipline might have multiple BIM Users who are responsible for the following:

- Create a Local copy of latest Central File.
- Model design geometry.
- Assign data, as needed, to Model Elements.
- Coordinate design work with that of other disciplines.
- Relinquish all Worksets before closing Project files.
- Day to day BIM work.

1.8 GENERAL REQUIREMENTS

This section establishes the technical criteria required to develop a project using BIM technology for The Port Authority of NY & NJ.

1.8.1 SOFTWARE

The Port Authority of NY & NJ BIM practice is comprised of several Autodesk products. The Port Authority of NY & NJ BIM Standard Manual will generally use terminology and references that are unique to the Autodesk-based software applications. Also, with the use of Autodesk products and the version the Port Authority uses, allows for more efficient interoperability between software.

The Port Authority of NY & NJ has adopted the following Autodesk products and Discipline uses:

Table 1.8-1

SOFTWARE NAME	USE
Autodesk Revit	Design and Construction Models development and update, typically all trades. Models are used for Drawings development, Trades Coordination, Construction phasing, Quantity Take-Off, Scheduling.
Autodesk AutoCAD Civil 3D	Develop Surfaces, Profiles, Alignments, Corridors, Pipe Networks and Quantity Take-offs.

Autodesk Navisworks	Design and Construction Models fly through, Interference/Clash Detection, 4D and 5D simulation. Site Planning and logistics. Program wide review
Autodesk Recap	LiDAR Point cloud view and manipulation.

NOTE:

Based on the backwards compatibility issues of the Revit-based applications, please make sure to check which version of the application is recently being used by the Port Authority of NY & NJ.

1.8.2   SOFTWARE VERSION

Unless otherwise agreed upon, all active BIM models shall be developed in accordance with the current software version in use by The Port Authority of NY & NJ. This includes all third-party applications, regardless of when the project began.

Current Autodesk products versions used is v.2018

1.8.3   MODEL OWNERSHIP

The Port Authority of NY & NJ holds ownership of the BIM Model including all inventions, ideas, designs, and methods contained within. This includes, but is not limited to, Revit families (system-based and/or component-based) and any other content submitted as part of the BIM Model itself.

Outside resources, such as consultants and/or contractors, using the BIM Model are granted temporary use of it for the duration of the project. After project completion, they are required to return all copies of the BIM Model to The Port Authority of NY & NJ.

1.8.4   MODEL QUALITY

The Port Authority of NY & NJ requires that all BIM Models shall be developed using object-based elements only, such as Columns, Beams, Walls, Doors, Windows, etc. along with their associated parametric information. This will streamline the BIM processes from Design all the way down to Construction and then Operations.

1.8.5   MODEL LEVEL OF DEVELOPMENT

The Level of Development (LOD) Specification is a reference that enables practitioners in the AEC Industry to specify and articulate with a high level of clarity the content and reliability of Building Information Models (BIMs) at various stages in the design and construction process.

The Level of Development is cumulative and should progress along with the design from stage to stage.

For Level of Development, the Port Authority of NY & NJ requires, at a minimum, that models adhere to the 2018 version of the BIM Forum LOD Specification (Part I), publicly available at https://bimforum.org/lod/.

This document shall be used along with the project specific Model Development Specification (MDS) prepared by the Port Authority as a base for each element LOD assignment.

NOTE:

Base MDS may be modified by the PANYNJ to fit the particular needs of some projects. Project-specific MDS will be handed over at the Project BIM Kick-off meeting. Consultants/Contractor shall include this as an annex to the project BEP.

The Port Authority of NY & NJ uses the term Design Intent Model to distinguish a model in design development from a BIM model to be used for construction purposes. Likewise, the term Construction Model is used to indicate a BIM model that has been developed to a higher level of LOD and shows how a project will be constructed in the field.

1.8.6 MODEL GRANULARITY

Modeling every component in a structure is not a common practice supported by The Port Authority of NY & NJ BIM Standard Manual. Therefore, the BIM model may not represent the complete design intent and may not indicate all elements required for construction. As a rule of thumb, objects smaller than 1" in size do not need to be modeled. Refer to Model Development Specification (MDS) to determine the level of granularity needed for each component.

1.8.7 MODEL EXCLUSIONS

There is no requirement to model the following objects:

Table 1.8-2

DISCIPLINE	OBJECTS
Structural	Rebar
Fire Protection	Hangers
HVAC	Duct Insulation
	Pipe Insulation
	Hangers
	Filters
Electronics	Hangers
Electrical	Cables
	Wires
Plumbing	Hangers

1.8.8 MODEL DISCREPANCIES

When conflicts exist between the contents of a BIM model and the contract documents, the most specific information contained within the contract documents will prevail and will be considered as definitive.

1.8.9 COORDINATE SYSTEMS

For all Port Authority of NY & NJ projects, the default horizontal coordinate systems are the State Plane NAD83 New York East and Long Island Foot systems. The default vertical system is the State Plane NAVD 88 system. The LEA must determine at the beginning of a project if another coordinate system is to be used. The project coordinate system will be established in the BIM Site Model file provided by The Port Authority of NY & NJ BIM Support Group.

1.8.10 SHARED PARAMETERS

Shared Parameters allow for values or functionality of parameters built into Family files to be included in schedules in projects.

Standard PANYNJ Shared parameters are stored within a text file labeled *PA-Shared Parameters.txt*, from which they can be taken from for use within any PANYNJ project. For example, since the *Confidential & Privileged Sheet* parameter is used to control features (the presence or absence of stamps) within all Contract Border Families, it cannot be created in a project as a Project Parameter. However, since this

parameter is built into the *PA-Shared Parameter.txt* file and loaded into all PANYNJ Contract Borders, if you load this parameter into your project you can extract a list of all Confidential-Privileged Sheets into a schedule. Although Project Parameters can be used for the vast majority of data storage and scheduling needs, Shared Parameters are essential for passing data from Family files into project schedules.

1.8.10.1 EDITING THE PA - SHARED PARAMETERS.TXT FILE

The Revit-based applications enable the creation of custom fields that may be shared between project and family files and be scheduled and called out correctly through a function named "Shared Parameters". PANYNJ BIM Support has made available a basic Shared Parameters file that includes parameters that are needed for schedules, and may be added to as needed.

For any additional parameters needed, from the *MANAGE* Contextual Tab on the Ribbon, select *Shared Parameters.* This will open the *Edit Shared Parameters* Dialog Box as shown in the below. (See Figure 1.8-1 Shared Parameter Tab)
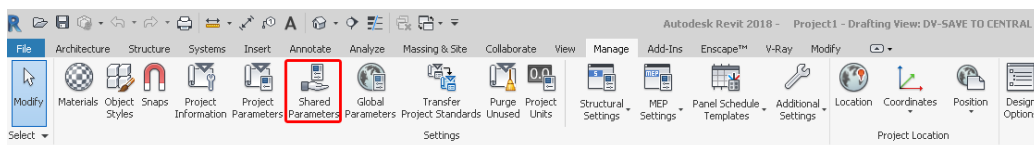
Figure 1.8-2 Shared Parameter Tab

To select the file, click on the *Browse* button and navigate to the following folder:

K:\Application\EAD\BIM_Standards\2018\Shared Parameters Then select "PA - Shared Parameters.txt" and click on the *"OK"* button.
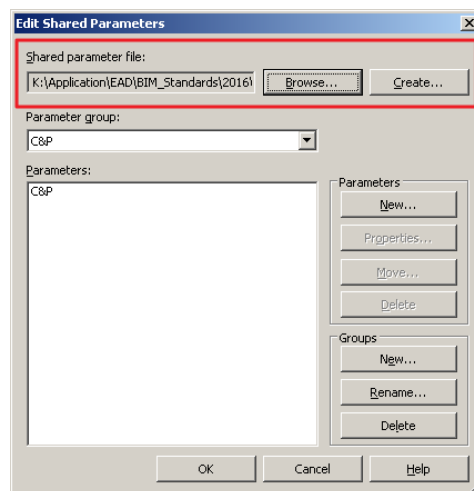
Figure 1.8-2 Shared Parameters Dialog Box

Please discuss any additional Shared Parameters that are necessary for your project with the Port Authority BIM/CAD Support Group.

> **NOTE**
>
> The Autodesk Revit Products can reference only one shared parameter file at a time, so make sure this is the default file when working on Port Authority of NY & NJ projects. If parameters from external sources need to be imported this can be changed without impacting parameters already imported. Please coordinate with the Port Authority BIM/CAD Support Group to coordinate.

E/A Design Division BIM Standard

1.8.11 IMPORT/EXPORT SETTINGS

The Revit-based applications have the ability to import and export AutoCAD files into and from the 3D Model, respectively.

1.8.11.1 IMPORT LINE WEIGHTS DWG/DXF

To make the required modifications, go to the *INSERT* Contextual Tab and expand the arrow under *Import* Panel. (See Figure 1.14-4 Import Line Weight Dialog Box)

This will launch the *IMPORT LINE WEIGHTS* Dialog Box as shown in the image to the right, click on the "*Load*" button to select the PA - Import Line Weights from AutoCAD.txt file which can be found under: **K:\Application\EAD\BIM_Standards\2018\Support**
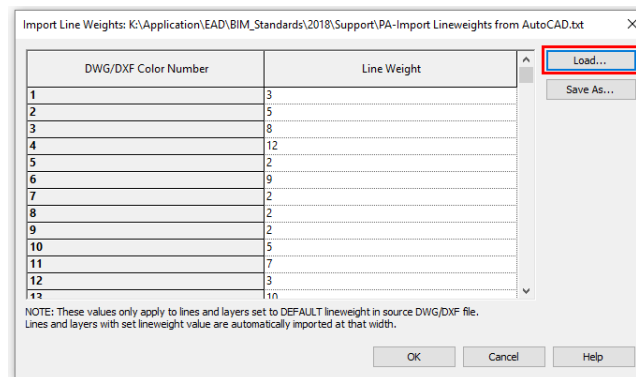
Figure 1.8-3 Import Line Weight Dialog Box

NOTE

AutoCAD drawings need to be set appropriately before being imported into Revit, refer to **Section 1.8.12.2 - AutoCAD Drawings** for proper use.

1.8.11.2 EXPORT DWG/DXF SETTINGS

Before you export DWG files from a Revit project, please refer to the following directions:

From the *MENU BROWSER,* select *Export*, then *Options,* and then *Export Setups DWG/DXF* option.

Name the new setup ***PA – Export to AutoCAD***. On the *Layers* tab for this new setup, from the drop-down menu next to *Load layers from standards,* click on the *Load settings from file…* option (See Figure 1.8 4 Modify DWG/DXF Export Setup Dialog Box) and load the ***PA – Export Layers to AutoCAD.txt*** file to acquire the proper settings. Leave the Export layer options set to *Export category properties BYLAYER and overrides BYENTITY.* Your setup should look as follows (note: drive location for consultants will vary):
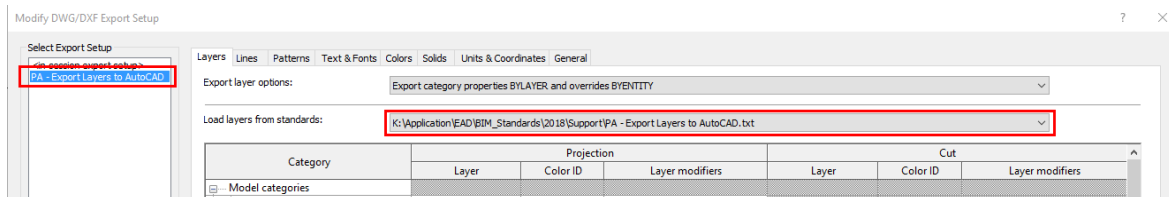
Figure 1.8-4 Modify DWG/DXF Export Setup Dialog Box

From the *Lines* tab, select *Paper space (PSLTSCALE=1)* from the *Set line type scale* menu. This will ensure that line types assigned to objects in Revit will be properly transferred to AutoCAD.

E/A Design Division BIM Standard

From the *Units & Coordinates* tab, select *Inch* as the unit equivalent next to *One DWG unit is:* **For Coordinate system basis, be sure to select *Shared* so that Revit utilizes the origin of the coordinate system being shared between files**. Click the "*OK*" button to save the setup.

The Import Layers and Export Layers files can be found under:

K:\Application\EAD\BIM_Standards\2018\Support

> **NOTE**
>
> Two color-dependent Plot Style Table files (CTBs) have been provided with The PANYNJ BIM Standard to plot from AutoCAD in either full size or half size.

- PA - MasterFULL.ctb
- PA - MasterHALF.ctb

These files can be found under:
K:\Application\Plotter\Plot_styles

For a Revit 2018 project you will need to use the transfer project standards utility. Open a new project file based on the appropriate template as well as your project file in the same session of Revit. While active in the Project file, go to the *MANAGE* ribbon and choose the *Transfer Project Standards* tool. (See <u>Figure 1.8 5 Transfer Project Standards Dialog Box</u>)

Ensure that the only thing checked is the DWG/DXF Export Settings and choose 'ok'
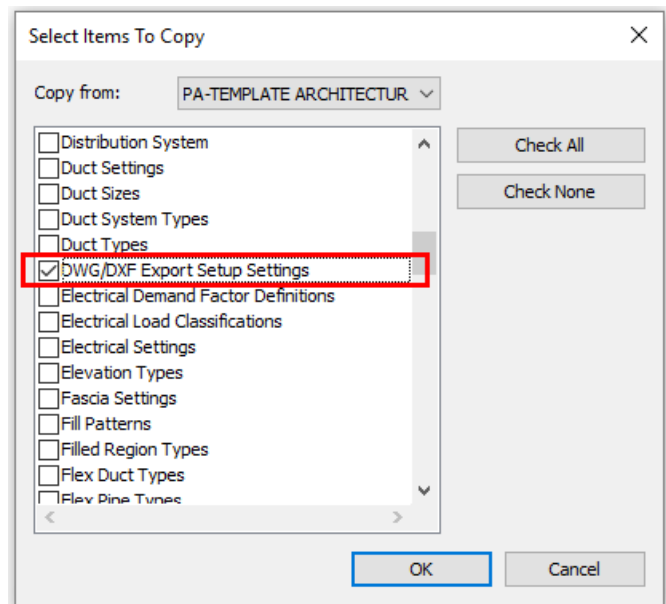
Figure 1.8-5 Transfer Project Standards Dialog Box

1.8.12 LINKING FILES

1.8.12.1 REVIT FILES

When working with other Discipline Revit Model files, you are required to link them. All project Revit files should be linked into each other, included the Site Model.

- Unload links of all types if not used.
- Temporarily unload links if not needed in the view and reload them as required to limit memory resources necessary to open a project file.
- Linked models must be pinned in place to ensure that they retain their coordinates relative to the active model and other linked models in the project. This can be accomplished by first clicking on any linked RVT model in the Project Browser using the right mouse button, and then choosing "Select All Instances" > "In Entire Project". Then use the Pin tool as shown below from the Ribbon to pin the linked model to its current position.
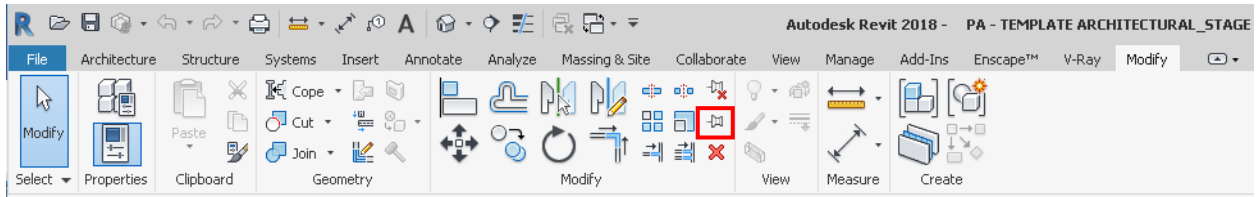
Figure 1.8-6 Pin Tool on the Modify Tab

1.8.12.2   AUTOCAD DRAWINGS

There are two types of AutoCAD Drawings that might need to be linked into Revit, Reference Drawings and Detail Drawings. The first type refers to drawing such as Floor Plans, that will be used as an underlay to build Revit Elements from their entities and will not be part of the Contract Set. The second type of files refer to drawings such as a Location Plan or a One Line Diagram, that will be included as part of the Contract Set. Both types of files required the following minimal settings before being link into Revit:

- In the AutoCAD file set the PROXYGRAPHICS System Variable to 1.
- For Civil 3D AutoCAD file, the GEOMARKERVISIBILITY set to 0.
- Linked files should not contain External References.
- In order to preserve the AutoCAD Line Weight inside Revit, the Line Weight column within the Layer Properties Manager Dialog Box should be set to Default.
- Avoid importing unnecessary data like hatching or line-work such as construction lines. Delete all unnecessary parts and layers of the DWG file within AutoCAD and import only the cleaned smaller version.
- Minimize the number of linked or imported DWG files.
- Only link essential DWG files into necessary views.
- All linked AutoCAD files should be pinned.
- Avoid exploding the geometry imported from DWG files. The exploding operation within a Revit-based application can change a DWG from a single-managed element to hundreds or thousands of additional elements depending on the number of entities in the imported DWG.

In order to link AutoCAD Drawings into Revit, go to the *INSERT* Ribbon and from the *LINK* Panel select the *LINK CAD* Tool to open the *LINK CAD FORMATS* Dialog Box as shown in the image below.

These settings within the *LINK CAD FORMATS* Dialog Box should be set as follows:

- The *Current View Only* Option Check Box should be un-checked when linking Reference Drawings and should be check when linking Detail Drawings.
- Set the *Colors* Option to either *Invert*, *Preserve* or *Black and White* as desire.
- Set the *Layers* Option to either *All*, *Visible* or *Specify* as desire.
- Set the Import Units Option to Auto-Detect.
- Set the *Positioning* Option to *Auto - By Shared Coordinates* for Reference Drawings or to *Auto - Center to Center"* for Detail Drawings.

> **NOTE**
>
> The Import CAD Tool should never be used instead of the Link CAD Tool since the Revit-based applications handles AutoCAD entities individually, decreasing overall Model performance.

1.8.12.2.1   REFERENCE DRAWINGS

Reference Drawings are typically linked into Floor Plan Views and/or Ceiling Plan Views and are usually used as an underlay to build Revit Elements from their entities.

In addition to the requirements described above, the Reference Drawings should have the following:

- DWG files shall be on NAD83 Coordinate System.
- DWG files shall be saved using the World Coordinates System (WCS) before they are linked into Revit in order to be correctly aligned.
- Elements within the DWG cannot be more than 2 miles apart from each other.
- When linking files, un-check the *Current View Only* Option.
- When linking files, under *Positioning,* select the *Auto - By Shared Coordinates* option located in the lower right-hand corner of the *LINK CAD FORMATS* Dialog Box.

1.8.12.2.2   DETAIL DRAWINGS

Detail Drawings are typically linked into Drafting Views and/or Legend Views and are usually used as part of the Contract Set.

In addition to the requirements described above, the Detail Drawings should have the following:

- When linking files, check the *Current View Only* Option.
- When linking files, under *Positioning,* select the *Auto – Center to Center* option located in the lower right-hand corner of the *LINK CAD FORMATS* Dialog Box.

1.9   SPECIAL PROJECTS

Special Projects are those in which unique circumstances may require different guidelines be followed in order to comply with The Port Authority of NY & NJ BIM Standard. The contents of this section will be followed in addition to the ones already specified in this document, unless specifically instructed otherwise. Confidential or Confidential Privileged information and their access within the E/A Design Division network are restricted to certain users.

1.9.1 CONFIDENTIAL PROJECTS

Confidential Projects contain highly sensitive information that if lost or made public could seriously damage or compromise the Port Authority and/or public safety and security. Confidential information includes, but is not limited to, methods utilized to mitigate vulnerabilities and threats, such as identity, location, design construction and fabrication of security systems.

For that reason, if aspects being worked on as part of a project drawing are considered Confidential they will need to be handled differently than standard contract drawings.

If a project contains any Confidential sheets then the Confidential Information Warning Sign must be displayed on the Title Sheet and Drawing Index sheet(s) of the project, along with markings at the top, bottom and right side of the pages identifying the project as Confidential. This is accomplished by loading and placing the "PA-C-CP Warning.rfa" family on the Title and Drawing Index sheets and setting a check in the box next to the "Confidential Sheet" parameter in the property set of each, respectively. These parameters can be found in the properties sets of both the Title sheet and Contract border families. The Warning Sign is displayed below. (See Figure 1.9 1 Confidential Information Warning Sign)

"WARNING": THE ATTACHED IS THE PROPERTY OF THE PORT AUTHORITY OF NEW
YORK AND NEW JERSEY (PANYNJ). IT CONTAINS INFORMATION REQUIRING
PROTECTION AGAINST UNAUTHORIZED DISCLOSURE. THE INFORMATION CONTAINED
IN THE ATTACHED DOCUMENT CANNOT BE RELEASED TO THE PUBLIC OR OTHER
PERSONNEL WHO DO NOT HAVE A VALID NEED TO KNOW WITHOUT PRIOR WRITTEN
APPROVAL OF AN AUTHORIZED PANYNJ OFFICIAL. THE ATTACHED DOCUMENT MUST
BE CONTROLLED, STORED, HANDLED, TRANSMITTED, DISTRIBUTED AND DISPOSED
OF ACCORDING TO PANYNJ INFORMATION SECURITY POLICY. FURTHER
REPRODUCTION AND/OR DISTRIBUTION OUTSIDE OF THE PANYNJ ARE PROHIBITED
WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PANYNJ.

AT A MINIMUM, THE ATTACHED WILL BE DISSEMINATED ONLY ON A NEED TO KNOW
BASIS AND, WHEN UNATTENDED, WILL BE STORED IN A LOCKED CABINET OR AREA
OFFERING SUFFICIENT PROTECTION AGAINST THEFT, COMPROMISE, INADVERTENT
ACCESS AND UNAUTHORIZED DISCLOSURE.

Figure 1.9-1 Confidential Information Warning Sign

The Title sheet setup for Confidential projects is shown below. (See Figure 1.9 2 Example of Confidential Projects Title sheet)

Figure 1.9-2 Example of Confidential Projects Title sheet

On the Drawing Index sheet, names of Confidential drawings should be listed and should take the form "<Drawing Title> (Protected Information)", where <Drawing Title> is the title of a Confidential drawing.

All interior Confidential pages within the set must also be marked Confidential at the top, bottom and right side of the page. Sets of documents that are folded or rolled must be marked so that the marking is visible on the outside of the set once folded or rolled. The Warning Sign and Confidential markings can be set to display by setting a check mark in the box next to the "Warning Sign" parameter and the "Confidential Sheet" parameter, respectively, in the properties set for the Contract border. All the Confidential Markings for interior pages are displayed in the following image. (See Figure 1.9 3 Interior Confidential Page)

Figure 1.9-3 Interior Confidential Page

For more information on the handling and submitting of Confidential projects, refer to "The Port Authority of New York & New Jersey Information Security Handbook".

1.9.2 CONFIDENTIAL PRIVILEGED PROJECTS

Confidential Privileged Projects contain extremely sensitive security or public safety information that if lost or made public could seriously damage or compromise the Port Authority and/or public safety and security. Confidential Privileged information includes, but is not limited to, any information identifying vulnerabilities, capabilities, threats, operational methodologies and/or security related design criteria.

For that reason, if aspects being worked on as part of a project drawing are considered Confidential Privileged they will need to be handled differently than standard contract drawings.

If information on a drawing is considered to be Confidential Privileged the system that contains the Confidential Privileged design elements is to be removed from the main file for that particular discipline and stored in a separate Confidential Privileged model file in the Model_CP folder. For the purpose of isolating Confidential Privileged information, a system consists of any model elements that connect to the Confidential Privileged objects or are necessary for them to exist, such as Host objects. Any plotsheet file that contains Confidential Privileged information must be stored in the Plotsheets_CP folder. It is permitted to reference non-Confidential information from outside the CP folder into a Confidential Privileged plotsheet file. If a model file that has been deemed Confidential Privileged needs to be shared across disciplines, then the file is to be copied to the Publish_CP folder.

If a project contains any Confidential Privileged sheets then they must be broken out into a separate drawing set, with its own Title Sheet. The Confidential Information Warning Sign must be displayed on the Title Sheet and Drawing Index sheet(s) of the project, along with markings at the top, bottom and right side of the page identifying the project as Confidential Privileged and displaying the Confidential Privileged Document Control Number. The Warning Sign and Confidential Privileged markings can be set to display by loading and placing the "PA-C-CP Warning.rfa" family on the Title and Drawing Index sheets and setting a check in the box next to the "Confidential Privileged Sheet" parameter in the property set of each, respectively. These parameters can be found in the properties set of both Project Information and the Contract border families. The Confidential Privileged Document Control Number, designated by the "CP Number" parameter, can be activated by first importing the parameter from PA-Shared_Parameters.txt, grouping it under the Title Text section of Properties, designating it as an Instance property, and associating it with the Project Information object category as shown below. (See <u>Figure 1.9 4 Shared Parameter Dialogue Box</u>)
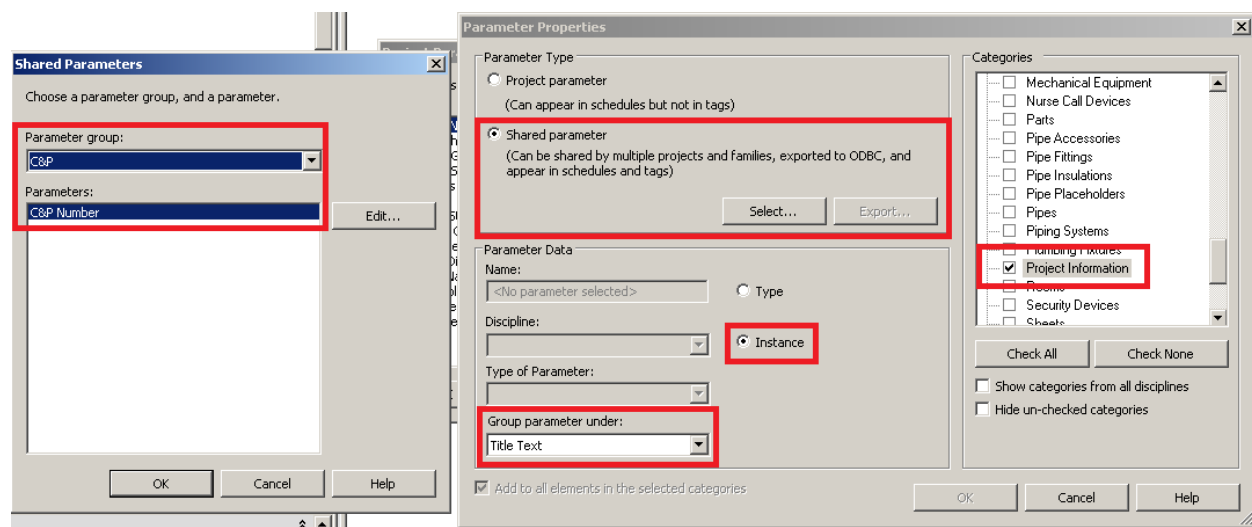
Figure 1.9-4 Shared Parameter Dialogue Box

The Confidential Privileged Document Control Number can then be entered by opening the Project Information dialog and entering the number in the field next to the "CP Number" parameter in the Title Text section. The warning is displayed in **Section 1.9.2 Confidential Privileged Projects.**

The Title Sheet setup for Confidential Privileged projects is shown in the following image (See Figure 1.9 5 Title Sheet setup of Confidential Privileged projects)
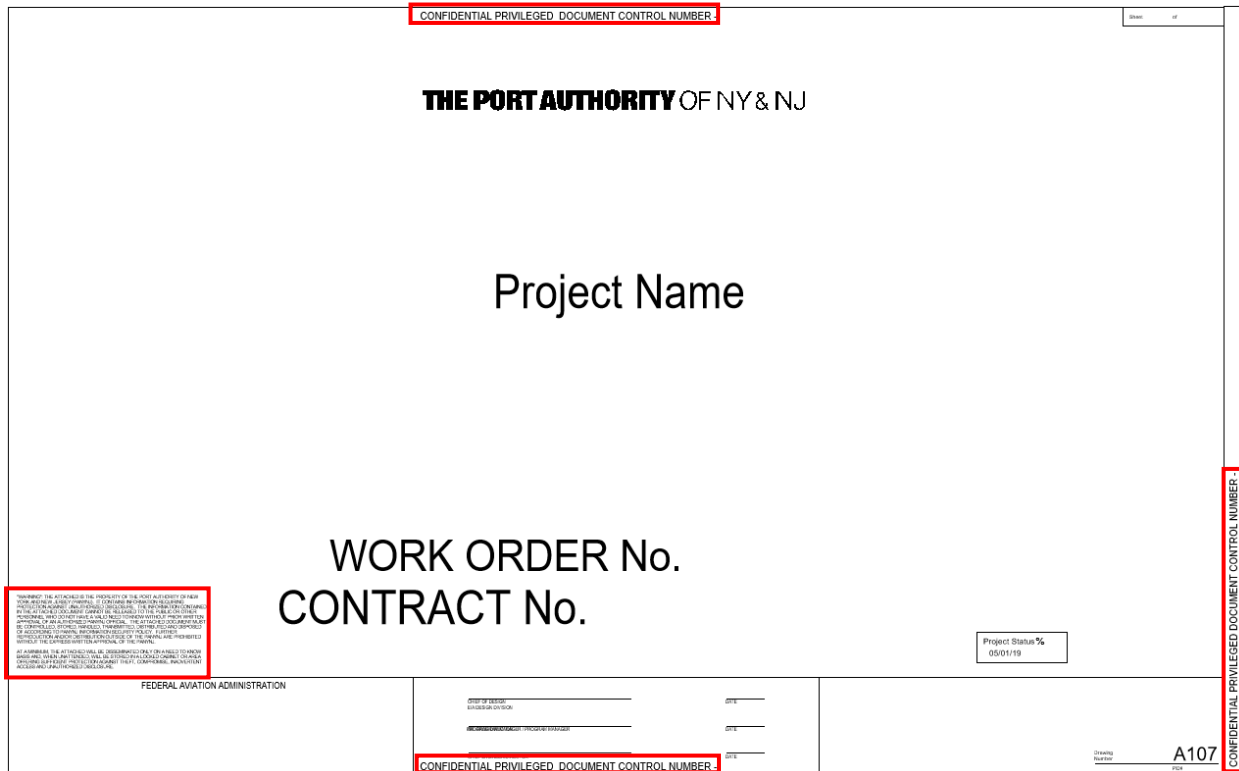
Figure 1.9-5 Title Sheet setup of Confidential Privileged projects

All interior pages within the set must also be marked at the top, bottom and right side of the page. Sets of documents that are folded or rolled must be marked so that the marking is visible on the outside of the set once folded or rolled. The Confidential Privileged markings can be set to display by setting a check mark in the box next to the "Confidential Privileged Sheet" parameter (for instructions regarding the setup of the CP Number parameter, see above). All the Confidential Privileged Markings for interior pages are displayed in the following image. (See <u>Figure 1.9 6 Interior pages of Confidential Privileged Projects</u>)
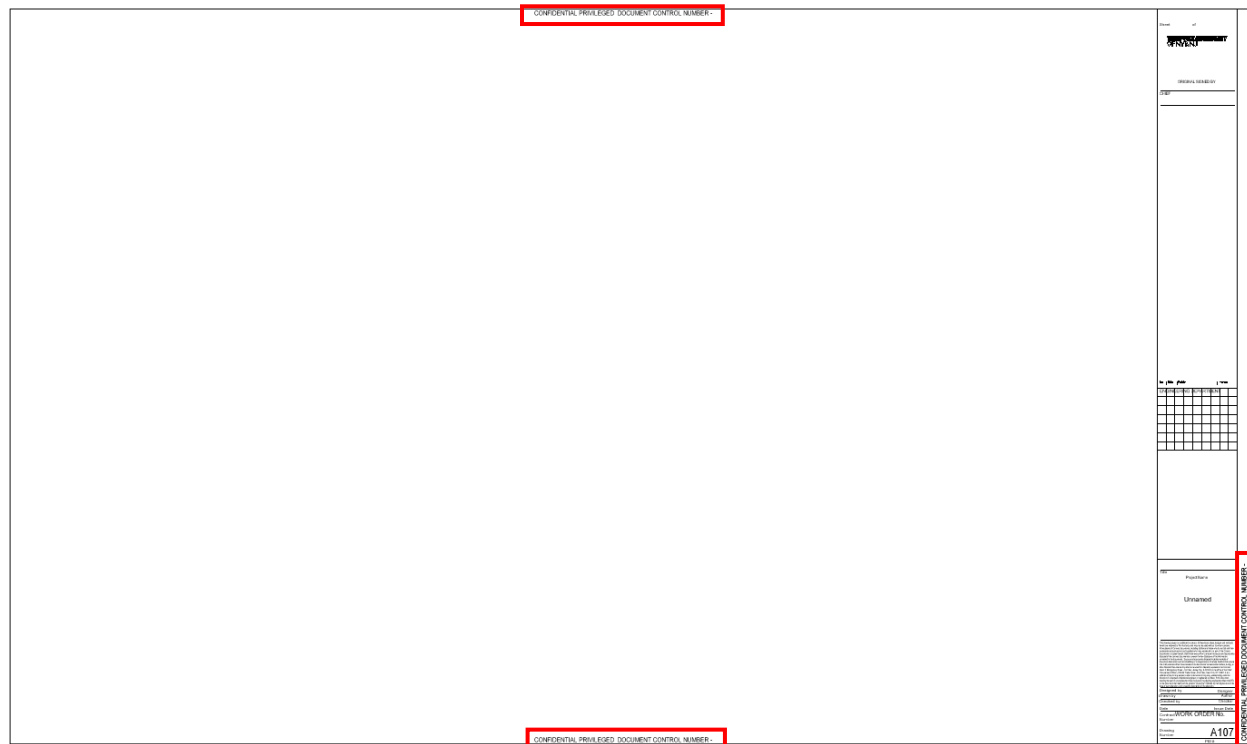
Figure 1.9-6 Interior pages of Confidential Privileged Projects

For more information on the handling and submitting of Confidential Privileged projects, refer to "The Port Authority of New York & New Jersey Information Security Handbook".

1.9.2.1 FOLDER STRUCTURE

A Folder Structure has been provided for the Central File of Confidential and/or Confidential Privileged Projects. Internally, this folder will have specific access rights to the C and/or CP users only.

Refer to **Section 1.13.7 Sample Folder Structure** for proper use.

1.9.2.2 FILE NAMING CONVENTION

All Confidential and/or Confidential Privileged Project files, which will include the Central and Local Revit files in RVT format, along with the Plot sheet files in PDF format should have the letters"C" for Confidential Projects and/or "CP" for Confidential Privileged Projects. As an example, the Architectural Group is working on a project where portions have been determined to be Confidential Privileged; two Central files will need to be created and should be named as follows:

A08313000-3D_CENTRAL.rvt
A08313000-3D_CENTRAL_CP.rvt

1.10   PROJECT DELIVERABLES

Hardcopy and electronic deliverables are required at the completion of every project. All submitted sheets must use The Port Authority of NY & NJ Title Sheets and Contract Borders identified in this Manual.

> **NOTE:**
> For Stage IV project deliverables, refer to CMD BIM Standards Manual.

All submitted electronic files must be compatible with the version of the Autodesk Revit software recently being used by the Port Authority of NY & NJ and must conform and comply with the latest version of the Port Authority of NY & NJ BIM Standard as outlined in this Manual.

1.10.1   HARDCOPY DELIVERABLES

Final hardcopies of each sheet must use the PANYNJ Contract Border identified in this standard and must be submitted at full size, either 22x34 or 34x56. Submitted hardcopies must use archival paper with Permalife® plotter paper specifications. Engineering Department staff will verify that submissions contain the "Permalife 25% cotton content" watermark.

1.10.2   ELECTRONIC DELIVERABLES

Electronic files are required for each milestone during Stages I, II, III and IV. If the project does not have a milestone scheduled prior to the 100% Submittal, files must be submitted no later than 6 weeks before the submission for a BIM Standard Review Audit.

1.10.2.1   MEDIA AND FILE FORMATS

All project-related files must be submitted on Live Link or media CDs/DVDs, delivered virus free.
The following formats are required on every submission:

- RVT   :   Autodesk Revit files
- NWD   :   Autodesk Navisworks Master files
- NWC   :   Autodesk Navisworks Cache files
- 2D PDF: Autodesk 2D Portable Document Format files
- 3D DWF: Autodesk 3D Design Web Format files
- Navisworks Clash Report (submitted in PDF format)

1.10.2.2   CLASH-FREE MODEL

Models submitted at the 100% milestone for Stage III and as-constructed for Stage IV must be fully coordinated in Navisworks. All standard coordination tests shall display zero clashes unless otherwise approved by the project's LEA.

> **NOTE:**
> Consultants are required to submit the entire Central File version of the project directory structure for review. See **Sections 1.13.6.13 SUBMITTALS Folder** and **1.17.13 Submissions** for proper use.

1.10.3   IDENTIFICATION

All project-related files must be submitted on Live Link or media CDs/DVDs, delivered virus free, and labeled with the following information:

- Consultant's name and Project Identification Number (PID)
- Contact name, E-mail Address and phone number of consulting project manager

- Discipline-Facility (e.g. Civil-JFK)
- Submittal Date and Percent Completed
- Data Format (e.g. Revit Version .dwg)
- File Name(s) on CD
- Company Name and Address
- Project Name
- Percent Completed
- As much information as possible should be printed on both the CD label and the CD case. If all the information will not fit on either the CD label or the CD case, the information can be listed in an orderly manner in a text file that will be copied to the CD in electronic format.

1.11 BIM STANDARDS REVIEW

The BIM/CAD Support Group will monitor all BIM projects for Standard compliance. These reports will be generated on discipline-specific Models developed by in-house staff and/or outside consultants and are applicable to all BIM active projects. Copies of the reports will be submitted to the Project's LEA (Stage III) or corresponding stakeholder (Stage IV).

1.11.1 BIM REVIEW SUBMISSION

At each project milestone, all Revit files should be detached and saved as new central models to the corresponding Stage folder within each Discipline's *SUBMITTALS* folder.

The structure of a sample submittals folder is presented in the right image. The "Save as New Central" procedure in Revit is illustrated at <u>Figure 1.11 1 Procedure and folder structure for Revit submittal files</u> below.
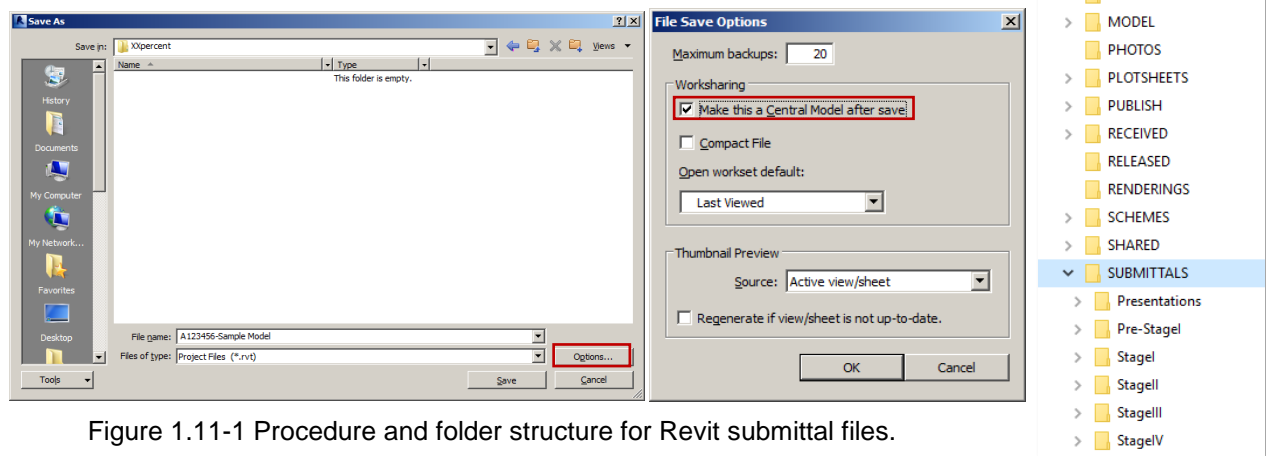
Figure 1.11-1 Procedure and folder structure for Revit submittal files.

NOTE

The BIM Standard Review Report check will be run on the Discipline's Central file only.

1.11.2 INTERIM BIM REVIEW

- BIM Review is mandatory for:

    o Revit models used to produce report drawings (Stage I).
    o Revit Models used to produce contract drawings by one discipline and sets consisting of more than 25 sheets (Stage I to III).
    o Revit Models used to produce contract drawings by two or more disciplines and sets consisting of more than 15 sheets (Stage I to III).
    o Models used for Coordination and As-built conditions (Stage IV).

- Requirements

    o <u>When</u>: Required at 50% milestone and 100% submission or as determined by the LEA if no official interim milestone prior to each official submission.
    o Initiated by the LEA via EOL request form.

- Report is issued to the Assistant Chiefs, Principals, LEA and Task Leaders.

1.11.3 CONSTRUCTION CONTRACT PA WIDE BIM REVIEW

- BIM Review is mandatory for:

    o BIM models used to produce contract drawings.

- Review process:

    o An initial compliance report is issued to the LEA and Task Leaders.
    o 3 weeks are provided for the correction of non-compliant model files.
    o At the end of the 3-week period the final BIM Standard Review Report is issued to the Assistant Chiefs, Principals, LEA and Task Leaders.
    o Models will not be reviewed after the PA Wide Review period.

- Requirements

    o <u>When</u>: Required at the onset of PA Wide Review.
    o A PA Wide BIM Review is initiated by the LEA via an EOL request form.
        ▪ Upon receipt of the request, the BIM Support Group is to upload the files to Live Link for electronic review and notify the Contract Engineer of the initiation of PA Wide Review.

1.11.4 BIM COMPLIANCE REPORT

The BIM Standard Review Report is divided into 4 Sections:

- Project Revit files submission Information
- Mandatory fields, compliance with EAD BIM Standards is required for the project to pass.
- Non-Mandatory fields, do not define if a model has passed or not but should be following the EAD BIM Standards.
- Notes, contain general comments referred to the review, BIM Standard Sections to refer to, etc.

BIM Standard Review Report checks for compliance in the submitted RVT files in the following fields among others:

1.11.4.1 MANDATORY BIM REVIEW FIELDS

- General
    - The location of all modeling files along with the project's digital folder structure. The correct Coordinate System, linked files method utilized and Revit model size (should be less than 500MB).
    - The requirements include: *Folder Structure, File Location, Coordinate System, AutoCAD and Revit Links and Model Size.*
- Project Settings
    - The technical formatting and setup of all Revit files should follow the PANYNJ Revit Templates.
    - The requirements include: *Units, Export to AutoCAD, Phase Settings, Project Browser, Discipline/Subdiscipline and Views classification.*
- Naming Convention
    - The standardized used of names for all files and components.
    - The requirements include: *Naming conventions for Files, Worksets, Views, Families and Levels.*
- Content Quality
    - The general model integrity to ensure the correct use of BIM.
    - The requirements include: *Overlapping Objects, Hosting, Object Category, Parameter Assignment, general Model Integrity, model coordination and cleanup.*
- Plot Sheet Files
    - The file formatting of the submitted contractual PDF files.
    - The requirements include: *Full Size, Grouped by drawing type, Black and White and Signed by line.*
- Plan Set Preparation
    - The contractual drawing information of the project.
    - The requirements include: *Title Sheet, Contract Border, Facility, Discipline and Subdiscipline, Contract and PID Numbers, Drawing type and number, Professional Stamps, C & CP Stamps, and no additional objects on Sheets* (See **Section 1.17.10.6 - Items Prohibited From Sheets**).

1.11.4.2 NON-MANDATORY BIM REVIEW FIELDS

- Styles
    - The Project Revit Templates predefined Graphic features.
    - The requirements include: *Object Styles, Symbols, Tags, Text & Dimension Styles, Lines Styles, Filled regions and View Templates used.*

The following images show three sections of the BIM Standard Review Report template. A fourth section with comments will be included with each report as well. See. <u>Figure 1.11-2 Example of BIM Standard Review Report page 01</u> & <u>Figure 1.11 3 Example of BIM Standard Review Report page 02.</u>

THE PORT AUTHORITY OF NY & NJ

Engineering BIM/CAD Support Group

BIM Standards Review Report

Facility Name:	AMT ▾	**Discipline Group:**	
PID Number:		**Task Leader:**	
Project Title:		**LEA:**	Enter a name or email address...
Contract Number:		**Consultant Name:**	
Stage:	1 ▾	**Submittal Percentage:**	%
Date Submitted:		**Initial Review Date:**	
File Reviewed:		**Reviewed By:**	Enter a name or email address...
Date Reviewed:		**Due Date:**	
Official:	☐	**Final Report:**	☐
Confidential:	☐	**Confidential Privileged:**	☐
BIM Execution Plan:	☐		

MANDATORY

GENERAL		PDF SUBMITTALS	
Folder Structure:	▾	Full Size:	▾
File Location:	▾	Grouped by Drawing Type:	▾
Coordinate System:	▾	Black & White:	▾
AutoCAD Links:	▾	Original Signed By Line:	▾
Revit Links:	▾	PLAN SET PREPARATION	
Model Size:	▾	Title Sheet (Lead):	▾
PROJECT SETTINGS		Contract Border:	▾
Units:	▾	Facility:	▾
Export to AutoCAD Layers:	▾	Discipline:	▾
Phase Settings:	▾	Sub-Discipline:	▾
Discipline / Discipline Sub-Group:	▾	Contract Number:	▾
View Classification:	▾	PID Number:	▾
NAMING CONVENTIONS		Drawing Type:	▾
Files:	▾	Drawing Number:	▾
WorkSets:	▾	Professional Stamps:	▾
Views:	▾	C & CP Stamps:	▾
Families:	▾	No Object on Sheets:	▾
Levels:	▾		
CONTENT QUALITY			
Overlapping Objects:	▾		
Object Hosting:	▾		
Object Category:	▾		
Parameter Assignment:	▾		
Model Integrity:	▾		
Interference Review:	▾		
Model Cleanup:	▾		

Figure 1.11-2 Example of BIM Standard Review Report page 01.

NON-MANDATORY

STYLE

Objects: ▼

Symbols: ▼

Tags: ▼

Texts: ▼

Dimensions: ▼

Lines: ▼

Regions: ▼

View Templates: ▼

Figure 1.11-3 Example of BIM Standard Review Report page 02.

NOTES

1.12 ACCESSING THE E/A DESIGN DIVISION BIM SUPPORT FILES

The E/A Design Division BIM Standard includes a series of support files. All support files are located on K:\Application\EAD\BIM_Standards\2018 folder of the PANYNJ network. (See Figure 1.12 1 EAD BIM Standards Folder Structure).

K_Drive (\\patcav56) (K:)
- Application
- Aviation
- Bluebeam
- CSG
- EAD
  - BIM_Standards
    - 2018
      - Content
      - Contract Borders
      - Fonts
      - IES
      - Logos
      - Lookup Tables
      - Sample Folder Structure
      - Shared Parameters
      - Support
      - Templates
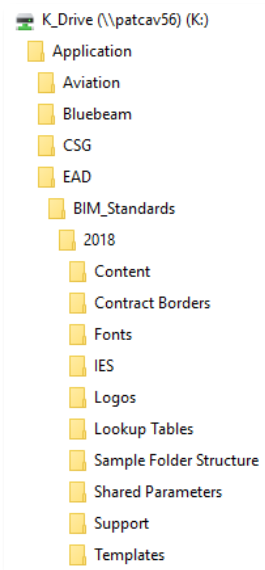
Figure 1.12-1 EAD BIM Standards Folder Structure

Outside consultants can find some of this files inside the PANYNJ Website http://www.panynj.gov/business-opportunities/engineering-documents-bim-cad-standards.html

Consultants should copy these files to the appropriate directories. Contact your System Administrator or BIM/CAD Manager for proper configuration and use.

1.12.1 BIM LIBRARY

The following is the path to the BIM Library. **K:\Application\EAD\BIM Standards\2018\Content**
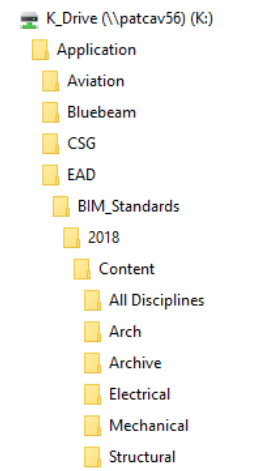
Figure 1.12-2 BIM Content Library Folder Structure

The content folder contains the on-going BIM library. It contains 2D detail components and 3D families. The library holds multi-discipline families to make the modeling process easier and more efficient.

1.12.2 DISTRIBUTION FILES

This section identifies the files supplied for general use within the E/A Design Division BIM Standard. The entire E/A Design Division CAD & BIM Standards can be found internally at:

K:\Documentation\Standards Documents

or externally downloaded from: http://www.panynj.gov/business-opportunities/engineering-documents-bim-cad-standards.html

Table 1.12-1 - EAD BIM Standards Distribution files

K:\Documentation\Standards Documents	
	Contains the "EAD-BIM-Standard-Manual".
K:\Application\EAD\BIM_Standards\2018\Content	
All Disciplines	Contains all cross-discipline support files and content.
<Discipline>	Contains all discipline specific support files and content.
K:\Application\EAD\BIM_Standards\2018\Contract Borders	
22x34	22x34 border for PA Contract, Presentation, Report and Title sheet drawings.
34x56	34x56 border for PA Contract, Presentation, Report and Title sheet drawings.
K:\Application\EAD\BIM_Standards\2018\Contract Borders\Stamps	
22x34	-Law Review, Preliminary, Quality Assurance and Percent submission stamp for use on 22x34 borders. -Confidential Privileged Warning sign for use on stamp for use on 22x34 borders for CP drawings. -Confidential stamp for use on 22x34 borders for C drawings. -One and Multiple consultant company providing NJ & NY PE signatures on 22x34 drawings. -One and Multiple consultant company providing NJ & NY RA signatures on 22x34drawings.
34x56	-Law Review, Preliminary, Quality Assurance and Percent submission stamp for use on 34x56 borders. -Confidential Privileged Warning sign for use on stamp for use on 34x56borders for CP drawings. -Confidential stamp for use on 34x56borders for C drawings. -One and Multiple consultant company providing NJ & NY PE signatures on 34x56 drawings. -One and Multiple consultant company providing NJ & NY RA signatures on 34x56 drawings.

K:\Application\EAD\BIM_Standards\2018\IES	
	Includes the IES files.
K:\Application\EAD\BIM_Standards\2018\Logos	
	Includes the latest PA Logos.
K:\Application\EAD\BIM_Standards\2018\Lookup Tables	
	Includes the support files for Conduits and Pipes.
K:\Application\EAD\BIM_Standards\2018\Sample Folder Structure	
	Includes the Folder Structure templates to address both the Central File and the Local File.
K:\Application\EAD\BIM_Standards\2018\Shared Parameters	
PA Shared_Parameters.txt	Includes the Port Authority of NY & NJ custom Shared Parameters file.
K:\Application\EAD\BIM_Standards\2018\Support	
	Includes support files for importing and exporting AutoCAD files to and from Revit, a Navisworks template for creating sets when doing clash detections.
K:\Application\EAD\BIM_Standards\2018\Templates	
	Includes the discipline-specific template files for the Architectural, Electrical, Mechanical, and Structural disciplines.

1.13   PROJECT FOLDER STRUCTURE

The Port Authority of NY & NJ BIM Standard provides a structure for the organization of BIM projects within the Engineering Department.

The primary goal of this structure is to improve coordination among all functional groups within the E/A Design Division and their consultants, as well as to develop BIM projects in a way that will facilitate the further use of the electronic information beyond the initial contract.

1.13.1 FACILITY FOLDERS

All Port Authority of NY & NJ E/A Design Division BIM projects are stored on a central server, which has internally been mapped using the drive letter "R." The Engineering BIM Server (R:\ drive) is divided into Facility Folders using the following Facility Codes.

Table 1.13-1 List of PA Facility with BIM projects

FACILITY CODE	FACILITY NAME
AMT	Automobile Marine Terminal
BB	Bayonne Bridge
BRKMT	Brooklyn Port Authority Marine Terminal
EP	Elizabeth Port Authority Marine Terminal
EWR	Newark Liberty International Airport
FERRY	Ferry Transportation
GB	Goethals Bridge
GWB	George Washington Bridge and Bus Station
HCMF	Harrison Car Maintenance Facility
HELI	Downtown Manhattan Heliport
HH	Howland Hook Marine Terminal
HT	Holland Tunnel

FACILITY CODE	FACILITY NAME
📁IPY	Industrial Park at Yonkers
📁JFK	John F. Kennedy International Airport
📁JSTC	Journal Square Transportation Center
📁LGA	LaGuardia Airport
📁LT	Lincoln Tunnel
📁MULTI	Multi Facility Projects
📁NFC	Newport Financial Center
📁NJMT	New Jersey Marine Terminals
📁NLCC	Newark Legal and Communication Center
📁OBX	Outer Bridge Crossing
📁PABT	Port Authority Bus Terminal
📁PACD	Port Authority Police Academy
📁PATC	Port Authority Technical center
📁PATH	Port Authority Trans-Hudson Corporation
📁PHQ	Police Headquarters
📁PJ	Port Jersey
📁PN	Port Newark
📁PRTC	Police Rescue Training Center
📁RLLC	Cross Harbor Rail Road NY/NJ
📁SWF	Stewart International Airport
📁TEB	Teterboro Airport
📁TLPT	Staten Island Teleport
📁WTC	World Trade Center

1.13.2 FIM (FACILITY INFORMATION MODEL) FOLDER

The root of each Facility Folder contains the FIM sub-folder, which stores the most recent 3D Model of that particular Facility.

The image below illustrates this concept using the FIM Folder at the root of PATH.
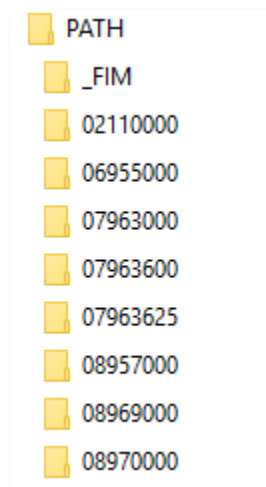
Figure 1.13-1 Facility Information Model Folder Location

The FIM Folder contains eight sub-folders named after each discipline. Each of these sub-folders stores the discipline-specific models that compose the Facility Information Model.

> **NOTE**
>
> The BIM/CAD Support Group is responsible for updating the FIM Folder.

1.13.3 PID (PROJECT IDENTIFICATION) NUMBER FOLDER

The PID Number is a unique identifier assigned for all Port Authority of NY & NJ BIM projects. Every Facility Folder within the Engineering BIM Server has been divided into project folders using an eight-digit PID Number.

The image below illustrates this concept using a project at PATH with the PID Number of 12951000, which includes the PIM Folder, the SM folder and eight pre-defined Discipline Folders.

The Lead Engineer/Architect (LE/A) shall request the creation of the Project Folder Structure on the Engineering BIM Server through the BIM/CAD Support Group. Consultants are required to get this number from either the LE/A or the discipline's Task Leader (TL) at the project kickoff.
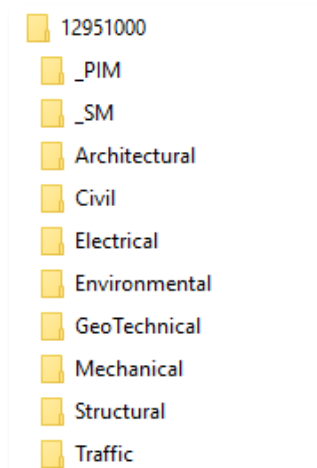
Figure 1.13-2 Example of Folder structure within a PID folder

1.13.4 PIM (PROJECT INFORMATION MODEL) FOLDER

Each PID Folder contains a PIM sub-folder that stores the most recent 3D Model of that particular project. The image below illustrates this concept using a project with the PID Number of 12951000, which includes the PIM Folder at the top of the folder.

At the completion of the project, the PIM Folder will include one Model per discipline. These will be the Navisworks files for the FIM folder.

Figure 1.13-3 Project Information Folder Location

> **NOTE**
>
> The BIM/CAD Support Group is responsible for the PIM Folder.

1.13.5 SM (SITE MODEL) FOLDER

Each PID Folder contains an SM sub-folder that stores the Site Model file, which holds the project coordinate system and controls the location, rotation, and elevation of all Revit-based Models.

The image below illustrates this concept using a project with the PID Number of 12951000, which includes the SM Folder.
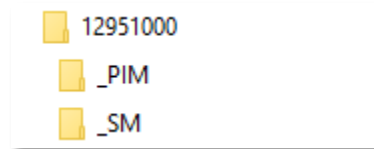
Figure 1.13-4 Site Model Folder location

The Site Model Folder stores two files, an AutoCAD file in DWG format and a Revit file in RVT format, both named after the eight-digit PID Number followed by letters SM.

NOTE

The BIM/CAD Support Group is responsible for creating the files contained within the SM Folder.

1.13.6 DISCIPLINE FOLDER

This folder is used to share files among the eight Disciplines of the Port Authority of NY & NJ Engineering Department, which are:

- Architectural
- Civil
- Electrical
- Environmental
- Geotechnical
- Mechanical
- Structural
- Traffic

Every Discipline is provided with a folder in the Project Directory. Each Discipline folder has a series of standardized sub-folders in which all design related data is to be stored.

The image to the right illustrates these standardized sub-folders using the Architectural folder as an example.

Rules of the DISCIPLINE folder:

- Sub-folders should not be created in the Discipline folder.
- The Discipline folder has read-write permissions assigned to the owning discipline only.
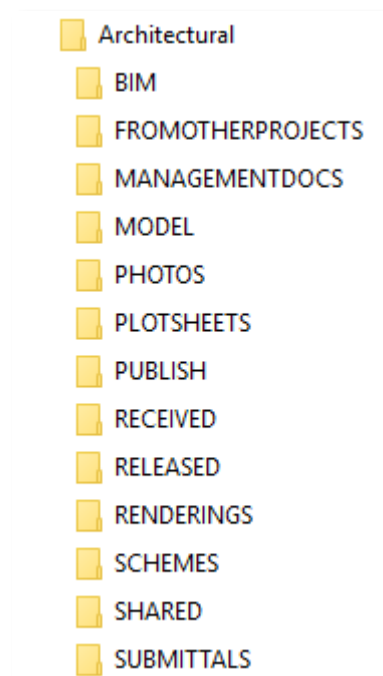
Figure 1.13-5 Discipline Folder Structure

1.13.6.1   BIM FOLDER

This folder is to be used for storing Revit-related information files that do not need to be shared outside each discipline.

The image to the right illustrates the standardized sub-folders provided within the BIM folder. (See Figure 1.13 6 BIM Folder Structure)

Rules of the BIM folder:

- Sub-folders should not be created at the root level of the BIM folder.
- The BIM folder allows read-write access to the owning discipline.
- No other discipline has access to the BIM folder.
- The BIM folder will be archived with the project.
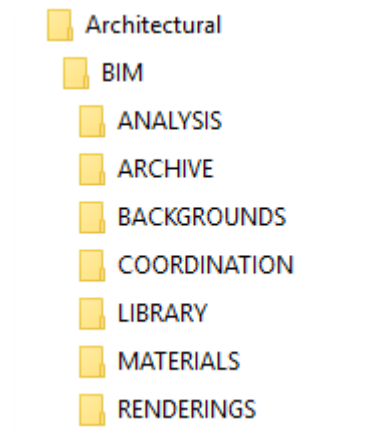
Figure 1.13-6 BIM Folder Structure

1.13.6.1.1   ANALYSIS FOLDER

This folder stores results of the different types of analysis performed in the BIM Model.

Rules of the ANALYSIS folder:

- Sub-folders may be created in the Analysis folder. (Refer to **Section 1.15.1 Folder Naming Convention.**)

1.13.6.1.2   BACKGROUNDS FOLDER

This folder stores AutoCAD and/or Image files that will be referenced into the BIM Model and will become part of the Contract Set.

Rules of the BACKGROUNDS folder:

- Sub-folders should not be created in the BACKGROUNDS folder.
- AutoCAD files and Image files should be named accordingly. (Refer to **Sections 1.15.2.9 AutoCAD Files and 1.15.2.11 Image Files**)

1.13.6.1.3   COORDINATION FOLDER

This folder stores documents and reports for multi-discipline coordination purposes only.

Rules of the COORDINATION folder:

- Sub-folders may be created in the COORDINATION folder. (Refer to **Section 1.15.1 Folder Naming Convention**)

E/A Design Division BIM Standard

1.13.6.1.4 LIBRARY FOLDER

This folder stores project-specific Revit Family files.

Rules of the LIBRARY folder:

- Sub-folders may be created in the LIBRARY folder. If this is decided by the Project Team, a folder structure similar to the one provided by the Revit product in use should be created. This folder structure can be found under:

  C:\Documents and Settings\All Users\Application Data\Autodesk*REVIT PRODUCT*\Imperial Library

1.13.6.1.5 MATERIALS FOLDER

This folder stores custom and/or project-specific materials (.adsklib files) along with the associated bitmaps used within the BIM Model.

Rules of the MATERIALS folder:

- Sub-folders may be created in the MATERIALS folder. If this is decided by the Project Team, a folder structure similar to the one provided by the Revit product in use should be created. This folder structure can be found under:

  C:\Program Files(x86)\Common Files\Autodesk Shared\Materials\2018\assetlibrary_base.adsklib

1.13.6.1.6 RENDERINGS FOLDER

This folder stores data such as images, walkthroughs and animations generated from the BIM Model.

Rules of the RENDERINGS folder:

- Sub-folders may be created in the RENDERINGS folder. (Refer to **Section 1.15.1 Folder Naming Convention**)

1.13.6.2   FROM OTHER PROJECTS FOLDER

This folder stores data that relates to the recent project and is needed only as a reference.

If a drawing needs to be part of the Contract Set, it should be either moved or copied into the BACKGROUNDS folder and renamed accordingly.

Rules of the FROMOTHERPROJECT folder:

- Sub-folders may be created in the FROMOTHERPROJECT folder. (Refer to **Section 1.15.1 Folder Naming Convention**)
- The FROMOTHERPROJECT folder allows read-write access to the owning discipline.
- No other discipline has access to the FROMOTHERPROJECT folder.
- The FROMOTHERPROJECT folder will not be archived with the project.

1.13.6.3   MANAGEMENTDOCS FOLDER

This folder stores non-drawing project-related data such as e-mails, memos, spreadsheets, documents, estimates, specs, etc.

Rules of the MANAGEMENTDOCS folder:

- Sub-folders may be created in the MANAGEMENTDOCS folder. (Refer to **Section 1.15.1 Folder Naming Convention**)
- The MANAGEMENTDOCS folder provides read-write access to the owning discipline.
- No other discipline has access to the MANAGEMENTDOCS folder.
- The MANAGEMENTDOCS folder will be archived with the project.

1.13.6.4   MODEL FOLDER

This folder stores the Central Revit Model file.

Rules of the MODEL folder:

- Sub-folders should not be created in the MODEL folder.
- The MODEL folder allows read-write access to the owning discipline.
- The MODEL folder allows read-only access to all other disciplines.
- The MODEL folder will be archived with the project.

1.13.6.5   PHOTOS FOLDER

This folder stores digital photographs relevant to the project.

If a photo needs to be part of the Contract Set, it should be moved or copied into the BACKGROUNDS folder and renamed accordingly.

Rules of the PHOTOS folder:

- Sub-folders may be created in the PHOTOS folder. (Refer to **Section 1.15.1 Folder Naming Convention**.)
- There are no file naming requirements for images saved in the PHOTOS folder.
- The PHOTOS folder allows read-write access to the owning discipline.
- The PHOTOS folder allows read-only access to all other disciplines.
- The PHOTOS folder will be archived with the project.

1.13.6.6   PLOTSHEETS FOLDER

This folder stores AutoCAD files assembled as sheets for printing created from Civil 3D and shall consist of external reference files only. Refer to the E/A Design Division CAD Standard for proper use.

No line work or annotation is allowed on the Plotsheet files.

Layout tabs must be named after their sheet numbers and must appear in sequential order. Only consecutive drawings may be stored on multiple paper-space tabs in a single drawing file.

Rules of the PLOTSHEETS folder:

- Sub-folders should not be created in the PLOTSHEETS folder.
- The PLOTSHEETS folder allows read-write access to the owning discipline.
- The PLOTSHEETS folder allows read-only access to all other disciplines.
- The PLOTSHEETS folder will be archived with the project.

1.13.6.7   PDF FOLDER

A Portable Document Format file (PDF) is an industry standard non-editable file format. PDF files will be created at full-size, directly from the Revit files and stored in the PDF folder. The use of PDF's officially replaces the use of DWF files within EA/D (c.10/2018). It is no longer necessary to produce DWF files, and the submission of DWF's will not satisfy these revised requirements to properly create PDF files at each milestone submission.

The PDF folder will always contain the most recent milestone version of the PDF file(s). Earlier milestone files once copied to the SUBMITTALS folder for the milestone will be either deleted from the PDF folder or overwritten in place.

Rules of the PDF folder:

- Sub-folders are not permitted within the PDF folder.
- The PDF folder has read-write permissions assigned to the owning discipline.
- Other disciplines have read permissions assigned to the PDF folder.
- The PDF folder will be archived with the project.

1.13.6.8   PUBLISH FOLDER

This folder is used as a sharing mechanism between disciplines using the Revit-based applications and Civil 3D. BIM Models will be exported as DWG files and saved within this folder.

Rules of the PUBLISH folder:

- Sub-folders should not be created in the PUBLISH folder.
- The PUBLISH folder allows read-write access to the owning discipline.
- The PUBLISH folder allows read-only access to all other disciplines.
- The PUBLISH folder will be archived with the project.

1.13.6.9   RECEIVED FOLDER

This folder contains a dated archive of design information received from outside sources.

This folder is a record intended to identify exactly when and what information was provided by a consultant.

Rules of the RECEIVED folder:

- Sub-folders may be created in the RECEIVED folder. (Refer to **Section 1.15.1 Folder Naming Convention.**)
- The RECEIVED folder provides read-write access to the owning discipline.
- No other discipline has access to the RECEIVED folder.
- The RECEIVED folder will not be archived with the project.

1.13.6.10   RELEASED FOLDER

This folder contains a dated archive of design information provided to outside sources.

This folder is a record intended to identify exactly when and what information was provided to a consultant.

Rules of the RELEASED folder:

- Sub-folders may be created in the RELEASED folder. (Refer to **Section 1.15.1 Folder Naming Convention.**)

- The RELEASED folder provides read-write access to the owning discipline.
- No other discipline has access to the RELEASED folder.
- The RELEASED folder will not be archived with the project.

1.13.6.11 SCHEMES FOLDER

This folder stores various schemes of a design when using Civil 3D, providing the designer with an area in which to make trial changes to a design. Refer to the E/A Design Division CAD Standard for proper use.

When using the Revit-based applications, Design Options is the preferred method to accomplish schemes.

Rules of the SCHEMES folder:

- Sub-folders may be created in the SCHEMES folder. (Refer to **Section 1.15.1 Folder Naming Convention**.)
- The SCHEMES folder allows read-write access to the owning discipline.
- No other discipline has access to the SCHEMES folder.
- The SCHEMES folder will not be archived with the project.

1.13.6.12 SHARED FOLDER

This folder is used as a sharing mechanism for non-CAD\BIM-related information between disciplines, such as e-mails, memos, spreadsheets, documents, estimates, specs, etc.

A discipline may copy its files into its own SHARED folder, making them available for other disciplines to use.

Rules of the SHARED folder:

- Sub-folders may be created in the SHARED folder. (Refer to **Section 1.15.1 Folder Naming Convention**.)
- The SHARED folder allows read-write access to the owning discipline.
- The SHARED folder allows read-only access to all other disciplines.
- The SHARED folder will not be archived with the project.

1.13.6.13 SUBMITTALS FOLDER

This folder is to be used for storing project information as it appears at each milestone of the project.

The image to the right illustrates the standardized sub-folders provided within SUBMITTALS.

While the BIM, MANAGEMENTDOCS, MODEL, PHOTOS, PLOTSHEETS and PUBLISH folders contain working information that changes throughout the life of project, the SUBMITTALS folder preserves the state of those files at the moment of each milestone.

> **NOTE**
>
> Before every submission, BIM Models should be purged of all unused information. Users will need to save their Local Files, synchronize with Central and Relinquish their Worksets.

Each discipline Task Leader is responsible for archiving their own discipline-specific Central Files into one of the sub-folders within SUBMITTALS. After verifying that all discipline Task Leaders has archived their folders, the LEA should notify the BIM/CAD Support Group.

Rules of the SUBMITTALS folder: (See Figure 1.13 7 Submittal Folder Structure)

- Sub-folders should not be created at the root level of the SUBMITTALS folder.
- The SUBMITTALS folder allows read-write access to the owning discipline.
- The SUBMITTALS folder allows read-only access to all other disciplines.
- All sub-folders under the SUBMITTALS folder will be archived with the project.
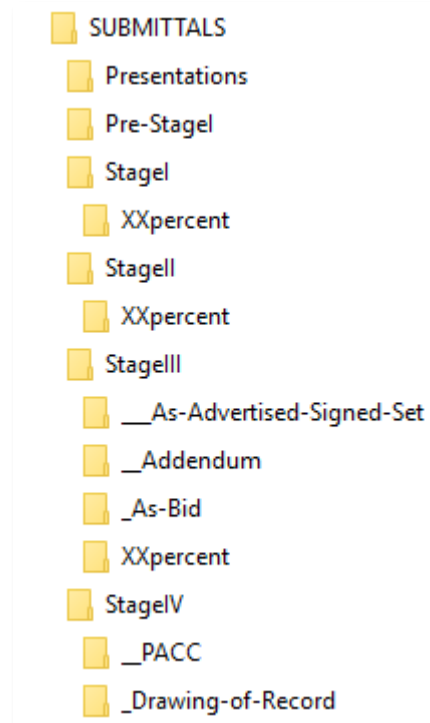
Figure 1.13-7 Submittal Folder Structure

1.13.6.13.1 PRESENTATIONS FOLDER

The Presentations folder might contain different file formats used for presentation purposes only.

Rules of the Presentations folder:

- Sub-folders may be created as long as they follow the naming convention of the default folder provided in which the letters XX are replaced by a two-digit number representing the percentage stage number.
- Only the BIM, MANAGEMENTDOCS, MODEL, PLOTSHEETS and PUBLISH folders should be copied into this folder.

1.13.6.13.2 PRE-STAGEI FOLDER

The Pre-Stage I (Pre-Conceptual Design) is necessary for some projects to compare alternatives before proceeding with Stage I (Conceptual Design)

Rules of the Pre-Stage I folder:

- Sub-folders may be created as long as they follow the naming convention of the default folder provided in which the letters XX are replaced by a two-digit number representing the percentage stage number.
- Only the BIM, MANAGEMENTDOCS, MODEL, PLOTSHEETS and PUBLISH folders should be copied into this folder.

1.13.6.13.3 STAGEI FOLDER

Stage I (Conceptual Design) is necessary for some projects to develop design concepts, determine anticipated construction costs and schedules, and to compare alternatives before proceeding with Design Development (StageII) or Final Design (StageIII).

Rules of the Stage I folder:

- Sub-folders may be created as long as they follow the naming convention of the default folder provided in which the letters XX are replaced by a two-digit number representing the percentage stage number.
- Only the BIM, MANAGEMENTDOCS, MODEL, PLOTSHEETS and PUBLISH folders should be copied into this folder.

1.13.6.13.4 STAGEII FOLDER

Stage II (Design Development) is necessary to develop the chosen design concept, further refine anticipated construction costs and schedules before proceeding with contract documents.

Rules of the Pre-Stage II folder:

- Sub-folders may be created as long as they follow the naming convention of the default folder provided in which the letters XX are replaced by a two-digit number representing the percentage stage number.
- Only the BIM, MANAGEMENTDOCS, MODEL, PLOTSHEETS and PUBLISH folders should be copied into this folder.

1.13.6.13.5 STAGEIII FOLDER

Stage III (Final Design) effort includes preparation of contract documents that will be used for construction.

Rules of the Pre-Stage III folder:

- Sub-folders may be created as long as they follow the naming convention of the default folder provided in which the letters XX are replaced by a two-digit number representing the percentage stage number.
- Only the BIM, MANAGEMENTDOCS, MODEL, PLOTSHEETS and PUBLISH folders should be copied into this folder.

1.13.6.13.5.1   As-Advertised-Signed-Set Sub-Folder

The signed and sealed 100% submission plotted on Permalife® paper is the "As Advertised Signed Set". Before submitting the As Advertised Signed Set all Design Options within the BIM models should be set to the Primary Option.

Rules of the As-Advertised-Signed-Set folder:

- Sub-folders should not be created in the As-Advertised-Signed-Set folder.

1.13.6.13.5.2   Addendum Sub-Folder

The Addendum Set contains drawings that have been modified or new drawings that have been issued after the original As Advertised Signed Set was signed and issued.

Addenda occur after the As Advertised Signed Set is issued. Not all addenda contain drawings; some may only contain specifications. Therefore, an Addendum Set may contain non-consecutive addenda sub-folders.

Rules of the Addendum folder:

- Sub-folders may be created as long as they follow the naming convention of the default folder provided in which the letters XX are replaced by a two-digit number representing the Addendum number.
- Only the BIM, MANAGEMENTDOCS, MODEL, PLOTSHEETS and PUBLISH folders should be copied into this folder.
- A set of PDF files should be created including only the drawings that have changed and/or drawings that have been added. Either a single-sheet PDF files (for non-consecutive drawings) and/or multi-sheet PDF files (for consecutive drawings).

> **NOTE**
>
> A new Contract Border should be used only on the drawings that have changed and/or have been added to the Addendum Set. Contact the BIM/CAD Support Group if you need to create a new Contract Border for the above Submissions.

1.13.6.13.5.3   As-Bid Sub-Folder

The As-Bid Set is the Awarded Set of Drawings that incorporates all the addenda that have been issued.

Rules of the As-Bid folder:

- Sub-folders should not be created in the As-Bid folder.

1.13.6.13.6   STAGEIV FOLDER

StageIV (Construction) effort includes preparation of contract documents while construction is in progress and completed.

1.13.6.13.6.1   PACC Sub-Folder

The PACC (Post Award Contract Changes) Set contains drawings that have been modified or new drawings that have been issued after the contract was awarded.

Rules of the PACC folder:

- Sub-folders may be created as long as they follow the naming convention of the default folder provided in which the letters XX are replaced by a two-digit number representing the PACC number.
- Only the BIM, MANAGEMENTDOCS, MODEL, PLOTSHEETS and PUBLISH folders should be copied into this folder.
- A set of PDF files should be created including only the drawings that have changed and/or drawings that have been added. Either a single-sheet PDF files (for non-consecutive drawings) and/or multi-sheet PDF files (for consecutive drawings).

> **NOTE**
>
> A new Contract Border should be used only on the drawings that have changed and/or have been added to the Addendum Set. Contact the BIM/CAD Support Group if you need to create a new Contract Border for the above Submissions.

1.13.6.13.6.2   Drawing-of-Record Sub-Folder

The Drawing-of-Record Set is the set of drawings created after construction is completed. This Set may also be called the "As-Built Set".

Rules of the Drawing-of-Record folder:

- Sub-folders should not be created in the Drawing-of-Record folder.

1.13.7 SAMPLE FOLDER STRUCTURE

The Sample Folder Structure, defined in this section, should be used to simplify the exchange of information among The Port Authority of NY & NJ departments, divisions, and functional groups as well as between The Port Authority of NY & NJ and outside resources (consultants and contractors).

Every discipline is provided with a folder in the project directory, in which all design-related data is to be stored. Consultants are required to use this folder structure when defining their Revit Central Files.

Three Sample Folder Structures have been provided with The Port Authority of NY & NJ BIM Standard, two of which address the Central File for Standards Projects and for Confidential and/or Confidential Privileged Projects respectively, and one which addresses the Local Files.

Central File folder:	The word "Facility Name" should be replaced with the Facility Code provided in **Section 1.15.1 Folder Naming Convention** Folders and the letters "PID" with the eight-digit PID Number provided by the LE/A or by the Discipline TL at the kickoff meeting.
Local File folder:	The word "Facility Name" should be replaced with the Facility Code provided in **Section 1.13.1 Facility Folders**, the letters "PID" with the eight-digit PID Number provided by either the LE/A or by the Discipline TL at the kickoff meeting and the word "Discipline" with one of the eight disciplines within the Port Authority of NY & NJ Engineering Department provided in **Section 1.13.6 Discipline Folder.**

A copy of both Sample Folder Structures can be found under:

K:\Application\EAD\BIM_Standards\2018\Sample Folder Structure

NOTE

The BIM/CAD Support Group is responsible for setting up all Revit Models either for internal use or when consultants are involved.

1.13.7.1   CENTRAL FILE

Each discipline's Central File folder has a series of standardized sub-folders that will contain various groups of design data.

1.13.7.1.1   STANDARD FOLDER

The image to the right (See Figure 1.13 8 Standard Discipline Folder Structure) shows the Central File Folder Structure for Standard Projects using the discipline Architectural Folder as an example for a project on PATH with a PID Number of 12951000.
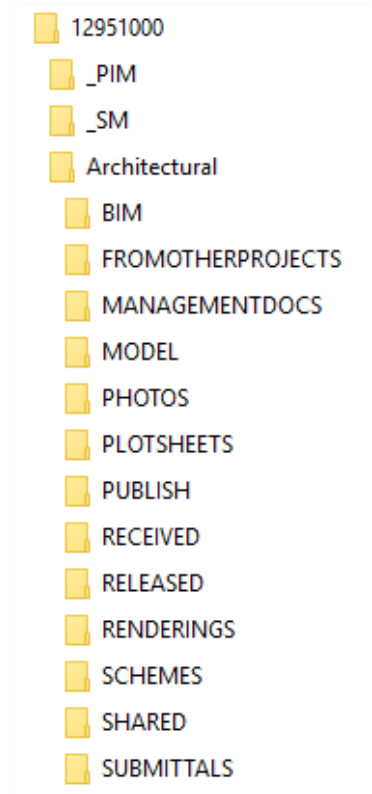
Figure 1.13-8 Standard Discipline Folder Structure

1.13.7.1.2   C & CP FOLDERS

The image to the right (See Figure 1.13 9 C & CP Folder Structure) shows the Central File Folder Structure for Confidential and/or Confidential Privileged Projects using the Electrical Discipline Folder as an example.
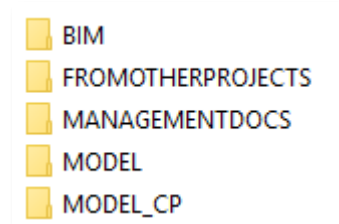
Figure 1.13-9 C & CP Folder Structure

1.13.7.2   LOCAL FILE

The Local version of the Central File described above should be saved on the user's local machine on a folder named as follows:

C:\Users\username\My Documents\Revit Projects

NOTE

It is highly recommended and best practice to create a new local file as least once a day.

1.14   REVIT TEMPLATES

All Revit projects must be created using one of the templates provided with the BIM Standard, which are:

- PA-TEMPLATE ARCHITECTURAL.rte
- PA-TEMPLATE ELECTRICAL.rte
- PA-TEMPLATE MECHANICAL.rte
- PA-TEMPLATE STRUCTURAL.rte
- PA-TEMPLATE VERTICAL TRANSPORTATION.rte

NOTE:

Do not alter the settings within the Template Files.

To promote consistency in the Contract Set as well as the Revit models created, the PANYNJ Revit templates contain several predefined Starting View, Project Browser, Shared Parameters, Loaded families, View templates, defined settings such as units, fill patterns, line styles, line weights, scales, text, dimensions, among others.

As to prevent the use of un-licensed fonts, all Port Authority of NY & NJ Text Styles, Dimension Styles, Leaders, Tags and Content have been defined using Arial font.

1.14.1 PROJECT INFORMATION VIEW

A Drafting View is included in all Project Templates that allows for important Project Information to be readily available upon opening the project, as it is set as the default starting View. It is recommended that for large multi-participant project files, this View is used when synchronizing with the Central model. (See Figure 1.14 1 Example of Project Information View)

For faster saving, Open and Save your file to this view only,
Close all other views before saving Local or to Central
Files.

THE PORT AUTHORITY OF NY & NJ

- ☐ Split levels are being used in this model
- ☐ Worksets are being used in this model
- ☐ Phasing is being used in this project
- ☐ Other models are linked to this model
- ☐ This model is being linked to another model or models
- ☐ Design options are being used in this model
- ☐ Shared Coordinates are being used in this model

ARCHITECTURAL TEMPLATE [PID]

Figure 1.14-1 Example of Project Information View

As the project evolves, please make sure that the appropriate boxes are checked to accurately reflect project information. Where any condition listed is true, click on the box, and from the Properties palette, click in the check box next to the *Check Mark* property. This will add an "X" into the box. As previously noted, this View is primarily intended to serve as a quick reference for anyone working in, or reviewing, the file. (See Figure 1.14 2 Example of Check Mark Property in Properties Tab)
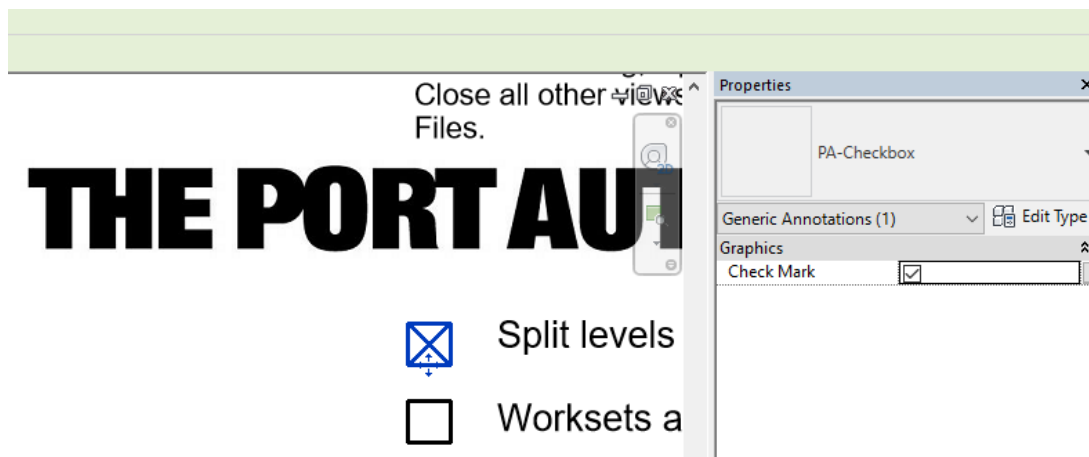
Figure 1.14-2 Example of Check Mark Property in Properties Tab

1.14.2 TEXT STYLES

Eight Text Styles have been defined within the Templates as follows:

- PA-NOTE 1.0/10"   (Use in general notes)
- PA-TEXT 0.5/10"   (Use in location plan notes)
- PA-TEXT 1.0/10"   (Use for text)
- PA-TEXT 1.5/10"   (Use for sub-titles)
- PA-TEXT 2.0/10"   (Use for regular titles)
- PA-TEXT 2.5/10"   (Use for big titles)
- PA-SCHEDULE TEXT 1   (Used for Schedules, already set up in templates)
- PA-SCHEDULE TEXT 2   (Used for Schedules, already set up in templates)

> **NOTE:**
>
> If additional (not existing within the template) styles are needed, those should be named following the existing styles naming convention, but instead of using "PA" use your company initials. All text styles should use the Font Arial.

1.14.3 DIMENSIONS STYLES

Three Dimension Styles have been defined within the Templates as follows:

- PA-DIM ARC
- PA-DIM DIAGONAL
- PA-DIM LINEAR

> **NOTE:**
>
> If additional (not existing within the template) styles are needed, those should be named following the existing styles naming convention, but instead of using "PA" use your company initials. All text styles should use the Font Arial.

1.14.4 GRIDS

Two Standard Grids have been provided as follows:

- PA-GRID HEAD EXISTING (for existing construction)
- PA-GRID HEAD NEW (for new construction)

1.14.5 ELEVATIONS

Four Standard Elevations have been provided under the Coordination View in the Project Browser as follows:

- EE-01-EAST COORDINATION VIEW
- EE-02-WEST COORDINATION VIEW
- EE-03-SOUTH COORDINATION VIEW
- EE-04-WEST COORDINATION VIEW

1.14.6 ANNOTATION SYMBOLS

Different Annotation symbols, such as, Generic Annotation, Tags, Symbols, Callouts among others have been pre-loaded within the Templates based on the Discipline.

NOTE:

If additional (not existing within the template) styles are needed, those should be named following the existing styles naming convention, but instead of using "PA" use your company initials. All text styles should use the Font Arial.

1.14.7 VIEW TITLE

All PA View Title families have a toggle control checkbox parameter ("View Scale") that allows for the scale to be hidden when the box is unchecked or displayed when the box is checked. Given the preference for the use of graphic scales in most projects, the View Title families have been set to have their scales hidden by default. See the following images: (See Figure 1.14-3 Example of View Title family and Type Properties)
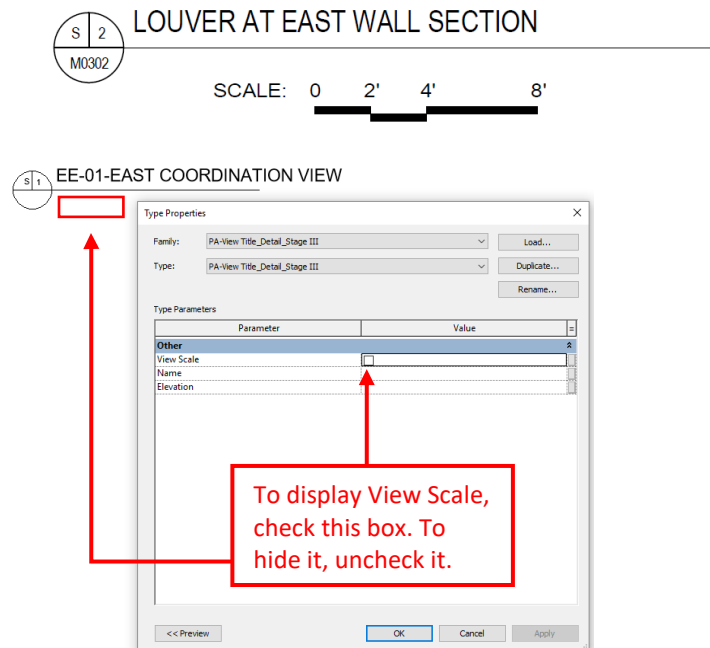
Figure 1.14-3 Example of View Title family and Type Properties

1.14.8 LINE WEIGHTS

Line Weights have been provided for Model, Annotation and Perspective Objects as follows.

1.14.8.1   MODEL, PERSPECTIVE AND ANNOTATION LINE WEIGHTS

Sixteen Line Weights have been provided for Model, Perspective and Annotation Objects, which have been defined at the 1/8" = 1' Scale.

Table 1.14-1

MODEL AND ANNOTATION LINEWEIGHTS	
PEN #	**WIDTH**
1	0.0040"
2	0.0080"
3	0.0100"
4	0.0120"
5	0.0140"
6	0.0160"
7	0.0180"
8	0.0200"
9	0.0240"
10	0.0280"
11	0.0320"
12	0.0360"
13	0.0400"
14	0.0440"
15	0.0480"
16	0.0720"

1.14.9 LINE STYLES

Sixteen Line Styles that match the sixteen Line Weights have been provided as follows:

NOTE:

If additional (not existing within the template) styles are needed, those should be named following the existing styles naming convention, but instead of using "PA" use your company initials. All text styles should use the Font Arial.

Table 1.14-2

LINE STYLES		
NAME	**PEN # (WIDTH)**	**LINE PATTERN**
PA - Pen#1	1 (0.0040")	Solid
PA - Pen#2	2 (0.0080")	Solid
PA - Pen#3	3 (0.0100")	Solid
PA - Pen#4	4 (0.0120")	Solid
PA - Pen#5	5 (0.0140")	Solid
PA - Pen#6	6 (0.0160")	Solid
PA - Pen#7	7 (0.0180")	Solid

PA - Pen#8	8 (0.0200")	Solid
PA - Pen#9	9 (0.0240")	Solid
PA - Pen#10	10 (0.0280")	Solid
PA - Pen#11	11 (0.0340")	Solid
PA - Pen#12	12 (0.0360")	Solid
PA - Pen#13	13 (0.0400")	Solid
PA - Pen#14	14 (0.0440")	Solid
PA - Pen#15	15 (0.0480")	Solid
PA - Pen#16	16 (0.0720")	Solid
PA - Contract Limit	11 (0.0302")	Center

1.14.10   LINE STYLES SCREENING

Five screened Line Styles have been provided as follows:

Table 1.14-3

LINE STYLES			
NAME	PEN # (WIDTH)	RGB	RGB COLOR
PA-Black 100%	1 (0.0040")	000-000-000	
PA-Black 80%	3 (0.0100")	050-050-050	
PA-Black 60%	5 (0.0140")	100-100-100	
PA-Black 40%	7 (0.0180")	150-150-150	
PA-Black 20%	9 (0.0240")	200-200-200	

NOTE

The lighter the Screening of the Line Style the thicker it has been set; this is because we need to ensure that screened Line Styles reproduce correctly when plotted on Permalife® plotter paper.

1.14.11   FILL PATTERNS

Several general Fill Patterns can be found at all templates.

Table 1.14-4

Fill PATTERNS		
PA-ANSI31	PA-Brick-02	PA-Gravel
PA-ANSI32	PA-Brick-03	PA-Hexagons
PA-ANSI33	PA-Brick-04	PA-Honey
PA-ANSI34	PA-Clay	PA-Hound
PA-ANSI35	PA-Cork	PA-Mudst
PA-ANSI36	PA-Cross	PA-Parquet-01
PA-ANSI37	PA-Dash	PA-Parquet-02
PA-ANSI38	PA-Dolmit	PA-Sacner
PA-Brass	PA-Dots	PA-Siding
PA-Brick-01	PA-Grate	PA-Trans
		PA-Triangles

NOTE:

Other "Out-of-the-Box" line patterns exist within the template to use.

If additional (not existing within the template) styles are needed, those should be named following the existing styles naming convention, but instead of using "PA" use your company initials. All text styles should use the Font Arial.

1.14.12   FILL REGIONS

Fill Regions (opaque and transparent) have been provided as follows:

Table 1.14-5

SCREENING		
FILLED REGION NAME	**RGB VALUE**	**RGB COLOR**
PA-Solid Black 100%	000-000-000	
PA-Solid Black 80%	050-050-050	
PA-Solid Black 60%	100-100-100	
PA-Solid Black 40%	150-150-150	
PA-Solid Black 20%	200-200-200	

NOTE:

Other "Out-of-the-Box" line patterns exist within the template to use.

If additional (not existing within the template) styles are needed, those should be named following the existing styles naming convention, but instead of using "PA" use your company initials. All text styles should use the Font Arial.

1.14.13   HALFTONE

Halftone has been set to 50%.

1.14.14   SCHEDULES

A series of Schedules for Engineering Estimates (ES) have been provided with the different Discipline Templates to support the Estimating process.

The Header and Body Text size of any custom Schedules needs to be set within the Appearance Tab as described in the Table below.

Table 1.14-6

SCHEDULES			
TEXT STYLE	**DESCRIPTION**	**FONT**	**HEIGHT**
PA-SCHEDULE TEXT 1	Header Text	Arial	19/128"
PA-SCHEDULE TEXT 2	Body Text	Arial	13/128"

NOTE

Schedules can be duplicated within the Revit Model so the Filter and Sorting/Grouping Categories can be used.

1.14.15   PHASES

Phases can be created to match the Project Phases as necessary. The LE/A is responsible for coordinating how many Phases the Project might have. Refer to **Section 1.15.6 – Phasing Naming Convention.**

Phase Status for Existing, Demolished, New and Temporary have been set as shown in the image below. (See Figure 1.14 4 Phasing Dialog Box)
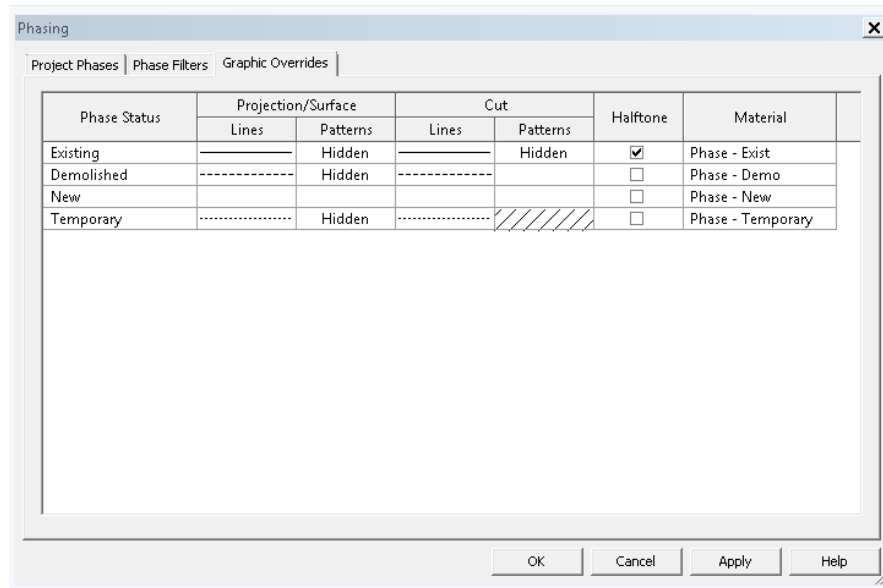
Figure 1.14-4 Phasing Dialog Box

1.14.16   ROOM COMPUTATION

The Room Computation has been enabled for Area and Volumes and has been set at wall finish as shown in the image below.
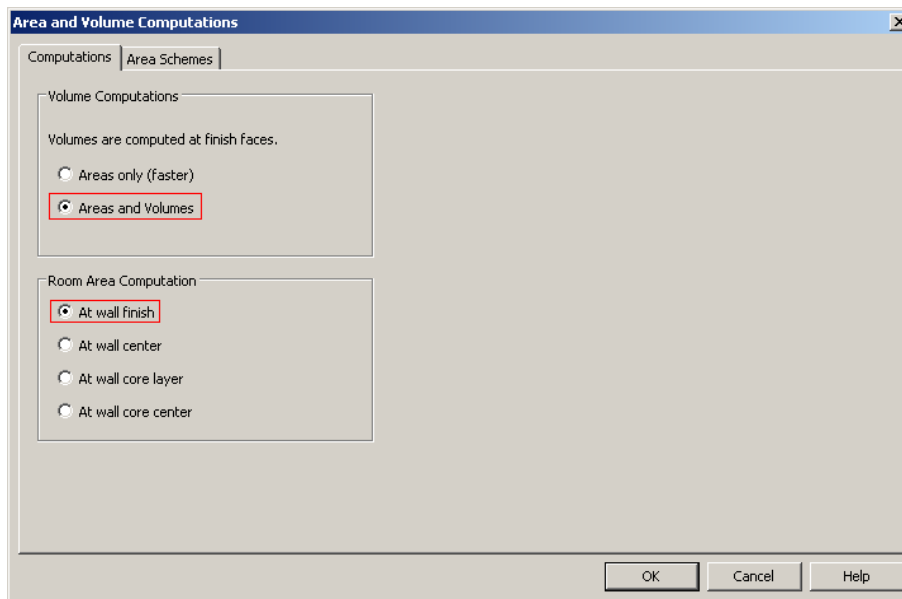
Figure 1.14-5 Area and Volume Computation Dialog Box

1.14.17   CONTENT

The Port Authority of NY & NJ BIM Standard Templates include out-of-the-box System Families, such as Columns, Beams, Walls, Roofs, Ceilings, Floors, etc. Users can customize this content as per project needs.

Loadable families such as Equipment, Furniture, Doors, etc. are permitted, but need to have the correct naming convention.

All The Port Authority of NY & NJ BIM computers have been configured to access Loadable Families from:

> **K:\Application\EAD\BIM_Standards\2018\Content**

1.15   NAMING CONVENTIONS

All electronic project information should be named following The Port Authority of NY & NJ BIM Standard Naming Conventions.

1.15.1 FOLDER NAMING CONVENTION

If sub-folders are needed and permitted by the Folder's Rules, they can be created under the predefined Project Folder Structure and should follow the Folder Naming Convention.

The folders should be named using the following format:

📁 YYYY-MM-DD-Description

Example: 2015-04-01-Filled Sketches

Table 1.15-1

ITEM	DESCRIPTION
YYYY	Four-digit Year
MM	Two-digit Month
DD	Two-digit Day
Description (optional)	Brief User Description (up to 24 characters) The following characters should not be used as part of the description @ $ % ^ & < > / \ " " : ; ? * | , '

NOTE

Refer to **Section 1.13.6 Discipline Folder** for each Discipline's folder rules before creating a subfolder.

1.15.2 FILE NAMING CONVENTION

All electronic files should be named following the File Naming Convention, including Revit files (RVT), Plotsheet files (PDF), Revit Family files (RFA), AutoCAD files (DWG), Image files (JPG, MOV), Animation files (AVI), Microsoft Office files (DOC, XLS, HTML, TXT), Navisworks files (NWF, NWC, NWD) and Analysis files (multiple formats) and Rhino files (SAT).

1.15.2.1 DISCIPLINE CODES

There are eight disciplines within The Port Authority of NY & NJ Engineering Department as described in **Section 1.13.6 Discipline Folder**. All electronic files should be named beginning with the appropriate Discipline Code based on the following table.

Table 1.15-2

DISCIPLINE CODE	DISCIPLINE NAME
A	Architectural
C	Civil
E	Electrical
N	Environmental
G	Geotechnical
M	Mechanical
S	Structural
T	Traffic

1.15.2.2 REVIT CENTRAL FILE

The Central file should be named beginning with the Discipline Code, an eight-digit PID Number, a dash, a Model Type, an underscore and the word "CENTRAL". Once defined, the Central File name should not change through the life of the project.

For certain projects, a Discipline's work may be divided into several models. Very often, this happens for large projects where file size would otherwise be an issue. For example, the Architectural Discipline may split a large building design into a Core model and a separate Shell model. Another situation that may necessitate a single Discipline creating multiple separate models is where the design work is divided among multiple consultants. For example, Plumbing and Fire Protection designs might be handled by two different specialty consultants, in which case each will need to create their own model with a unique file name.

If a Discipline only has one Model file, the "3D" Type Code shall be used; the "3D" Type Code may also be used for the main model in cases where there are several models to a single Discipline. For example, the Electrical model may be labeled as "E12345678-3D_CENTRAL" in cases where a separate Electronics model also exists.

The filename should take the form of: DPID–MT_CENTRAL.rvt

Table 1.15-3

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 - Discipline Codes**
PID	Eight-digit PID Number
MT	Model Type Code Refer to chart below
CENTRAL	This shall stay as is

Model Types:

Table 1.15-4

MODEL TYPE CODE	DESCRIPTION
GENERAL	
3D	3D Model
EC	Existing Conditions Model
PC	Point Cloud Model
SC	Site Context Model
RM	Removal
BR	Bridges
PBB	Pedestrian Boarding Bridges
TR	Terminal
ARCHITECTURAL	
CNP	Canopy
FFE	Furniture Fixtures and Equipment
CR	Core
SH	Shell
ELECTRICAL	
CP	Corrosion Protection
ES	Electronics
FP	Facility Power
LG	Lighting
SA	SCADA
SG	Signage
TP	Traction Power
MECHANICAL	
BH	Baggage Handling
HVAC	Heating, ventilation, and air conditioning
FP	Fire Protection
PL	Plumbing
STRUCTURAL	
SS	Superstructure
SB	Substructure

As an example, the Architectural Group is saving their Revit Model as a Central File to a network drive.

The file should be named as follows: A07963000-3D_CENTRAL.rvt

NOTE

After you save the Central File, Revit creates two folders: one named "YOUR FILE NAME_backup" and another folder named "Revit_temp". Neither the folders nor the files contained within it should be moved, renamed, or deleted.

1.15.2.3   **REVIT LOCAL FILE**

The filename should take the form of: DPID–MT_CENTRAL_username.rvt

Table 1.15-5

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
MT	Model Type Refer to chart under Central files **Section 1.15.2.1 Discipline Codes**

As an example, the Architectural Group is saving their Revit Model as a Local File to their local drives.

The file should be named as follows: A07963000-3D_CENTRAL_username.rvt

NOTE

> After you save the Local File, Revit creates a folder named "YOUR FILE NAME_backup." Do not move, rename, or delete this folder or the files within.

1.15.2.4   **PLOTSHEET FILES**

Plotsheet files should be generated out of the Revit Models in PDF format.

Name the Plotsheet files using this format: DPID–DT–001_###.pdf

Table 1.15-6

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
DT	Drawing Type Refer to **Section 1.15.3 Drawing Type Naming Convention**
001_###	First Sheet Number to Last Sheet Number Refer to **Section 1.15.4 Sheet Number Naming Convention**

When using Series Numbers, either Level 1 or Level 2, as described in **Section 1.15.4 Sheet Number Naming Convention**, the PDF files should be named not only by grouping them together by Drawing Type but also by their Series Number.

Example 1

The Architectural Group is creating a set of drawings using Level 1 (without using the Series Number), which include the General drawings (1 through 7), Architectural drawings (1 through 37), and Landscape drawings (1 through 11) for a project with a PID Number of 07963000, three multi-sheet files should be created and named as follows:

> A07963000-G001_G007.pdf
> A07963000-A001_A037.pdf
> A07963000-LS001_LS011.pdf

Example 2

The Architectural Group is creating a set of drawings using Level 1 (using the Series Number), where the Series 1 are being used to describe their plan drawings (1 through 3) and Series 4 are being use to describe their elevation drawings (1 through 7) for a project with a PID Number of 07963000, two multi-sheet files should be created and named as follows:

> A07963000-A101_A103.pdf
> A07963000-A401_A407.pdf

Example 3

The Architectural Group is creating a set of drawings using Level 2 (using the Series Number), where the Series 01 are being used to describe their plan drawings (1 through 5) and Series 02 are being use to describe their section drawings (1 through 3), for a project with a PID Number of 07963000, two multi-sheet files should be created and named as follows:

> A07963000-A0101_A0105.pdf
> A07963000-A0201_A0203.pdf

1.15.2.5   REVIT ANNOTATION FAMILY FILES

Annotation Family files, including the Contract Border, shall be named with the prefix "PA-", followed by a description. Several standardized Annotation Families are provided with each of the PANYNJ project templates, and their names shall not be changed.

File names for Contract Border families used for addenda shall take the name of the Contract Border file as received from PANYNJ, but have a dash (-) followed by the date of the addendum appended at its end in the form -YYYY_MM_DD. The original Contract Border shall remain unchanged and both files will co-exist within the Publish folder. Contact the BIM/CAD Support Group if you need to create a new Contract Border for any of the above Submissions.

Examples for Annotation Families

- PA-Callout Head Detail.rfa
- PA-Ceiling Tag.rfa
- PA-North Arrow.rfa

1.15.2.6   REVIT MODEL FAMILY FILES

Family files other than the Contract Border and Annotation Families shall be named beginning with the Revit Object Category followed by the Manufacturer of the product or the word "Generic", and ending with a Description and/or a Model Number.

The filename should take the form of:

 <Category>-<Manufacturer>-< Description and/or Model Number>.rfa

Table 1.15-7

ITEM	DESCRIPTION
Category	Names the element that the family creates
Manufacturer	Manufacturer Name or the word "Generic". Underscores (_) may be used in place of dashes (-) for multi-segment Manufacturer names.
Description and/or Model Number	A brief Description and/or a Model Number. Underscores (_) may be used in place of dashes (-) for multi-segment Descriptions or if a Model Number is included with a Description. The following characters should not be used as part of the description: @ $ % ^ & < > / \ " " : ; ? * | , '

When naming Family Files keep in mind the following:

- Capitalize the leading letters in each portion of the family name.
- Keep file names as short as possible because they need to display in the Type Selector.
- Create a Type Catalog for Family files that contain five or more types.
  See **Section 1.15.2.7 Type Catalogs Files.**

Examples for Model Families

- Windows-Andersen-Double Hung_400 Series_Archtop.rfa
- Plumbing Fixtures-Generic-Oval Undercounter Sink.rfa
- Structural Framing-Generic-Steel Girder.rfa
- Electrical Equipment-Square D-Distribution Panelboard.rfa

    NOTE

    Standard Port Authority Families exclude the element object category from their names for ease of identification

1.15.2.6.1   FAMILY TYPES

Types within a Family file should indicate the key differences or variations between the different Family options. Depending on the Family Component the Type names might take one of the following forms:

    <Model> or <Series Number>
    <Value> or <Capacity>
    <Width>x<Depth>x<Height>

NOTE

- Capitalize the leading letters in each portion of the Type Name (when applicable).
- When Types are named by size, use dimensions only.
- Keep file names as short as possible because they need to display in the Type Selector.
- Create a Type Catalog for Family files that contain five or more types. See **Section 1.15.2.7 Type Catalogs Files.**

Examples

Windows-Andersen-Double Hung_400 Series_Archtop.rfaWA1832

- WA2032
- WA2432

Plumbing Fixtures-Generic-Oval Undercounter Sink.rfa

- Standard Height
- ADA Height

Structural Framing-Generic-Steel Girder.rfa

- W6x10
- W6x12

Electrical Equipment-Square D-Distribution Panelboard.rfa

- 208V MCB - Surface
- 480V MLO - Surface

1.15.2.7   TYPE CATALOGS FILES

Create a Type Catalog for Family files that contain five or more types or when the Family file exceeds 500 Kb in size.

Name the Type Catalog file (.TXT) with the same name as the Family file (.RFA) that it supports.

NOTE

- If a Type Catalog is used, no predefined Types should exist in the Family file.
- Do not include the Family Name in the Type Name.
- Type Names should mirror actual usage.
- Capitalize the leading letters in each portion of the Type Name (when applicable).
- When Types are named by size, use dimensions only.
- Keep file names as short as possible because they need to display in the Type Selector.

Examples

Windows-Andersen-Double Hung_400 Series_Archtop.rfa

- Windows-Andersen-Double Hung_400 Series_Archtop.txt

Plumbing Fixtures-Generic-Oval Undercounter Sink.rfa

- Plumbing Fixtures-Generic-Oval Undercounter Sink.txt

Structural Framing-Generic-Steel Girder.rfa

- Structural Framing-Generic-Steel Girder.txt

1.15.2.8   MATERIALS

Materials should be named beginning with the Finish Material followed by the Manufacturer Name, the Finish Code and an optional User Description.

The filename should take the form of: <Finish>-<Manufacturer>-<Code>-<Description>

Table 1.15-8

ITEM	DESCRIPTION
Finish	Finish Material
Manufacturer	Manufacturer Name or Generic Primary Characteristic or Shape
Finish Code	Finish Code or Model Number
User Description (Optional)	Brief description (up to 24 characters) The following characters should not be used as part of the description @ $ % ^ & < > / \ " " : ; ? *	, '

NOTE
Capitalize the leading letters in each portion of the Material Name.

Examples

- Paint-Sherwin Williams-SW6034-Arresting Auburn
- Glass-Pilkington-Evergreen 3/16"-Uncoated Insulated

1.15.2.8.1   BITMAP FILES

Bitmap files used to define Materials within Revit should match the corresponding Materials they represent and should be in .JPG format

Examples

Paint-Sherwin Williams-SW6034-Arresting Auburn

- Paint-Sherwin Williams-SW6034-Arresting Auburn.jpg

Glass-Pilkington-Evergreen 3/16"-Uncoated Insulated

- Glass-Pilkington-Evergreen 3/16"-Uncoated Insulated.jpg

1.15.2.9   AUTOCAD FILES

AutoCAD files linked to the Revit Model should be named beginning with the Discipline Code, followed by the eight-digit PID Number, an optional two-digit Drawing Type and/or Sequence Number and an optional User Description. Once defined, the AutoCAD file name should not change for the life of the project.

The filename should take the form of: DPID–SN/DT–Description.dwg

Table 1.15-9

ITEM	DESCRIPTION
D	Discipline Code **Refer to Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
DT/SN (Optional)	Drawing Type / Sequence Number (Drawing Type based on PANYNJ CAD Standards / Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 24 characters) The following characters should not be used as part of the description: @ $ % ^ & < > / \ " " : ; ? * | , '

Example 1

As an example, the Structural Group is linking three AutoCAD files into their Revit Model. The files should be named as follows:

    S07963000-01-First Floor.dwg
    S07963000-02-Second Floor.dwg
    S07963000-03-Roof.dwg

Example 2

As an example, the Structural Group is linking three AutoCAD files into their Revit Model. The files should be named as follows:

    S07963000-FP-First Floor.dwg
    S07963000-FP-Second Floor.dwg
    S07963000-FP-Roof.dwg

Example 3

As an example, the Structural Group is linking three AutoCAD files into their Revit Model. The files should be named as follows:

    S07963000-FP01-First Floor.dwg
    S07963000-FP02-Second Floor.dwg
    S07963000-FP03-Roof.dwg

NOTE

Only AutoCAD files in DWG format should be linked into the Revit Model.

1.15.2.10   POINT CLOUD FILES

Point Cloud files linked to the Revit Model should be named beginning with the Discipline Code, followed by the eight-digit PID Number, a dash, an optional Sequence Number, a dash, and an optional User Description. Once defined, the Point Cloud file name should not change for the life of the project.

The filename should take the form of: DPID–Description.pcg

Table 1.15-10

ITEM	DESCRIPTION
D	Discipline Code **Refer to Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
/SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 24 characters) The following characters should not be used as part of the description @ $ % ^ & < > / \ " " : ; ? * | , '

Revit will index the Raw Point Cloud File (FLS, FWS, LAS, PTG, PTS, PTX, XYB, XYZ) before insertion creating a new compressed file on the same folder but with the extension PCG. The file should be named as follows:

A06497000-Washington St. Shaft.pcg

NOTE

Point Cloud files can contain millions of points and therefore be extremely large in size. Depending on the project needs, the level of accuracy or point density should be determined beforehand to avoid having unnecessary information.

1.15.2.10.1 QUICKTIME FILES

QuickTime files delivered with the Point Cloud file should be named beginning with the Discipline Code, followed by the eight-digit PID Number, a two-digit Sequence Number and an optional User Description.

The filename should take the form of: DPID-SN–Description.mov

Table 1.15-11

ITEM	DESCRIPTION
D	Discipline Code **Refer to Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
SN	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 24 characters)

1.15.2.11   IMAGE FILES

Image files linked to or created from the Revit Model should be named beginning with the Discipline Code, followed by the eight-digit PID Number, an optional Sequence Number and an optional User Description. If Image files are referenced into the Revit Model, once defined, the Image file name should not change through the life of the project.

The filename should take the form of: DPID–SN–Description.jpg

Table 1.15-12

ITEM	DESCRIPTION
D	Discipline Code **Refer to Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 24 characters) The following characters should not be used as part of the description @ $ % ^ & < > / \ " " : ; ? * | , '

As an example, the Architectural Group is linking two image files into their Revit BIM Model. The files should be named as follows:

A07963000-01-Signage A1.jpg
A07963000-02-Signage A2.jpg

NOTE

Only Image files in JPG format should be linked into, or created from, the Revit Model.

1.15.2.12   ANIMATION FILES

Animation files created from the Revit Model should be named beginning with the Discipline Code, followed by the eight-digit PID Number, an optional Sequence Number and an optional User Description.

The filename should take the form of: DPID–SN–Description.avi

Table 1.15-13

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 - Discipline Codes**
PID	Eight-digit PID Number
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 24 characters)

As an example, the Architectural Group is creating an animation file out of their Revit Model. The file should be named as follows:

A07963000-01-Walkthrough Exterior.avi

NOTE

Only Image files in AVI format should be created from the Revit Model.

1.15.2.13   MICROSOFT OFFICE FILES

Microsoft Office files created from the Revit Model should be named beginning with the Discipline Code, followed by the eight-digit PID Number, an optional Sequence Number and an optional User Description.

The filename should take the form of: DPID–SN–Description.format

Table 1.15-14

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 24 characters)

As an example, the Mechanical Group is exporting two schedules out of their Revit Model into Excel. The files should be named as follows:

M07963000-01-Equipment List.xls
M07963000-02-Loads.xls

NOTE

Only Microsoft Office Word, Excel, Hyper Text Markup Language and Text files, in DOC, XLS, HTML and TXT format, respectively, shall be created from the Revit Model.

1.15.2.14   3D DWF FILES

3D DWF Files created from the Revit Model should be named beginning with the Discipline Code, followed by the 8-digit PID Number and the letters 3D.

The filename should take the form of: DPID–3D.dwf

Table 1.15-15

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number
3D	3D Model (this may remain as is)

As an example, the Electrical Group is exporting their Revit BIM Model as a 3D DWF.

The file should be named as follows:

E07963000-3D.dwf

NOTE

The 3D DWF files will be used for cost estimate, quantity takeoff, and visualization purposes.

1.15.2.15   NAVISWORKS CACHE FILES

Navisworks Cache files created from the Revit Model should be named beginning with the Discipline Code, followed by the eight-digit PID Number and the characters "3D".

The filename should take the form of: DPID–3D.nwc

Table 1.15-16

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 Discipline Codes**
PID	8-digit PID Number
3D	3D Model (this may remain as is)

As an example, the Architectural Group is exporting their Revit Model as a Navisworks Cache file.

The file should be named as follows:

A07963000-3D.nwc

NOTE

Navisworks Cache Files in NWC format stores the project model geometry.

1.15.2.16   NAVISWORKS MASTER FILE SET FILES

Navisworks Master File Set files created by assembling the Discipline specific Navisworks Cache files from Navisworks Manage should be named beginning with the eight-digit PID Number and the characters "3D".

The filename should take the form of: PID–3D.nwf

Table 1.15-17

ITEM	DESCRIPTION
PID	Eight-digit PID Number
3D	3D Model (this may remain as is)

As an example, the LE/A has assembled all Discipline's Navisworks Cache files into a Navisworks Master file.

The file should be named as follows:

07963000-3D.nwf

NOTE

The LE/A is responsible for assembling all discipline's Navisworks Cache files into a Navisworks Master file.

Navisworks Master files in NWF format stores the links to the appended NWC files, but no project model geometry.

1.15.2.17 NAVISWORKS MASTER CONSOLIDATED FILES

Navisworks Master Consolidated files created by merging or publishing the Discipline specific Navisworks Cache files from Navisworks Manage should be named beginning with the eight-digit PID Number and the characters "3D".

The filename should take the form of: PID–3D.nwd

Table 1.15-18

ITEM	DESCRIPTION
PID	Eight-digit PID Number
3D	3D Model (this may remain as is)

As an example, the LE/A has assembled all Discipline's Navisworks Cache files into a Navisworks Master file.

The file should be named as follows:

07963000-3D.nwd

NOTE

The LE/A is responsible for assembling all discipline's Navisworks File Set files into a Navisworks Master Consolidated file.

Navisworks Master files in NWD format contains all project model geometry as well as views and redlines.

1.15.2.18 ANALYSIS FILES

Multiple applications will be used to perform different types of analysis within the different Revit Models.

Analysis files should be named beginning with the Discipline Code, followed by the eight-digit PID Number, an optional Sequence Number and an optional User Description.

The filename should take the form of: DPID–SN–Description.format

Table 1.15-19

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 Discipline Codes**
PID	Eight-digit PID Number

SN (Optional)	Sequence Number (Two-digit consecutive numbers starting with 01)
Description (Optional)	Brief User Description (up to 12 characters) The following characters should not be used as part of the description: @ $ % ^ & < > / \ " " : ; ? * | , '

NOTE

Regardless of the application used to perform the analysis within the Revit-based applications, the results of such applications shall be brought back into the Revit 3D Model. This will ensure that the Revit 3D Model has the latest and most recent information.

1.15.3 DRAWING TYPE NAMING CONVENTION

Drawing Types are categories used to organize the Contract Set of Drawings and refer to either one or two letters that appear before the Sheet Number in the lower right-hand corner of each sheet.

The image to the right shows an example of a Structural drawing:

The following table shows the Drawing Types Convention to be used on BIM Projects.

Table 1.15-20

ALL DISCIPLINES	
CS	Construction Staging or Sequence
G	General
SK	Stage IV Sketch Sheets (For Stage IV use only)
ARCHITECTURAL	
A	Architectural
LS	Landscape
CIVIL	
C	Civil
ML	Marking Lighting & Signage
ELECTRICAL	
CP	Corrosion Protection
E	Electrical
ES	Electronics
ENVIRONMENTAL	
N	Environmental
GEOTECHNICAL	
GT	Geotechnical Plan
MECHANICAL	
B	Baggage Handling
FP	Fire Protection
M	Mechanical
P	Plumbing
SP	Sprinkler

It is a violation of law for any person to alter a document in any way, unless acting under the direction of a licensed professional engineer or registered architect. If this document bearing the seal of an engineer/architect is altered, the altering engineer/architect shall affix to the document their seal and the notation "altered by" followed by their signature and the date of such alteration, and a specific description of the alteration.

Designed by	T. Bal
Drawn by	N. Dellarosa
Checked by	J. Quiroz
Date	08/01/2015
Contract Number	**WORK ORDER No.**
Drawing Number	**S001**
	PID#

Figure 1.15-1 Example of Drawing Type Name

VT	Vertical Transportation
STRUCTURAL	
S	Structural
TRAFFIC	
ITS	Intelligent Transportation Systems
MT	Maintenance of Traffic
SG	Signal Plan
T	Traffic

1.15.4 SHEET NUMBER NAMING CONVENTION

The Sheet Number Convention refers to the numbers that appear right after the Drawing Type and are used to organize the Contract Drawings in order.

The image to the right shows this concept, taking as an example a Structural Drawing.

The Port Authority of NY & NJ BIM Standard adopts two types of Sheet Number Conventions to provide flexibility when numbering the Contract Set of Drawings:

It is a violation of law for any person to alter a document in any way, unless acting under the direction of a licensed professional engineer or registered architect. If this document bearing the seal of an engineer/architect is altered, the altering engineer/architect shall affix to the document their seal and the notation "altered by" followed by their signature and the date of such alteration, and a specific description of the alteration.

Designed by	T. Bal
Drawn by	N. Dellarosa
Checked by	J. Quiroz
Date	08/01/2015
Contract Number	**WORK ORDER No.**
Drawing Number	**S001**
	PID#

Figure 1.15-2 Example of Drawing Number

Level I	Based on the Drawing Type (Refer to **Section 1.15.3 - Drawing Type Naming Convention**) plus three digits.
Level II	Based on the Drawing Type (Refer to **Section 1.15.3 - Drawing Type Naming Convention**) plus four digits.

At the beginning of each project, the LE/A will determine whether a Level I or a Level II format will be used for all Disciplines of the project. A description of what each number in a series represents will be defined by each Discipline's Task Leader. These two formats cannot co-exist on the same project.

1.15.4.1 LEVEL I

For projects in which series are not used or with nine or less series, the identification format should include a one-letter or two-letter Drawing Type followed by a one-digit Series Number, followed by a two-digit Sheet Counter Number.

Use Level I Sheet Number Convention for projects that do not require detailed sheet numbering.

The Sheet Number should take the form of:

Without using Series

- Use a "0" as the Series Number for projects where the number of drawings does not exceed 999 sheets.
- All drawings should be consecutive starting from 001

Using Series

- Use "1" through "9" as the Series Number for projects where a more detailed breakdown is required and the number of drawings per series does exceed 99 sheets.
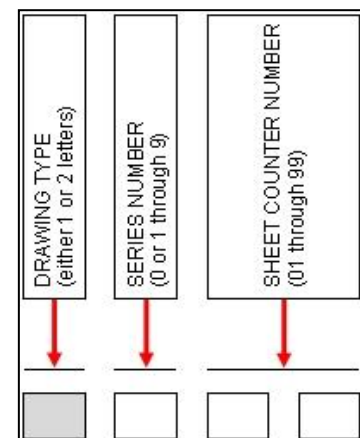
Figure 1.15-3 Sheet Number Convention

- The Sheet Counter Number should be a two-digit number and shall always start withdrawing, "01" when series are used.

The images below show this concept for both options within Level I. The image to the left shows an example for a project without using Series and the image to the right shows an example for a project in which Series "1" is being used.

Figure 1.15-4 Example of Sheet Number without using Series

Figure 1.15-5 Example of Sheet Number with using Series

1.15.4.2 LEVEL II

For projects with more than nine series, the identification format should include a one-letter or two-letter Drawing Type followed by a two-digit Series Number, followed by a two-digit Sheet Counter Number.

Use Level II Sheet Number Convention for complex projects for which Level I Series are not sufficient.

The Sheet Number should take the form of:

- Use "01" through "99" as the Series Number for projects where a more detailed breakdown is required and the number of drawings per series does exceed 99 sheets.
- The Series Number shall be a two-digit number and shall always start with "01."
- The Sheet Counter Number should be a two-digit number and shall always start withdrawing "01."
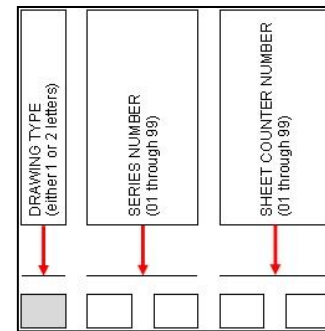

Figure 1.15-6 Sheet Number Convention

The image to the right shows this concept for Level II taking as an example a project in which Series "01" is being used.

Figure 1.15-7 Example of Level II Sheet Number

1.15.5 WORKSETS NAMING CONVENTION

When naming Worksets, The Port Authority of NY & NJ BIM Standard adopts two different approaches based on the size and complexity of the project.

Each discipline shall determine which of the two approaches better fits their design needs. The Worksets Naming Convention is discipline specific, not project specific; therefore, these two formats will be able to co-exist within the same project.

The image below shows the default Worksets supported by both approaches, which are:

- Linked Files-Default
- Reference Elements-Shared Levels and Grids
- Active Project-Default
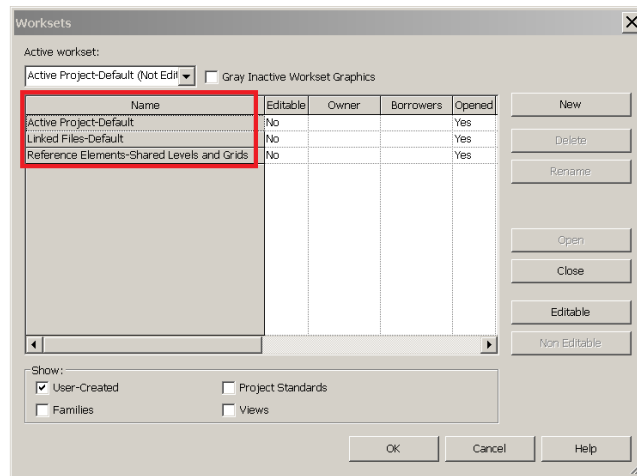
Figure 1.15-8 Default Worksets

1.15.5.1 WORKSETS BASED ON LOCATION

Worksets based on location should be named according to where the elements are spatially located within the project.

The Workset should take the form of: <Location>-<Description>

Table 1.15-21

ITEM	DESCRIPTION
Location	Location within the project.
Description	Brief User Description (up to 24 characters) The following characters should not be used as part of the description @ $ % ^ & < > / \ " " : ; ? * | , '

NOTE

- This approach is most suitable for small-to-medium size projects in which a small team is part of the project.
- Capitalize the leading letters in each portion of the Workset name.
- Keep file names as short as possible.

The image to the right shows the Worksets for a project done by the Architectural Group in which they are proposing 4 Worksets named as follows:

- Northeast-Head House
- Northwest-Head House
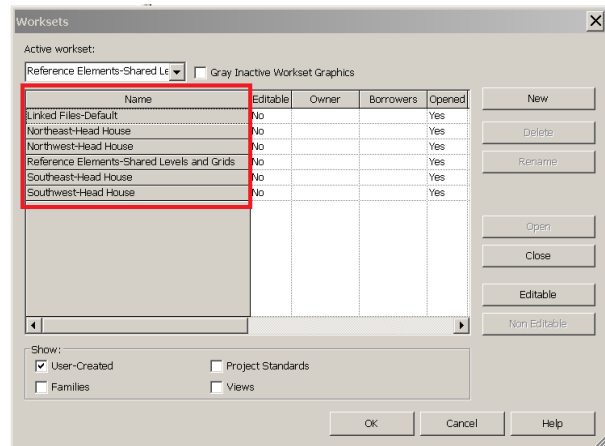- Southeast-Head House
- Southwest-Head House

Figure 1.15-9 Example of Location based Workset Names

1.15.5.2   WORKSETS BASED ON FUNCTION\SYSTEM

Worksets based on Function should be named according to what each logical component or system represents within the project.

The Workset should take the form of: <Function\System>-<Description>

Table 1.15-22

ITEM	DESCRIPTION
Function\System	Function or system within the project. Refer to chart below.
Description	Name of logical component or system within the project. Refer to chart below.

NOTE

- This approach is most suitable for medium-to-large size projects in which a large team is part of the project.
- Capitalize the leading letters in each portion of the Workset name.
- Keep file names as short as possible.

1.15.5.2.1   ALL DISCIPLINES

Table 1.15-23

FUNCTION\SYSTEM	DESCRIPTION
Linked Files	Architecture
	Electrical
	Mechanical/Fire Protection/Plumbing
	Structural
	Default

1.15.5.2.2   ARCHITECTURAL DISCIPLINE

Table 1.15-24

FUNCTION\SYSTEM	DESCRIPTION
Building Exterior	Entourage
	Landscape
	Roof
	Walls
Building Interior	Ceilings
	Equipment
	Fixtures
	Furniture
	Lighting
	Slabs
	Vertical Circulation
	Walls

1.15.5.2.3   ELECTRICAL DISCIPLINE

Table 1.15-25

FUNCTION\SYSTEM	DESCRIPTION
Corrosion Protection	Cathodic
Electrical	Auxiliary Power
	Grounding
	Lighting
	Lightning
	Power
Electronics	Access Control
	Fire Alarm
	Radio
	Network
	Public Address
	Security
	Telecommunications

1.15.5.2.4   MECHANICAL DISCIPLINE

Table 1.15-26

FUNCTION\SYSTEM	DESCRIPTION
Fire Protection	Foam
	FM200
	Sprinkler
HVAC	Chill Water
	Controls
	Ductwork
	Equipment

FUNCTION\SYSTEM	DESCRIPTION
	Hot Water
	Steam
Plumbing	Compress Air
	Domestic Cold Water
	Domestic Hot Water
	Domestic Hot Water Return
	Fixtures
	Natural Gas
	Sanitary Sewer
	Sanitary Ventilation
	Storm
Vertical Circulation	Baggage Handling
	Elevators
	Escalators

1.15.5.2.5   STRUCTURAL DISCIPLINE

Table 1.15-27

FUNCTION\SYSTEM	DESCRIPTION
Columns	Concrete
	Steel
	Wood
Foundation	Concrete
	Steel
Framing	Concrete
	Steel
	Wood
Slabs	Concrete
	Steel
	Wood

The image to the right shows the Worksets for a project done by the Structural Group in which they are proposing 2 Worksets named as follows:
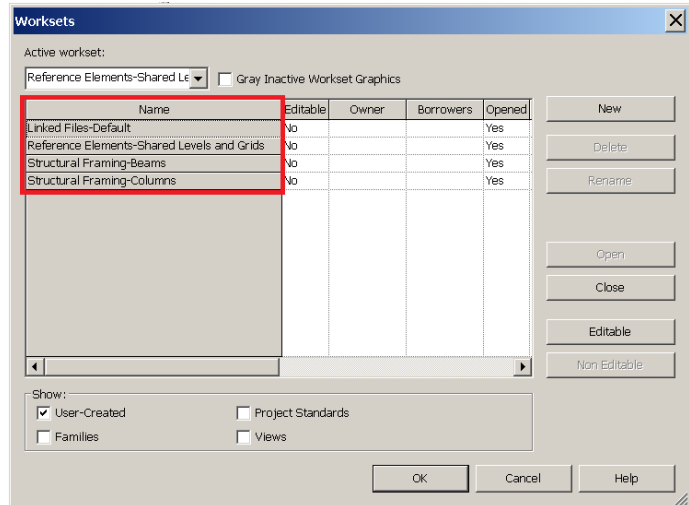
- Structural Framing-Columns
- Structural Framing-Beams

Figure 1.15-10 Example of Function based Workset Names

1.15.6 PHASING NAMING CONVENTION

If used, Phases within the Project shall be named beginning with the word "Phase", a space and a Roman Numeral.

The Phases should take the form of: Phase RN

Table 1.15-28

ITEM	DESCRIPTION
Phase	This shall stay as is
RN	Roman Number (Phases should be consecutive numbers starting with I)

At the beginning of each project, the LE/A will determine how many Phases the Project might have. All other Disciplines are required to recreate and match those Phases on their Revit Models.
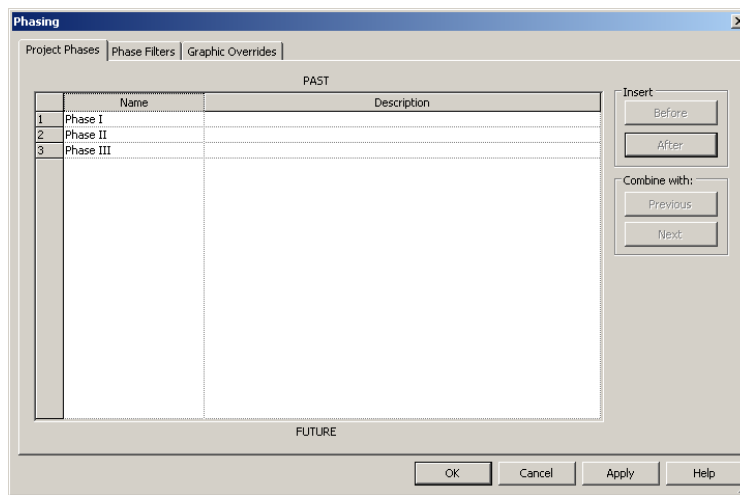
Figure 1.15-11 Phasing Dialog Box

As an example, if the Electrical Group is Group is creating two Phases on a Project, the Phases should be named as follows:

- Phase I
- Phase II
- Phase III

NOTE

At the beginning of each project, the LE/A will determine how many Phases the project might have so each Discipline's Task Leader can duplicate and map them on their own Revit Models.

1.15.7 LEVELS NAMING CONVENTION

Levels should be named beginning with the Discipline Code, a dash and the word "Level" followed by the Level Number.

The Levels should take the form of: D-LEVEL LN

Table 1.15-29

ITEM	DESCRIPTION
D	Discipline Code Refer to **Section 1.15.2.1 - Discipline Codes**
Level	This shall stay as is
LN	Datum Elevation or Level Number

When naming Levels, The Port Authority of NY & NJ BIM Standard adopts two different approaches based either on the Datum Elevation (NAD83-based) or the Level Name.

At the beginning of each project, the LE/A will determine whether the Datum Elevation or the Level Name approach will be used for all Disciplines of the project. These two approaches cannot co-exist on the same project.

Example 1

The Architectural Group is the Lead Discipline on a project where they decided to use the Datum Elevation approach. The Levels should be named as follows:

- A-LEVEL 342'
- A-LEVEL 356' 6"
- A-LEVEL 363'

Example 2

The Structural Group is the Lead Discipline on a project where they decided to use the Level Name approach. The Levels should be named as follows:

- S-LEVEL 1
- S-LEVEL 2
- S-LEVEL 3

1.15.8 VIEWS NAMING CONVENTION

Views within the Project Browser shall be named beginning with the View Type Code, followed by an optional Level/Sequence Number and an optional User Description.

The Views should take the form of: <View>-<Level/Sequence>-<Description>

Table 1.15-30

ITEM	DESCRIPTION
View	View Type Code Refer to charts below
Level/Sequence (Optional*)	Level Number or Sequence Number (Two-digit integer)
Description (Optional*)	Brief User Description (up to 24 characters) The following characters should not be used as part of the description @ $ % ^ & < > / \ " " : ; ? * | , '

*All View names must include a Level/Sequence number, a Description, or both.

1.15.8.1 ALL DISCIPLINES

Table 1.15-31

ALL DISCIPLINES	
VIEW TYPE CODE	**VIEW TYPE NAME**
3D	3D Views
AP	Area Plans
BS	Building Sections
CP	Ceiling Plans
CS	Construction Staging or Construction Sequence
DL	Drawing List
DR	Drafting Views
DS	Detail Sections
DV	Detail Views
EE	Exterior Elevations
EP	Enlarged Plan
ES	Engineering Estimates
FE	Framing Elevation
FP	Floor Plans
IE	Interior Elevations
KL	Keynote Legend
LG	Legends
LP	Location Plan
MT	Material Takeoff
NB	Note Block
NO	General Notes
ON	One Line Diagram Plan

QP	Equipment Plan
RD	Riser Diagram
RO	Roof Plan
RP	Reports
SC	Sections
SL	Sheet List
SP	Site Plan
SQ	Schedule/Quantities
VL	View List
WT	Walkthroughs

1.15.8.2 ARCHITECTURAL

Table 1.15-32

ARCHITECTURAL	
VIEW TYPE CODE	**VIEW TYPE NAME**
FU	Furniture Plan
SP	Signage Plan

1.15.8.3 ELECTRICAL

Table 1.15-33

ELECTRICAL	
VIEW TYPE CODE	**VIEW TYPE NAME**
AC	Access Control Plan
AX	Auxiliary Power Plan
CM	Communication Plan
CO	Corrosion Protection Plan
FA	Fire Alarm Plan
GP	Grounding Plan
LI	Lighting Plan
LT	Lightning Protection Plan
NS	Network System Plan
PA	Public Address System Plan
PP	Power Plan
RS	Radio System Plan
SS	Security System Plan
TC	Telecommunication Plan
WD	Wiring Diagram Plan

1.15.8.4   MECHANICAL

Table 1.15-34

MECHANICAL	
VIEW TYPE CODE	**VIEW TYPE NAME**
CC	Control Schematic Plan
CD	Communication System Plan
CN	Control Plan
FP	Fire Protection Plan
FS	Fire Suppression Plan
HP	HVAC Ductwork Plan
MD	Machine Design Plan
MH	Material Handling Plan
PI	Piping Plan
PL	Plumbing Plan
SI	Specialty Piping Plan
SK	Sprinkler Plan

1.15.8.5   STRUCTURAL

Table 1.15-35

STRUCTURAL	
VIEW TYPE CODE	**VIEW TYPE NAME**
CF	Concrete Framing Plan
DP	Decking Plan
FD	Foundation Plan
FR	Framing Plan
GC	Graphical Column Schedule
L	Joist Girder Load Diagram
PP	Precast Panel Plan
RE	Reinforcement Plan
SF	Stair Framing Plan
ST	Steel Framing Plan
TB	Truss Bracing Plan
WG	Wind Girt Plan
XB	X Bracing Plan

The image to the right shows the Floor Plans Views within the Project Browser organized by its View Type Code followed by a Sequence Number and a Description.

Example 1

Architectural Floor Plans should be named as follows if all naming components are included:

Figure 1.15-12 Example of Project Browser

- FP-01-FIRST FLOOR
- FP-02-SECOND FLOOR
- FP-03-THIRD FLOOR

Example 2

Mechanical Ceiling Plans should be named as follows if the optional Level/Sequence Number is used but the optional Description is not used:

- CP-03
- CP-04
- CP-05

There are specific steps required to be followed when creating Views. Refer to **Section 1.15.7 - Levels and Plan Views** and **Section 1.17.1.4 - Views.**

1.16   INTERFERENCE CHECK / CLASH DETECTION

The Interference Check Tool should be used during the design process to coordinate major building elements and systems allowing the identification of interferences earlier in the design process.

This tool can be used to find single-discipline or cross-discipline interferences, enabling effective identification, inspection and/or reporting of any interference.

The use of Interference Check Tools such as the ones performed either within the Revit based applications or through Navisworks will have 3 possible outcomes within our BIM practice:

- **No Clash   :**   Such as Switches going through Partition Walls for example.
                              This will be the perfect case scenario.
- **Soft Clash** :   Such as Ducts going through Architectural Partition Walls for example.
                              This type of Clash will not require any additional action from the Team.
- **Hard Clash** :   Such as Columns going through Equipment, Ducts, Pipes going through
                              Structural Walls or Floors for example.
                              This type of Clash will require action from the Team.

1.16.1 SINGLE-DISCIPLINE INTERFERENCE CHECK

The Single-Discipline Interference Check will be performed by each Discipline's Leader using the Interference Check tool within Revit or Navisworks.

1.16.2 CROSS-DISCIPLINE INTERFERENCE CHECK: CLASH DETECTIONS

The Project Leader is responsible for setting up Inter-Disciplinary Interference Check Sessions as often as the project requires, usually defined in the BEP (BIM Execution Plan).

The Cross-Discipline Interference Check will be performed by the Project Leader using Autodesk Navisworks. Each Discipline Leader, including the Lead Discipline, is responsible for creating a Navisworks file out of their Revit Models.

1.16.3 NAVISWORKS CLASH REPORT SETTINGS

The Project Leader is responsible for compiling all the discipline-specific Navisworks Cache files (NWC) into a single Master Navisworks file (NWF) for coordination purposes.

After launching Navisworks Manage, the Project Leader should open the Navisworks template file located in **K:\Application\EAD\BIM_Standards\2018\Support** and append his/her discipline NWC file and link other disciplines' NWC files.

Verify Navisworks settings inside the OPTIONS EDITOR Dialog Box.

Expand the Interference/Display Units and make sure of the following:

- Under *Linear Units* select Feet and inches Fractions
- Under *Angular Units* select Degrees
- Under *Decimal Places* select 2
- Under *Fractional Display Precision* select 1/32

Expand the Quick Properties/Definitions and make sure of the following:

- Under the first *Category* field select *Item*, under the *Property* field select *Name.*
- Under the second *Category* field select *Element ID*

After loading all disciplines NWC files, the Project Leader will save this file in his own COORDINATION folder as a NWF file as described in **Section 1.15.2.16 Navisworks Master File Set File.**

1.16.4 NAVISWORKS CLASH REPORT

1.16.4.1 COLOR SCHEMES

The following color scheme is used to promote consistency and easy identification across all users when generating Clash Reports.

Table 1.16-1

DISCIPLINE	COLOR
Architectural	Cyan
Electrical	Yellow
Electronics	White
Corrosion Protection	Orange
HVAC	Green
Plumbing	Magenta
Fire Protection	Red
Vertical Circulation	Pink
Structural	Blue

NOTE

Depending on the project needs further breakdown can be set either by level or by system. Contact the BIM/CAD Support Group if you need to create new Color Schemes.

1.16.4.2 CLASH DETECTIVE

From the Home tab of the Ribbon, select Clash Detective. This will open the CLASH DETECTIVE window.

Switch to the Rules Tab and verify the following:

- The "Items in previously found pair of composite objects" option should be checked.

Switch to the Select Tab and verify the following:
- Under *Type*, Hard should be selected.
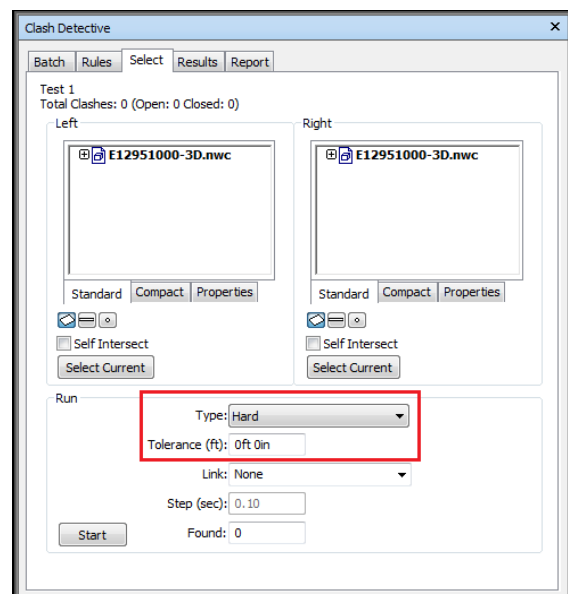- Under *Tolerance, 0ft 0in* should be specified. (This can be modified by project.)

Figure 1.16-1 Example of Select Tab on Clash Detective

Switch to the Results Tab and verify the following:

Under the *Display* category:

- The *Auto Reveal* option should be checked.
- The *Auto Zoom* option should be checked.
- The *Save Viewpoint* option should be checked.
- The *Dim Other* option should be checked.
- The *Transparent Dimming* option should be checked

Under the *Item 1* and *Item 2* category

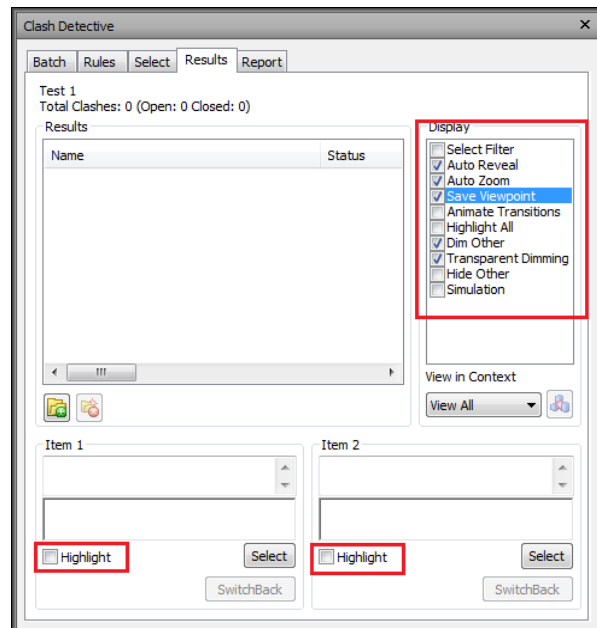- The *Highlight* options should be unchecked on both.

Figure 1.16-2 Example of Results Tab on Clash Detective

The following fields are **Mandatory** for clash reporting:

Under the *Contents* category:

- Clash Point
- Date Found
- Assigned To
- Date Approved
- Item ID
- Status
- Comments
- Image
- Grid Location

Following every Coordination meeting, both a PDF report and a NWD file shall be issued to Project Leaders for distribution to Discipline Leaders. The PDF shall be a copy of the HTML report generated from Navisworks and the NWD file shall contain Saved Viewpoints of all clashes that are *New* or *Existing*.

In updating the Navisworks coordination file, a copy of the NWF file containing the latest coordination status of the model must be saved.

1.17 BEST PRACTICES AND PROCEDURES

The following sections describe application-specific best practices as well as procedures used on all Port Authority of NY & NJ BIM projects.

1.17.1 GENERAL GUIDELINE

The following characteristics of a Revit Model can affect performance:

- Complex Geometry
- Multiple Parametric Relations
- Multiple Constraints
- Linked Files

1.17.1.1 RESTARTING REVIT

The Revit-based applications maintain model data in memory and hard disk caches to increase performance against repeated data access. Revit platform performance may benefit from a workstation restart once or twice a day (at the end of the day and after lunch), and especially before triggering the following memory-intensive tasks:

- Printing
- Rendering
- Exporting

1.17.1.2 COMPACTING CENTRAL AND LOCAL FILES

Compacting the Central and Local files reduces file sizes when saving Workset-enabled files. During a normal save, Revit-based applications only write new and changed elements to the existing files. This can cause files to become large, but it increases the speed of the save operation. The compacting process rewrites the entire file and removes obsolete parts to save space. Because it takes more time than a normal save, use the compact option when the workflow can be interrupted.

1.17.1.3 DESIGN OPTIONS

Even though this document does not mandate any Naming Conventions when Design Options are used, the Option Set Names and the Option Names should be named after their location and scheme respectively so they can be easily identified by other team members.

- Preserve Design Options only as long as they are useful to the project. Even though options may not be active and visible, when changes are made within the main model all Design Options will update to maintain the model's consistency.
- Consider whether options should be preserved long-term in separate models that can be linked as needed.
- All Elements that are to be changed by design options will need to be in design options. For example, a design option for a room with different wall layouts will need to include the room object in the design options as well to get an accurate square footage for the options.

1.17.1.4 VIEWS

- Use "Wireframe" or "Shading" display modes when working in linked file environment. "Wireframe" and "Shading" modes can be three times faster than "Hidden Line" or "Shading with Edges" modes.
- Zoom in to speed up drawing and snapping.

- Clear the "Snap to Remote Objects" setting in the snap dialog if you have a very dense view and snap lines appear to be shooting off in all directions.
- Close unnecessary windows.
- Turn off shadows in views where they are unnecessary.

1.17.1.5   MODELING

- Until component types are determined, use the generic version of elements such as walls, doors, windows, slabs and roofs, which incorporate less geometry.
- Room Bounding property (See Figure 1.17 1 Highlighted Room Bounding property of a Wall) setting of all bounding families **must** be verified before rooms are added to models. The Room Bounding Property is crucial to the process of being able to schedule equipment with the proper room information displayed. See image to the right showing the Room Bounding attribute.

- Break up models when they get to over 500MB. Larger models shall be broken up logically by system or along grid lines.

- Regularly review and fix warnings by going to the *MODIFY* Contextual Tab and clicking on the *Warnings* option located under the *INQUIRY* Panel.
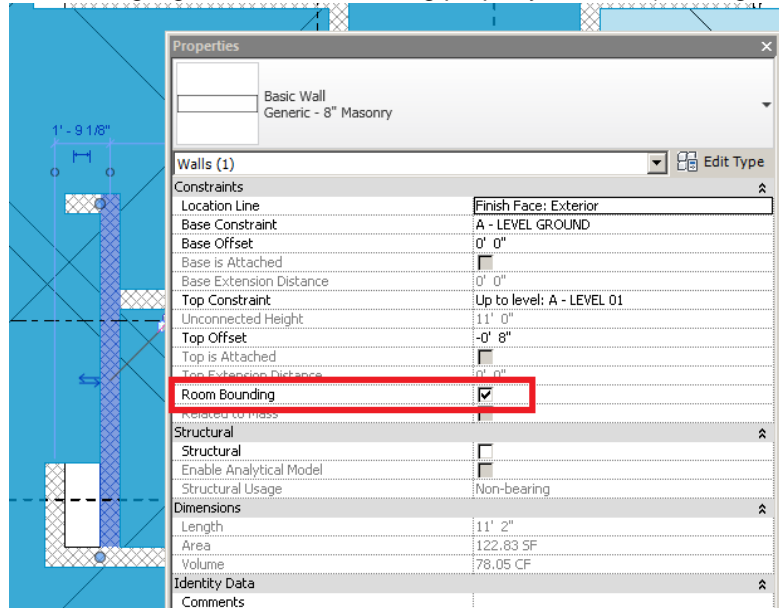

Figure 1.17-1 Highlighted Room Bounding property of a Wall

1.17.1.6   WORKSTATIONS

- Try to have all users utilizing the same Operating System.
- Install the latest version of the approved video drivers.
- Before closing a file, keep only a simple Splash Screen Drafting View open to accelerate saving and subsequent opening of the file.
- It is recommended that 3D views should be closed when saving to Central, since the Revit-based applications will regenerate this complex view as part of the save process.
- Synchronize with Central/ Reload Latest several times a day.
- Relinquish your Workset(s) and borrowed elements at the end of the day.

1.17.1.7   THIRD-PARTY APPLICATIONS

The Port Authority of NY & NJ recognizes that there are multiple third-party applications recently available on the market that are able to run simulations and/or analysis within the Revit-based applications.

However, regardless of the software used to run simulations and/or analysis within the Revit-based applications, the results must be brought back into the Revit Model. This will ensure that the Revit Model has the latest and most recent information.

1.17.2 PROJECT TEMPLATES

As described in **Section 1.14 - Templates**, Project Templates include predefined settings for a project, such as Project Parameters, Project Browser, Unit Settings, Object Styles, Line Patterns, Line & Dimension Styles and Print Settings, among others which should be used on The Port Authority of NY & NJ BIM Projects.

1.17.2.1 USING THE PA TEMPLATES

All Revit projects must be created using one of the templates provided with the BIM Standard as described in **Section 1.14 - Templates**.

1.17.2.2 CREATING THE CENTRAL AND LOCAL FILES

Each Discipline Task Leader is responsible for setting up each Discipline-specific project on the BIM Server (Central File). These files will include:

- Predefined Coordinate System
- Initial Worksets Configuration
- Project Browser Setup

1.17.3 WORKSETS

A Workset is a collection of elements, such as Walls, Doors, Windows, Stairs, etc. that can be accessed by multiple users at a given time, but ensures that individual elements are only ever edited by a single user at a time. No member of the team should ever be listed as an owner of a Workset, but should instead be listed as a borrower. This ensures that they have not locked out other team members from editing all content on that Workset.

To help manage file size, users can load or unload model geometry and data from individual Worksets if they do not need to see or edit the content on them. This is done via the Open and Close option in the Worksets dialog window, and is also available during the File Open dialog as well.
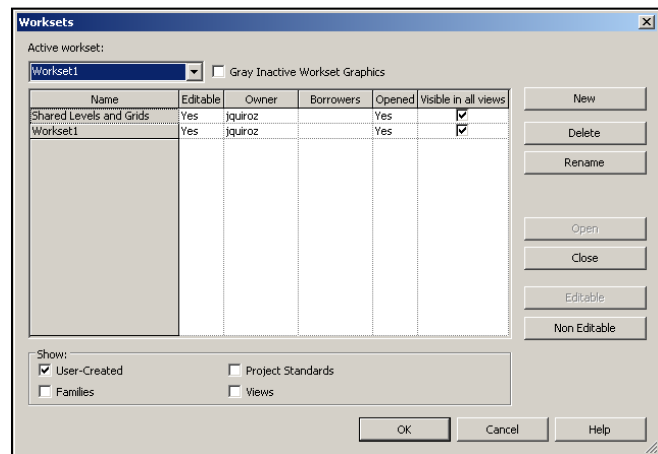

Figure 1.17-2 Workset Dialog Box

When working with Worksets, users must follow these steps to ensure changes are saved to both the Local and the Central versions of the Revit 3D Model file, as well as relinquishing previously owned Worksets.

1. Synchronize with Central

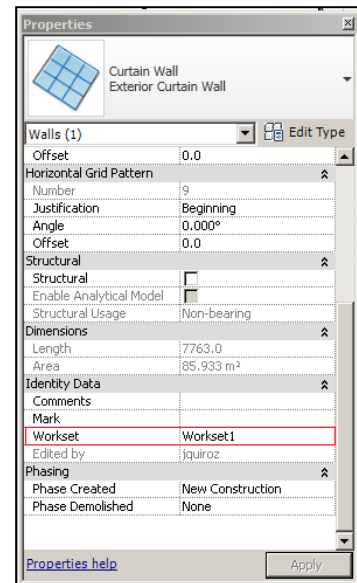2. Save to Local

3. Relinquish All Mine

Figure 1.17-3 Example of Worksets Assignment for a Model Element

NOTE

Users Should never be Owners of Worksets, they should be Borrowers.

1.17.4 PROJECT BROWSER

A customized Revit Project Browser has been included within the different Discipline Templates, as described in **Section 1.17.2 - Project Templates**, in which Views and Sheets within the Project Browser will be grouped based on the PA - View Classification as follows:

Table 1.17-1

PROJECT BROWSER	
PA - VIEW CLASSIFICATION	**DESCRIPTION**
Coordination Views	Views are intended to be the Views that maintain the coordination across the different Discipline Revit Models as well as for coordination purposes only. These types of Views include Floor Plans, Ceiling Plans, 3D Views and Elevations.
Design Option Views	Different design views.
Design Views	Views intended to be included in the Contract Set.
Export Views	Views intended to be exported to Third Party Applications.
Presentation Views	Views intended for presentation purposes only to be included in the Stage I - Report Book.
Working Views	These types of Views are for working purposes only and not intended to be included in the Contract Set.

The Architecture Template is broken down into 3 main categories, see below. The image shows the PA - Project Browser for Views, for an Architectural project. (See Figure 1.17 4)
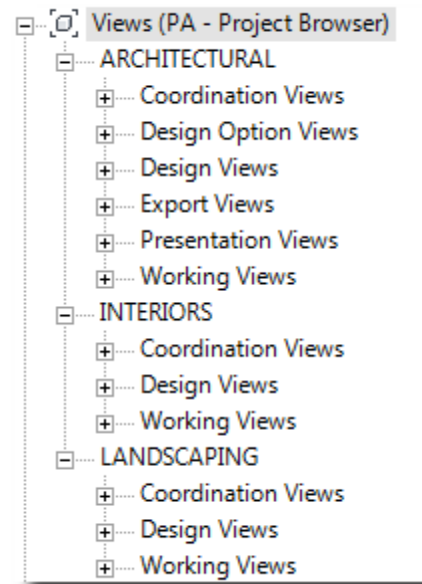
Figure 1.17-4

The Electrical Template is broken down into two categories, see below. The image shows the PA - Project Browser for Views, for an Electrical project. (See Figure 1.17 5)
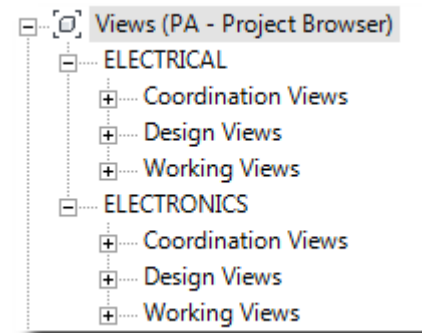
Figure 1.17-5

The Mechanical Template is broken down into three categories, see below. The image shows the PA - Project Browser for Views, for a Mechanical project. (See Figure 1.17 6)
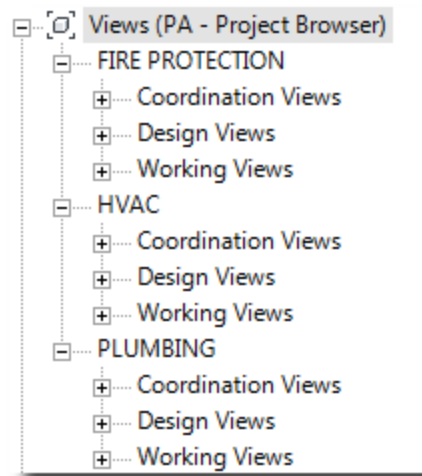
Figure 1.17-6

The Structural Template is broken down into one category, see below. The image shows the PA - Project Browser for Views, for a Structural project. (See Figure 1.17 7)
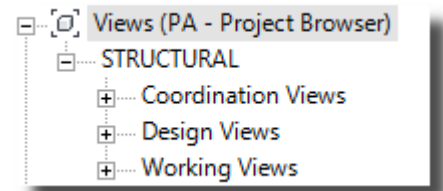

Figure 1.17-7

1.17.5 VIEW TEMPLATES & FILTERS

View Templates are a collection of View Properties, such as the Discipline, the View Scale, the Detail Level, and Overrides to Model and Annotation Objects that are common for a View Type, such as a 3D View, a Plan View or an Elevation View.

View Templates have been provided within the different Discipline Templates in Black & White as well as in Color. Black & White View Templates are intended for Design, Export, and Coordination Views while Color View Templates are intended to be used only on Working and Presentation Views.

> **NOTE**
>
> View Templates have been associated with their respective Project Browser Category, so when applying a View Template to a specific View this will automatically move the View to the correct Category.

Views Templates are provided, but their use is not mandatory for BIM compliance. Custom View Templates may be created, and are not required to follow a specific naming convention.

Filters provide additional control for View Templates by overriding the graphic display and controlling the visibility of elements that share common properties in a view. Filters are designed to apply a Color, Line Weight, Line Pattern, Fill Color and Fill Pattern to objects based on specific characteristics.

Categories in Revit tend to be very general and do not distinguish between similar objects made of different material or that have different purposes. For example, Revit doesn't graphically distinguish between a pipe used for domestic cold water and one used for liquid refrigerant without the use of Filters. Therefore, Filters are being provided within the different Discipline Templates to solve this issue only for the Electrical and Mechanical Disciplines.
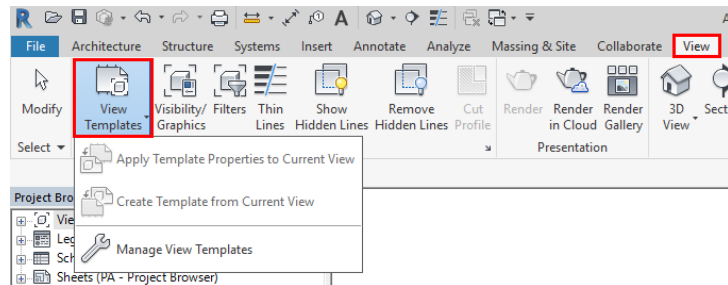

Figure 1.17-8 View Template Tab on Graphics Panel

The use of Filters requires each element to be associated to their correspondent Search Parameter based on the following Table:

Table 1.17-2

FILTERS SEARCH PARAMETERS	
ELECTRICAL	**MECHANICAL**
Electrical Filter	Mechanical Filter

Filters are case-sensitive, that means that the Search Parameter for both the Electrical and Mechanical Filters need to match exactly with the Tables provided in **Section 1.17.5.1.1 Electrical Filters** and **Section 1.17.5.1.2 Mechanical Filters.**

To apply a Filter to an Object, select the Object and within the Properties Panel look for either the Electrical Filter or the Mechanical Filter Parameter under the Identity Data Group.

1.17.5.1.1   ELECTRICAL FILTERS

Table 1.17-3

CORROSION PROTECTION FILTERS	
NAME	SEARCH PARAMETER
Cathodic Conduit & Cable Tray	CP
Cathodic Power	CP
Corrosion Protection Equipment	Corrosion Protection

Table 1.17-4

ELECTRICAL FILTERS	
NAME	SEARCH PARAMETER
13.8KV Cable	13.8KV
13.8KC Conduit/Cable Tray	13.8KV
27KV Cable	27KV
27KV Conduit/Cable Tray	27KV
Electrical Equipment	Electrical
Ground	G
Ground Conduit/Cable Tray	G
Out of Service	OS
Out of Service Conduit/Cable Tray	OS
PSEG Conduit/Cable Tray	PSEG
PSEG Duct bank	PSEG
Power	P
Power Conduit/Cable Tray	P
Power Duct bank	PD
Power Underground	PU
ELECTRONICS FILTERS	
NAME	SEARCH PARAMETER
CCTV Cable	CCTV
CCTV Conduit/Cable Tray	CCTV
Communication Cable	C
Communication Conduit/Cable Tray	C
Electronics Equipment	Electronics
Fire Alarm Cable	FA
Fire Alarm Conduit/Cable Tray	FA
Fiber Optic Cable	FO
Fiber Optic Conduit/Cable Tray	FO

Out of Service	OS
Power & Communication	PC
Power & Communication Conduit/Cable Tray	PC

1.17.5.1.2   *MECHANICAL FILTERS*

Table 1.17-5

FIRE PROTECTION FILTERS	
NAME	**SEARCH PARAMETER**
Deluge System Piping	Deluge
Dry Chemical System Piping	Dry Chemical
Dry System Piping	Dry
Mechanical Equipment - Fire Protection	Fire Protection
Wet System Piping	Wet

Table 1.17-6

HVAC FILTERS	
NAME	**SEARCH PARAMETER**
Boiler Blow Down	BBD
Chilled Water Supply	CHWS
Chilled Water Return	CHWR
Condensate Low Pressure	LPC
Condensate Medium Pressure	MPC
Condensate High Pressure	HPC
Condenser Water Supply	CWS
Condenser Water Return	CWR
Drain	Drain
Dual Temperature Water Supply	DTWS
Dual Temperature Water Return	DTWR
Duct Supply	Supply
Duct Return	Return
Duct Exhaust	Exhaust
High Temperature Hot Water Supply	HTHWS
High Temperature Hot Water Return	HTHWR
Hot Water Supply	HWS
Hot Water Return	HWR
HVAC Equipment	HVAC
Makeup Water	MU
Medium Temperature Hot Water Supply	MTHWS
Medium Temperature Hot Water Return	MTHWR
Refrigerant Discharge	RD
Refrigerant Liquid	RL
Refrigerant Suction	RS
Steam Low Pressure	LPS

Steam Medium Pressure	MPS
Steam High Pressure	HPS

Table 1.17-7

PLUMBING FILTERS	
NAME	SEARCH PARAMETER
Compressed Air	CA
Domestic Cold Water	DCW
Domestic Hot Water Supply	DHW
Domestic Hot Water Return	DHWR
Fuel Oil Equipment	Fuel Oil
Fuel Oil Return Above	FORA
Fuel Oil Return Below	FORU
Fuel Oil Suction Above	FOSA
Fuel Oil Suction Below	FOSU
Fuel Oil Vent Above	FOVA
Fuel Oil Vent Below	FOVU
Gas	Gas
Plumbing Equipment	Plumbing
Sanitary Sewer	STU
Sanitary Ventilation	STA
Storm	Storm
Wet System Piping	Wet

1.17.6 LEVELS AND PLAN VIEWS

The Revit-based applications can create a relationship between the Level and the Floor Plans, so when the Level Name is changed, the associated name for the Floor Plan and the Reflected Ceiling Plan can update automatically.

Users will be given the option to rename the corresponding Level Views (Floor Plan and Reflected Ceiling Plan) if the Level Name is changed. If so, the relationship between both will be broken.

It is crucial to maintain this name relationship between the Level and the Floor Plans in a multi-disciplinary practice for coordination purposes.

Plan Views should be created by making a copy of any of the existing Floor Plans and/or Reflected Ceiling Plans under the System Views Category by using the tools on the View Ribbon. Levels and Views use different Naming Convention, Plan Views created should follow View Naming Convention.
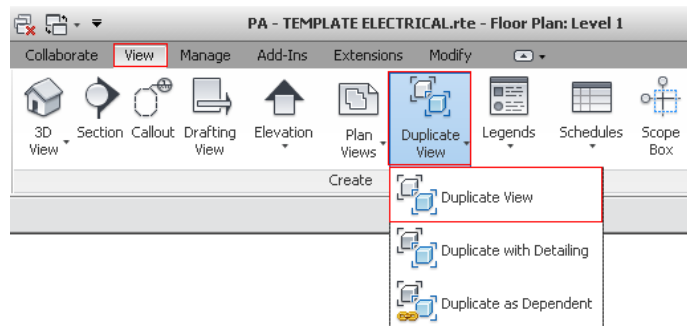

Figure 1.17-9 Duplicate View Control on the View Ribbon

NOTE

All Detail Lines, Text, Dimensions and Tags should be placed within the Design Views which will be dragged-and-dropped into Sheet Views.

1.17.7 UNIFORMAT CLASSIFICATION

The Port Authority of NY & NJ organizes all of its assets based on the Uniformat System. This classification organizes the different building elements into specific groups. Therefore, when creating Revit Families, the Assembly Code Parameter under the Identity Data Group shall be defined and set in accordance with the CSI Uniformat 2010.

The image to the right (See <u>Figure 1.17-10 Example of Family Type Dialog Box</u>) shows the *FAMILY TYPES* Dialog Box within a Door Family with the Assembly Code parameter set to C1020, which corresponds to the Interior Doors classification.
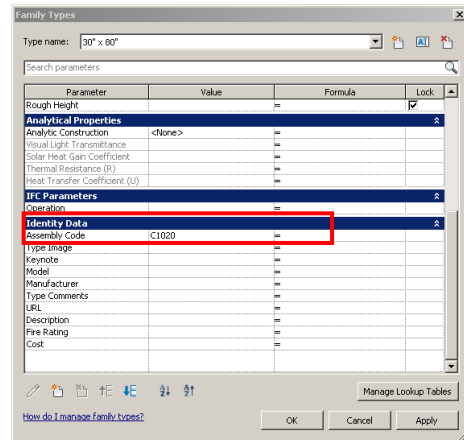

Figure 1.17-10 Example of Family Type Dialog Box

NOTE

Revit uses RevitKeynotes_Imperial_2004.txt for the Assembly Code mapping

1.17.8 PHASES

Phasing allows representation of different elements of the Model in different time periods in the life of the project for design, scheduling and construction purposes. All Objects added to a project have a Phase Created and a Phase Demolished Parameter.

Revit tracks the Phase in which elements are created or demolished and lets you use and create Phase Filters that can be applied to Views so that different stages of work can be displayed in different Views.

1.17.8.1 PHASE STATUS

As mentioned previously, all Objects added to a project have a Phase Created and a Phase Demolished Parameter. Depending on the values assigned to each of these Parameters, Revit determines the Phase Status.

Table 1.17-8

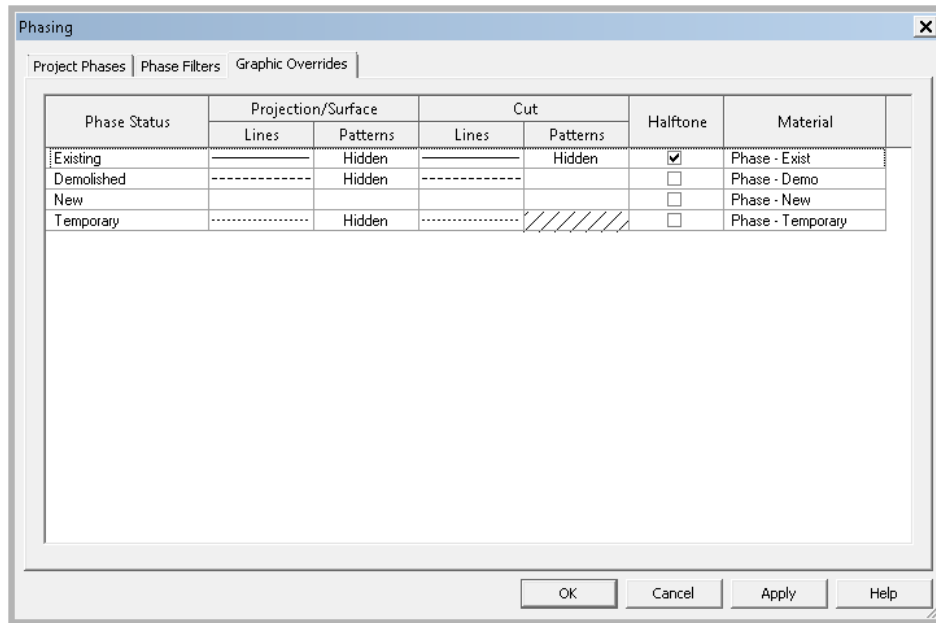| PHASE STATUS	
ACTION	**DESCRIPTION**
New	Element was created in the current Phase and will not be demolish in the current Phase
Existing	Element was created in an earlier Phase and continues to exist in the current Phase
Demolish	Element was created in an earlier Phase and demolished in the current Phase
Temporary	Element was created and demolished during the current Phase

Figure 1.17-11 Phasing Dialog Box

The image shows the Graphic Override assigned to each of the Phase Status

1.17.8.2 PHASE FILTERS

A Phase Filter is a setting that is applied to a View to control the display of elements based on their Phase Status.

- Show All
- Show Complete
- Show Demo + New
- Show New
- Show Previous + Demo
- Show Previous + New
- Show Previous Phase

1.17.8.3   MATCHING PHASE ACROSS DISCIPLINES

When working with Phases on a multi-disciplinary project, it is critical to match Phases across the different Discipline Models.

Select each of the linked Models and go to their Type Properties and select the Edit Button right next to the Phase Mapping Parameter as shown in the image to the right.
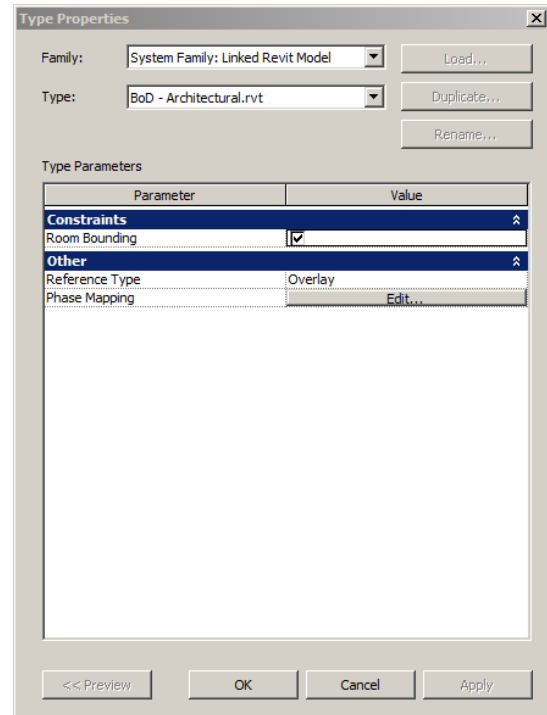
Figure 1.17-12 Example of Phase Mapping Parameter of a Linked Model

This will open the Phases Dialog Box as shown in the image to the right. Match the Phase of the Host Model (Left Column) with the ones of the Linked Model (Right Column)
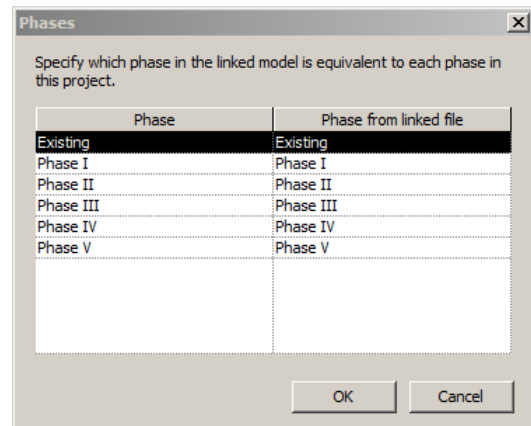
Figure 1.17-13 Phases Dialog Box

1.17.9 COST ESTIMATE AND QUANTITY TAKEOFF

A series of pre-defined empty Engineer's Estimates (ES) Schedules have been provided with the Templates. These Schedules will populate automatically as you add content to the Models and will help streamline the processes of Cost Estimating and Quantity Takeoffs with the Engineering Department Estimating Group.

NOTE:

Room schedules **must** show location data for equipment and furniture (where applicable). This data can be extracted by choosing to include Room data from the Schedule/Quantities dialog as shown below. (See Figure 1.17 14 Schedule Properties Dialog Box to create a New Schedule)

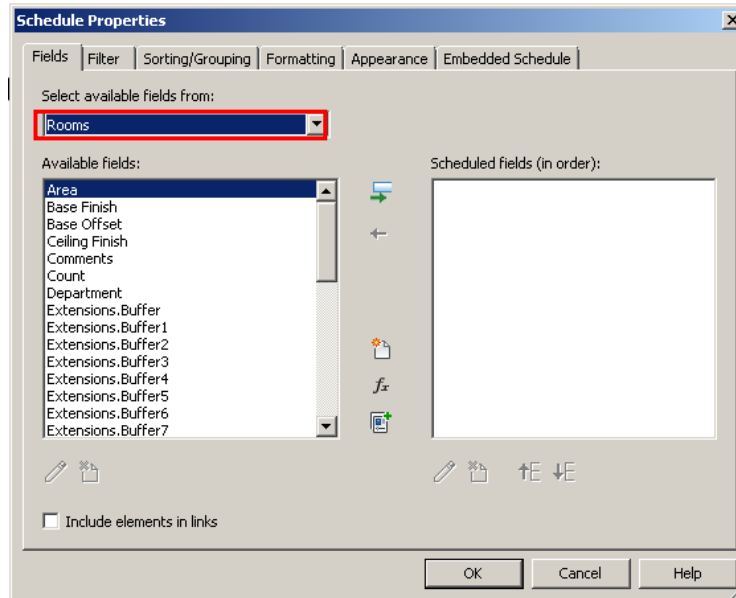Figure 1.17-14 Schedule Properties Dialog Box to create a New Schedule

1.17.9.1   EXPORTING TO EXCEL

In order to export a Revit Schedule to Excel, the Schedule View will need to be open and active. Go to the *APPLICATION* menu and select the *Export* button followed by the *Reports* option, and then *Schedule.* This will open the *EXPORT SCHEDULE* Dialog Box as shown in the image below. (See <u>Figure 1.17 15 Export Schedule Dialog Box</u>)
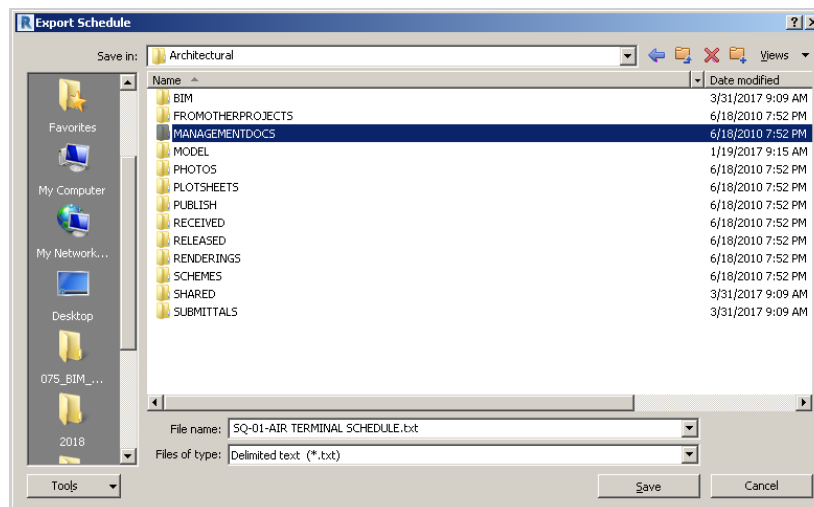

Figure 1.17-15 Export Schedule Dialog Box

Browse to your own discipline's MANAGEMENT folder on the BIM Server mapped internally as the R:\ drive, by selecting the drop-down button.

After clicking the OK button, the EXPORT SCHEDULE Dialog Box will open as shown in the image below.

Make sure the settings match the ones on the image above and click the OK button. At this point open Excel and open the TXT file and follow the prompts.
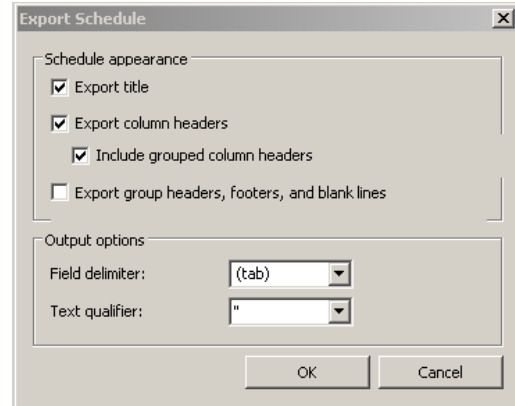

Figure 1.17-16 Export Schedule Dialog Box Prompt

1.17.9.2 EXPORTING TO 3D DWF

In order to export the Revit Model for Cost Estimate and Quantity Takeoffs purposes, go to the APPLICATION menu and select the Export button followed by the DWF option, and then DWF. This will open the DWF EXPORT SETTINGS Dialog Box as shown in the image below. (See Figure 1.17 17 DWF Export Setting Dialog Box)

In the "View/Sheet Set" Tab, select the "In Session View/Sheet Set" under the "Export" drop-down list.

This will enable the "Show in List" drop-down list, from which you can select the "Views in the Model" option to select which views to export.
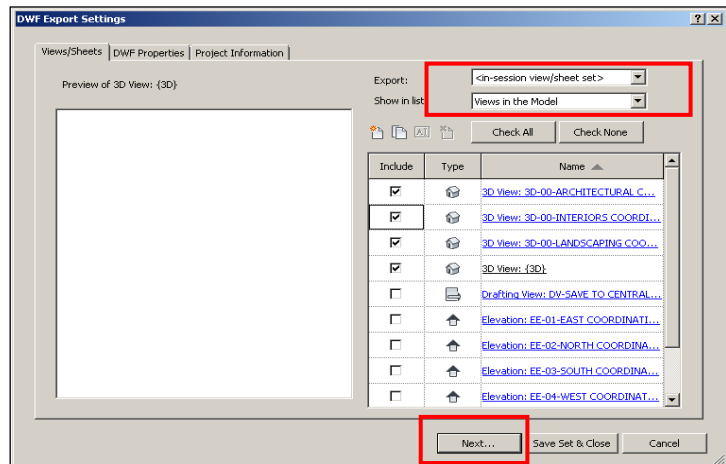
Select the 3D View to export.

Figure 1.17-17 DWF Export Setting Dialog Box

Switch to the DWF Properties Tab and have both check boxes, Element Properties and Rooms and Areas in a Separate Boundary Layer, under the Export Object Data option, checked.
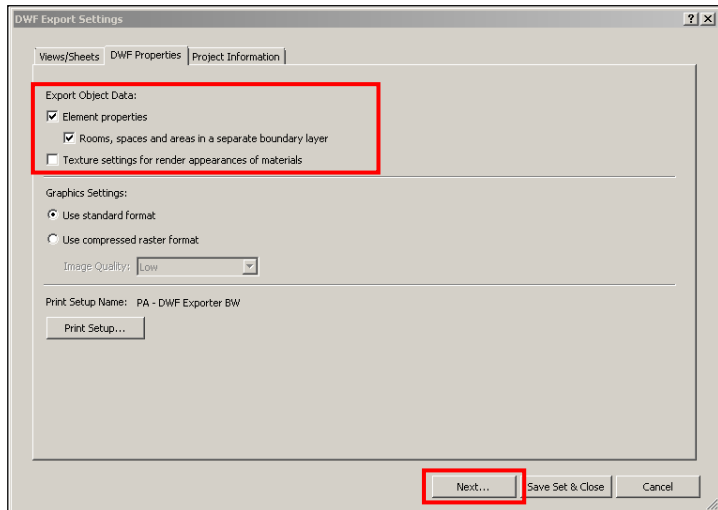
Click the *"Next"* button

Figure 1.17-18 DWF Export Setting Dialog Box

This will open the *EXPORT DWF* Dialog Box as shown in the image to the right. Browse to your own discipline's ANALYSIS folder on the BIM Server mapped internally as the R:\ drive, by selecting the drop-down button.

Under the *File Name/Prefix* option, type the desired name of the DWF file, and under the *Files of Type* options select *DWF Files (*.dwf.)*.
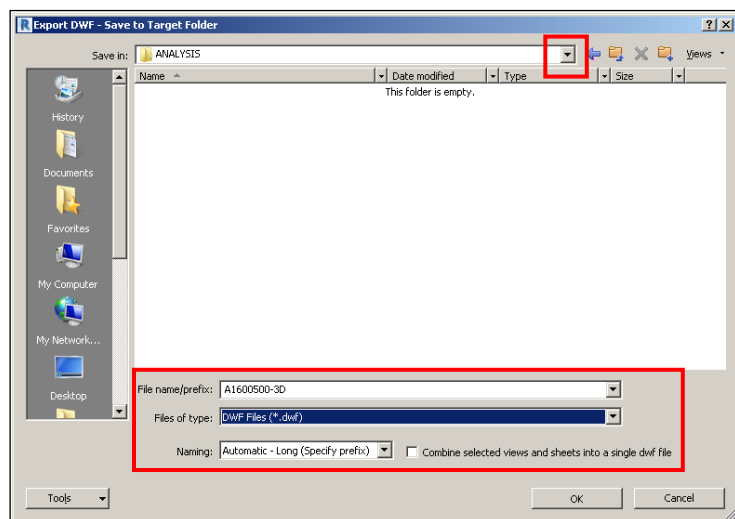
Figure 1.17-19 DWF Export Setting Dialog Box-Saving to Target Folder

Under the *Naming* option, select *Automatic - Long (Specify Prefix)*. This option will append the selected view name at the end of the file name. Users are required to rename this file as described in **Section 1.15.2.14 3D DWF Files.**

1.17.10   SHEET VIEWS

Creating a Contract Set in Revit is accomplished through Sheets, in which Views have been added.

Sheets within The Port Authority of NY & NJ BIM Standard have been pre-configured to work in conjunction with the discipline Templates file and with the Shared Parameters file.

> **NOTE**
>
> Detail Lines, Text, Dimensions and Tags should not be created within the Sheet Views themselves.

1.17.10.1   PROJECT INFORMATION

Project Information is data that remains the same on all sheets of a project, such as the Facility Name, Project Name, Contract Number, Work Order Number, PID Number, Discipline Group, Discipline's Chief, Total Sheet Number, Signee's Name, and Project Issue Date.

The image to the right shows the Project Information *INSTANCE PROPERTIES* Dialog Box.(See Figure 1.17 20 Project Information Dialog Box)

All the available Project Information fields are listed under the Title Text and Other Parameter columns.

Another option to enter the Project Information is by typing it directly on a sheet by clicking on the text placeholder and updating the text as desired.

Figure 1.17-20 Project Information Dialog Box

NOTE

The Revit-based applications will update all sheets in the Contract Set based on the information provided here.

1.17.10.2   DRAWING INFORMATION

Drawing Information is data related to an individual sheet of the Contract Border in a project. All the available Title Sheet Information fields are listed under the *Identity Data* and *Title Text* Parameter columns.

To update the Drawing Information of a sheet, use either one of the following methods:

Enter the information directly on a sheet by clicking on the text placeholder within the sheet and update the text as desired.

Select a sheet and right-click it to display the OPTIONS menu and select "View Properties". This will open the Sheet *INSTANCE PROPERTIES* Dialog Box. Change the values as desired.

E/A Design Division BIM Standard

1.17.10.2.1   TITLE SHEETS

Values within the Title Sheet are the Program Director and the Current Sheet Number.

The image to the right shows the Title Sheet *INSTANCE PROPERTIES* Dialog Box.
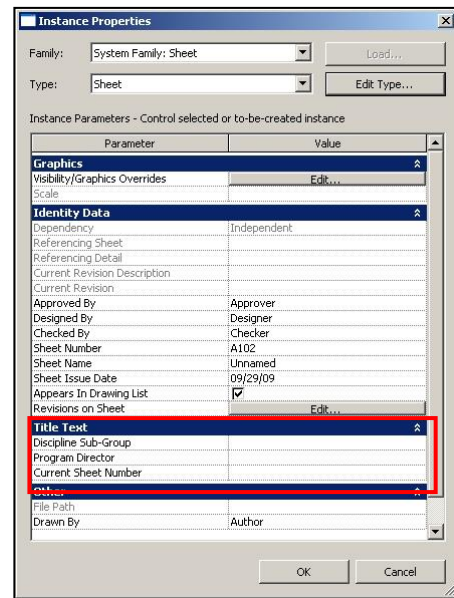

Figure 1.17-21 Instance Properties
Dialog Box of Title Sheet Block

Three Signature Lines are provided within the Title Sheets:

- Line One   ASSISTANT CHIEF ENGINEER / DESIGN

- Line Two   PROGRAM DIRECTOR XX or SR. PROGRAM MANAGER/PROGRAM MANAGER

- Line Three   CHIEF ENGINEER

The following table describes which Signature Lines to use, depending on the Contract Type and Contract Cost.

Table 1.17-9

CONTRACT TYPE	ENGINEER'S ESTIMATE	SIGNATURE LINES
Quick Bids (Limited to $500,000 including extra work & net cost) M/WBE Set-Asides	Up to $1,000,000	Deputy Director - Design Sr. Program Manager/Program Manager
	Above $1,000,000	Deputy Director - Design Program Director Chief Engineer
Work Order Drawings & Standard Contracts	Up to $2,500,000	Deputy Director - Design Sr. Program Manager/Program Manager
	Above $2,500,000	Deputy Director - Design Program Director Chief Engineer

There are only two possible options for the Signature Lines:

Option 1

- Line One   CHIEF OF DESIGN / E/A DESIGN DIVISION

- Line Two   SR. PROGRAM MANAGER/PROGRAM MANAGER

Figure 1.17-22 Signature Lines Option 1

Option 2

- Line One   CHIEF OF DESIGN / E/A DESIGN DIVISION
- Line Two   PROGRAM DIRECTOR XX
- Line Three   CHIEF ENGINEER/DIRECTOR

Figure 1.17-23 Signature Lines Option 2

The PROGRAM DIRECTOR line (included only in Option 2) contains a field (which by default is set to XX) that should be replaced by any one of the following options:

- AVIATION
- PATH
- PORT COMMERCE
- TB&T
- SECURITY

1.17.10.2.2 CONTRACT BORDERS

Values within the Contract Border are the Discipline Sub-Group, the Drawing Name, the Designed by, Drawn by & Checked by Lines, and the Current Sheet Number.

The image to the right shows the Contract Border Information *ELEMENT PROPERTIES* Dialog Box.
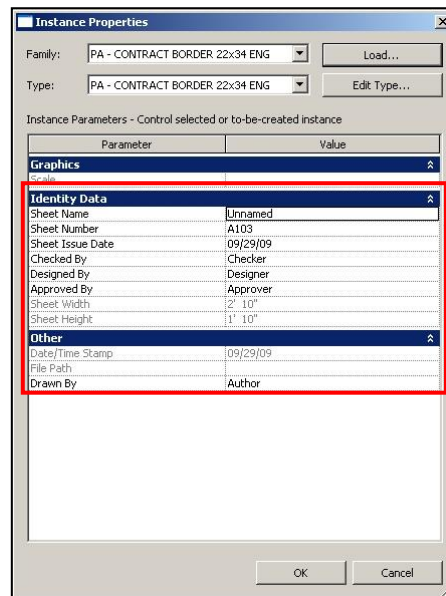

Figure 1.17-24 Contract Border Title Block Dialog Box

The following table describes the options for the "Discipline Group" field and the "Discipline Sub-Group" field that users will need to refer to when filling out the Project Information and the Contract Border, respectively.

Table 1.17-10

DISCIPLINE GROUP	DISCIPLINE SUB_GROUP
Architecture	Landscape
Civil	
Electrical	Power
	Electronics
	Corrosion Protection
Environmental	
General	
Geotechnical	
Mechanical	Fire Protection
	HVAC
	Plumbing
Structural	
Traffic	

The image to the right shows an example where the "Discipline Group" field has been set to MECHANICAL and the "Discipline Sub-Group" field has been set to FIRE PROTECTION.

If a discipline does not have a "Sub-Group", this field should be left empty.

NOTE

Both the "Discipline Group" and the "Discipline Sub-Group" fields should be filled out using uppercase characters.

Figure 1.17-25 Example of Discipline Sub-Group

To promote consistency and easy identification of the people involved in the project, the "Designed by", "Drawn by", and "Checked by" fields should have the first name's initial, followed by a period and the last name. Note that spaces before and after the period are not permitted. The "Date" field should be filled out as a two-digit month, a two-digit day, and a four-digit year format separated by the slash "/" character as shown in image to the right.

NOTE

The "Designed by", "Drawn by", and "Checked by" fields should be filled out using uppercase characters only for the first character of the first name and last name. Only one person's name is allowed by field.

Figure 1.17-26 Example of People Involved in a Project Title Block

1.17.10.3 CONTROLLING VISIBILITY

Visibility Parameter has been set within the Title Sheets, Contract Borders, and Stamps provided with the Port Authority of NY & NJ BIM Standard.

The Revit-based applications provide these parameters with their default values set ON. These parameters are controlled within the project file itself.

To control visibility, by turning those fields ON and OFF, use the following methods:

- For sheet-specific fields, select a sheet and right-click it to display the *OPTIONS* menu and select "*Element Properties*". This will open the Sheet *INSTANCE PROPERTIES* Dialog Box, where the values can be changed as desired.
- For project-specific fields, within the Sheet *INSTANCE PROPERTIES* Dialog Box accessed in the previous step, select the "*Edit Type*" button to access the *TYPE PROPERTIES* Dialog Box, and change the values as desired.

1.17.10.3.1 TITLE SHEETS

There are four sheet-specific fields within the Title Sheets, which are:

- Sr. Program Manager/Program Manager
- Program Director
- FAA
- Chief Engineer

There is one project-specific field within the Title Sheets, which is:

- Work Order Number

The image to the right shows the four sheet-specific fields of the Title Sheet controlled within the *INSTANCE PROPERTIES* Dialog Box.
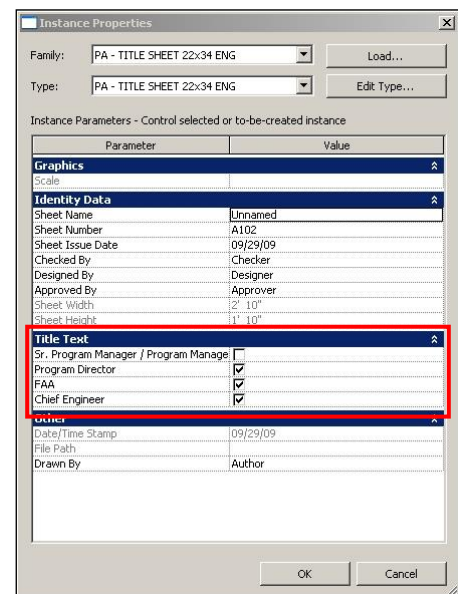

Figure 1.17-27 Instance Properties Dialog Box of Title Sheet Block

The image to the right shows the project-specific field of the Title Sheet controlled within the *TYPE PROPERTIES* Dialog Box.
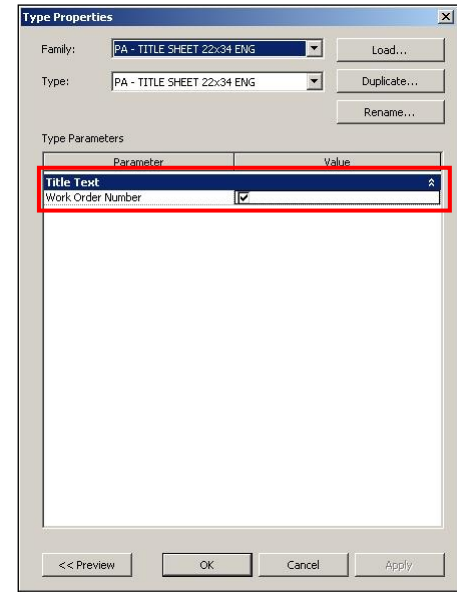

Figure 1.17-28 Type Properties Dialog Box of Title Sheet Block

1.17.10.3.2 CONTRACT BORDERS

There are three project-specific fields within the Contract Borders, which are:

- Work Order Number
- Original Signed By
- Discipline's Chief

The image to the right shows the three project-specific fields of the Contract Border controlled within the *TYPE PROPERTIES* Dialog Box.
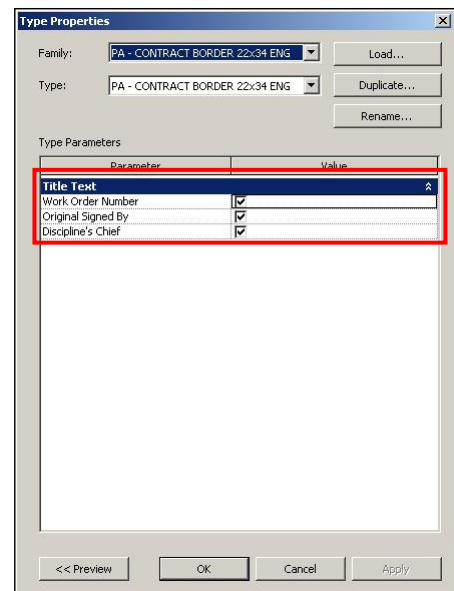

Figure 1.17-29 Type Properties Dialog Box of Contract Borders Sheet Block

1.17.10.4 I NSERTING S TAMPS

A series of Professional, Submissions and Confidential & Confidential Privileged Stamps for both sizes, 22x34 and 34x56, have been provided with the Port Authority of NY & NJ BIM Standard and can be found under:

K:\Application\EAD\BIM_Standards\2018\Contract Borders

These Stamps have been defined within the Revit-based applications as symbols and should be inserted on each individual sheet origin.

All Stamps should be inserted at the sheet origin, which is invisible by default. To enable the sheet origin, hover over it.
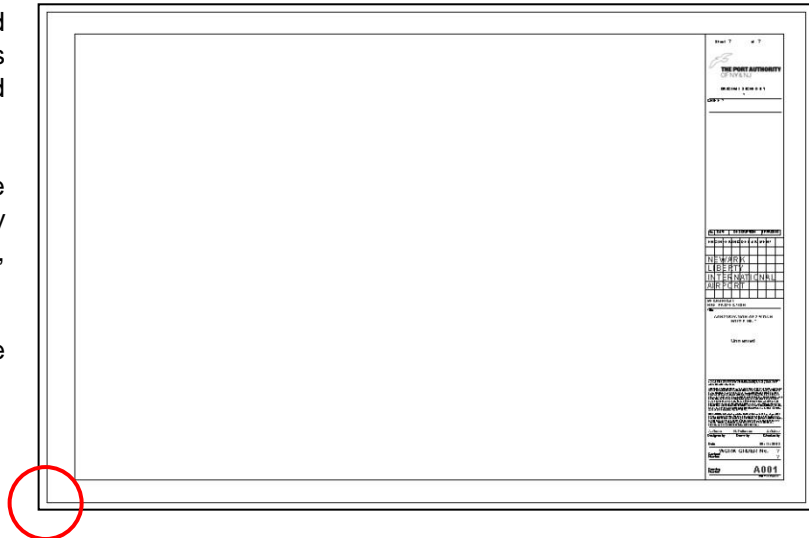
The image to the right shows the sheet origin.

Figure 1.17-30 Insertion point for Professional Stamp Blocks

To edit the fields and control visibility within the Stamps, select a symbol and right-click it to display the *OPTIONS* menu and then select *"Element Properties."*

This will open the Symbol *INSTANCE PROPERTIES* Dialog Box as shown in the image to the right. Select the *"Edit Type"* button to access the *TYPE PROPERTIES* Dialog Box and change the values as desired.
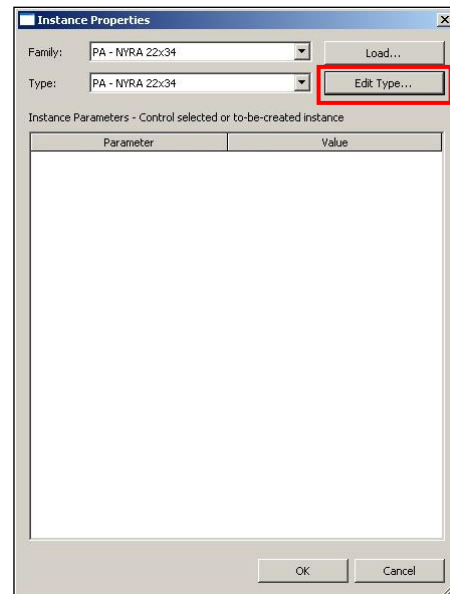

Figure 1.17-31 Instance Properties Dialog Box

1.17.10.4.1 P ROFESSIONAL S TAMPS

Professional Stamps have been created for both New York and New Jersey Professional Engineer and Registered Architect and can accommodate these 3 options:

• Single Professional Stamp - Two Consultants

- Combined Professional Stamps of NY & NJ - One Consultant
- Combined Professional Stamps of NY & NJ - Two Consultants

By default, the DISCIPLINE'S CHIEF and the ORIGINAL SIGNED BY fields are provided with their default values set ON as shown in the image to the right.

In order to accommodate the Professional Stamps, these fields should be turned OFF. This is accomplished by controlling the visibility of the Contract Border as described on **Section 1.17.10.3.2 Contract Borders.**

NOTE

The Professional Stamps are to be used in place of custom Consultant Logos to identify the Consulting firm(s).

Figure 1.17-32 Example of Discipline's Chief and Original Signed by Field

All Professional Stamps shall be inserted at the bottom left sheet corner, just outside of the bottom left border corner, as shown circled in red in the image below.

Figure 1.17-33 Example of insertion point of Professional Stamps

The Consulting Firm field is required and should accommodate the primary consultant hired directly by the Port Authority of NY & NJ. The Sub-Consulting Firm fields have been provided to accommodate the name of the sub-consultant performing work for the primary consultant. If no sub-consultant is involved, this field should be left empty.

Two lines have been provided for both the Consulting Firm and Sub-Consulting Firm. If the second line of either of these fields is not needed, it should be left empty.

The Consulting Firm and Sub-Consulting Firm fields should only accommodate the Consultants and Sub-Consultants Company Names, respectively, and not the Company Addresses.

The image to the right shows an example of the Single Professional Stamp - Two Consultants provided with this Manual, which includes 2 lines for both the Consulting Firm and the Sub-Consulting Firm.

For each firm listed, fields are included for the name of the licensed Engineer or Architect certifying the drawings as well as their license number. Note that for New Jersey projects, a Certificate of Authorization field has been included and must be filled.

The Single Professional Stamp - Two Consultants provided with this Manual are:

- PA-NJPE 22x34.rfa
- PA-NJRA 22x34.rfa
- PA-NYPE 22x34.rfa
- PA-NYRA 22x34.rfa
- PA-NJPE 34x56.rfa
- PA-NJRA 34x56.rfa
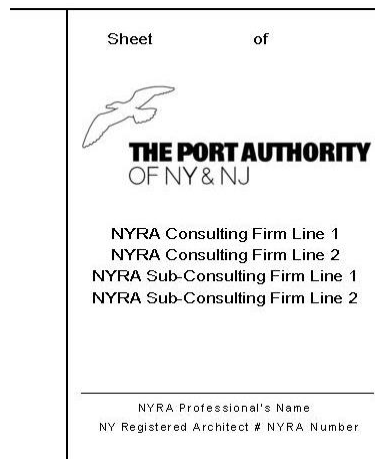- PA-NYPE 34x56.rfa
- PA-NYRA 34x56.rfa

Figure 1.17-34 Example of Single Professional stamp - Two Consultants

The image to the right shows an example of the Combined Professional Stamps of NY & NJ - One Consultant, provided with this Manual, which includes 2 lines for either the New York or the New Jersey Registered Architect or Professional Engineer.

The Combined Professional Stamps of NY & NJ - One Consultant, provided with this Manual, are:

- PA-NY&NJ PE One Consultant 22x34.rfa
- PA-NY&NJ RA One Consultant 22x34.rfa
- PA-NY&NJ PE One Consultant 3x56.rfa
- PA-NY&NJ RA One Consultant 34x56.rfa

The Combined Professional Stamps of NY & NJ - One Consultant are used for jobs in which signatures of Professionals from both States are required.
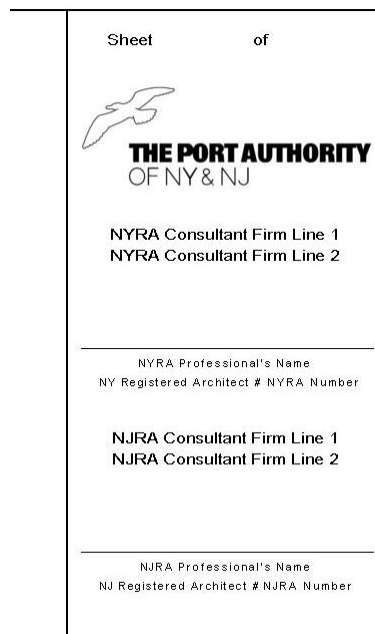
Figure 1.17-35 Example of Combined Professional Stamps of NY & NJ - One Consultants

The image to the right shows an example of the Combined Professional Stamps of NY & NJ - Two Consultants provided with this Manual, which includes 2 lines for either the New York or the New Jersey Registered Architect or Professional Engineer.

The Combined Professional Stamps of NY & NJ - Two Consultants provided with this Manual are:

- PA-NY&NJ PE Two Consultants 22x34.rfa
- PA-NY&NJ RA Two Consultants 22x34.rfa
- PA-NY&NJ PE Two Consultants 34x56.rfa
- PA-NY&NJ RA Two Consultants 34x56.rfa

The Combined Professional Stamps of NY & NJ - One Consultant are used for jobs in which signatures of Professionals from both States are required.
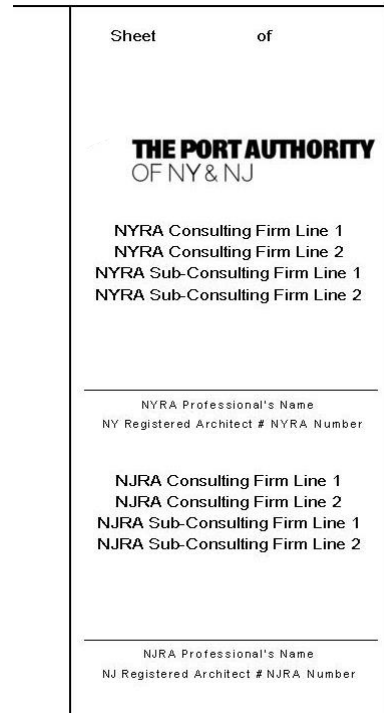

Figure 1.17-36 Example of Combined Professional Stamps of NY & NJ - Two Consultants

1.17.10.4.2 SUBMISSION STAMPS

Submission Stamps have been provided for the following circumstances:

- Law Review
- Preliminary
- Submission

NOTE

All Submission Stamps should be removed before plotting the As Advertised Signed Set and before creating the PDF files.

The image to the right shows an example of the Law Review Stamp provided with this Manual, in which the date needs to be entered in the format MM/DD/YYYY, as described in **Section 1.17.10.3.2 - Contract Borders.**

The Law Review Stamps provided with this Manual are:

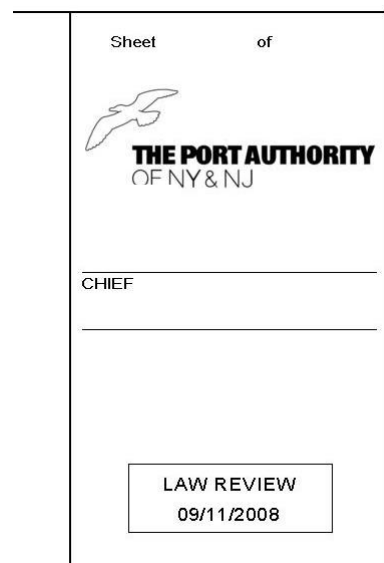- PA-Law Review 22x34.rfa
- PA-Law Review 34x56.rfa

Figure 1.17-37 Example of the Law Review Stamp

The image to the right shows an example of the Preliminary Stamp provided with this Manual, in which the date needs to be entered in the format MM/DD/YYYY, as described in **Section 1.17.10.3.2 - Contract Borders.**

The Preliminary Stamps provided with this Manual are:

- PA-Preliminary 22x34.rfa
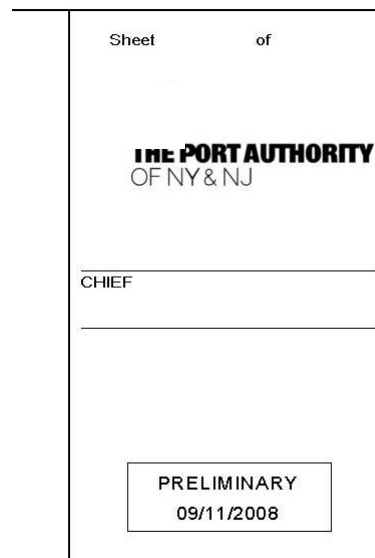- PA-Preliminary 34x56.rfa

Figure 1.17-38 Example of Preliminary Stamps

The image to the right shows an example of the Submission Stamp provided with this Manual, in which the date needs to be entered in the format MM/DD/YYYY, as described in **Section 1.17.10.3.2 - Contract Borders**, as well as the submission percentage.

The Submission Stamps provided with this Manual are:

- PA-Submission 22x34.rfa
- PA-Submission 34x56.rfa
- PA-Submission 22x34_STAGE II.rfa
- PA-Submission 34x56_STAGE II.rfa

Note that submission stamps for Stage II projects are slightly larger than the stamp shown to the right and display the text "Stage II" at the top of the boxed area.
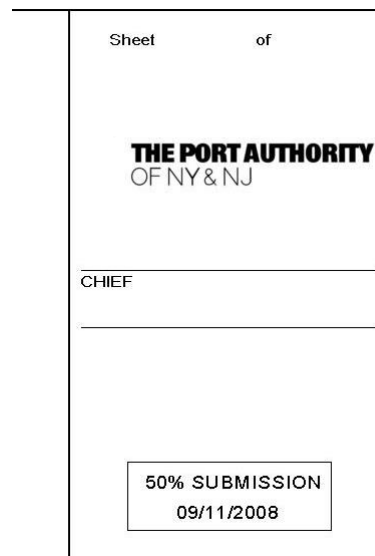

Figure 1.17-39 Example of the Submission Stamp

1.17.10.4.3 SECURITY STAMPS

Security Stamps have been provided for the following circumstances:

- Confidential
- Confidential Privileged

   NOTE

   Security Stamps should be displayed when plotting the As Advertised Signed Set and when creating the PDF files to help identify either the Confidential and/or the Confidential Privileged sheets. The image below shows the Confidential Privileged Markings which sit both within and outside the Contract Border limits.
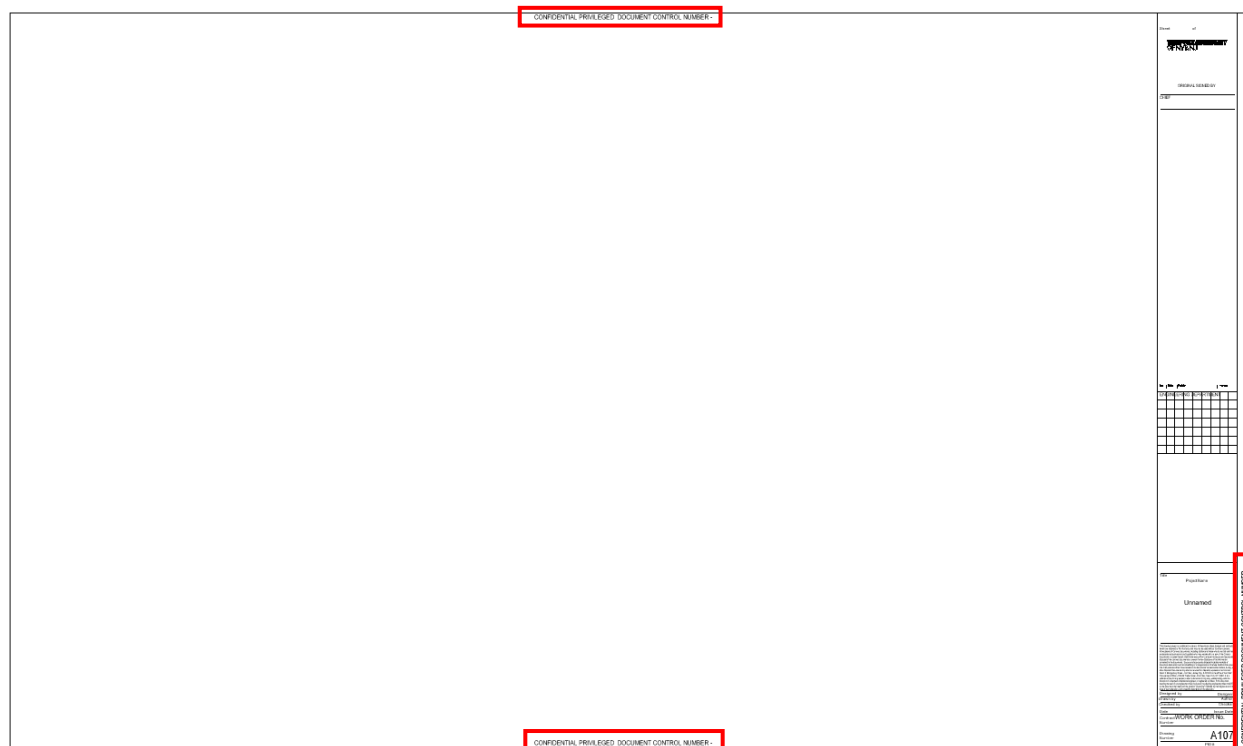
Figure 1.17-40 Confidential Privileged Markings outside the Contract Border limits

The Confidential and Confidential Privileged check boxes should be used only on those sheets that have been determined to be Confidential and/or Confidential Privileged.

Refer to **Section 1.9.1 - Confidential Projects** for proper handling of this type of Project.

   NOTE

   All Confidential and/or Confidential Privileged sheets should be grouped together in separate PDF files.

1.17.10.5   MAKING REVISIONS

Revision tracking is the process of recording changes made to a model after sheets have been issued. In the Revit-based applications revisions are displayed and tracked using revision clouds, tags, and schedules.

The revision process should be managed as follows:

1. Enter information about the revision in the *SHEETS ISSUES/REVISIONS* Dialog Box.

2. Update the Revit project to implement the change.

3. In one or more project views, draw revision clouds to indicate the areas that changed.

4. Assign a revision to each cloud.

5. Tag the revision clouds to identify the assigned revisions.

6. Check sheets to make sure that the revision schedules show the desired information.

7. Issue the revisions.

The Revit-based application provides flexibility in how it displays the sequence of revisions in a project, the numbers used, what is shown, and the system used.

To control the visibility of individual Revision series clouds and deltas, refer to the Revision Dialog window, not the view specific visibility graphics.

To set up the Revisions go to the *VIEW* Contextual Tab and expand the *SHEET COMPOSITION* Panel.

The image to the right shows the preferences used within The Port Authority of NY & NJ BIM Standard.

Revisions are Sheet based, shall use Numbers and shall show the Cloud and Tag.

The revision schedule displays information about revisions that have been issued in the project. All Contract Borders provided with The Port Authority of NY & NJ BIM Standard have been preset with the PA - REVISION SCHEDULE.
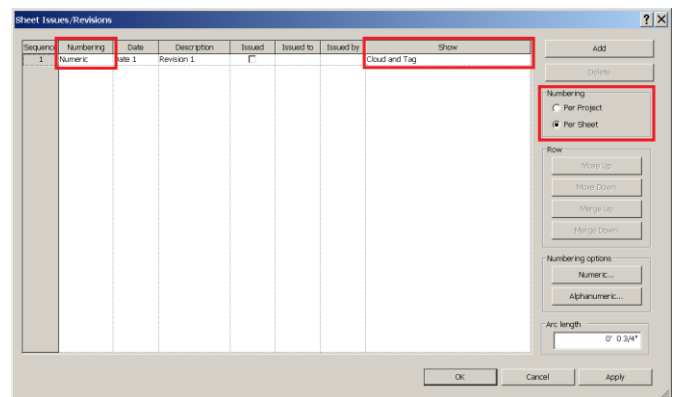

Figure 1.17-41 Sheet Issues/Revisions Dialog Box

NOTE

When issuing a revision within the Revit-based applications the following applies:

On the *SHEETS ISSUES/REVISIONS* Dialog Box, you can no longer change information for that revision.

In project views, you will assign the appropriate issued revision, to each revision cloud via the Properties palette.

You cannot edit revision clouds to which the issued revision is assigned.

The image to the right shows the Revision Schedule updated after 3 revisions have been issued.

3	09/16/2009	Revision 3	JQ
2	05/06/2009	Revision 2	JQ
1	02/03/2009	Revision 1	JQ
No.	DATE	DESCRIPTION	APPROVED

ENGINEERING DEPARTMENT

NEWARK LIBERTY INTERNATIONAL AIRPORT

ARCHITECTURAL

Figure 1.17-42 Example of Revision Schedule

1.17.10.5.1 MAKING REVISIONS IN CONTRACT DRAWINGS

Two types of revisions can happen in a Contract Drawing Set, Partial Revisions and Complete Revisions. A partial revision is when only portions of the Contract Drawings have been changed and a complete revision is when a new Contract Drawing is created.

Regardless of the revision type, users will be required to enter data into the Sheet Issues/Revisions dialog as outlined above, and add a corresponding revision cloud and triangle for each entry near the revised entities.

1.17.10.5.1.1   For Partial Revisions:

A Revision Cloud will be placed either in the View or on the Sheet surrounding just the area of the drawing where changes were made. The Revision Triangle family will be placed next to the Revision Cloud and will display the Revision Number. The Revision Table within the Contract Border will update including the Revision Number as well as the Date, the Description and the Initials of the respective persons issuing and receiving the revisions, as entered in the Sheet Issues/Revisions dialog.

1.17.10.5.1.2   For Complete Revisions:

The entry for the new Sheet in the Drawing Index will be bubbled with a Revision Cloud, and the Revision Triangle family will be placed near the bubble, displaying the Revision Number. The Revision table will display on the Contract Border with the Revision Number as well as the Date, the Description and the Initials of the respective persons issuing and approving the changes. A new Contract Border shall be issued for the new Sheet, showing the date of issue in the lower right-hand corner, and its file name shall have the date of issue appended to it, in the form, "-DD_MM_YY". Lastly, the sheet counter text "Drawing _ of _", displayed on the new drawing, must reflect the location of the new sheet and total number of sheets in the set.

Note that for any drawings that are added within a series (as opposed to the end of the series), all drawings following the inserted drawing must be renumbered correctly so that drawing numbers remain unique. Any drawings that have had their drawing number changed as a result of the addition of a drawing within a series must have the drawing number bubbled on the Sheet itself as well as in the Drawing Index, since the corresponding entry for the drawing shall be modified.

For every Revision Triangle inserted into a Sheet, a corresponding revision entry must exist within the Sheet Issues/Revisions dialog.

1.17.10.5.2 ADDENDA

The revision procedures detailed in **Section 1.17.10.5.1 Making Revisions in Contract Drawings** apply to Addenda.

1.17.10.5.3 PACC

The PACC Set (Post Award Contract Changes) contains drawings that have been modified or new drawings that have been issued after the Contract was awarded.

The revision procedures detailed in **Section 1.17.10.5.1 Making Revisions in Contract Drawings** apply to PACC Sets.

1.17.10.6 ITEMS PROHIBITED FROM SHEETS

No line work or annotation is allowed on Sheets with the following exceptions:

- ✓ Viewports
- ✓ View Titles
- ✓ Match lines and associated Match line annotations.
- ✓ Revision clouds and associated Revision cloud annotations.
- ✓ Scale Bars
- ✓ North Arrows

1.17.11 PLOTTING

The Port Authority of NY & NJ BIM Standard adopts the PDF format as the standard to be used when creating sheets for plotting purposes.

Plotting from the Revit-based application is accomplished by exporting the sheets as a PDF file. All Revit-based templates provided with The Port Authority of NY & NJ BIM Standard have been preconfigured with these settings.

PDF files shall always be created as multi-sheet files, in full size (22x34 or 34x56), in black and white, and grouped together by Drawing Type and by Series (if used).

By default, the ORIGINAL SIGNED BY field is provided with its default value set ON, as described in **Section 1.17.10.4.1 Professional Stamps.**

The image to the right shows the ORIGINAL SIGNED BY parameter turned OFF, which is required when plotting the As Advertised Signed Set.

Figure 1.17-43

1.17.12   PURGE UNUSED

The Purge Unused command unloads any unused Families and Family Types along with Groups and Styles, reducing the file size of the Revit Model file.

To purge the Revit Model, go to the *MANAGE* Contextual Tab and click on the *Purge Unused* Tool located under the *PROJECT SETTINGS* Panel. This will open the *PURGE UNUSED* Dialog Box as shown in the image at right.

Expand the desired category and click on the *"OK"* button.

NOTE

Every discipline's Task Leader is responsible for purging their discipline's Revit Model before each Submittal milestone.
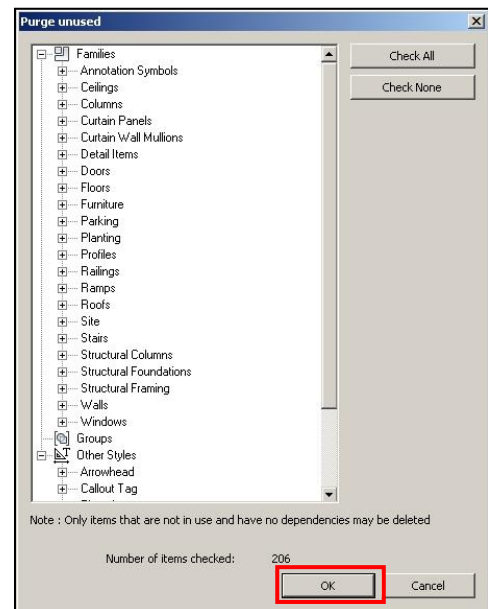

Figure1.17-44 Purge Unused Dialog Box

1.17.13   SUBMISSIONS

Before every Submission, each Discipline's BIM Coordinator is responsible for having all their team members save their changes to the Central File and to release any Workset ownership.

At the completion of every milestone, each Discipline's BIM Coordinator shall copy their Discipline's BIM, MANAGEMENTDOCS, MODEL, PHOTOS, PLOTSHEETS, and PUBLISH folders into the appropriate milestone sub-folder within SUBMITTALS.

Once the folders have been copied, each Discipline's BIM Coordinator shall notify the BIM Lead Coordinator who will notify the BIM/CAD Support Group via email (engbim@panynj.gov).

Upon notification, the BIM/CAD Support Group shall move the files to the Archive Server, mapped internally as the N:\ drive, leaving behind a text file named ARCHIVED YYYY-MM-DD.txt, which contains the exact location where the files can be found.

Projects received from an Outside Resource should be sent directly to the Discipline's BIM Coordinator.

> **NOTE**
>
> Before every submission, BIM Models should be purged of all unused information as described in **Section 1.17.12 Purge Unused.**

1.17.14   EXPORTING REVIT VIEWS TO AUTOCAD

This section describes the steps required to export Revit Views to AutoCAD preserving the predefined Coordinates System (NAD83) used on all BIM projects so other disciplines using Civil 3D can use these files as backgrounds.

In order to export Revit Views to AutoCAD, go to the *APPLICATION* menu and select the *Export* button followed by the *CAD Formats* option and then *DWG.* This will open the *DWG Export* Dialog Box as shown in the image below.

E/A Design Division BIM Standard

In the *Select Views and Sheets to Export* area of the *DWG Export* dialog, select the *In Session View/Sheet Set* under the *Export* drop-down list. This will enable the *Show in List* drop-down list, from which you can select the *Views in the Model* option to select which views to export. Select the desired views to export from the list.

If you are planning to export the same floor plan or levels multiple times throughout the lifetime of the project, you can save the selected views by clicking on the *New Set* button in the upper left-hand corner of the *EXPORT CAD FORMATS* Dialog Box.

The *NEW SET* Dialog Box will open as shown in the image to the right. Type a name and click the *"OK"* button. Next time you need to export the same floor plan or levels you just need to load the set you just saved.
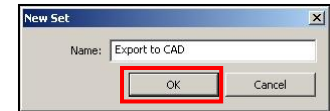

Figure 1.17-45 New Set Dialog Box

This file, as described in **Section 1.18.11.2 Export Layers DWG/DXF**, will convert Revit objects such as Walls, Doors, and Windows into their respective PA AutoCAD layers.

Click on the *Next…* button to open the *Export CAD Formats – Save to Target Folder* Dialog Box as shown in the image to the right, and browse to your own discipline's PUBLISH folder on the CAD Server mapped internally as the M:\ drive, by selecting the drop-down button.

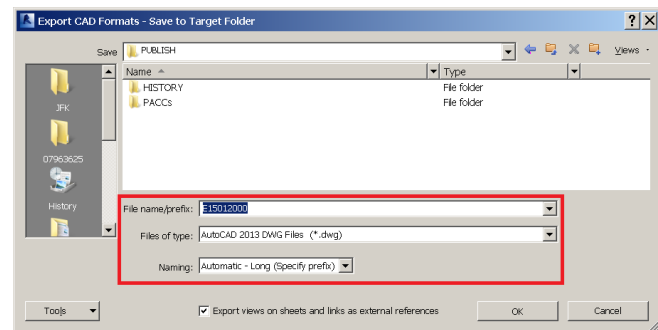This is where you will share backgrounds with disciplines not using Revit.

Figure 1.17-46 Export CAD Formats – Save to Target Folder Dialog Box

These settings within the *EXPORT CAD FORMATS* Dialog Box should be set as follows:

- The *File name/prefix* box has to be set to the Discipline Code followed by the eight-digit PID Number.
- Under Files of type select AutoCAD 2013 DWG Files (*.dwg).
- Under Naming" select the Automatic - Long (Specify Prefix) option.
- Un-check the check-box right next to the Export views on sheets and links as external references option.

    <u>**NOTE**</u>

    Two color-dependent plot style table files (CTBs) have been provided with The PANYNJ BIM Standard to plot from AutoCAD, refer to **Section 1.14.3.2 Export Layers DWG/DXF** for proper use.

1.17.15   EXCHANGING INFORMATION WITH OUTSIDE RESOURCES

Consultants are required to use the Sample Folder Structure provided with The Port Authority of NY & NJ BIM Standard Manual when working on BIM projects.

When exchanging information with outside resources, the Central File version of the Revit Model and, in the case of project coordination, the Navisworks Cache file (*.nwc), are the files that shall be shared.

E/A Design Division BIM Standard

The frequency with which this information will be shared between in-house staff and outside resources may vary from project to project. The following two sections describe the appropriate procedure when sharing information.

Two folders (RECEIVED and RELEASED) have been provided within the Sample Folder Structure to keep track of this.

1.17.15.1 RELEASING INFORMATION TO AN OUTSIDE RESOURCE

Each Discipline's Task Leader is required to submit their own discipline Model file, along with copies of other Disciplines Model files (if required) to their consultants via the LiveLink website.

1.17.15.2 RECEIVING INFORMATION FROM AN OUTSIDE RESOURCE

Consultants are required to submit their own discipline Model file directly to their Discipline's Task Leader.

Upon receiving the information, each discipline TL is responsible for copying their discipline models on the BIM Server, mapped internally as the R:\ drive, and shall notify the LE/A.

After copying the Revit Model file into the discipline's MODEL folder, the discipline's TL is responsible for opening the file and resaving it as a new central copy, overwriting the existing file.
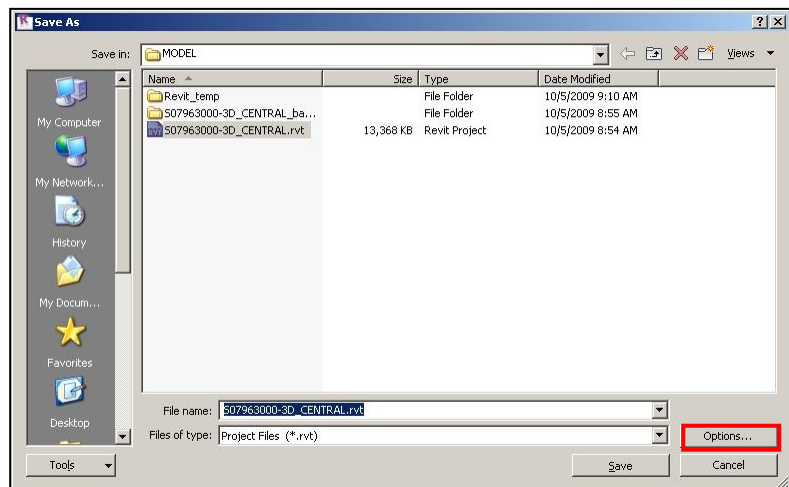
Figure 1.17-47 Save As Dialog Box

1.18 TITLE SHEETS & CONTRACT BORDERS

The following pages shows images of the official Port Authority of NY & NJ Title Sheets and Contract Borders for both sizes, 22x34 and 34x56, used on Engineering and Path projects.

1.18.1 TITLE SHEET ENGINEERING 22X34

Figure 1.18-1 Example of Title Sheet Engineering 22x34

1.18.2 TITLE SHEET ENGINEERING 34x56

Figure 1.18-2 Example of Title Sheet Engineering 34x56

1.18.3 TITLE SHEET PATH 22X34

Figure 1.18-3 Example of Title Sheet PATH 22x34

1.18.4 TITLE SHEET PATH 34x56
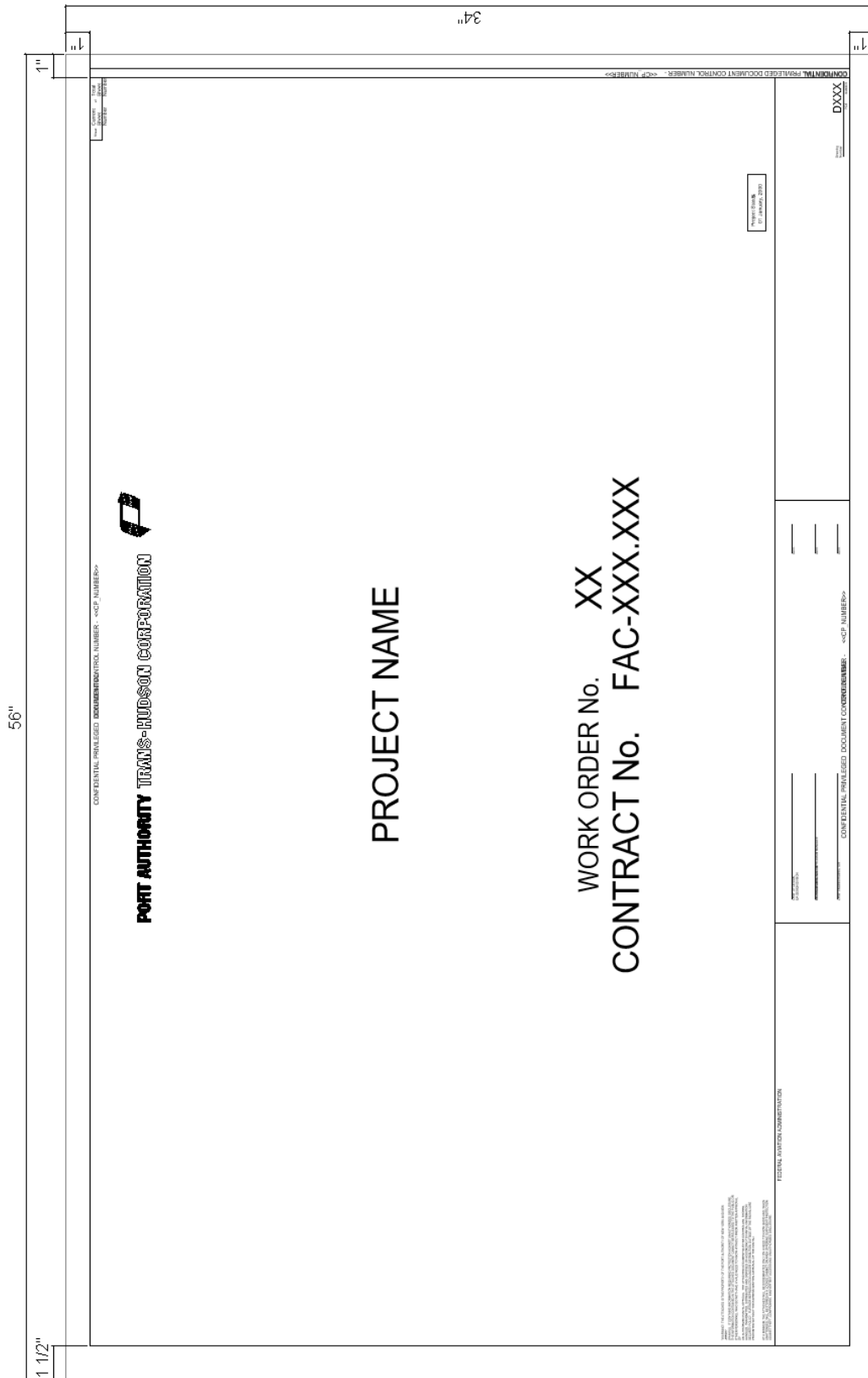
Figure 1.18-4 Example of Title Sheet PATH 34x56

1.18.5 CONTRACT BORDER ENGINEERING 22x34

Figure 1.18-5 Example of Contract Border Engineering 22x34

1.18.6 CONTRACT BORDER ENGINEERING 34x56
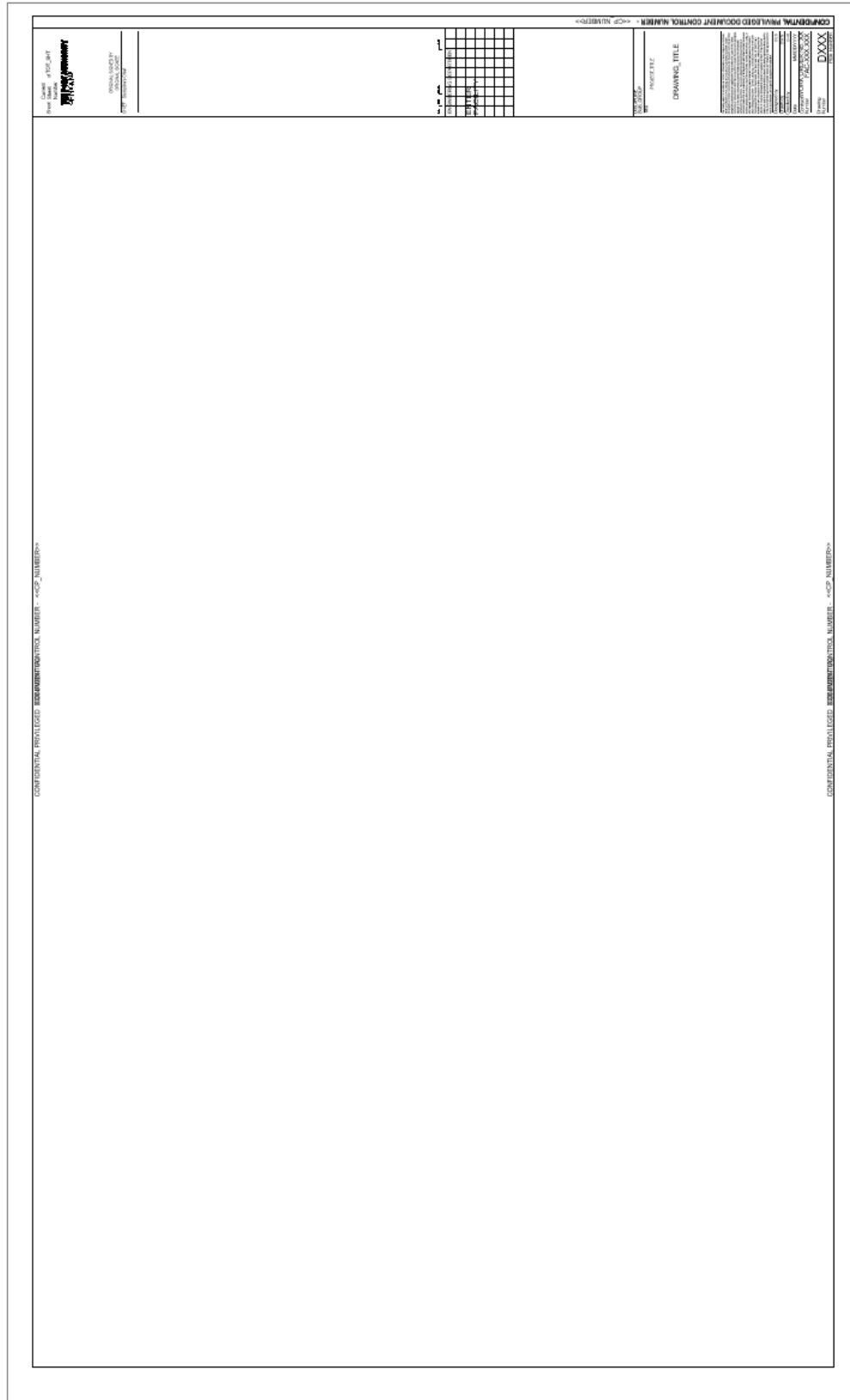
Figure 1.18-6 Example of Contract Border Engineering 34x56

1.18.7 CONTRACT BORDER PATH 22x34

Figure 1.18-7 Example of Contract Border Path 22x34

1.18.8 CONTRACT BORDER PATH 34x56

Figure 1.18-8 Example of Contract Border PATH 34x56

1.19 UPDATES AND REVISIONS

The dynamic nature of BIM technology dictates that this document will change over time. Changes to this document will be made by following strict procedures and guidelines.

Changes may be made based on errors and omissions, as well as to enhance or update the standard based on changes in the BIM environment. All requested changes to this document must be accompanied by a Request to Change BIM Standard Form provided in **Section 1.19.1 Request To Change BIM Standard Form.**

The Request to Change Standards form must be provided to the BIM/CAD Support Group. All requests will be reviewed on a periodic basis. If the change is approved, it will be incorporated into the next draft of this document and all support files will be modified.

The creation of Standards Content may be made based on Components used and approved by the BIM/CAD Support Group.

All requests must be accompanied by a Request to Create BIM Content Form provided in **Section 1.19.1 Request To Change BIM Standard Form.**

The Request to Change Standards form must be provided to the BIM/CAD Support Group.

Updates to this document and the related support files will be made as required and will be posted on **http://www.panynj-cadstandards.com/**

1.19.1 REQUEST TO CHANGE BIM STANDARD FORM

REQUESTOR INFORMATION	
NAME:	
COMPANY:	
ADDRESS:	
CITY:	
STATE:	
ZIP CODE:	
EMAIL:	
PHONE:	

CATEGORY CHANGE			
DOCUMENT CORRECTION	☐	**NAMING CONVENTIONS**	☐
ENVIRONMENT SETUP	☐	**BEST PRACTICES AND PROCEDURES**	☐
SAMPLE FOLDER STRUCTURE	☐	**SUPPORT FILES**	☐
LINE PATTERNS	☐	**OBJECT LINE WEIGHTS**	☐
VIEW TEMPLATES	☐	**FILTERS**	☐
OTHER (SPECIFY):			

DESCRIPTION

PLEASE BE SPECIFIC ABOUT ANY CHANGE OR ENHANCEMENTS YOU WOULD LIKE TO REQUEST AND INCLUDE WHY YOU ARE REQUESTING THE CHANGE.	

1.19.2 REQUEST TO CREATE BIM CONTENT FORM

REQUESTOR INFORMATION

NAME: _____
COMPANY: _____
ADDRESS: _____
CITY: _____
STATE: _____
ZIP CODE: _____
EMAIL: _____
PHONE: _____

CATEGORY

FAMILY FILE	☐	**FAMILY TYPES**	☐
TYPE CATALOG	☐	**MATERIALS**	☐
SYMBOL	☐	**TAG**	☐
LINE PATTERN	☐	**FILL REGION**	☐
TEXT STYLE	☐	**DIMENSION STYLE**	☐

OTHER (SPECIFY):	

DESCRIPTION

PLEASE BE SPECIFIC ABOUT IF THE INFORMATION REQUESTED, SUCH AS A FAMILY, ITS TYPES AND DIMENSIONS ALONG WITH ITS UNIFORMAT CLASSIFICATION CODE. INCLUDE ANY SAMPLE FILES, DRAWINGS OR SKETCHES.

1.20 ACRONYMS

ACRONYMS	DESCRIPTION
BIM	Building Information Model
CMD	Construction Management Division
C3D	Civil 3D
E/AD	Engineering/Architecture Design
FIM	Facility Information Model
IPD	Integrated Project Delivery
LE/A	Lead Engineer\Architect
LOD	Level of Development
PIM	Project Information Model
PWS	Project Website
SM	Site Model
TL	Task Leader
WCS	World Coordinates System

1.21 GLOSSARY OF TERMS

TERM	DESCRIPTION
3D Model	A three-dimensional representation of a building and/or structure generated out of a CAD and/or BIM application
Building Information Model	A Building Information Model (BIM) is a digital representation of the physical and functional characteristics of a building and/or structure
BIM/CAD Manager	The System Administrator for all CAD & BIM projects, in this case the BIM/CAD Support Group
Central File	The Master Project File that is saved to a network drive and acts as the distribution point for publishing work to the rest of the team. The Central File stores the current ownership information for all the elements of the project
Contract Drawing	A drawing sheet of the Contract Set
Contract Set	The legal set of issued drawings originally signed and sealed by a PE or RA
DWF	A highly compressed non-editable vector file format created out of BIM/CAD applications. A DWF file can represent sheets for plotting purposes (2D DWF) or the entire 3D Model (3D DWF) for visualization or estimating purposes
Element Borrowing	The ability to edit an element located in a Workset without needing to take ownership of the entire Workset. If no one owns the Workset, permission to borrow the element is automatically granted. If Workset is owned individual permission must be granted to edit.
Facility Information Model	The Facility Information Model (FIM) stores the most current Revit-based and Civil 3D-based models of that facility
Intelligent Objects	An Object or Set of Objects that represents not only the geometry of a component but also has much more information that can be extracted in multiple ways depending on the user needs
Integrated Project Delivery	Integrated Project Delivery (IPD) is a project delivery approach that integrates people, systems, and practices to optimize efficiency through all phases of design, fabrication and construction

TERM	DESCRIPTION
Lead Engineer/Architect	Lead Engineer/Architect (LE/A) refers to the project coordinator among all disciplines involved in the project
Local File	The copy of the Central File located directly on the user's workstation. The main purpose of the Local File is faster data access. The Workset processes establish a link between the Central File and the Local File for data sharing
Level of Development	Categorized as Phases I-IV, refers to the level of project completion
PDF	A Portable Document Format is a file format that provides an electronic image of text or text and graphics that looks like a printed document and can be viewed, printed, and electronically transmitted
Project Information Model	The Project Information Model (PIM) stores the finalized Revit-based and Civil 3D-based models as a record of a completed project
Point Cloud	A Point Cloud is a large collection of points placed on a 3D Coordinate System which creates a 3D representation of an object or space.
Revit Families	Revit Families are groups of elements with a common set of parameters, identical use, and similar graphical representation
Shared Parameters	Shared Parameters can be connected to projects and families. They give the ability to add specific parameters/ data that does not already exist in the Revit-based applications
Site Model	The Site Model (SM) is the centralized Revit-based file where all models share coordinates with each other and at the same time will control true north, project north, and elevations
Task Leader	Task Leader (TL) refers to each discipline's responsible team member. This person will be in charge of managing the 3D Model in terms of Worksets and rights
Traditional Project Delivery	Traditional Project Delivery (TPD), such as Conceptual Design, Design Development, and Final Design, creates well-defined workflow boundaries that do not align with a collaborative process
Worksets	Worksets create the ability to divide the project in functional areas allowing the propagation and coordination of changes between designers, enabling multiple members of a team the ability to simultaneously work on different portions of a project

1.22   CHANGES TO THE STANDARDS

2019- First Quarter

File / Section	Description
EAD_BIM_Standard_Manual.pdf 1.5 BIM PROJECTS WORKFLOW	Updated Section.
EAD_BIM_Standard_Manual.pdf 1.8 BIM ROLES AND RESPONSIBILITIES	Updated Section.
EAD_BIM_Standard_Manual.pdf 1.9 BIM STANDARD REVIEW REPORT	Updated Images of BIM Review Report and Items description.
EAD_BIM_Standard_Manual.pdf 1.10 MODEL GENERALTIES	Updated Section.
EAD_BIM_Standard_Manual.pdf 1.16 TEMPLATES	Updated Section.
EAD_BIM_Standard_Manual.pdf 1.18 NAMING CONVENTIONS	Updated naming conventions for Annotation families.
EAD_BIM_Standard_Manual.pdf 1.22 TITLE SHEETS & CONTRACT BORDERS	Updated the images.
EAD_BIM_Standard_Manual.pdf 1.29 APPENDIX B BIM MODELING TECHNIQUES	Section Deleted and replaced by "BIM Specific Requirements for Construction"

2019- Second Quarter

File / Section	Description
EAD_BIM_Standard_Manual.pdf 1.4 HOW TO USE THIS MANUAL	Updated Section to include Reference to CMD BIM Standard Manual.
EAD_BIM_Standard_Manual.pdf 1.5 E/AD BIM PROJECTS WORKFLOW	Section name updated.
EAD_BIM_Standard_Manual.pdf 1.6 CRITERIA FOR SELECTION OF BIM PROJECTS	Section was deleted. Criteria is being modified.

EAD_BIM_Standard_Manual.pdf 1.6 BIM EXECUTION PLAN	Section has been updated to reflect General guidance and refer to each EAD and CMD BEP templates.
EAD_BIM_Standard_Manual.pdf 1.7 BIM ROLES AND RESPONSIBILITIES	Updated Section to include Reference to CMD BIM Standard Manual for Stage IV Roles and Responsibilities.
EAD_BIM_Standard_Manual.pdf 1.8 GENERAL REQUIREMENTS	Section name updated. Software version has been included. Level of Development has been updated.
EAD_BIM_Standard_Manual.pdf 1.10 PROJECT DELIVERABLES	Section name updated. Reference to CMD BIM Standard Manual was included for Stage IV Specific deliverables.
EAD_BIM_Standard_Manual.pdf 1.11 BIM STANDARDS REVIEW	Section was relocated, renamed and Updated.
EAD_BIM_Standard_Manual.pdf ~~1.14 ENVIRONMENT SETUP~~	Section was deleted and content relocated to General Requirements Section.
EAD_BIM_Standard_Manual.pdf 1.14 REVIT TEMPLATES	Section name and content updated.
EAD_BIM_Standard_Manual.pdf 1.16 INTERFERENCE CHECK / CLASH DETECTION	Section was relocated and updated.
EAD_BIM_Standard_Manual.pdf ~~1.17 SHARED PARAMETERS~~	Section was deleted and content relocated to General Requirements Section.
EAD_BIM_Standard_Manual.pdf 1.17 BEST PRACTICES AND PROCEDURES	Updated Section.
EAD_BIM_Standard_Manual.pdf ~~1.21 VIRTUAL REALITY~~	Section was deleted and content relocated.
EAD_BIM_Standard_Manual.pdf 1.24 APPENDIX A BIM EXECUTION PLAN FOR E/AD	BEP is now specific for EAD Projects. Stage IV Projects BEP is located in the CMD BIM Standard Manual.
EAD_BIM_Standard_Manual.pdf ~~1.29 APPENDIX C BIM SPECIFIC REQUIREMENTS FOR CONSTRUCTION~~	Section Deleted and replaced by CMD BIM Standard Manual.

2019- Third Quarter

File / Section	Description
EAD_BIM_Standard_Manual.pdf 1.6 INTERFERENCE CHECK / CLASH DETECTION	Section was restructured.

1.23 INFORMATION

Questions regarding the Port Authority of NY & NJ BIM Standard provided within this Manual should be directed to the BIM/CAD Support Group at:

Port Authority of NY & NJ

4 World Trade Center

20th Floor

New York, NY 10007

Attn. BIM/CAD Support Group

212-435-6102

engbim@panynj.gov

1.24   APPENDIX A – BIM EXECUTION PLAN TEMPLATE FOR E/AD

[Notes for customizing the BIM Execution Plan are highlighted in red. Review, replace and/or remove all text in red with current project information before completion of final BEP]

[Project Name]
BIM Execution Plan
(Stages I, II, III)

1.24.1 INTRODUCTION

1.24.1.1 PURPOSE

The Port Authority of New York and New Jersey has developed this BIM Execution Plan template to be used in the creation of a project roadmap, which shall outline project-specific goals and strategies for the successful execution of BIM technologies.

The objective of the BIM Execution Plan is to define a framework within which the designers, construction managers, contractors and owners, among all the participants of a project, enumerate their project goals while implementing the same shared standard practices.

This BIM Execution Plan will:

- Define and facilitate the exchange of information between all participants.
- Establish coordination procedures and consistency among all trades.
- Organize all BIM-related activities around a philosophy of collaborative design.
- Emphasize BIM's role in the beneficial re-use of project data throughout the whole life-cycle.

This will ensure all information provided by all participants is reliably and precisely developed in each stage of design, construction and facility operation and maintenance throughout the entire project lifecycle.

1.24.1.2 OVERVIEW

The expectations of the BIM Execution Plan (BEP) should be addressed no later than at the Project Kick-Off Meeting. The BEP shall be submitted no later than two weeks after the Project Kick-Off Meeting takes place. The BEP is a live document and will be updated if major changes to the process are needed as a result of lessons learned and/or changes in technology that would provide significant advantages to the project. All changes are subject to Port Authority of NY & NJ approval.

1.24.2 PROJECT INFORMATION

For large projects and programs that are divided into multiple projects the following information must be provided for each project:

1.24.2.1 PROJECT NAME

(Enter project name here)

1.24.2.2 PROJECT NUMBER

(Enter the PID Number)

1.24.2.3 PROJECT LOCATION

(Describe the location of the project at the address below)

1.24.2.4 PROJECT ADDRESS

(Enter the project address)

1.24.2.5 PROJECT TYPE

(Indicate what type of building/structure is being designed)

1.24.2.6 PROJECT DESCRIPTION

(Provide at a minimum project scope, important milestone dates, and project area (SF))

1.24.2.7   PROJECT OWNER

(List the Port Authority of New York & New Jersey Line Department for which the project is being developed)

1.24.2.8   PROJECT SCHEDULE

PHASE	SUBMISSION MILESTONE	START DATE	END DATE	NUMBER OF WEEKS
Stage I	50%			
	100%			
Stage II	25%			
	50%			
	75%			
	100%			
Stage III	25%			
	50%			
	75%			
	100%			

NOTE

Delete the stages that do not apply to the project and define project-specific submission milestones.

1.24.3 PROJECT CONTACTS

For large projects and programs that are divided into multiple projects the following information must be provided for each project.

1.24.3.1   THE PORT AUTHORITY OF NY & NJ

DEPARTMENT	DIVISION	NAME	TITLE	EMAIL	PHONE

1.24.3.2   DESIGN

DISCIPLINE	TRADE / SUBDISCIPLINE	COMPANY	NAME	TITLE	EMAIL	PHONE
Architecture	Architecture					
	Landscape					
Electrical	Electrical					
	Electronics					
Mechanical	HVAC					
	Plumbing					
	Fire Protection					
Structural						

NOTE

Add the Disciplines and/or Trades that are involved in the project.

1.24.4 PROJECT LIFECYCLE DEVELOPMENT

1.24.4.1   BIM PHASES

The phases indicated in the diagram and table below relate directly to distinct stages of a BIM project's lifecycle development at The Port Authority of NY & NJ:
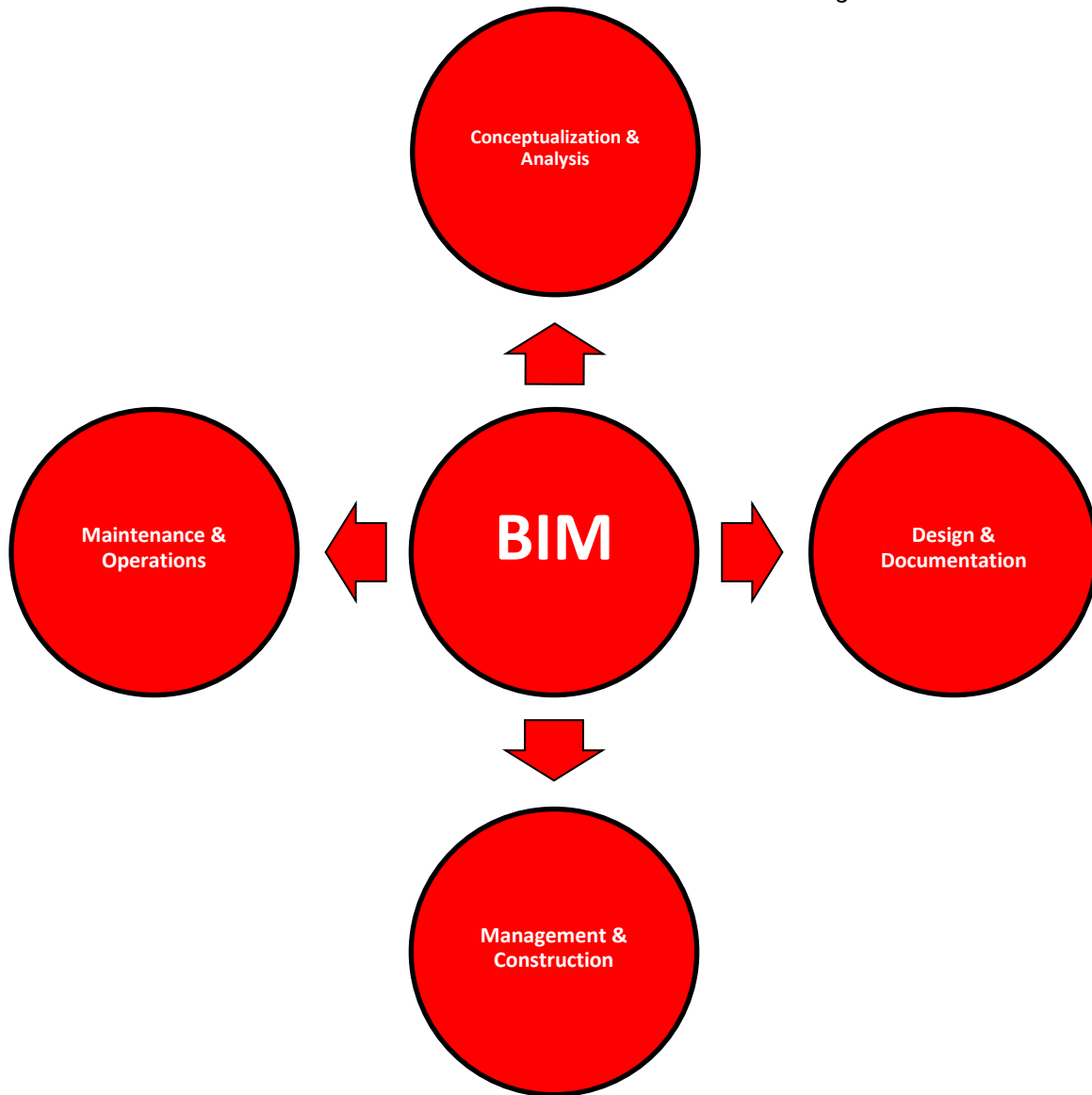
BIM PHASE	PANYNJ STAGE	DESCRIPTION
Conceptualization & Analysis	Stage I	Conceptual Design
Design & Documentation	Stage II	Design Development
	Stage III	Construction Documents
Management & Construction	Stage IV	Construction
Maintenance & Operations	Stage V	Operations

1.24.4.2 BIM USES

CONCEPTUALIZATION & ANALYSIS	DESIGN & DOCUMENTATION	MANAGEMENT & CONSTRUCTION	MAINTENANCE & OPERATIONS
Existing Conditions Modeling	Design Review	3D Coordination	Record Model

Cost Estimation	Design Authoring	Site and Logistics Planning	Maintenance Schedule
Phase Planning	Lighting Analysis	Construction System Design	Building System Analysis
Programming	Energy Analysis	Digital Fabrication	Facility / Asset Management
Site Analysis	Mechanical Analysis	Schedule Control and Planning	Space management
	LEED Evaluation	Cost Tracking and Management	Disaster Planning
	Code Validation	Commissioning	
	Design Coordination	Project Interface Management	
	Constructability Review	Cost and Schedule Forecast	
	Value Engineering	Accurate As-Built Documentation	
	Design Management	Quality Assurance and Quality Control	
	Cost and Schedule Forecast	Change Management	
	Virtual Mockups		
	Site and Logistics Planning		
	Safety Planning		

1.24.5 PROJECT GOALS

1.24.5.1 PRIMARY GOALS

- Reduce overall construction cost by developing a coordinated, constructible design.

  o Reduce the number of RFIs
  o Reduce the number of Change Orders
  o Reduce re-work in the field

- Improve the accuracy and efficiency of quantity take-offs and generate cost estimates twice as fast with a precision of +/- 3%
- Develop an integrated model including the design, cost and schedule of the project to be used for cash flow and schedule forecasting.
- Utilize the integrated model for cost and schedule control.
- All construction documents will be derived from the Revit model.
- Develop an as-constructed BIM model to LOD 500 for data handoff to The Port Authority of NY & NJ's Asset Management System.
- Perform safety analysis.
- Perform site and logistics planning.
- Aid in detailed constructability review.

NOTE

The above Primary Goals are for example only. Each BIM project team shall define their project-specific Primary Goals.

1.24.5.2   SECONDARY GOALS

- Optimize sustainable design measures and minimize operating cost by allowing the Sustainable Design Group to influence design early on
- Reduce repetitive data entry and rework by utilizing model geometry and data in analysis applications (Computational Fluid Dynamics (CFD), egress, daylighting, cost estimating, etc.)
- Develop renderings and animations more efficiently using 3D geometry
- Provide a method to study design alternatives in three or four dimensions.
- Improve communication of design changes by relying on impact of 3D geometry.

NOTE

The above Secondary Goals are for example only. Each BIM project team shall define their project-specific Secondary Goals.

1.24.6 TECHNOLOGICAL INFRASTRUCTURE

1.24.6.1   COMPUTER HARDWARE & OPERATING SYSTEM

Recommended Mínimum Requirements:

ITEM	DESCRIPTION
Operating System	Microsoft Windows 7 64-bit - Enterprise - Ultimate - Professional - Home Premium
Browser	Internet Explorer 9.0
Processor	Intel i7
Memory	16GB RAM 32GB (if possible)
Monitor	Minimum resolution: 1680 x 1050 1920 x 1200 (if possible) 2 monitors (if possible)
Video Card	1GB (2GB (if possible) With Direct X 10 technology Review approved Video Cards list from: http://usa.autodesk.com/adsk/servlet/syscert?id=18844534&siteID=123112
Hard Drive	25 GB (free space)
Mouse	3 buttons with scroll-wheel
Media	DVD

1.24.6.2   SOFTWARE

SOFTWARE	VERSION	USES
Revit		
NavisWorks Manage		

Design Review		
AutoCAD		
Primavera P6		
Other		

1.24.7 COLLABORATION PROCEDURES

NOTE

Delete either Design Process or Construction Process section below so that only the process relevant for your project is described, unless your project is Design-Build.

1.24.7.1 DESIGN PROCESS

The [indicate primary discipline] discipline shall guide the design process. All disciplines involved shall meet [X] days before bi-weekly submissions to verify the coordination of BIM models. In situations where a coordination conflict exists, the disciplines involved must discuss, assign design responsibility and resolve each issue.   Three-dimensional modeling work shall take priority over adding annotations and text. Data shall be added to the model in the most efficient way possible, for example exporting items to a spreadsheet, completing data entry in the spreadsheet, and importing the completed spreadsheet back into the model.

1.24.7.2 MEETINGS

1.24.7.2.1 PROJECT KICK-OFF MEETINGS

At the Project Kick-Off Meeting, expectations for compliance with The Port Authority of NY & NJ BIM process will be reviewed and the Site Model for the project will be turned over. The URL http://www.panynj-cadstandards.com is the source of templates and The Port Authority of NY & NJ BIM Standards guide for developing the project in compliance with The Port Authority of NY & NJ BIM-related project controls.

1.24.7.2.2 COORDINATION MEETINGS

Regular meetings to discuss areas of concern will take place as requested by the Lead Engineer/Architect (LEA). To facilitate the discussion copies of pertinent Revit RVT files or their corresponding Navisworks NWC derivatives should be accessible via Livelink and displayed on a screen viewable by all attendees.

1.24.7.2.3 PROGRESS MEETINGS

Meetings will take place at the LEA's discretion and/or as otherwise defined by the BIM Execution Plan to review the general development of the BIM model files. Discussions may revolve around progress in developing geometry and/or adding data to the files.

1.24.7.3 INFORMATION EXCHANGE

Information exchange shall take place via Livelink (or other approved system) on a bi-weekly basis.

1.24.7.4 MODEL COORDINATION

Special attention must be paid to coordination between disciplines and/or trades. Coordination should be a conscious effort throughout the design process and construction processes. Coordination review meetings are an integral part of The Port Authority of NY & NJ BIM process. Coordination meetings shall be held on a recurring basis starting six weeks after project kick-off. These meetings shall be based around coordination results found using The Port Authority of NY & NJ's Navisworks coordination template, which shall be reviewed and discussed internally in advance of scheduled meetings. The meetings shall involve a meeting leader and at least one person from each discipline who is directly involved in the project design. Each meeting will involve a live walk-through of the composite model and result in a clash report detailing

the agreement reached for each coordination issue (including who is responsible for resolving the issue and any recommendations resulting from the discussion in the coordination meeting).

1.24.7.4.1 COORDINATION / CLASH DETECTION PROCESS

See **Section 1.16 Interference Check / Clash Detection** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.7.4.2 4D/5D DEVELOPMENT PROCEDURES

(Provide development procedures for schedule, (4D) analysis of construction, including workflow procedures for 4D schedule. Provide development procedures for cost, (5D) analysis. Provide details for coordination processes between all parties involved during design and construction, including utilization of BIM 4D/5D analyses during coordination and progress meetings)

1.24.8 MODEL DETAILS

1.24.8.1 MODEL OWNERSHIP

See **Section 1.8.3 Model Ownership** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.8.2 MODEL QUALITY

See **Section 1.8.4 Model Quality** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.8.3 MODEL GRANULARITY

See **Section 1.8.6 Model Granularity** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

> **NOTE**
>
> **Enumerate any project-specific components that must be modeled that are smaller than the stipulated threshold.**

1.24.8.4 DISCREPANCIES

See **Section 1.8.8 Model Discrepancies** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.8.5 TOLERANCES / CLEARANCES

The Model should be created in a scale of 1:1 and should contain the appropriate dimensions for construction.

The maximum tolerance shall be +/- 1/8"

> **NOTE**
>
> **Enumerate any project-specific tolerances or clearances for each component that differs from +/- 1/8"**

1.24.8.6 COORDINATE SYSTEMS

See **Section 1.8.9 Coordinate Systems** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.8.7   MODEL LEVEL OF DEVELOPMENT

See **Section 1.8.5 Model Level of Development** in The Port Authority of NY & NJ E/A Design Division *BIM* Standard*.*

1.24.8.8   MEASUREMENT OF DESIGN PROGRESS

Design progress is measured by the amount of geometry include in the model at each Milestone Submission.

1.24.8.8.1   STAGE X MILESTONE SUBMISSIONS

Each stage submission requirements have been divided into 4 major milestones described below, as a way to measure a model's design progress.

NOTE

Add or remove trades and systems (such as Security, Baggage Handling Systems, Hydrant Fueling Systems, etc.) as needed per project requirements.

1.24.8.8.1.1   25% Milestone Submission

TRADE	OBJECTS / ELEMENTS	LOD
Architecture	Ceiling	LOD-200
	Curtain Wall	LOD-200
	Doors	LOD-200
	Floors	LOD-200
	Partitions	LOD-200
	Stairs	LOD-200
	Windows	LOD-200
Structure	Beams	LOD-200
	Columns	LOD-200
	Floors	LOD-200
	Foundations	LOD-200
	Ramps	LOD-200
	Stairs	LOD-200
	Walls	LOD-200
Fire Protection	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
HVAC	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
Electronics	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
Electrical	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
Plumbing	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200

1.24.8.8.1.2   50% Milestone Submission

TRADE	OBJECTS / ELEMENTS	LOD
Architecture	Ceiling	LOD-200
	Curtain Wall	LOD-200

E/A Design Division BIM Standard

TRADE	OBJECTS / ELEMENTS	LOD
	Doors	LOD-200
	Floors	LOD-200
	Partitions	LOD-200
	Railings	LOD-200
	Stairs	LOD-200
	Windows	LOD-200
	Woodwork	LOD-200
Structure	Beams	LOD-200
	Columns	LOD-200
	Floors	LOD-200
	Foundations	LOD-200
	Ramps	LOD-200
	Stairs	LOD-200
	Walls	LOD-200
Fire Protection	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
	Branch Lines	LOD-200
	Sprinklers	LOD-200
	Hose Cabinet	LOD-200
HVAC	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
	Branch Lines	LOD-200
	Dampers	LOD-200
	Diffusers	LOD-200
	Grilles	LOD-200
Electronics	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
	Branch Lines	LOD-200
	Panels	LOD-200
	Communication Devices	LOD-200
	Data Devices	LOD-200
	Telephone Devices	LOD-200
	Switches	LOD-200
	Fittings	LOD-200
Electrical	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
	Branch Lines	LOD-200
	Panels	LOD-200
	Lighting Fixtures	LOD-200
	Electrical Devices	LOD-200
	Switches	LOD-200
	Fittings	LOD-200
Plumbing	Equipment	LOD-200
	Risers	LOD-200
	Main Lines	LOD-200
	Branch Lines	LOD-200
	Plumbing Fixtures	LOD-200

1.24.8.8.1.3   *75% Milestone Submission*

TRADE	OBJECTS / ELEMENTS	LOD

Architecture	Ceiling	LOD-300
	Curtain Wall	LOD-300
	Doors	LOD-300
	Floors	LOD-300
	Partitions	LOD-300
	Railings	LOD-300
	Stairs	LOD-300
	Windows	LOD-300
	Woodwork	LOD-300
Structure	Beams	LOD-300
	Columns	LOD-300
	Floors	LOD-300
	Foundations	LOD-300
	Parget	LOD-300
	Ramps	LOD-300
	Stairs	LOD-300
	Walls	LOD-300
Fire Protection	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Sprinklers	LOD-300
	Hose Cabinet	LOD-300
	Drains	LOD-300
	Traps	LOD-300
	Valves	LOD-300
HVAC	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Dampers	LOD-300
	Diffusers	LOD-300
	Grilles	LOD-300
	Thermostats	LOD-300
Electronics	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Panels	LOD-300
	Communication Devices	LOD-300
	Data Devices	LOD-300
	Telephone Devices	LOD-300
	Switches	LOD-300
	Fittings	LOD-300
Electrical	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Panels	LOD-300
	Lighting Fixtures	LOD-300
	Electrical Devices	LOD-300
	Switches	LOD-300
	Fittings	LOD-300
	Outlets	LOD-300

E/A Design Division BIM Standard

Plumbing	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Plumbing Fixtures	LOD-300
	Drains	LOD-300
	Traps	LOD-300
	Valves	LOD-300

1.24.8.8.1.4 100% Milestone Submission

TRADE	OBJECTS / ELEMENTS	LOD
Architecture	Ceiling	LOD-300
	Curtain Wall	LOD-300
	Doors	LOD-300
	Floors	LOD-300
	Partitions	LOD-300
	Railings	LOD-300
	Rooms	LOD-300
	Stairs	LOD-300
	Windows	LOD-300
	Woodwork	LOD-300
Structure	Beams	LOD-300
	Columns	LOD-300
	Floors	LOD-300
	Foundations	LOD-300
	Parget	LOD-300
	Ramps	LOD-300
	Stairs	LOD-300
	Walls	LOD-300
Fire Protection	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Sprinklers	LOD-300
	Hose Cabinet	LOD-300
	Drains	LOD-300
	Traps	LOD-300
	Valves	LOD-300
HVAC	Spaces	LOD-300
	Zones	LOD-300
	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Dampers	LOD-300
	Diffusers	LOD-300
	Grilles	LOD-300
	Thermostats	LOD-300
Electronics	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300

	Panels	LOD-300
	Communication Devices	LOD-300
	Data Devices	LOD-300
	Telephone Devices	LOD-300
	Switches	LOD-300
	Fittings	LOD-300
Electrical	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Panels	LOD-300
	Lighting Fixtures	LOD-300
	Electrical Devices	LOD-300
	Switches	LOD-300
	Fittings	LOD-300
	Outlets	LOD-300
Plumbing	Equipment	LOD-300
	Risers	LOD-300
	Main Lines	LOD-300
	Branch Lines	LOD-300
	Plumbing Fixtures	LOD-300
	Drains	LOD-300
	Traps	LOD-300
	Valves	LOD-300

1.24.9 BIM STANDARDS

1.24.9.1   REQUIREMENTS

The BIM process used on Port Authority of NY & NJ BIM projects shall be in complete compliance with the release of The Port Authority of NY & NJ EAD BIM Standard manual currently in use.

1.24.9.2   CONSIDERATIONS

1.24.9.2.1 MODEL FILES

Model files must comply with all regulations outlined in The Port Authority of NY & NJ BIM Standards manual.

1.24.9.2.2 FAMILY FILES

Family files must comply with all regulations outlined in The Port Authority of NY & NJ BIM Standards manual.

See **Section 1.15.2.5 Revit Annotation Family Files**

Annotation Family files, including the Contract Border, shall be named with the prefix "PA - ", followed by a description. Several standardized Annotation Families are provided with each of the PANYNJ project templates, and their names shall not be changed.

File names for Contract Border families used for addenda shall take the name of the Contract Border file as received from PANYNJ, but have a dash (-) followed by the date of the addendum appended at its end in the form -YYYY_MM_DD. The original Contract Border shall remain unchanged and both files will co-exist within the Publish folder. Contact the BIM/CAD Support Group if you need to create a new Contract Border for any of the above Submissions.

See **Section 1.15.2.6 Revit Model Family Files** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

In the event The Port Authority of NY & NJ cannot provide a comparable family, custom families less than 10MB can be created and shall be submitted to The Port Authority of NY & NJ for review.

1.24.9.3 DELIVERABLES

Electronic Deliverables are required at every bi-weekly submission. In addition to Electronic Deliverables, a hardcopy is required at the completion of every project.

1.24.9.3.1 HARDCOPY DELIVERABLES

See **Section 1.10.1 Hardcopy Deliverables** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.9.3.2 ELECTRONIC DELIVERABLES

See **Section 1.10.2 Electronic Deliverables** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.9.3.2.1 File Types

See **Section 1.10.2.1 Media and File Formats** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.9.3.2.2 Clash-Free Model

See **Section 1.10.2.2 Clash-Free Model** in The Port Authority of NY & NJ E/A Design Division BIM Standard.

1.24.9.4 QUALITY CONTROL

1.24.9.4.1 MODEL REPORT

A Model Report shall be issued with each project milestone submission to convey design progress. Next to each item in the Model Report spreadsheet provided by The Port Authority of NY & NJ, project participants must indicate the percentage of all system components that have been modeled, as well as their modeled Level of Development.

1.24.9.4.2 CLASH REPORT

Clash reports shall be generated as part of all coordination meetings and shall accompany all project milestone submissions. The Port Authority of NY & NJ Navisworks template shall be used to generate the reports and shall be submitted in HTML format along with all associated linked image files. In addition to the HTML reports, an NWD file containing saved viewpoints of clashes and assigned responsibilities for resolving the issues shall also be submitted.

The Port Authority of NY & NJ Navisworks template contains preset clash tests. These preset tests represent the minimum clashes to be executed for each project. To achieve a clash-free model additional tests may be required. Record the results of all clash tests shall in the HTML reports and NWD files.

See **Section 1.20 Interference Check / Clash Detection** in The Port Authority of NY & NJ E/A Design Division BIM Standard for additional information.