

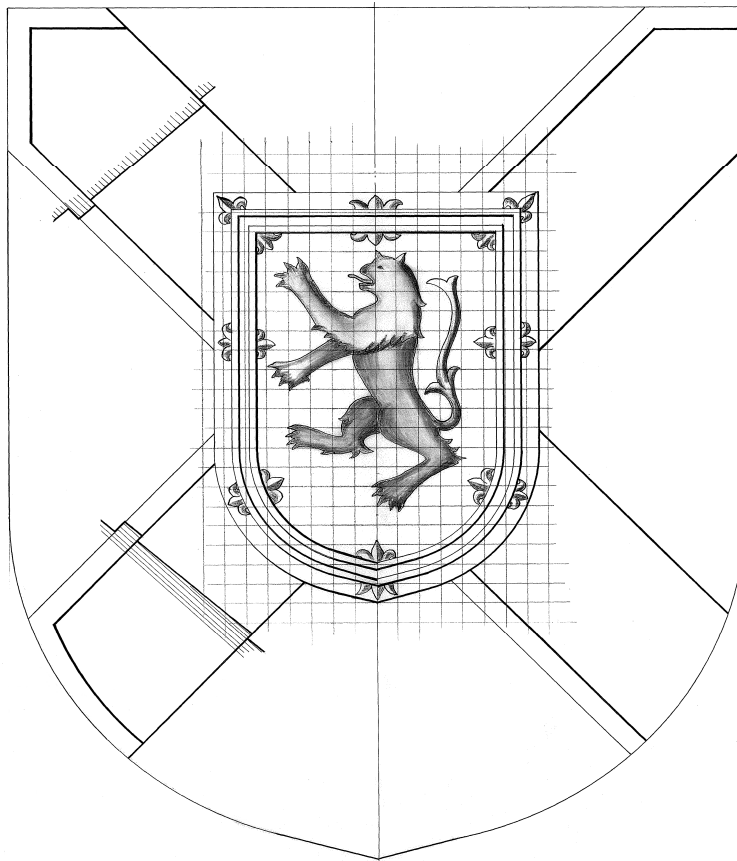
TPW CADD STANDARDS
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TRANSPORTATION & PUBLIC WORKS

CADD Standards



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FAQ: for frequently asked questions (FAQ) and contact information, please refer to appendices b & c (at the back of this document)

About the cover: The creation of technical drawings, which convey project information in an accurate, concise and legible manner, combines advanced technical knowledge and skill, with a keen sense of aesthetics. In the past this was accomplished by the drawing techniques illustrated by this early 1950's era working drawing from the re-construction of the Keltic Lodge In Ingonish Beach, C.B., from TPW archives. The cover illustration provides a bridge between past and present and demonstrates that although the skills have changed, the requirements for precision and accuracy have not.

1 general introduction

Reasons for CADD standards

Computer aided Design and Drafting (CADD) standardization is an integral component of information management planning for the Nova Scotia Department of Transportation and Public Works (TPW). The digital files produced by and for the department are an important public asset and return their investment by allowing for quick retrieval and reuse of digital data for incorporation into a multitude of document types and future projects. In order for CADD files to be used efficiently they must adhere to a set of standards, which allows for easy transfer and compatibility by all users. (See additional resource material in **appendix a.**)

1.1 quality assurance / quality control, of CADD data

The Nova Scotia Department of Transportation and Public Works will ensure Quality Control of the CADD files produced by or for the Department by means of a checklist form entitled “TPW Quality Assurance Checklist for CADD Drafting”. (**appendix d**). The delivered work must meet the pass mark established or NS DoT & PW will deem the work unacceptable and thereby require the consultant to make right the problem at the consultant’s cost. Furthermore, TPW will exercise its option to withhold payment of the contracted work as set out in the contract terms until the work is made right.

The “TPW Quality Assurance Checklist for CADD Drafting” can be self-administered in assuring adherence to the CADD Data Specification prior to delivery to TPW. As well, a self-assessment of conformance to industry drafting practice as specified by the Canada Standards Association (CSA) Drafting (Building) standard can be applied as well. Sheet layout, content and naming conventions should adhere to the Uniform Drawing System (UDS) unless otherwise noted in this document.

The checklist has 4 quality control areas. The checklist passmark is 80%. Each QC area is weighted according to the following points system. Additionally, there are several QC items that a zero tolerance for non-conformance has been established.

<p>Drafting Basics Value 30</p>	<p>Proper drafting units, correct use of lineweights, proper dimensions & text layout, correct drawing scales, proper use of title sheet/graphic scale/section bubbles, proper symbology usage, correct grid notation, etc.</p>
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CAD Basics Value 40	1 to 1 drafting, title sheet inserted at (0,0) and plotted at 1:1, lower left of building extents set at (0,0), no x-refs (in submitted files), purged drawing, lines snapped to each other, graphics/symbols on proper layer, no exploding, etc.
Layering/pen colours Value 20	Correct pen colours and adherence to the TPW colour standard for CADD. Entities drawn with colour and linetype "bylayer"
Text/Dim styles Value 10	Proper Text styles & Dimensioning practices.

NOTE: This document, N. S. Department of Transportation and Public Works CADD Standards and related material is a dynamic standard and is subject to change and revision by the Department at any time. It is the responsibility of the person submitting work to this Department to ensure that he/she is using the most up-to-date version

2 project delivery

2.1 project start up

All projects are to be completed, using CADD, as per Departmental standards. All projects are to be submitted in electronic format (which is easily stored, archived and transferred). All project drawings are to be CADD based and may contain electronic files of other types such as image files, however all new work is to be vector based. No hand drawn or scanned images are to be submitted except as described by this document.

All programs, program versions and file types are to be compatible with TPW standards and it is the responsibility of the consultant to check and verify the suitability of all systems with the project design leader prior to commencement of the project.

Where consulting and/or CADD services will be provided externally, it is the responsibility of the service provider (consultant) to obtain and adhere to the Nova Scotia Department of Transportation & Public Works CADD Standards. The consultant shall co-ordinate start-up of the project with the TPW Project Design Leader. The TPW Project Design Leader shall verify that the consultant is provided with the most up-to date CADD standards, prototype drawings, title sheet blocks, graphics, related data, legacy CADD drawings and archival information as is available, at the time of commencement of each project.

Note: Pertinent CADD (vector based) drawings and archive data files (electronic, raster image format) shall be provided to the consultant subject to availability at the commencement of each project. Existing digital information, where available, shall be used to form the foundation for new project drawings. Any areas critical to the project shall be verified by field checking. Any new digital drawing files created must be modified to include any discrepancies found. The extent of verification of the existing digital files should be addressed at the start up meeting.

2.2 work in progress

All work in progress shall be routinely backed up by the consultant. All electronic CADD data shall be submitted to the Department on compact disk or via FILO FTP site (filo.gov.ns.ca) via the designated contact person at the 30%, 60% and 90% project development stage of the project. If transmitted through FILO, the files shall be bound and zipped (using Winzip) and file

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size should be limited to between 5 and 10 megabytes where practical, for efficient transfer. Larger file sizes may be accommodated if required up to the limit of the FILO FTP transfer site. (Not specified in this document as this file size will vary over time).

Digital files of drawings developed through consultants or other external CADD services shall be viewed by specifically trained TPW personnel at time of receipt and reviewed for compliance with the standards contained in this document. The CADD service shall maintain the drawings in their own project directory until the project is completed and all record drawings for the project are completed, verified and accepted by the Department. The Project Design Leader shall obtain a copy of the verification checklist signed by the designated CADD personnel and shall convey this to the consultant.

2.3 production of contract drawings

Drawing sheet size shall conform to the following:

SHEET DESIGNATION	OVERALL SIZE (mm)	INSIDE BORDER SIZE
B1	707 x 1000	687 x 970
A0	841 x 1189	821 x 1159
A1	594 x 841	574 x 811
A2	420 x 594	400 x 564
A3	297 x 420	277 x 390
A4	210 x 297	190 x 267
A4 (vertical)	297 x 210	277 x 180

The B1 sheet is the most widely used size and usually accommodates an entire floor plan. Do not use A0 sheet unless by written permission of Project Design Leader. This permission would be granted where a project is large in scale and would not fit on a smaller sheet.

NOTE: When drawings larger than 860 x 1120 or A0 are required, it is recommended that drawings be used having a width of 860 or 841 and a length in increments of 150. Digital files of standard TPW formats will be provided in required standard size and should not be altered or modified without authorisation.

All drawings will be microfilmed and / or scanned for archival purposes by TPW and all lines, lettering, notes, details, sections, etc., on the original drawings must be of sufficient size and weight of line to result in clear, legible drawings when reproduced. Particular attention is to be paid to the spacing between characters and printed lines of characters, and line weights assigned to symbols or standard conventions. Because distortion may result from the size reduction and enlargement process, completeness of dimensioning is essential in order that no scaling of drawings is necessary.

The use of electrostatic plotters may not produce an image of sufficient density or anticipated longevity to meet departmental requirements. Sample plots are to be provided or electrostatic plotters can be used to plot CADD drawings on paper media which can then be used to produce

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photo mechanical reproducibles (chronoflex) acceptable as the final product. Diazo intermediate film will not be accepted for final contract drawings.

Original drawings, defined as first generation, single or overlay composites, submitted as final, shall become the property of the Nova Scotia Department of Transportation and Public Works. Second generation or subsequent copies will not be accepted.

2.4 contract drawing submission

Submission of final as-built Contract Drawings (record drawings) is to be in hard copy as per Departmental contract and must be accompanied by digital CADD (record drawing) files. The hard copy drawings and digital files must represent exactly, the as-built conditions on site at the time of completion of the project. ALL changes made to the project during the construction phase, by ALL disciplines and sub-disciplines are to be incorporated into the contract drawings at the record drawing stage prior to submittal to TPW. All changes must be clearly and properly denoted on the record drawing sheets as per standard drafting convention on both the hard copy and electronic files.

Procedures for denoting revisions should include, (but not be limited to) the following: All revisions are to be recorded in the revision area of the title block, noted as per revision number, date, reason for revision. Triangular symbols with numbers inside are to denote the changes on the drawings. Clouds are to be used to denote areas of revision where there is a significant area involved. Where major revisions are required, entire sheets shall be re-issued and numbered as per chapter 4 of this document. Hard copy files must be submitted to TPW requirements and must exactly match the electronic version. The final digital files received must meet all standards set forth in this document.

These files are to be transmitted to the Department as complete entities in the record drawing (as-built) stage with all associated files inserted and bound as one drawing.

Acceptable file type: **native AutoCAD .dwg file format** – most recent version (or version approved by TPW). All entities shall be visible and available in model space. All drawings and directories shall be purged of superfluous data. Only those items appearing on the sheets shall be included in the record drawing. Any associated files used for the creation of the model space entities (such as image files of floor plans, etc.) shall be submitted to TPW as part of the body of work and shall be placed in separate files and organised into sub-directories and shall be properly labelled. Refer to **section 3.9** for drafting conventions.

2.5 electronic file submission

Electronic files shall be submitted to the department on archive quality CD media. Quality standards for media are to be as per TPW archival standards or minimum 25 year shelf life whichever is greater. Three (3) copies of the final drawings are to be forwarded to TPW in electronic format on CD media, as described in this document.

2.6 electronic file exchange format

In some instances it may be necessary to exchange drawing information between the parties involved in design and construction projects. This may be through direct file exchange or via means of posting on the world wide web. In this case, the preferred format is the .dwf (Drawing Web Format) and this file format is to be used whenever practical. This is **NOT** to be used as format for record drawing submittal to TPW however, may be used, at the discretion of the project design leader throughout the course of the project for data exchange. This is a compact format compatible with AutoCAD and is preferred over other electronic exchange formats such as raster images. Programs for viewing and printing this format are available free of charge on the world wide web.

A set of record drawings in .dwf format shall be provided to TPW in addition to the set of record drawings submitted in AutoCAD .dwg format. DWF format drawing files shall be placed in a separate directory on the submission CD or on a separate CD and properly identified as such. Dwf format files are to be identical to record drawings and are to be created only after completion of the record drawing set.

3 computer assisted drafting conventions

3.1 drawing file composition

Drawings are to be composed at full scale (real world units), with text, symbols, hatch patterns and line widths adjusted by scale factor required. Completed drawings to be compiled on standard title sheets for final storage. Title sheet blocks must always be inserted at 0,0,0 with scale factor of 1 and rotation angle of 0.

Compilation of final drawing package must be by placing Title Sheet in Paper space with Model space graphics in scaled viewports. Layer visibility may be controlled individually, by viewport if required.

3.2 system of measurement

The International System of units (S.I. metric) is to be used to prepare all drawings. The unit for linear dimensioning is the millimetre (mm), except where the scope of the drawing requires the use of the metre (m), such as in site plans. Whole numbers will indicate millimetres, e.g., 453, 3400, etc.; and decimalized expressions to three places of decimals will indicate metres, e.g.: 6.457, 3.400, etc. All other dimensions and notations should be followed by the unit symbol.

3.3 reference points and orientation

All Plan Views of facilities, e.g.: Site Plans, Floor Plans, etc., must contain sufficient information to relate the new work to the actual existing site. There must be a minimum of two fixed reference points, or a baseline established on the plan from which the new work can be readily laid out or measured during and after construction. The corresponding reference points on the site must be clearly defined, accessible and unlikely to be disturbed during construction.

All Site Plans should be drawn using the World Coordinate System (WCS) with North vertical. The Grid North Arrow must be included, along with notation for specific mapping grid projection being used and grid coordinate values for reference points. User Co-ordinate Systems (UCS's) may be used to orient the drawing orthogonally as desired to facilitate work. The base point may be set to one of the reference points to facilitate insertion of the plan, but the WCS origin must

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remain at 0,0 to retain proper coordinate values. Site Plan entries must not be moved or rotated under any circumstances, as this would destroy spatial orientation.

Building Floor Plans that are not related to a specific mapping grid projection should be drawn with the main building façade oriented horizontally at the bottom, where possible, and the base point (0,0,0) (model space) at extreme lower left corner of building footprint, as shown in figure 3.3. This base point must be common for all levels of the building to ensure accurate alignment when overlaying floors and building grids. The North Arrow, including associated information (Magnetic North, True North, Reference North, etc.) must be included in the proper direction. Project north should be indicated on all plans. The relationship of Project North to Grid North must be clearly indicated. Sheet orientation shall have north pointing toward the top of the sheet and orientation of plans with respect to North shall be similar on all sheets.

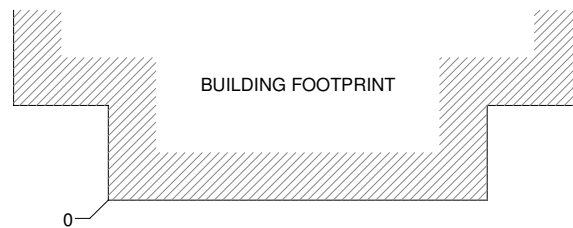


FIG. 3.3

3.4 preferred scales

The selection of scale for drawings must be given careful attention to ensure that all information required to carry out work is accurately conveyed in the most economical space. The preferred scales for various drawing components are provided in the following table:

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Commonly used preferred scales			
Stage:	Type of Drawing	Scale	Notes:
Design	Sketch and Preliminary drawings	-----	Scales will vary but it is recommended that preference be given to those used in the working drawing stage.
Working drawings	Location drawings	-----	Scale will vary according to maps used as reference
	Key Plan	1:2000 1:1000	
	Site Plan	1:500 1:200	
	General Location Drawings	1:200 1:100 1:50	
	Component range drawings	1:100 1:50 1:25 1:20	
	Assembly drawings	1:25 1:20 1:10 1:5	
	Component detail drawings	1:10 1:5 1:1	

In special cases, the recommended range of preferred scales might be extended; however, the new scale shall be created, in multiples of 10, from a recommended scale.

To facilitate scaling from reduced or enlarged reproductions, each plan, section, detail, elevation, profile, etc., on a completed drawing sheet shall be accompanied by a graphic scale.

The graphic scale shall be located immediately below the pertinent heading. The TPW standard graphic scales associated with this document are available in CADD format

3.5 layer colours and pen weights












Colour is to be used in TPW drawings as the method of defining line weight to a plotter. Layers must be assigned appropriate colours and entities must be created with colour bylayer, except as provided for in the creation of symbols, Section 4.4.

Where user defined pens are used, a configuration file must be supplied by the user, at the time each drawing is submitted to TPW.

Standard line weight assignments are as follows:

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(Note: Mapping *information* is not required to adhere to the following colour standard. Where maps incorporate standard sheets or symbols, the sheets, symbols and other entities shall adhere to TPW CADD standards where applicable).

AutoCAD COLOUR		PLOT COLOUR	LINE WEIGHT	WIDTH SAMPLE
PRIMARY	SECONDARY			
1 (red)	7,9	Black	0.250mm	
2 (yellow)	11	Black	0.300mm	
3 (green)	12,14	Black	0.350mm	
4 (cyan)	15	Black	0.400mm	
5 (blue)		Black	0.500mm	
6 (magenta)		Black	0.700mm	
7 (white)		Black	0.250mm	
8 (dark grey)		Black	0.170mm	
9 (light grey)		Black	0.250mm	
16-249		Colour or black, user defined. Configuration file must be supplied at the time of each submission.	.0250mm or as assigned by user	
250-255		Various grey tones Assign respective pens 250-255	0.250mm	

Note:

Pens 1-15 and pens 250 – 255 are to be used as the default pens for CADD drawings. Pens 16 – 249 are to be used only after the above pens have been assigned and additional pens are required.

Line use examples:			
Thin – 0.160mm	Medium – 0.250 to 0.400mm	Thick – 0.500mm	Extra Thick – 0.600mm & up

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Reference plans Existing work Leader and extension lines Dimension lines Centre lines – axes Intermediate contour lines Phantom lines Hatching	Visible object outlines Hidden lines Index contour lines	Cutting / Section lines viewing planes Titles / headings Reference lines Match lines lines	Border lines
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3.6 annotation styles

Text for drawings must be created using TPW standard text styles using only standard windows or AutoCAD font files as indicated below. Alternate fonts will be accepted only where required characters are not available in any standard Windows or AutoCAD font file and prior approval is obtained from the TPW representative reviewing the CADD files. Where alternate fonts are used, they must not be proprietary and digital files of the font file must accompany the drawings. Where applicable provide both compiled font file (.shx) and source file (.shp). Where company logos appear on the sheet the proprietary file (drawing or shape or other) must accompany the project. All text should be left justified (except as specifically required such as centered in symbols or blocks).

Font style names are to bear the same names as the font. The primary fonts to be used for the production of working drawings is the Romans (.shx) or Simplex (postscript) font. No “hand” style fonts are to be used on tender drawings. Text height is to be set to “0” in style definition.

TEXT STYLES		
STYLE (COMMON EXAMPLES)	FONT	USAGE
ROMANS, SIMPLEX	ROMANS SIMPLEX	ALL TENDER (WORKING) DRAWINGS. USE ONLY SANS SERIF FONTS FOR WORKING DRAWING PURPOSES.
TIMES NEW ROMAN	TIMES NEW ROMAN	SPECIALTY TEXT, HIGHWAYS GROUP
ARIAL ARIAL BOLD	ARIAL ARIAL BOLD	HEADINGS, DETAIL NUMBERING, TITLE BLOCK INFORMATION (WHERE INDICATED BY DoT &PW)

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“HAND”	ALL “HAND” STYLE FONTS	<p>NOT PERMITTED FOR ANY CONSTRUCTION (TENDER) OR POST CONSTRUCTION PHASE DOCUMENT</p> <p>PERMITTED AT PRELIMINARY DESIGN STAGE FOR PRESENTATION PURPOSES ONLY. If used for this purpose, specialty or “hand” style fonts shall be <u>clearly</u> legible and shall be of sufficient size and clarity to meet microfilm standards.</p>
OTHER STYLES (STYLE NAME TO MATCH FONT NAME)	OTHER STANDARD WINDOWS AND AutoCAD FONTS ONLY	<p>USE ROMANS AND ARIAL FONTS FOR ALL CONSTRUCTION AND POST CONSTRUCTION PHASE DOCUMENTS.</p> <p>OTHER FONTS MAY BE USED BY PERMISSION OF DOT & PW ONLY AND ONLY WHERE NECESSARY TO DESCRIBE THE WORK .</p> <p>FONT SIZES ARE INDICATED IN TEXTSIZE TABLE</p>

Standard text height for notes, dimensions and annotations, etc., must be 2.5mm real world units (plotted height) minimum. Standard text height for major headings is to be 5.0mm and sub-headings to be 3.5mm. Text smaller than 2.5mm may only be used for special conditions and prior approval must be obtained from the DoT & PW representative reviewing the CADD files.

SCALE:	TEXTSIZE						
	2mm	2.5mm	3mm	3.5mm	4.5mm	5mm	6mm
1:10	20	25	30	35	45	50	60
1:20	40	50	60	70	90	100	120
1:25	50	62.5	75	87.5	112.5	125	150
1:50	100	125	150	175	225	250	300
1:75	150	187.5	225	262.5	337.5	375	450
1:100	200	250	300	350	450	500	600
1:125	250	312.5	375	437.5	562.5	625	750
1:200	400	500	600	700	900	1000	1200
1:250	500	625	750	875	1125	1250	1500
1:300	600	750	900	1050	1350	1500	1800
1:400	800	1000	1200	1400	1800	2000	2400
1:500	1000	1250	1500	1750	2250	2500	3000
1:1000	2000	2500	3000	3500	4500	5000	6000

Pen weight for text shall be .35mm minimum typical weight. This shall be consistent across all drawings and details within a drawing where standard notational text occurs.

3.7 dimension styles

Standard TPW named dimension styles must be used at all times. All dimensioning must be created on entities in model space with associative dimensions. Two dimensioning formats are used to cover most applications for TPW projects:

Style 1: Engineering style for **all construction (tender documents) and working drawings** with open arrowheads for dimension terminators.

Style 2: Architectural with ticks for dimension terminators **for preliminary work and presentation drawings only**, (or Style 1 may be used everywhere, whichever is preferred)

Dimension styles are to be named cryptically according to the style they represent .

For example:

E_100mm represents style 1 – Engineering with scale 1:100 and millimetres for units.

A_50mm represents style 2 – Engineering with scale 1:100 and millimetres for units.

Dimensions may have a modifier added to the name: e.g. **E_100mm_0**

Modifiers are as follows:

NONE = normal

0 = Both extension lines suppressed.

1 = First extension line suppressed.

2 = Second extension line suppressed.

The time it takes to create, edit and maintain dimensions is reduced by using dimension styles. Dimension styles are created by specifying values for a number of dimension variables and saving the style with a unique name. The dimension style controls the appearance of all the dimensions created while the dimension style is active. Changes to the dimension style will automatically be reflected in the associated dimensions.

DIMENSION VARIABLES			
Variable description	Variable	Engineering	Architectural
Alternate units selected	DIMALT	Off	Off
Alternate unit decimal places	DIMALTD	4	4
Alternate unit scale factor	DIMALTF	0.03937	0.03937
Alternate unit decimal places	DIMALTTD	4	4
Alternate tolerance zero suppression	DIMALTTDZ	0	0
Alternate units	DIMALTU	4	4
Alternate units zero suppression	DIMALTZ	0	0
Prefix and suffix for alternate text	DIMAPOST	Nil	nil
Create associative dimensions	DIMASO	On	On
Arrow size	DIMASZ	3.0000	3.0000
Angular unit format	DIMAUNIT	0	0

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Arrow block name	DIMBLK	Nil	arctick
First arrow block name	DIMBLK!	Nil	nil
Second arrow block name	DIMBLK2	Nil	Nil
Centre Mark Size	DIMCEN	2.5	2.5
Dimension line and leader colour	DIMCLRDR	1 (grey)	1 (grey)
Extension line colour	DIMCLRE	8 (grey)	8 (grey)
Dimension text colour	DIMCLRT	Bylayer	Bylayer
Decimal places	DIMDEC	0	0
Dimension line extension	DIMDLE	0.0000	0.0000
Dimension line spacing	DIMDLI	10.0000	10.0000
Extension above dimension line	DIMEXE	2.0000	2.0000
Extension line origin offset	DIMEXO	1.0000	1.0000
Fit text	DIMFIT	3	3
Gap from dimension line to text	DIMGAP	1.2500	1.2500
Justification of text on dimension line	DIMJUST	0	0
Linear unit scale factor	DIMLFAC	1*	1*
Generate dimension limits	DIMLIM	Off	Off
Prefix & suffix for dimension text	DIMPOST	Nil	Nil
Rounding value	DIMRND	0.0000	0.0000
Separate arrow blocks	DIMSAH	Off	Off
Overall scale factor	DIMSCALE	1*	1*
Suppress the first dimension line	DIMSD1	Off	Off
Suppress the second dimension line	DIMSD2*	Off	Off
Suppress the first extension line	DIMSE2*	Off*	Off*
Suppress the second extension line	DIMSE2*	Off*	Off*
Update dimensions while dragging	DIMSHO	On	ON
Suppress outside dimension lines	DIMSOXD	Off	Off
Current dimension style (read-only)	DIMSTYLE	E_100mm*	A_100mm*
Place text above the dimension line	DIMTAD	1	1
Tolerance decimal places	DIMTDEC	4	4
Tolerance text height scaling factor	DIMTFAC	0.7500	0.7500
Text inside extensions is horizontal	DIMTIH	Off	Off
Place text inside extensions	DIMTIX	Off	Off
Minus tolerance	DIMTM	0.0000	0.0000
Force line inside extension lines	DIMTOFL	ON	ON
Text outside is horizontal	DIMTOH	Off	Off
Tolerance dimensioning	DIMTOL	Off	Off
Tolerance vertical justification	DIMTOLJ	1	1
Plus tolerance	DIMTP	0.0000	0.0000
Tick size	DIMTSZ	0.0000	0.0000
Text vertical position	DIMTVP	0.0000	0.0000
Text style	DIMTXSTY	Romans	Romans
Text height	DIMTXT	2.5000	2.5000

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Tolerance zero suppression	DIMTZIN	0	0
Unit format	DIMUNIT	2	2
User positioned text	DIMUPT	Off	Off
Zero position	DIMZIN	8	8

*these dimension variable settings are to be adjusted to accommodate scaling and units.

DIMSCALE is to be set to match plotting scale, e.g. If plot scale is 1=50, then DIMSCALE = 50. This variable can be set through the command line or by opening the dimension style dialog box, selecting *geometry*, and entering the appropriate value in the *Overall scale* box.

DIMLFAC is set to be 1 where base units are millimetres and 1000 for metres. This allows indicated dimensions to be always in millimetres even though base units and measured distances may be in metres. (This variable can also be adjusted to accommodate drawings not at a real world size.) This variable can be set through the command line or by opening the dimension style dialog box, selecting *Annotation*, selecting *Units* in the Primary Unit Box and entering the appropriate value in the *Linear* box.

DIMSE1 and DIMSE2 are to be set to *On* to suppress the dimension extension lines where necessary. These variables can be set through the command line or by opening the dimension style dialog box, selecting *Geometry*, and selecting *Suppress 1st or 2nd* in the Extension Line box as required.

DIMSTYLE is a read only variable that reflects the current dimension style's name. Once the dimension variables have been set they can be saved as a new dimension style.

Note: When changing dimension variables, be sure to save the dimstyle or they will only be set as dimension overrides.

3.8 linetypes

The appearance of linetypes should appear similar in both layout space and model space.

The appearance of linetypes in the drawing is determined by the system variables MEASUREMENT, LTSCALE and PSLTSCALE. The MEASUREMENT variable determines which linetype description file to use for linetype loading, ("0" sets default file to the imperial unit file acad.lin and "1" sets default file to the metric unit file acadiso.lin). The LTSCALE variable sets the global linetype scale factor and the PSLTSCALE controls linetype appearance in paper (layout) space. For consistent plotting results, the recommended values for the variables are as follows:

1. Title sheet in Paper Space with multiple variously scaled VIEWPORTS.
 - a) MEASUREMENT = 0
 - b) LTSCALE = 12
 - c) PSLTSCALE = 1 (On)

Do not set Linetype scale at the entity level. The Current Object Scale in the Linetype Properties dialog box (System Variable CELTSCALE) must be set to 1.0 to ensure creation of new entities do not have entity level linetype scaling.

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Linetypes should appear as “bylayer” where practical and no more than 5% of the linetypes in a drawing should deviate from this practice.

Drawings must not contain linetypes or complex linetypes other than those defined in the ACAD.LIN file supplied with AutoCAD.

3.9 drawing legibility and conventions

- 1 All intersections are to be closed.
- 2 Lines are to be trimmed to intersections.
- 3 Text used on tender (construction, working) drawings is to be in block letters. Font: romans or equivalent. No text style variables are to apply. Do not place boxes around text.
- 4 Text is to be placed so as not to overwrite other entities. Whenever possible or practical, textual information is to be placed away from the drawing’s line work with leaders extending into the drawing area.
- 5 Leaders should originate in similar locations in relation to text and should generally not cross over each other or be drawn at differing angles. Leaders are to be at 90 deg. angles or leaders are to be at approximately 30 deg. or 60 deg. angles and are to appear similar. to each other.
- 6 A variety of lineweights are to be used to enhance the readability of the drawings. On drawings showing new construction, existing condition entities are to be shown “greyed out” for clarity. New construction is to be in heavy, dark lineweight.
- 7 Only information pertaining to the drawing shall be displayed on a sheet, all other information is to be deleted or placed on frozen layers.
- 8 All partial plans are to be referenced to a “key” plan or detail reference to indicate where the partial plan is located in relation to the entire floor plan or site.
- 9 Clearly identify all component materials in details. In particular, continuity of air/vapour barriers are to be clearly indicated. Use broken linetype (dashed, hidden), weight: medium or heavy, (.35 to .6 mm).
- 10 Sheets are to be well organised as per the Uniform Document System (UDS) standard. Refer to **UDS module 2 – SHEET ORGANIZATION** for sheet layout requirements.
- 11 Sheet details are to be given descriptive names as identified on the sheet. Names such as “SECTION – BULKHEAD AT MAIN LOBBY” are preferred rather than just “SECTION”.
- 12 A building code summary is to be included in the drawing set and is to be listed in the drawing title.
- 13 Hatch patterns are to be on a separate layer for each major type of hatch.
- 14 Hatches are to be applied to new work as applicable to denote the extent and type of work. Existing structures are not to receive hatching.
- 15 The purpose of the drawings shall be clearly indicated by means of designation, eg: “**Concept only**”, “**Preliminary**”, “**Not for Construction**”, “**Issued for Construction**”, “**Record Drawing**”, “[**other reason for issue**]”, and should include any qualifying notation or limitation regarding the

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scope of the drawings. All releases shall be stamped and signed by the issuer (designer's personal seal).

- 16 Imperial dimensions are not to be used for the preparation of tender documents. However, in the event that a circumstance dictates the use of Imperial dimensions, the correct notation is as follows: Express dimensions of less than 12 inches, as inches, i.e.: 11", 7", etc.. Express dimensions 12 inches and above as feet and inches with a zero place holder as required, i.e.: 1'-0", 3'-4" 114'-0 3/4" etc.
- 17 Where details or sheets are omitted from a series or set such that there is a gap in the sequential numbering there shall be a notation to indicate that these missing elements do not comprise part of the final document set. This shall only be permitted to occur at the very end of the project where it would be difficult &/or time consuming to amend the documents. Gaps in the sequencing of sheets or details are to be corrected at the preliminary phases where possible.
- 18 The types of image files used within CADD drawings should be limited to .tif or .jpg where practical and these should be in native format and uncompressed. Where other file types are required these shall be co-ordinated through the project design leader.
- 19 All symbology used for CADD drawings to conform to the electronic symbols set as provided by TPW. In the instances where no TPW symbol is available, use the symbols as described by the CSA standard B-78.5 (most recent edition) Computer-Aided Design Drafting (Buildings).
- 20 Wall types are to be indicated on the plans and a legend is to be included on each 100 series plan drawing.
- 21 All consultants shall submit, as early in the design process as possible, CADD files of the site layout showing all traffic routes, parking areas, etc., to facilitate the evaluation process for the transportation related items.
- 22 All drawings are to have fire separations isolated "bylayer" and are to clearly denote them graphically.
- 23 All drawings are to be organised with layers conforming to the AIA CAD layer guidelines, by the American Institute of Architects (most recent edition). (Where layer and file names are specified in this document other than in the AIA, this document is to prevail.)

4 data structure for CADD information

4.1 drawing management & filing procedures

All CADD information submitted must be arranged in a logical format so it can be easily accessed and modified by the user. The **Uniform Document System (UDS)** is to be used as the standard for all drawing information submitted to the Nova Scotia Department of Transportation and Public Works. (For contact information for the UDS see **appendix b**) This standard provides for set **content and order**, as well as **file and sheet naming and numbering, sheet layout and discipline codes**. The consultant is responsible to maintain an up to date copy of the UDS standard and to make it available to all team members who participate in the work on a project. Drawings are to be organised according to the UDS standard.

The following is a brief summary of the UDS system, provided as a quick reference. Please obtain and refer to the actual UDS system manual for project use. The UDS manual includes more comprehensive documentation and examples than described within this document.

UDS modules to be used for the purpose of TPW work are the following:

- a) **Drawing Set Organisation**
- b) **Sheet Organisation**
- c) **Schedules**

A drawing set for a project must provide for the inclusion of each of the following types of construction drawings:

Bidding Drawings
Contract (Tender) Drawings
Resource Drawings
Addenda Drawings
Revision (Modification) Drawings
Record (As-Built) Drawings

All completed drawing sets should be clearly indicate the reason for issue and must be stamped and signed and dated correctly.

I.e. Issued for Tender, [date]

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Subsets:

Sheets should be organized into subsets in the following order:

- COVER SHEET
- 0-GENERAL
- H-HAZARDOUS MATERIALS
- C-CIVIL
- L-LANDSCAPE
- S-STRUCTURAL
- A-ARCHITECTURAL
- I-INTERIORS
- Q-EQUIPMENT
- F-FIRE PROTECTION
- P-PLUMBING
- M-MECHANICAL
- E-ELECTRICAL
- T-TELECOMMUNICATIONS
- R-RESOURCE

4.2 sheet identification

A	A	N	N	N	DISCIPLINE DESIGNATOR – consists of 1 or 2 alphabetical characters.
---	---	---	---	---	---

A	A	N	N	N	SHEET TYPE DESIGNATOR – consists of 1 numerical character.
---	---	---	---	---	--

A	A	N	N	N	SHEET SEQUENCE DESIGNATOR – consists of 2 numerical characters.
---	---	---	---	---	---

A =alphabetical character
N =numerical character

A	-	N	N	N	LEVEL 1 discipline designator – use of hyphen as a required place holder is required when the second discipline designator is not used.
---	---	---	---	---	---

A	-	1	SHORT FORM - may be used on smaller projects when full 5 figure sheet identification is not required. (Delete empty spaces and designate sheet as A-1)
---	---	---	--

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LEVEL 1 DISCIPLINE DESIGNATORS	
G	GENERAL
H	HAZARDOUS MATERIALS
C	CIVIL
L	LANDSCAPE
S	STRUCTURAL
A	ARCHITECTURAL
I	INTERIORS
Q	EQUIPMENT
F	FIRE PROTECTION
P	PLUMBING
M	MECHANICAL
E	ELECTRICAL
T	TELECOMMUNICATIONS
R	RESOURCE
X	OTHER DISCIPLINES
Z	CONTRACTOR SHOP DRAWINGS

DISCIPLINE DESIGNATORS	<table style="margin: auto; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px 10px;">A</td> <td style="border: 1px solid black; padding: 5px 10px;">A</td> <td style="border: 1px solid black; padding: 5px 10px;">N</td> <td style="border: 1px solid black; padding: 5px 10px;">N</td> <td style="border: 1px solid black; padding: 5px 10px;">N</td> </tr> </table>	A	A	N	N	N
A	A	N	N	N		

DISCIPLINE DESIGNATOR: The first component of the **sheet identification** format, the discipline designator, is based on the traditional system of alphabetical discipline designators, using either a single alphabetical character with a hyphen (Level 1) or two alphabetical characters (Level 2). The first character is the discipline character and the second character is the modifier character. The discipline character identifies the creator of the drawings on the sheet and the second character, the modifier is used to further subdivide the information for a specific use or purpose.

Example: An electrical engineer may be the designer of a telephone system. In that case, if the project is large then he may sub-divide the drawings and the telephone system may be segregated onto sheets with the Level 2 designator ET (Electrical Telecommunications).

Example 2: For an even more complex project, the Telecommunications designator may be used as the discipline designator and the modifier may be further sub-divided into other categories.

Examples are:

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EXAMPLE: - Table indicating discipline designators for Telecommunications discipline

Designator		Description of suggested name	Content
Level 1	Level 2		
T	-		
-	TA	Audio Visual	Cable, music & closed circuit television (CCTV) systems
-	TC	Clock and program	Time generators and bell program systems
-	TI	Intercom	Intercom and public address systems
-	TM	Monitoring	Monitoring and alarm systems
-	TN	Data Networks	Network cabling and equipment
-	TT	Telephone	Telephone systems, wiring & equipment
-	TY	Security	Access control and alarm systems

SHEET TYPE DESIGNATORS	A	A	N	N	N
-------------------------------	----------	----------	----------	----------	----------

The second component of the sheet identification format is the sheet type designator. The sheet type is identified by a single numerical character. All sheet types may apply to all discipline designators. It is not necessary to use all the sheet types for a project or within a discipline

SHEET TYPE DESIGNATORS	
0	General (symbols, legends, notes, etc.)
1	Plans (horizontal views)
2	Elevations (vertical views)
3	Sections (symbols, legends, notes, etc.)
4	Large Scale Views (symbols, legends, notes, etc.)
5	Details (symbols, legends, notes, etc.)
6	Schedules & Diagrams (symbols, legends, notes, etc.)
7	User Defined (for types which do not fall in other categories)
8	User Defined (for types which do not fall in other categories)
9	3D Representations (isometrics, perspectives, photographs)

The use of sheet type designators does not preclude combining different types of drawings on the same sheet for simplicity. For instance it is acceptable to:

- Place profile drawings on sanitary sewer or road plan sheets.
- Place same scale sections on the same sheet as large scale plans of stairs.
- Place schedules on a plan sheet when the information is closely associated.

When the type of drawings on a sheet is mixed, clearly identify all of the drawings contained on the sheet in the sheet title block.

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SHEET SEQUENCE NUMBER	A	A	N	N	N
-----------------------	---	---	---	---	---

The third component of the sheet identification format, a two digit sheet sequence number, identifies each sheet in a series of the same discipline and sheet type. The first sheet of each series is numbered **01** followed by **02** through **99**. Additional drawings inserted in a set of drawings after a sheet identification organization has been established can be identified with a suffix.

Supplemental drawings:

Small changes on a drawing are to be accomplished with the use of revision clouds and numbers-in-triangle symbol accompanied with a brief description in the revision block. This drawing is to be designated **with the suffix R followed by a number** beginning with 1.

Example: Partially revised drawing SHEET SEQUENCE NUMBER	A	-	1	0	2	R	1
--	---	---	---	---	---	---	---

Occasionally an entire drawing must be altered and re-issued for supplementary work involving a change in scope. In this case the drawing is to be designated with the **suffix X and a number** beginning with 1.

Example: Completely revised drawing SHEET SEQUENCE NUMBER	A	-	1	0	2	X	1
---	---	---	---	---	---	---	---

Occasionally an entire drawing set must be phased to reflect the sequence of construction such as in the case of fast track or staged construction. In this case the drawing is to be designated with a letter **suffix representing the phase and a number** beginning with 1.

Example: Phase 1 of a multi-stage project SHEET SEQUENCE NUMBER	A	-	1	0	2	A	1
---	---	---	---	---	---	---	---

4.3 file naming

The following defines the file naming protocol for the Department of Transportation and Public Works. The electronic file naming format is to follow the conventions of the UDS. Sometimes the UDS refers to other documents such as the AIA CADD layer guidelines for naming a specific type of file, however the UDS format should always take precedence when there is reference to similar items in other documents. AIA sheet file information is provided within this document as a convenience. The UDS defines two broad categories of files, library and project. These require consistent but different approaches to developing a file name format.

Note: the following information is a summary of the UDS system and is provided in this document as a convenient reference only. Please refer to the UDS manual for more complete information.

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LIBRARY FILES:

Library files are used as sources of information for more than one project. They can be detail, schedule, text, database, symbol, border, and title block files. They should be named differently from project files because the classification and indexing requirements are different. Library file naming should be grouped by building systems, assemblies, or usage. Masterformat numbers provide a useful method of organization.

PROJECT FILES:

Project files are specific to a project and must be organised to make it easy to produce contract documents, record documents and facility management documents from many different files. Project files can be building and site models, details, sheets, schedules, text, database, symbols, borders, title blocks, and other files created for the project.

NAMING DETAIL FILES:

For a given project, the project file name must be consistent from firm to firm. The type of file directly affects the format of the file name of the project files. The following types of files may be used in electronic construction documentation:

Naming project files.	
Model	A building model is an electronic representation of a building. Elements representing the building or site should always be created at their “real world” size. This is drawn in “model” space. A model file contains a whole or partial full scale digital model of the building or site. Model files are referenced to other drawings so their names should only be changed with care.
Detail	Project detail files are a specific type of model file. They can include plans, elevations, sections and details. Detail files are referenced to other drawings so their names should only be changed with care.
Sheet	When there is sufficient information to print a sheet it becomes necessary to create a sheet file. Sheet file names must correspond to the actual sheet number so they may be changed when sheets are added.
Schedule	Schedule files may be created with software other than CADD software and may be inserted and /or linked within CADD files.
Text	Text files may be files that are useable from project to project. They may include general notes, discipline specific notes, sheet type specific notes, (e.g. notes that apply only to foundation plans), and symbol legends.
Database	Database files include tables that predefine and label “fields”. These may include schedules, inventory listings for equipment and furnishings, master keynote listings and numerous other lists.
Symbols	The latest version approved symbol files are provided by TPW on the accompanying CD or are available from the department representative. These are to be used for all CADD work where they exist. Symbols not found on the CD are to be created by the consultant and are to follow the guidelines for creation outlined in this document. Symbol types are to be as per standards described in this document.
Title block / sheet border	The latest version approved TP W titleblock files are to be obtained by the consultant and are to be used for all work submitted to the Department.

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MODEL FILE:

A **model file** contains a whole or partial full scale digital model of the building or site. There are three main variations in the process of building digital models and extracting or composing digital models from them. There can be:

- A single multi-discipline building model.
- A single model for each construction discipline.
- Several models per discipline.

These models may be 2D or 3D but they must all be accurate, complete and in conformance to ongoing industry standards in regard to layer usage and symbology.

NAMING MODEL FILES:

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	A	A	U	U	U	U	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 70%; padding-left: 5px;"> DISCIPLINE DESIGNATOR: The first character is the single letter discipline designator. These are presented in the sheet identification format section of this module. </td> </tr> </table>	A	A	A	DISCIPLINE DESIGNATOR: The first character is the single letter discipline designator. These are presented in the sheet identification format section of this module.
A	-	A	A	U	U	U	U	.						
A	A	A	DISCIPLINE DESIGNATOR: The first character is the single letter discipline designator. These are presented in the sheet identification format section of this module.											

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	A	A	U	U	U	U	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 70%; padding-left: 5px;"> PLACEHOLDER: The second character is the hyphen. It serves as a placeholder that makes the name more readable and easier to manage. </td> </tr> </table>	A	A	A	PLACEHOLDER: The second character is the hyphen. It serves as a placeholder that makes the name more readable and easier to manage.
A	-	A	A	U	U	U	U	.						
A	A	A	PLACEHOLDER: The second character is the hyphen. It serves as a placeholder that makes the name more readable and easier to manage.											

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	A	A	U	U	U	U	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 70%; padding-left: 5px;"> TYPE OF MODEL: The 3rd and 4th characters define the type of model. The following designations for model types are taken from the AIA CADD Layer Standards: </td> </tr> </table>	A	A	A	TYPE OF MODEL: The 3 rd and 4 th characters define the type of model. The following designations for model types are taken from the AIA CADD Layer Standards:
A	-	A	A	U	U	U	U	.						
A	A	A	TYPE OF MODEL: The 3 rd and 4 th characters define the type of model. The following designations for model types are taken from the AIA CADD Layer Standards:											

MODEL FILE TYPES	
FP	Floor Plan
SP	Site Plan
DP	Demolition Plan
QP	Equipment Plan
XP	Existing plan
EL	Elevation
SC	Section
DT	Detail
SH	Schedules
DG	Diagrams

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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	A	A	U	U	U	U	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> </tr> </table>	A	A	A	USER DEFINED MODEL TYPE MODIFIERS: The 5 th through 8 th positions are alphanumeric user-defined modifiers for the model types.
A	-	A	A	U	U	U	U	.						
A	A	A												

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">U</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	A	A	U	U	U	U	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> </tr> </table>	A	A	A	FILE EXTENSION: The three remaining characters after the required decimal point are defined by the CADD software and represent file extensions such as .dwg, .dwt and .dxf.
A	-	A	A	U	U	U	U	.						
A	A	A												

DETAIL FILES:

Project detail files are a specific type of model file. They can include plans, elevations, sections and details. They form the majority of the individual files in a project.

When project detail files are incorporated on a sheet, they are indexed using sheet grid coordinates. Their file names require close coordination with the sheet file on which they are placed. The identification of details is part of the system that includes the drawing blocks, (drawing area coordinate system), the sheet identification format and the use of a 2 part reference bubble.

NAMING DETAIL FILES:

The first five characters are identical to the sheet identification of the sheet file that contains the detail. This coordinates the individual detail file to the specific detail sheet.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	N	N	N	-	A	N	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> </tr> </table>	A	A	A	Sheet identification section:
A	-	N	N	N	-	A	N	.						
A	A	A												

The 6th character is the hyphen. It serves as a placeholder that makes the name more readable and easier to manage.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	N	N	N	-	A	N	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> </tr> </table>	A	A	A	Placeholder:
A	-	N	N	N	-	A	N	.						
A	A	A												

The 7th and 8th characters are used for the detail identification number.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">N</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	N	N	N	-	A	N	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">A</td> </tr> </table>	A	A	A	Detail identification number:
A	-	N	N	N	-	A	N	.						
A	A	A												

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">A</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">5</td> <td style="width: 10%; text-align: center;">0</td> <td style="width: 10%; text-align: center;">1</td> <td style="width: 10%; text-align: center;">-</td> <td style="width: 10%; text-align: center;">B</td> <td style="width: 10%; text-align: center;">3</td> <td style="width: 10%; text-align: center;">.</td> </tr> </table>	A	-	5	0	1	-	B	3	.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">D</td> <td style="width: 10%; text-align: center;">W</td> <td style="width: 10%; text-align: center;">G</td> </tr> </table>	D	W	G	Example of detail identification.
A	-	5	0	1	-	B	3	.						
D	W	G												

This is a specific example of a file name of a specific project detail found on sheet **A-501**. The detail identification number **B3** indicates that it is located on the sheet grid at coordinates **B3**. The 2 part reference bubble for this detail would be **B3 / A-501**. Refer to the *Sheet Organization Module* of the UDS for more information.

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SHEET FILES:

When there is sufficient information to print a sheet it becomes necessary to create a **sheet** file. Such a file may be composed of a border template, (a file which contains graphic and text elements common to all sheets of a specific size), text, symbols, and views of files (of the model files), representing everything that appears on the final sheet. Sheet files are not “plot” files (files with extension .plt which are in HPGL language). Sheet files are created and can be edited by CADD software.

NAMING SHEET FILES:

Sheet file naming is to conform to the requirements of the **AIA CADD Layer guidelines** (latest edition). The following is a short summary of the requirements for sheet file naming.

A	-	N	N	N	U	U	U	DISCIPLINE CODE DESIGNATOR – consists of 1 or 2 alpha characters (use hyphen when second character not used)
---	---	---	---	---	---	---	---	--

SHEET FILE NAMING - DISCIPLINE CODES:		
A	Architectural	Secondary character A second character may be used to further define the discipline code. E.g.: AG – Architectural Graphics QK – Kitchen Equipment QV – Audio Visual Equipment
C	Civil	
E	Electrical	
F	Fire Protection	
G	General	
H	Hazardous Materials	
I	Interiors	
L	Landscape	
M	Mechanical	
P	Plumbing	
Q	Equipment	
R	Resource	
S	Structural	
T	Telecommunications	
X	Other Disciplines	
Z	Contractor Shop Drawings	

A	-	N	N	N	U	U	U	SHEET TYPE CODE – 1 numerical character
---	---	---	---	---	---	---	---	--

SHEET FILE NAMING - SHEET TYPE DESIGNATORS -	
0	General (symbols, legends, notes, etc.)
1	Plans (horizontal views)

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2	Elevations (vertical views)
3	Sections (sectional views)
4	Large scale (plans, elevations, or sections that are not details)
5	Details
6	Schedules and diagrams
7	User defined
8	User defined
9	3D views (isometrics, perspectives, photographs)

A	-	N	N	N	U	U	U	SHEET SEQUENCE IDENTIFIER - 2 numerical characters
---	---	---	---	---	---	---	---	---

SHEET SEQUENCE NUMBER:
Sheet sequence numbers should be designated sequentially starting at "01" and continuing through "99"

A	-	N	N	N	U	U	U	USER DEFINABLE
---	---	---	---	---	---	---	---	-----------------------

EXAMPLES:

A	-	1	0	1	EXAMPLE: TYPICAL SHEET FILE NAME for floor plan sheet 1
---	---	---	---	---	--

A	-	2	0	2	EXAMPLE: TYPICAL SHEET FILE NAME for elevation plan sheet 2
---	---	---	---	---	--

4.4 model and sheet files

Using a conventional database analogy, models contain the building database and sheets are reports created from the building database. Just like creating multiple reports from the same database, multiple sheets can be created from one model, with each sheet containing a different graphic representation of the model. For example, a set of presentation drawing sheets and a set of construction document sheets can be set up simultaneously from the same model files using different sheet borders, scales, views and layer visibility.

Model files contain basic building geometry: walls, doors, columns, and mechanical and electrical information. Sheet files contain information such as title blocks and project notes.

annotation

Annotation can be placed in either models or sheets. Types of annotation that apply to the project generally (such as dimensions, notes, and targets), are easier to co-ordinate and revise when they are included in the model. More specific types of annotation (such as drawing titles, legends, and sheet-specific notes) are generally more convenient to include in the sheet file. The layer guidelines support both annotation methods.

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rules to ensure reliable plots

Sheets are plotted in a consistent way by following these guidelines:

1. Each sheet represents one – and only one – plotted drawing.
2. A sheet is always plotted at full scale (1=1)
3. The original sheet is located at the lower left outside corner of the sheet border. The sheet border itself should always be attached as a reference file at 0,0.
4. A sheet should not contain any information placed outside of the sheet border.
5. The layers required for the correct plotting of a sheet – an only those layers – should be visible when a sheet is saved.

special cases

Sheets can contain model information as long as that model information is not shared by any other model or sheet. A site plan sheet, for example, may contain a reference to a separate site plan model, as well as several site details drawn in the sheet file itself.

For some types of sheets, in fact, it is not necessary to reference a separate file at all, other than the sheet border. Examples include interior elevations, detail sheets, or other construction drawings that contain no model information shared by any other drawing. In those cases, all model information relating to the sheet is contained within the sheet file itself. For many small projects, it is not worth the effort to separate a model and a sheet into two separate CAD files; both are easier to manage when they are contained in a single file.

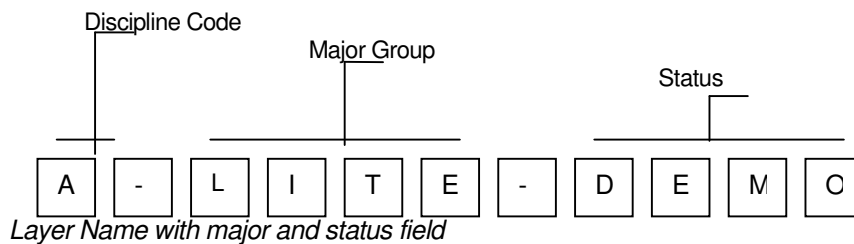
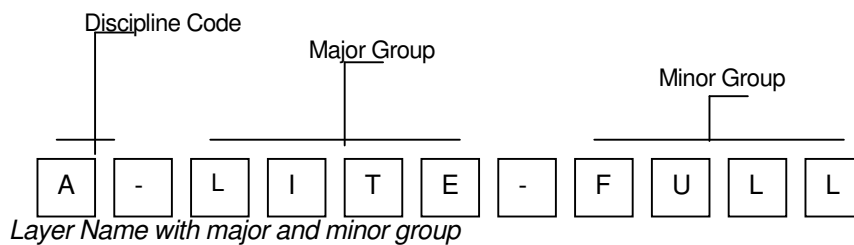
5 layer name formats

5.1 introduction

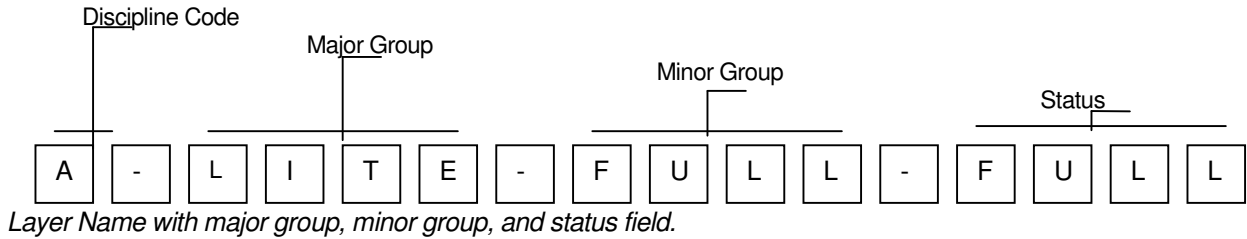
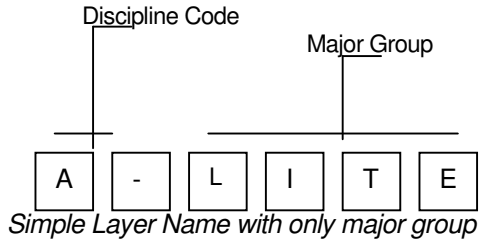
The *CAD Layer Guidelines* are organized as a hierarchy. This arrangement accommodates expansion and addition of user-defined extensions to the layer list. Layer names are alphanumeric and use abbreviations that are easy to remember.

A single format is defined rather than the short and long formats used in the first edition of *CAD Layer Guidelines*. A survey of users indicated a preference for long layer names, in part because they are easier to read and understand than short layer names. This legibility is particularly important when CAD files are distributed among architects, consultants, and clients. In the second edition, a single, long formation is specified.

5.2 layer format



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5.3 discipline code

The discipline code is a two-character field with the second character either a hyphen or a user-defined modifier. The defined discipline codes are the same for both layers and file names. For example, the file A-FP01.DWG might contain layers, A-WALL, A-DOOR, and A-CLNG.

A - Architectural	I - Interiors	S - Structural
C - Civil	L - Landscaping	T - Telecommunications
E - Electrical	M - Mechanical	X - Other Disciplines
F - Fire Protection	P - Plumbing	Z - Contractor/Shop Drawings
G - General	Q - Equipment	
H - Hazardous Materials	R - Resource	

5.4 major group

The major group designation identifies the building system. Although major groups are logically grouped with specific discipline codes, it is possible to combine major group codes with any of the discipline codes. For example, a drawing might contain the following layers.

A-WALL	Walls
A-LITE	Lighting Fixtures
A-FIXT	Plumbing Fixtures
A-DOOR	Doors

5.5 minor group

This is an optional, four-character field for further differentiation of major groups. For example, A-WALL-PART indicates architecture, new, wall, partial height. The following common modifiers are defined for use in the minor group field:

IDEN	Identification
PATT	Pattern

5.6 status field

The status field is a four-character designator that differentiates new construction from remodelling and existing to remain. It is only needed when phases of work must be differentiated. Defined values for this field are as follows:

NEWW	New Work
EXST	Existing to remain
DEMO	Existing to demolish
TEMP	Temporary work
MOVE	Items to be moved
RELO	Relocated items
NICN	Not in contract
PHS1-9	Phase Numbers

The status field is optional and is only needed when phases of work need to be differentiated.

Layers representing the dominant phase can be represented without a status field. For example, in a small remodelling project, NEWW would indicate new construction, while layers without status fields would indicate parts of the existing building that will remain. For example, a remodelling plan might contain the following layers:

A-WALL-NEWW	New Walls
A-DOOR-NEWW	New doors
A-WALL-DEMO	Walls to be demolished
A-DOOR-DEMO	Doors to be demolished
A-WALL	Existing walls to remain
A-DOOR	Existing doors to remain

Conversely, a remodelling project consisting of mostly new construction might use EXST to indicate “existing to remain” and layers without status fields to represent new construction.

The status field is always placed as the last field of the layer name. In a simple layer name such as A-WALL, the status field would be the third field (A-WALL-DEMO). In a more detailed layer name, the status field would be the fourth field (A-WALL-FULL-DEMO).

5.7 annotation

Annotation comprises text, dimensions, sheet borders, detail references, and other elements on CAD drawings that don't represent physical aspects of a building. Annotation is designated by the major group "ANNO". Types of annotation are designated as follows:

*-ANNO-DIMS	Dimensions
*-ANNO-KEYN	Keynotes
*-ANNO-LEGN	Legends and Schedules
*-ANNO-NPLT	Construction lines, nonplotting information
*-ANNO-NOTE	Notes
*-ANNO-REDL	Redline
*-ANNO-REVS	Revisions
*-ANNO-SYMB	Symbols
*-ANNO-TEXT	Text
*-ANNO-TTLB	Border and title block

* Asterisk designates discipline code.

Annotation can be placed both in model files and in sheet files. Dimensions, symbols and keynotes would typically be placed in model files. Legends, schedules, borders, and titles blocks would typically be placed in sheet files. The same layer names would be used in both cases.

A special case exists when a single model file is referenced by two or more sheet files. In this case, it may be necessary to differentiate two or more "sets" of annotation. For example, a model file containing both floor plan and ceiling plan information may need different layers for ceiling plan dimensions and floor plan dimensions. In this case, users should modify the minor group to indicate the intended view. For example, A-ANNO-DMFP for floor plan dimensions and A-ANNO-DMCP for ceiling plan dimensions.

5.8 user definable fields

The minor group field can be defined by the user, allowing additional layers to be added to accommodate special project requirements. This should only be done if a defined layer does not apply to a project. Some examples of layers using a user-defined minor group field are as follows:

A-DOOR-METL	Metal doors
A-WALL-STRC	Walls to structure
A-FURN-PNL1	Furniture panels from manufacturer 1
A-FURN-PNL2	Furniture panels from manufacturer 2

In contrast to the first edition of *CAD Layer Guidelines*, this edition does not incorporate a fourth level of hierarchy for user-defined layouts. In other words, users should use a layer such as A-DOOR-METL-IDEN. Since the minor group field can accept any user-defined code, the revised format accommodates flexibility while avoiding long, cumbersome layer names.

5.9 layers for elevations, sections, and three dimensional drawings

Special groups of layers within each discipline are defined for elevations, sections, details, and three-dimensional views. Defined layer groups are as follows:

*-ELEV	Elevations
*-ELEV-IDEN	Component identification numbers
*-EVEL-OTLN	Building outlines
*-ELEV-PATT	Textures and hatch patterns
*-SECT	Sections
*-SECT-MBND	Material beyond section cut
*-SECT-MCUT	Material cut by section
*-SECT-PATT	Textures and hatch patterns
*-SECT-IDEN	Component Identification numbers
*-DETL	Details
*-DETL-IDEN	Component identification numbers
*-DETL-MBND	Material beyond section cut
*-DETL-MCUT	Material cut by section
*-DETL-PATT	Textures and hatch patterns

The minor group "ELEV" can be added to any major group layer (A-WALL, A-DOOR, etc.) to identify information only seen in 3D views. This facilitates integrating three-dimensional CAD models with two-dimensional plans as shown here:

A-WALL	Walls in plan view
A-WALL-ELEV	Wall surfaces in 3D views

6 master layer list

6.1 introduction

This layer list is to be used for all projects submitted to the Department of Transportation and Public Works. This master layer list is to be used as a reference document and identifies all defined layers in the (AIA) *CAD Layer Guidelines*. As well, layers defined by the Public Works and Government Services Canada (Atlantic Region) (PWGSC) CADD Data Specification are cross referenced to the AIA CAD Layer Guidelines format, and new layer names are provided in AIA format. Users shall use the new AIA format name for work submitted to the N.S. Department of Transportation & Public Works, rather than the PWGSC layer name. It should be noted that these layers directly correspond in most cases and automated conversion via scripts or LISP programs is possible and recommended, for those who may have a need to convert back and forth from PWGSC to TPW standard. The PWGSC layer names are provided as a convenient reference only, in order to assist those users who may benefit from this information.

Should a need exist, users are free to add their own layers according to the layer naming conventions identified in section 5 if there is no predefined layer. They should identify them as “user-defined”. No new layer should be created where a layer is already described by the AIA CAD Layer Guidelines or the PWGSC Atlantic Region CADD Data Specification.

The use of an asterisk (*) indicates a placeholder for the discipline code, major group, or minor group. Layers that are new or revised from the first edition of *CAD Layer Guidelines* are marked or noted in parentheses.

annotation layers

*-ANNO-TEXT	Text	(changed from *-****-TEXT)
*-ANNO-REDL ¹	Redline	(changed from *-****-TEXT)
*-ANNO-SYMB	Symbols	(changed from *-****-TEXT)
*-ANNO-LEGN ¹	Legends and symbols	(changed from *-****-TEXT)
*-ANNO-DIMS	Dimensions	(changed from *-****-TEXT)
*-ANNO-TTLB	Border and title block	(changed from *-****-TEXT)
*-ANNO-NOTE	Notes	(changed from *-****-TEXT)
*-ANNO-NPLT	Construction lines, non-plotting information	(changed from *-****-TEXT)
*-ANNO-KEYN ¹	Key Notes	(changed from *-****-TEXT)
*-ANNO-REVS ¹	Revisions	(changed from *-****-TEXT)

Note: Annotation layer names may be appended with a four-character sheet name designator when needed.

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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common modifiers

*_****_PATT	Cross-hatching, poche
*_****_IDEN	Identification tags
*_****_ELEV	Elevation (vertical surfaces in 3D)
X-RDME	Read me layer, not to be plotted

status field modifiers

*_****_NEWW	New work
*_****_EXST	Existing to remain
*_****_DEMO	Demolition
*_****_FUTR	Future work
*_****_TEMP	Temporary work
*_****_MOVE	Items to be moved
*_****_RELO	Relocated items
*_****_NICN	Not in contract
*_****_PHS1-9	Phase numbers (1-9)

Note: The status field may also occur as the fourth field, following a minor group.

6.2 architectural layers

Note: Section 6.2 Architectural layers and section 6.3 engineering layers may be combined on sheets or across projects as required. The layers name lists are separated into Architectural and Engineering sections for convenience only.

TPW

A-WALL-ELEV	Wall surfaces: 3D views
A-WALL-FIRE ¹	Fire wall patterning
A-WALL-FULL	Full-height walls, stair and shaft walls, walls to structure
A-WALL-HEAD	Door and window headers (appear on reflected ceiling plans)
A-WALL-JAMB	Door and window jambs (do not appear on reflected ceiling plans)
A-WALL-MOVE	Items to be moved
A-WALL-PATT	Wall insulation, hatching and fill
A-WALL-PRHT	Partial-height walls (do not appear on reflected ceiling plans)
A-DOOR	Doors
A-DOOR-ELEV	Doors: 3D views
A-DOOR-FULL	Full height (to ceiling) door: swing and leaf
A-DOOR-IDEN	Door number, hardware group, etc.
A-DOOR-PRHT	Partial height door: swing and leaf

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A-GLAZ	Windows, window walls, curtain walls, glazed partitions
A-GLAZ-ELEV	Glazing and mullions – elevation views
A-GLAZ-FULL	Full height glazed walls and partitions
A-GLAZ-IDEN	Window number
A-GLAZ-PRHT	Windows and partial-height glazed partitions
A-GLAZ-SILL	Window sills
A-FLOR	Floor information
A-FLOR-CASE	Casework (manufactured cabinets)
A-FLOR-EVTR	Elevator cars and equipment
A-FLOR-FIXT ¹	Miscellaneous features
A-FLOR-HRAL	Stair and balcony handrails, guard rails
A-FLOR-IDEN	room numbers, names, targets etc.
A-FLOR-LEVL	Level changes, ramps, pits, depressions
A-FLOR-OTLN	Floor or building outline
A-FLOR-OVHD	Overhead items (skylights, overhangs – usually dashed line)
A-FLOR-PATT	Paving, tile, carpet patterns
A-FLOR-PFIX ¹	Plumbing fixtures
A-FLOR-RAIS	Raised floors
A-FLOR-RISR	Stair risers
A-FLOR-SIGN ¹	Signage
A-FLOR-SPCL	Architectural specialities (toilet room accessories, display cases)
A-FLOR-STRS	Stair treads, escalators, ladders
A-FLOR-TPTN	Toilet partitions
A-FLOR-WDWK	Architectural woodwork (field-built cabinets and counters)
A-EQPM	Equipment
A-EQPM-ACCS	Equipment access
A-EQPM-CLNG ¹	Ceiling mounted or suspended equipment
A-EQPM-ELEV	Equipment surfaces: 3D views
A-EQPM-FIXD	Fixed equipment
A-EQPM-IDEN	Equipment identification numbers
A-EQPM-MOVE	Moveable equipment
A-EQPM-NICN	Equipment not in contract
A-CLNG	Ceiling information
A-CLNG-ACCS ¹	Ceiling access
A-CLNG-GRID	Ceiling grid
A-CLNG-OPEN	Ceiling/roof penetrations
A-CLNG-PATT	Ceiling patterns
A-CLNG-SUSP	Suspended elements
A-CLNG-TEES	Main trees
A-FURN	Furniture
A-FURN-CHAR	Chairs and other seating
A-FURN-ELEV	Furniture: 3D views
A-FURN-FILE	File cabinets
A-FURN-FREE	Furniture: free-standing (desks, credenzas, etc.)
A-FURN-IDEN	Furniture numbers
A-FURN-PATT	Finish patterns
A-FURN-PLNT	Plants

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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A-FURN-PNLS	Furniture system panels
A-FURN-POWR	Furniture systems – power designations
A-FURN-STOR	Furniture systems storage components
A-FURN-WKSF	Furniture system work s
A-LITE ¹	Light fixtures
A-HVAC Rdff	Return air diffusers
A-HVAC-Sdff	Supply diffusers
A-COLS ¹	Columns on architectural drawings (or use structural layer S-GRID)
A-GRID ¹	Planning grid or column grid
A-ROOF	Roof
A-ROOF-ELEV	Roof surfaces: 3D views
A-ROOF-HRAL	Stair handrails, nosing, guard-rails
A-ROOF-LEVL	Level changes
A-ROOF-OTLN	Roof outline
A-ROOF-PATT	Ceiling surface patterns, hatching
A-ROOF-RISR	Stair risers
A-ROOF-STRS	Stair treads, ladders
A-AREA	Area calculation boundary lines
A-AREA-IDEN	Room numbers, tenant identifications, area calculation
A-AREA-OCCP	Occupant or employee names
A-AREA-PATT	Area cross hatching
A-ELEV	Interior and exterior elevations
A-ELEV-CASE	Wall-mounted casework
A-ELEV-FIXT	Miscellaneous, fixtures
A-ELEV-FNSH	Finishes, woodwork, trim
A-ELEV-IDEN	Component identification numbers
A-ELEV-OTLN	Building outlines
A-ELEV-PATT	Textures and hatch patterns
A-ELEV-PFIXT ¹	Plumbing fixtures in elevation
A-ELEV-SIGN	Signage
A-SECT	Sections
A-SECT-IDEN	Component identification numbers
A-SECT-MBND	Material beyond section cut
A-SECT-MCUT	Material cut by section
A-SECT-PATT	Textures and hatch patterns
A-DETL	Details
A-DETL-IDEN	Component identification numbers
A-DETL-MBND	Material beyond section cut
A-DETL-MCUT	Material cut by section
A-DETL-PATT	Textures and hatch patterns

Interior Layers

TPW *pwgsc*

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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I-WALL-ELEV ¹		Wall surfaces: 3D views
I-WALL-FIRE ¹		Fire wall patterning
I-WALL-FULL ¹		Full-height walls, stair and shaft walls, walls to structure
I-WALL-HEAD ¹		Door and window jambs (do not appear on reflected ceiling plan)
I-WALL-MOVE ¹		Moveable partitions
I-WALL-PATT ¹		Wall insulation, hatching and fill
I-WALL-PRHT ¹		Partial height walls (do not appear on reflected ceiling plan)
I-DOOR ¹		Doors
I-DOOR-ELEV ¹		Doors: 3D views
I-DOOR-FULL ¹		Full height (to ceiling) door: swing and leaf
I-DOOR-IDEN ¹		Door number, hardware group, etc.
I-DOOR-PRHT ¹		Partial height door: swing and leaf
I-GLAZ ¹		Glazing
I-GLAZ-ELEV ¹		Glazing and mullions – elevation views
I-GLAZ-FULL ¹		Full height glazed walls and partitions
I-GLAZ-IDEN ¹		Window number
I-GLAZ-PRHT ¹		Windows and partial height glazed partitions
I-GLAZ-SILL ¹		Windowsills
I-FLOR ¹		Floor information
I-FLOR-CASE ¹		Casework (manufactured cabinets)
I-FLOR-EVTR ¹		Elevator cars and equipment
I-FLOR-FIXT ¹		Miscellaneous fixtures
I-FLOR-HRAL ¹		Stair and balcony handrails, guard rails
I-FLOR-IDEN ¹		Room numbers, names, targets, etc.
I-FLOR-LEVEL ¹		Level changes, ramps, pits, depressions
I-FLOR-OTLN ¹		Floor or building outline
I-FLOR-OVHD ¹		Overhead items (skylights, overhangs – usually dashed lines)
I-FLOR-PATT ¹		Paving, tile, carpet patterns
I-FLOR-PFIX ¹		Plumbing fixtures
I-FLOR-RAIS ¹		Raised floors
I-FLOR-RISR ¹		Stair risers
I-FLOR-SIGN ¹		Signage
I-FLOR-SPCL ¹		Architectural specialties (toilet room accessories, display cases)
I-FLOR-STRS ¹		Stair treads, escalators, ladders
I-FLOR-TPTN ¹		Toilet partitions
I-FLOR-WDWK ¹		Architectural woodwork (field built cabinets and structures)
I-EQPM ¹		Equipment
I-EQPM-ACCS ¹		Equipment access
I-EQPM-CLNG ¹		Ceiling mounted or suspended equipment
I-EQPM-COMP	<i>I-EQ-CMP</i>	Computers
I-EQPM-ELEV ¹		Equipment surfaces: 3D views
I-EQPM-FIXD ¹	<i>I-EQ-OEQ</i>	Fixed equipment,
I-EQPM-IDEN ¹		Equipment identification numbers
I-EQPM-MOVE ¹	<i>I-EQ-OEQ</i>	Moveable equipment
I-EQPM-NICN ¹	<i>I-EQ-SPC</i>	Equipment not in contract
I-FURN ¹	<i>I-FU</i>	Furniture
I-FURN-ARTW	<i>I-FU-ART</i>	Artwork
I-FURN-ASSY	<i>I-FU-ACC</i>	Accessories, Coat Trees, Racks
I-FURN-CHAR ¹	<i>I-FU-SET</i>	Chairs and other seating
I-FURN-ELEV ¹		Furniture: 3D views
I-FURN-FILE ¹		File cabinets

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I-FURN-FREE ¹	<i>I-FU-DSK</i>	Furniture: Free-standing (desks, credenzas, etc.)
I-FURN-IDEN ¹		Furniture numbers
I-FURN-OTHR	<i>I-FU-NOF</i>	Non office furniture, first aid-room bed, etc.
I-FURN-PATT ¹		Finish patterns
I-FURN-PNLS ¹		Furniture system panels
I-FURN-PLNT ¹	<i>I-FU-PLT</i>	Plants
I-FURN-POWR ¹		Furniture systems – power designations
I-FURN-SHEL	<i>I-FU-SHL</i>	Shelving
I-FURN-STOR ¹	<i>I-FU-CAB</i>	Furniture system storage components
I-FURN-TABL	<i>I-FU-TAB</i>	Tables
I-FURN-WKSF ¹		Furniture system work surface components
I-CLNG ¹		Ceiling information
I-CLNG-ACCS ¹		Ceiling access
I-CLNG-GRID ¹		Ceiling grid
I-CLNG-OPEN ¹		Ceiling/roof penetrations
I-CLNG-PATT ¹		Ceiling patterns
I-CLNG-SUSP ¹		Suspended elements
I-CLNG-TEES ¹		Main tees
I-LITE ¹		Light fixtures
I-COLS ¹		Columns
I-HVAC-SDFF ¹		Supply diffusers
I-HVAC-RDFF ¹		Return air diffusers
I-GRID ¹		Planning grid or column grid
I-AREA ¹		Area calculation lines
I-AREA-IDEN ¹		Room numbers, tenant identifications, area calculation
I-AREA-OCCP ¹		Occupant or employee names
I-AREA-PATT ¹		Area cross hatching
I-ELEV ¹		Interior and exterior elevations
I-ELEV-CASE ¹		Wall mounted casework
I-ELEV-FIXT ¹		Miscellaneous fixtures
I-ELEV-FNSH ¹		Finishes, woodwork, trim
I-ELEV-IDEN ¹		Component identification numbers
I-ELEV-PATT ¹		Textures and hatch patterns
I-ELEV-PFIXT ¹		Plumbing fixtures in elevation
I-ELEV-SIGN ¹		Signage on interior elevations
I-SIGN	<i>I-SI</i>	Signage
I-SIGN-OFCE	<i>I-SI-OFF</i>	Office signage
I-SIGN-SPCL	<i>I-SI-SPC</i>	Special signage
I-SCRN	<i>I-SY</i>	Screening systems
I-SCRN-CONN	<i>I-SY-CON</i>	Screen Connecting Devices
I-SCRN-FURN	<i>I-SY-FUR</i>	Screen mounted furniture, storage, accessories
I-SCRN-POWR	<i>I-SY-PWS</i>	Powered screens
I-SCRN-SCRN	<i>I-SY-SCR</i>	Screens
I-SECT ¹		Sections

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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I-SECT-IDEN ¹	Component identification numbers
I-SECT-MCUT ¹	Material cut by section
I-SECT-MBND ¹	Material beyond section cut
I-SECT-PATT ¹	Textures and hatch patterns

landscape layers

TPW

L-PLNT	Plant and landscape materials
L-PLNT-BEDS	Rock, bark, and other landscaping beds
L-PLNT-GRND	Ground covers and vines
L-PLNT-PLAN	Planting plans
L-PLNT-TREE	Trees
L-PLNT-TURF	Lawn areas
L-IRRG	Irrigation system
L-IRRG-COVR	Irrigation coverage
L-IRRG-EQPT	Irrigation equipment
L-IRRG-PIPE	Irrigation piping
L-IRRG-SPKL	Irrigation sprinklers
L-WALK	Trails, walks and steps
L-WALK-PATT	Walks and steps – cross-hatch patterns
L-SITE	Site improvements
L-SITE-BRDG	Bridges
L-SITE-DECK	Terraces, courtyards, patios, decks
L-SITE-FURN	Site furnishings
L-SITE-PLAY	Play structures
L-SITE-POOL	Fountains, pools and spas
L-SITE-SPRT	Sports fields
L-SITE-STEP	Steps
L-SITE-WALL	Walls

6.3 engineering layers

bridge engineering layers

<u>TPW</u>	<u><i>pwgsc</i></u>	
B-APSL	<i>B-AP</i>	Approach slabs
B-APSL-PLAN	<i>B-AP-PLN</i>	Approach slabs plan
B-BRNG	<i>B-BR</i>	Bearing plan
B-BRNG-LINE	<i>B-BR-LN</i>	Bearing linework

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B-DECK	<i>B-DK</i>	Bridge deck and components
B-DECK-CURB	<i>B-DK-CBS</i>	Bridge curbs and sidewalks
B-DECK-DRAN	<i>B-DK-DDR</i>	Bridge deck drains
B-DECK-PLAN	<i>B-DK-EXJ</i>	Bridge expansion joints
B-DECK-RLBR	<i>B-DK-RBR</i>	Bridge railings and barriers
B-DECK-STLG	<i>B-DK-STG</i>	Bridge deck – steel grating
B-ENGR	<i>B-ER</i>	Engineering information
B-ENGR-LINE	<i>B-ER-LIN</i>	Engineering linework
B-EREC	<i>B-ER</i>	Erection sequence
B-EREC-BRAC	<i>B-ER-BR</i>	Erection bracing
B-REIN	<i>B-RB</i>	Reinforcing
B-REIN-STEL	<i>B-RB-STL</i>	Reinforcing steel
B-SUBS	<i>B-SB</i>	Substructure
B-SUBS-ABUT	<i>B-SB-ABP</i>	Abutment plan
B-SUBS-PIER	<i>B-SB-PPL</i>	Pier plan
B-SUBS-REWL	<i>B-SB-RWL</i>	Retaining wall
B-SCUR	<i>B-SP</i>	Scour protection
B-SCUR-GBNS	<i>B-SP-GAB</i>	Gabions
B-SCUR-RPRP	<i>B-SP-RRP</i>	Rip rap
B-SUPR	<i>B-SP</i>	Superstructure
B-SUPR-BEAM	<i>B-SP-BEM</i>	Floor beams layout
B-SUPR-BRAC	<i>B-SP-BRC</i>	Superstructure bracing
B-SUPR-GRTR	<i>B-SP-GTL</i>	Girders/Truss layout
B-SUPR-STRG	<i>B-SP-SNL</i>	Stringers layout
civil layers		
<u>TPW</u>	<u>pwgsc</u>	
C-GSOL	<i>C-GO</i>	Gas and Oil
C-GSOL-NAPI	<i>C-GO-NPI</i>	Natural gas pipelines
C-GSOL-NASE	<i>C-GO-NSE</i>	Natural gas valves, manholes, meters, storage
C-GSOL-OLPI	<i>C-GO-OPI</i>	Oil pipelines
C-GSOL-OLSE	<i>C-GO-OSE</i>	Oil valves, manholes, meters, storage
C-GSOL-PRSE	<i>C-GO-PPI</i>	Propane pipelines
C-HWAY	<i>C-HW</i>	Highway engineering data
C-HWAY-CONS	<i>C-HW-CON</i>	Highway construction planning
C-HWAY-HPLN	<i>C-HW-HWY</i>	Highway plan
C-HWAY-MSHL	<i>C-HW-MSH</i>	Mass hauling diagram
C-HWAY-STGL	<i>C-HW-STG</i>	Staging layout plans
C-HDRO	<i>C-HY</i>	Hydrology
C-HDRO-CTCH	<i>C-HY-CAT</i>	Catchment area
C-HDRO-DRAN	<i>C-HY-DRA</i>	Drainage area
C-HDRO-FLOW	<i>C-HY-FLO</i>	Flow/discharge
C-HDRO-ICET	<i>C-HY-ICE</i>	Ice thickness
C-SITE	<i>C-SF</i>	

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C-SITE-ARMR	<i>C-SF-ARM</i>	Erosion control, armourstone, riprap
C-SITE-BARR	<i>C-SF-BAR</i>	Concrete barriers
C-SITE-BRDG	<i>C-SF-BRG</i>	Foot bridges
C-SITE-CULV	<i>C-SF-CUL</i>	Culverts
C-SITE-DCLN	<i>C-SF-DCL</i>	Ditch centre line
C-SITE-DEBR	<i>C-SF-DBR</i>	Debris, rubble, loose rock & soil
C-SITE-FENC	<i>C-SF-FEN</i>	Fencing
C-SITE-GRAD	<i>C-SF-GRA</i>	Grading, ditches, berms, dykes
C-SITE-MRSH	<i>C-SF-MAR</i>	Marshes, wetlands
C-SITE-RWAL	<i>C-SF-RWL</i>	Retaining walls
C-SITE-SDWK	<i>C-SF-SWK</i>	Sidewalks
C-SITE-TRAL	<i>C-SF-TRL</i>	Trails
C-SITE-TREE	<i>C-SF-TRE</i>	Trees, tree lines
C-SITE-WATR	<i>C-SF-WTR</i>	Watercourses, shorelines, dams
C-PROP	<i>L-PL</i>	Property lines, survey benchmarks, legal survey plan
C-PROP-BODY	<i>L-PL-BDY</i>	Legal Limits, Fee Simple, Administration and Control
C-PROP-BRNG		Bearings and distance labels
C-PROP-CENT	<i>L-PL-CEN</i>	Provincial, National Coordinates of Parcel Centroid
C-PROP-CNTL	<i>L-PL-CLN</i>	Radial ties, traverse lines, control lines, etc.
C-PROP-CONS		Construction controls
C-PROP-ESMT	<i>L-PL-LIM</i>	Easements, rights-of-way, setback lines, leases, limited interest estate
C-PROP-FEAT	<i>L-PL-FEA</i>	Physical features on site, fences, wall, etc.
C-PROP-MONU	<i>L-PL-MON</i>	Legal Monuments, horizontal/vertical control, etc.
C-PROP-NATB	<i>L-PL-NAT</i>	Natural Boundaries, watercourses, shorelines, etc.
C-PROP-PERB	<i>L-PL-PPR</i>	Outside perimeter boundary of Ownership in fee simple
C-PROP-UGDF	<i>L-PL-UCD</i>	Underlying cadastral fabric, deeds, lots, plans, etc.
C-TOPO	<i>C-TP</i>	Proposed contour lines and elevations
C-TOPO-BANK	<i>C-TP-BNK</i>	Embankments, cliffs
C-TOPO-BORE	<i>C-BH</i>	Test borings
C-TOPO-LOGS	<i>C-BH-LOG</i>	Borehole logs and data
C-TOPO-MAJR	<i>C-TP-MAJ</i>	Major contours
C-TOPO-MINR	<i>C-TP-MIN</i>	Minor contours
C-TOPO-RTWL		Retaining wall
C-TOPO-SMPL	<i>C-BH-SMP</i>	Borehole soil sample location
C-TOPO-SPOT	<i>C-TP-SPT</i>	Spot elevations
C-TOPO-STGP	<i>C-BH-STP</i>	Borehole stratigraphic profile
C-BLDG		Proposed building footprints
C-PKNG		Parking lots
C-PKNG-CARS		Graphic illustration of cars
C-PKNG-DRAN		Parking lot drainage slope indications
C-PKNG-ISLD		Parking islands
C-PKNG-STRP		Parking lot striping, handicapped symbol
C-ROAD	<i>C-RO</i>	Roadways
C-ROAD-ACRT	<i>C-RO-ACR</i>	Fire department access routes
C-ROAD-ALGN	<i>C-RO-ALI</i>	Road alignment
C-ROAD-BRDG	<i>C-RO-BRG</i>	Road bridges
C-ROAD-BSUP	<i>C-RO-STR</i>	Bridge abutments and piers, overhead trestles and supports
C-ROAD-CNTR	<i>C-RO-CLI</i>	Centre lines

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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C-ROAD-CURB	<i>C-RO-CRB</i>	Curbs
C-ROAD-MARK	<i>C-RO-MRK</i>	Markings and road striping
C-ROAD-RAMP	<i>C-RO-RMP</i>	Ramps
C-ROAD-ROAD	<i>C-RO-ROD</i>	Road, lots
C-ROAD-TUNL	<i>C-RO-TUN</i>	Tunnels
C-SIGN	<i>C-SI</i>	Signs and guideposts
C-SIGN-GDPS	<i>C-SI-GDP</i>	Guideposts
C-SIGN-SIGN	<i>C-SI-SGN</i>	Signs
C-SIGN-SNLD	<i>C-SI-SGL</i>	Sign layouts and details
C-STRM	<i>C-SM</i>	Storm drainage
C-STRM-DCLN	<i>C-SM-DCL</i>	Ditch centre line
C-STRM-DRAIN	<i>C-SM-DRA</i>	Drainage catchment areas, storm water ponds
C-STRM-MANT	<i>C-SM-MAN</i>	Stations catch basins, manholes, pumping
C-STRM-SUBD	<i>C-SM-SUB</i>	Subdrains
C-STRM-UNDR	<i>C-SM-UND</i>	Storm drainage pipe – underground
C-SRVY	<i>C-SV</i>	Survey
C-SRVY-BNDR	<i>C-SV-BND</i>	Non-legal boundaries
C-SRVY-CHNE	<i>C-SV-CHN</i>	Chainage
C-SRVY-ESFC	<i>C-SV-ESF</i>	Electronic survey feature connectivity
C-SRVY-GRID	<i>C-SV-GRD</i>	Survey grid, UTM, etc.
C-SRVY-HORZ	<i>C-SV-HOR</i>	Horizontal alignment
C-SRVY-HZPT	<i>C-SV-HPT</i>	Horizontal control point
C-SRVY-LMTC	<i>C-SV-LMT</i>	Limits of contract, non-legal
C-SRVY-SELV	<i>C-SV-SEL</i>	Superelevation
C-SRVY-SETB	<i>C-SV-SET</i>	Setback
C-SRVY-VERT	<i>C-SV-VER</i>	Vertical alignment
C-SRVY-VRPT	<i>C-SV-VPT</i>	Vertical control point
C-SURV	<i>L-SP</i>	Legal site plan
C-SURV-CANB	<i>L-SP-CAN</i>	Canadian Boundaries
C-SURV-CENT	<i>L-SP-CEN</i>	Provincial, National Coordinates of Parcel Centroid
C-SURV-CLSR	<i>L-SP-CLS</i>	CLSR Boundaries, Reserves, Parks, etc.
C-SURV-PROV	<i>L-SP-PRO</i>	Provincial Boundaries
C-SURV-REGL	<i>L-SP-REG</i>	Regional and Municipality Boundaries
C-SURV-SPRB	<i>L-SP-SPR</i>	Outside perimeter boundary of the entire fee simple
C-AZON	<i>L-AZ</i>	Airport zoning
C-AZON-NZON	<i>L-AZ-ZNP</i>	Proposed new zoning
C-AZON-ZSUR	<i>L-AZ-ZNS</i>	Zoning surfaces, runway strips, centrelines, etc.
C-COMM		Site communication/telephone poles, boxes, towers
C-COMM-OVHD		Overhead communication lines
C-COMM-UNDR		Underground communications lines
C-WATR		
C-WATR-DOMW	<i>C-WM-DOM</i>	Domestic water lines
C-WATR-MANH	<i>C-WM-MAN</i>	tanks manholes, pumping stations, storage
C-WATR-RAWL	<i>C-WM-RAW</i>	Raw water lines
C-WATR-TRTL	<i>C-WM-TWL</i>	Treated water lines
C-WATR-UNDR		Domestic water – underground lines
C-FIRE	<i>C-WM-FHY</i>	Fire protection hydrants, connections
C-FIRE-HYD		Hydrants, connections

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C-FIRE-UNDR	<i>C-WM-FRL</i>	Fire protection – underground lines
C-NGAS		Natural gas, manholes, meters, storage tanks
C-NGAS-EQPM		Natural gas, equipment
C-NGAS-UNDR		Natural gas - underground lines
C-PRFL	<i>C-PF-HOR</i>	Horizontal profiles
C-PRFL-VERT	<i>C-PF-VER</i>	Vertical profiles
C-SSWR	<i>C-SA</i>	Sanitary sewer
C-SSWR-DRAN	<i>C-SA-DRA</i>	Drainage catch areas
C-SSWR-NANH	<i>C-SA-MAN</i>	Storage Tanks, manholes, pumping stations
C-SSWR-TMNT	<i>C-SA-TMT</i>	Sewer treatment areas
C-SSWR-UNDR	<i>C-SA-UND</i>	Sanitary sewer – underground lines
M-WHRF	<i>M-WF</i>	Wharf features
M-WHRF-BRAC	<i>M-WF-BRC</i>	Bracing, wales
M-WHRF-CAIS	<i>M-WF-CAI</i>	Caissons
M-WHRF-CATW	<i>M-WF-CAT</i>	Catwalks
M-WHRF-CRBW	<i>M-WF-CRB</i>	Cribwork, ballast floor
M-WHRF-CRWN	<i>M-WF-CRW</i>	Crownslopes, crowns
M-WHRF-CWLB	<i>M-WF-CWL</i>	Copewalls, copebeams
M-WHRF-DERK	<i>M-WF-DRK</i>	Derricks, cranes, gallows
M-WHRF-DRAN	<i>M-WF-DRN</i>	Drains, scuppers
M-WHRF-FEND	<i>M-WF-FND</i>	Fenders
M-WHRF-FIWL	<i>M-WF-FWL</i>	Fire walls
M-WHRF-FTGD	<i>M-WF-FTG</i>	Footings, mattresses, deck substructures
M-WHRF-FTGW	<i>M-WF-FST</i>	Floating wharf
M-WHRF-GARD	<i>M-WF-GUA</i>	Guards
M-WHRF-GNGW	<i>M-WF-GWY</i>	Gangways
M-WHRF-JONT	<i>M-WF-JNT</i>	Construction, control joints
M-WHRF-LADR	<i>M-WF-LAD</i>	Ladders
M-WHRF-MRNG	<i>M-WF-MOR</i>	Mooring cleats, bollards
M-WHRF-OTLN	<i>M-WF-OLN</i>	Wharf and Dolphin outlines
M-WHRF-PILE	<i>M-WF-PIL</i>	Piles and Bents
M-WHRF-STSP	<i>M-WF-SSP</i>	Steel sheet piling
M-WHRF-TIEB	<i>M-WF-TIE</i>	Tie rods, anchor blocks, tie back walls
M-BWTR	<i>M-BW</i>	Breakwater features
M-BWTR-BERM	<i>M-BW-BRM</i>	Crest of breakwater, berm
M-BWTR-BTOE	<i>M-BW-TOE</i>	Toe of breakwater
M-BWTR-OTLN	<i>M-BW-OLN</i>	Breakwater outline
M-NVGN	<i>M-NV</i>	Navigation
M-NVGN-BUOY	<i>M-NV-BUO</i>	Buoys
M-NVGN-CARD	<i>M-NV-CAR</i>	Cards
M-NVGN-CHNL	<i>M-NV-COR</i>	Navigation corridor, channel
M-NVGN-EQPM	<i>M-NV-EQP</i>	Floating aids, marker buoys, fog horns
M-NVGN-SPAR	<i>M-NV-SPA</i>	Spars
M-SKID	<i>M-SK</i>	Skidways, haulouts, slipways and marine railway features
M-SKID-ABLK	<i>M-SK-BLK</i>	Anchor blocks, haulout blocks
M-SKID-FTNG	<i>M-SK-FTG</i>	Footings
M-SKID-GARD	<i>M-SK-GUA</i>	Guards
M-SKID-OTLN	<i>M-SK-OLN</i>	Skidway timbers, skid poles
M-SKID-RLWY	<i>M-SK-RAI</i>	Railway

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M-SKID-SKDP	<i>M-SK-SKD</i>	Skid Timbers, skid poles
M-SKID-SLBP	<i>M-SK-SLB</i>	Concrete slabs, precast panels
M-SKID-SSPI	<i>M-SK-SSP</i>	Steel sheet piling
M-SKID-VBED	<i>M-SK-BED</i>	Vessel beds
M-HSNL	<i>M-SN</i>	Hydrographic survey information, non-legal
M-HSNL-DATC	<i>M-SN-DAT</i>	Chart Datum Contour, 0.00m
M-HSNL-DREG	<i>M-SN-DRG</i>	Dredged area or limits
M-HSNL-HINT	<i>M-SN-HNT</i>	High normal tide
M-HSNL-HIWL	<i>M-SN-HWL</i>	High water line
M-HSNL-LONT	<i>M-SN-LNT</i>	Low normal tide
M-HSNL-LOWL	<i>M-SN-LWL</i>	Low water line
M-HSNL-MAJC	<i>M-SN-MAJ</i>	Major sea bottom contours
M-HSNL-MINC	<i>M-SN-MIN</i>	Minor sea bottom contours
M-HSNL-SPTE	<i>M-SN-SPT</i>	Soundings, spot elevations
M-HSNL-TIDE	<i>M-SN-TID</i>	Tide gauges, tidal equipment, tide datum

electrical layers

TPW	<i><u>pwgsc</u></i>	
E-LITE		Lighting
E-LITE-CLNG	<i>E-NL-LCM</i>	Ceiling mounted lighting
E-LITE-EMER		Emergency lighting
E-LITE-EXIT		Exit lighting
E-LITE-FLOR		Floor mounted lighting
E-LITE-OTLN		Lighting outline for background (optional)
E-LITE-NUMB		Lighting circuit numbers
E-LITE-ROOF		Roof lighting
E-LITE-SITE	<i>E-NL-OLB</i>	Site lighting (also see civil group) Outside luminaires
E-LITE-SPCL		Special lighting
E-LITE-WALL	<i>E-NL-LWS</i>	Wall mounted lighting attached to buildings and poles and associated canopy.
E-LITE-CIRC		Lighting circuits
E-LITE-CTRL	<i>E-NL-CTR</i>	Lighting controls
E-LITE-IDEN		Luminaire identification and text
E-LITE-JBOX ¹		Junction box
E-LITE-SWCH		Lighting – switches
E-POWR	<i>E-NP</i>	Power, normal power equipment
E-POWR	<i>E-HW</i>	Power, normal power wiring and cables
E-POWR-BUSW		Busways
E-POWR-CABL	<i>E-NW-CBT</i>	Cable trays
E-POWR-CIRC		Power circuits
E-POWR-CLNG		Power – ceiling receptacles and devices
E-POWR-CNBX	<i>E-FW-CNB</i>	Flat wiring connection boxes
E-POWR-CONV	<i>E-NP-CNV</i>	Electrical heat convectors
E-POWR-CTU	<i>E-NW-CTL</i>	Wiring, lighting, controls
E-POWR-EMEC	<i>E-NP-MEC</i>	Electrical connections to mechanical equipment
E-POWR-EQPM		Power equipment
E-POWR-EXPO	<i>E-NW-HVW</i>	Wiring, high voltage wiring in ceiling space
E-POWR-FEED		Feeders
E-POWR-IDEN		Power identification, text
E-POWR-FLTW	<i>G-FW</i>	Flat wiring
E-POWR-FWCB	<i>E-FW-CBL</i>	Flat wiring cable location

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E-POWR-GENE	<i>E-NG</i>	Normal power generation
E-POWR-GENQ	<i>E-NG-EQP</i>	Normal power generation equipment
E-POWR-GENR	<i>E-NG-GEN</i>	Generators, control switchboard
E-POWR-HRAD	<i>E-NP-RAD</i>	Radiation heating panels
E-POWR-HVTG	<i>E-NP-HVD</i>	High voltage distribution
E-POWR-JBOX		Junction box
E-POWR-LVCL	<i>E-LW-LVW</i>	Wiring, low voltage wiring in ceiling space
E-POWR-LVUF	<i>E-NW-LVF</i>	Wiring, low voltage underfloor
E-POWR-LVTG	<i>E-NP-LVD</i>	Low voltage distribution
E-POWR-LVWS	<i>E-NW-LVW</i>	Wiring, low voltage in workspace
E-POWR-MOTR	<i>E-NP-CTL</i>	Electrical motors
E-POWR-NUMB		Power circuit numbers
E-POWR-OTLN		Power outline for backgrounds
E-POWR-PANL		Power panels
E-POWR-RECP	<i>E-NP-REC</i>	Receptacles
E-POWR-REPP	<i>E-NW-PST</i>	Wiring, power poles with receptacles
E-POWR-ROOF		Roof power
E-POWR-SITE		Site power (also see civil group)
E-POWR-SWBD		Power switchboards
E-POWR-TENA	<i>E-NP-TEN</i>	Special tenant systems equipment
E-POWR-TENW	<i>E-NW-TEN</i>	Wiring, tenant systems in workspace
E-POWR-UCPT		Under carpet wiring
E-POWR-URAC		Underfloor raceways
E-POWR-UPSW	<i>E-NW-UPS</i>	Wiring, UPS and conditioned power
E-POWR-WALL		Wall outlets and receptacles
E-CTRL		Electric control systems
E-CTRL-DEVC		Control system devices
E-CTRL-WIRE		Control wiring system
E-GRND	<i>E-GD</i>	Ground system
E-GRND	<i>E-GD-WRG</i>	Wiring, rods, bus plates
E-GRND-CIRC		Ground system circuits
E-GRND-DIAG		Ground system diagram
E-GRND-EQUI		Equipotential ground system
E-GRND-REFR		Reference ground system
E-EMER		Emergency
E-EMER-ESGN	<i>E-EL-ESG</i>	Emergency lighting, exit signs
E-EMER-LITE	<i>E-EI</i>	Emergency lighting
E-EMER-LUWM	<i>E-EL-LWM</i>	Emergency lighting, luminaires, wall mounted
E-EMER-OLUM	<i>E-EL-OLB</i>	Emergency lighting, outside luminaires attached to
E-EMER-WCM	<i>E-EL-LUM</i>	Emergency lighting, luminaires, ceiling mounted
		Building poles, controls
E-EMER-CBLT	<i>E-EW-CBT</i>	Emergency wiring, cable trays, ducts and raceways
E-EMER-CTLS	<i>E-EP-CTL</i>	Emergency power motors and controls
E-EMER-CTLW	<i>E-EW-CLT</i>	Control wiring for emergency lighting
E-EMER-DCBA	<i>E-EP-DCB</i>	Emergency power, DC battery systems
E-EMER-EPQM	<i>E-EP</i>	Emergency power equipment
E-EMER-EXPO	<i>E-EW-EXP</i>	Emergency exposed inside/outside wiring
E-EMER-HVCL	<i>E-EW-HVC</i>	Emergency wiring, high voltage in ceiling space
E-EMER-POWR	<i>E-EW</i>	Emergency wiring, power wiring and cabling
E-EMER-RECP	<i>E-EP-REC</i>	Emergency power, power receptacles

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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E-EMER-TENA	<i>E-EP-TEN</i>	Emergency power, special tenant systems
E-EMER-LVCL	<i>E-EW-LVC</i>	Emergency wiring, low voltage in ceiling space
E-EMER-LVUF	<i>E-EW-LVU</i>	Emergency wiring, low voltage underfloor
E-EMER-UPSU	<i>E-EP-UPS</i>	Emergency power, UPS & conditioned power
E-EMER-UPSU	<i>E-EW-UPS</i>	Emergency wiring, UPS & conditioned power
E-EMER-WICL	<i>E-EW-WCL</i>	Emergency wiring, ceiling mounted wiring
E-AUXL	<i>E-EG</i>	Auxiliary power systems, emergency generation
E-AUXL-EQPM	<i>E-EG-EQP</i>	Emergency power generation equipment
E-AUXL-GENR	<i>E-EG-GEN</i>	Generators, control switchboard
E-LANN	<i>E-LA</i>	Local area networks
E-LANN-EQPM	<i>E-LA-EQP</i>	Equipment
E-LANN-OUTL	<i>E-LA-OUT</i>	Outlets
E-LANN-WIRE	<i>E-LA-WRG</i>	Wiring
E-LTNG	<i>E-EL</i>	Lightning protection systems
E-LTNG-DVCS	<i>E-EL-WRG</i>	Lightning protection devices
E-LTNG-WIRE	<i>E-LP-WRG</i>	Lightning Protection - wiring
E-FIRE	<i>E-FR</i>	Fire alarm, fire extinguishers, electrical fire protection
E-FIRE-ADEV	<i>E-FR-AID</i>	Alarm initiation devices
E-FIRE-APNL	<i>E-FR-AED</i>	Alarm and annunciator panels
E-FIRE-ELOK	<i>E-FR-ELD</i>	Electromagnetic locking devices
E-FIRE-SGNL	<i>E-FR-VCE</i>	Emergency voice communication equipment and controls
E-FIRE-VCEW	<i>E-FR-VCW</i>	Emergency voice communication system wiring
E-COMM	<i>E-PH</i>	Telephone systems
E-COMM		Telephone, communication outlets
E-COMM-EQPM	<i>E-PH-EQP</i>	Telephone equipment
E-COMM-OUTL	<i>E-PH-OUT</i>	Telephone outlets
E-COMM-WRG	<i>E-PH-WRG</i>	Telephone wiring
E-DATA	<i>E-DA</i>	Data systems
E-DATA-EQPM	<i>E-DA-EQP</i>	Data equipment
E-DATA-OUTL	<i>E-DA-OUT</i>	Data outlets
E-DATA-WIRE	<i>E-DA-WRG</i>	Data wiring
E-SOUN	<i>E-PA</i>	Sound/PA system
E-SOUN-EQPM	<i>E-PA-EQP</i>	Sound and PA equipment
E-SOUN-OUTL	<i>E-PA-OUT</i>	Sound and PA outlets
E-SOUN-WIRE	<i>E-PA-WRG</i>	Sound and PA wiring
E-TVAN		TV antenna systems
E-CCTV	<i>E-VD</i>	Closed-circuit TV and video conferencing systems
E-CCTV-EQPM	<i>E-VD-EQP</i>	Closed circuit TV and video conferencing equipment
E-CCTV-OUTL	<i>E-VD-OUT</i>	Closed circuit TV and video conferencing outlets
E-CCTV-WIRE	<i>E-VD-WRG</i>	Closed circuit TV and video conferencing systems wiring
E-NURS		Nurse call system
E-SCHM	<i>E-SM</i>	Electrical schematics
E-SCHM-CLOK	<i>E-SM-CLK</i>	Clock system schematics
E-SCHM-COMM	<i>E-SM-TEL</i>	Telephone schematics
E-SCHM-DATA	<i>E-SM-DAS</i>	Data system schematics

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E-SCHM-EFPS	<i>E-SM-EFP</i>	Electrical fire protection schematics
E-SCHM-EMGE	<i>E-SM-GEN</i>	Emergency generation schematics
E-SCHM-EMLT	<i>E-SM-ELT</i>	Emergency lighting schematics
E-SCHM-EMPO	<i>E-SM-EPR</i>	Emergency power schematics, risers
E-SCHM-EMWI	<i>E-SM-EWR</i>	Emergency wiring schematics
E-SCHM-GRND	<i>E-SM-GND</i>	Grounding schematics
E-SCHM-LANN	<i>E-SM-LAN</i>	Local area network schematics
E-SCHM-LITE	<i>E-SM-NLT</i>	Normal lighting schematics
E-SCHM-LTGC	<i>E-SM-LFT</i>	Lighting control schematics and diagrams
E-SCHM-LTNG	<i>E-SM-LTP</i>	Lighting protection schematics
E-SCHM-PASS	<i>E-SM-PAS</i>	Public address system schematics
E-SCHM-POWR	<i>E-SM-NPR</i>	Normal power schematics, risers
E-SCHM-SGNL	<i>E-SM-SGN</i>	Signal schematic
E-SCHM-VIDO	<i>E-SM-VID</i>	Video system schematics
E-SERT	<i>E-SE</i>	Security, security equipment
E-SERT-ALRM	<i>E-SE-ALM</i>	Intrusion alarms
E-SERT-CNTL	<i>E-SE-CTL</i>	Intrusion controls
E-SERT-ELCK	<i>E-SE-ELK</i>	Electrical security locks
E-SERT-SENS	<i>E-SE-SEN</i>	Intrusion sensors
E-SERT-VCAM	<i>E-SE-VCM</i>	Video cameras and monitors
E-SERT-WIRE	<i>E-SE-WRG</i>	Intrusion wiring
E-SERT-VWAC	<i>E-SE-VWC</i>	Video wiring and cabling
E-SGNL	<i>E-SG</i>	Signal systems
E-SGNL-EQPM	<i>E-SG-EQP</i>	Signal, equipment
E-SGNL-OUTL	<i>E-SG-OUTL</i>	Signal, outlets
E-SGNL-WIRE	<i>E-SG-WRG</i>	Signal, wiring
E-PGNG		Paging system
E-DICT		Central dictation system
E-BELL		Bell system
E-CLOK	<i>E-CK</i>	Clock system
E-CLOK-CLOK	<i>E-CK-CLK</i>	Clock locations
E-CLOK-EQPM	<i>E-CK-EQP</i>	Clock equipment
E-CLOK-WIRE	<i>E-CK-WRG</i>	Clock wiring
E-ALRM		Miscellaneous alarm system
E-INTC		Intercom system
E-LEGN		legend of symbols
E-1LIN		One-line diagrams
E-RISR		Riser diagram
E-SITE		Site electrical substations, poles (changed from C-ECTR)
E-SITE-COMM	<i>E-SD-COM</i>	Communication cables and lines, phone, video
E-SITE-DIST	<i>E-SD</i>	Site distribution and electrical equipment
E-SITE-HVTG	<i>E-SD-HVD</i>	High voltage distribution
E-SITE-LITE		Site lighting (changed from C-ECTR-LITE)
E-SITE-LITE	<i>E-SD-LTG</i>	Lighting
E-SITE-LOVO	<i>E-SD-LVO</i>	Low voltage distribution
E-SITE-MANH	<i>E-SD-MAN</i>	Manholes and handwells, electrical and communications
E-SITE-MUNI	<i>E-SD-MUN</i>	Municipal and utility services
E-SITE-OVHD		Overhead lines (changed C-ECTR-OVHD)
E-SITE-POLE		Electric poles (changed from C-ECTR-POLE)
E-SITE-SUBS	<i>E-SD-SUB</i>	Substations

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E-SITE-TOPP	<i>E-SD-POL</i>	Poles and towers, electrical and communications
E-SITE-UNDR		Underground electrical lines (changed from E-ECTR-UNDR)

fire protection layers

<u>TPW</u>	<u>pwgsc</u>	
F-CO2S		CO ₂ system
F-CO2S-EQPM		CO ₂ equipment
F-CO2S-PIPE		CO ₂ sprinkler piping
F-HALN		Halon
F-HALN-EQPM		Halon equipment
F-HALN-PIPE		Halon piping
F-IGAS ¹		Inert gas
F-IGAS-EQPM ¹		Inert gas piping
F-SPRN	<i>H-FE-FIT</i>	Fire protection sprinkler system
F-SPRN-CLHD	<i>H-FE-SPH</i>	Sprinkler head – ceiling mounted
F-SPRN-EQPM	<i>H-FE-SPE</i>	Sprinkler equipment
F-SPRN-OTHD	<i>H-FE-SPH</i>	Sprinkler head – other
F-SPRN-PIPE		Sprinkler piping
F-SPRN-STAN		Sprinkler system standpipe
F-SPRN-ZONE	<i>H-FE-SSZ</i>	Sprinkler system zones
F-STAN		Fire protection standpipe system
F-STAN-EQPM	<i>H-FE-STE</i>	Sprinkler system standpipe equipment
F-PROT		Fire protection systems
F-PROT-ALRM		Fire alarm
F-PROT-CHEX	<i>H-FE-CEX</i>	Chemical extinguishing equipment
F-PROT-EQPM	<i>H-FE-CAB</i>	Fire system equipment (fire hose cabinet extinguishers)
F-PROT-EXPE	<i>H-FE-EPE</i>	Explosion proof equipment
F-PROT-EXTG	<i>H-FE-EXG</i>	Fire extinguisher
F-PROT-FDMP	<i>H-FE-FDP</i>	Fire dampers
F-PROT-FFEX	<i>H-FE-FEX</i>	Foamed extinguishing equipment
F-PROT-FHYD	<i>H-FE-FHY</i>	Building fire hydrants (other than sitework drawings)
F-PROT-FSFL	<i>H-FE-FSF</i>	Fire stop flaps
E-PROT-SMEQ	<i>H-FE-SMC</i>	Smoke control equipment
F-PROT-SMOK		Smoke detectors/heat sensors

general layers

<u>TPW</u>	<u>pwgsc</u>	
G-PLAN ¹		Floor plan – key plan
G-SITE ¹		Site plan – key map
G-FIRE ¹		Fire protection plan
G-ACCS ¹		Access plan
G-EVAC ¹		Evacuation plan
G-CODE ¹		Code compliance plan

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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hazardous layers

<u>DoT & PW</u>	<i><u>pwgsc</u></i>	
H-PLAN ¹		Floor plan
H-SITE ¹		Site plan

mechanical layers

<u>TPW</u>	<i><u>pwgsc</u></i>	
M-BRIN		Brine systems
M-BRIN-EQPM		Brine equipment system
M-BRIN-PIPE		Brine system piping
M-CHIM		Prefabricated chimneys
M-CMPA	<i>H-PD-CMA</i>	Compressed air systems
M-CMPA-CEQP		Compressed air equipment
M-CMPA-CPIP		Compressed air piping
M-CMPA-PEQP		Process air equipment
M-CMPA-PPIP		Process air piping
M-CONT		Controls and instrumentation
M-CONT-THER		Thermostats
M-CONT-WIRE		Low voltage wiring
M-DUST		Dust and fume collection system
M-DUST-DUCT		Dust and fume ductwork
M-DUST-EQPM		Dust and fume collection equipment
M-ELHT-EQPM		Electric heat equipment
M-ENER		Energy management system
M-ENER-EQPM		Energy management equipment
M-ENER-WIRE		Energy management wiring
M-RCOV		Energy recovery
M-RCOV-EQPM ¹		Energy recovery equipment
M-RCOV-PIPE ¹		Energy recovery piping
M-FUME-EQPM ¹		Fume hoods
M-FUME-EXIS ¹		Fume hood exhaust system
M-EXHS ¹		Exhaust system
M-EXHS-DUCT		Exhaust system ductwork
M-EXHS-EQPM		Exhaust system equipment
M-EXHS-RFEQ		Rooftop exhaust equipment
M-FUEL	<i>H-SP, H-SP-SERV</i>	(as applicable) Fuel system piping
M-FUEL-FORT	<i>H-PD-FOR</i>	Fuel oil return
M-FUEL-FOSU	<i>H-PD-FOS</i>	Fuel oil supply
M-FUEL-GGEP		Fuel gas general piping
M-FUEL-GPRP		Fuel gas process piping
M-FUEL-OGEP		Fuel oil general piping
M-FUEL-OPRP		Fuel oil process piping
M-FUEL-MANH	<i>H-SP-MAN</i>	Manholes, valves and fueling stations

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M-FUEL-TANK	<i>H-SP-TNK</i>	Fuel tanks
M-GLYC-GLRT	<i>H-PD-GLR</i>	Glycol return
M-GLYC-GLSU	<i>H-PD-GLS</i>	Glycol supply
M-HVAC		HVAC System
M-HVAC-CDFF		HVAC ceiling diffusers
M-HVAC-DUCT		HVAC ductwork
M-HVAC-EQPM		HVAC equipment
M-HVAC-ODFF		HVAC other diffusers
M-HVAC-RDFF		Return air diffusers
M-HVAC-SDFF		Supply diffusers
M-HOTW		Hot water heating system
M-HOTW-EQPM		Hot water equipment
M-HOTW-HORT	<i>H-PD-HWR</i>	Heating water return
M-HOTW-HOSU	<i>H-PD-HWS</i>	Heating water supply
M-HOTW-PIPE		Hot water piping
M-CWTR		Chilled water systems
M-CWTR-CHWR	<i>H-PD-CHR</i>	Chilled water return
M-CWTR-CHWS	<i>H-PD-CHS</i>	Chilled water supply
M-CWTR-EQPM		Chilled water equipment
M-CWTR-PIPE		Chilled water piping
M-MACH		Machine shop equipment
M-MDGS		Medical gas systems
M-MDGS-EQPM		Medical gas equipment
M-MDGS-PIPE		Medical gas piping
M-LGAS ¹		Laboratory gas systems
M-LGAS-EQPM ¹		Laboratory gas equipment
M-LGAS-PIPE ¹		Laboratory gas piping
M-NGAS ¹	<i>H-PD-NGA</i>	Natural gas systems
M-NGAS-EQPM ¹		Natural gas systems equipment
M-NGAS-PIPE ¹		Natural gas piping
M-PGAS	<i>H-PD-PGA</i>	Propane gas
M-PROC	<i>H-SP, H-SP-SER</i>	(as applicable), Process systems
M-PROC-EQPM		Process equipment
M-PROC-PIPE		Process piping
M-REFG		Refrigeration systems
M-REFG-EQPM		Refrigeration equipment
M-REFG-PIPE		Refrigeration piping
M-REFG-RGAS	<i>H-PD-RAD</i>	Propane gas
M-REFG-RLIQ	<i>H-PD-RFL</i>	Refrigerant liquid
M-RDNT		Radiant heating
M-RDNT-PANL		Radiant heating panels
M-RDNT-TUBE	<i>H-PD-RAD</i>	Radiant heat tube
M-SCHM	<i>H-SM</i>	Mechanical schematics and riser diagrams

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M-SCHM-CSR	<i>H-SM-CSY</i>	Control systems schematics
M-SCHM-DSR	<i>H-SM-DRS</i>	Duct riser diagrams
M-SCHM-DUC	<i>H-SM-DUC</i>	Duct schematic diagrams
M-SCHM-PIP	<i>H-SM-PIP</i>	Piping schematic diagrams
M-SCHM-PIR	<i>H-SM-PRS</i>	Piping riser diagrams
M-SCHM-WAS	<i>H-SM-WST</i>	Waste schematics
M-SPCL		Special systems
M-SPCL-EQPM		Special systems equipment
M-SPCL-PIPE		Special systems piping
M-STEM	<i>H-PD-STM</i>	Steam systems
M-STEM-CONP	<i>H-PD-STC</i>	Steam systems condensate piping
M-STEM-EQPM		Steam systems equipment
M-STEM-HPIP		High pressure steam piping
M-STEM-LPIP		Low pressure steam piping
M-STEM-MPIP		Medium pressure steam piping
M-TEST-EQPM		Test equipment

plumbing layers

TPW

pwgsc

P-ACID		Acid, alkaline, oil waste systems
P-ACID-PIPE		Acid, alkaline, oil piping
P-DOMW		Domestic hot and cold water systems
P-DOMW-CPIP		Domestic cold water piping (changed from P-DOMW-PIPE)
P-DOMW-DCWS	<i>H-PD-DCW</i>	Domestic cold water supply
P-DOMW-DHWS	<i>H-PD-DHW</i>	Domestic hot water supply
P-DOMW-DHWR	<i>H-PD-DHR</i>	Domestic hot water recirculation
P-DOMW-EQPM		Domestic hot and cold water equipment
P-DOMW-HPIP		Domestic hot water piping (changed from P-DOMW-PIPE)
P-DOMW-RISR ¹		Domestic hot and cold water risers
P-SANR		Sanitary drainage
P-SANR-DRAN	<i>H-PD-DRAN</i>	Drainage waste and vents
P-SANR-EQPM ¹		Sanitary equipment
P-SANR-FITG	<i>H-PD-FIT</i>	Piping fittings
P-SANR-FIXT	<i>H-PF-FIX</i>	Plumbing fixtures
P-SANR-FLDR	<i>H-PF-FDR</i>	Floor drains
P-SANR-PIPE	<i>H-PD-SAN</i>	Sanitary piping
P-SANR-RISR		Sanitary risers
P-STRM		Storm drainage system
P-STRM-PIPE	<i>H-PD-STD</i>	Storm drain piping
P-STRM-RFDR	<i>H-PF-RDR</i>	Roof drains
P-STRM-RISR		Storm drain risers
P-EQPM		Plumbing miscellaneous equipment
P-FIXT		Plumbing fixtures
P-FIXT-HBIB	<i>H-PF-BIB</i>	Hose bib connectors

equipment layers

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<u>TPW</u>	<u>pwgsc</u>	
Q-OTLN ¹		Equipment outlines
Q-POWER ¹		Power information
Q-PIPE ¹		Piping information

resource layers

(information provided by product manufacturers)

R-****-OTLN ¹		Outline or profile graphics
R-****-DETL ¹		Additional detail graphics
R-****-PATT ¹		Textures and hatch patterns
R-****-ANNO		Annotation

structural layers

<u>TPW</u>	<u>pwgsc</u>	
S-GRID		Column grid
S-GRID-DIMS		Column grid dimensions
S-GRID-EXTR	<i>S-GD-EXT</i>	Column grid outside building
S-GRID-IDEN		Column grid tags
S-GRID-INTR	<i>S-GD-INT</i>	Column grid inside building
S-FNDN		Foundation
S-FNDN-FILL	<i>S-FN-FIL</i>	Backfill, Soil-line
S-FNDN-FTNG	<i>S-FN-FTG</i>	Footings
S-FNDN-OTLN	<i>S-FN-OLN</i>	Foundation Outline
S-FNDN-PCAP	<i>S-FN-CAP</i>	Pile caps and grade beams
S-FNDN-PILE		Pile, drilled piers, caissons
S-FNDN-RBAR		Foundation reinforcing
S-FLOR	<i>S-FL</i>	Floors
S-FLOR-BEAM	<i>S-FL-BEM</i>	Beams
S-FLOR-BRAC	<i>S-FL-BRC</i>	Bracing
S-FLOR-DECK	<i>S-FL-DEK</i>	Decking, waffle
S-FLOR-FRAM	<i>S-FL-FRM</i>	Framing
S-FLOR-JOIN	<i>S-FL-JNT</i>	Joints, expansion, construction
S-FLOR-JOIS	<i>S-FL-JST</i>	Joists
S-FLOR-OTLN	<i>S-FL-OLN</i>	Floor outline
S-FLOR-OPNG	<i>S-FL-OPN</i>	Floor openings
S-FLOR-STRS	<i>S-FL-STA</i>	Stairs
S-SLAB		Slab
S-SLAB-EDGE		Edge of slab
S-SLAB-RBAR		Slab reinforcement
S-SLAB-JOIN		Slab control joints

¹ Layer name new to AIA CAD Layer Guidelines 2nd Edition

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S-ABLT		Anchor bolts
S-COLS		Columns
S-WALL	<i>S-WL</i>	Walls, columns or shear walls
S-WALL-BRNG	<i>S-WL-BRG</i>	Bearing walls
S-WALL-COLM	<i>S-WL-COL</i>	Columns
S-WALL-JOIN	<i>S-WL-JNT</i>	Joints, expansion, construction
S-WALL-OPNG	<i>S-WL-OPN</i>	Wall openings
S-WALL-RTWL	<i>S-WL-RET</i>	Retaining walls
S-ROOF	<i>S-RF</i>	Roofs
S-ROOF-BEAM	<i>S-RF-BEM</i>	Beams
S-ROOF-BRAC	<i>S-RF-BRC</i>	Bracing
S-ROOF-DECK	<i>S-RF-DEK</i>	Decking, waffle
S-ROOF-FRAM	<i>S-RF-FRM</i>	Framing
S-ROOF-JOIN	<i>S-RF-JNT</i>	Joints, expansion, construction
S-ROOF-JOIS	<i>S-RF-JST</i>	Joists
S-ROOF-OPNG	<i>S-RF-OPN</i>	Roof openings
S-ROOF-OTLN	<i>S-RF-OLN</i>	Roof Outline
S-ROOF-TRUS	<i>S-RF-TRU</i>	Roof Truss
S-METL		Miscellaneous metal
S-BEAM		Beams (changed from S-FRAM-BEAM)
S-JOIS		Joists (changed form S-FRAM-JOIS)
S-DECK		Structural floor deck (changed from S-FRAM-DCK)

telecommunication layers

T-CABL ¹		Cable plan
T-EQPM ¹		Equipment plan
T-JACK ¹		Data/telephone jacks
T-DIAG ¹		Diagram

Real property space management layers

R-BLDG	<i>R-BS</i>	Building service areas
R-BLDG-BSRM	<i>R-BS-RMS</i>	Building service areas/rooms (boiler, mechanical, garbage room)
R-BLDG-LOBY	<i>R-BS-LOB</i>	Building main entrance lobby, security/commissionaire/concierge area
R-BLDG-OTLN	<i>R-BS-OLN</i>	General outline of building service areas
R-BLDG-VPEN	<i>R-BS-SFT</i>	Vertical penetration (shafts, elevators, stairs)
R-FLRC	<i>R-FC</i>	Floor common area
R-FLRC-COLM	<i>R-FC-COL</i>	Building structure (interior and perimeter)
R-FLRC-CONV	<i>R-FC-CNV</i>	Window sills and convectors (baseboard heaters, radiators)
R-FLRC-CORR	<i>R-RF-COR</i>	Primary circulation
R-FLRC-FIRE	<i>R-RF-FIR</i>	Fire egress cross over areas/fire refuge areas
R-FLRC-LOBY	<i>R-RF-LOB</i>	Floor elevator lobby
R-FLRC-OTLN	<i>R-FC-OLN</i>	General outline of floor common areas
R-FLRC-WRMS	<i>R-FC-RMS</i>	Washrooms, electrical/telecom/janitor's closets
R-GROS	<i>R-GA</i>	Gross Areas
R-GROS-FEXT	<i>R-GA-EXT</i>	Floor outside gross area
R-GROS-FINT	<i>R-GA-INT</i>	Floor inside gross area
R-PARK	<i>R-PK</i>	Parking

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R-PARK-PEXT	<i>R-PK-EXT</i>	Exterior parking
R-PARK-PINT	<i>R-PK-INT</i>	Interior parking
R-USAR	<i>R-US</i>	Usable area
R-USAR-COMN	<i>R-US-COM</i>	User Common support (shared conference, day-care, fitness, mail)
R-USAR-DEPO	<i>R-US-DEP</i>	Space allocation by occupant department of company
R-USAR-GRPM	<i>R-US-GRP</i>	Space allocation by occupant's major groups: branch, division
R-USAR-GRPS	<i>R-US-SEC</i>	Space allocation by occupant's sub-groups
R-USAR-OTLN	<i>R-US-OLN</i>	General outline of usable area
R-USAR-RAID	<i>R-US-AID</i>	Room, area identifier
R-ZONE	<i>R-ZN</i>	Zoning
R-ZONE-CLN	<i>R-ZN-CLZ</i>	Cleaning zoning
R-ZONE-SECR	<i>R-ZN-SEC</i>	Security zoning

6.4 international standards - introduction

This section provides guidance on the use of *CAD Layer Guidelines* for practical applications. Special issues are discussed such as the relationship of the layer names published here to international standards. Case studies for particular project types are also included.

6.5 international standards - issues

In 1997 the International Standards Organization (ISO) establish an international standard for CAD layer names. This three-part document (ISO/DIS 13567) defines a standard layer name format rather than specific layer names. The definition of layer classification is left to each country.

The required fields in the ISO standard format are shown below. Additional fields are defined for status, sector, phase, projection, and scale; use of these fields is optional.

Agent Responsible – 2 characters

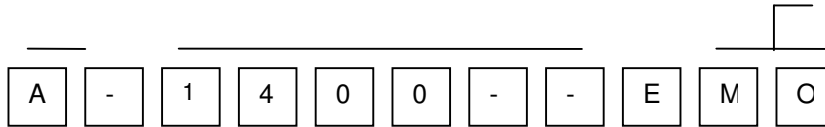


Major Group – 6 characters



Presentation – 2 characters

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The ISO format is similar to that presented in *CAD Layer Guidelines*. The ISO “agent responsible” field is comparable to *CAD Layer Guidelines* “discipline” field. The ISO “element” field is comparable to the “major and minor group” fields.

The two different formats differ in the treatment of presentation information. In *CAD Layer Guidelines*, presentation information is optional and handled under the ANNO major group. For example, dimensions for an architectural drawing would be placed on A-ANNO-DIMS. Text would be placed on A-ANNO-TEXT.

In the ISO standard, presentation is a required field. Annotative information is indicated with a P designation. For example, A-1400--PT might indicate text relating to walls. Building elements such as walls and doors are designated by adding M to the layer name. For example, A-1400--M- might indicate walls.

The AIA *CAD Layer Guidelines* are comparable in information content of the ISO standard, allowing user to “map” layers between the two formats. The method for conversion is as follows:

1. Shorten minor group codes from four characters to two characters. This allows major and minor group codes to fit within six characters.
2. Add P (indicating *paper* information) and a one-character modifier to layers with ANNO as their major group.
3. Add M- to all layers not in the ANNO group to indicate *model* information.
4. Where a status field is used (EXST, DEMO, NEWW), convert it to a single character and place it after the presentation field.

Examples are shown below:

CAD LAYER GUIDELINES FORMAT	ISO FORMAT
A-WALL	A-WALL-M-
A-WALL-FULL	A-WALLFUM-
A-ANNO-DIMS	A-ANNODIPD
A-ANNO-TEXT	A-ANNOTEPT
A-WALL-FULL-EXST	A-WALLFUM-E
A-WALL-DEMO	A-WALL--M-D-

7 survey

7.1 introduction

Survey drawings prepared for the Department of Transportation and Public Works shall adhere to the NS Department of TRANSPORTATION & Public Works CADD standards listed in this document. Layer names for survey are related to data point codes acquired from field work and are listed in the following section.

The following chapter is to be used as a reference in order to assist in the preparation of survey drawings.

7.2 survey point codes and feature codes

Numeric Code	Alpha Code	Feature Definition	Layer Name
1	CL	Centre Line	RRRD
2	FCCL	Chainlink Fence	STFE
3	COLUMN	Column	RRBR
4	HEGE	Hedge	LCHG
5	BRFT	Bridge Footing	RRBR
6	DRPIP	Drain Pipe	UTPI
8	MISC	Miscellaneous	O
9	MAIL	Mail Box	TRSVMB
10	PP	Power Pole	UTPO
11	TP	Telephone Pole	UTPO
12	TELB	Telephone Junction Box	TRSVUT
13	FCWB	Barbwire	STFE
14	SWA	Sidewalk (Asphalt)	RRRD
15	PIER	Pier	STPR
16	WWALL	Wingwall	STRW
17	CRNPST	Corner Post	STFE
18	FCPW	Pagewire Fence	STFE
19	FCORN	Ornamental Fence	STFE

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20	FCGATE	Gate Fence	STFE
Numeric Code	Alpha Code	Feature Definition	Layer Name
22	CULV	End of Culvert	RRCL
23	WDRD	Woods Road	RRRDRAIN
25	EDWD	Edge of Woods	LCTA
26	IB	Iron Bar	TRCDST
27	IP	Iron Pipe	TRCDST
28	SM	Survey Marker	TRCDST
29	WP	Wooden Post	TRCDST
30	PROP	Property Line	TRCDPL
31	DRVG	Driveway (Gravel)	RRRDDR
32	DWG	Dwelling Corners	BLDG
33	MHOME	Mobile Home Corners	BLDG
34	SHED	Shed Corners	BLDG
35	GAR	Garage Corners	BLDG
36	PMPIS	Pump Island	STGP
37	BARN	Barn Corners	BLDG
38	STREE	Softwood Tree (Conifer)	LCTS
39	BUSH	Bush	LCTS
40	WELL	Well	WAWL
41	RTWL	Retaining Wall	STRW
42	BRGE	Bridge Corners	RRBR
43	BROK	Edge of Brook	WARV
44	RIVR	Edge of River	WARV
45	RR	Railroad	RRRR
46	RRC	Railway Crossing	RRRR
47	SBOX	Railway Switch Box	RRRRSW
48	LP	Light Pole	UTPO
49	CURB	Curb (Asphalt)	RRRD
50	CBA	Catch Basin	TRSVUT
51	MHSW	Manhole Sewer	TRSVUT
52	UMH	Utility Manhole	TRSVUT
53	WSOF	Water Shut Off	TRSVUT
54	PAVE	Edge of Pave	RRRD
55	SHLD	Edge of Shoulder	RRRD
57	FPOLE	Flag Pole	STFP
58	STRE	Store Corners	BLDG
59	CHUR	Church Corners	BLCH
60	SIGN	Sign	RRSI (on road only)
61	GRAIL	Guardrail	RRGR
62	NSPT	Nova Scotia Power Tower	UTTR
67	ROWM	RT. Of Way Marker	TRCDST
68	HTREE	Hardwood Tree (Deciduous)	LCTS
69	ABUT	Abutment	RRBR
70	PLOT	Parking Lot	DAPA
71	BM	Bench Mark	TRCDST
73	CWK	Crosswalk	TRSVPM
74	GIDP	Guide Post	TRRRGP
75	PMPST	Pump Station	BLPU
77	HYDR	Fire Hydrant	TRSVUT
79	FCRL	Fence (Rail)	STFE
80	LAKE	Lake Edge @ H.W.M.	Walk
81	HWM	High Water Mark	WA*(lk, co, rv...)
82	GYW	Guy Wire	TRSVGW
83	WL	Water Line	WA*(lk, co, rv...)

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84	RRSP	Railroad Signal Post	RRRR
Numeric Code	Alpha Code	Feature Definition	Layer Name
85	LWM	Low Water Mark	WA*(lk, co, rv...)
86	WHRF	Wharf	STWH
88	CULBOX	Box Culvert	RRCL
89	GASL	Gas Line	TRSVUT
90	GASM	Gas Meter	TRSVUT
91	GASV	Gas Valve	TRSVUT
92	GABN	Gabion Baskets	STRW
94	GUTR	Asphalt Gutter	RRRD
96	DRVC	Driveway (Concrete)	RRRDDR
97	CULCON	Culvert (Concrete)	RRCL
98	LAWN	Edge of Lawn	TRSVLN
99	FIELD	Edge of Field	TRSVFD
101	FLGAR	Flower Garden	TRSVFG
102	ARLT	Turning Arrow Left	TRSVPM
103	ARRT	Turning Arrow Right	TRSVPM
104	ARST	Straight Arrow	TRSVPM
105	STOPB	Stop Bar	TRSVPM
108	CLARR	Centreline of Abandoned Railroad	RRRR04
114	CEME	Cemetery	DACM
115	GRAV	Gravestone	TRSVGS
118	PSTUR	Pasture	TRSVPT
143	FINAL	Final Sections	TRSVSE
144	GRUB	Grubbing Sections	TRSVSE
145	PROG	Progress Sections	TRSVSE
148	TROCK	Top of Rock Sections	TRSVSE
149	CURBC	Curb (Concrete)	RRRD
151	USROCK	Undercut Solid Rock Sections	TRSVSE
152	UCOM	Undercut Common Sections	TRSVSE
158	CPAD	Concrete Pad	STSB
161	JERS	Jersey Barrier	RRRD
162	GYP	Guy Pole	TRSVUTGP
163	TLST	Traffic Light Standard	TRSITS
164	TLSB	Traffic Light Switch Box	TRSITS
166	DRVP	Driveway (Paved)	RRRDDR
167	SMWL	Stone & Masonry Wall	STWL
168	STEP	Steps	TRSVST
176	FOUN	Old foundation	BLDG04
178	CHUR	Church Corner	BLCH
183	FOMARK	Fibre Optic Marker	TRSVUT
185	ORGR	Original Ground Sections	TRSVSE
186	TROCK	Top of Rock Sections	TRSVSE
187	GRUB	Grubbing Sections	TRSVSE
190	USROCK	Undercut Solid Rock Sections	TRSVSE
191	UCOM	Undercut Common Sections	TRSVSE
192	TSWAMP	Top of Swamp Sections	TRSVSE
200	SWLINE	Solid, White	TRSVPM
201	CLBW	Centreline Broken, White	TRSVPM
202	CLDS	Centreline Double Solid Yellow	TRSVPM
203	CLBY	Centreline Broken, Yellow	TRSVPM
204	CLBS	Centreline Solid Left, Broken Right	TRSVPM
205	CLBS	Centreline Broken Left, Solid Right	TRSVPM
206	CLSY	Centreline Single Solid Yellow	TRSVPM
207	DITCH	Centre of Ditch	WADI

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209 Numeric Code	DYKE Alpha Code	Dyke Feature Definition	WADY Layer Name
210	STPL	Stock Pile	DAPI
211	TOES	Toe of Slope	LFBL
212	TB	Top of Bank	LFBL
214	SWC	Sidewalk (Concrete)	RRRD
215	SWMP	Swamp (Edge)	WASW
217	POND	Pond (Edge)	WALK
300	FINAL	Final Sections	TRSVSE
301	PROG	Progress Sections	TRSVSE
500	NSCM	Nova Scotia Control Monument	DLCM
501	TRAV	Traverse Point	TRSVTP

8 mapping

8.1 introduction

The Department of Transportation and Public Works generates, acquires and maintains a wide variety of digital map products. TPW has 1: 5000 scale (resource) base mapping produced to provincial base mapping standards and specifications for use in new highway planning and specific project areas. TPW maintain a comprehensive digital map library consisting of large scale (1:1000, 1:2000) urban maps through to small scale highly generalized maps of the whole province. TPW also maintain a Road List Classification Map series, which is a 1:50,000 scale graphical representation of provincially owned roads.

The Service Nova Scotia and Municipal Relations (SNSMR) provides the focal point for coordinating access to provincial corporate geographic information, including the development of land information standards. The bulk of this information is stored in the Nova Scotia Topographic Database (NSTDB) and its associated programs.

Standards for digital mapping have been established by the Nova Scotia Committee on Standards for Geographic Information. TPW was an active member on this committee and sat on a number of subcommittees dealing specifically with mapping. At the present time mapping standards relate directly to the NSTDB 1:10,000 series. This is the base mapping that will be the foundation of future Geographical Information Systems and will be the platform for sharable corporate geographic data.

8.2 www links to mapping related information

The following are links to Provincial Standard material relating to mapping.

1. Link to the **Nova Scotia's Geographic Information Standards Manual**. This is the first attempt by the Province to outline and distribute standards for all types of shareable geographic information.

<http://www.gov.ns.ca/snsmr/land/programs/post/manual/default.asp>

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2. Link to the **Nova Scotia Topographic Database (NSTDB)** specifications pages. This link describes in detail the NSTDB digital mapping products. Here you will find the feature code lists for both the urban (1:2000, 1:5000) and resource (1:10,000) map series.
<http://www.nsgc.gov.ns.ca/mappingspecs/Specifications/>
3. The Service Nova Scotia & Municipal Relations Home geographic information page can be found at
<http://www.gov.ns.ca/snsmr/land/new/>

8.3 NSTDB feature code (layer) creation rationale

The following describes the rationale for the creation of feature codes:

The system adopted by the Province of Nova Scotia has been prepared by the Feature Definition and Coding Task Group under the Nova Scotia Committee on Standards for Geographic Information. Where possible, existing definition and coding systems have been adopted, for example adopting a large portion of the former LRIS system. As will be noted in the following pages, the system adopted by Nova Scotia is a hierarchical approach, going from the general, to the specific. To date there are ten general classes of features. They are listed at the end of this section.

The use of a hierarchical classification system allows a structured approach in designing and maintaining a standard feature coding system. Features can be added to the standard at any hierarchical level, subject to approval by the Nova Scotia Committee on Standards for Geographic Information. In some cases, new general classes may have to be created (the top level of the hierarchy). In others, it may be desirable to add new features to an existing class (level 2); while in others, adding another level of hierarchy to an existing code may be the preferred choice. However, if a feature definition already exists, a new code should not be added.

All data collected for the primary databases have a unique feature code. This code is restricted to a length of 12 alpha/numeric characters, which are designed to work in pairs. The first two letters always refer to one of ten major categories, followed by other pairs to further define the feature. The feature codes may also have numeric attributes (at least 2) attached, to the end which provide additional information on the sub-classes of the feature.

Major Feature Categories:

The ten major categories of features are grouped along with their two letter code and a description of each follows:

1. Building - BL
A generic term for any permanent roofed construction such as a house, factory, barn, etc.
2. Designated Area - DA
An area set aside for a particular use or purpose.
3. Delimiter - DL
A real or imaginary entity which describes limits.

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Included are boundaries and control monuments.

4. Landcover - LC
The representation and description of the various surface characteristics of the land.
5. Hypsography - LF
The representation and description of land forms and relief.
6. Road and Railroad - RR
Any feature associated with a travelled way.
7. Structure - ST
A generic term for a man made feature.
8. Utility - UT
A public service such as gas, water, electricity, etc.
9. Hydrography - WA
Surface water as indicated on a topo map and related features.
10. Cadastral - CD

Numeric Attribute Code Breakdown

Two numeric digits define sub-classes of a feature. These sub-classes are identified in the table below. NOTE: Both columns must be filled if a sub-class from either column is used.

Column 1 after the code	Column 2 after the code
0 - Regular	0 - Regular
1 - Left	1 - Paved
2 - Right	2 - Unpaved
3 - Text	3 - Under Construction
4 - "Stars" Parallel Line (Carto)	4 - Ruin / Inactive / Abandoned
5 - Hard surface more than 2 lanes	5 - Indefinite / Approximate
6 - Hard surface, 2 lanes	6 - Underground
7 - Hard surface, less than 2 lanes	7 - Overhead
8 - Loose surface, 2 lanes or more	8 - Proposed Location
9 - Loose surface, less than 2 lanes	9 - Road Text

Once a feature has been named and defined, all information about the feature is recorded in the feature dictionary using the standard entry format.

Examples of Features with Numeric Attributes:

DAQU10 - Quarry / left *where*

- DA indicates a designated area (major category)

- QU further define the feature as a quarry

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- 10 with the 1 (taken from column 1) indicating left and the 0 (taken from column 2) used as a filler

DAPA11 - Parking Area / left / paved *where*

- DA indicates a designated area (major category)
- PA further define the feature as a parking area
- 11 with the first 1 (taken from column 1) indicating left and the second 1 (taken from column 2) indicating the area is paved

RRBR03 - Bridge / under construction *where*

- RR indicates a road or railroad (major category)
- BR further define the feature as a bridge
- 03 with the 0 (taken from column 1) used as a filler and the 3 (taken from column 2) indicating that it is under construction

8.4 NTS - RLCM feature codes (layers)

The following is a list of feature codes and/or layers for the 1:50,000 digital NTS (National Topographic System) series which was used as a base for the Department's Road List/Classification Map (RLCM) series. Some codes may have been added or deleted since the creation of this.

Feature Code	Definition
BLAM	Building:armory
BLAMOL	Building:armory outline
BLAPOL	Building:automobile plant outline
BLAR	Building:arena symbol
BLAROL	Building:arena outline
BLBN	Building:barn/machinery shed symbol
BLBNOL	Building:barn/machinery shed outline
BLBS	Building:other sybmol
BLBS4	Ruins
BLCA	Building:cabin
BLCC	Building:community center symbol
BLCCOL	Building:community center outline
BLCG	Building:coast guard station
BLCH	Building:church symbol
BLCHNC	Building:non-christian place of worship
BLCHOL	Building:church outline
BLCI	Building:correctional institute
BLCIOL	Building:correction institute outline
BLCL	Building:college symbol
BLCLOL	Building:college outline
BLCMOL	Building:cement plant outline
BLCO	Building:convent symbol

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BLCOOL	Building:convent outline
BLCT	Building:courthouse
BLCTOL	Building:courthouse outline
Feature Code	Definition
BLCV	Building:city hall
BLCVOL	Building:city hall outline
BLDG	Building:other outline
BLDG4	Ruins
BLDM	Building:dome
BLEL	Building:grain elevator symbol
BLELOL	Building:grain elevator outline
BLEP	Building:electric power station symbol
BLEPOL	Building:electric power station outline
BLFA	Building:factory symbol
BLFAFP	Building:fish process plnt symbol
BLFAFPOL	Building:fish process plnt outline
BLFAOL	Building:factory outline
BLFAPMOL	Building:pulp/paper mill outline
BLFASM	Building:sawmill symbol
BLFASMOL	Building:sawmill outline
BLFH	Building:fish hatchery symbol
BLFHOL	Building:fish hatchery outline
BLFP	Building:filtration plant
BLFPOL	Building:filtration plant outline
BLFS	Building:fire station symbol
BLFSOL	Building:fire station outline
BLFSPS	Building:fire/police sta symbol
BLFTOL	Fort
BLGH	Greenhouse symbol
BLGHOL	Greenhouse outline
BLHA	Building:hall symbol
BLHAOL	Building:hall outline
BLHLOL	Building:hotel outline
BLHO	Building:hospital symbol
BLHOOL	Building: hospital outline
BLHS	Building:highway servce centre symbol
BLHSOL	Building:highway service centre outline
BLKL	Building:kiln(tobacco) symbol
BLLM	Building:lumber mill symbol
BLLMOL	Building:lumber mill outline
BLMC	Building:medicalcentre symbol
BLMCOL	Building:medical centre outline
BLMH	Building:municipal hall symbol
BLMHOL	Building:municipal hall outline
BLMNOL	Building:monastery outline
BLMO	Building:motel symbol
BLMOOL	Building:motel outline
BLMU	Building:museum symbol
BLMUOL	Building:museum outline
BLOB	Building:outbuilding symbol
BLOBOL	Building:outbuilding outline
BLOG	Building:oil/gas facilities sym
BLPL	Building:plant symbol
BLPLFI	Building:water treatment plant sybmol
BLPLOL	Building:plant outline

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BLPS	Building:police station
BLPSOL	Building:police station outline
BLRFOL	Building:retormatory outline
Feature Code	Definition
BLRR	Building:railway station symbol
BLRROL	Building:railway station outline
BLSC	Building:senior citizens home
BLSCOL	Building:senior citizens home outline
BLSH	Building:school symbol
BLSHOL	Building:school outline
BLSMOL	Building:steel mill outline
BLSPOL	Building:shopping centre outline
BLSPXOL	Building:sportsplex outline
BLSTOL	Building:satellite track station outline
BLSW	Building:sewage treatment plant
BLSWOL	Building:sewage treatment plant outline
BLSYOL	Building:shipyard outline
BLTROL	Building:trading post outline
BLUNOL	Building:university outline
BLWR	Building:warden/ranger station symbol
BLWS	Building:weigh scale (highway)
DAAP1	Runway:airport,oper., hard surface
DAAPHE	Heliport
DAAS5	Runway:airfield condition unknown
DAAS11	Runway:airfield, oper., h.surf.
DAAS12	Runway:airfield, oper.1.surf
DAAS14	Runway:abandoned
DABU1	Built-up area
DACAPT	Camp symbol
DACG1	Campground boundary
DACGSY	Campground symbol
DACM1	Cemetery
DACMSY	Cemetery symbol
DADI1	Drive-in theatre
DADISY	Cemetery symbol
DADU4	Dump: abandoned
DADU1	Dump:other
DAEX1	Exhibition grnd/fairgrnd:exhibition
DAFG1	Exhibition grnd/fairgrnd:fairground
DAFH1	Fish pond outline
DAGC1	Golf Course
DAGCDR	Golf driving range
DAHSSY	Historic site/point of interest symbol
DALO	Lookout
DALOSY	Lookout symbol
DALY1	Lumber Yard
DAMN1	Mine:operational openpit
DAMN14	Mine:abandoned, n/a
DAMN14SY	Mine:abandoned, n/a symbol
DAMNSY	Mine:operational, other
DAMP1	Mobile home park
DAOGOL	Oil/gas facilities outline
DAPC1	Peat cutting
DAPI1	Stockpile
DAPKAPOL	Amusement park outline

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DAPK11	Park site
DAPKPISY	Park site symbol
DAPT1	Pit
Feature Code	Definition
DAPTGS	Sand:other
DAQU1	Quarry
DARTD	Sports/race track:drag strip
DARTS	Sports/race track:other
DASF	Park/sports field
DASPA	Seaplane base/anchorage:anchorage
DASPB	Seaplane base/anchorage: base
DASVI	Auto wrecker
DAWASL	Waste:other, solid
DAYC	Marina/yacht club: yacht club
DAYCM	Marina/yacht club: marina
LCCLLOT	Cutline: other
LCNU1	Tree nursery
LCOR1	Vegetation: orchard
LCTA1	Vegetation: wooded area
LFBR	Breakline
LFCCO	Contour: other, collected
LFDC1	Contour: depression, collected
LFEK	Esker
LFRL	Rocky ledge/reef
LFSDWA1	Sand:underwater
LFSH	Elevation point: spot height
LFSHP	Elevation point: Precise altitute
NEATLINE	Neatline added by NSGC Amherst
RRBR	Bridge: other
RRBRCA	Causeway
RRBRCO	Bridge: covered
RRBRMO	Bridge: moveable surface
RRCT1	Cut
RRFB	Footbridge
RRFC	Ferry Route
RRFL1	Embankment
RRRD	Road: undiv, other, unclassified
RRRD93	Road:<2 lanes, all seas, undiv, na, u/c ls
RRRDAT5	Road:2 lanes or+, all season, div, hs
RRRDAT6	Road: 2 lanes, all season, undiv, hs
RRRDAT61	Road:2 lanes, all seaso,el, undiv, hs
RRRDAT63	Road: 2 lanes, all seas, undiv, hs, u/c
RRRDAT7	Road:<2 lanes, all season, undiv, hs
RRRDAT8	Road:>2 lanes, all seas, undiv, hs
RRRDAT83	Road:2lane or+, a.s., undiv, ls, u/c
RRRDCO9	Road:<2 lanes, all seas, undiv, ls
RRRDLO	Road: street, hard surface
RRRDLODW	Road: dry weather, undiv, 1 surf
RRRDLOLS	Road: street, loose surface
RRRDTK	Road: cart track, loose surface
RRRDTR	Trail: other
RRRDTRPO	Trail: portage
RRRR	Railway: stnd ga, oper, single
RRRR4	Railway:n/a, n/a, abandoned, n/a
RRRRM	Railway: stnd ga, oper, multiple

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RRRRSI	Railway:stnd ga, oper, side track
RRRTT	Turntable (railway)
RRTU	Tunnel
Feature Code	Definition
STACSL	Aerial cableway: ski lift
STCHI	Chimney: industrial
STCRS	Crane: stationary
STCV	Conveyor
STDD	Drydock
STES	Exposed shipwreck
STFE	Fence
STGTO	Barrier/gate: other
STGTSY	Barrier/gate:tollgate symbol
STIN	Burner symbol
STLG	Lock gate
STNL	Navigation light symbol
STPAR	Parabolic antenna: radar
STPART	Parabolic antenna: radio telescope
STP O	Swimming pool (outdoor) outline
STPOSY	Swimming pool (outdoor) symbol
STSH	Shrine symbol
STSLP	Slip
STSO	Silo symbol
STSPSY	Boat ramp symbol
STSW	Seawall
STWAWL	Well:water symbol
STWH	Wharf
STWL	Wall
STWM	Wind operated device symbol
UTC0	Conduit: aboveground, other
UTC06	Conduit:underground, other
UTCOP	Conduit:aboveground, penstock
UTCOP6	Conduit: underground penstock
UTPI	Pipeline: multiuse, underground
UTPICV	Valve symbol
UTPIUA	Pipeline: unknown, aboveground
UTPIUK	Pipeline: unknown, underground
UTSPOL	Waste: settling pond, liquid outline
UTSPOLO	Waste: other, liquid
UTSPOLSY	Waste: settling pond, liquid sym
UTSPSD	Waste: sewage disposal pond, liquid symbol
UTSPSDSY	Waste:sewage disposal pond, liquid symbol
UTSS	Transformer station (electric)
UTSY	Transformer station (electric)
UTTK	Tank: vertical, other symbol
UTTKH	Tank: horizontal, n/a symbol
UTTKHOL	Tank: horizontal, n/a line
UTTKOL	Tank: vertical, other line
UTTKWA	Tank: vertical, water symbol
UTTKWAOL	Tank: vertical, water line
UTTOCL	Tower: clearance
UTTOCO	Tower: communication
UTTOCT	Tower: control
UTTOFT	Tower: fire
UTTOLO	Tower: lookout

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UTTR	Transmission line: power, other
UTTRS	Transmission line: power, submarine
UTTRTL	Transmission line: telephone, other
Feature Code	Definition
WABW	Breakwall, breakwater
WACA	Navigable canal: operational
WACO1	Waterbody: other
WADI	Irrigation canal/ditch
WADM	Dam
WADMSY	Dam symbol
WADRVB	Dry river bed
WADY1	Dyke/levee
WAF1	Falls line
WAFASY	Falls symbol
WAFF1	Foreshore flats
WAFI	Fish ladder
WAFL1	Flooded area
WAFO	Ford line
WAFOSY	Ford symbol
WALK1	Waterbody: other
WALKSB	Waterbody:in string bog
WAOB	Obstacle in water
WAPPF	Pond partition: fish pond
WAPPR	Pond partition: reservoir
WAPPW	Pond partition: waste
WARA	Rapids line
WARASY	Rapids symbol
WARK	Rock in water symbol
WARSDUI	Reservoir: open, dugout
WARSDUSY	Reservoir: open, dugout symbol
WARSDW1	Reservoir: open, drinking water
WARSDWS	Reservoir: open, drinking water sybmol
WARSP1	Reservoir: open, filtration pond
WARVBS	Watercourse: braided stream
WARVDI	Disappearing stream: other
WARVDL1	Waterbody: other
WARVIS2	Waterbody: other
WARVSL	Watercourse: (single line river)
WARVSP	Watercourse: split stream
WASG	Spring
WASUGT	Sluice gate symbol
WASUGTL	Sluice gate line
WASW5	Waterbody: intermittent/slough
WASW1	Wetland
WASWSB1	String bog

The following list shows feature codes, which were added as a result of our road list/classification project. You will notice that there are two new major feature categories TR and EO. Because entities were added to the original digital products and cannot be readily adopted into the provincial database they must be placed on a layer that will identify their source. It was proposed that thematic layers be established for different departments and disciplines, therefore anything on a layer beginning with TR would be identified with the Department of Transportation & Public Works, and layers beginning with EO are associated with the Electoral Office.

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Feature Feature Code

ROADS;

Road Class

A	RRRDAA TRRDAA
B	RRRDAB TRRDAB
C	RRRDAC TRRDAC
D	RRRDAC TRRDAC TRRDAC TRRDAC
E	RRRDCE TRRDCE
F	RRRDCF TRRDCF
G	RRRDLG TRRDLG
H	RRRDLH TRRDLH
I	RRRDLI TRRDLI
J	RRRDLJ TRRDLJ
K	RRRDLK TRRDLK

Unclassified

Other Jurisdiction	TRRDUO
Maintenance Agreement	TRRDMA

Highway Symbols

Trans Canada Hwy Symbol	TRRDAASY
Provincial Arterial Hwy Symbol	TRRDABSY
Trunk Hwy Symbol	TRRDACSY
Collector or Trunk Hwy Symbol on a D class road	TRRDCDSY
Collector Hwy Symbol on an E class road	TRRDCESY
Collector Hwy Symbol on an F class road	TRRDCFSY

Authority Numbers

Number adjacent to F class roads	TRRDCFNO
Leaders from F class roads to numbers	TRRDCFNO

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Provincial Park text

DAPKPR30

Historic roads
Previous edition

TRRDHI
TRRDPE

FOREST ROADS:

Kimberly Clarke Paper Company forest roads RRRDFCKC (...Forest Company Kimberly Clarke)

TRRDFCKC
TRRDFCKCA

Stora Enso Port Hawkesbury Ltd forest roads RRRDFCSE (...Forest Company Stora Enso)

TRRDFCSE
TRRDFCSENA

IMPORTANT WARNING: The forest roads on layers TRRDFCKC & TRRDFCSE were 'heads up' digitized from hand drawn field sketches supplied by Stora Enso Port Hawkesbury Ltd. Their location and configuration are (very) approximate.

8.5 RLCM plot table:

Layer	AutoCAD Colour	Pen	Thickness	Linetype
WALK*	130	130	.25mm	continuous
WARVDL*	130	130	.25mm	continuous
WARSDW*	130	130	.25mm	continuous
WACO*	121	121	.25mm	continuous
RRRR	7	7	.25mm	continuous
RRRR04	253	250	.25mm	dashedx2
RRRDTR	253	250	.25mm	dashed2
RRRDTK	253	250	.25mm	dashed2
RRRDAA	210	210	1mm	continuous
RRRDAB	10	10	1mm	continuous
RRRDAC	11	11	1mm	continuous

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RRRD CD	180	180	.7mm	continuous
RRRD CE	150	150	.7mm	continuous
RRRD CF	143	143	.7mm	continuous
RRRD LG	96	96	.5mm	continuous
RRRD LH	83	83	.5mm	continuous
RRRD LI	70	70	.5mm	continuous
RRRD LJ	30	30	.35mm	continuous
RRRD LK	50	50	.30mm	continuous
OTHER RRRD'S	7	7	.25mm	continuous
TRRD AA	210	210	1mm	continuous
TRRD AB	10	10	1mm	continuous
TRRD AC	11	11	1mm	continuous
TRRD CD	180	180	.7mm	continuous
TRRD CE	150	150	.7mm	continuous
TRRD CF	143	143	.7mm	continuous
TRRD LG	96	96	.5mm	continuous
TRRD LH	83	83	.5mm	continuous
TRRD LI	70	70	.5mm	continuous
TRRD LJ	30	30	.35mm	continuous
TRRD LK	50	50	.30mm	continuous
TRRD TR	253	250	.25mm	dashed2
TRRD TK	253	250	.25mm	dashed2
Other text	7	7	.25mm	continuous
DLBNPR	250	7	1mm	border
DAHS	253	253	.5mm	continuous
DAIR	253	253	.5mm	continuous

appendix a

quality control checklist

The following is a checklist of requirements that all submissions shall be expected to complete successfully.

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Item 1 – Drafting Basics – Value 30 - Page 2 of 5

Review the CADD drawings for correct drafting practices as defined in the Department of Transportation and Public Works CADD Data specification standard (incorporating AIA CADD Layer guidelines, Uniform Drawing System Standards and CSA CADD Drafting (Buildings) B78.5-93 standards. (As applicable, where required by DoT & PW Standards)	√	Quality Requirement met
	N/A	Quality Control issue not applicable
	∅	Quality Requirement is met inconsistently or met in a different way. Both are marginally acceptable
	X	Quality requirement is not met

#	Quality Control Requirement	Score
1	Civil Site plan in metres; Building / Structure plans and details in millimetres.	
2	Layout of dimensioning follows CSA standard; dimensions to the left and above.	
3	Layout of annotation; notes to the right and below; no crossing of dimension lines.	
4	Linework is drafted at varied line thickness to clarify and distinguish graphics.	
5	Appropriate approved drawing scale(s) used to clearly depict drafting work.	
6	Use of major headings and DoT & PW graphic scales for each drawing portion.	
7	North arrow on plan view; Key map in titlesheet to locate work.	
8	Proper structural grid notation; letters for horizontal, #'s for vertical; no o, 0, or "l" (capital i) .	
9	Section/Indicator/Elevation bubbles drawn according to NS DoT & PW standards.	
10	Establish clearly marked Benchmark with description and elevation on site plans.	
11	Express slope using correct numerical ratio; arrows point upslopes except where indicating drainage.	
12	Titlesheet information / Drawing Notes are correctly entered on drawings.	
13	Legend & Schedules used to facilitate understanding of symbology & items lists.	
14	Proper use of text heights (2.5mm for notes and dimensions / 5.0mm Headings)	

Rating:

27-30	All 14 items are addressed (no "X"s and 2 "∅"s)
21-26	Most of the 14 items are addressed (1 "X" and 3 "∅"s)
15-20	Some of the 14 items are addressed (3 "X"s and 4+ "∅"s)
0-14	Few of the 14 items are addressed (>5 "X"s)

Comments:

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Item 2 – CADD Basics – Value 40 - Page 3 of 5

Review the CADD drawings for correct drafting practices as defined in the Department of Transportation and Public Works CADD Data specification standard (incorporating AIA CADD Layer guidelines, Uniform Drawing System Standards and CSA CADD Drafting (Buildings) B78.5-93 standards. (As applicable, where required by DoT & PW Standards)	√	Quality Requirement met
	N/A	Quality Control issue not applicable
	∅	Quality Requirement is met inconsistently or met in a different way. Both are marginally acceptable
	X	Quality requirement is not met

#	Quality Control Requirement	Score
1	CADD drawing is modelled at full 1:1 scale; Annotation, Dimensioning and Hatching scaled accordingly to match final viewport or block insertion scaling.	
2	DoT & PW Titlesheet inserted at (0,0,0) with scale factor of 1; Plotted at 1:1 scale.	
3	LL corner of BLDG./Structure footprint extents established at (0,0) in model space.	
4	NO X-referencing allowed; referenced drawing files must be inserted as blocks.	
5	Drawing must be fully purged; no extraneous drawing entities “out in space”.	
6	> 95% of all linework that should be orthogonal and joined, must have no dangles or overlaps.	
7	Blocks cannot be exploded, must be created correctly and inserted correctly as per DoT & PW standard.	
8	Real world grid coordinates. used on site plans; reference coordinate system noted on plan.	
9	Drawing file names follow correct UDS numbering schema as described in DoT & PW standards.	
10	One drawing per CADD file, with no unnecessary frozen or off layers.	
<p>NOTE: QC items that are indicated as embolded (1) denote a zero tolerance for non-compliance. These items must be correct.</p>		

Rating:	36-40		All 10 items are addressed (no “X”s and 2 “∅”s)
	28-35		Most of the 10 items are addressed (1 “X” and 3 “∅”s)
	20-27		Some of the 10 items are addressed (3 “X”s and 4+ “∅”s)
	0-19		Few of the 10 items are addressed (>5 “X”s)

Comments:

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Item 3 – Layering / Pen colours – Value 20 - Page 4 of 5

Review the CADD drawings for correct drafting practices as defined in the Department of Transportation and Public Works CADD Data specification standard (incorporating AIA CADD Layer guidelines, Uniform Drawing System Standards and CSA CADD Drafting (Buildings) B78.5-93 standards. (As applicable, where required by DoT & PW Standards)	√	Quality Requirement met.
	N/A	Quality Control issue not applicable.
	∅	Quality Requirement is met inconsistently or met in a different way. Both are marginally acceptable.
	X	Quality requirement is not met.

#	Quality Control Requirement	Score
1	Proper use of colour assignments. Is proper lineweight represented by the use of colour? Are drawing entities all colour "bylayer" or are drawing elements showing up with fixed colours? Are drawing elements showing up on the wrong layer or colour? Are colours above colour 15 used for no apparent reason? Are all colours suitable for the plot scale without running together?	
2	>95% of drawing entities must have colour and linetype bylayer.	

NOTE: QC items that are indicated as embolded (1) denote a zero tolerance for non-compliance. These items must be correct.

#	Quality Control Requirement	100 * $\frac{\text{total \# layers} - \text{total \# fail}}{\text{total \# layers}}$ = ____	Score
1	Empirical quality check: Count total number of layers created in drawing; then count # of non-standard layers. Note mark as √ for >80% correct, ∅ for >70% correct.	$100 * \frac{\text{total \# layers} - \text{total \# fail}}{\text{total \# layers}} = \underline{\hspace{2cm}}$	
2	Quality check: Randomly pick 10% or (or 10) of significant layers and check each layer to see if drawing entities are correctly placed on their designated layer. Note mark as √ for >80% correct, ∅ for >70% correct.	$100 * \frac{\text{total \# layers} - \text{total \# fail}}{\text{total \# layers}} = \underline{\hspace{2cm}}$	

NOTE: QC items that are indicated as embolded (1) denote a zero tolerance for non-compliance. These items must be correct.

Rating:

18-20		All 4 items are addressed (no "X"s and 2 "∅"s)
14-17		Most of the 4 items are addressed (1 "X" and 3 "∅"s)
10-13		Some of the 4 items are addressed (3 "X"s and 4+ "∅"s)
0-9		Few of the 4 items are addressed (>5 "X"s)

Comments:

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Item 4: Linetype / Text / Dimension Styles – Value 10 - Page 5 of 5

Review the CADD drawings for correct drafting practices as defined in the Department of Transportation and Public Works CADD Data specification standard (incorporating AIA CADD Layer guidelines, Uniform Drawing System Standards and CSA CADD Drafting (Buildings) B78.5-93 standards. (As applicable, where required by DoT & PW Standards)	√	Quality Requirement met
	N/A	Quality Control issue not applicable
	∅	Quality Requirement is met inconsistently or met in a different way. Both are marginally acceptable
	X	Quality requirement is not met

QC Issue	Quality Control Requirement	Score
Text Standard	Text Style conforms to the requirements of the document “N.S. D o T & P W CADD Standards”.	
	Font styles are properly named, font is as per required type.	
Dimension Standard	Associative dimensioning is used throughout the drawing.	
	Dimension styles are created per the document “N.S. D o T & P W CADD Standards”.	
Dimension Standard	Drawing must be fully purged; no extraneous drawing entities “out in space”.	
	Linetype scaling set up correctly re: ltscale/ psltscale/ measurement variables.	

Rating:	9-10	All 6 items are addressed (no “X”s and 2 “∅”s)
	7-8	Most of the 6 items are addressed (1 “X” and 3 “∅”s)
	5-6	Some of the 6 items are addressed (3 “X”s and 4+ “∅”s)
	0-4	Few of the 6 items are addressed (>5 “X”s)

Comments:

CADD DRAFTING QUALITY CONTROL TOTALS:	Rating:
Item #1 Drafting Basics:	of 30
Item #2 CADD Basics:	of 40
Item #3 Layering / Pen Colours:	of 20
Item #4 Linetype / Text / Dimension Styles:	of 10
Total: (Pass Mark is 80%)	

appendix b

FAQ – frequently asked questions:

1. How do I obtain a copy of this document.

A. Please refer to contact information in **appendix c**.

2. Does this document apply to my work?

A. **Yes.** The information contained in this document refers to **all** CADD, and CADD related work submitted to the entire Department, province wide from any source. The Department of Transportation and Public Works CADD Standard is to be applied to all work submitted to the Department. The TPW CADD Standard is also to be applied to all CADD work produced within the Department.

3. What if I am in survey or mapping. Does this standard apply?

A. This document Department of Transportation & Public Works CADD STANDARDS is to be applied to all CADD work including survey and mapping work, *where it is applicable*. This may be in the areas of titlesheet information, sheet layout, etc. Mapping and feature code information is also driven by other requirements and outside agencies. Please refer to **chapter 7, survey**, and **chapter 8, mapping**, for more information. Note: chapter 8 is provided and intended as a reference only. It is the responsibility of the user to refer to the appropriate source for the most up-to-date information regarding mapping standards. Web links are provided in this chapter in order to assist the user in this task.

4. Is this document all I need to do my work?

A. This document is self-contained to the extent practical. All of the information necessary to begin a small project is contained within these pages. However, this document refers to other standards, including (but not limited to) the Uniform Drawing System and the AIA CADD Layer Guidelines. The UDS standard and the AIA standard are referred to because they evolve over time to reflect current industry standards and they are in widespread use throughout the industry. In order to apply the TPW CADD Standards, it is necessary to obtain and maintain an up-to date copy of each of the aforementioned standards. It is the responsibility of the person performing the work to obtain the additional reference material required and to ensure that this information is up-to-date. Also, there are electronic template files for title sheets and symbols available and these must be obtained prior to commencement of a project and

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incorporated into the work. These may be obtained from the TPW representatives listed in **appendix c**.

5. Where can I obtain copies of the UDS and AIA CAD Layer Guidelines?

- A. Contact information is provided in **appendix c**.

6. What if there is a grey area or multiple standards seem to apply?

- A. Occasionally a situation may arise whereby there are multiple options or multiple standards that seem to apply. In this situation **this document takes precedence** and you should refer to this document first. Some of these situations have been anticipated and the correct course of action is described within this document. For example: In some areas such as file naming, this document instructs the user that the UDS will take precedence. Where this document does not provide a clear answer, contact the Project Design Leader or the TPW Sub-Committee on CADD Drawing Standards (see **appendix c** for contact information) to have question resolved and clarified. The standard will be amended to account for this situation and the answer will also be added to future editions of the TPW CADD Standards. If you cannot immediately contact the Chair to have the situation resolved, then select the standard which is most suitable and apply that standard to the current project. Inform the Chair of the Sub-Committee on drawing standards at the earliest possible opportunity either directly or through the Project Design Leader in charge of the project. It is the responsibility of the Project Design Leader to refer all questions regarding CADD Standards, which cannot be readily answered by this document, to the CADD Standards Sub-Committee.

7. Why do we need the CADD standard?

- A. CADD standards increase efficiency and help to ensure that all consultants are providing drawing information to the same quality standard thus helping to ensure a fair bidding system. Please refer to **appendix d**, reference information, for more information on why CADD standards are necessary.

8. I have been using the numbering system 100, 200, 300, 400, etc. to number my drawings. Is it all right to continue doing this?

- A. **NO.** Drawing numbering is to follow the format as defined in **chapter 4** of this document, **data structure for CADD information**. The previous drawing number system is discontinued. The new system is more descriptive, is CADD compatible and is more typical of industry standard practice.

appendix c

contact information:

N. S. Department of Transportation & Public Works

For answers to questions, to obtain a copy of the standard, to make suggestions or recommendations, or to obtain electronic copies of template and reference drawing files please contact:

N. S. Department of Transportation and Public Works Sub-Committee on Drawing Standards:

John Leroy, C.E.T, *Chair*,
3rd floor J. W. Johnston Building
1972 Granville Street,
P.O. Box 186,
Halifax, N.S., B3J 3Z8
T (902) 424 3328 F(902) 424 0566 email leroyjo@gov.ns.ca

Ask for a copy of: **N.S. Department of Transportation and Public Works C.A.D.D. Standards.**

For Uniform Drawing System (UDS) information:

The Construction Specifications Institute
601 Madison St.
Alexandria VA 22314-1791
P (800) 689 2900 F (703) 684 0465 email csimail@csi.net <http://www.csinet.org>

For American Institute of Architects CADD layer Guidelines:

Task Force on CAD Layer Guidelines
c/o The American Institute of Architects
1735 New York Avenue, N.W.
Washington, DC 2000.

appendix d

reference information:

Emerging standards for computer-aided design will improve communication within the design industry.

by Jerry Laiserin, AIA

Without standardized ways of sharing information, CAD cannot live up to its promise of faster, more economical, and better coordinated project documentation. A virtual Babel of file formats, document layouts, and project systems impedes the flow of computer-aided design (CAD) information and confuses users in the fields of architecture, engineering, and construction. Software translations of CAD files are error prone, requiring costly, time-consuming tweaking.

Features that spice up new versions of CAD software may be indigestible by competing products or even previous releases of the same software programs. Two architects using the same version of the same software may organize digital drawing elements so differently that automatic file exchange is impossible.

Responding to these problems, several groups have been working throughout the past decade to define common approaches to such issues. The questions they have addressed include: What is the best way to describe drawing geometry? What is the most logical way to sort and label drawing elements? Which is the clearest arrangement of details on a sheet or sheets in a project set? Who defines the digital attributes of building industry products and materials represented in CAD files?

Some codifying efforts for digital architecture are nearing fruition. Architects, clients, and consultants should prepare to adapt to these emerging standards so that they can benefit fully from them.

Why standardize?

Ideally, building information created by a firm using any CAD software should be equally accessible to another firm using different CAD software. At the file level, this degree of standardization requires either sophisticated file import and export routines in each program or the ability to read from and write to a common format.

Document-level standardization involves grouping drawing elements into sets, called layers or levels in most CAD programs. The term "layer" hearkens back to the days of pin-bar overlay drafting, in which building elements were drawn on separate sheets that were

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then overlaid as needed. To share their work, early CAD users organized CAD information according to similar layers. Walls and doors, for example, are grouped separately. Most design firms develop an in-house layering standard, but few agree on the same one. Facility owners with many buildings can manage their operations more effectively if CAD documents for all their buildings follow the same layering standard. Some large client organizations impose their own layering systems on their consulting architects. For the design firm, the resulting multiplicity of standards followed for different projects is almost as bad as having no standards at all.

The absence of a universal layering standard prevents client A from working with CAD files prepared by architect B, even when both use the same program. Similar incompatibilities arise when CAD programs translate internal representations or models of building designs into traditional plan, section, elevation, and detail drawings.

Who's standardizing what?

In the competitive world of software development, innovation nurtures new markets. In the case of CAD, this occurred in the early 1980s. As software markets mature, various organizations promote standards intended to streamline user interaction with the software. CAD is now in this more mature phase.

At one end of the standardization spectrum is a file-level proprietary format promoted by a single vendor. Autodesk's AutoCAD developed the DWG format, which has become the de facto standard—simply because billions of DWG files exist.

To accommodate architects, consultants, and building owners who prefer working with DWG files without using AutoCAD, several other CAD vendors formed the OpenDWG Alliance to develop a publicly documented description of a DWG file's inner workings. According to OpenDWG's executive director, Evan Yares, the group "focuses on documenting a standard DWG that is not publicly documented by its originator [Autodesk]." This allows participating CAD programs to read from and write to a common format.

IAI, not AIA

At the other end of the spectrum is the International Alliance for Interoperability (IAI). This group initiated a bold attempt to replace traditional drawings and specifications with collections of software "objects." These represent physical objects and simulate their behavior and attributes, like the swing, handedness, and fire rating of a door. IAI refers to collections or classes of such objects as Industry Foundation Classes (IFCs).

Vladimir Bazjanac, chair of IAI's Research/Advisory Committee and staff scientist in the building technologies department of Lawrence Berkeley Laboratory, points to proof-of-concept demonstrations in which 10 computer programs from six different countries, communicating via IFC files, advanced a building design through the following phases: Space allocation spreadsheet, bubble diagram, 2-D and 3-D schematics, graphical simulations of energy performance, building-code checks, HVAC duct designs, and cost estimates. All of this was done with 80 percent less computing effort than traditional design tools normally require.

For IAI, proving that its standard works is only the first step in the process. Implementing a comprehensive system of IFCs will require the entire AEC industry, and all the software vendors and building product manufacturers, to alter current business practices and design procedures.

A national CADD standard

The hot zone of CAD-standards development lies between the nitty-gritty of DWG file

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compatibility and the lofty dreams of IAI. A coalition of professional associations and federal agencies, led by the National Institute of Building Sciences (NIBS), is finishing a national standard for CADD (the government acronym for computer-aided drafting and design).

The NIBS standard, scheduled for release later this year, addresses three broad areas of document- and project-level standardization: Model file organization through the AIA's CAD Layer Guidelines (CLG), drawing organization through the Construction Specifications Institute's Uniform Drawing System (UDS), and translation of model information into drawings via the U.S. Coast Guard's plotting system.

CLG spans file and document standardization. Michael Schley, AIA, president of FM Systems, a North Carolina developer of computer-aided facility management software, and chairman of the AIA's CLG Task Force, says layers function by "mediating between the computer's internal model and the final presentation on screen or on paper." With doors and walls on separate CAD layers, for example, it is easy to show the doors on a floor plan but omit them from the corresponding reflected-ceiling plan.

UDS consists of a series of modules that cover document- and project-level standardization. For example, the first module, Drawing Set Organization, spells out the order for arranging sheets of drawings in a project set. The initial release of the CADD standard also will include UDS modules for Sheet Organization and for Schedules. Drafting Conventions, Terms & Abbreviations, Symbols, Notations, and Code Conventions will be available soon after, according to John Patrick McCaffrey, AIA, a specifications consultant and chairman of CSI's Task Team for UDS.

The final CADD standard component, developed by the coast guard, defines plotting from CAD files. This project standard addresses issues such as the scaling of plotted drawings and translations from the computer's internal representations of line weights to the pen widths recognized by plotting devices.

Adopting Standards

Initially, the NIBS CADD standard will be more of a recommendation than a fiat. Dana K. Smith, an architect who works with NIBS and serves in the Naval Facilities Engineering Command, expects his command to be the first in the Department of Defense (DOD) to require architects to comply with the NIBS standard. McCaffrey anticipates such implementation will "expand within the federal government beyond initial usage in the DOD and trickle down to state and municipal projects. Ultimately the weight of government construction will influence private construction."

As more clients require compliance with the standard, architects will have an incentive to abandon their homegrown standards, or lack of the same. McCaffrey adds, "large A/E firms benefit if multiple owners adopt one standard, and smaller A/E firms benefit by having a predefined standard they can work to, rather than developing their own."

Consultants likely will follow the architects' lead, according to Luis Eguiluz, CAD supervisor at engineering giant Syska & Hennessy. "If all architects use one standard it will make design communication easier for consultants."

CAD vendors, who were invited by NIBS to participate in developing the standard, will have a strong commercial incentive to incorporate into their software the templates and setup routines necessary for architects and engineers to adapt traditional, prestandard drawing habits to the new regime.

For architects, the trauma of transition depends on the type of practice. Firms with DOD and other federal clients will feel the pain first. They will be required to implement new layering systems, drawing layouts, and plotter settings for these jobs. But many of their existing projects or those commissioned by nonfederal clients will maintain the old

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standards. Managing these simultaneously will be difficult. Meanwhile, firms that specialize in single-family residential work may never be compelled to switch to the new system.

Most practices fall somewhere in between, with a grace period before the inevitable conversion crunch. These firms should acquire the standards documents and assess their differences from and similarities to current procedures.

They should also verify that their CAD software provides the layer flexibility and plotter setup necessary to implement CADD standards. Most consultants advise firms to standardize layer organization and plot settings first, then they move to their symbol libraries, notations, and abbreviations. Architects should also plan to implement parts of the standard gradually, over a year or two, to allow existing nonstandard projects to move through the office, while introducing new projects that conform.

"Everyone appreciates the need for standards," says Barbara Heller, AIA, a partner at Heller & Metzger and 1999 chairman of the AIA Specifications and Building Technology professional interest area. "But, the time, effort, and expense involved in standardizing means the issue ultimately is not about standards, but about coping with change." And, as everyone knows, that's never easy.

Full text article from Architectural Record (online), August 27, 2001.
http://www.archrecord.com/digital/da_artic/da5_99.asp

definitions

definitions:

TPW, NS DoT & PW and the **Department** refer to the Nova Scotia Department of Transportation and Public Works, province wide, all groups. For contact information refer to **appendix c**.

CADD refers to Computer Assisted Design and Drafting. **CAD** refers to Computer Assisted Drafting. Both terms are used interchangeably except when Computer Assisted Drafting is used as a design tool, or when add on menu systems augment CAD systems and design is performed as a function of the program capability. Generally the term CADD is preferred as it encompasses all options.

CADD & CADD related work: Refers to all work prepared by computer assisted design and /or drafting systems of any description. Refers to other associated graphical representation such as: (but not limited to) imaging, digital photographs, photo realistic rendering, etc. which is submitted to the department.

UDS Uniform Drawing System – The Construction Specifications Institute drawing standard format, a standard format in widespread use (at time of writing) by much of the North American construction and CADD industry. For contact information refer to **appendix c**.

AIA – The American Institute of Architects, who publish the American Institute of Architects CAD Layer Guidelines. This is a standard for the Architecture and Construction industry which is in widespread use. For contact information refer to **appendix c**.

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Cartoon by Rusty Fenwick

TPW Sub-Committee on CADD Drawing Standards members:

Richard Mac Pherson, (*Highway Planning & Design, Survey*)

Bill Powell, (*Asset Systems*)

Mike Minick (*Mapping*)

John Leroy, C.E.T., (*chair, Building Design Group*)