# Port of Seattle CAD Standards
# 2023 Edition

## Effective April 3, 2023

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

**This manual supersedes Port of Seattle CAD Standards, 2018 Edition**

## 2023 Port of Seattle CAD Standards Change Log

| Section | Page # | Modification Description |
|---|---|---|
| 1.4 | 13 | Software versioning updated |
| | | |
| 2.2 | 18 | Infrastructure classification: Add Sub-Discipline (CM=CIVIL MARKINGS) |
| | | |
| 3.3.2 | 25 | Sub-Discipline Designators: Add (CM=CIVIL MARKINGS) |
| 3.6 | 32 | Cover/Title Sheet and Index Sheet/s Required Protocol Revised for clarity |
| 3.10.5 | 33 | Small revision for clarity re: PDF use |
| 3.11.1 | 33 | Procedure for requesting base drawings modified. |
| 3.12 | 33 | Sheet File Protocol Revised for clarity |
| 3.15 | 35 | Section removed: DWG Revision Numbering protocol |
| | | |
| 4.1 | 40 | Approved Text Styles Revised/Updated |
| 4.3.3 | 41 | Stacked dimensions |
| 4.11.2 | 45 | Pen Weights |
| | | |
| 5.1.2 | 49 | Revised location of KEY PLANS |
| 5.2 | 49 | Cover/Title Sheet and Index Sheet/s Required Protocol Revised for clarity |
| 5.4 | 51 | Adjusted order of bullet points to associate with the example correctly |
| 5.9.2.a | 55 | Updated professional stamp and seal requirements per WAC 196-23-020 |
| 5.11 | 56 | Updated Revisions Identification protocol |
| 5.14.1 a | 58 | Fixed typo. |
| 5.14.2 | 58 | Updated definitions of attribute constants |
| | | |
| 6.2.4 | 64 | Maximum layer name characters defined. |
| | | |
| 7.4.1 | 73 | Adjusted bungled format at bottom of list, and Updated last text in section for clarity |
| 7.4.2 | 73 | Remove bullet: Elec Dwg Index Spreadsheet |
| 7.4.4 | 74 | Revised: Standards Review Technician will forward submittal to Quality Manager......, etc. |
| | | |
| 8.7 | 79 | Updated As-Built Record Drawing Preparation |
| 8.7.1.j | 80 | Updated professional stamp and seal requirements per WAC 196-23-020 |
| | | |
| Appendix C | | Design Symbols Library content has been updated to Arial font, restructured and renamed |
| Appendix C | | Added Scale Bar block to CAD Library for 1/32" = 1'-0" |
| Appendix C | | Sample Drawings/Title Block: Updated attribute - Consultant's # |
| Appendix H | | Updated CAD & PDF Check Lists |
| | | |
| Folders | | Cleaned up CAD Standards folder/Revised structure |

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# Section 1

# General

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## Section 1 – General:

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

The Port of Seattle CAD Standards 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 standards contained herein generally conform to standards established by authorities in each engineering field (e.g., AIA, CSI, and APWA). 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 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 for specifications, cost estimates, permit documents, calculations etc.

### 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 created, project titles 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 and accurate. Unnecessary 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. The design firm must comply with the standards contained herein before the construction documents will be accepted by the Port. Strict adherence to the following:

- 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 layer tables format and protocols.

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 2022, while all CAD files in the project drawing set must also be sent saved in a uniform version of AutoCAD.

The use of AutoCAD Civil 3D can be facilitated by using the most current version of the Port of Seattle Civil 3D template, Port_Design_R1.0.dwt. The access to the template is shown here and in Appendix A. It is located at http://www.portseattle.org/Business/Construction-Projects/Airport-Tenants/Pages/Reference-Documents.aspx  Select Design Standards, then select CAD Standards 2023.  Please contact your Port Project Manager for the current link.

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# Section 2

# Elements of Port of Seattle Drawing Sets

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## 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 | Level 3 |
|---|---|---|
| Capital improvement, major projects | Projects requiring AV F&I application for connection | Temporary facilities |
| Small works | Asbestos removal projects | Non-systems related or architectural work. |
| PCS construction projects. | Systems related permanent work | Project related signage. |
|  | Terminal and Tenant projects involving systems-related work. | Glass replacement, carpet, and replacement in kind. Painting and lighting refits |

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 | Level 3 |
|---|---|---|
| Full compliance required. Create and simultaneously submit CAD and PDF files in accordance with the Port of Seattle CAD Standards.  Hard copy not required for review submittals in design stages.  Hard copy and Construction redlines required for Record (As-Built) Documents submittals (May be printed from PDF). | Full compliance required. Create and simultaneously submit CAD and PDF files in accordance with the Port of Seattle CAD Standards.  Hard copy not required for review submittals in design stages.  Hard copy and Construction redlines required for Record (As-Built) Documents submittals (May be printed from PDF). | CAD compliance not required. PDF files in accordance with Port of Seattle CAD Standards. |
| Use backgrounds provided by Port of Seattle Engineering if available | Use backgrounds provided by Port of Seattle Engineering if available |  |
| Incorporate change orders in project record drawing CAD and PDF files. | Incorporate change orders in project record drawing CAD and PDF files. Submit redlines to engineering. |  |

## 2.2    Infrastructure Classification:

The following is a list of terms used to classify infrastructure components within a design project.

Trade Disciplines

Designation of an engineering or architectural field that encompasses the design of particular systems. Port of Seattle-recognized disciplines are:

## Trade Letter:

**G… General Layers (Please Note Not a true Trade, however used for Port Projects)**
**C… Civil Layers**
**L… Landscape Layers**
**A… Architectural Layers**
**S… Structural Layers**
**M… Mechanical Layers**
**P… Plumbing Layers**
**E… Electrical Layers**
**F… Fire Protection Layers**
**V…Survey Layers**
**X… Xrefs Layers (Attach Drawing References) (Not a true Trade, however used for Port Projects)**

## Trade (1) Letter and Sub Discipline (2) Letters:

**C… Civil Layers**

| | |
|---|---|
| **CA** | **Alignment** |
| **CB** | **Site Preparation/Removals** |
| **CC** | **Construction Phasing or Staging** |
| **CD** | **Demolition** |
| **CE** | **Erosion Control…. Environmental** |
| **CF** | **Profiles** |
| **CG** | **Grading** |
| **CI** | **Intelligent Transportation System (ITS)** |
| **CK** | **Track** |
| **CM** | **Civil Markings** |
| **CR** | **Right-Of-Way (ROW) elements** |
| **CS** | **Signage** |
| **CT** | **Transportation/Traffic control** |
| **CU** | **Utilities** |
| **CV** | **Paving** |
| **CW** | **Retaining Walls** |
| **CX** | **Roadway Sections** |
| **CY** | **Storm Drainage** |

**L… Landscape Layers**

| | |
|---|---|
| **LD** | **Demolition** |
| **LI** | **Irrigation** |
| **LP** | **Planting** |

## Trade Letter and Sub Discipline Letter:

**A… Architectural Layers**

| | |
|---|---|
| AD | Demolition |
| AE | Electrical |
| AG | Signage |
| AI | Interiors |
| AK | Equipment |
| AM | Mechanical |
| AS | Structural |
| AX | Sections (longitudinal and traverse) |

**S… Structural Layers**

| | |
|---|---|
| SA | Alignment |
| SB | Bridge |
| SD | Demolition |
| SF | Foundation/Framing |
| SK | Track Supports |
| SS | Seismic |
| SX | Sections |

**M… Mechanical Layers**

| | |
|---|---|
| MB | Baggage |
| MD | Demolition |
| ME | Elevators/Escalators |
| MF | Fire Protection |
| MH | HVAC |
| MP | Plumbing and Drainage |
| MR | Risers |
| MX | Sections |

**P… Plumbing Layers**

| | |
|---|---|
| PD | Demolition |
| PR | Risers |
| PX | Sections |

## Trade Letter and Sub Discipline Letter

**E… Electrical Layers**

| | |
|---|---|
| EA | Data… Audio/Visual |
| EB | Baggage |
| EC | Communications |
| ED | Demolition |
| EF | Fire System |
| EG | Grounding |
| EI | Roadway Illumination |
| EK | Track System |
| EL | Lighting |
| EN | Computer/Networks |
| EP | Power |
| EQ | Baggage Controls |
| ER | Runway Illumination |
| ES | Security |
| ET | Telephone |

**F… Fire Protection Layers**

| | |
|---|---|
| FA | Alarm Systems |
| FD | Demolition |
| FR | Risers |
| FX | Sections |

## 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
- Vicinity/ Key Maps
- Legend and Abbreviation Sheets
- Site Plans

## 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 to 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.

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# Section 3

# Project Sheet File Naming Convention

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## Section 3 – Project Sheet File Naming Convention:

### 3.1    Port of Seattle Project Tracking Number

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

| | |
|---|---|
| **Aviation Projects:** | **STIA-0412** |
| **Maritime Projects:** | **69-0433** |

### 3.2    Port of Seattle Project Designator Protocols:

3.2.1    The Consultant shall obtain the Port project tracking (drawing) number from the Port Project Manager. Requests for Port project tracking (drawing) number shall be made by the Port Project Manager who shall fill out the Port Project Tracking (Drawing) Number Request Form and forward the form to the CAD Standards Review Technician.

3.2.2    Port of Seattle Economic Development and Maritime/Maritime facilities and their designator abbreviations are listed in the following table.

Waterfront Facilities

| Piers | | Terminals | |
|---|---|---|---|
| **Facility** | **Designator** | **Facility** | **Designator** |
| Pier 2 | 02 | Terminal 5 | 05 |
| Pier 16 | 16 | Terminal 18 | 18 |
| Pier 17 | 17 | Terminal 20 | 20 |
| Pier 31 | 31 | Terminal 25 | 25 |
| Pier 48 | 48 | Terminal 30 | 30 |
| Pier 64 | 64 | Terminal 37 | 37 |
| Pier 66 | 66 | Terminal 46 | 46 |
| Pier 69 | 69 | Terminal 91 | 91 |
| Pier 86 | 86 | Terminal 102 | 102 |
| | | Terminal 105 | 105 |
| | | Terminal 106 | 106 |
| | | Terminal 107 | 107 |
| | | Terminal 115 | 115 |
| | | Terminal 128 | 128 |
| | Fishermen's Terminal | FT | |
| | Lower Duwamish Industrial Development District | LDIDD | |
| | Maritime Industrial Center | MIC | |
| | Shilshole Bay Marina | SBM | |

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    Project Trade Discipline Letters are as shown in the following table.

| Project Trade Letters | |
|---|---|
| *Trade Discipline Letter* | *Description* |
| G | **General Layers (Please Note Not a true Trade, however used for Port of Seattle Projects)** |
| *V* | *Survey* |
| C | **Civil** |
| *L* | **Landscape** |
| *A* | **Architectural** |
| S | **Structural** |
| M | **Mechanical** |
| *P* | **Plumbing** |
| *E* | **Electrical** |
| *F* | **Fire Protection** |

### Trade – Sub-Discipline Designators: (Are Optional)

3.3.2    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 plot sheets. Project trade and sub-discipline are shown in the following tables.

| Civil Sub – Disciplines (2 Letters): (optional) | |
|---|---|
| *Trade + Sub-Discipline Letter* | *Description* |
| **CA** | *Alignment* |
| **CB** | *Site Preparation/Removals* |
| **CC** | *Construction Phasing or Staging* |
| **CD** | *Demolition - Structure Removal and Site Clearing* |
| **CE** | *Erosion Control…. Environmental* |
| **CF** | *Profiles* |
| **CG** | *Grading - Excavation, Grading, Drainage, Erosion Control* |
| **CI** | *Intelligent Transportation System (ITS)* |
| **CK** | *Track* |
| **CM** | *Civil Markings* |
| **CP** | *Paving* |
| **CR** | *Right-Of-Way (ROW) elements* |
| **CS** | *Signage* |
| **CT** | *Transportation - Waterways, Wharves, Docks, Trams, Railways, Airfields, and People Movers* |
| **CU** | *Utilities - Water, Sanitary Sewer, Storm Sewer, Power, Communications, Fiber Optic, Telephone, Cable Television, Natural Gas, and Steam Systems* |
| **CW** | *Retaining Walls* |
| **CX** | *Roadway Sections* |
| **CY** | *Storm Drainage* |
| **CZ** | *Project Details* |

| Landscape Sub – Disciplines (2 Letters): (optional) | |
|---|---|
| *Trade + Sub-Discipline Letter* | *Description* |
| **LD** | *Demolition - Protection and Removal of Existing Landscaping* |
| **LI** | *Irrigation* |
| **LP** | *Planting* |
| **LZ** | *Project Details* |

| Architectural Sub – Disciplines (2 Letters): (optional) | |
|---|---|
| *Trade + Sub-Discipline Letter* | *Description* |
| **AD** | *Demolition* |
| **AE** | *Electrical* |
| **AF** | *Architectural Finishes* |
| **AG** | *Signage* |
| **AI** | *Interiors* |
| **AK** | *Equipment* |
| **AM** | *Mechanical* |
| **AS** | *Structural* |
| **AX** | *Sections (longitudinal and traverse)* |
| **AZ** | *Project Details* |
| Structural Sub Disciplines (2 Letters): (optional) | |
| *Trade + Sub-Discipline Letter* | *Description* |
| **SA** | *Alignment* |
| **SB** | *Substructure - Foundations, Piers, Slabs, and Retaining Walls* |
| **SD** | *Demolition - Protection and Removal* |
| **SF** | *Foundation/Framing - Floors and Roofs* |
| **SK** | *Track Supports* |
| **SS** | *Seismic* |
| **ST** | *Structural Site* |
| **SX** | *Sections* |
| **SZ** | *Project Details* |

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

| Plumbing Sub – Disciplines (2 Letters): (optional) | |
| --- | --- |
| *Trade + Sub-Discipline Letter* | *Description* |
| **PD** | *Demolition - Protection, Termination, and Removal* |
| **PP** | *Piping, Valves, and Insulation* |
| **PQ** | *Equipment - Pumps and Tanks* |
| **PR** | *Risers* |
| **PS** | *Site - Extensions and Connections to Civil Utilities* |
| **PX** | *Sections* |
| **PZ** | *Project Details* |

| Electrical Sub – Disciplines (2 Letters): (optional) | |
| --- | --- |
| *Trade + Sub-Discipline Letter* | *Description* |
| **EA** | *Airfield Lighting and Navaids - Visual Air Navigation Systems* |
| **EB** | *Baggage Systems and Control* |
| **EC** | *Communications – Data, Audio/Visual* |
| **ED** | *Demolition - Protection, Termination, and Removal* |
| **EF** | *Fire System* |
| **EG** | *Grounding* |
| **EI** | *Roadway Illumination* |
| **EK** | *Track System* |
| **EL** | *Interior Lighting* |
| **EN** | *Instrumentation - Controls, Relays, Instrumentation, and Measurement Devices* |
| **EP** | *Interior Power* |
| **ER** | *Runway Illumination* |
| **ES** | *Security* |
| **ET** | *Interior Telecommunications - Telephone, Network, Voice, and Data Cables* |
| **EY** | *Interior Auxiliary - Alarms, Nurse Call, Security, CCTV, PA, Music, Clock, and Program* |
| **EZ** | *Project Details* |

| Fire Protection Sub – Disciplines (2 Letters): (optional) | |
| --- | --- |
| *Trade + Sub-Discipline Letter* | *Description* |
| **FA** | *Alarm Systems* |
| **FD** | *Demolition - Protection, Termination, and Removal* |
| **FR** | *Risers* |
| **FX** | *Sections* |

| | |
|---|---|
| **FZ** | *Project Details* |

## 3.4 ID Placeholder:

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

| Facility | ID Placeholder |
|---|---|
| Aerial Maps | **AM** |
| Equipment, Cranes | **E** |
| Furniture | **F** |
| Harbor Maps | **HM** |
| Maritime Terminal Facilities Book | **M** |
| Presentation Exhibit (sketch study) | **PE** |
| Property Management (Lease Exhibit) | **PM** |
| Property Plan | **PP** |
| Real Estate | **RE** |
| Standard Detail | **SD** |
| Sounding Plan | **SP** |
| Union Station Terminal | **UST** |
| World Trade Center | **WTC** |
| Waterfront Utilities | **WU** |

**Note: Only applies to 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 (drawing) number from the CAD Standards Review Technician they will forward to the design team. The Port project tracking (drawing) number shall be used for naming all project sheet file drawings.

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

The following Protocols shall be used on all facilities, Aviation and Maritime Projects.

3.5.2    Sheet Drawing File Name Protocols:

The hyphen is removed in the Port project tracking number example:  **STIA-1414** becomes **STIA1414.**

This is followed by the *Trade letter* or *Trade + Sub-Discipline Letters*

**See Table below for examples.**

- After the Trade / Sub-Discipline letter/s the next field shall contain three digits.  i.e., E004

- Sheet numbers with a decimal point [.] shall be replaced with an underscore: [ _ ]

- I.E., E004.01 shall be E004_01

- No Alpha **characters (numerical only)**

| Trade Discipline Letter or with Sub- Discipline Letters + Sheet Drawing Number | Port of Seattle Project Tracking Number + Sheet Drawing Number |
|---|---|
| Required To have 3 numbers after the trade letter. Underscore between fields (only) | |
| A2 | STIA1414A002_00.dwg |
| A20 | STIA1414A020_00.dwg |
| A200 | STIA1414A200_00.dwg |
| A2.1 | STIA1414A002_01.dwg |
| A2.12 | STIA1414A002_12.dwg |
| AD20.35 | STIA1414AD020_35.dwg |

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

| Trade Discipline Letter or with Sub- Discipline Letters | Port of Seattle Project Tracking Number + Trade Discipline Letter or with Sub- Discipline Letters |
|---|---|
| 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 |
|  |  |

## Example of a Sheet Drawing Number



**In the sheet drawing the underscore is replaced by a decimal point**

**Example of the Port of Seattle Sheet Numbering Protocols**

**Sheet Drawing Numbers:**                 **000_00**

**Range: 100-900** -------------------------
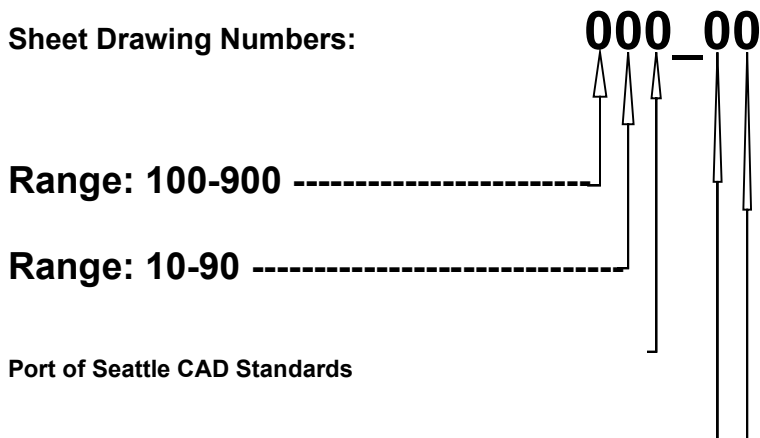
**Range: 10-90** ----------------------------

**Range: 1-9** -------------------------------

       **Range: 10-90** ---------------------

       **Range: 1-9** -------------------------

## 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 must begin with **G0.**

## 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:

    a.    **Airport drawings** shall be constructed and setup according to the Port of Seattle Airport Grid System.

    b.    Horizontal Datum: All bearings and coordinates shall conform to STIA Grid System.

    c.    Vertical Datum: All elevations shall conform to the NGVD of 1929.

3.7.2   Maritime Projects:

    a.    **Maritime drawings** shall be based on the Seattle Tide Lands Grid System and the NAD Grid.

    b.    Horizontal Datum: All bearings and coordinates shall conform to Seattle Tidelands grid.

    c.    Vertical Datum shall conform to Mean Lower Low Water (MLLW).

    d.    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.

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: 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 File:

Base Files contain existing topographic information, survey data. The Base Files contain information that the Reference files are built from.  These files are not to be modified in any way.  These files may come in a variety of filenames and are not to be modified.

3.11.1  Requests for Project base drawings to be used for Port projects shall be made by the Port Project Manager who shall fill out the CAD Drawing Request Forms and submit the forms via the appropriate channels.

## 3.12   Sheet Files:

Model Space view ports (MVIEWS) 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 overlaid 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 Xrefs, 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.

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.

Use the Overlay option for X-referencing.  Overlaying does not allow nested Xrefs.  Overlaying 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    Xref files are never to be bound.  No binding of Xrefs will be allowed.

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    Xref aliases (Reference) names are limited to a maximum of 16 characters, Xref (Reference) names (shall be 16 or less characters) including spaces.
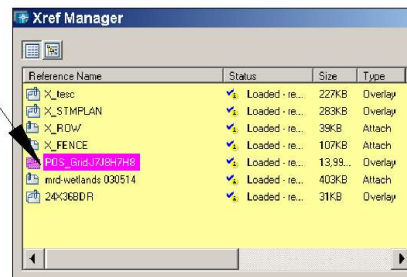


3.13.7    Before submitting projects for Port of Seattle CAD Review check each drawing for orphaned, unresolved, or missing Xrefs.

3.13.8    All Xrefs that are "X-clipped" will be so noted below viewed area in giant text.

3.13.9    Sheet CAD drawing files with a Title Block shall not be used as X-references 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 X-reference, that model 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 Title block that will be used in sheet drawing files. This will prevent nested Xrefs which are not allowed.**

3.13.13 All Xrefs that will be inserted in a Base or Sheet drawing shall follow the Port of Seattle X-Reference Layer tables and protocols.

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 "Xrefs").

- For different Trades that use the same base or Xref drawings to be used as Xref files for sheet file drawings shall have to be renamed.

- This shall be enforced as this will help avoid having duplicate CAD drawings with the same name.

## 3.14 Images:

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

3.14.1 All images shall be inserted in MS (Model Space).

- Each image file to be inserted on its own correct Port named Layer:

Option 1: Example: C_1GEN_ BLDG_ PHTO

Option 2: Example: S_1GEN_STRU_GRPH_PH01

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.)

## 3.15 Not Used

## 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 F, 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.

    e.  If Bluebeam will not be used for the Design Review Process (i.e., review will be conducted with hardcopies), the requirements in sections 3.16.7.c and 3.16.7.d may be waived at the Port Project Manager's discretion.

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# Section 4

# Graphic Standards

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## 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:

| | |
|---|---|
| **Arial** | For Titles, Headings, or Major callouts **(Only)** |
| **Arial Bold** | For Titles, Headings, or Major callouts **(Only)** |
| **Arial** | For **General, all Notes,** Detail callouts and dimension text |
| **Arial** | For **General, all Notes,** Detail callouts and dimension text |
| **Arial** | For **General, all Notes,** Detail callouts and dimension text |

(Refer to Appendix E, Port of Seattle CAD 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, or major callouts use **Arial Bold**.

4.1.5    Do not continue to use the **HMF1** font; it has been found to be corrupted and may not plot as a filled font.

4.1.6    Also do not use any big font text style on any Port project.

Text heights and widths shall be as shown in the following table, to be read in PS.

| Trade/s | Text Height for Notes | Titles/Headings | Dimensions Text | Width for Text |
|---|---|---|---|---|
| Civil & Survey Drawings | 0.125 0.10 minimum | .1875 to .25 | 0.125 0.10 minimum | 1.0% |
| Architectural Drawings | 1/8" 3/32" minimum | 3/16" to 1/4" | 1/8" 3/32" minimum | 1.0% |

Note: the use of **MTEXT** may not comply with the above standards.

## 4.2    Line Types:

Use only standard AutoCAD line types.

## 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 0.125 **(1/8")** 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.

- If the Port of Seattle symbols, blocks and abbreviations do not exist then symbols, blocks and abbreviations approved by AIA, APWA, ANSI and CSI shall be used.

- If blocks are required that are not covered by the Port of Seattle, AIA, APWA, ANSI and CSI, symbols, blocks and abbreviations, the consultant may create their own under the guidelines outlined within this Section. The symbols, blocks and abbreviations must be recognizable by the trade involved and must be submitted to the CAD Standards Review Technician 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 Plan, Section, Elevation, and Detail a Port of Seattle Drawing View Title block shall be used to indicate the specific view that is shown.

## POS DRAWING VIEW TITLES
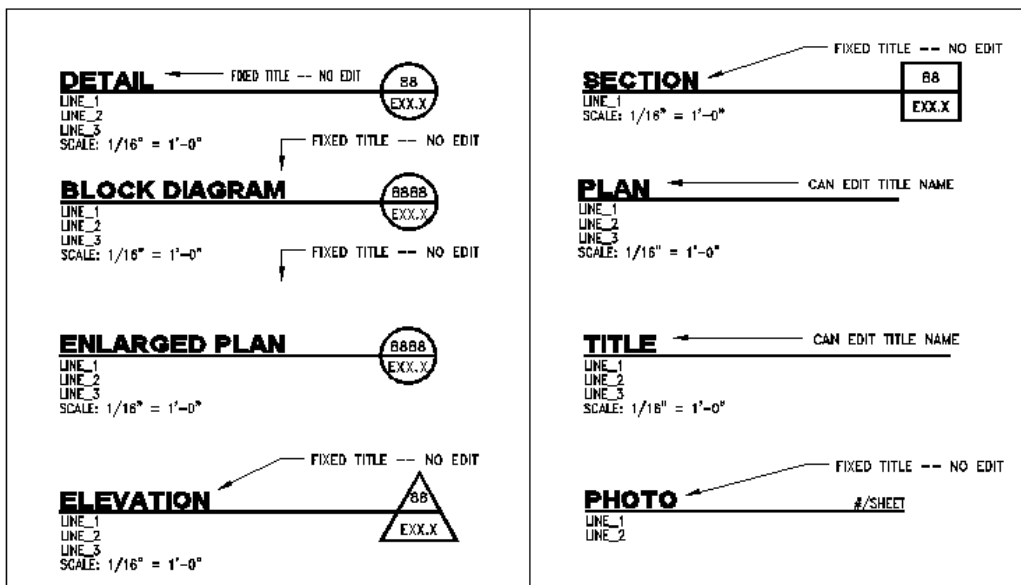


4.6.2    Within each symbol will be a numerical reference and corresponding sheet cross-reference number.  This will eliminate the need for long and repetitive titles and notes. If needed, a more specific subtitle may be added under the generic title.  For example:
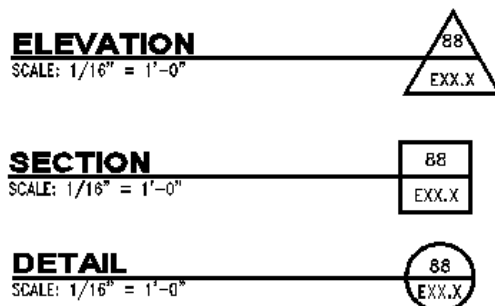
Within PLAN might be included:

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 be used once only throughout a project, all text in the reference symbol shall not overlap with the lines of the symbol, with numerical referencing on the top half of the symbol for:

**ELEVATION**
SCALE: 1/16" = 1'-0"
88
EXX.X

**SECTION**
SCALE: 1/16" = 1'-0"
88
EXX.X

**DETAIL**
SCALE: 1/16" = 1'-0"
88
EXX.X

4.6.5 For those titles that need to show more than one, all text in the reference symbol shall not overlap with the lines of the symbol, Sheet cross-referencing numbers shall occur on the lower left right side of the View Port Title.

**DETAIL**
SCALE: 1/16" = 1'-0"
1
E1.0   E1.1 & E2.0
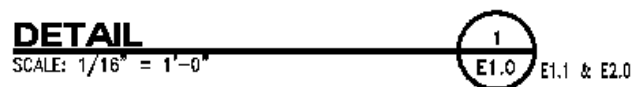
## 4.7 Abbreviations and Acronyms:

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.

## 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.  The reference text should read, (as an example), "MATCH LINE NB 111+50, SEE SHEET C1.0".  It shall be placed perpendicular to plan and profile, outside the limits of drawing coverage.  The lettering height shall be 0.14 inch bold and heavy line weight.

## 4.10 Pen Mapping:

4.10.1 A standard mapping of plotter pens to electronic drawing line colors will be established. All Disciplines producing drawings for this 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 intent.

Please 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 may be rejected.

## 4.12   Line Weights / Pen Widths and Colors:

4.12.1   The following line weights are a guideline to pen weight definitions:

- Extra light        = 0.050 mm
- Light              = 0.100 mm
- Medium             = 0.250 mm
- Heavy              = 0.300 mm
- Bold               = 0.500 mm
- Extra Bold         = 0.750 mm

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# Section 5

# Project Drawing Layout – Sheet Protocols

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## 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 Scales 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 at the lower right-hand corner of the sheets, above the title block area, and just inside the right side of the title block border.

- Sheet Layout information, general notes, symbols, legends, etc.

- Plan View Port Titles, Elevation View Port Titles, Section View Port Titles, and Detail View Port Titles.

- Match lines / Gridlines and Grid Bubbles, 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 Library*. 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.

- A Project Vicinity Map

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 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, then Option 1 may be used (as seen in the illustration below).



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.

COVER SHEET INDEX (OPTION 2)

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 written *exactly* as the Sheet Titles are written 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:

PORT OF SEATTLE NO.

STIA-T0410 S2.0

Rename The P.s. Tab To
Be The Same As The
Trade & Sub-discipline
Letter/s
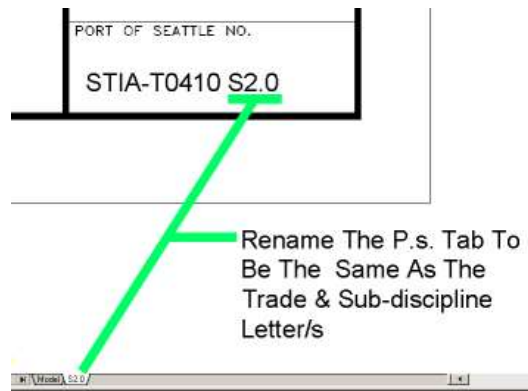
## 5.5 Sheet Notes Placement:

5.5.1   Notes:

    a.   There are two types of notes:

- General Notes and Construction Notes.

- Each shall be unique so that there is no confusion as to which note is being referenced.

- Each shall have a header separating the different types of notes. The 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.

    b.   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:

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

### 5.5.3 Construction Notes/Keyed Notes:

a.     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.     Construction notes shall be numbered consecutively for the project, per discipline and sub-discipline.  However, only the construction notes that are applicable to a particular sheet will be shown on the sheet.  Once you have created a construction note 1 it will always be the same.  Continue sequencing of construction notes consecutively as you add them.

c.     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.

- Viewports to be placed on the correct layer name. i.e., G_1GEN_SHBD_VIEW or Defpoints.

### 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.     Vicinity Plan or Key Map on a plan drawing shall be consistent on all plan sheets.  The Vicinity Plan or Key Map should appear in the inside lower right-hand corner of the title block, below the legend, if used.  The purpose of the Vicinity Plan or Key Map is to show the general area where the work is to be performed.  If the Key Map is the same throughout the set, it can be placed in the Title block, or in a consistent location in all 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    Location Map and Vicinity Plans:

5.8.1    Location Map: A location map is used when a vicinity map does not give enough information on job site location and access.

5.8.2    Vicinity Plan: vicinity plans on a site plan drawing appear to the left of/or below the legend. The vicinity plan (or map) shows the general area where the work is to be performed.

5.8.3    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 area below a viewport.

- Use only Port of Seattle supplied scale bar blocks.

5.8.4 North Arrow

a. 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.
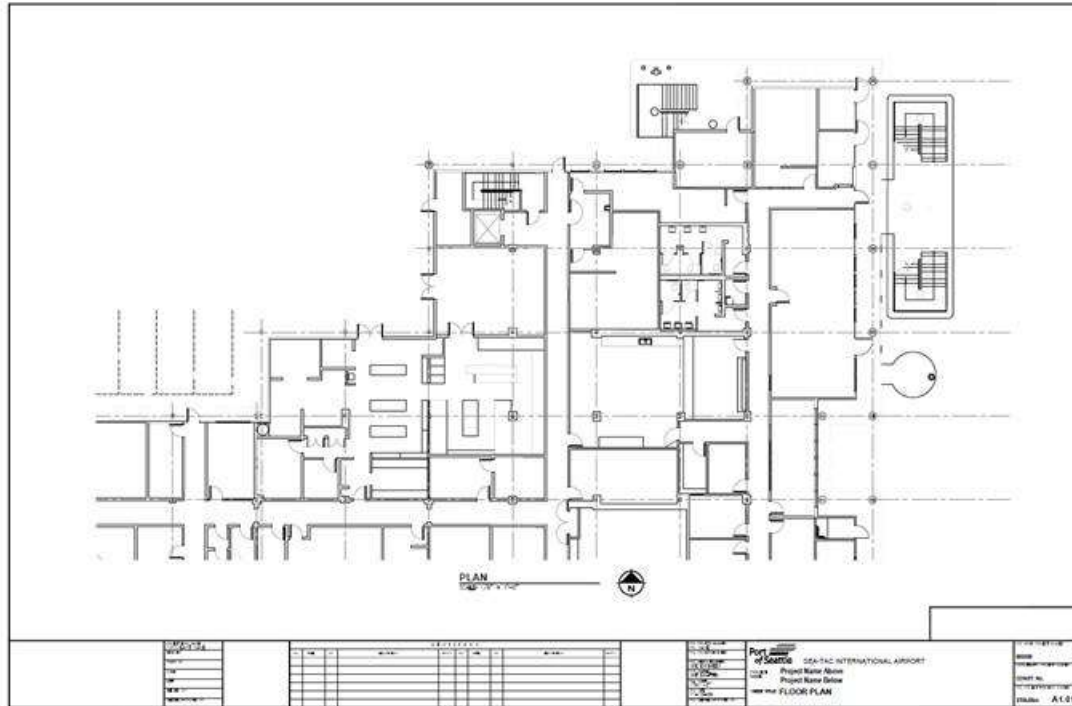


## 5.9 Logos, Stamps and Other Blocks:

5.9.1 Design Team Logos

a. 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 a Xref this action creates a nested Xref in all Xref Title blocks used for sheet drawings. Insert logos as blocks and place on the correct layer name.

5.9.2 Professional Seal Stamps

a. Final documents (e.g., plans, specifications, etc.) shall be stamped with a seal, signature, and date signed at all final document submittals, per WAC 196-23-020 (e.g., as-bid, permit, as-built, etc.). These Stamps should be located in the square box on the left-hand side of the title block. See figure 5.9.2.

- Call B4 U Dig must be inserted in the title block, or just above it. This stamp must be shown on all drawings.
- Contract Block must be shown on the Cover Sheet for the project.

Figure 5.9.2

### 5.9.3 Plot Stamp Date

a. 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 the correct layer.

## 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.

- Detail, section, and elevation numbering starts at the upper top left of the sheet and go horizontally left to right in a sequential order. Then continue to proceed down to the next row numbering from left to right in sequential order.

### 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 horizontally by rows starting at top row, left side of the sheet. Continue numbering horizontally to the right and then proceed down to the next row.

## 5.11 Revisions:

5.11.1 The REVISIONS area of the title block is used to indicate submittal milestones/issuances.

a. Prior to the *Issued for Construction* milestone, alphabetical indicators are used in the **"NO."** column.

b. At *Issued for Construction*, these earlier submittal milestone entries are removed from the REVISIONS area of the title block.

c. After *Issued for Construction*, numerical indicators are used in the **"NO."** column of the REVISIONS area when a sheet or set of sheets is issued with changes.

Example:

| NO. | DATE | BY | DESCRIPTION | APP'D | NO. | DATE |
|-----|------|----|----|----|----|----|
| A | 01/01/2045 | | USE ALPHABETICAL "NO." PRIOR TO ISSUED FOR CONSTRUCTION | | | |
| | 07/29/2046 | | AT ISSUED FOR CONSTRUCTION, REMOVE PRIOR MILESTONES | | | |
| 1 | 02/28/2047 | | AFTER ISSUED FOR CONSTRUCTION, USE NUMERICAL "NO." | | | |

R E V I S I O N S

5.11.2 Revision Deltas and Clouds are used during design and construction phases 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 the *General Plot Sheet Layers* section of *Appendix E*.

## 5.12   Title Sheets:

Use only Port of Seattle standard Cover and Title sheet Blocks for all drawings.

Port of Seattle standard Sheet sizes:

- 24" x 36"
- 22" x 34"
- 11" x 17"
- 8.5" x 11"
- If the project team requires a different size not shown a request must be submitted to the CAD Standards Review Technician for approval.

## 5.13   Project Sheet Blocks:

- Title (Cover Sheet) (no sheet index)
- Cover Sheet with Sheet Index
- Title block (Xref)
- Title Block with sheet index
- Title block Attribute blocks use for Xref Title Blocks

## 5.14 Xref Title Block Sheet Attributes:

### 5.14.1 The Sheet Title Block

a. This attribute block should be filled in upon insertion into each Sheet drawing. Example follows:

- Insert in PS @ 0,0,0.

| Block name: | SHT_TITL_wRev_24X36 |
|---|---|
| SHEET TITLE - LINE 1 | EXTERIOR ELEVATIONS |
| SHEET TITLE - LINE 2 | |
| Discipline Sheet Number | A6.01 |
| CONTRACT DESIGNER | TDD |
| CONTRACT DRAWN BY | TDD |
| CONTRACT SCALE | AS NOTED |
| CONTRACT DATE | |
| CONTR CHECKED BY | MJH |

### 5.14.2 Title Block Attribute Constants

a. The Title Block Sheet block has attributes that are the same on all sheets, or among all sheets from one Consultant. These include the following:

| Block name: | 22x34_Sheet_Project_Info |
|---|---|
| Aviation Project Or Seaport Project | SEA-TAC INTERNATIONAL AIRPORT |
| PROJECT NAME - LINE 1 | SEATTLE - DELTA CONCOURSE B EXPANSION |
| PROJECT NAME - LINE 2 | AND & OTHER ASSOCIATED GROWTH PROJECT |
| POS Work Order Number | U00109 |
| CONSULTANT'S No. | 14056.00 |
| POS Project Number | STIA-T1413 |
| % REVIEW OR PERMIT DRAWING: | 60% DESIGN REVIEW |
| POS PROJECT MANAGER | KERI STEPHENS |

| | |
|---|---|
| Consultant's Overall Project Manager, Engineer, or Architect | To be included on all Port of Seattle projects. |
| Port Project Manager | Include the Port of Seattle Project Manager. |
| Project Title | There are two lines to spell out the full Project Title. This Title should match what is on the Consultant's Contract. |
| Port of Seattle Work Order No. | This is a 6-digit Port of Seattle issued number. This is specifically for the project. |
| Consultant's No. | The design team internal work project number goes here. |
| Port of Seattle No. | The Port of Seattle Design Quality Manager issues this number. |

## 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 that is used to identify a line or a specific object. Typically, text with a leader is drawn in Model Space.

- Hatch and fill patterns.

- Dimensions.

- Room names.

- Object symbols (symbol bugs) i.e., wall type, doors, column types and equipment symbols.

- Diagrams and Schematics. (Including one-line diagrams and electrical circuits 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.

## 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 Engineering (Civil) Units.

5.16.1    Engineering units shall be used for all civil drawings including site plans, 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.

5.16.3    See Section 4, Graphic Standards, for which units to use on which type of sheet.

## 5.17 Scales:

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

5.17.2    See Drawing Layout, this Section 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 |
|---|---|
| 1" = 10' | 3"        = 1'-0" |
| 1" = 20' | 1 1/2"   = 1'-0" |
| 1" = 30' | 1"         = 1'-0" |
| 1" = 40' | 3/4"      = 1'-0" |
| 1" = 50' | 1/2"      = 1'-0" |
| 1" = 100' | 3/8"      = 1'-0" |
| 1" = 200' | 1/4"      = 1'-0" |
| 1" = 300' | 3/16"    = 1'-0" |
| 1" = 400' | 1/8"      = 1'-0" |
| 1" = 500' | 3/32"    = 1'-0" |
| 1" = 600' | 1/16"    = 1'-0" |
| 1" = 1200' | 1/32"    = 1'-0" |
| FULL SIZE | FULL SIZE |

## 5.18 Object Properties:

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

- Do not adjust object properties by entity (forcing colors or line types) unless submitted to the CAD Standards Review Technician 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, 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.

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# Section 6

# Drawing Layer Protocol

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## Section 6 - Drawings Layer Protocol:

**6.1 Layer Naming:**

The Naming Layer Convention is based on the AIA Standard with an addition of one group (Verified Data and Level).  See section 6.3 for more information.

**6.2 Layer Names:**

The purpose of this Section is to explain layer names and to aid in finding the correct layer name needed for each area of work.  Care must be taken to apply the correct root and root modifier to the correct trade discipline area of work.

6.2.1 Layer names must match exactly those outlined within the layer tables in Appendix E, Port of Seattle CAD 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 the Port of Seattle CAD Layer Naming Standards.

6.2.4 All layers to be a maximum of 27 characters only.

**6.3 Definitions of Layer Groups:**

There are six distinct group variables within the layer name.  All layer name modifiers use four letters or numbers.  The only exception is the Trade Name Letter (discipline name), where one or two characters are used.

6.3.1 Trade Name Letter (Discipline Name)

    a. (1 Character) (Alpha) or (2 Characters) (Alpha) if Sub-Disciplines are used

6.3.2 Verified Data and Floor Level:

    a. Verified Data (1 Character) (Numerical)

    b. Floor Level: (3 Characters) (Alpha-Numerical)

6.3.3 Root

    a. (4 Characters) (Alpha)

6.3.4 Root Modifier

    a. (4 Characters) (Alpha) + Port specific (Numerical)

6.3.5 1st Optional Root Modifier

    a. (1 to 4 Characters) (Alpha-Numerical)

    Unless Elements are required for Matching a specific Layer Description then 4 Characters shall be used.

6.3.6 2nd Optional Root Modifier

    a. (1 to 4 Characters) (Alpha-Numerical)

### 6.4 Detailed Descriptions of Layer Groups:

An example of an Architectural Layer is A_1FL2_FLOR_FNSH_MRBL_EXST.  This layer is used in the descriptions of the layer group descriptions below.
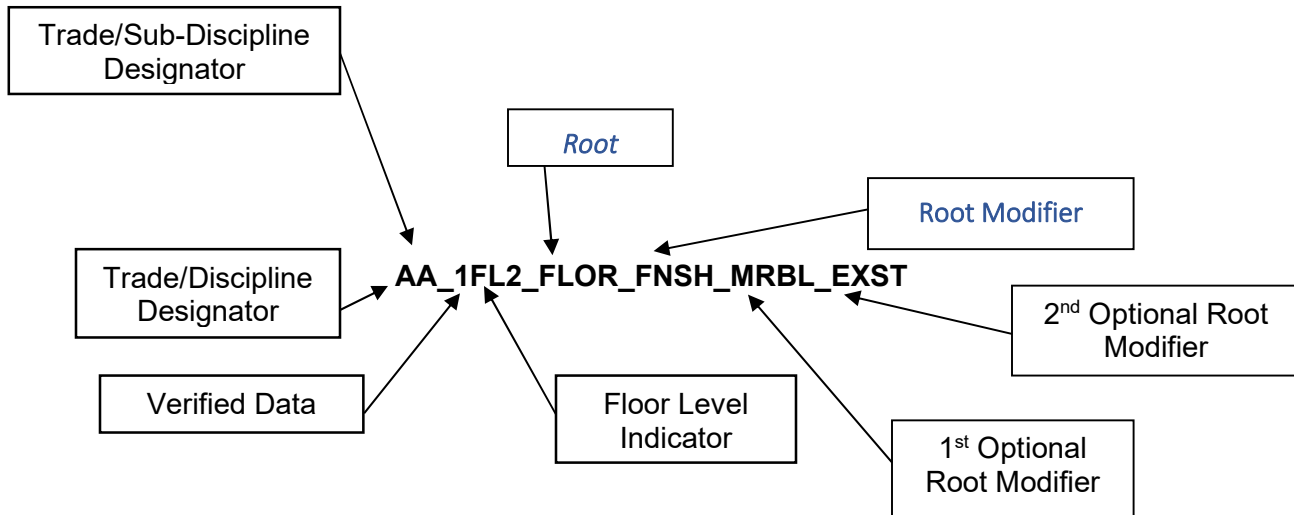


### 6.5 Trade Discipline / Trade Sub-Discipline Designator (1-2 characters):

This group is fixed by the Port of Seattle and generally follows the AIA standard.  Current Port of Seattle approved trade names are as follows:

| Trade Name Designator | Discipline |
|---|---|
| G | General |
| V | Survey |
| C | Civil |
| A | Architectural |
| S | Structural |
| M | Mechanical |
| P | Plumbing |
| F | Fire Protection |
| E | Electrical |
| L | Landscape |
| H | Safety/ (Health Hazard) |
| X | *X-Reference |

*The "X" trade listed above is not an actual trade.  This is shown for layer naming purposes only.

See Section 3.3.2 for a more detailed list of Trade Sub-Discipline Designators.

**6.6    Verified Data and Floor Level:**

This group is divided into two sections. The first character indicates whether the information on the layer is verified or unverified data. The next three characters indicate the floor level.  Examples follow.

**6.7    Verified Data (1 character):**

A_**1**FL2_FLOR_FNSH_MRBL_EXST

This indicates whether the information on the layer is verified or unverified data. Acceptable symbol for the first character in the sequence is a "1" (one) for verified or a "0" (zero) for unverified information. Generally, all work being done outside the Port of Seattle, should be verified (1).

**6.8    Verified (designation '1') Items and Objects:**

- All new design elements.

- New buildings.

- Items that have been field verified by the consultant.

- Items on existing Port of Seattle Master Documents shown as verified.

- Items that have been located by Survey (Port or consultant's sub-consultant).

- Items field verified by another consultant on the project team.

- Items from previous drawings that are shown as verified in the layer name.

- General sheet information, such as title blocks, sheet names, and most legend information.

- Symbols and tags associated with verified objects (e.g., door tags that are associated with verified doors).

**6.9    Unverified (designation '0') Items and Objects:**

- Items that do not fit in the above description for verified.
- Items on existing drawings shown as unverified.
- Items on existing Port of Seattle Master Documents shown as unverified.
- Future or proposed work.
- Symbols and tags associated with unverified objects (e.g., door tags associated with unverified door locations or type)

**6.10    Survey Reference Points (X):**
- To be used by survey design groups (only).

## 6.11 Floor Level Indicator (3 Characters):

A_1**FL2**_FLOR_FNSH_MRBL_EXST

This group is fixed by the Port of Seattle.  Requests for clarification or additions shall be submitted to the CAD Standards Review Technician for approval.  Refer to the following chart for examples of level designators.

| Level Designator | Description |
|---|---|
| GEN | General:  items without a floor level (items not associated with a plan such as notes, details, etc.) |
| GRD | Ground:  at grade roadwork including short viaducts, sidewalks, objects less than 30" above grade, roadway and sidewalk appurtenances (e.g., jersey barriers and guardrails), ground cover (grass, small bushes) and outside furniture. |
| UDG | Underground:  foundations, pilings, underground work, vaults, utility lines and tunnels. |
| ABV | Above Ground:  elevated roadways supported by columns, bridges, roads higher than 16'-6" above adjacent grades, objects greater than 30" above surrounding grade (signage, lights, flag poles, above ground utilities, trees) |
| FL1 | Building 1st Floor |
| FL2 | Building 2nd Floor |
| FL3 | Building 3rd Floor |
| FL4 | Building 4th Floor |
| RMP | Ramp |
| MEZ | Mezzanine |
| PEN | Penthouse/Roof |

## 6.12 Root (4 characters):

A_1FL2_**FLOR**_FNSH_MRBL_EXST

This group is fixed by the Port of Seattle and generally follows the AIA standard.  Additions shall be submitted to the CAD Standards Review Technician for approval.

## 6.13 Root Modifier (4 characters):

A_1FL2_FLOR_**FNSH**_MRBL_EXST

This group is fixed by the Port of Seattle and generally follows the AIA standard.  Changes or additions shall be submitted to the CAD Standards Review Technician for approval.  All layer names are expected to comply with the Port of Seattle CAD Standards through the root modifier.

## 6.14   1st Optional Modifier (1-4 Alpha-Numerical Characters):

A_1FL2_FLOR_FNSH_**MRBL**_EXST

If the optional modifier is available, the consultant may use this field on an as-needed basis. Although common optional modifiers are listed in the table below, it is the user's discretion as to what one to four characters they choose to best represent the object, which will reside on the layer.

| Optional Modifier | Description |
|---|---|
| **EXST** | Existing work |
| **DEMO** | Demolition work |
| **HIDN** | Hidden line type |

## 6.15   2nd Optional Modifier (1-4 Alpha-Numerical Characters):

A_1FL2_FLOR_FNSH_MRBL_**EXST**

A 2nd optional modifier may be used for clarification or description purposes. This extra modifier can use up to a maximum of 4 characters. The suggestions preceding for the 1st optional root modifier can be used, or any 1 to 4-character combination of the user's discretion.

## 6.16   Requesting Additions to the Layering Standards:

The consultant may request that layers be added to the Port of Seattle CAD Standards. Notify the CAD Standards Review Technician in writing or email requesting a new layer name. Requests may be refused if not in the best interest of the Port of Seattle. Reasons for approving new layers include the following:

- Adds to the clarity of the construction documents.
- Increases the future flexibility of the CAD document.
- Applicable to a variety of projects
- Required to complete the design work.
- Assists in coordinating the work between disciplines.

6.16.1   No new layers may be on the final or as-built submittals without prior approval of the CAD Standards Review Technician. Review for conformance shall be based on Port of Seattle CAD Standards in effect when the design work is initiated and shall be documented during the CAD kickoff meeting. A denial of a request is not considered cause for scope adjustment.

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# Section 7

# Drafting Document Lifecycle

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## Section 7 - Drafting Document Lifecycle:

**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 CAD Standards Review Technician supports and assists designers/CAD technicians on Port of Seattle engineering projects and enforces 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    Submit PDFs and CAD in compliance with Appendix F, Design Submittal Deliverable Flowcharts. See Appendix H, AutoCAD, and PDF Submittals Checklist, for AutoCAD and PDF submittal checklist.

**7.2    CAD Kickoff Meeting:**

7.2.1    Before initiating drawing production work, the Port Project Manager shall instruct the consultant's representative to contact the CAD Standards Review Technician. The CAD Standards Review Technician will provide the consultant's representative the Port of Seattle CAD Standards.

7.2.2    The main purpose of the meeting is to familiarize consultants with the Port of Seattle CAD Standards. Requests for archive CAD Documents shall be made by the Port Project Manager who shall fill out the CAD Drawing Request Forms and forward the forms to the CAD Standards Review Technician.

### 7.3 Requests for Master Documents:

Requests for archive CAD Documents shall be made in writing or by e-mail by the Port Project Manager to the Port of Seattle CAD Standards Review Technician.

7.3.1 Requests for archive CAD Documents for aviation and maritime projects shall be made through the Port Project Manager. The following information shall accompany the request with a request form.

- Project Name
- Port of Seattle Project Tracking (Drawing) Number
- Contract Number
- Port Project Manager
- Requested Sheet Numbers

### 7.4 CAD Drawings Compliance Review:

7.4.1 The Port of Seattle may comment on any information that is submitted. As a general rule, the main 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.

See Section 5.20 Directory Structure for folder requirements. All CAD and CAD support files for all disciplines to be submitted in one folder, with no subfolders or sub zipped folders.

7.4.2 Requests for reviews shall be made to CAD Standards Review Technician by email through the appropriate Port Project Manager. The request shall include the following information:

- Project name and number.
- Contract number.
- Project manager.
- Type of work being done.

- Location of project.

- Consultant's representative.

- Anticipated date (month/year) of contract document completion.

- Number of files.

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 for PDF 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 in the Engineering Document Management System. Signed hard copies <u>and</u> electronic CAD files shall be submitted prior to project advertisement for bid.

See Section 3.16 PDF Documents for PDF Document requirements.

7.4.5    Ready to Bid Submittal

Documents will be issued for Bid by CPO

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# Section 8

# Record Drawings

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## Section 8 - Record Drawings

### 8.1    Design Stage:

During design, submittals are made to the CAD Standards Review Technician for review for conformance to the Port of Seattle CAD Standards.  The intent is to catch non-conformances at an early stage to minimize the burden on the designer in making corrections at a late stage in the preparation of the documents.  Hard copy is not required during design.

### 8.2    Permit Stage:

Permit submittal may be stand-alone or combined with 90% or 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 (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 in the conformed CAD set of documents for use by the contractor as the as-built set/redline set.

### 8.4    Construction Stage:

Project as-built document maintenance 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, 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 set of drawings shall be prepared from the as-bid contract documents and provided to the contractor for marking up changes occurring during construction (redline set).

8.6.3    Contractor marks up the 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 drawing set.

8.6.4    Typically, the Port Engineer reviews for completeness and accuracy and accepts the redlines.

8.6.5    The Port Project Manager contracts with an entity, typically the Designer of Record, for production of CAD record documents.  The Port provides the entity with the CAD files of the conformed drawings and the contractor's redline mark-ups on the hard copy of the conformed set.

8.6.6    Prior to production of CAD record documents, the entity selected for production of the documents meets with the CAD Standards Review Technician, to review processes and submittal requirements, and to ensure an understanding of the Port's requirements for CAD Standards.

8.6.7    Complete CAD record documents in accordance with requirements indicated in Section 7, Drafting Document Lifecycle.

8.6.8    Upon completion of the CAD record documents, the consultant submits the completed work to the Port of Seattle CAD Standards Review Technician for review and acceptance. The consultant makes changes requested and resubmits the final documents.

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.


## 8.7    Preparation of CAD Record (As Built) Documents:

8.7.1    As-built record drawings must be compliant with all Port of Seattle CAD Standards. In addition, there are further procedures required for preparing the files specifically for as-builts.

   a.   Check CAD compliance reviews from all submittal milestones and ensure that all noted issues are addressed.

   b.   All contractor redline drawings and sketches must be incorporated into the project drawing set.

   c.   Adjustments to traffic control plans and construction phasing drawings made during construction are not required to be reflected in as-builts, 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 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 as-built drawing set.

   f.   All sheets in the conformed set are required to be kept in the set whether changes are made or not.

g.  Added sheets to the drawing set during construction must be included with the as-built set and must be reflected accurately in the sheet index.

h.  The cover sheet must have the as-built cover block (ASBLTCVR.dwg) displayed. It is provided in the cover sheet template and will appear in the correct location when thawing layer G_1GEN_SHBD_COVR_ASBT. Provide the as-built date in this cover block and ensure it is the same as the date found in the as-built stamps for the title blocks.

i.  The as-built stamp 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_1GEN_SHBD_STMP_PSST. Edit this stamp with the as-built date, ensuring this date is the same on all sheets.

j.  Professional stamps must be removed from all sheets.

i.  PDF as-built files shall be submitted stamped with a seal, signature, and date per WAC 196-23-020.

ii.  CAD .dwg as-built files must be submitted with the stamp removed.

k.  All information in the REVISIONS area of the title block is to be completely removed by deleting it from the block attribute fields with command: ATTEDIT.

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 G, Bluebeam Design Review Flowcharts.

8.8.3   PDFs shall be formatted in accordance with Section 3.16 PDF Documents.

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# Section 9

# Construction Document Management System (CDMS)

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## 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 easy retrieval.

### 9.2　Application to Record Documents

9.2.1　The CDMS is used for all contract communications, submittals, 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 documents to clarify the as-built condition if necessary and if 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*.