

CAD STANDARDS & PROCEDURES

Version 2.1



**THE NORTHWEST
SEAPORT ALLIANCE**



Preface

The information contained in this document is intended for all CAD work completed for the Port of Tacoma (Port) or the Northwest Seaport Alliance (NWSA), internally or by contract. When we reference “the Port” within this document, we are referring to both Port of Tacoma and NWSA.

The purpose for developing the CAD Standards & Procedures is to maintain consistency throughout the drawings for the Port. This helps provide well managed plans to port personnel and consultants for project needs. These standards allows the data within drawings to be easily transferrable into GIS. All consultants that provide plans to Port shall adhere to these standards. Drawings that do not comply with these CAD Standards & Procedures will not be accepted.

The Port will create, manage, implement, and provide the CAD Standards & Procedures for all the Port’s consultants that provide CAD plans to the Port of Tacoma or the NWSA.

The Port’s CAD Department is committed to providing their customers and clients with the highest standards and best practices. This is a dynamic document that will change as CAD and GIS evolves in response to the Port’s innovation and direction, customer needs, available resources, and technological growth. Consultants are responsible to stay informed and ask for the latest revisions of the CAD Standards & Procedures when they work on new projects for the Port.

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	NCS Office Address National Institute of Building Sciences (NIBS) 1090 Vermont Avenue NW, Suite 700 Washington, DC 20005 202-289-7800 202-289-1092 Fax.....	40

Chapter 1 - Plan Development

1.0 Files for Consultants

The most current files and CAD Standards for consultants to use in the creation of engineering plans will be on the Port website and can be downloaded at any time. See the link below to obtain the CAD Standards and the related design files. These files and procedures should be used on all plan deliverables developed for the Port of Tacoma and/or the NWSA.

Files that may be used for plan development include the following. Please see Appendix A for all the associated files.

- a. Port CAD Standards
- b. Port Titleblocks
- c. Port CAD Master Block Library
- d. Port CAD Master Linetypes
- e. Port CAD Call-Outs and Labels
- f. Port Standards DWG Checker
- g. Port CAD Standards Proposal Worksheet
- h. Port CTB Files

<https://portoftacoma.com/contracts/forms>

1.1 Requesting plan files or data from the Port

Consultants may request specific CAD or GIS Data from the Port if available. The consultant should be clear on what they exactly need from the Port. When asking for base data, consultants should be specific with the items needed.

Data received from the Port is provided for the convenience of the recipient only and should not be misused or redistributed without approval from the Port. Data provided may have been gathered from a variety of sources, and it may or may not conform to current CAD or GIS standards set forth by the Port. Let it be understood that data may be incomplete or may not accurately reflect current conditions. The Port makes no representation as to the completeness or accuracy of the data. Consultants should keep in mind that CAD or GIS data may appear to be accurate because it is computer-generated; however, its appearance does not guarantee that the data truly represents existing conditions.

1.2 Plan development phases

During the plan set development by consultants, plan submittals will be determined by the project manager. The following are the typical plan document phases that may be used throughout plan development.

30% Design

At the Project Manager's Discretion, an initial review of the drawing files may be made at this time to determine conformity to the Port of Tacoma CAD Standards.

60% Design	<i>A review of the drawing files will be made at this time to determine conformity to the Port of Tacoma CAD Standards. An emphasis on Port Layers, Port Symbols (Blocks), Port Object Tables, and Port Linetypes will be looked at and changes will be required by 90% Design.</i>
90%/100% Design	<i>A last review of the drawing files will be made before the Bid Set to determine conformity to the Port of Tacoma CAD Standards. All aspects of the drawing files will be looked at with emphasis on Port Layers, Port Symbols (Blocks), Port Object Tables, XRefs, and Port Linetypes. If changes are required, they will be made by the consultant at no further expense to the Port and completed within a timely manner. Final changes must be accepted by the Port of Tacoma.</i>
Bid Set	<i>Bid Sets are signed and stamped by the Engineering Consultant and signed by the Director of Engineering. These must be provided to the Port of Tacoma's in the accepted formats.</i>
Conformed Set	<i>Sheets that are Revised and go into the Bid Set to replace what is there are signed and stamped by the Engineering Consultant and signed by the director of Engineering. These must be provided to the Port of Tacoma in the accepted formats.</i>
Construction Set	<i>These are plans that are issued for construction and go to the contractor for use in the field.</i>
As-Built Set	<i>These plans are the markups provided by the construction contractor.</i>
Record Set	<i>As required by the project scope, a record set will be provided to the Port in the accepted formats listed within this standard. The record set of drawings is developed from the construction contractor as-built set and includes redlines, clouds and edits updated within the plans so that they are now part of the final document. A review of the drawing files will be made to ensure as-builts are incorporated in compliance with the CAD standards. If changes related to the non-conformance to the CAD standards are required, changes will be made by the consultant at no further expense to the Port.</i>

1.3 Other plans (These plans may be needed at any time during the project)

Conceptual drawings	<i>A drawing concept, plan, or graphic typically developed before the project begins. These drawings are not required to follow the Port's CAD standards.</i>
Permit Drawings	<i>Drawing typically made for an Environmental Permits, such as a SEPA or JARPA. These plans are developed from engineering plans or Port base data so they should already conform to Port CAD Standards.</i>

Survey Drawings	<i>Drawings are developed from any survey work done at the Port. Drawings are stamped and signed by the licensed surveyor. A review of the drawing files will be made to determine conformity to the Port of Tacoma CAD Standards. An emphasis on Port Titleblocks, Port Layers, Port Symbols (Blocks), Port Object Tables, and Port Linetypes will be looked at. If changes are required, they will be made by the consultant at no further expense to the Port and completed within a timely manner. Final changes must be accepted by the Port of Tacoma.</i>
Vicinity Map	<i>Typically a plan that shows the Port Area and project location. These are typically done internally.</i>
Working Drawings	<i>An internal drawing that is made in relation to an Engineering Project for a specific purpose. These drawings have no bearing on the engineering plans.</i>

1.4 Plan Review

It is important for the Port to review all DWG Files (AutoCAD) as early as possible to allow for the consultant to make necessary changes if needed. The Port's Project Manager will determine when the first review is completed. All projects with plans will be reviewed for compliance before the bid set is developed. An emphasis on Port Layers, Port Symbols (Blocks), Port Object Tables, if the drawing is setup in the correct datum, text styles, linetypes, xrefs, the use of paper space and model space, dimensions, and hidden items will be looked at and changes will be required by the next plan phase. A final review will be done when the record set is provided before acceptance.

It is vital that project plan files go through a review process to determine conformity to the Port's CAD Standards. The CAD Standards are setup to compliment the Port's GIS system. Therefore, every effort should be made to follow the CAD Standard to allow for ease of use and transfer of the CAD data into the GIS System. Port Layers, Port Symbols (Blocks), and Port Linetypes are crucial to follow. The Layer standards are setup to separate out points, lines, and polygon information, as well as text. Use symbols from the Port master block library as they are the standard blocks used by the Port, and may have object tables attached to them. This will greatly reduce clutter and allow for consistency throughout all Port drawings and deter the use of multiple symbols for one object within base plans.

For layers, symbols, or linetypes that are needed to be used by the consultant, but are not within the Port CAD Standards, requests for additions or changes to the CAD Standards can be made by the consultant. These additional symbols, layers, and/or linetypes will need to follow the same naming structure set within the CAD standard. They will need to be determined if appropriate before or at the review phase of the project so that they can be used, or other considerations need to be made.

Every effort must be made by consultants for the Port to reduce drawing file size. It is the responsibility of the consultant to clean up the drawings as best as possible and organize project drawing information coherently to maintain reasonable file sizes. Major contributors to excessive file sizes are unreferenced blocks, unused layers & line styles, unused font styles, overlapping lines, redundant line work and hatches. Files are to be PURGED and AUDITED before deliverables are received by the Port to remove

unnecessary data and reduce file size. Also, detach any unused XREFs within drawings, and keep XREFs at a minimum for project drawings sent to the Port. Remove any unnecessary or unused files within these project folders.

Drawing deliverables that are sent to the Port should be cleaned up so that information within the drawings is compliant with the Port's CAD Standards and Procedures.

1.5 Plans and CAD file data deliverables.

The Port currently uses AutoCAD Civil 3D Release 2017. We require that all of drawing deliverables submitted to the Port are to be saved within .DWG format in version 2014 of AutoCAD. Drawings that consultants submit to the Port must be accurate and conform to the current CAD standards. The Consultant must verify any data that the Port provided to the consultant for accuracy. When this data is returned to the Port it must conform to the CAD standards. The Port will validate all CAD data and other materials that the consultant submits prior to project completion. If submittals do not conform to the CAD Standards, the Port can ask for corrections to be made without additional costs or the Port can reject the submittals from the consultant. The consultant will be responsible for all revisions to the plans to make them conform to the Port CAD Standards. Consultants shall ensure that their sub-consultants follow the Port CAD Standards too.

Bid Set Plans & Record Drawings for projects must be provided to the Port in the following formats as determined by the project scope. The project scope will determine the requirements for other submittals

1.5a How to deliver

Files may be delivered over an FTP site or through a consultant's web enabled download page. Any other method must be approved by the Port before proceeding. Files can be zipped to bundle the drawing set for ease of delivery and reduce file data size.

1.5b What to deliver

What to deliver

1. At 30% Design, 60% Design, 90% Design

DWG or PDF Files may be requested at any time for review. Review periods will be set by the Port's Project Manager.

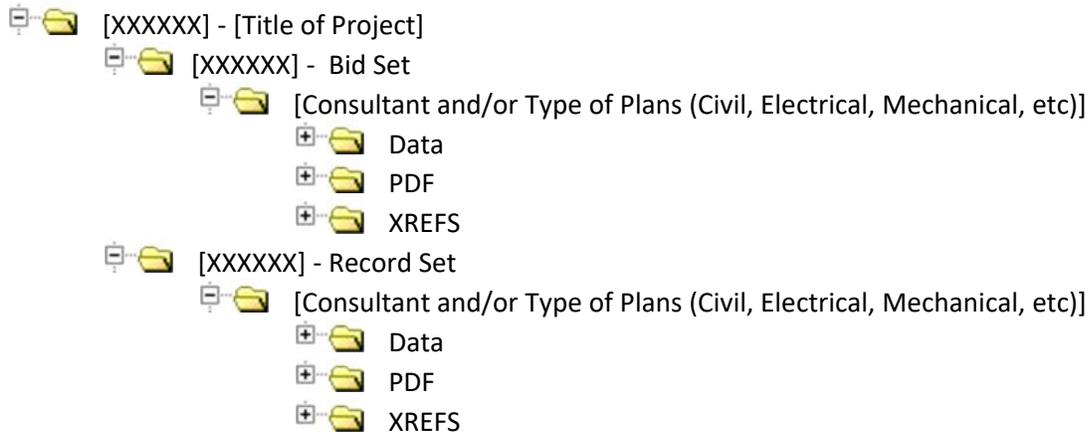
2. At BID Set & at Record Set

DWG files will be provided as indicated within this document. These files shall be formatted to print to Ansi-D (22x34) at full scale and 11X17 for a ½ scale set when submitted to the Port. All paths to XRef drawings shall not be broken. No engineer's stamp or signature is needed on these files.

PDF files will be provided as indicated within this CAD Standard. These files shall be formatted to print to Ansi-D (22x34) at full scale and 11X17 for a ½ scale set when submitted to the Port. The drawing sheets will be PDF's broken out into individual files. An engineer's stamp or signature is required on these files.

1.5c Drawing File Naming Convention and Folder Structure

All project drawing deliverables shall be provided to the Port in the following folder structure. The consultant shall only provide folders that are applicable for each submittal. If only one submittal and one file type is provided, the folder structure is not required. The following are examples of how project drawing folders should be named, organized and submitted. For large projects, subdirectories may be created to separate out the drawing disciplines, such as Civil, Electrical, Survey, etc.



Example:

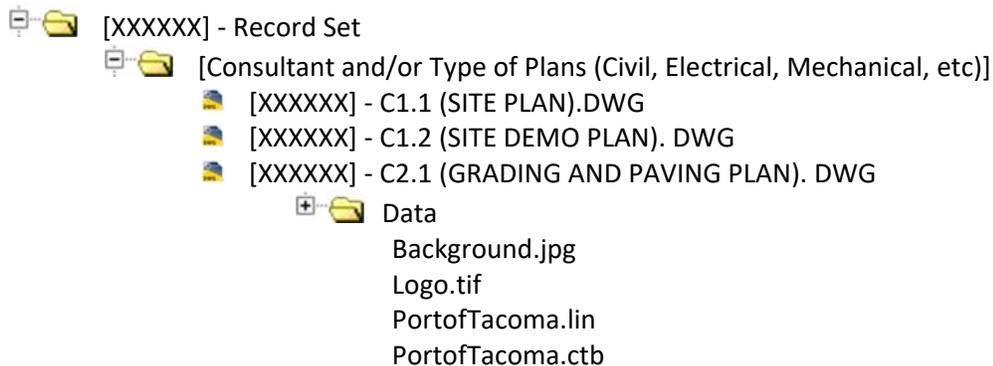
[XXXXXX] = Master ID # the consultant will receive from the Project Manager.

[Title of Project] = The title of the project the consultant will receive from the Project Manager.

[Consultant and/or Type of Plans (Civil, Electrical, Mechanical, etc)] = This can be either the consultant name if there are multiple consultants (subconsultants), and/or the type of drawings that are done such as Civil, Electrical, Mechanical, Architectural, etc.

1.5d File Naming Convention

All project drawings that are delivered to the Port are to be provided in the following manner. The following are examples of how project drawing files should be named and organized under the project folders. The development and organization of the folder structure will be managed by the Port. The consultant shall name their files according to the following:



-  PDF
 -  [XXXXXX] - C1.1 (SITE PLAN).PDF
 -  [XXXXXX] - C1.2 (SITE DEMO PLAN). PDF
 -  [XXXXXX] - C2.1 (GRADING AND PAVING PLAN). PDF
-  XREFS
 -  [XXXXXX] – TB 22X34 P-XREF.DWG
 -  [XXXXXX] – TB 22X34 P-BLOCK.DWG
 -  [XXXXXX] – TB 22X34 CONSULTANT.DWG
 -  [XXXXXX] – PORT MSTR BLOCK LIB.DWG
 -  [XXXXXX] – XE-BASE.DWG
 -  [XXXXXX] – XE-UTIL.DWG
 -  [XXXXXX] – XP-DEMO.DWG
 -  [XXXXXX] – XP-KEY.DWG
 -  [XXXXXX] – XP- UTIL.DWG
 -  [XXXXXX] – XP-TOPO.DWG

Example: (Drive):\...\098074 - Record Set\PDF\098074-C1.1 (SITE PLAN).pdf

- Drawing .DWG Examples: 098074 -E1.1 (ELECTRICAL SITE PLAN).dwg
- Drawing .PDF File Examples: 098074 -E1.1 (ELECTRICAL SITE PLAN).pdf

Chapter 2 – Sheets

2.0 Sheet Size Format

There are only two sheet size formats for engineering project drawings that should be used by outside contractors, consultants, and A/E firms. These sizes are listed below and will be the only sizes that are accepted by the Port. Hard copy plans should be provided on bond or coated paper only.

- Full scale size = 22x34 (ANSI D)
- ½ scale size = 11x17 (Half Scale Set)

2.1 Sheet Designation

Sheets shall have no more than 5 characters within their designation. This naming designation is originated from the NCS (National CAD Standard) and closely resembles the national standard.

- The sheet designation should be limited to 5 characters. The Port’s Plan Database only supports 5 characters.
- Besides the first letter in the sheet designation, the rest of the sheet designation should be limited to numbers. Periods can be used for separation, but there will be no use of letters, symbols, or other characters in the rest of the sheet designation. Periods (if used) will be 1 of the 5 characters in the sheet designation.

Example: This example indicates that this is Sheet 1.0 of the General Notes.



The following list consists of the drawing sheet designations for the project disciplines at the Port. These will be the designations to use on the Port CAD Titleblocks.

<u>Sheet Designation</u>	<u>Discipline Description</u>
A	All Architectural, Interiors, Space Planning, Related to Building Design
C	Civil
D	Demolition
E	Electrical, Fiber, Telecommunications
F	Fire Protection
G	Cover page, Sheet Legend, General Notes, Etc.
H	Hazardous Materials
I	Interiors
L	Landscaping, Irrigation
M	Mechanical
P	Plumbing
Q	Equipment
R	Rail
REF	Reference drawings
S	Structural
TF	Traffic
SV	Any Survey, Topography, Bathymetry, Mapping

2.2 Sheet Organization

Plans shall be organized so that numbering of the sheets should always be in chronological order. Plans may not necessarily reflect the numbering below, for example: If there are no “sections” in the plans then the “details” can be numbered starting with a 3 instead of 4. The organization of the numbering beyond the sheet designation may be defined by the consultant.

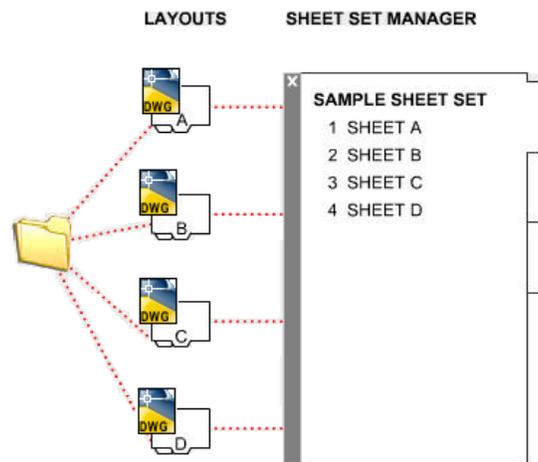
0	GENERAL
1	PLANS
2	ELEVATIONS
3	SECTIONS
4	DETAILS
5	SCHEDULES & DIAGRAMS
6	PHOTOS
7	REFERENCE DRAWINGS
8	USER DEFINED
9	USER DEFINED

2.3 Sheet Legend

A sheet legend or “drawing list” must always be provided within the plan set even if there are only a couple of sheets within the set. A sheet legend for the project drawing set must be listed either on the cover page if there is room or the next page/s within the plan set if the list is larger.

2.4 Sheet Set Manager

Sets of drawings are the primary deliverable for most design groups and communicate the overall design intent, documentation, and specifications for the project. However, managing sets of drawings manually can be complicated and time consuming. Sheet Sets are an accepted method of organizing a projects sheets by the Port. By developing a sheet set with the sheet set manager, you can manage drawings more efficiently as *sheet sets*. A sheet set is an organized and named collection of sheets from several drawing files. A sheet is a selected layout from a drawing file. You can import a layout from any drawing into a sheet set as a numbered sheet.



You can manage, transmit, publish, and archive sheet sets as a unit.

2.5 Sheet Set Protocol

Sheet sets may be developed for project drawing packages that are developed for the Port. If a Sheet Set File is generated for a set of project drawings, the Sheet Set File must be placed in the same directory as the main DWG Files. A sheet set should be developed so that each drawing sheet is setup ready to plot in the paper space environment at half scale.

Chapter 3 – Titleblocks

3.0 Titleblocks

All Drawing Files submitted to the Port shall have the standard Port titleblock. This titleblock will and should always reside within the Paper Space of each drawing. Each titleblock has attribute tags that are what makes up the records of each drawing. These attribute tags on each titleblock need to be filled out completely for the drawings to be accepted by the Port. Consultants are responsible to stay informed and download the most current Port titleblock and coversheet. There shall be no modifications or additions to the Port's titleblock except for the addition of the consultant logo and stamp.

3.1 Parts of a Title Block

- **Drawing Number (EP#) = A drawing number is needed for each project.** Contact the Port's Project Manager (PM) for this number. This number identifies the plan set within the Port plans database.
- **Sheet Name Designation** = Sheet Designation Letter and the number of that sheet set.
- **Sheet Number** = Number within a drawing set. Example: (1 of 20)
- **Master ID Number or Project Number (#####)** = the Project Number provided by the Port's PM.
- **Phase** = Drawing Phase: Conceptual, 30% Design, 60% Design, 90% Design, Bid Set, Conformed Set, Construction Set, Record Set, Survey. **These should be the only designations used for phase.**
- **Project Title**= Main Project Title
- **Project Description** = Project Title Description (if needed, or Main Project Title can go here.)
- **Sheet Title** = Discipline Description IE: (General Notes, Structural, Electrical, Utilities, Mechanical, Survey, Civil, Etc.)
- **Sheet Subtitle** = Discipline Description Subtitle (if needed)
- **Port Address** = The Port's Address or the known address of the project within the Port.
- **Datum** = Horizontal & Vertical Datum defined by the Port (WA83-SF).
- **Parcel #** = The Port Parcel Number provided by the Port's PM.
- **Drawing Scale** = A scale should be designated by sheet or put "N/A" if bar scales or various scales are used on a sheet or the drawing/s is not to scale.
- **Township/Range/Section** = The Township, Range, Section put forth by the Public Land Survey System (PLSS) and the U.S. Geological Survey (USGS) for the project area.
- **Approved** = The Port's Director of Engineer's Signature for approval.
- **Checked By** = The Consultants Plan Checker's Initials and Date of Initials.
- **Project Engineer/Date** = The Consultants Project Engineer's Initials and Date of Initials.
- **Director of Engineering/Date** = The Port's Director of Engineer's Date of Signature.
- **Printed By** = This is automatically generated and is setup this way within the titleblock. Each time the sheet is printed it will capture the user's name.
- **Revisions** = Any revisions done or asked to do by the consultant to the Bid Set. (All revisions shall be clouded and depicted by a triangle with the revision number inside it.)
- **Port Logo & Address** = The Port's logo and address is automatically placed within the titleblock.
- **Engineers' Stamp** = Washington State Board Registered Professional Engineer or Land Surveyor Stamp or Seal signed at the Bid Set and Beyond.
- **Consultant Logo & Address** = The consultant's logo and address will be placed next to the Port's logo and address in the title block by the consultant.

WUT GATE IMPROVEMENTS COVER SHEET

6497
G1.0
SHEET #1 OF #19

CONT/CONS: 069475
M. ID: 091237
PHASE: 90%

TOWNSHIP: DAT-HRZ: W483-SF
PARCEL: 30

RANGE: MLLW 19.39' @ Tide 22 1933
VERT: [DRAWING SCALE], AS NOTED

SECTION: [DRAWING SCALE]

DIRECTOR ENG. DATE: [DATE]
PRINTED BY: bercher Jul 26, 2012
PORT ADDRESS: ONE SITCLIM PLAZA
TACOMA, WA 98401-1837

APPROVED: [DATE]
CHECKED BY: [DATE]
PROJECT ENGR: [DATE]

PORT DIRECTOR OF ENGINEERING APPROVAL

CONSULTANTS CHECKED BY

CONSULTANTS PROJECT ENGINEERS APPROVAL

LOCATION OF ENGINEERS STAMP

MARK: REVISION: [BY: DATE]

REVISIONS

LOCATION OF CONTRACTORS NAME, ADDRESS, PHONE, NUMBER & LOGO

PORT ADDRESS

PORT LOGO

TOWNSHIP, SECTION, RANGE (WHERE PROJECT IS LOCATED)

PROJECT TITLE

DICSPLINE OR SHEET TITLE

SHEET TITLE

SHEET NUMBER

DRAWING NUMBER

SHEET NAME DESIGNATION

DRAWING SCALE

DRAWING DISCLAIMER

PORT PARCEL NUMBER

CONTRACT NUMBER

PROJECT NUMBER

DRAWING PHASE

THIS DRAWING IS THE PROPERTY OF THE PORT OF TACOMA AND SHALL NOT BE USED ON OTHER WORK, DISCLOSED, COPIED, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION

3.2 Titleblock Proprietary

The Port's titleblock should be treated like the Port's logo and should not be modified or altered in any way without permission from the Port.

Chapter 4 – Drawing Environment

4.0 Model and Paper Space

There are two distinct working environments, or “spaces,” in which you can create objects in an AutoCAD drawing. These are represented by the Model (Model Space), and Layout Tabs (Paper Space). A drawing can have several layout tabs or just one layout within it. These layout tabs are within the paper space views of a drawing.

There are several benefits to switching between model space and paper space to perform certain tasks. It is the Port’s standard to use model space for creating and editing your drawing model, and use paper space for composing your drawing sheet, defining views, and plotting. See below for more detail.

4.0a Model Space

Model space is AutoCAD’s working mode for developing the drawing. The drawing is always drawn in model space and at full scale (1:1). Any additional items that help define the drawing data such as details, schedules or sections must also be drawn at full scale in model space. This information then can be scaled to fit within a sheet in the paper space view. All dimensions and text shall be drawn in Model Space as well.

4.0b Paper Space

Paper space enables you to take the drawing what was drawn in model space and create a variety of views for plotting at different scales. Each paper space layout represents a sheet to be plotted at a designated scale. Viewport/s are created in paper space and scaled to fit at certain scales on the sheet. General project graphic elements such as titleblocks, legends, callouts and labels, plan titles, and sheet specific notes should be drawn or inserted as blocks within paper space. Dimensioning should be done in model space and should only be used in paper space when appropriate.

4.1 Layout

A drawing can have multiple layout tabs or just one layout within it. These layout tabs are within the paper space views of a drawing.

4.2 Layout Viewport

You can create a single layout viewport that fits the entire layout or create multiple layout viewports in the layout. When you create a layout, you can add layout viewports that act as windows into model space. In each layout viewport, you can control the view that is displayed by changing their scale size by using the “viewport scale control” within paper space. This “viewport scale control” will determine your plot scale. Plot Scales will already be set-up within the Port standard drawing files. Viewports shall be created on layer “*Defpoints*” or some other, preapproved, non-plotting layer.

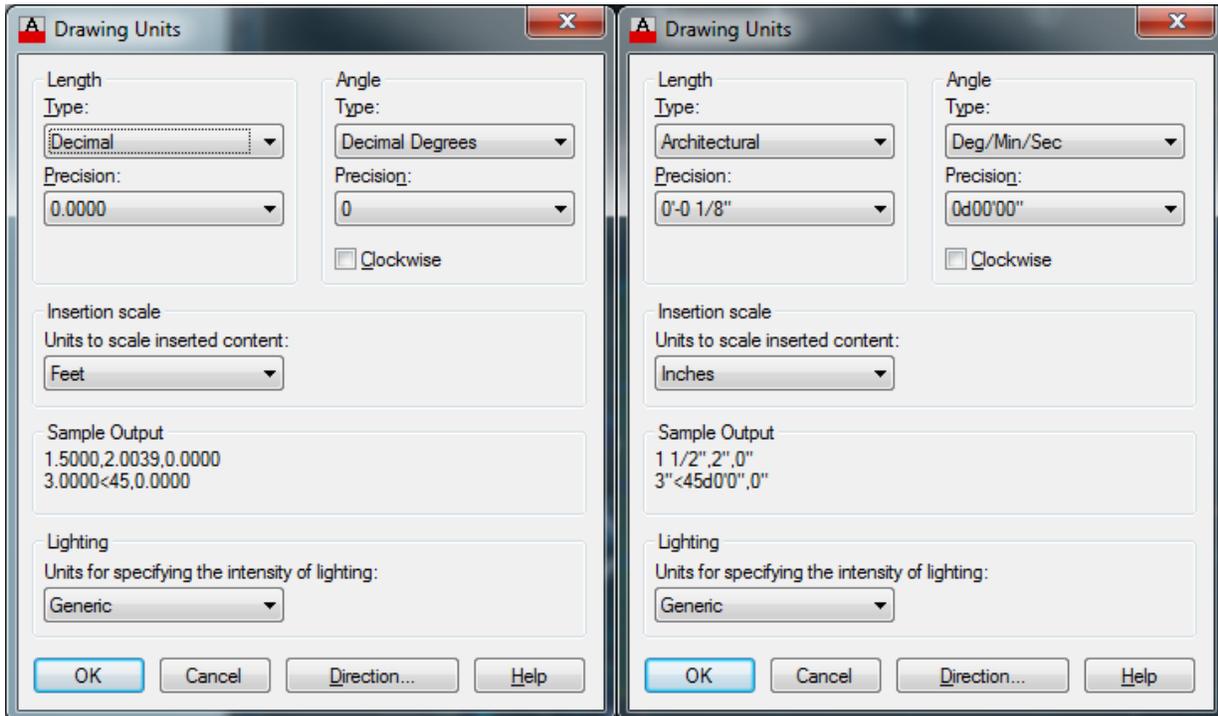
4.3 Drawing Rotation for Plotting

If you rotate a drawing in model space for design purposes, you must rotate it back before submitting it to the Port. Drawing rotation for plotting purposes must be setup by using the “mvsetup” command. This must be done within a viewport in paper space.

4.4 Drawing Units

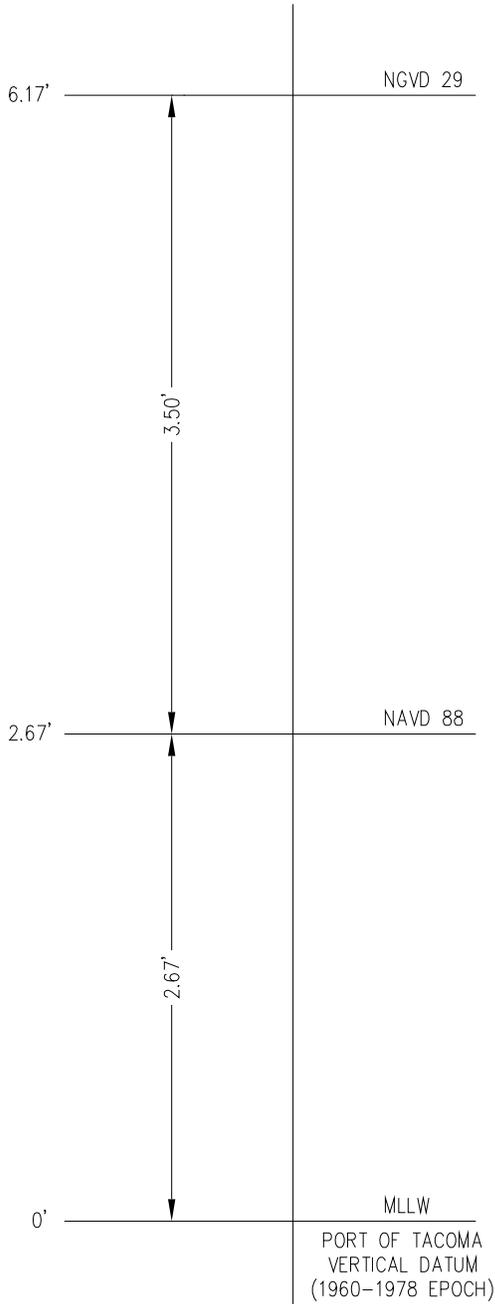
The Port’s standards for civil drawings should be setup in decimal units (Refer to the left image below). The insertion scale should be set in feet.

The Port’s standards for architectural drawings should be setup in architectural units (Refer the right image below). The insertion scale should be set in inches.



4.5 Standard Coordinate System

2007 PORT OF TACOMA RELATIONSHIP BETWEEN DATUMS (U.S. FEET)



4.6a - HORIZONTAL DATUM:

HORIZONTAL DATUM IS NAD 1983(2007) BASED ON NATIONAL GEODETIC SURVEY (NGS) CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS).

PROJECTION IS WASHINGTON STATE PLANE ZONE SOUTH 4602, U.S. SURVEY FEET

4.6b - VERTICAL DATUM:

VERTICAL DATUM IS MEAN LOWER LOW WATER (MLLW) AS DEFINED BY THE NATIONAL OCEAN SERVICE FOR COMMENCEMENT BAY, BENCH MARK "TIDE 22 1933"=19.39' FOR TIME PERIOD 1960-1978 EPOCH

"TIDE 22 1933" IS A STANDARD DISK SET IN A CONCRETE SIDEWALK ON THE NORTH SIDE OF AND AT THE EAST END OF THE EAST 11TH STREET BRIDGE OVER THE PUYALLUP RIVER. IT IS LOCATED ABOUT 3.5 FEET NORTH OF A LAMP POST.

4.6c - BENCHMARK:

TIDAL 22 (1960-1978 EPOCH)
NGS PID:#SY0536
NOAA VM:#13315
ELEVATION = 19.39 MLLW US FEET

4.6d - CONVERSIONS:

MLLW TO NGVD 29
SUBTRACT 6.17'
MLLW ELEV.-6.17'=NGVD 29 ELEV.
MLLW TO NAVD 88
SUBTRACT 2.67'
MLLW ELEV.-2.67'=NAVD 88 ELEV.

Chapter 5 – Layers

5.0 Industry CAD Standards for Layering

The Port follows two major industry CAD standards for layer naming conventions. They are the National CAD Standard (NCS) and American Public Works Association (APWA). NCS is used for architectural design work include building(s) and items inside building(s). APWA is used for Civil design work or site design elements that are outside the building(s) envelope. These layering standards are the most commonly used standards in the CAD community.

Every effort has been made by the Port to evaluate current and past plans received by consultants to discover the most commonly used layering methods and apply those to our current standards. While complying with industry standards as close as possible, the Port may make slight variances from these industry standards in-order-to meet the Port's needs. Below is a further explanation of the layering structures of the NCS/AIA and the APWA Standards.

5.1 Port Architectural Layering Standards

This standard is setup primarily for building architecture. The NCS and AIA (American Institute of Architects) standards are to be used for architectural, interior, and facility management drawings.

5.1a Building Features

The U.S. based NCS is a system for organizing and classifying drawing-centric building design data. Drawings that will follow the NCS/AIA CAD Standards may include the following building features:

- Building Architecture, Interior and Exterior Walls, Interior and Exterior Windows, Interior and Exterior, Doors, Ceiling / Floor Grids, Building Structural Plans and Details, Building Electrical Drawings, Building Mechanical Drawings, Building Plumbing Drawings, Casework or Millwork Drawings, Details and Room Numbers, Furniture & Equipment Drawings, Building Sections, Details, & Schedules, Parking Lot & Site Plans and/or Details (if included within the Architectural Plan Set), Building Landscaping and Irrigation (if included within the Architectural Plan Set).

5.1b Architectural Drawings Layering Organization

There are four defined layer name data fields: Discipline Designator, Major Group, two fields for Minor Group, and Status. The discipline designator and major group fields are mandatory. The minor group and status fields are optional. With the layer names organized as a hierarchy, you can have options for naming layers according the level of detail required.

Example:	SD-LINE-GLIN-E	Stormwater, Line, Gravity, Port Owned, Existing work
Example:	SD-LINE-GLIN-P	Stormwater, Line, Gravity, Port Owned, Proposed work
Example:	SD-LINE-GLIN-N	Stormwater, Line, Gravity, Port Owned, New work

5.2c Discipline Designations for Civil Drawings

The following is the computer-aided drafting layer naming convention used for Civil, Survey, Environmental, Topography and Rail at the Port. Drawings that consultants submit to the Port must use and conform to these current CAD layering standards. If submittals do not conform to the Port’s layering standards, the Port can reject the submittals from the consultant. The consultant will be responsible for making necessary revisions to the materials to make them conform to the Port’s layering standards.

<u>Discipline Designator</u>	<u>Discipline Description</u>
C	Sections, Elevations, Details, Profiles, Etc.
CM	Communications (telephone, fiber, cable)
EQ	Equipment (things you can operate)
GEN	General Reference Layers
GS	Gas
OL	Oil
PO	Power & Electrical
RR	Railroad
SD	Storm Drainage
SF	Surface Features
SS	Sanitary Sewer
ST	Structural Items
SV	Survey Features
TF	Traffic Features
TP	Topography & Bathymetry
UT	Unknown Utilities
VG	Vegetation
WA	Water Features

VARIES This will vary depending upon the discipline

DIM	Dimensioning & Dimension Text
HAT	Hatching or Solid Fill
ALIN	Above Ground Lines (Power & Communications)
BLIN	Below Ground Lines (Power & Communications)
GLIN	Gravity Flow Lines
LIN	Line work
PLIN	Pressure Flow Lines
PNT	Points (Typically brought in from a GPS unit)

SYM Symbols & Blocks
 TXT Text, Notes, and Annotation

VARIABLES Only if needed (varies depending upon the discipline)

5.3 Master Layer Matrix

C = ANYTHING NOT IN PLAN VIEW (SECTIONS, ELEVATIONS, DETAILS, PROFILES, ETC)							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
C	DETL	DIM		C-DETL-DIM	Cyan (4)	Continuous	Detail Dimensions
C	DETL	HAT		C-DETL-HAT	Green (3)	Continuous	Detail Hatching
C	DETL	LIN		C-DETL-LIN	Green (3)	Continuous	Detail Lines
C	DETL	PNT		C-DETL-PNT	Green (3)	Continuous	Detail Points
C	DETL	SYM		C-DETL-SYM	Green (3)	Continuous	Detail Blocks & Symbols
C	DETL	TXT		C-DIAG-TXT	White (7)	Continuous	Detail Text
C	DIAG	DIM		C-DIAG-DIM	Cyan (4)	Continuous	Diagram Dimensions
C	DIAG	HAT		C-DIAG-HAT	Blue (5)	Continuous	Diagram Hatching
C	DIAG	LIN		C-DIAG-LIN	Blue (5)	Continuous	Diagram Lines
C	DIAG	PNT		C-DIAG-PNT	Blue (5)	Continuous	Diagram Points
C	DIAG	SYM		C-DIAG-SYM	Blue (5)	Continuous	Diagram Blocks & Symbols
C	DIAG	TXT		C-DIAG-TXT	White (7)	Continuous	Diagram Text
C	ELEV	DIM		C-ELEV-DIM	Cyan (4)	Continuous	Elevation Dimensions
C	ELEV	HAT		C-ELEV-HAT	Blue (5)	Continuous	Elevation Hatching
C	ELEV	LIN		C-ELEV-LIN	Blue (5)	Continuous	Elevation Lines
C	ELEV	PNT		C-ELEV-PNT	Blue (5)	Continuous	Elevation Points
C	ELEV	SYM		C-ELEV-SYM	Blue (5)	Continuous	Elevation Blocks & Symbols
C	ELEV	TXT		C-ELEV-TXT	White (7)	Continuous	Elevation Text
C	ISOM	DIM		C-ISOM-DIM	Cyan (4)	Continuous	Isometric Dimensions
C	ISOM	HAT		C-ISOM-HAT	Green (3)	Continuous	Isometric Hatching
C	ISOM	LIN		C-ISOM-LIN	Green (3)	Continuous	Isometric Lines
C	ISOM	PNT		C-ISOM-PNT	Green (3)	Continuous	Isometric Points
C	ISOM	SYM		C-ISOM-SYM	Green (3)	Continuous	Isometric Blocks & Symbols
C	ISOM	TXT		C-ISOM-TXT	Green (3)	Continuous	Isometric Text
C	NOTE	TXT		C-NOTE-TXT	White (7)	Continuous	Detail, Section, Elevation Notes
C	PROF	DIM		C-PROF-DIM	Cyan (4)	Continuous	Profile Dimensions
C	PROF	HAT		C-PROF-HAT	Blue (5)	Continuous	Profile Hatching
C	PROF	LIN		C-PROF-LIN	Blue (5)	Continuous	Profile Lines
C	PROF	PNT		C-PROF-PNT	Blue (5)	Continuous	Profile Points
C	PROF	SYM		C-PROF-SYM	Blue (5)	Continuous	Profile Blocks & Symbols
C	PROF	TXT		C-PROF-TXT	White (7)	Continuous	Profile Text
C	SCHD	DIM		C-SCHD-DIM	Cyan (4)	Continuous	Schedule Dimensions
C	SCHD	HAT		C-SCHD-HAT	Blue (5)	Continuous	Schedule Hatching
C	SCHD	LIN		C-SCHD-LIN	Blue (5)	Continuous	Schedule Lines
C	SCHD	PNT		C-SCHD-PNT	Blue (5)	Continuous	Schedule Points
C	SCHD	SYM		C-SCHD-SYM	Blue (5)	Continuous	Schedule Blocks & Symbols
C	SCHD	TXT		C-SCHD-TXT	White (7)	Continuous	Schedule Text
C	SECT	DIM		C-SECT-DIM	Cyan (4)	Continuous	Section Dimensions
C	SECT	HAT		C-SECT-HAT	Green (3)	Continuous	Section Hatching
C	SECT	LIN		C-SECT-LIN	Green (3)	Continuous	Section Lines

C	SECT	PNT		C-SECT-PNT	Green (3)	Continuous	Section Points
C	SECT	SYM		C-SECT-SYM	Green (3)	Continuous	Section Blocks & Symbols
C	SECT	TXT		C-SECT-TXT	White (7)	Continuous	Section Text

CM = COMMUNICATIONS							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
CM	CABL	DIM		CM-CABL-DIM	Cyan (4)	Continuous	Television Cable Dimensions
CM	CABL	HAT		CM-CABL-HAT	8	Continuous	Television Cable Hatching
CM	CABL	ALIN		CM-CABL-ALIN	8	ATV	TV Cable Above Ground Lines
CM	CABL	BLIN		CM-CABL-BLIN	8	BTV	TV Cable Above Ground Lines
CM	CABL	PNT		CM-CABL-PNT	8	Continuous	TV Cable Points
CM	CABL	SYM		CM-CABL-SYM	8	Continuous	TV Cable Blocks
CM	CABL	TXT		CM-CABL-TXT	White (7)	Continuous	TV Cable Text
CM	FIBR	DIM		CM-FIBR-DIM	Cyan (4)	Continuous	Fiber Dimensions
CM	FIBR	HAT		CM-FIBR-HAT	30	Continuous	Fiber Hatching or Fill
CM	FIBR	ALIN		CM-FIBR-ALIN	30	AFO	Fiber Above Ground Lines
CM	FIBR	BLIN		CM-FIBR-BLIN	30	BFO	Fiber Below Ground Lines
CM	FIBR	PNT		CM-FIBR-PNT	30	Continuous	Fiber Points
CM	FIBR	SYM		CM-FIBR-SYM	30	Continuous	Fiber Blocks & Symbols
CM	FIBR	TXT		CM-FIBR-TXT	White (7)	Continuous	Fiber Text
CM	TELE	DIM		CM-TELE-DIM	Cyan (4)	Continuous	Telephone Dimensions
CM	TELE	HAT		CM-TELE-HAT	200	Continuous	Telephone Hatching or Fill
CM	TELE	ALIN		CM-TELE-ALIN	200	AT	Telephone Above Ground Lines
CM	TELE	BLIN		CM-TELE-BLIN	200	BT	Telephone Below Ground Lines
CM	TELE	PNT		CM-TELE-PNT	200	Continuous	Telephone Points
CM	TELE	SYM		CM-TELE-SYM	200	Continuous	Telephone Blocks & Symbols
CM	TELE	TXT		CM-TELE-TXT	White (7)	Continuous	Telephone Text

EQ = EQUIPMENT							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
EQ	CRANE	SYM		EQ-CRANE-SYM	White (7)	Continuous	Cranes
EQ	STRAD	SYM		EQ-STRAD-SYM	White (7)	Continuous	Straddle Carriers
EQ	TRUCK	SYM		EQ-TRUCK-SYM	White (7)	Continuous	Trucks
EQ	AUTO	SYM		EQ-AUTO-SYM	White (7)	Continuous	Automobiles
EQ	TEU	SYM		EQ-TEU-SYM	White (7)	Continuous	Twenty Equiv. Units (Any Size)
EQ	SHIP	SYM		EQ-SHIP-SYM	White (7)	Continuous	Ships & Container Vessels
EQ	RCAR	SYM		EQ-RCAR-SYM	White (7)	Continuous	Rail Cars
EQ	RTG	SYM		EQ-RTG-SYM	White (7)	Continuous	Rubber Tire Gantrys
EQ	RMG	SYM		EQ-RMG-SYM	White (7)	Continuous	Rail Mounted Gantrys
EQ	TUGB	SYM		EQ-TUGB-SYM	White (7)	Continuous	Tug Boats
EQ	TRAIN	SYM		EQ-TRAIN-SYM	White (7)	Continuous	Trains
EQ	TPICK	SYM		EQ-TPICK-SYM	White (7)	Continuous	Top Picks
EQ	BARGE	SYM		EQ-BARGE-SYM	White (7)	Continuous	Barges
EQ	FLEET	SYM		EQ-FLEET-SYM	White (7)	Continuous	Port Fleet Vehicles
EQ	BUS	SYM		EQ-BUS-SYM	White (7)	Continuous	Busses
EQ	SECV	SYM		EQ-SECV-SYM	White (7)	Continuous	Port Security Vehicles
EQ	MACH	SYM		EQ-MACH-SYM	White (7)	Continuous	Port Machinery
EQ	SPICK	SYM		EQ-SPICK-SYM	White (7)	Continuous	Side Picks

EQ	BULK	SYM		EQ-BULK-SYM	White (7)	Continuous	Break Bulk Machinery, Etc.
EQ	BOAT	SYM		EQ-BOAT-SYM	White (7)	Continuous	Boats and Yachts
EQ	FLIFT	SYM		EQ-FLIFT-SYM	White (7)	Continuous	Fork Lift

GEN = GENERAL REFERENCE LAYERS							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
GEN	DIM			GEN-DIM	White (7)	Continuous	General Dimensions
GEN	GRID			GEN-GRID	White (7)	Continuous	General Grid Lines
GEN	KEYN			GEN-KEYN	White (7)	Continuous	General Key Notes or Key Map
GEN	LOGO			GEN-LOGO	White (7)	Continuous	General Logo
GEN	LGND			GEN-LGND	White (7)	Continuous	General Legend
GEN	MTCH			GEN-MTCH	White (7)	Continuous	General Match Lines
GEN	NOTE			GEN-NOTE	White (7)	Continuous	General Notes
GEN	ORTH			GEN-ORTH	White (7)	Continuous	General Orthophoto
GEN	REDL			GEN-REDL	White (7)	Continuous	General Red Lines or Clouds
GEN	STMP			GEN-STMP	White (7)	Continuous	Engineer's or Surveyor's Stamp
GEN	SYMB			GEN-SYMB	White (7)	Continuous	General Symbols
GEN	TABL			GEN-TABL	White (7)	Continuous	General Tables
GEN	TTBL			GEN-TTBL	White (7)	Continuous	General Titleblock
GEN	VPRT			GEN-VPRT	White (7)	Continuous	General Viewports
GEN	XREF			GEN-XREF	White (7)	Continuous	General Xrefs
GEN	REF			GEN-REF	White (7)	Continuous	General Reference Layer

GS = GAS							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
GS	AIRL	DIM		GS-AIRL-DIM	Cyan (4)	Continuous	Air Line Dimensions
GS	AIRL	HAT		GS-AIRL-HAT	130	Continuous	Air Line Hatching
GS	AIRL	PLIN		GS-AIRL-PLIN	130	AIR	Air lines
GS	AIRL	PNT		GS-AIRL-PNT	130	Continuous	Air Line Points
GS	AIRL	SYM		GS-AIRL-SYM	130	Continuous	Air Line Blocks & Symbols
GS	AIRL	TXT		GS-AIRL-TXT	White (7)	Continuous	Air Line Text
GS	JETF	DIM		GS-JETF-DIM	Cyan (4)	Continuous	Jet Fuel Dimensions
GS	JETF	HAT		GS-JETF-HAT	155	Continuous	Jet Fuel Hatching
GS	JETF	PLIN		GS-JETF-PLIN	155	JET	Jet Fuel lines
GS	JETF	PNT		GS-JETF-PNT	155	Continuous	Jet Fuel Points
GS	JETF	SYM		GS-JETF-SYM	155	Continuous	Jet Fuel Blocks & Symbols
GS	JETF	TXT		GS-JETF-TXT	White (7)	Continuous	Jet Fuel Text
GS	HYDG	DIM		GS-HYDG-DIM	Cyan (4)	Continuous	Hydrogen Dimensions
GS	HYDG	HAT		GS-HYDG-HAT	135	Continuous	Hydrogen Hatching
GS	HYDG	PLIN		GS-HYDG-PLIN	135	HYDROGEN	Hydrogen lines
GS	HYDG	PNT		GS-HYDG-PNT	135	Continuous	Hydrogen Points
GS	HYDG	SYM		GS-HYDG-SYM	135	Continuous	Hydrogen Blocks & Symbols
GS	HYDG	TXT		GS-HYDG-TXT	White (7)	Continuous	Hydrogen Text
GS	NGAS	DIM		GS-NGAS-DIM	Cyan (4)	Continuous	Natural Gas Dimensions
GS	NGAS	HAT		GS-NGAS-HAT	34	Continuous	Natural Gas Hatching
GS	NGAS	PLIN		GS-NGAS-PLIN	34	NGAS	Natural Gas Pressure lines
GS	NGAS	PNT		GS-NGAS-PNT	34	Continuous	Natural Gas Points

GS	NGAS	SYM		GS-NGAS-SYM	34	Continuous	Natural Gas Blocks & Symbols
GS	NGAS	TXT		GS-NGAS-TXT	White (7)	Continuous	Natural Gas Text

OL = OIL							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
OL	LINE	DIM		OL-LINE-DIM	Cyan (4)	Continuous	Oil Dimensions
OL	LINE	HAT		OL-LINE-HAT	47	Continuous	Oil Hatching
OL	LINE	PLIN		OL-LINE-PLIN	47	OIL	Oil Pressure lines
OL	LINE	PNT		OL-LINE-PNT	47	Continuous	Oil Gas Points
OL	LINE	SYM		OL-LINE-SYM	47	Continuous	Oil Gas Blocks & Symbols
OL	LINE	TXT		OL-LINE-TXT	White (7)	Continuous	Oil Gas Text

PO = POWER							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
PO	LITE	DIM		PO-LITE-DIM	Cyan (4)	Continuous	Lighting Dimensions
PO	LITE	HAT		PO-LITE-HAT	Yellow (2)	Continuous	Lighting Hatching
PO	LITE	ALIN		PO-LITE-ALIN	Yellow (2)	ALITE	Lighting Above Ground Lines
PO	LITE	BLIN		PO-LITE-BLIN	Yellow (2)	BLITE	Lighting Below Ground Lines
PO	LITE	PNT		PO-LITE-PNT	Yellow (2)	Continuous	Lighting Points
PO	LITE	SYM		PO-LITE-SYM	Yellow (2)	Continuous	Lighting Blocks
PO	LITE	TXT		PO-LITE-TXT	White (7)	Continuous	Lighting Text
PO	LINE	DIM		PO-LINE-DIM	Cyan (4)	Continuous	Power Dimensions
PO	LINE	HAT		PO-LINE-HAT	Red (1)	Continuous	Power Hatching
PO	LINE	ALIN		PO-LINE-ALIN	Red (1)	AP	Power Above Ground Lines
PO	LINE	BLIN		PO-LINE-BLIN	Red (1)	BP	Power Below Ground Lines
PO	LINE	PNT		PO-LINE-PNT	Red (1)	Continuous	Power Points
PO	LINE	SYM		PO-LINE-SYM	Red (1)	Continuous	Power Blocks
PO	LINE	TXT		PO-LINE-TXT	White (7)	Continuous	Power Text

SD = STORM DRAIN							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
SD	LINE	DIM		SD-LINE-DIM	Cyan (4)	Continuous	Storm Drain Dimensions
SD	LINE	HAT		SD-LINE-HAT	120	Continuous	Storm Drain Hatching
SD	LINE	GLIN		SD-LINE-GLIN	120	STORM	Storm Drain Gravity Lines
SD	LINE	PLIN		SD-LINE-PLIN	120	SDFM	Storm Drain Pressure Lines
SD	LINE	PNT		SD-LINE-PNT	120	Continuous	Storm Drain Points
SD	LINE	SYM		SD-LINE-SYM	120	Continuous	Storm Drain Blocks & Symbols
SD	LINE	TXT		SD-LINE-TXT	White (7)	Continuous	Storm Drain Text

SS = SANITARY SEWER							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
SS	LINE	DIM		SS-LINE-DIM	Cyan (4)	Continuous	Sanitary Sewer Dimensions
SS	LINE	HAT		SS-LINE-HAT	Green (3)	Continuous	Sanitary Sewer Hatching
SS	LINE	GLIN		SS-LINE-GLIN	Green (3)	Continuous	Sanitary Sewer Gravity Lines
SS	LINE	PLIN		SS-LINE-PLIN	Green (3)	Continuous	Sanitary Sewer Pressure Lines
SS	LINE	PNT		SS-LINE-PNT	Green (3)	Continuous	Sanitary Sewer Points

SS	LINE	SYM		SS-LINE-SYM	Green (3)	Continuous	Sanitary Sewer Blocks & Symbols
SS	LINE	TXT		SS-LINE-TXT	White (7)	Continuous	Sanitary Sewer Text

RR = RAIL							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
RR	LGND			RR-LGND	White (7)	Continuous	Rail Legend
RR	RAEI	DIM		RR-RAEI-DIM	Cyan (4)	Continuous	Rail AEI Dimensions
RR	RAEI	HAT		RR-RAEI-HAT	160	Continuous	Rail AEI Hatching
RR	RAEI	LIN		RR-RAEI-LIN	160	TRACKS	Rail AEI lines
RR	RAEI	PNT		RR-RAEI-PNT	160	Continuous	Rail AEI Points
RR	RAEI	SYM		RR-RAEI-SYM	160	Continuous	Rail AEI Blocks & Symbols
RR	RAEI	TXT		RR-RAEI-TXT	White (7)	Continuous	Rail AEI Text
RR	RAIL	DIM		RR-RAIL-DIM	Cyan (4)	Continuous	General Rail Dimensions
RR	RAIL	HAT		RR-RAIL-HAT	14	Continuous	General Rail Hatching
RR	RAIL	LIN		RR-RAIL-LIN	14	Continuous	General Rail Lines
RR	RAIL	PNT		RR-RAIL-PNT	14	Continuous	General Rail Points
RR	RAIL	SYM		RR-RAIL-SYM	14	Continuous	General Rail Blocks & Symbols
RR	RAIL	TXT		RR-RAIL-TXT	White (7)	Continuous	General Rail Text
RR	RAIL	LIN	BNMN	RR-RAIL-LIN-BNMN	100	TRACKS	BNSF Main Rail
RR	RAIL	LIN	BNSF	RR-RAIL-LIN-BNSF	104	TRACKS	BNSF Rail Line
RR	RAIL	LIN	BNUP	RR-RAIL-LIN-BNUP	45	TRACKS	BNSF with UP Rights Rail Lin
RR	RAIL	LIN	PRIV	RR-RAIL-LIN-PRIV	215	TRACKS	Private Rail Line
RR	RAIL	LIN	PTAC	RR-RAIL-LIN-PTAC	160	TRACKS	Port of Tacoma Rail line
RR	RAIL	LIN	SDTR	RR-RAIL-LIN-SDTR	30	TRACKS	Sound Transit Rail Line
RR	RAIL	LIN	TACR	RR-RAIL-LIN-TACR	141	TRACKS	Tacoma Rail Line
RR	RAIL	LIN	TLNK	RR-RAIL-LIN-TLNK	40	TRACKS	Tacoma Link Rail Line
RR	RAIL	LIN	TRMN	RR-RAIL-LIN-TRMN	210	TRACKS	Tacoma Rail Line - Mountain Division
RR	RAIL	LIN	UPPR	RR-RAIL-LIN-UPPR	244	TRACKS	Union Pacific Rail Line
RR	RAIL	TXT	NUMB	RR-RAIL-TXT-NUMB	RED (1)	Continuous	Rail Text - Number
RR	SWCH	TXT		RR-SWCH-TXT	White (7)	Continuous	Rail Text - Switches

SF = SURFACE FEATURES							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
SF	BLDG	DIM		SF-BLDG-DIM	Cyan (4)	Continuous	Building Dimensions (Civil)
SF	BLDG	HAT		SF-BLDG-HAT	144	Continuous	Building Hatching (Civil)
SF	BLDG	LIN		SF-BLDG-LIN	144	Continuous	Building Lines (Civil)
SF	BLDG	PNT		SF-BLDG-PNT	144	Continuous	Building Points (Civil)
SF	BLDG	SYM		SF-BLDG-SYM	144	Continuous	Building Symbols (Civil)
SF	BLDG	TXT		SF-BLDG-TXT	White (7)	Continuous	Building Text (Civil)
SF	BUSS	SYM		SF-BUSS-SYM	Yellow (2)	Continuous	Bus Station Symbols
SF	CRAN	DIM		SF-CRAN-DIM	Blue (5)	Continuous	Crane Dimensions
SF	CRAN	HAT		SF-CRAN-HAT	Blue (5)	Continuous	Crane Hatching
SF	CRAN	LIN		SF-CRAN-LIN	Blue (5)	Continuous	Crane Lines
SF	CRAN	PNT		SF-CRAN-PNT	Blue (5)	Continuous	Crane Points
SF	CRAN	SYM		SF-CRAN-SYM	Blue (5)	Continuous	Crane Blocks & Symbols
SF	CRAN	TXT		SF-CRAN-TXT	White (7)	Continuous	Crane Text

SF	CURB	LIN		SF-CURB-LIN	White (7)	Continuous	All Curbing Lines
SF	CURB	SYM		SF-CURB-SYM	252	Continuous	All Curbing Symbols
SF	DPLE	LIN		SF-DPLE-LIN	14	Continuous	Dirt Pile Lines
SF	DTCH	LIN		SF-DTCH-LIN	Blue (5)	Continuous	Ditch Lines
SF	EMBT	LIN		SF-EMBT-LIN	Blue (5)	Continuous	Embankment Lines
SF	FENC	LIN		SF-FENC-LIN	10	Chain link Fence	Fence Lines
SF	GATE	LIN		SF-GATE-LIN	10	Continuous	Gate Lines
SF	GATE	SYM		SF-GATE-SYM	10	Continuous	Gate Symbols
SF	GENL	LIN		SF-GENL-LIN	45	Continuous	General Surface Features Lines
SF	GENL	SYM		SF-GENL-SYM	45	Continuous	General Surface Features Symbols
SF	GURD	LIN		SF-GURD-LIN	Yellow (2)	Continuous	Guard Rail Lines
SF	JBAR	SYM		SF-JBAR-SYM	Yellow (2)	Continuous	Jersey Barrier Blocks & Symbols
SF	LAKE	LIN		SF-LAKE-LIN	Blue (5)	Continuous	Lake Lines
SF	MWEL	SYM		SF-MWEL-SYM	144	Continuous	Monitoring Wells
SF	PIER	DIM		SF-PIER-DIM	Cyan (4)	Continuous	Pier Dimensions
SF	PIER	HAT		SF-PIER-HAT	Cyan (4)	Continuous	Pier Hatching
SF	PIER	LIN		SF-PIER-LIN	Cyan (4)	Continuous	Pier Lines
SF	PIER	PNT		SF-PIER-PNT	Cyan (4)	Continuous	Pier Points
SF	PIER	SYM		SF-PIER-SYM	Cyan (4)	Continuous	Pier Blocks & Symbols
SF	PIER	TXT		SF-PIER-TXT	White (7)	Continuous	Pier Text
SF	PKGU	LIN		SF-PKGU-LIN	254	Continuous	Parking areas
SF	PVMT	LIN		SF-PVMT-LIN	254	Continuous	Driveways and Pavement
SF	RIPR	LIN		SF-RIPR-LIN	White (7)	Continuous	Rip Rap Lines
SF	RIVR	LIN		SF-RIVR-LIN	Blue (5)	Continuous	River Lines
SF	SHOR	LIN		SF-SHOR-LIN	Blue (5)	Continuous	Shore Lines
SF	SHOR	TXT		SF-SHOR-TXT	White (7)	Continuous	Shoreline Text
SF	SIGN	LIN		SF-SIGN-LIN	White (7)	Continuous	Port Signs
SF	STRC	LIN		SF-STRC-LIN	253	Continuous	Structures
SF	STRP	LIN		SF-STRP-LIN	150	Continuous	Any Striping
SF	TERM	LIN		SF-TERM-LIN	30	Continuous	Terminal Boundary Lines
SF	TERM	HAT		SF-TERM-HAT	30	Continuous	Terminal Hatching
SF	TERM	TXT		SF-TERM-TXT	White (7)	Continuous	Terminal Texting
SF	VEGE	LIN		SF-VEGE-LIN	Cyan (4)	Continuous	All Vegetation Lines
SF	VEGE	SYM		SF-VEGE-SYM	White (7)	Continuous	All Vegetation Symbols
SF	VEGE	TXT		SF-VEGE-TXT	White (7)	Continuous	All Vegetation Text
SF	RWLL	LIN		SF-RWLL-LIN	White (7)	Continuous	Retaining Walls
SF	WETL	LIN		SF-WETL-LIN	White (7)	Continuous	All Wetland Lines
SF	WETL	SYM		SF-WETL-SYM	White (7)	Continuous	All Wetland Symbols
SF	WETL	TXT		SF-WETL-TXT	White (7)	Continuous	All Wetland Text

ST = STRUCTURAL							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
ST	LINE	DIM		ST-LINE-DIM	Cyan (4)	Continuous	Structural Dimensions
ST	LINE	HAT		ST-LINE-HAT	Green (3)	Continuous	Structural Hatching
ST	LINE	LIN		ST-LINE-LIN	Green (3)	Continuous	Structural Lines
ST	LINE	PNT		ST-LINE-PNT	Green (3)	Continuous	Structural Points
ST	LINE	SYM		ST-LINE-SYM	Green (3)	Continuous	Structural Blocks & Symbols
ST	LINE	TXT		ST-LINE-TXT	White (7)	Continuous	Structural Text

ST	PILE	SYM	CONC	ST-LINE-TXT	13	Continuous	Concrete Hollow Pile
ST	PILE	SYM	CONC	ST-LINE-TXT	13	Continuous	Concrete Solid Pile
ST	PILE	SYM	CONC-BATT	ST-LINE-TXT	13	Continuous	Concrete Hollow Batt Pile
ST	PILE	SYM	CONC-BATT	ST-LINE-TXT	13	Continuous	Concrete Solid Batt Pile
ST	PILE	SYM	CONC-FEND	ST-LINE-TXT	13	Continuous	Concrete Fender Pile
ST	PILE	SYM	STEEL	ST-LINE-TXT	353	Continuous	Steel Pile
ST	PILE	SYM	STEEL-BATT	ST-LINE-TXT	353	Continuous	Steel Batt Pile
ST	PILE	SYM	STEEL-FEND	ST-LINE-TXT	353	Continuous	Steel Fender Pile
ST	PILE	SYM	WOOD	ST-LINE-TXT	12	Continuous	Wood Pile
ST	PILE	SYM	WOOD-BATT	ST-LINE-TXT	12	Continuous	Wood Batt Pile
ST	PILE	SYM	WOOD-FEND	ST-LINE-TXT	12	Continuous	Wood Fender Pile

SV = SURVEY							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
SV	16 TH	LIN		SV-16 TH -LIN	15	Continuous	16 TH Section Lines
SV	CITY	LIN		SV-CITY-LIN	15	Continuous	City Boundary Lines
SV	CNTY	LIN		SV-CNTY-LIN	15	Continuous	County Boundary Lines
SV	CTRL	SYM		SV-CTRL-SYM	15	Continuous	Control Symbols
SV	DATM	SYM		SV-DATM-SYM	15	Continuous	Datum Symbols
SV	ESMT	LIN		SV-ESMT-LIN	15	Continuous	Easement Lines
SV	FTRZ	HAT		SV-FTRZ-HAT	15	Continuous	Foreign Trade Zone Hatching
SV	FTRZ	LIN		SV-FTRZ-LIN	15	Continuous	Foreign Trade Zone Lines
SV	LOTN	TXT		SV-LOTN-TXT	White (7)	Continuous	Lot Lines
SV	MONU	SYM		SV-MONU-SYM	15	Continuous	Survey Monuments
SV	WETL	SYM		SV-WETL-SYM	74	Continuous	Wetland Symbols
SV	SOIL	SYM		SV-SOIL-SYM	136	Continuous	Soil Sampling Symbols
SV	GEN	DIM		SV-GEN-DIM	Cyan (4)	Continuous	General Survey Dimensions
SV	GEN	HAT		SV-GEN-HAT	15	Continuous	General Survey Hatching
SV	GEN	LIN		SV-GEN-LIN	15	Continuous	General Survey Lines
SV	GEN	PNT		SV-GEN-PNT	15	Continuous	General Survey Points
SV	GEN	SYM		SV-GEN-SYM	15	Continuous	General Survey Symbols
SV	GEN	TXT		SV-GEN-TXT	15	Continuous	General Survey Text

TF = TRAFFIC							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
TF	BRDG	LIN		TF-BRDG-LIN	White (7)	Continuous	Bridge Lines
TF	CHNL	DIM		TF-CHNL-DIM	Cyan (4)	Continuous	Channel Dimensions
TF	CHNL	HAT		TF-CHNL-HAT	White (7)	Continuous	Channel Hatching
TF	CHNL	LIN		TF-CHNL-LIN	White (7)	Continuous	Channel Lines
TF	CHNL	PNT		TF-CHNL-PNT	White (7)	Continuous	Channel Points
TF	CHNL	SYM		TF-CHNL-SYM	White (7)	Continuous	Channel Symbols

TF	CHNL	TXT		TF-CHNL-TXT	White (7)	Continuous	Channel Text
TF	ROAD	DIM		TF-ROAD-DIM	Cyan (4)	Continuous	Road Dimensions
TF	ROAD	HAT		TF-ROAD-HAT	White (7)	Continuous	Road Hatching
TF	ROAD	LIN		TF-ROAD-LIN	White (7)	Continuous	Road Lines
TF	ROAD	PNT		TF-ROAD-PNT	White (7)	Continuous	Road Points
TF	ROAD	SYM		TF-ROAD-SYM	White (7)	Continuous	Road Symbols
TF	ROAD	TXT		TF-ROAD-TXT	White (7)	Continuous	Road Text
TF	SGNL	SYM		TF-SGNL-SYM	White (7)	Continuous	Road Signal Symbols
TF	SIGN	SYM		TF-SIGN-SYM	White (7)	Continuous	Road Sign Symbols
TF	WALK	SYM		TF-WALK-SYM	White (7)	Continuous	Walking Symbols

TP = TOPOGRAPHIC / BATHYMETRY							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
TP	CONT	SYM		TP-CONT-SYM	Red (1)	Continuous	Contour Lines
TP	MJRC	LIN		TP-MJRC-LIN	Red (1)	Continuous	Major Contour Lines
TP	MNRC	LIN		TP-MNRC-LIN	13	Continuous	Minor Contour Lines

TP = TOPOGRAPHIC / BATHYMETRY							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
VG	VEGE	LIN		VG-VEGE-LIN	Green (3)	Continuous	All Vegetation Lines
VG	VEGE	SYM		VG-VEGE-SYM	Green (3)	Continuous	All Vegetation Symbols
VG	VEGE	TXT		VG-VEGE-TXT	White (7)	Continuous	All Vegetation Text

WA = WATER							
1st	2nd	3rd	4th	Layer Name	Color	Linetype	Description
WA	FIRE	DIM		SV-GEN-DIM	Cyan (4)	Continuous	Fire Water Dimensions
WA	FIRE	HAT		SV-GEN-HAT	Blue (5)	Continuous	Fire Water Hatching
WA	FIRE	GLIN		SV-GEN-LIN	Blue (5)	Continuous	Fire Gravity Water Lines
WA	FIRE	PLIN		SV-GEN-LIN	Blue (5)	Continuous	Fire Pressure Water Lines
WA	FIRE	PNT		SV-GEN-PNT	Blue (5)	Continuous	Fire Water Points
WA	FIRE	SYM		SV-GEN-SYM	Blue (5)	Continuous	Fire Water Symbols
WA	FIRE	TXT		SV-GEN-TXT	White (7)	Continuous	Fire Water Text
WA	LINE	DIM		SV-GEN-DIM	Cyan (4)	Continuous	Water Dimensions
WA	LINE	HAT		SV-GEN-HAT	Blue (5)	Continuous	Water Hatching
WA	LINE	GLIN		SV-GEN-LIN	Blue (5)	Continuous	Gravity Water Lines
WA	LINE	PLIN		SV-GEN-LIN	Blue (5)	Continuous	Pressure Water Lines
WA	LINE	PNT		SV-GEN-PNT	Blue (5)	Continuous	Water Points
WA	LINE	SYM		SV-GEN-SYM	Blue (5)	Continuous	Water Symbols
WA	LINE	TXT		SV-GEN-TXT	White (7)	Continuous	Irrigation Water Text
WA	IRRG	DIM		SV-GEN-DIM	Cyan (4)	Continuous	Irrigation Water Dimensions
WA	IRRG	HAT		SV-GEN-HAT	Blue (5)	Continuous	Irrigation Water Hatching
WA	IRRG	GLIN		SV-GEN-LIN	Blue (5)	Continuous	Irrigation Gravity Water Lines
WA	IRRG	PLIN		SV-GEN-LIN	Blue (5)	Continuous	Irrigation Pressure Water Lines
WA	IRRG	PNT		SV-GEN-PNT	Blue (5)	Continuous	Irrigation Water Points
WA	IRRG	SYM		SV-GEN-SYM	Blue (5)	Continuous	Irrigation Water Symbols
WA	IRRG	TXT		SV-GEN-TXT	White (7)	Continuous	Irrigation Water Text

Chapter 6 – Blocks

6.0 Block Creation

The Port has made every effort to evaluate current and past plans received by consultants to discover the most commonly used blocks and apply those to our current standards. The Port has also determined that the APWA blocks are the most widely used industry standard within civil design. The Port may make slight variances from these standards in order to meet the Port's needs. These standards need to be followed by contractors and A/E consultants submitting drawings to the Port.

The following are the Port's standard rules for creating, storing, and using blocks:

1. New blocks in addition to the Port master block library must be approved by the Port before use.
2. All new blocks will be created on the layer "0" and defined on layer "0". NO EXCEPTIONS!
3. All blocks color should be set to "bylayer".
4. All blocks lineweight should be at "0.00".
5. All blocks will be created with a "reasonable" Architectural snap set, depending on the drawing discipline. Smaller snap sets will be allowed for 1-line and system flow diagram drawings. (Architectural - "1/8" typical & Engineering - .25 typical)
6. All blocks will be defined with insertion points at the object snaps of the object. Typical Snap locations for blocks are the center of the object or the lower left corner.
7. All attribute text styles will follow the text style standards of this manual.
8. When creating "wblocks", the new blocks and will be stored in an appropriate block (symbol) library. All blocks will be stored in a library located in an appropriate folder on the server under the symbol group for which it belongs.
9. All blocks will be managed as separate drawing files.
10. Blocks will be named using a method similar to our file naming convention, or an Industry standard. Utility blocks will use the APWA Standard unless the standard has not developed the block.
11. There shall be no nested blocks (Blocks within Blocks)
12. The 'BASE' within a block file should be set to 0,0,0

6.1 Port Blocks

The Port has developed blocks within a master block drawing, as well as maintained the blocks within individual drawing files to create a block library. It is recommended that consultants use these blocks for consistency within drawings for the Port. If you need access to these files, please contact the Port.

For any additional blocks that you may need or use within your drawings, please forward individual drawing files of your blocks and a list describing each block to the Port. After review, the Port may allow you to use these blocks for your project. The Port may adopt these new blocks to use within their CAD Standards.

Chapter 7 – Linetype Standards

7.0 Linetype Standards

Linetypes are used in drawings to delineate lines for clear identification. They can be used on any layer. Complex linetypes for mechanical drafting can have letters imbedded in the line to show the function of the line or pipe it represents. The “ltscale” or “linetype scale” will be determined by the individual for best representation of the linetype text. “ltscale” of “0.25” or “0.5” will be used rather than “0.23” or “0.497” respectively.

The existing linetype definitions that are packaged with AutoCAD are sufficient for most of the Port CAD Department and its customer’s needs. These linetypes are the industry standard and are recognized as the standard in this document. The standard AutoCAD linetypes are stored in the “acad.lin” file. Some additional linetypes along with the APWA linetype standards have been added to the “acad.lin” file (Refer to Appendix A for associated files). This will be the standard linetypes used at the Port.

Chapter 8 – Text Styles

8.0 Text Styles

The Port’s standards for naming text styles is to match the font style that is being used in uppercase. For Example: If you want to use the font “romans.shx”, you will name your text style “ROMANS”. All settings will be set to the default. Refer to the diagram below. The only exceptions are:

Standard = The Port uses the “simplex.shx” font for this style.

The existing text style definitions that are packaged with AutoCAD are sufficient for most of the Port CAD Department and its customer’s needs. These text styles are the industry standard and are recognized as the standard in this document. They should be left at a Height of “0” so that AutoCAD can prompt for a height when the text is entered in the drawing. By leaving the standard text style height at “0” you can change the text style height to what you need when prompted, therefore not having to create multiple text styles using the same font.



8.1 Standard Text Heights

- 3/32" = Minimum text height for all Full Scaled Drawings
- 1/8" = Standard text height for all Full Scaled Drawings General Notes, Dimensioning, Tables, Scale Callouts, Etc.
- 1/4" = Standard text height for all Full Scaled Drawings Table Headers, Drawing Headers, Legend Headers, Drawing Titles, Etc.

Imperial – Architectural US Foot									
Architectural - US Foot		Plotted Text Height							
		3/32"	1/8"	5/32"	3/16"	1/4"	3/8"	1/2"	1"
Viewport Scale Control		Actual "FOOT" height of text in AutoCAD Drawing							
1/32"=1'-0"	Text Ht =	3'	4'	5'	6'	8'	12'	16'	32'-0"
1/16"=1'-0"	Text Ht =	1'-6"	2'	2'-6"	3'	4'	6'	8'	16'-0"
3/32"=1'-0"	Text Ht =	1'-1.5"	1'-6"	1'-8"	2'-3"	3'	4'-6"	6'	12'-0"
1/8"=1'-0"	Text Ht =	9"	1'	1'-3"	1'-6"	2'	3'	4'	8'-0"
1/4"=1'-0"	Text Ht =	4.5"	6"	7.5"	9"	1'	1'-6"	2'	4'-0"
3/8"=1'-0"	Text Ht =	3"	4"	5"	6"	8"	1'	1'-4"	2'-8"
1/2"=1'-0"	Text Ht =	2.25"	3"	3.75"	4.5"	6"	9"	1'	2'-0"
3/4"=1'-0"	Text Ht =	1.5"	2"	2.5"	3"	4"	6"	8"	16"
1"=1'-0"	Text Ht =	1.125"	1.5"	1.875"	2.25"	3"	4.5"	6"	12"
1 1/2"=1'-0"	Text Ht =	.75"	1"	1.25"	1.5"	2"	3"	4"	8"
3"=1'-0"	Text Ht =	.375"	.5"	0.625"	.75"	1"	1.5"	2"	4"
6"=1'-0"	Text Ht =	.1875"	.25"	.3125"	.375"	.5"	.75"	1"	2"

Imperial – Engineering Decimal Foot									
Engineering – Decimal Foot		Plotted Text Height							
		3/32"	1/8"	5/32"	3/16"	1/4"	3/8"	1/2"	1"
Viewport Scale Control		Actual "FOOT" height of text in AutoCAD Drawing							
1" = 1'	Text Ht =	.09375'	.125'	.15625'	.1875'	.25'	.375'	.50'	1'
1" = 5'	Text Ht =	.46875'	.625'	.78125'	.9375'	1.25'	1.875'	2.5'	5'
1" = 10'	Text Ht =	.9375'	1.25'	1.5625'	1.875'	2.5'	3.75'	5'	10'
1" = 20'	Text Ht =	1.875'	2.5'	3.125'	3.75'	5'	7.5'	10'	20'
1" = 30'	Text Ht =	2.8125'	3.75'	4.6875'	5.625'	7.5'	11.25'	15'	30'
1" = 40'	Text Ht =	3.75'	5'	6.25'	7.5'	10'	15'	20'	40'
1" = 50'	Text Ht =	4.6875'	6.25'	7.8125'	9.375'	12.5'	18.75'	25'	50'
1" = 60'	Text Ht =	5.625'	7.5'	9.375'	11.25'	15'	22.5'	30'	60'
1" = 70'	Text Ht =	6.5625'	8.75'	10.9375'	13.125'	17.5'	26.25'	35'	70'
1" = 80'	Text Ht =	7.5'	10'	12.5'	15'	20'	30'	40'	80'
1" = 100'	Text Ht =	9.375'	12.5'	15.625'	18.75'	25'	37.5'	50'	100'
1" = 120'	Text Ht =	11.25'	15'	18.75'	22.5'	30'	45'	60'	120'
1" = 125'	Text Ht =	11.71875'	15.625'	19.53125'	23.4375'	31.25'	46.875'	62.5'	125'
1" = 150'	Text Ht =	14.0625'	18.75'	23.4375'	28.125'	37.5'	56.25'	75'	150'
1" = 175'	Text Ht =	16.40625'	21.875'	27.34375'	32.8125'	43.75'	65.625'	87.5'	175'
1" = 200'	Text Ht =	18.75'	25'	31.25'	37.5'	50'	75'	100'	200'
1" = 250'	Text Ht =	23.4375'	31.25'	39.0625'	46.875'	62.5'	92.5'	125'	250'
1" = 300'	Text Ht =	28.125'	37.5'	46.875'	56.25'	75'	112.5'	150'	300'
1" = 400'	Text Ht =	37.5'	50'	65'	75'	100'	150'	200'	400'
1" = 500'	Text Ht =	46.875'	62.5'	78.125'	93.75'	125'	187.5'	250'	500'
1" = 600'	Text Ht =	56.25'	75'	93.75'	112.5'	150'	225'	300'	600'
1" = 700'	Text Ht =	65.625'	87.5'	109.375'	131.25'	175'	262.5'	350'	700'
1" = 800'	Text Ht =	75'	100'	125'	150'	200'	300'	400'	800'
1" = 1000'	Text Ht =	93.75'	125'	156.25'	187.5'	250'	375'	500'	1000'

Chapter 9 – Dimension Style Standards

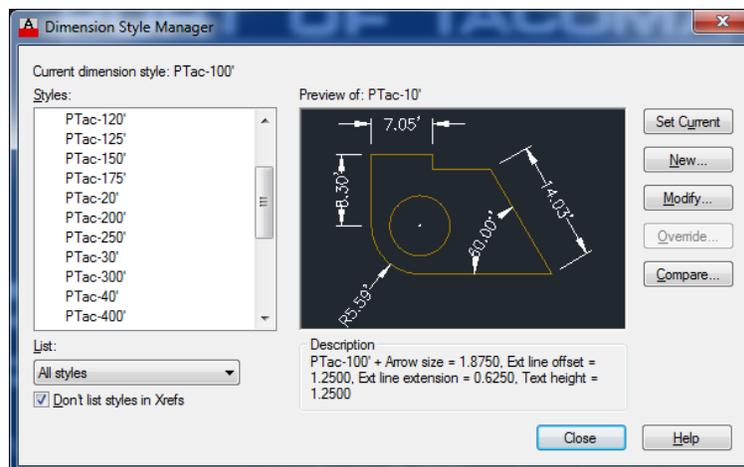
9.0 Dimension Styles

“Dimension Styles” are a named group of dimension settings that determine the appearance of the dimension. Each style depends on the drawing type, drawing scale, and application. The contractor and A/E consultants will need to follow the Port’s standards. This will represent the dimensioned object or objects in the clearest form possible for the Port while staying within the industry standard for dimensioning.

The text that goes along with the dimensioning should always be linked with the dimensioning and never exploded. This assures users the ability to modify dimensions knowing that the text will be updated as well. Dimension style colors will always be set to “bylayer”. All dimension variables will reside on the same layer. If a dimension resides on a layer named “GEN-DIMS”, then the dimension line color, extension line color, and dimension text color will also reside on layer “GEN-DIMS”. All dimension styles will have the Text Color set to “White” for best clarity when printing. This is already setup within the Port’s standard dimension styles. The only modifications a contractor or A/E consultant may do to a standard Port dimension style may be with the leader line in that they may adjust a dimensions leader to loop or have an arrow, etc. depending on the drawing needs. Also, the contractor or A/E consultant may adjust the dimension text location if it does not fit within the dimension callout.

The dimension styles will all be located within a default drawing setup file or titleblock that includes all the other Port CAD departments standards such as (layouts, linetypes, variables, text styles, etc.). The drawings system variable “dimscale” should always be set to “1” since the dimension styles are already set up. If a drawing requires multiple views using multi-size dimensions, then a different dimension styles will be used accordingly for each view. Remember that all dimensioning will be done in model space unless approved to be used in paper space by the Port

Below is an image depicting a list of the Port’s dimensions that are within the Port’s titleblock drawings.



Chapter 10 – External References

10.0 General XREF Information

The following are required when using external references:

1. Xref drawings should follow the Port's coordinate system so that when inserted, an xref drawing will align with the base drawing. Insert external references (xrefs) at (0, 0, 0) no exceptions.
2. Xrefs will only be used when necessary.
3. Xref drawings will be in an appropriate folder structure, with a maximum of 1 subdirectory. Xrefs can be in the same folder as the sheet files. Ideally this is the best option.
4. Only full path attachments of xrefs may be made. No overlays.

10.1 XREF Folder & File Structure

1. Naming convention for Proposed XREF Items

[Proj. No.]-X-[APWA Discipline Designator][Sequence 01 -> 99 (if needed - 4 character limit)]

Example, assuming the Project Number to be E4301:

E4301-X-SD.dwg – Storm Drain Design Base / Reference file

E4301-X-SD01.dwg – Storm Drain Design Base / Reference file (assuming a series of files is needed – 4 character limit).

2. Naming convention for Existing XREF Items

[Proj. No.]-XEX-[Discipline Designator (*same as Layers*)][Sequence 01 -> 99
(if needed – 4 character limit)]

Example, assuming the Project Number to be E4301:

E4301-XEX-SF.dwg – Existing Site Features Base / Reference file

E4301-XEX-SF01.dwg – Existing Site Features Base / Reference file (assuming a series of files is needed – 4 character limit).

Chapter 11 – Plotting

11.0 CTB Files

The Port has a full scale ctb file (Ansi-D) and a half scale ctb file (11x17). Because there are so many different kinds of drawing submittals to the Port, these CTB Files may need to be modified to delineate and emphasize what is needed in the drawing file. These files are flexible to be modified by the consultant. The consultant will use their best judgment in look and feel when setting up the drawing for plotting. The Port will provide feedback during review if the represented line-work needs to be adjusted. (Refer Appendix A for the reference files)

Chapter 12 – AutoCAD & Files

12.0 Lisp & Script Files

Lisp and Script files that are used on project drawings submitted to the Port are used at the contractor or A/E consultant's discretion if these files do not alter the CAD Standards set forth by the Port. These files may be submitted along with the record drawing files if there is clarification on how they are used.

12.1 DGN Files

DGN files and MicroStation design related files and are not accepted or supported by the Port. For contractor's or A/E consultants that use MicroStation, they must convert the drawing files to DWG format before submitting electronic files to the Port.

12.2 Database Files

Database files that are linked to AutoCAD geometry must accompany the drawing file and reside in the same folder as the drawing file itself.

12.4 Standard Drawing Variable Settings

- USCICON shall be ON, <1>.
- VISRETAIN shall be ON, <1>.
- BLIPMODE shall be OFF, <0>.
- PSLTSCALE shall be ON, <1>.
- LTSCALE shall be set to "1", when in PaperSpace.
- MAXSORT shall be set to "1000" or greater (a layer sort limit).
- DIMASO shall be set to ON, <1> (also relates to the Port's "Chapter 9 - Dimension Style Standards")

Chapter 13 – Plan delivery

13.0 Methods

Drawing files can be delivered through multiple methods for example, FTP, web exchange, email, CD or jump drive. Hard copy plans can be delivered on bond paper. These will be stamped and signed when bid sets & record sets are delivered.

13.1 eTransmit

eTransmit is an acceptable method to use within CAD to combine related project drawings and data that are to be submitted to the Port as project deliverables. If eTransmit is used, it is preferred that it is setup so that the "Path Option" uses the organized folder structure that is outlined within Section 1.5c of these CAD Standards.

Appendix A – Associated Files to the Manual

You can access this current Port CAD Standard on the Port Website along with the associated files.

<https://portoftacoma.com/contracts/forms>

These are the files associated with the Port CAD Standards.

PTac CAD Stand-Proposals.xls = If there are additional Layers/Linetypes/Blocks that you would like to use that are not in the Port Standards, use this sheet to list them here to get approval from the Port before their use in record plans.

Port Standards Checker.dws = Use this file to check Port Standards Compliance with your drawings using the Cad Standards tool.

Additional files, such as the Port Titleblocks, Block Libraries, and Plot Files are available by requesting them through the Port Project Manager. These include the following...

PTac TB 22x34 P-block.dwg = Part of the Port Titleblock package

PTac TB 22x34 P-xref.dwg = Part of the Port Titleblock package

PTac TB 22x34 P-cover.dwg = Part of the Port Titleblock package

PTac Master Block Lib.dwg = This file includes the Port Blocks/Layers/and Linetypes

PTac Master Linetypes.lin = This file has all of the Ports adopted CAD Linetypes

PTac Callouts & Labels.zip = This Zip file includes all of the Port callouts and labels.

PTAC_11x17_B&W.ctb = Half Scale Plot File Black and White

PTAC_11x17_Color.ctb = Half Scale Plot File Color

PTAC_22x34_B&W.ctb = Full Scale Plot File Black and White

PTAC_22x34_Color.ctb = Full Scale Plot File Color

Appendix B – Resources

APWA Office Addresses

Kansas City Missouri Office
1200 Main Street, Suite 1400
Kansas City, MO 64105-2100
Phone: (816) 472-6100
Fax: (816) 472-1610
Toll-Free: (800) 848-APWA

Washington DC Office
1275 K Street, NW, Suite 750
Washington, DC 20005
Phone: (202) 408-9541

NCS Office Address

National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, DC 20005
202-289-7800
202-289-1092 Fax

For more information about NCS, visit www.nationalcadstandard.org.

AIA Office Address

The American Institute of Architects
1735 New York Ave NW
Washington, DC 20006-5292
Fax: (202) 626 7547