

# Port of Seattle CAD Standards **2025 Edition**

**Effective March 17, 2025**

Major changes in this Edition are documented in the 2025 Change Log on  
page 2

**This manual supersedes Port of Seattle  
CAD Standards, 2023 Edition**

<b>2025 Port of Seattle CAD Standards Change Log</b>		
<b>Section</b>	<b>Page</b>	<b>Modification Description</b>
<a href="#">1.1</a>	9	National CAD Standard (NCS) adoption.
<a href="#">1.1</a>	9	Compliance is contractually required on all Port of Seattle projects.
<a href="#">1.3</a>	9	Compliance: Language updated to emphasize requirements.
<a href="#">1.4</a>	10	Revised software versioning and drawing template info.
<a href="#">2.1</a>	12	Revised applicability language.
<a href="#">2.2</a>	12	Infrastructure Classification. Removed redundancy. Refer to Section 3.3.
<a href="#">3.2.1</a>	15	Port Project Tracking # [PTN] request process clarified.
<a href="#">3.2.2</a>	15	Updated facility designation list.
<a href="#">3.3.1</a>	16	Added discipline designator for Telecommunications
<a href="#">3.3.2</a>	17	Added sub-discipline designator “CJ” for Aircraft Fueling.
<a href="#">3.3.2</a>	17	Added sub-discipline designators for Survey.
<a href="#">3.3.2</a>	19	Added sub-discipline designators for Telecommunications.
<a href="#">3.4.1</a>	20	Updated ID Placeholder list for internal non-design related drawings.
<a href="#">3.5</a>	20	Updated sheet drawing file naming protocol.
<a href="#">3.5.2</a>	20	Added Sheet Type Designations.
<a href="#">3.7.1b</a>	22	Coordinate/datum requirements for native CAD in BIM projects.
<a href="#">3.9.1</a>	23	Coordinate/datum requirements for native CAD in BIM projects.
<a href="#">3.11</a>	23-24	Port base files. Updated definitions, protocol, and usage.
<a href="#">3.13.6</a>	25	XREF file naming convention.
<a href="#">3.13.8</a>	25	X-clipping requirement removed.
<a href="#">3.13.13</a>	25	Shared external reference file protocol.
<a href="#">3.13.15</a>	25	Removed confusing bullets for clarity.
<a href="#">3.14.1</a>	25	Image file insertion and layer protocol.
<a href="#">3.14.4</a>	25	Image/Raster allowed file types.
<a href="#">3.14.5</a>	25	Image/Raster reference file naming convention.
<a href="#">3.15</a>	26	Reference/Information Only drawing files and protocol.
<a href="#">3.16.7</a>	26	3.16.7 c and 3.16.7 d always required.
<a href="#">3.16.8</a>	26	New subsection. PDF/Plot color requirements.
<a href="#">4.1</a>	28	Standard text sizes.
<a href="#">4.1.1/4.1.2</a>	28	Match line text to be Arial Bold.
<a href="#">4.2</a>	28	Linetypes
<a href="#">4.3.2</a>	28-29	Dimension text height.
<a href="#">4.4.1</a>	29	Symbol and block protocol. Dynamic blocks allowed.
<a href="#">4.6</a>	30	View Titles - updated & added reference to Appendix C
<a href="#">4.6.4 &amp; 5</a>	30-31	Use of Referencing Numbers clarified
<a href="#">4.7</a>	31	Abbreviation and Acronym protocol
<a href="#">4.9</a>	31	Updated match line protocol.
<a href="#">4.12</a>	32	Standard line weights/pen widths per U.S. National Cad Standards (NCS).

<a href="#">5.1.2</a>	34	Keyplan location. Grid lines, grid tags, match lines removed from list.
<a href="#">5.2.2</a>	34	Cover Sheet: Added reference to Appendix C example.
<a href="#">5.2.3</a>	35	Updated sheet index protocol.
<a href="#">5.6.1</a>	37	Viewport Layer
<a href="#">5.8</a>	37	Now "Scale Bars and North Arrows". (Removed "Location Map and Vicinity Plan")
<a href="#">5.8.1</a>	37	Was 5.8.3
<a href="#">5.8.2</a>	38	Was 5.8.4
<a href="#">5.9.2a</a>	38	Updated Professional Seal/Stamp requirements/language.
<a href="#">5.9.2b&amp;c</a>	38	Various stamp locations and usage.
<a href="#">5.9.3</a>	38	Plot stamp layer.
<a href="#">5.10.3</a>	39	Detail, Section, and Elevation numbering.
<a href="#">5.11</a>	39	Revision table and usage protocol updated.
<a href="#">5.12</a>	40	Updated sheet size standards and protocol.
<a href="#">5.13</a>	40	Project sheets blocks updated.
<a href="#">5.14</a>	40	Updated Title Block attributes.
<a href="#">5.15</a>	41	Grid lines, grid tags are model space elements.
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<a href="#">5.17</a>	42	Drawing scale placement.
<a href="#">5.20</a>	43	Directory structure and further reference.
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<a href="#">6.2.4</a>	45	Maximum layer characters.
<a href="#">6.3</a>	45	Layer name data field definitions.
<a href="#">6.4-6.16</a>	46	Obsolete Sections removed.
<a href="#">7</a>	47	Renamed Section to "QA/QC Compliance Framework"
<a href="#">7.1.3</a>	48	Submittals and reviews - added reference.
<a href="#">7.1.4</a>	48	Added new sub-section defining Review Submittal folder structure.
<a href="#">7.2</a>	48	Updated CAD Kickoff Meeting information.
<a href="#">7.3</a>	49	Master Document request process (Building Baseplans).
<a href="#">7.3.1</a>	49	Master Document Request Form.
<a href="#">7.3.2</a>	49	Survey request process (Basemaps and Backgrounds).
<a href="#">7.4.1</a>	49	Updated Compliance review verbiage.
<a href="#">7.4.2</a>	49	Review requests/submittals and required turnaround date.
<a href="#">7.4.4</a>	50	100% Design Review/CPO Review document requirements.
<a href="#">7.4.6</a>	50	Added reference to Professional Seal requirements.
<a href="#">8</a>	51	Renamed Section to "Drafting Document Lifecycle"
<a href="#">8.2</a>	52	Added hyperlinks to the relevant governing codes.
<a href="#">8.6.8</a>	53	Updated language and clarification of requirements.
<a href="#">8.7</a>	53	Updated Record/As Built language and definition.
<a href="#">8.7.1b</a>	53	Contractor (GC) redlines required with submission.
<a href="#">8.7.1j</a>	54	Revised stamping language, removed optional language.
Resources		Revised CAD Standards content download structure.

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Appendix D	Port of Seattle CAD Layer Naming Standards 2025 Edition
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Appendix F	Bluebeam Design Review Flowcharts
Appendix G	AutoCAD & Bluebeam PDF Submittal Checklists
Appendix H	Change Control & Contact Information

# **Section 1**

## **General**



## Section 1 – General:

### 1.1 Purpose of Port of Seattle CAD Standards:

The Port of Seattle CAD Standard describes the information necessary for CAD technicians to maintain drawing uniformity, neatness, proficiency, speed, and quality. It contains CAD standards and protocols pertaining to drawing layouts, fonts, symbols, details, sections, views, layers, etc. This CAD Standards document also includes information necessary to create Portable Document Format (PDF) files from CAD drawings. The Port of Seattle has adopted many elements of the US National CAD Standard (NCS v6) and the standards contained herein generally conform to standards established by authorities in each engineering field (e.g., AIA, CSI, and APWA). The objective of the standards is to ensure design intent is consistently, efficiently, and effectively transmitted through the construction phase to operations and maintenance (O&M) and back to design to inform future work. It is important that CAD drawings and PDF Files conform to the Port of Seattle CAD Standards as closely as possible since unclear CAD drawings may cause conflicts between the Port and the construction contractors. Compliance with the Port of Seattle CAD Standards is contractually **REQUIRED** as it is essential to improve the ease of information exchange between the various consultants involved on a particular project.

The Port of Seattle CAD Standards do not include the requirements for specifications, cost estimates, permit documents, calculations, etc. Please see the latest edition of the appropriate Port of Seattle reference documents for the most current requirements pertaining to these topics.

### 1.2 Drafting Document Management System Overview:

The primary function of the system is to maintain an indexed library of facility plans. The facility plans are maintained in two forms. The typical form of facility plan information is the plan sets for the projects that originally designed and constructed, modified, or upgraded a Port of Seattle facility or portion of a facility. These documents are indexed in the system by, for example, Port of Seattle project tracking number, Port of Seattle work project number, year constructed, project title and facility identifier. The second form of facility plan is a facility Archive CAD record drawing. For some of the Port's infrastructure, particularly underground utilities, master models are maintained by periodically merging new components from project drawings or surveys.

### 1.3 Compliance:

Drawings prepared for the Port of Seattle must be complete, accurate, and in compliance with these published standards. Unnecessarily elaborate drawings should be avoided. All plan views, elevations, sections, details, profiles, schedules, etc. must be as complete as necessary to carry out the purpose of the drawing. Per Port of Seattle standard contract language, the design firm **must** comply with the standards contained herein before the construction documents will be accepted as complete by the Port. For example, strict adherence to the following will be enforced (not an all-inclusive list):

- All Base drawings (Xrefs, Blocks) and supporting design elements in sheet Plan View drawings to be to the Port of Seattle Project Grid systems origin orientation and Coordinates in Model Space.
- All Port of Seattle CAD projects to have a cover sheet and sheet index of drawings.
- All CAD drawing sheets to follow the Port's CAD sheet drawing protocols.
- All working blocks and sheet drawings to comply with the Port of Seattle CAD/National CAD Standard (NCS v6) layer format and protocol.

The items listed above are crucial for effective updating of the **Engineering Document Management System (EDMS)**.

#### **1.4 Software:**

CAD files submitted to the Port of Seattle must be compatible with and functional in AutoCAD/AutoCAD Civil 3D 2024, while all CAD files in the project drawing set must also be sent saved in a uniform version of AutoCAD.

## **Section 2**

# **Elements of Port of Seattle Drawing Sets**

## Section 2 - Elements of Port of Seattle Drawing Sets:

### 2.1 CAD Project Requirements and Standards Applicability

Projects are defined in the following tables.

Level 1	Level 2
Capital improvement, major projects	Temporary facilities
Small works projects	Project related signage
PSC Construction projects	Glass, carpet, lighting replacement when in-kind. Painting, etc.
Projects requiring AV F&I application for connection	
Asbestos removal projects	
Systems related permanent work	
Terminal and Tenant projects involving systems-related permanent work	

Criteria for Application of the Port of Seattle CAD Standards and fully text searchable Portable Document Format (PDF) are according to the following table:

Level 1	Level 2
Full compliance <b>required</b> . Create and simultaneously submit CAD and PDF files in accordance with the Port of Seattle CAD Standards. Construction (GC) redlines required for Record/As Built Documents submittals.	CAD compliance not required. PDF files required in accordance with Port of Seattle CAD Standards <a href="#">Section 3.16</a> . Submit to Design Quality team.
Use backgrounds provided by Port of Seattle in accordance with <a href="#">Sections 3.11</a> and <a href="#">7.3</a> of this manual.	
Incorporate change orders in project Record/As Built drawing CAD and PDF files. Submit to Design Quality team. Submit GC Redlines to Design Quality team.	

### 2.2 Infrastructure Classification:

Refer to [Section 3.3 "Trade-Discipline Designators"](#) for a list of terms used to classify infrastructure components within a design project.

### 2.3 Elements of a Port of Seattle Project Drawing Set:

All Port of Seattle Projects drawing sets shall contain the following general information that will be part of the General (G Sheets):

- Cover Sheet
- Sheet Index
- Site Plan/s (Plan or map of the project site)

- Legend and Abbreviation Sheets

## 2.4 Design Components of a Port of Seattle Project:

The following is a list of design components that will describe how the design information that will be generated shall be organized to conform to the Port of Seattle CAD Standards protocols.

The following drawing entities shall be placed in Model Space (MS).

### 2.4.1 Base (Model)

- Plans (all)
- Includes notes, call-out tags, text, dimensions, symbols, etc.
- All base drawings (Xrefs, blocks) and supporting design elements **must** be in the Port project grid systems, UCS origin orientation @ World Coordinates in Model Space.
- Show grid lines and grid line bubble tags in all plan sheet drawings in both the vertical and horizontal axis.
- No project design elements in any Port base drawings. X-reference the Port base drawing in your working drawing then place all project design elements on top and screen back the Port of Seattle base drawing layers.

### 2.4.2 Elevations, Sections and Details

- Do not have all layers set to one plot color. Ex: white all layer to show different line weight and line types as when necessary.
- All layers to follow the Port of Seattle Layer Tables and protocols.
- Grid coordinate systems **are not** required for details.
- Grid coordinate systems **are** required for Elevations and Sections.

### 2.4.3 Diagram Elements Include:

- P and IDs.
- I/O (input/output).
- Ladder logic.
- Motor controllers.
- Wiring diagrams.
- Hydraulic grade lines/flow charts related to the function of a designed system.

## **Section 3**

# **Project Sheet File Naming Convention**

### Section 3 – Project Sheet File Naming Convention:

#### 3.1 Port of Seattle Project Tracking Number [PTN]

The Port project tracking number [PTN] consists of a facility designator and a sequential drawing set number that shall be part of all sheet numbers. The PTN shall be on all sheet drawings. See example below.

<b>Aviation Projects:</b>	<b>STIA-0412</b>
<b>Maritime Projects:</b>	<b>69-0433</b>

#### 3.2 Port of Seattle Project Designator Protocols:

3.2.1 The Consultant shall obtain the PTN from the Port Project Manager. The Port PM shall request a PTN via the request form available in the AutoCAD Resource Library or via the Quality Team page on Compass. See Appendix H for example. The Design Quality team will then create the project record and issue the Port project tracking number to the project manager.

3.2.2 Port of Seattle Maritime facilities and their designated abbreviations are listed in the following table.

<b>Waterfront Facilities</b>			
<b>Piers</b>		<b>Terminals</b>	
<b>Facility</b>	<b>Designator</b>	<b>Facility</b>	<b>Designator</b>
Pier 2	2	Terminal 5	5
Pier 16	16	Terminal 10	10
Pier 17	17	Terminal 18	18
Pier 31	31	Terminal 20	20
Pier 34	34	Terminal 25	25
Pier 64	64	Terminal 30	30
Pier 48	48	Terminal 37	37
Pier 66	66	Terminal 46	46
Pier 69	69	Terminal 86	86
Pier 86	86	Terminal 91	90/91
		Terminal 102	102
		Terminal 103	103
		Terminal 104	104
		Terminal 105	105
		Terminal 106	106
		Terminal 107	107
		Terminal 115	115
		Terminal 117	117
		Terminal 128	128
		Fishermen's Terminal	FT
		Lower Duwamish Industrial Development District	LDIDD

Duwamish Turning Basin	DTB
Maritime Industrial Center	MIC
Shilshole Bay Marina	SBM
Marine Maintenance Shop	MMS
Salmon Bay Marina	SABM
Seaport – Multiple Locations	SE

- 3.2.3 Port of Seattle Airport facilities and their designator abbreviations are listed in the following table.

Aviation Facilities	
Facility	Designator
Seattle-Tacoma International Airport	STIA

### 3.3 Trade - Discipline Designators:

- 3.3.1 Trade-Discipline Designators are as shown in the following table.

Discipline Designators	
<i>Discipline Designation</i>	<i>Description</i>
<b>G</b>	<b>General (Please Note: Not a true trade, however used for Port of Seattle projects)</b>
<b>V</b>	<b>Survey</b>
<b>C</b>	<b>Civil</b>
<b>L</b>	<b>Landscape</b>
<b>A</b>	<b>Architectural</b>
<b>S</b>	<b>Structural</b>
<b>M</b>	<b>Mechanical</b>
<b>P</b>	<b>Plumbing</b>
<b>E</b>	<b>Electrical</b>
<b>F</b>	<b>Fire Protection</b>
<b>T</b>	<b>Telecommunication</b>

- 3.3.2 Trade – Sub-Discipline Designators: (Optional)

A Port of Seattle approved second character, or sub-discipline, may be used to provide a more descriptive classification of the trade and discipline. Sub-disciplines can be used to increase the number of available drawing numbers per discipline. It is not necessary to have sub-disciplines for all sheet sets. Project trade and sub-disciplines are shown in the following tables.



Civil Sub-Disciplines (2 Letters/Optional)	
<i><b>Discipline + Sub-Discipline Designation</b></i>	<i><b>Description</b></i>
CA	<i>Alignment</i>
CB	<i>Site Preparation/Removals</i>
CC	<i>Construction Phasing or Staging</i>
CD	<i>Demolition - Structure Removal and Site Clearing</i>
CE	<i>Erosion Control.... Environmental</i>
CF	<i>Profiles</i>
CG	<i>Grading - Excavation, Grading, Drainage, Erosion Control</i>
CI	<i>Intelligent Transportation System (ITS)</i>
CJ	<i>Aircraft Fueling</i>
CK	<i>Track</i>
CM	<i>Civil Markings</i>
CP	<i>Paving</i>
CR	<i>Right-Of-Way (ROW) elements</i>
CS	<i>Signage</i>
CT	<i>Transportation - Waterways, Wharves, Docks, Trams, Railways, Airfields, and People Movers</i>
CU	<i>Utilities</i>
CW	<i>Retaining Walls</i>
CX	<i>Roadway Sections</i>
CY	<i>Storm Drainage</i>
CZ	<i>Project Details</i>

Survey Sub-Disciplines (2 Letters/Optional)	
<i><b>Discipline+ Sub-Discipline Designation</b></i>	<i><b>Description</b></i>
VA	<i>Aerial Surveyed Points/Features</i>
VB	<i>Boundary</i>
VC	<i>Computed Points and Features</i>
VF	<i>Field Surveyed Points and Features</i>
VI	<i>Digitized Points and Features</i>
VN	<i>Node Points and Features</i>
VS	<i>Staked Points and Features</i>
VU	<i>Utilities</i>

Landscape Sub-Disciplines (2 Letter/Optional)	
<i><b>Discipline+ Sub-Discipline Designation</b></i>	<i><b>Description</b></i>
LG	<i>Landscape Grading</i>
LI	<i>Irrigation</i>
LL	<i>Landscape Lighting</i>
LP	<i>Planting</i>
LR	<i>Relocation of Existing Vegetation</i>
LS	<i>Landscape Site</i>
LZ	<i>Project Details</i>

Architectural Sub-Disciplines (2 Letter/Optional)	
<i>Discipline+ Sub-Discipline Designation</i>	<i>Description</i>
<b>AD</b>	<i>Demolition</i>
<b>AE</b>	<i>Electrical</i>
<b>AF</b>	<i>Architectural Finishes</i>
<b>AG</b>	<i>Signage</i>
<b>AI</b>	<i>Interiors</i>
<b>AK</b>	<i>Equipment</i>
<b>AM</b>	<i>Mechanical</i>
<b>AS</b>	<i>Structural</i>
<b>AX</b>	<i>Sections (longitudinal and traverse)</i>
<b>AZ</b>	<i>Project Details</i>

Structural Sub-Disciplines (2 Letter/Optional)	
<i>Discipline + Sub-Discipline Designation</i>	<i>Description</i>
<b>SA</b>	<i>Alignment</i>
<b>SB</b>	<i>Substructure - Foundations, Piers, Slabs, Retaining Walls</i>
<b>SD</b>	<i>Demolition - Protection and Removal</i>
<b>SF</b>	<i>Foundation/Framing - Floors and Roofs</i>
<b>SJ</b>	<i>Seismic</i>
<b>SK</b>	<i>Track Supports</i>
<b>SS</b>	<i>Structural Site</i>
<b>SX</b>	<i>Sections</i>
<b>SZ</b>	<i>Project Details</i>

Mechanical Sub-Disciplines (2 Letters/Optional)	
<i>Discipline+ Sub-Discipline Designation</i>	<i>Description</i>
<b>MB</b>	<i>Baggage Control Systems</i>
<b>MD</b>	<i>Demolition - Protection, Termination, and Removal</i>
<b>ME</b>	<i>Elevators/Escalators</i>
<b>MF</b>	<i>Fire Protection</i>
<b>MH</b>	<i>HVAC - Ductwork, Air Devices, and Equipment</i>
<b>MI</b>	<i>Instrumentation and Controls</i>
<b>MP</b>	<i>Plumbing And Drainage - Chilled and Heated Water, Steam</i>
<b>MR</b>	<i>Risers</i>
<b>MS</b>	<i>Site - Utility Tunnels and Piping Between Facilities</i>
<b>MX</b>	<i>Sections</i>
<b>MZ</b>	<i>Project Details</i>

Plumbing Sub-Disciplines (2 Letters/Optional)	
<i>Discipline + Sub-Discipline Designation</i>	<i>Description</i>
<b>PD</b>	<i>Demolition – Protection, Termination, and Removal</i>

<b>PP</b>	<i>Piping, Valves, and Insulation</i>
<b>PQ</b>	<i>Equipment - Pumps and Tanks</i>
<b>PR</b>	<i>Risers</i>
<b>PS</b>	<i>Site - Extensions and Connections to Civil Utilities</i>
<b>PX</b>	<i>Sections</i>
<b>PZ</b>	<i>Project Details</i>

<b>Electrical Sub-Disciplines (2 Letters/Optional)</b>	
<b><i>Discipline+ Sub-Discipline Designation</i></b>	<b><i>Description</i></b>
<b>EA</b>	<i>Airfield Lighting and Nav aids - Visual Air Navigation Systems</i>
<b>EB</b>	<i>Baggage Systems and Control</i>
<b>EC</b>	<i>Communications – Data, Audio/Visual</i>
<b>ED</b>	<i>Demolition - Protection, Termination, and Removal</i>
<b>EF</b>	<i>Fire System</i>
<b>EG</b>	<i>Grounding</i>
<b>EI</b>	<i>Roadway Illumination</i>
<b>EJ</b>	<i>Security System</i>
<b>EK</b>	<i>Track System</i>
<b>EL</b>	<i>Interior Lighting</i>
<b>EN</b>	<i>Instrumentation - Controls, Relays, Measurement Devices</i>
<b>EP</b>	<i>Interior Power</i>
<b>ER</b>	<i>Runway Illumination</i>
<b>ES</b>	<i>Site – Utility Tunnels, Site Lighting</i>
<b>ET</b>	<i>Interior Telecommunications - Telephone, Network, Voice, and Data Cables</i>
<b>EY</b>	<i>Interior Auxiliary - Alarms, Nurse Call, Security, etc.</i>
<b>EZ</b>	<i>Project Details</i>

<b>Fire Protection Sub-Disciplines (2 Letters/Optional)</b>	
<b><i>Discipline+ Sub-Discipline Designation</i></b>	<b><i>Description</i></b>
<b>FA</b>	<i>Alarm Systems</i>
<b>FD</b>	<i>Demolition - Protection, Termination, and Removal</i>
<b>FR</b>	<i>Risers</i>
<b>FX</b>	<i>Sections</i>
<b>FZ</b>	<i>Project Details</i>

<b>Telecommunications Sub-Disciplines (2 Letters/Optional)</b>	
<b>TA</b>	<i>Audio Visual</i>
<b>TC</b>	<i>Clock and Program</i>
<b>TI</b>	<i>Intercom</i>
<b>TM</b>	<i>Monitoring</i>
<b>TN</b>	<i>Data Networks</i>
<b>TT</b>	<i>Telephone</i>
<b>TY</b>	<i>Security</i>
<b>TX</b>	<i>Sections</i>
<b>TZ</b>	<i>Project Details</i>

### 3.4 ID Placeholder:

- 3.4.1 The following shall be used instead of trade abbreviation or facility designator for **internal non-design related** Port of Seattle drawings.

Facility	ID Placeholder
Aerial Photographs	<b>A</b>
Aerial Maps	<b>AM</b>
Equipment, Cranes	<b>E</b>
Eastside Rail Corridor	<b>ERC</b>
Harbor Maps	<b>HM</b>
Maritime Terminal Facilities Book	<b>M</b>
Miscellaneous	<b>MISC</b>
Presentation Exhibit (sketch study)	<b>PE</b>
Property Management (Lease Exhibit)	<b>PM</b>
Property Plan	<b>PP</b>
Real Estate	<b>RE</b>
Standard Detail	<b>SD</b>
Sounding Plan	<b>SP</b>
Union Station Terminal	<b>UST</b>
World Trade Center	<b>WTC</b>
Waterfront Utilities	<b>WU</b>

**Note: Only applies to the internal Port of Seattle Engineering Design Group.**

### 3.5 Port of Seattle Sheet Drawing Naming Protocol:

- 3.5.1 When the Port Project Manager receives the Port Project Tracking Number (PTN) from the Design Quality team, they will forward it to the design team. The Port Project Tracking Number (PTN) shall be used for naming all project sheet file drawings.

- There shall be only one drawing sheet/layout per electronic file. A file containing multiple drawings/layouts will be returned unchecked.

The following protocols apply to all Port of Seattle Aviation and Maritime facility projects.

- 3.5.2 Sheet Drawing File Name Protocols:

The hyphen is removed in the Port Project Tracking Number (PTN) example:

**STIA-1414 becomes STIA1414.**

This is followed by the 5-digit sheet drawing number per the following convention:

- Discipline Designator or Discipline + Sub-Discipline Designator. ***If a sub-discipline designator is not used, the second digit is replaced with a hyphen.***
- After the Discipline / Sub-Discipline Designator/s the next field shall contain the three-digit sheet type designator & number, i.e., *EL104 or E-104.*

Port of Seattle Sheet Type Designators	
0	General (Cover Sheet, Symbols, Legends, Notes, etc.)
1	Plans (Horizontal Views and combination Plan & Profile)
2	Elevations & Profiles (Vertical Views)
3	Sections (Sectional Views, Wall Sections)
4	Large-Scale Views (Scaled up reproductions of plans, elevations, stair sections, or sections that are not details).
5	Details
6	Schedules and Diagrams
7	Reference/Information Only drawing files ( <b>or</b> User Defined)
8	User Defined (for types that do not fall into other categories).
9	3D Representations (isometrics, perspectives, photos)

- Sheet numbers with decimal points or underscores are **not** allowed.
- Sheet type designators are **numerical** only (No Alpha **characters**).
- Sheet sequence numbering begins with 01, followed by 02 through 99, i.e., *E-101*, *E-102*. Sheet sequence number 00 is not permitted, i.e., *EL100* or *E-100*.
- To permit future insertion of sheets during design, sheet numbers need not be sequential.

See table below for examples.

Discipline Designator or with Sub-Discipline Designator + Sheet Drawing Number	Port of Seattle Project Tracking Number (PTN) + Sheet Drawing Number
--	--

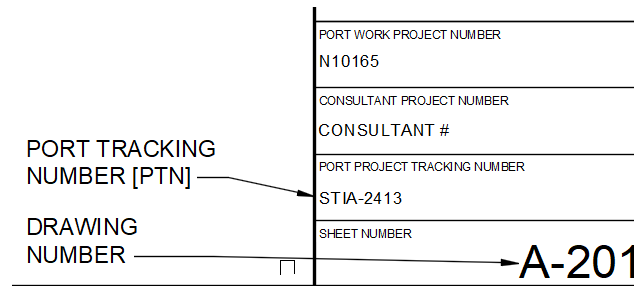
Required to have 3 numbers after the Discipline Designator / Sub-Discipline Designator fields.

G-001	STIA1414G-001.dwg
A-101	STIA1414A-101.dwg
AD101	STIA1414AD101.dwg

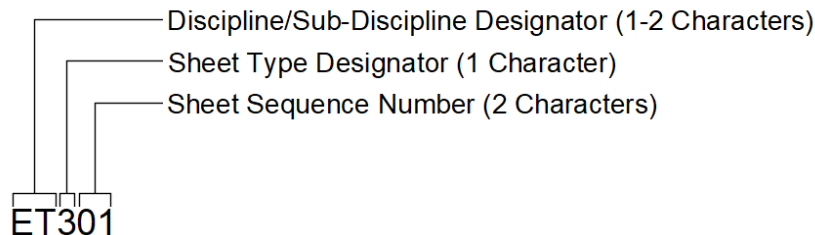
At the time of submittal, the Port Project Manager will determine whether a single combined PDF or discipline-specific combined PDFs will be submitted. They shall be named using the following table as a guide.

Discipline Designator	Port of Seattle Project Tracking Number [PTN] + Discipline Designator
Single Combined PDF	STIA1414.pdf
C	STIA1414C.pdf
L	STIA1414L.pdf
A	STIA1414A.pdf
S	STIA1414S.pdf
M	STIA1414M.pdf
P	STIA1414P.pdf
E	STIA1414E.pdf
F	STIA1414F.pdf
T	STIA1414T.pdf

## Example of a Sheet Drawing Number



## Sheet Drawing Numbers:



### 3.6 Title and Index Sheets:

The Cover/Title Sheet and the Index Sheet/s start the General (G) Sheet Series. The Cover Sheet number shall be **G-001**.

### 3.7 Coordinate System:

All plan design drawing elements shall be in the Port of Seattle Grid Systems for both Aviation and Maritime projects. All information shall match the Port of Seattle project grid system UCS World Coordinate point and orientation.

#### 3.7.1 Seattle Tacoma International Airport Projects:

- Airport drawings** shall be constructed and setup according to the Port of Seattle Airport Grid System.
- Horizontal Datum: All bearings and coordinates shall conform to STIA Grid System.  
**Note: Project files generated in Civil 3D/AutoCAD as part of a BIM/Revit designated project shall conform to State Plane rather than STIA.**
- Vertical Datum: All elevations shall conform to the NGVD of 1929.

#### 3.7.2 Maritime Projects:

- Maritime drawings** shall be based on the Seattle Tide Lands Grid System and the NAD Grid.
- Horizontal Datum: All bearings and coordinates shall conform to Seattle Tidelands grid.
- Vertical Datum shall conform to Mean Lower Low Water (MLLW).
- When the latter two are combined, there is a rotation factor of 1.138245 with 'NORTH' pointing up and a rotation factor of 271.138245 with 'NORTH' pointing to the right.

### 3.8 Port Grid Systems:

- 3.8.1 The Port of Seattle Project Grid Systems shall be used for all Port projects. In all sheet drawings it will be required to show the grid lines and grid bubble tags in both Horizontal and Vertical Axis.
- 3.8.2 Project Grids to be X-referenced into sheet drawings.
- 3.8.3 Request direction from the Port of Seattle under the following conditions:
  - New grid lines are to be added or moved.
  - Grid lines are permanently deleted.
  - Grid line name is changed.
  - Do not rotate base or master grids, use the DVIEW command with the TWIST option.

### 3.9 Datum:

- 3.9.1 Horizontal Datum:
  - a. All bearings and coordinates shall conform to STIA Grid System.

**Note: Project files generated in Civil 3D/AutoCAD as part of a BIM/Revit designated project shall conform to State Plane rather than STIA.**
- 3.9.2 Vertical Datum:
  - a. All elevations shall conform to the NGVD of 1929.

### 3.10 File Types:

The following addresses the five types of files used by the Port: Base Files, Sheet Files, Reference Files, Image Files, and PDF.

- 3.10.1 Base Files:
  - a. Type of reference file that shows existing conditions without any “new” work.
- 3.10.2 Sheet Files:
  - a. Used to present design elements in a standard format for plotting.
- 3.10.3 Reference Files (Xref):
  - a. Used to share design data between disciplines.
- 3.10.4 Images (photos):
  - a. Used to aid in clarity of selected objects in the current drawing, image types are of the following: BMP, JPG, and TIFF.
- 3.10.5 PDF:
  - a. Used for electronic submittal of design review and collaboration.

### 3.11 Port Base Files:

There are 3 types of Base Files used at the Port using the following terminology.

- BASEMAPS: Survey files that contain existing exterior facility site information and survey data (utilities, building footprints, coordinate data, etc.). Basemaps contain information that the reference files are built from. These files may come in a variety of filenames and are not to be modified.
- BACKGROUNDS: Survey files that contain topographic survey data and information such as contours. Mostly used at airport facilities. These files may come in a variety of filenames and are not to be modified in any way.

- BASEPLANS: Interior architectural building plans/record drawings. Upon request, the Port of Seattle Design Quality team will provide these files (in either CAD or PDF format depending on availability) and subject to the following disclaimer (i.e., these files MAY be modified):

*"The recipient accepts full liability for use of all information contained in the CAD files and as the Engineer/Architect/Designer of Record they must confirm the applicability and accuracy of the information for their intended use. CAD files provided by the Port may not represent actual As Built conditions and the Engineer/Architect/Designer of Record is **required** to verify data that will be critical to their design. It must be understood that the data and accuracy of As Built information has not been independently verified."*

*Acceptance by the Project Manager that the CAD files may not be in full compliance with the Port's CAD Standards and the Engineer/Architect/Designer of Record will make **all necessary corrections** to the CAD data to ensure that the project documents meet the Port's CAD Standards. Reference drawings (excluding x-refs) should be incorporated in PDF or TIF format, so they do not result in errors when checking for compliance with the Port's CAD Standards."*

- The design team should use BASEMAP file and building footprint to verify that architectural BASEPLANS are located in correct coordinates.
- If the design team identifies any discrepancies in the BASEMAP or BACKGROUND files received from the Port Survey/Mapping Team, they should seek direction by notifying the Port Design Quality team in writing with a description of the discrepancy.

3.11.1 Refer to [Section 7.3](#) for information on requesting Master Documents.

### 3.12 Sheet Files:

Model Space view ports (MVIEWWS) will be used to create a window from Paper Space into specific project locations. All sheets that are part of the Port project shall originate from a single sheet file. All sheet files shall have the sheet title block border reference file inserted as an OVERLAY in Paper Space.

3.12.1 Only 2 layout tabs are allowed per Sheet File – one Paper Space tab and one Model Space tab.

### 3.13 External References (XREF):

Reference drawings shall be inserted as External References for discipline-specific backgrounds. The following is provided for guidance on developing External References.

3.13.1 External References (XREFs):

All Base XREFs shall be inserted in MS (Model Space).

All XREFs shall be on the correct project coordinate system. Refer to [Section 3.7](#).

Each XREF shall be inserted onto its own designated Port XREF layer. I.E., if 5 Xrefs are attached in a drawing: there shall be five XREF layers. Refer to Appendix D, Layer Naming Standards.

The XREF type should always be "overlay". Overlaying does not allow nested Xrefs and prevents referencing loops.

3.13.2 XREF files are intended as overlays to other CAD files, not direct attachments.

3.13.3 Under no condition should a path be specified when overlaying reference files to other drawings. **Set all Xref drawing paths to "NO PATH"**.

3.13.4 The binding of XREFs will **not** be allowed nor accepted by the Port.

3.13.5 Nested XREFs are not allowed, use the overlay option to insert each XREF onto its own layer within the sheet file.



- 3.13.6 The standard file naming convention for XREF drawings utilizes the layer fields from the layer naming convention and is as follows:
  - Format: {PTN}-X-MAJOR GROUP LAYER FIELD-[*optional description from MINOR GROUP FIELD*]-[*optional STATUS FIELD*]
  - Example: STIA2509-X-MECH, or STIA2509-X-MECH-PIPE, or STIA2509-X-MECH-PIPE-E
  - Refer to Appendix D, Layer Naming Standards for typical Major Group Fields.
- 3.13.7 Before submitting projects for Port of Seattle CAD Review check each drawing for orphaned, unresolved, or missing XREFs.
- 3.13.8 Refer to [Section 3.15](#) for protocols related to “For Reference/Information Only” drawing sheets.
- 3.13.9 Sheet CAD drawing files with a Title Block shall **not** be used as XREFs in other sheet CAD drawings.
- 3.13.10 If a drawing that was originally developed in MS (Model Space) for a sheet CAD drawing is to be used as an XREF, that drawing must be saved as a separate file and renamed. It can then be referenced back into the original plot sheet file and any other sheet files for which it is needed.
- 3.13.11 XREFs shall never be inserted onto layer 0 (zero).
- 3.13.12 **All Design team consultants shall insert their logos and engineering seals as blocks in the titleblock that will be used in sheet drawing files. This will prevent nested XREFs which are not allowed.**
- 3.13.13 When multiple disciplines are utilizing the same reference file, any layer manipulation required to achieve desired results in the final plot presentation must take place within each discipline’s own sheet files, NOT within the reference file itself.
- 3.13.14 All XREF Title Blocks shall be inserted @ 0,0,0 in PS (Paper Space).
- 3.13.15 **Prime Consultants are responsible** for maintaining XREF drawing file integrity and shall ensure that no files within the total submittal package have the same CAD drawing file name (including all XREF files).

### 3.14 Images/Raster References:

The following information is provided for guidance on the use of images:

- 3.14.1 All images shall be inserted as a reference file in MS (Model Space).
  - Each image file to be inserted on its own correct Port named Layer. Refer to Appendix D, Layer Naming Standards:

Example: G-ANNO-IMGS-PH01 (PH02, PH03, ETC.)
- 3.14.2 Images may be used to superimpose on a drawing for the purpose of tracing. These images must be 1 unit = 1” scale.
- 3.14.3 Images for the purpose of enhancing the drawing. These Images must be 1” = 1” scale. (These are usually brought in behind the drawing.)
- 3.14.4 For interoperability, the only raster file types allowed to be referenced are TIF, JPG, and PDF.
- 3.14.5 Image File Naming:
  - Format: X-IMGS-[*unique identifier*]
  - Examples: X-IMGS-PH01, X-IMGS-SITE, etc.

### 3.15 Reference/Information Only Drawing Files:

The following information is provided for guidance on the use of “For Reference/Information Only” files in a project drawing set:

- Files intended as “For Reference Only” or “For Information Only” shall be incorporated into the drawing set as a CAD drawing sheet file using the current project’s drawing file naming convention.
- “Reference Only” drawings shall be X-Referenced into model space in a drawing sheet file that contains the currently approved Port of Seattle titleblock/border in use within the project drawing set.
- “Reference Only” drawing sheet files shall display the “**4RefOnly**” stamp available in the Port AutoCAD Resource Library.

Refer to Appendix C, Sample Drawings for a graphic example of a “Reference Only” sheet file.

### 3.16 PDF Documents:

Submission requirements.

Create and simultaneously submit the CAD and PDF files for each phase submission per [Section 7.4 CAD Drawings Compliance Review](#). See Appendix E, QA/QC Design Submittal Deliverable Flowcharts, for deliverable requirements.

- 3.16.1 All electronic documents shall be presented in editable (unlocked) PDF file format for use in Bluebeam review sessions.
- 3.16.2 Submit individual sheet PDFs, full-size pages. Document size must match size of full-size printed hard copy, e.g., 22” X 34” electronic pages for most drawings.
- 3.16.3 PDFs shall be text-searchable, including all blocks, notes, labels, model space areas, paper space areas, etc.
- 3.16.4 All fonts shall be embedded in the PDF.
- 3.16.5 All PDFs shall be created directly from the native application (MS Word, AutoCAD, InDesign, MS Publisher, etc.). They should not be scanned from a paper print.
  - a. If it is necessary to use a scanned document due to signature requirements, then the document shall have Optical Character Recognition (OCR) performed by the designer.
- 3.16.6 Drawings shall be submitted as individual sheet files.
- 3.16.7 Drawings shall additionally be submitted as a single assembled PDF file containing all sheets; order shall match the drawing index page.
  - a. At the discretion of the Port Project Manager, the assembled file may be broken into disciplines, multi-discipline volumes, or other, typically for large projects.
  - b. Page labels shall match sheet numbers. See graphic of sheet drawing number in [Section 3.5.2 Sheet Drawing File Name Protocols](#).
  - c. File shall have hyperlinks between callouts and pages referenced.
  - d. Bookmarks are required in the assembled PDF.
    - i. Bookmarks shall have a hierarchical arrangement by Discipline then Series.
    - ii. Bookmarks shall be saved with full page view (they should not be zoomed into a portion of the page when selected).
    - iii. Bookmark titles shall match the sheet numbers. See graphic of sheet drawing number in [Section 3.5.2 Sheet Drawing File Name Protocols](#).
- 3.16.8 PDFs shall be submitted in black & white **only**. Color prints/plots **will not** be accepted.

# **Section 4**

## **Graphic Standards**

## Section 4 - Graphic Standards:

### 4.1 Text Styles / Sizes:

On all projects use Standard AutoCAD text fonts and styles.

- 4.1.1 Acceptable fonts are as follows and all Titles, Headings, or Major callouts need to be text searchable within AutoCAD:

<b>Arial Bold</b>	For Titles, Headings, Match Lines, Major callouts <b>(Only)</b>
<b>Arial</b>	For <b>General, all Notes</b> , Detail callouts and dimension text

(Refer to Appendix D, Layer Naming Standards, for text layers by discipline)

- 4.1.2 **General Notes, Key Notes**, Detail callouts, dimension text and notes use **Arial**.
- 4.1.3 Subtitles (under Sections, Details, Elevations, and plan view symbol bugs) use **Arial**.
- 4.1.4 Titles, headings, match lines, or major callouts use **Arial Bold**.
- 4.1.5 The use of any other font style is strictly prohibited. Text heights and widths shall be as shown in the following table, to be read in PS. Refer to [Section 4.9](#) for match line protocol.

Trade/s	Text Height for Notes	Titles/Headings	Dimensions Text	Width for Text
Civil & Survey Drawings	0.0937	0.1875	0.0937	1.0
Architectural Drawings	3/32"	3/16"	3/32"	1.0

### 4.2 LineTypes:

Custom linetypes created within the discipline/design team *acad.lin* file are allowed. The modified *acad.lin* linetype file must be submitted to the Port of Seattle Design Quality team along with the CAD files.

### 4.3 Dimensioning:

- 4.3.1 Associative dimensioning is to be used at all times. Dimensions shall not be exploded or forced, unless break lines are being used or the object being drawn is noted as "not to scale".
- 4.3.2 The following guidelines can help ensure clarity in drawings.
- Repetition of dimensions and elevations should be avoided to eliminate errors when revisions occur.
  - In a chain of dimensions, it is preferred to omit the least significant dimension of a chain and include the total dimension. Longer and larger dimensions should appear on the outside of all other call outs.
  - On mechanical and electrical drawings, dimensions irrelevant to the drawing's discipline, such as civil, architectural, structural dimensions, are not shown.

- Dimension lines are to be located far enough from the item being dimensioned to ensure clarity between the dimension lines and the object being dimensioned.
- Dimension text height is 0.0937 (**3/32"**) at 1:1 scale.
- Avoid crossing dimension and leader lines. If crossing is unavoidable, break the leader lines at the point of crossing.
- Wherever possible, text should appear inside and above dimension lines. If impossible to dimension otherwise, text can be shown outside dimension lines with leader extension connecting text and dimension lines.
- Wherever possible avoid:
  - Long leader lines.
  - Vertical leader lines.
  - Leaders parallel to adjacent dimension lines, extension lines, or cross-hatching.
  - Small angles between leaders and the lines upon which they terminate.

4.3.3 Fractions shall be on one line of text and may be stacked. Either horizontal or diagonal fraction formatting is permissible but must be consistent per set and legible.

## 4.4 Port Symbols / Blocks Protocols:

- 4.4.1 The following protocols apply to usage and development of symbols, blocks and abbreviations:
- The Port of Seattle symbols, blocks and abbreviations shall be used on all Port projects. Port of Seattle CAD symbol blocks shall not be exploded, modified, or changed. Notify the Design Quality team of any errors or missing functionality.
  - If a required symbol or block is not found in the Port of Seattle resource library or manual, then symbols and blocks approved by NCS v6, AIA, APWA, ANSI, or CSI may be used upon approval from the Design Quality team.
  - If blocks are required that are not covered by the Port of Seattle, NCS v6, AIA, APWA, ANSI, or CSI, the consultant may create their own under the guidelines outlined within this Section. Dynamic blocks are allowed and encouraged. The symbols and blocks must be recognizable by the trade involved and must be submitted to the Design Quality team for approval.

## 4.5 Symbols / Blocks:

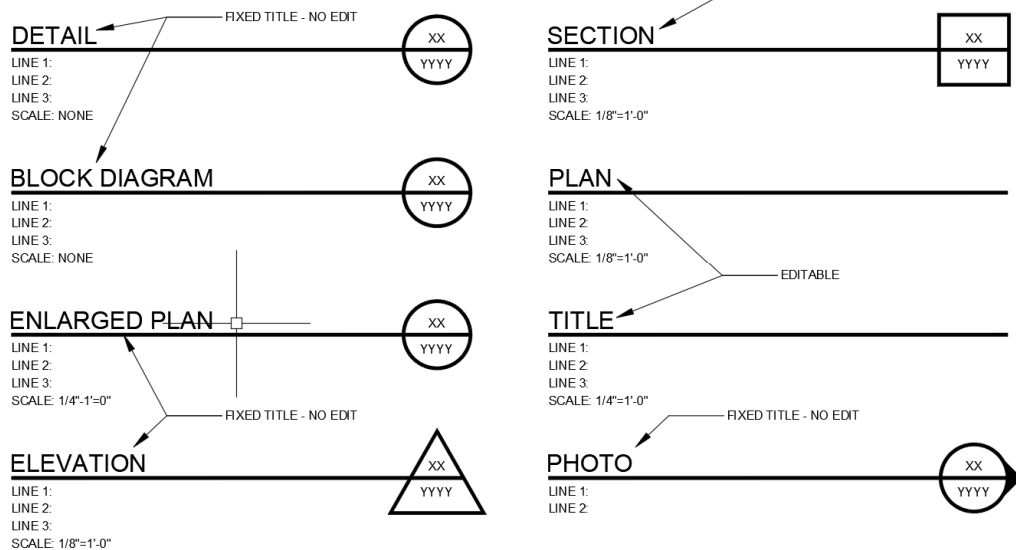
- 4.5.1 Nested Blocks are defined as block references that contain other blocks. Using blocks within blocks can simplify the organization of a complex block definition. The following are general guidelines for creating blocks:
- a. With nested blocks, a single block can be built out of several components. For example, one can insert as a block, a drawing of a mechanical assembly that contains housing, a bracket, and fasteners in which each fastener is a block composed of a bolt, washer, and nut. The only restriction on nested blocks is that blocks cannot be inserted that reference themselves.
  - b. Blocks that have all objects on the same layer shall be created on layer 0 (zero). The block should then be inserted into the drawing on a Port of Seattle designated layer.

- c. Blocks may contain multiple elements on different layers. The construction of these type blocks is more complex and requires planning. Some objects in the block may need to match the properties of the layer on which the block is inserted. These objects shall be created on layer 0. Block objects that are not created on layer 0 shall follow Port of Seattle standards. The block should then be inserted into the drawing on a Port of Seattle designated layer.

## 4.6 Reference Symbols and Viewport Titles:

- 4.6.1 In order to ensure uniformity and clarity on Sheet drawings a Port of Seattle Drawing View Title block shall be used to indicate the specific view that is shown. See Appendix C, Design Symbols.

### PORT DRAWING VIEW TITLES



- 4.6.2 Within each symbol will be a numerical reference and corresponding sheet cross-reference number. This will eliminate the need for long and repetitive titles and notes. If needed, a more specific subtitle may be added under the generic title. For example:

Within PLAN might be included:

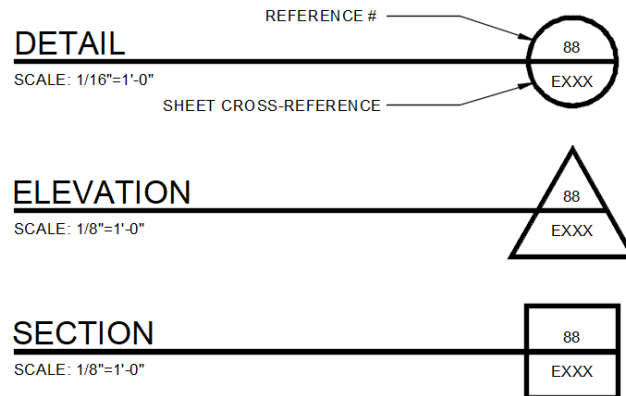
DEMOLITION  
 STRIPING  
 LANDSCAPING

Within DETAIL might be included:

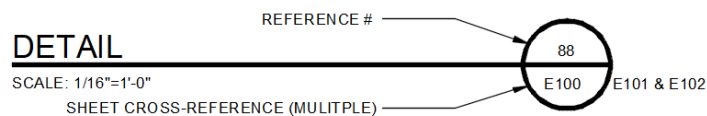
DOOR JAMB  
 PIPE CONNECTION

- 4.6.3 The foregoing is needed only to clarify the detail or sketch and should be called out just once. In addition, a scale callout appears under all the foregoing and a north arrow is required for all plan views. North arrows will be placed to the right of the View Port Title.
- 4.6.4 Referencing numbers shall restart at #1 on each detail, elevation, or section sheet. (i.e., there may be multiple details numbered "3" in the set with differing cross-reference sheets). Text in the reference symbol shall not overlap with the lines of the symbol.

Numerical referencing belongs on the top half of the symbol and sheet cross-reference belongs on the bottom half of the symbol:



- 4.6.5 For those titles that need to cross-reference more than one sheet, sheet cross-referencing numbers shall occur on the lower right, outside of the symbol.



## 4.7 Abbreviations and Acronyms:

Only approved abbreviations shall be used. See Appendix B, Port of Seattle Abbreviations Tables and Descriptions, for a complete list of abbreviations and acronyms to be used. If an abbreviation is required that is not covered by the Port of Seattle standards, then abbreviations recognized by NCS v6, AIA, APWA, ANSI, or CSI may be used and must be listed on the legend.

## 4.8 Hatch Patterns:

The use of hatching is not limited to the AutoCAD default hatch patterns. The scale of the pattern shall be relative to the scale of the drawing. Use the appropriate layer assigned for hatching.

## 4.9 Match Lines:

Where a feature shown on one drawing continues on another drawing, a reference to the adjoining sheet shall be provided. Do not locate match lines on column lines, grid lines, or expansion joints. Locate them instead at the centerline of a wall or corridor. Match lines should be shown at the same location on both sheets containing adjacent segments of the plan at the same location. Layout shall be consistent throughout project. The reference text should read, (as an example), "MATCH LINE NB 111+50, SEE SHEET C101". It shall be placed perpendicular to plan and profile, outside the limits of drawing coverage. Match lines may jog to avoid important elements of the plan. The lettering height shall be 0.15 or 5/32", Arial Bold. Match line pen weight should be 0.70mm.

#### 4.10 Pen Mapping:

- 4.10.1 A standard mapping of plotter pens to electronic drawing line colors/pen weights will be established. All disciplines producing drawings for a project shall use this standard pen mapping when producing hardcopies.

#### 4.11 Line Color, Thickness and Type:

- 4.11.1 Requirements for line color, thickness, and type are project specific and shall be established according to the needs of the Contract Documents.
- 4.11.2 The Port of Seattle does not intend to manage pen weight usage, recognizing that each discipline and project has individual needs. Designers are allowed to set up pen weights that best serve their ability to graphically convey design.

Design teams must provide the AutoCAD “CTB” file developed for printing the project files with every CAD Compliance Submittal (concurrent with design submittals). Submittals lacking the CTB file will be rejected.

#### 4.12 Line Weights / Pen Widths and Colors:

- 4.12.1 The following table depicts standard line weights/pen widths as established by the U.S. National CAD Standard (NCS). Design teams shall refrain from creating excessive line weights/pen widths. In general, no more than 10 to 12 pen widths set to various levels of shading should be necessary.

Line Thickness	Plotted Line Width	
	mm	in
Extra Fine*	0.13	0.005
Fine	0.18	0.007
Thin	0.25	0.010
Medium	0.35	0.014
Wide	0.50	0.020
Extra Wide	0.70	0.028
XX Wide	1.00	0.039
XXX Wide	1.40	0.055
XXXX Wide	2.00	0.079



## **Section 5**

# **Project Drawing Layout – Sheet Protocols**

## Section 5 – Project Drawing Layout – Sheet Protocols:

### 5.1 Sheet Layout (Paper) Space:

- 5.1.1 Paper Space is used to arrange, annotate, and plot various views of the 2D model. Title Blocks, general notes, sheet notes, and graphical elements that are not attached to entities representing “real objects” must be placed in Paper Space.
- 5.1.2 Strict adherence to the layering, sheet, and file naming standards are required for conformance to the Port of Seattle CAD Standards. These include but are not limited to:
  - Sheet title block, Project Cover Sheet/Sheet Index.
  - North Arrows and Graphic Scale Bars
  - General Notes and Sheet Notes: should be located in the upper right-hand corner inside of the title block border whenever possible.
  - Schedules & Legends (all disciplines).
  - The Key Plan is to be located in the lower right-hand corner of each plan sheet, to the left of the title block area. Refer to Appendix C, Sample Drawings for example.
  - Sheet layout information, symbols, etc.
  - Plan View Port Titles, Elevation View Port Titles, Section View Port Titles, and Detail View Port Titles.
  - Revision Deltas, Revision Clouds, and View Title Symbol Bugs.

### 5.2 Sheet Drawing Content Overview:

- 5.2.1 General Drawings:
  - a. ‘G’ General sheets shall follow the drawing order below:
    - Cover/Title Sheet, then Sheet Index.
    - General Legend and Symbols.
    - Horizontal and Vertical Control.
    - Project Sheet Layout Index.
- 5.2.2 Cover Sheet:
  - a. All Port of Seattle project drawing sets must have a Cover Sheet that has been created by using one of the Port-provided Cover Sheet templates, found in the Port AutoCAD Resource Library. Refer to Appendix C, Sample Drawings for layout. In addition to the components already set up on the template, a Cover Sheet is to include the following required items:
    - A list or logos of the consultants, with the Prime Consultant first.
    - Project Vicinity Plan/Map (depicts the project site within a broader area for providing location context)

### 5.2.3 Sheet Index:

- a. All Port of Seattle project drawing sets must have a Sheet Index that has been created by using one of the Port-provided Cover Sheet templates found in the *Port AutoCAD Resource Library*. One of two options should be chosen according to the following criteria:
- If the entire sheet index will fit within the template on the Cover Sheet (*for very small projects only*), then Option 1 may be used (as seen in the illustration below). **DO NOT** stretch or adjust the sheet index boundaries.

[illegible]

- b. If the Sheet Index will not fit within the template on the Cover Sheet, Option 2 should be used as seen in the illustration below.

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**SHEET INDEX (OPTION #2) LARGE PROJECTS**

- c. The Sheet Index is to be assembled in the same order as the drawing set.
- d. The Sheet Titles listed in the Sheet Index must be correlate exactly with the Sheet Titles in the title blocks of each drawing sheet file.
- e. **DO NOT** include the Port of Seattle project tracking number as part of the Sheet Number in the Sheet Index.

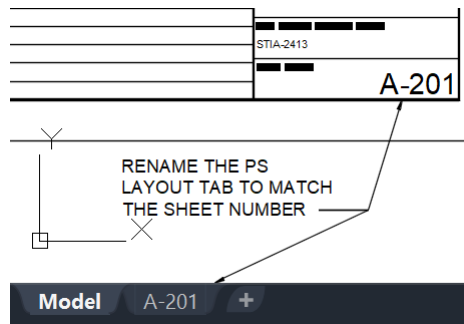
### 5.3 Sheet Drawing Layout:

Consistent drawing layout ensures organization and clarity of elements within a drawing. To the extent practical the plan views shall align exactly on the various sheets to facilitate the ease of use of overlay tools.

### 5.4 Sheet Drawing Layout Tabs:

There shall be only one drawing sheet per electronic file. The Port of Seattle will reject a file containing multiple drawings.

- Only 2 layout tabs are allowed per Sheet File - one Paper Space tab and one Model Space tab.
- No multiple tab sheets allowed in a single drawing; each sheet file shall have its own drawing file.
- See [Section 3.16 PDF Documents](#) for PDF Document requirements.
- The layout tab shall be renamed to reflect the plot sheet number, example:



### 5.5 Sheet Notes Placement:

#### 5.5.1 Notes:

- There are two types of notes:
  - General Notes and Construction Notes.
  - Each shall be unique to avoid confusion as to which note is being referenced.
  - Each shall have a header separating the different types of notes. Header shall always be plural, even if there is only one note under it. There shall be a line under the header that extends to within 0.50 inches of the right line of the border.
- In tables and charts, columns of notes are to follow guidelines described herein; numbers shall be right justified with equal decimal place accuracy.

#### 5.5.2 General Notes:

- Notes applicable to the whole drawing shall be shown in a numbered list beginning in the far-right upper corner of the Title Block. One space will be provided, between individual notes.

#### 5.5.3 Construction Notes/Keyed Notes:

- Specific construction notes shall be placed directly in plan or profile view as appropriate. When space is limited in plan or profile a numbered keynote reference may be used as appropriate with a leader to the item being noted. The leader shall terminate with an arrowhead when an object is being referenced. The corresponding keynotes shall be listed as specified above. The list of keynotes shall have a header

of CONSTRUCTION NOTES or KEYED NOTES that shall precede the list of numbered notes, or keyed notes.

- b. "Per sheet" or "consecutive" are both acceptable formats for construction notes, but the format used shall be consistent across the entire project (i.e., all disciplines and sub-disciplines shall follow the same format).
- c. When utilizing the consecutive format for construction notes, only the construction notes that are applicable to a particular sheet will be shown on the sheet. Once construction note 1 has been created, it will always be the same. Continue sequencing of construction notes as they are added. Do not re-sequence notes from one plan sheet to the next. For example, sheet R1 may have construction notes 1, 2, 3, and 4. Sheet R2 may have construction notes 1, 3, and 5. Notes 1 and 3 on sheet R2 would be identical to notes 1 and 3 on sheet R1 and note 5 on R2 is a new note, consecutively numbered.

## 5.6 Sheet Viewports:

### 5.6.1 Viewport Placement

- a. Viewport placement should be such that there should be approximately 1" clear on the left-hand edge of the sheet, with a minimum of one inch spacing between the views located on the sheet.
- b. Viewports to be placed on the correct layer name. i.e., G-ANNO-NPLT. **DO NOT** use the DEFPOINTS layer.

### 5.6.2 Viewport Scales

- a. A Viewport is a window in Paper Space to the area drawn 1" = 1" in Model Space. It is important that the view scale is set correctly so that the drawing can be scaled accurately. It is acceptable to have multiple view scales on a drawing if each has its own viewport.
  - Viewport scale to match scale bars or scales listed in the Title Block.

## 5.7 Key Maps and Legends:

### 5.7.1 Key Map (insert as a block or as a Xref)

- a. The purpose of the Key Map/Plan is to depict the general area where work is to be performed. The Key Map/Plan should appear in the inside lower right-hand corner of the title block (below the legend, if used) and shall be consistent on all plan sheets.

### 5.7.2 Legend

- a. A Legend is often required on drawings. A Legend sheet(s) at the front of the discipline sheet set is common; however, a legend on individual sheets is required when a symbol that has not been shown on the previous Legend sheets is being used on a particular sheet(s). The Legend shall be placed on the right-hand side of the border, under the notes, above the key map and scale bar(s).

## 5.8 Scale Bars and North Arrows

### 5.8.1 Scale Bars

- a. Scale bars shall be shown on the sheet for all scales being used. The only exception to this is when the scale shown is "not to scale". Scale bars shall be located in the lower right-hand corner of the titleblock, above the Key Plan (if used), and stacked if multiple scales are in use on the sheet.

- Use only Port of Seattle supplied scale bar blocks found in the AutoCAD resource library.

#### 5.8.2 North Arrow

- A North arrow shall appear on all sheet files that have plan views. The location of the North arrow will vary depending upon the type or size of the plan view. For sheets where the plan view is an enlarged plan (a DETAIL) amongst other non-plan views, the North arrow shall be located to the immediate right of the view title.

### 5.9 Logos, Stamps and Other Blocks:

#### 5.9.1 Design Team Logos

- Logos shall be shown for all consultants and sub-consultants who have responsibility for design conveyed on a particular sheet.
  - **DO NOT** insert logos as an Xref. This action creates a nested Xref in all Xref title blocks used for sheet drawings. Insert logos as blocks in the titleblock file and place on the correct layer name.

#### 5.9.2 Stamps

##### a. Professional Seals

The use of Engineer/Designer of Record (EOR/DOR) professional seals shall be in accordance with [WAC 196-23-020](#).

- Preliminary documents (e.g., milestone design submittals of plans and specifications such as 30%, 60%, 90%, etc.) must be clearly identified with a "Preliminary" sheet stamp or some other wording that differentiates them from final documents. Preliminary documents shall be stamped by the Engineer or Designer of Record but need not be signed or dated. When submitting preliminary documents to the Port of Seattle, the individual and combined PDF files shall include the unsigned EOR/DOR stamp. For security purposes, the unsigned EOR/DOR stamp shall be removed from all CAD files (DWG format) prior to submission.
- Final documents (e.g., Permit, As Bid, Conformed/Issued for Construction, and Record/As Built plans and specifications) shall be stamped, signed, and dated by the EOR/DOR. When submitting final documents to the Port of Seattle, the individual and combined PDF files shall include the EOR/DOR stamp, signature, and date. For security purposes, the EOR/DOR stamp, signature, and date shall be removed from all CAD files (DWG format) prior to submission. Refer to [Section 8.7.1](#) for definition of Record/As Built documents at the Port of Seattle.
- Refer to Appendix C, Sample Drawings for seal location.
- Refer to [Section 8, Drafting Document Lifecycle](#) and Appendix E, QA/QC Design Submittal Deliverable Flowcharts for further information.

- Call B4 U Dig must be visible in the title block on all drawings and is already included in the standard Port title block.
- The Port of Seattle Contract Block (Major, Small Works, Tenant, Survey) must be shown on the Cover Sheet for the project. Individual blocks are pre-loaded in the Port standard Cover Sheet and can be managed by freezing/thawing layers as needed. Refer to Appendix C, Sample Drawing for example.

#### 5.9.3 Plot Stamp Date

- All prints submitted to the Port shall have a plot date and drawing file name appearing in the lower left side of the Sheet Border in a vertical format placed on layer G-ANNO-STMP-PLOT.

### 5.10 Detail, Section, Elevations:

### 5.10.1 Detail, Section, Elevations:

- a. Layout details (elevations, sections, etc.) in a grid pattern so that they align horizontally and vertically.

### 5.10.2 Detail, Section, and Elevation Spacing:

- a. All drawing elements should have at least 1 inch between them to prevent confusion with adjacent elements.

### 5.10.3 Detail, Section, and Elevation Numbering Protocol:

- a. Number details, sections, and elevations horizontally by rows starting with (1) at the upper top left side of the sheet. Continue numbering horizontally to the right and then proceed down to the next row. If there are multiple sheets of details, sections, and elevations in a set, numbering will begin at (1) on each sheet.

## 5.11 Revisions:

5.11.1 The REVISIONS table of the title block is used to indicate revisions made to a sheet after the drawing set has been issued for construction.

- a. Numerical indicators are used in the “NO.” column of the REVISIONS area when a sheet or set of sheets is issued with changes.
- b. **DO NOT** indicate submittal milestones (I.E., 90%, 100%, BID) in the revision table. Milestones are indicated at the lower right-hand corner, outside of the title block border, in vertical. Refer to Appendix C, Sample Drawings for information.
- c. The revision table is an insertable block table available in the Port AutoCAD Resource Library. The table should only be inserted into the titleblock (@ 0,0,0) on sheets containing revisions and must be set to explode on insertion in order to function properly. Rows can then be added or deleted as needed to convey revision information pertaining to the sheet. Refer to [Section 5.13](#) for block name and other information.
- d. Blank rows should never be displayed in the revision table. Only insert rows when adding a revision and date. See below for an example.

Example:

REVISIONS		
NO.	DATE	DESCRIPTION
1	02/02/23	DESIGN BULLETIN 1
2	06/14/23	DESIGN BULLETIN 2
PORT PROJECT MANAGER: <b>DAVID NEDS</b> PROJECT ENGR./ARCH: <b>CONSULTANT NAME</b> DESIGNED:		

- 5.11.2 Revision Deltas and Clouds are used during the construction phase of a project for identifying drawing/design changes. They are required to be placed in Paper Space on specific Port layer names that are designated in Appendix D, Layer Naming Standards – General Annotation Layers.

## 5.12 Title Sheets:

Use only Port of Seattle standard Cover and Title sheet Blocks for all drawings. Please note that sheet sizes larger than 22x34 are generally discouraged due to factors relevant to internal Port use.

Port of Seattle standard Sheet size:

- 22" x 34"
- If the project team wishes to use a sheet size not shown above, a Variance Request Form must be submitted to the Port of Seattle Design Quality team for approval (Refer to Appendix H). The request should include justification and other details in support of the non-standard sheet size. Upon approval, a pre-formatted cover sheet and titleblock in the requested size will be provided to the project team for their use on the approved project **ONLY**.

## 5.13 Project Sheet Blocks:


- See Port AutoCAD Resource Library
- Title (Cover Sheet) (no sheet index): PORT\_22x34\_CVR.dwg
- Cover Sheet with Sheet Index: PORT\_CSI\_22x34.dwg
- Title block (Xref): PORT\_22x34\_XREF\_TBLK.dwg
- Title block with sheet index: PORT\_22x34\_Sheet Index.dwg
- Title block attributes (insert each sheet): PORT\_22x34\_SHT\_INFO.dwg
- Revision Table (insert each sheet as needed): PORT\_22x34\_REV\_TABLE.dwg

## 5.14 Xref Titleblock Sheet Attributes:

### 5.14.1 The Sheet Titleblock

- a. This attribute block (PORT\_22x34\_SHT\_INFO.dwg) should be filled in upon insertion into each sheet drawing. Insert @ 0,0,0. Example follows:

Block: SHT\_TITL\_REV22x34  
Tag: SHEET-NO

Select block 

Attribute Text Options Properties

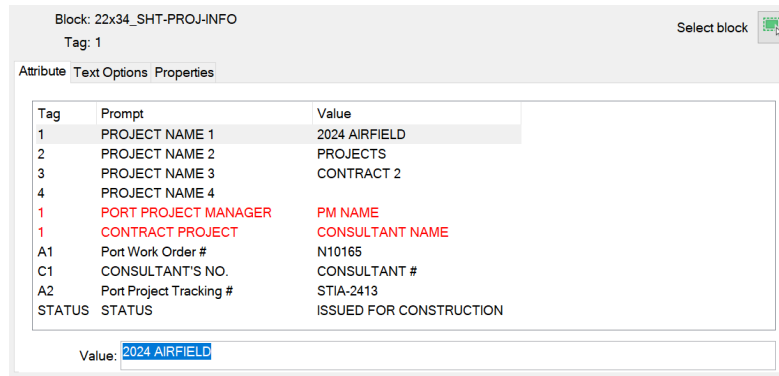
Tag	Prompt	Value
SHEET-NO	SHEET-NO	A-201
DSG	DESIGNED BY	DESIGNER
CHK	CHECKED BY	CHECKER
XX/XX/XXXX	DATE	02/15/2024
1	SHT-TITL1	TESC PLAN -
2	SHT-TITL2	CAMP CHANNEL
3	SHT-TITL3	DRAIN
4	SHT-TITL4	
5	SHT-TITL5	

Value: A-201



### 5.14.2 Titleblock Attribute Constants

- a. The Xref Title Block Sheet (PORT\_22x34\_XREF\_TBLK.dwg) contains attributes that are the same on all sheets, or among all sheets from one consultant. These include the following:



Tag	Prompt	Value
1	PROJECT NAME 1	2024 AIRFIELD
2	PROJECT NAME 2	PROJECTS
3	PROJECT NAME 3	CONTRACT 2
4	PROJECT NAME 4	
1	PORT PROJECT MANAGER	PM NAME
1	CONTRACT PROJECT	CONSULTANT NAME
A1	Port Work Order #	N10165
C1	CONSULTANT'S NO.	CONSULTANT #
A2	Port Project Tracking #	STIA-2413
STATUS	STATUS	ISSUED FOR CONSTRUCTION

Value: 2024 AIRFIELD

- b. Refer to the table below for further information and descriptions of each line in the attribute dialog box shown above.

#### Description of Titleblock Constants

Status	Milestone (60%,100%, BID, Issued for Construction, etc.)
Port Project Manager	Include the Port of Seattle Project Manager.
Project Title/Name	Title should match what is on the Consultant's Contract.
Port Work Order #	6-digit Port of Seattle issued number specific to project.
Consultant's No.	External design team's internal project number goes here.
Port Tracking # [PTN]	Issued by the Port of Seattle Design Quality Team.

## 5.15 Model Space Elements:

Model Space is used for most drafting and design work. Elements, such as "real" entities and text referring to them should be placed in Model Space.

### 5.15.1 Model Space elements include:

- Plan views.
- Section views, section cuts and call out notes.
- Elevation views and call out notes.
- Details and call out notes.
- Text used to identify a line or specific object. Typically, text with leaders in MS.
- Hatch and fill patterns.
- Dimensions.
- Room names.
- Object symbols (wall/door types, column types, & equipment symbols).
- Diagrams and Schematics. (One-line diagrams & electrical circuit drawings).
- Xref/s, Images (tiffs, jpegs, gifs, bumps, etc. and symbol blocks).

- Survey Details and Contour Lines and Profiles.
- Site map information and aerial images.
- Grid lines, grid bubbles.

## 5.16 Units:

Objects shall be drawn true size in Model Space, with:

- 1 unit = 1 Inch in Architectural Units.
- 1 unit = 1 foot in Decimal (Civil) Units.

5.16.1 Decimal units shall be used for all civil drawings including site plans (all disciplines), roadway sections and profiles, track plans, sections and profiles, utility plans and profiles.

5.16.2 Architectural units shall be used for ALL building drawings, including structural plans, mechanical and electrical plans, floor plans, reflected ceiling plans, sections and details. DO NOT USE ENGINEERING AND/OR DECIMAL UNITS ON BUILDING PLANS.

## 5.17 Scales:

5.17.1 All plan scale bars should be inserted into all drawings in Paper Space.

5.17.2 Refer to Sections 5.1.2 and 5.8.3 for placement within the sheet drawing file.

5.17.3 Acceptable scales for Paper Space viewports are listed in the following table:

Engineering Scales		Architectural Scales	
	Scale Factor		Scale Factor
1" = 10'	120	1/32" = 1'-0"	384
1" = 20'	240	1/16" = 1'-0"	192
1" = 30'	360	3/32" = 1'-0"	128
1" = 40'	480	1/8" = 1'-0"	96
1" = 50'	600	3/16" = 1'-0"	64
1" = 100'	1200	1/4" = 1'-0"	48
1" = 200'	2400	3/8" = 1'-0"	32
1" = 300'	3600	1/2" = 1'-0"	24
1" = 400'	4800	3/4" = 1'-0"	16
1" = 500'	6000	1" = 1'-0"	12
1" = 600'	7200	1-1/2" = 1'-0"	8
1" = 1200'	14400	3" = 1'-0"	4
Full Scale		Full Scale	

## 5.18 Object Properties:

All drawing element properties shall be set *By Layer*.

- Do not adjust object properties by entity (forcing colors or linetypes) unless submitted to the Port Design Quality team for approval. Use layering techniques.
- Exceptions: Dim ticks, arrows and dim text can be set another color.

### **5.19 Layer Control: (Do not turn off layer zero)**

Freeze layers rather than turning layers off. This is to prevent elements that are embedded in blocks from appearing.

### **5.20 Directory Structure:**

Port of Seattle CAD Standards do not require that the consultant maintain any specific directory structure for their working drawings on their computer systems. However, when files are exchanged or submitted for review, improper filing can complicate the use of external references. Therefore, all AutoCAD files completed by all disciplines, including Xrefs for a project, shall be submitted in one (1) folder only with no subfolders allowed whatsoever. Doing so prevents duplicate files from occurring across trades. Refer to [Section 7.1.4](#) for file submission requirements.

# **Section 6**

## **Drawing Layer Protocol**

## Section 6 - Drawing Layer Protocol:

### 6.1 Layer Naming Convention:

The Port of Seattle Layer Naming Convention is based on the U.S. National CAD Standard (NCS) v6/AIA CAD Layer Guidelines. This format is organized as a hierarchy that allows selection from a number of options according to the level of detailed information desired. Layer names consist of distinct data fields separated from one another by dashes. Most of the prescribed field codes are mnemonic English abbreviations of construction terminology that are easily recognized and easy to remember. See [Section 6.3](#) for more information.

### 6.2 Layer Names:

The purpose of this Section is to explain the adopted layer naming convention and protocol.

- 6.2.1 Refer to the layer lists in Appendix D, Layer Naming Standards.
- 6.2.2 Layer names must be (ALL CAPS)
- 6.2.3 Whether by the Port or by consultants, all drawings submitted shall be layered in accordance with this convention.
- 6.2.4 All layers to be a maximum of 19 characters only.

### 6.3 Definitions of Layer Name Data Fields:

There are five defined layer name data fields: **Discipline Designator**, **Major Group**, two **Minor Groups**, and **Status**. All data fields, with the exception of Discipline Designator and Status, consist of four (alpha) characters.

- 6.3.1 Discipline Designator (Mandatory):
  - a. 1-character (or 2-characters if Sub-Disciplines are used for further definition). Refer to [Section 3.3.1](#) and [3.3.2](#) for a list of Discipline and Sub-Discipline designators.
- 6.3.2 Major Group (Mandatory):
  - a. 4-character group that identifies a major building system.
  - b. Example: A-WALL
  - c. Prescribed Major Group field codes as shown in the Appendix D Layer List are logically grouped with specific discipline designators. However, any Major Group may be combined with any prescribed Discipline Designator provided that the definition of the Major Group remains unchanged (i.e., any reasonable combination of Discipline Designators and Major Groups is permissible).
- 6.3.3 Minor Group (Optional – 1 or 2 fields):
  - a. 4-character group that further defines a Major Group.
  - b. Example 1: A-WALL-FULL (one optional Minor Group denoting a full-height wall).
  - c. Example 2: A-WALL-FULL-EXTR (two optional Minor Groups denoting an exterior full-height wall).
  - d. Prescribed Minor Group field codes as shown in the Appendix D Layer List are logically grouped with specific Major Groups. However, any Minor Group may be used to modify any Major Group, provided that the definition of the Major Group remains unchanged (i.e., any reasonable combination of Major and Minor Groups is permissible)

#### 6.3.4 Status (or Phase):

- a. Optional single-character field (alpha or numeric) that distinguishes the data contained on the layer according to the status of the work or the construction phase.
- b. This field may be used to denote either "Status" OR "Phase", but not BOTH.
- c. Prescribed Status field codes are as follows:

Status Field Codes	
A	Abandoned
D	Existing to demolish
E	Existing to remain
F	Future Work
M	Items to be moved/relocated
N	New Work
T	Temporary Work
X	Not in contract
1-9	Phase numbers

# **Section 7**

## **QA/QC Compliance Framework**

## Section 7 – QA/QC Compliance Framework:

### 7.1 Document Submittal and CAD Reviews:

- 7.1.1 The Port of Seattle tracks facility drafting data at five levels:
- Port of Seattle Coordinate Grid System.
  - File naming, sheet naming, sheet index.
  - Layers
  - Xref Files
  - Paper Space/Model Space.
- 7.1.2 The Port of Seattle CAD Standards include a project review process in which the Port of Seattle Design Quality team assigns a CAD Standards Review Technician to support and assist designers/CAD technicians on Port of Seattle engineering projects. This includes enforcing compliance with the Port of Seattle CAD Standards via periodic reviews. In addition, the process is designed to allow consultants and contractors to provide feedback and request clarity to the Port of Seattle CAD Standards.
- 7.1.3 Refer to [Section 3.16](#) for PDF Requirements. Submit PDFs and CAD in compliance with Appendix E, QA/QC Design Submittal Deliverable Flowcharts. See Appendix G for AutoCAD and PDF submittal checklist.
- 7.1.4 Submittals for CAD compliance reviews shall follow the below folder convention:
- CAD: Will contain all drawing sheet files and supporting files (CTB, Images, Xrefs, etc.).
  - PDF (Combined): Combined drawing PDF per [Section 3.16](#) requirements.
  - PDF (Individual): Single sheet PDFs of each drawing sheet. Confirm that file count matches sheet index and CAD drawing sheet file count.
  - SHEET INDEX (Excel): An Excel file containing the project sheet index. Confirm the Excel file matches the sheet index as shown in the drawing set.
  - No sub-folders or zipped sub-folders allowed.

### 7.2 CAD Kickoff Meeting:

- 7.2.1 Before initiating drawing production work, the Port Project Manager shall schedule a CAD Kickoff meeting with the Port's Design Quality team. The request form is available in the AutoCAD Resource Library or via the Quality Team page on Compass. The CAD Standards Review Technician will provide the consultant's representative the current Port of Seattle CAD Standards. The CAD Kickoff meeting is **required** for ALL Port of Seattle projects unless an exemption is approved by the Design Quality team. Exemptions must be requested via the Variance Request Form prior to initiating any drawing production work. Refer to Appendix H for form examples.
- 7.2.2 The main purpose of the meeting is to familiarize consultants with the Port of Seattle CAD Standards, the review submittal process, compliance requirements, etc. The assigned CAD Standards Review Technician serves as a contact and guide for the design team on CAD compliance questions and clarifications throughout the life of the project.



### 7.3 Requests for Master Documents:

Requests for archive CAD or PDF Documents and BUILDING BASEPLANS for Aviation and Maritime projects shall be made via e-mail to the Port of Seattle Design Quality team using the Digital Archive File Request Form. The form is available in the AutoCAD Resource Library or via the Quality Team page on Compass. See Appendix H for example.

Requests for BASEMAP and BACKGROUND Survey files shall be made by the Port Project Manager via the Survey Request Form on the Port's Survey & Mapping Services SharePoint Site.

### 7.4 CAD Drawings Compliance Review:

7.4.1 The Port of Seattle may comment on **any** information that is submitted and reserves the right to require modifications to any elements, whether specifically addressed in the standard or not. As a general rule, the primary areas of concern are as follows:

- Coordinate system.
- Building grid.
- Electronic drawing index spreadsheet.
- Project plot sheet drawing index.
- Sheet naming.
- Sheet drawing file naming.
- Layer naming.
- External references (XREFs).
- Correct use of AutoCAD Paper Space and Model Space.
- Port of Seattle title block and cover sheet borders.
- Port of Seattle symbols.
- PDFs included in submission, compliant with Section 3.16 & Appendix G.

7.4.2 Submissions for review shall be made by the Port Project Manager via e-mail to the Port of Seattle Design Quality team using the Compliance Review Submission Intake form. The form is available in the AutoCAD Resource Library or via the Quality Team page on Compass. See Appendix H for example. The request shall include all information requested in the form, including:

- Project name of record and Port Tracking Number [PTN].
- Work Project (WP) number/Contract number.
- Port Project Manager name.
- PM Preferred response date (Quality Team reviewer will coordinate with PM).
- Anticipated date (month/year) of contract document completion.
- Number of CAD drawing sheet files.
- Number of PDF sheet files.
- A link to location of submission package files for retrieval.

7.4.3 30%, 60% and 90% Submittal Reviews:

All projects shall be reviewed at the 30%, 60% and 90% design submittals. The review process is intended to be iterative. Therefore, early-stage compliance and demonstration of an understanding of the Port of Seattle CAD Standards will reduce later stage review time. During each review, if a spot check indicates that a project is clearly not compliant, the submittal will be returned only partially reviewed. Reviews may be requested at any time.

See [Section 3.16, PDF Documents](#) and Appendix E, QA/QC Design Submittal Deliverable Flowcharts for document requirements.

7.4.4 100% Design Review Submittal:

This review is for Central Procurement Office (CPO) and any final review comments. Documents should be final, apart from these review comments.

A submittal will not be considered final until it complies with the Port of Seattle CAD and PDF Standards, as evaluated during the 30%, 60%, 90% and 100% design submittal reviews. Lack of compliance can be used as justification to delay a Project going to bid. Final submittals are made to the CAD Standards Review Technician who will forward the submittal to the Design Quality Manager for storage.

Stamped/Signed/Dated PDFs and electronic CAD files (remove stamp & signature from all CAD files) shall be submitted prior to project advertisement for bid.

See [Section 3.16, PDF Documents](#) and Appendix E, QA/QC Design Submittal Deliverable Flowcharts for document requirements.

7.4.5 Ready to Bid Submittal

Documents will be issued for Bid by CPO (Central Procurement Office).

7.4.6 For Professional Seal requirements at all phases/milestones and submittals, please refer to [Section 5.9.2, Professional Seal Stamps](#), [Section 8.7.1, Preparation of Record/As Built Documents](#), and Appendix E, QA/QC Design Submittal Deliverable Flowcharts.

## **Section 8**

# **Drafting Document Lifecycle**

## Section 8 - Document Stages

### 8.1 Design Stage:

During design, milestone submittals are made to the Port of Seattle Design Quality team for review for conformance to the Port of Seattle CAD Standards. The intent is to catch non-compliance at an early stage to minimize the burden on the designer in making corrections at a late stage in the preparation of the documents.

### 8.2 Permit Stage:

Permit submittal may be stand-alone or combined with the 100% design review submittal, at the discretion of the Port Project Manager.

Permit documents shall be in compliance with [RCW 18.08](#), [RCW 18.43](#), [WAC Title 196-23-020](#) (including [Board of Registration for Professional Engineers and Land Surveyors Electronic Documents Interpretive Guideline, dated June 30, 2015](#)) and [WAC Title 308-12-081](#).

### 8.3 Bid Stage:

Submittal for review for conformance to the Port of Seattle CAD Standards is **mandatory**. Manually prepared sketches in bid addenda are discouraged since they become part of the contract documents. If sketches are used, they should be drawn electronically and incorporated into the Conformed IFC CAD set of documents for use by the contractor as the on-site (GC) redline drawing set.

### 8.4 Construction Stage:

Document maintenance (on-site construction (GC) redlines) procedures by the contractor are specified in the project manual. The intent is to provide markings that are clear to a CAD drafter preparing the CAD record documents for the Port's Engineering Document Management System and future reference.

Ideally the scope agreement with the A/E construction support team will require issue of only CAD generated revision sketches. However, this is a scope issue between the Port Project Manager and the consultant.

### 8.5 Document Format:

See [Section 3.16, PDF Documents](#) for PDF Document requirements.

### 8.6 Overview of the Project CAD Documentation Process:

- 8.6.1 During design, milestone submittals are made to the Port of Seattle to check conformance to the Port of Seattle CAD Standards. The intent is that the final record documents will be compliant, and that no extraordinary effort will be required by the entity preparing them to bring them into compliance.
- 8.6.2 A Conformed IFC (Issued for Construction) set of drawings shall be prepared from the as-bid contract documents and provided to the contractor for marking up changes occurring during construction (GC redline set).
- 8.6.3 Contractor marks up the GC redline set with changes generated by RFI's, CBs or other change instruments. The contractor marks the "footprint" of a change, references the change instrument and marks the change exactly in line and text as the CAD drafter is intended to copy. Alternatively, if a sketch is provided, the sketch is referenced and attached to the back of the

- previous sheet without change indicated in the footprint. An electronic copy of the sketch shall be provided to the CAD drafter along with the CAD files of the Conformed IFC drawing set.
- 8.6.4 Typically, the Port Engineer reviews for completeness and accuracy and accepts the GC redlines.
  - 8.6.5 The Port Project Manager contracts with an entity, typically the Designer of Record, for production of CAD record/as built documents. The Port provides the entity with the CAD files of the conformed IFC drawings and the contractor's mark-ups (GC redlines) on the hard copy of the conformed IFC set.
  - 8.6.6 Prior to production of CAD record/as built documents, the entity selected for production of the documents meets with the CAD Standards Review Technician/Port Design Quality team to review processes and submittal requirements, and to ensure an understanding of the Port's requirements for CAD compliance.
  - 8.6.7 Complete CAD record/as built documents in accordance with requirements indicated in [Section 7, QA/QC Compliance Framework](#) and [Section 8.7.1, Preparation of Record/As Built Documents](#).
  - 8.6.8 Upon completion of the CAD record/as built documents, the consultant submits the completed work to the Port of Seattle Design Quality team for final review. The Design Quality team may return comments/request resubmission until **full compliance** is achieved. The consultant shall make any requested changes and resubmit the final documents until notification of final acceptance has been received from the Design Quality team..
  - 8.6.9 The Port archives the documents in the Engineering Document Management System for use in future projects and for reference by the maintenance department and notifies the Port Project Manager that compliance has been met and archival is complete.

## 8.7 Preparation of Record/As Built Documents:

- 8.7.1 At the Port of Seattle, **As Built drawings are synonymous with Record drawings** and are not to be confused with construction/contractor (GC) redlines. Record/As Built drawings must be compliant with all Port of Seattle CAD Standards. In addition, there are further procedures required specifically for preparing record/as built files/drawings.
  - a. Check CAD compliance reviews from all submittal milestones and ensure that all noted issues have been addressed.
  - b. All General Contractor (GC) redline drawings and sketches must be incorporated into the project drawing set, and the GC redline set **must** be included with the submission. Failure to include them will result in an automatic request for resubmittal. Projects **will not** be approved for archival until the GC redlines have been received.
  - c. Adjustments to traffic control plans and construction phasing drawings made during construction are not required to be reflected in record/as built drawings, but **do not** remove these sheets from the set.
  - d. Temporary design components that are then removed during construction should not be deleted from the drawings unless specifically marked on the GC redlines.
  - e. Bidder-Design Shop Drawings that may be included with the contractor's redlines should be sent to the Port, but **do not** incorporate them into the record/as built drawing set.
  - f. All sheets in the conformed IFC drawing set are required to be kept in the set whether changes are made or not.
  - g. Sheets added during construction must be included with the record/as built drawing set and must be accurately reflected in the sheet index.
  - h. The cover sheet must have the as built cover stamp (PORT\_22x34\_AsBltCvr.dwg) displayed. It is provided in the cover sheet template and will appear in the correct

location when that layer G-ANNO-COVR-ASBT. Edit this stamp with the as built date, ensuring this date is the same on all sheets.

- i. The as built sheet stamp (AsBltSht.dwg) must be displayed in the title block of all sheets. It is provided in the title block template and will appear in the correct location when thawing layer G-ANNO-STMP-ASBT. Edit this stamp with the as built date, ensuring the date is the same on all sheets.
- j. Professional stamps:
  - i. PDF record/as built files shall be submitted stamped with a seal, signature, and date per [WAC 196-23-020](#).
  - ii. CAD (DWG) record/as built files must be submitted with the stamp removed.
- k. All information in the REVISIONS are of the title block is to be completely removed by deleting the PORT\_22x34\_REV\_TABLE block from all sheet files.
- l. All revision clouds and deltas should be erased/purged from each sheet file.
- m. Do not bind x-referenced files to the drawing sheet files. Files referenced to the drawing sheet files are to remain/be applied per the Port's CAD standards.

## 8.8 Design Review Process

- 8.8.1 The Port will review all project designs.
- 8.8.2 Where the Port Project Manager has elected to use Bluebeam for design review, the process shall be per Appendix F, Bluebeam Design Review Flowcharts.
- 8.8.3 PDFs shall be formatted in accordance with [Section 3.16, PDF Documents](#).

## **Section 9**

# **Construction Document Management System (CDMS)**

## Section 9 - Construction Document Management System – CDMS:

### 9.1 General

- 9.1.1 The Construction Document Management System (CDMS) is a web-based system developed by the Port to manage contract documents. The CDMS will be used to generate and capture electronic contract documents, route them to the appropriate individuals, file them, and then allow for ease of retrieval.

### 9.2 Application to Record Documents

- 9.2.1 The CDMS is used for all contract communication, submittal, and shop drawings between the Port and the contractor unless specifically exempted from requirements by the engineer. CDMS is not used for Electronic Payroll Information (EPI) or any type of payroll submittals. It provides data in image format that may be added to record/as built documents to clarify as built condition if necessary and/or required by the engineer.

### 9.3 Use and Standards

- 9.3.1 Specification Section 01 78 39 Contract Management System of the project manual for the specific project provides all conditions of use, software applications and software to be furnished by the Port. The system currently in use is known as ***Open Text***.