



# CAD Standard Guidance Document

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Version 7.0



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# CAD Standard Guidance

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## Document Revision History

Version	Summary of Change	Document Status	Published
0.1	Initial Draft (internal only)	Draft	2018-01-31
0.2	Draft Shared with Externals on Demand	Draft	2018-04-19
1.0	First Public Release	Published	2018-07-16
1.1	Minor Revisions	Published	2018-08-22
2.0	Major Revisions to Incorporate Changes from Feedback from Pilot Projects in 2018	Published	2018-12-17
3.0	Major Revisions to incorporate changes from the December 2019 template update release	Published	2019-12-05
4.0	Major Revisions to incorporate changes from the December 2020 template update release	Published	2020-12-15
5.0	Major Revisions to incorporate changes from the January 2022 template update release	Published	2022-01-17
6.0	Major Revisions to incorporate changes from the January 2023 template update release	Published	2023-01-16
7.0	Minor revisions and fixing of typos for the January 2024 template update release	Published	2024-01-15

For a detailed list of changes between revisions, please see the [Version History document](#).



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# CAD Standard Guidance

## Purpose

This guidance document supplements the City of Calgary [CAD Standard](#) document. This document provides more information than contained in the CAD Standard, explains best practices in using the standard, and includes a link to downloadable templates and associated files that can be used to facilitate compliance with the standard. Everyone involved with design and drawing preparation should review this document. Note that the Standard describes the drafting standard specifications for drawings but does not indicate the content that must be included within them (i.e., it covers the “how” not the “what”). **This document is to be used in conjunction with (and does not replace) the technical specifications, engineering design manuals, and other existing documents from different City divisions, available on [calgary.ca](http://calgary.ca).**

This document has been developed to assist stakeholders in the preparation of CAD drawings for The City of Calgary.

## Scope

This guidance document is applicable to all projects that meet the Application of Standard clause included in the CAD Standard. This guidance contains recommendations for creations of CAD drawings. The recommendations presented in this Guidance align with minimum requirements from the Standard. Stakeholders may identify additional requirements to meet the specific application of the drawing for its intended purpose.

## Background

The City of Calgary has developed a CAD standard by adopting and amending the [Master Municipal Construction Documents Association](#) (MMCD) standard that is used by municipalities in British Columbia and supplemented with additional information from the [National CAD Standard](#) (NCS).

The City of Calgary requires that this standard to be used for engineering drawings on capital projects that impact City of Calgary horizontal infrastructure initiated on or after January 1, 2019. The City also requires that this standard to be used for drawings for subdivision construction projects initiated on or after January 1, 2020.

This standard has been developed and implemented to achieve several goals including the following:

- Ensure all CAD drawings created internally or by consultants can be readily used by any City business unit
- Provide a standard look and feel to all drawings to make them easier to read
- Provide information on the drawings in a standard electronic format so that asset information can be extracted from the drawings
- Make integration of data from the drawings into downstream systems as seamless as possible
- Provide consultants a defined standard for all drawing submissions to The City of Calgary, reducing setup time for projects, and making it easier to collaborate on projects involving several different contractors



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Usage of the standard is encouraged for CAD representations of buildings and other vertical infrastructure projects.

## Guidance

### Software Standard

The preferred computer drafting program to be used by contractors for production of contract drawings for The City of Calgary is [AutoCAD®](#), and [AutoCAD® Civil 3D®](#) for civil specific work, both by [Autodesk®, Inc.](#), but files produced with any other CAD software will be accepted. The city provides templates created using the AutoCAD® 2018 file format but will accept files in any version from 2013 to 2024.

The City's standard lies not with the underlying design software used, but on the layers, colours, line styles, fonts, and, blocks used to create the drawing.

**Note:** Users may use any software or version that they deem appropriate for their purposes. However, the submission is required to comply with this standard. The City has created AutoCAD templates to facilitate this, but these cannot be used if the consultant chooses to use different software, and it is the submitter's responsibility to ensure the submitted file is correct.

### Data Specifications

#### Map Projection Specifications

All drawings in digital form must:

- a) be in metric measurements and referenced to:
  - the 3 Degree Transverse Mercator (3TM) mapping projection
    - longitude of origin: 114° West
    - latitude of origin: 0° North
    - scale factor at origin: 0.9999
    - false easting: 0.000m
    - false northing: 0.000m
  - the 1983 North American Datum (NAD83)
    - reference ellipsoid: GRS80
      - semi major axis (a): 6,378,137.0000 m
      - semi minor axis (b): 6,356,752.3141 m
      - reciprocal of flattening: 1/298.257222101



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- b) reference elevation information to the 1928 Canadian Geodetic Vertical Datum (CGVD28).

## Dimension Specifications

All linear dimensions on drawings must be annotated as ground level distances.

## Date Specifications








All dates in drawings must be expressed in the standard [ISO 8601 format](#) of YYYY-MM-DD.

## Unit Specifications

All units must be displayed in SI ([International System of Units](#)). There should be a space between a measurement and the unit (e.g., 1030 m instead of 1030m).

## CAD Layer Naming

The City of Calgary standard CAD layer names are based on the defined MMCD layers and enhanced with City specific required layers. The defined layer names (along with their description and colour) are embedded within the provided downloadable [templates](#), and can be seen here:

-  [General](#)
-  [Architectural](#)
-  [Civil](#)
-  [Civil 3D](#)
-  [Electrical](#)
-  [Fire Suppression](#)
-  [Geotechnical](#)
-  [Landscape and Irrigation](#)
-  [Mechanical](#)
-  [Plumbing](#)
-  [Process](#)
-  [Structural](#)
-  [Survey and Mapping](#)
-  [Telecommunications](#)

Where a standard layer name does not exist, one may be created as long as it follows the City's standard naming convention as outlined below:

The layer name format is organized as a hierarchy to allow users to select naming layers according to the level of detailed information desired. Layer names consist of distinct data fields separated by dashes. These are the defined layer name data fields: Discipline Designator, Major Group, Minor Group(s) and Status. The complete layer name format will look like this:

**Dd-MAJR-MINR<sub>1</sub>-MINR<sub>n</sub>-S**, where

- **D** is the Discipline Designator, [Level 1](#) (mandatory, single alphabetic character)
- **d** is the Discipline Designator, [Level 2](#) (optional, single alphabetic character)
- **MAJR** is the [Major Group](#) (mandatory, four alphanumeric characters)



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- **MINR#** is the [Minor Group](#) (optional, each four alphanumeric characters)
- **S** is the [Status](#)<sup>1</sup> (optional, single alphanumeric character)













At minimum, a layer name will have the **D-MAJR** format such as V-POND – a surveying layer for a pond – whereas a full name may look something like this: C-POWR-XFMR-OVHD-TRUE-M – a civil layer for an overhead power transformer, at a true location, to be moved.

The Level 1 Discipline Designator and the Status fields must match the existing defined ones referenced above. If project specific Major and/or Minor Groups need to be created, they are allowed, however, they must contain four alphanumeric characters (and if necessary, end with one or more tilde {~} character(s) to fulfill the four character requirement) and must be fully documented.

## Symbols

The City of Calgary uses standard symbols to represent existing features as picked up in a field survey (including features that are abandoned, will be demolished, or moved), as well as design features, that must be shown on drawings. The standard symbols for different disciplines are embedded within the provided downloadable [templates](#). These symbols are described in the files listed below in terms of their graphical representations, their block names, and example layer names. Note that there are some annotative and some non-annotative blocks. To identify which ones are which, the annotative blocks have (Anno) at the end of their names. If you have an existing symbol for the same feature that you prefer to use you may do so as long as it is named the same as our symbol (for potential automatic extraction of data to downstream systems) and looks similar to it (to keep a consistent look and feel across drawings from different sources).

A unique symbol may be used to graphically represent a feature that does not exist in the list of standard symbols. It should be representative of the feature either through resemblance or abstraction and must be fully documented. It also must be different than any other symbol already reserved for other features. Please contact The City at [CADinfo@calgary.ca](mailto:CADinfo@calgary.ca) if there are any new symbols to be considered for inclusion in a future revision of the Standard and included in new templates.

-  [General](#)
-  [Architectural](#)
-  [Civil](#)
-  [Electrical](#) (see notes below)
-  [Fire Suppression](#)
-  [Geotechnical](#)
-  [Landscape and Irrigation](#) (see notes below)
-  [Mechanical](#)
-  [Plumbing](#)
-  [Structural](#)
-  [Survey and Mapping](#)
-  [Telecommunications](#)

<sup>1</sup> Please refer to the [Best Practices](#) section to see the preferred way of using the Status code.



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## Notes:

- There are several symbols included within AutoCAD software that should be used whenever possible:
  - For piping and instrumentation drawings (P&ID), any library symbols that are included in AutoCAD Plant3D that comply with ISA standards should be used.
  - For electrical blocks, any library symbols that are included in AutoCAD Electrical that comply with [IEEE 315/315A](#) or [IEC-60617](#) standards should be used.
  - Users who do not have access to AutoCAD Plant3D or AutoCAD Electrical software should use the City provided NCS compliant blocks.
- For landscape drawings, any user defined / customized / third-party symbols for trees and plants may be used.

When using these, the blocks should be on the standard [layers](#), or if necessary, on a new layer based on the [standard naming format](#).

## Drawing Set Organization

### Subsets

Drawings should be organized in subsets. The preferred order of drawings for different types of contract sets is shown [here](#).

### Sheet Identification

Each drawing will have a unique sheet identifier. Sheet identification organizes the categories of information into drawing sheet types and provides guidelines for sheet numbering sequence.

The sheet identifier includes the following components:

- A single character discipline designator followed by a hyphen (“D-”)
  - Optionally, a two character discipline designator, with or without a following hyphen may be used<sup>2</sup> (“Dd” or “Dd-”)
- Single digit sheet type designator (“N”)
- Two digit sheet sequence number (“##”)
- Optional user defined suffixes (“-ooo”)

Resulting in a format following a D-N##-ooo (or Dd-N##-ooo or DdN##-ooo) layout.

The discipline designator consists of the single character defined in the [Level 1 Discipline Designators](#) list followed by a hyphen, (or optionally the two character [Level 2 Discipline Designator](#)). The [sheet type designator](#) is a single digit that identifies the sheet type. The sequence number is a two digit sequence number

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<sup>2</sup> Level 1 and Level 2 discipline designators should not be mixed within a project. It is preferred to either use only Level 1 throughout all the disciplines in a given contract set, or use Level 2.



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(01 to 99)<sup>3</sup>. Note that the sequence number does not need to be sequential, to allow for future insertion of sheets. The optional suffix starts with a dash, and may be used for revisions (e.g., “-R1”) or any other user defined purpose.

For instance, C-305, VB101, VB-101, and A-102-R1 are all examples of valid sheet identifiers.

## File Naming

*NOTE: This section describes the standard that City of Calgary internal staff must follow when creating and saving files. External consultants are not mandated to comply with the specifications in this section.*

Consistent digital file naming and computer folder organization are essential for management of information that is reusable, as well as effective management of the graphical and non-graphical information related to a project.

It is recommended that files are named and filed in an organized and consistent manner for ease of use. It is up to each individual organization to determine how best to achieve this. The following section describes how The City of Calgary internally names files, and this practice may be adopted if one is not already in place.

**Project Files** are specific to a project and must be organized to make it easy to produce contract documents, record documents, and operational management documents. This includes model files, sheet files and detail files.

**Model files** for external references use a OOOO0DdAAUUUU.ext naming format where:

- OOOOO are user defined optional characters – typically a project number
- Dd is the single character discipline designator followed by a hyphen (or optionally the two character detailed designator) as described in the sheet identification section above.
- AA is an alphabetic user defined model file type
- UUUU is an alphanumeric user defined model file type modifier
- ext is the file name extension

**Sheet files** use the same naming convention as the [sheet identification](#), optionally prefixed by a project name or other unique identifier, followed by the extension, such as C-305.dwg or Pjt123456C-305.dwg.

**Detail files** are indexed using sheet area grid coordinates. They are named the same as the sheet file with the addition of the identification number representing the location on the sheet. The full format is DdN##-ooo-AN.ext, where AN is the letter and number representing the location grid coordinates on the sheet.

For example, a detail file on grid B4 of sheet file A-501.dwg, would be named A-501-B4.dwg.

## File Management

*NOTE: This section describes the standard that City of Calgary internal staff must follow when creating and saving files. External consultants are not mandated to comply with the specifications in this section.*

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<sup>3</sup> If a project needs more than 99 sheets within one discipline, this can be achieved by making use of the Level 2 Discipline Designators. For example, a plan with less than 99 sheets, can use a C-101 to C-199 sheet id. But if there are more than 99, then CS101 to CS199 for civil site plans, CG101 to CG199 for civil grading plans, etc. may be used.





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How multiple files needed for a complete set of drawings and how the relationships between the files are defined is an important component in being able to easily manage and share drawings among multiple parties. The City of Calgary uses the folder organization shown in [this document](#), and internal staff must follow this structure. External consultants may, but are not required to, use this same structure.

Place the following files within the folders as outlined below:

1CIRCBSE – used internally for circulation base drawings prior to contract work – typically CAD files

2PRODUCT: All production files and sheet set files

    \1PDF~~~~: PDFs of drawings

3XREF~~~: XREF files

4INCMNG~ - used to store incoming (source) files – may or may not be CAD files

5OUTGOIN – used to store outgoing files – may or may not be CAD files

6DISPLAY – used internally for open house drawings – typically CAD files

7EMAIL~~ - used to store project emails

8MISCREQ – used internally for miscellaneous requests – may or may not be CAD files

9SKETCH~ - used internally for sketches – typically CAD files

10C3D:

    \c3d All files that contain Civil 3D Objects:

        \\_shortcuts (Civil 3D automatically generates data shortcut files in the sub folders below)

        \\_Shortcuts\Alignments: Alignments

        \\_Shortcuts\PipeNetworks: Pipe Networks

        \\_Shortcuts\Pressure PipeNetworks: Pressure Pipe Networks

        \\_Shortcuts\Profiles: Profiles

        \\_Shortcuts\Surfaces: Surfaces

        \\_Shortcuts\ViewframeGroups: View Frame Groups

    \1CORRIDR

    \2GEOMETRY

    \3LINEWRK

    \4PIPENTW

    \5SECTION

    \6SURFACE

11DOCUMT – used to store additional project related files that do not fall within any of the other folders

Always use relative paths so these can be opened and shared with anyone without the need for a direct link. Overlays should be used instead of attachments.

## Sheet Organization

Sheet organization standards establish consistency in the systematic presentation of drawings organized on sheets. This includes sheet format, layout, sizes, and title block.

The City supplied [templates](#) incorporate the City standard sheet layouts.

## Drafting Conventions

Drafting conventions provide a standard format for both graphic and textual information within drawings. This includes linetypes, text styles, multileader styles and other elements that are included within the City supplied [templates](#).



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## Text, Dimension and Multileader Styles

There are several different defined styles for existing and proposed text, dimension, and multileaders. The text, dimension, and multileader styles for existing features can be seen [here](#), and for proposed features [here](#). Note that all text for proposed features uses an arial font, while text for existing features uses romans.

## Civil 3D Styles

The civil 3D styles available for use can be found in the Civil 3D [template](#).

## Hatching

Hatching refers to the patterns of repetitive lines, dots, or figures used to indicate specific types of materials or designate specific areas. Hatching is particularly useful in making drawings readable.

Standard hatching patterns have been selected for some commonly used features or materials for [Transportation](#) and [Landscape](#) drawings, and are included in the [templates](#).

All other features may use any of the available hatch patterns included within the software, or any custom ones, as long as these patterns are not re-purposed for other features.

Some features have more than one pattern reserved for it. It is recommended that the pattern listed as “Priority 1” be used if there is only one unique feature that requires hatching on a drawing. If there are two, then the “Priority 2” pattern should be used next, and so on. This will ensure that the common features will always look the same in any drawing.

Note that in some cases the same patterns are used to represent features across distinct disciplines. This should not cause confusion, as the context of the drawing should make it apparent what the hatch is for. For example, the “dots” pattern in a landscape drawing indicates manicured sod, and in a transportation drawing it is asphalt. Notwithstanding this, as per standard practice, all hatch patterns must be clearly indicated on a legend.

The same generic hatch patterns are to be used for any specific material/grade/specs of a given feature. The details may be included in the legend or on notes. e.g., if there is only one type of gravel on a drawing, it should use the “C-GRAVEL-1.pat” hatch pattern, regardless of whether it’s 20 mm, or 25 mm, or washed gravel, etc. The pattern just indicates that it is “gravel”. Across different contract sets, this same pattern is used, even though it may represent different types of gravel depending on the contract.

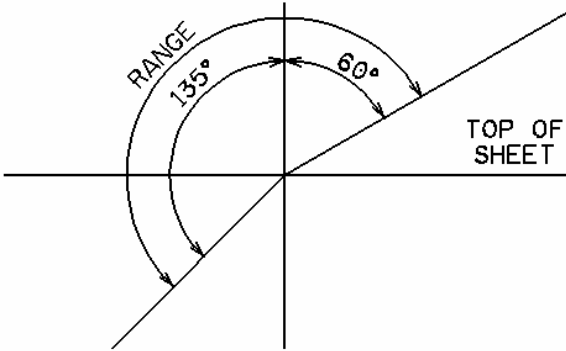
When creating hatches using the City standard patterns, the 'annotative' property of the hatch should be set, and the viewport scale should be applied to the hatch to ensure proper display in paper space.

## North Arrow & Orientation

The North arrow should be close to top and on the right hand-side of the sheet, and point towards the top of the page or the left-hand edge of the page, or within this range:



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## Terms & Abbreviations

The objective of using defined terms and abbreviations is to provide a standardized resource - it is not to encourage the use of abbreviations. Whenever possible, terms should be spelled out and abbreviations should be used only to reduce time and space or where appropriate to improve clarity. When the meaning of an abbreviation may be in doubt, it is preferable to spell it out in full.

Where abbreviations are used, they should be the standard ones used by The City of Calgary, defined [on this list](#). If a term is not referenced in these, then a new abbreviation may be used, but it must be referenced in a list of abbreviations in a general sheet.

The standard defines some abbreviations that have more than one meaning. Usually, these are from different disciplines, and the context where it is used should make the intended meaning obvious. However, if there is any doubt about this in a particular instance, do not use the abbreviation.



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## Templates

AutoCAD® 2018 templates have been created to facilitate complying with this Standard.

No template will be able to cover all aspects of municipal design requirements. Necessary styles not contained within the template and needed to convey the intent of the design may be created. The naming and creation of these layers must be consistent with the styles in the template and must follow the [standard format](#).

Please contact The City at [CADinfo@calgary.ca](mailto:CADinfo@calgary.ca) if you would like any changes to be considered for inclusion in a future revision of the Standard and included in new templates.

To download these templates and related files go to the Templates section of the CAD Standard website. Please see [Installing Files](#) in Appendix A for instructions on how to set up these files, and the [Templates subsection](#) for more details about what is included in them.

The templates include a figure prefix database and description keys, which have the code names used by internal City surveyors. Consultants may use these or replace them with their own keys, as long as they are set up to display valid blocks and layers.

**Note:** These templates and files are provided to assist users in using the City's Standard. Anyone may change these to accommodate their own internal processes as required. However, if this is done, when the City updates this Standard and provides new templates, any customization that may have been done will need to be re-applied to the newer templates.



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## Best Practices and Tips

### Use of Status Codes

The NCS standard status field codes include the option of using the “E” modifier to indicate “Existing to remain”. However, the preferred way of showing existing civil features on a plan, is to use the “V” (survey and mapping) layers. For example, a proposed curb would be on the C-ROAD-CURB layer, and an existing road curb would be shown on the V-ROAD-CURB layer instead of C-ROAD-CURB-E. Existing items to be moved or demolished, can be shown with the M or D status, but these should be shown on the “C” (civil) layers (e.g. C-ROAD-CURB-D), as there is civil work to be performed, and these layers will typically plot darker and stand out more than the “V” layers. (Also, to differentiate between surveyed features, and existing features that were not surveyed, the “-S” suffix may be used in the “V” layers).

For other disciplines, existing features should be used with the appropriate discipline code and the “-E” suffix, e.g., A-DOOR-E for an existing door, vs. A-DOOR for a new door to be placed at a location.

When modifying existing layers by using the status code, the following line styles should be used:

- A (Abandoned): 0.18 mm, continuous linetype
- D (Demolish): 0.18 mm, dashed linetype
- M (Move): 0.13 mm, continuous linetype
- F (Future): Use same linetype that is defined for the existing feature
- S (Surveyed): Use same linetype that is defined for the existing feature

### Truncation of Elevations

There are different styles defined for grading and pavement elevations. One set of styles shows the full elevation in metres (e.g., 1045.123), whereas the other set truncates the leading two digits (e.g., 45.123). It is common in many drawings for elevations to be represented with the shorter style to minimize clutter, since most of the elevations in the Calgary area are in the 1000 to 1100 metre range. However, in parts of The City, the elevation can be above 1100 metres, and only showing two digits is unclear. It is recommended that the two digit style only be used within contract sets where the elevation of the entire area is under 1100 metres, and it will be understood that readers of the drawing will recognize that any two digit elevations imply that the actual elevation is 1000 metres higher than listed. Also, note that due to software limitations, leading characters that are zero will normally not be displayed, so the two-digit convention should not be used for elevations between 1000 and 1009.999 metres, as they will be displayed as 9.123 for 1009.123, which may also lead to confusion.

In short, always use the full digits style where elevations may fall below 1010 m or above 1100 m. Either style may be chosen where all elevations are between 1010 m and 1100 m, but whichever style is used, only use that one, not a combination of both.

The full digits styles for Grading & Pavement Elevation labels are:

- EX Elev Above
- EX Elev Below
- PR Elev Above
- PR Elev Below

The corresponding truncated styles for these are:



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- EX Elev Above (Truncated)
- EX Elev Below (Truncated)
- PR Elev Above (Truncated)
- PR Elev Below (Truncated)

For pipe invert elevation labels, the full digit styles are:

- BP STORM Profile Invert (End) Pipe Aligned
- BP STORM Profile Invert (Start) Pipe Aligned
- EX SANITARY Profile Invert (End) Pipe Aligned
- EX SANITARY Profile Invert (Start) Pipe Aligned
- EX STORM Profile Invert (End) Pipe Aligned
- EX STORM Profile Invert (Start) Pipe Aligned
- PR SANITARY Profile Invert (End) Pipe Aligned
- PR SANITARY Profile Invert (Start) Pipe Aligned
- PR STORM Profile Invert (End) Pipe Aligned
- PR STORM Profile Invert (Start) Pipe Aligned

The corresponding truncated styles for these are:

- BP STORM Profile Invert (End) Pipe Aligned (Truncated)
- BP STORM Profile Invert (Start) Pipe Aligned (Truncated)
- EX SANITARY Profile Invert (End) Pipe Aligned (Truncated)
- EX SANITARY Profile Invert (Start) Pipe Aligned (Truncated)
- EX STORM Profile Invert (End) Pipe Aligned (Truncated)
- EX STORM Profile Invert (Start) Pipe Aligned (Truncated)
- PR SANITARY Profile Invert (End) Pipe Aligned (Truncated)
- PR SANITARY Profile Invert (Start) Pipe Aligned (Truncated)
- PR STORM Profile Invert (End) Pipe Aligned (Truncated)
- PR STORM Profile Invert (Start) Pipe Aligned (Truncated)

## Highlighting Key Information

Drawings have key information pertaining to the design, as well as background reference information. (For example, a water utilities drawing will show the roads that are in the area to be worked on). Using the defined standards with the default linetypes will result in making it difficult to see the relevant features on a drawing, as the background information will stand out just as much. Reference information that should not stand out should have the xref layer colour manually overridden (in the production drawing, not the xref itself!) and set to colour 8 to achieve this.

## Linetype Text Rotation

Not all lines in a drawing will be oriented in the same direction. There are 2 sets of .LIN files (Standard Text and Upright Text) supplied to avoid having text in a line turn upside down.

The Standard Text .LIN files are set to display true rotation, which will cause the lines to display upside down at times depending on the viewport orientation. This is the default file and allows users to reverse polylines / or to rotate lines to achieve the proper rotation.



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The Upright Text .LIN files define the lines as upright no matter what the orientation is. This would be the preferred method but causes issues when a line runs completely vertical, it then rotates the text in the lines the opposite rotation to what The City uses for displaying text vertically.

Depending on the situation, one or the other linetypes may need to be used. All, or individual linetypes can be reloaded using one or the other .LIN files.

## Block Profiles

### Title Block

As-built block profile drawings use the same title block as design drawings. However, different fields need to be populated. Only the Sheet Title, drawn by/date, and profile number at the bottom of the title block should be populated for as-builts, whereas design profiles should include the project name, file no., sheet id, and sheet no. This title block is available in the 002 - GENERAL DESIGN - ANSI D (22x34) LANDSCAPE layout. The following is an example:

Block profile title block:

PROJECT			
SEC: 26 - TWP: 23 - RGE: 29 - W 4th M			
SHEET TITLE			
FILE NO.		ENG DWG NO.	
SHEET ID.		SHEET NO.	
	BY	DATE (YYYY-MM-DD)	PROFILE NO.
DRAWN	ABC	2019-01-13	<b>123</b>

ISC: SHEET SIZE ANSI D 25 mm 0





# CAD Standard Guidance

Water drawings prepared by City staff require the work order no. and activity no. as well in the block profile title block. These additional fields only exist on the 005 - WATER DESIGN - ANSI D (22X34) LANDSCAPE layout. See example below:

Water design block profile title block:

PROJECT			
<b>THE CITY OF CALGARY CONSTRUCTION DRAFTING STANDARDS AND TEMPLATES</b>			
SEC: 04 - TWP: 24 - RGE: 01 - W 5th M			
SHEET TITLE			
WORK ORDER NO. 2153870-01		ACTIVITY NO. 452450	
FILE NO. 123456789C-101.dwg		ENG DWG NO. 425.0143.001	
SHEET ID. <b>C-101</b>		SHEET NO. <b>001</b>	
	BY	DATE (YYYY-MM-DD)	PROFILE NO.
DRAWN			
ISC:	SHEET SIZE ANSI D		25 mm 0

Layer G-ANNO-TBLK-BP~~-FRZE can be used to freeze the unnecessary title block information in an As-Built Block Profile and the 'BP' sheet set fields should be filled in through the sheet set manager.

Block profiles typically show either two views (legal and profile) or three views (legal, utility, and profile). Separate viewports should be used to display these views.

### Styles

The "PROP" styles show proposed information in a dark/thick/bold style for them to stand out from the existing information. However, when creating an as-built block profile, all the information is now existing. Therefore, there are "AS-BUILT BP" styles for block profiles that have been set up to show the existing information in the same dark/thick/bold style as proposed features in the design set.

Creating block profile drawings from design drawings, users will have to switch structure and pipe styles from the existing and proposed styles to the block profile styles. For roads specific objects, the existing layer colours in plan and profile viewports will need to be modified to match the colours used for proposed layers.



# CAD Standard Guidance

## Text Styles

All text should be using either the Existing or Proposed text styles with annotative property set to 'True'. All the '\_Civil 3D' Text Styles were developed to be used within C3D Label Styles only. These text styles are not annotative and should not be used in any Mtext/Text objects.

## Plotting

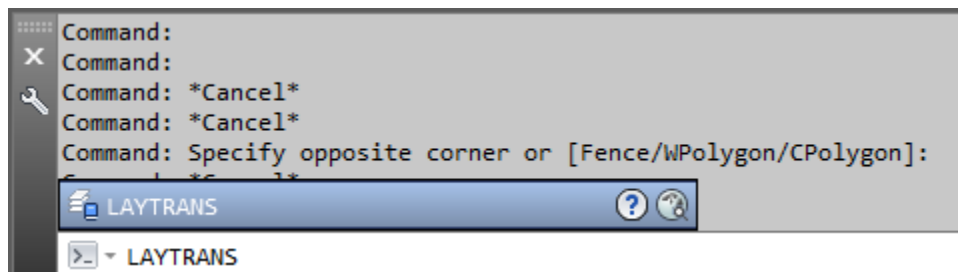
The General Template includes predefined page layouts that are to be used when plotting. The layouts pre-define several options including, but not limited to, paper size, scale, and plot style table. As The City typically requires PDFs as a final deliverable, the **DWG to PDF CofC.pc3** file has been set as the default printer. There may be times when users may want to print directly to a printer/plotter in their office, in this case the settings for paper size, scale, plot style table, etc found in the pre-defined page layouts should still be used.

The standard ctb used in the pre-defined page layouts is **CofC Black and Grey.ctb**, which will produce full size black & grey plots with correct lineweights. Additional ctb files have been provided to assist in plotting at half size (**CofC Black and Grey (Half).ctb**), as well as for plotting colour drawings (**CoC Colour.ctb** and **CofC Colour (Half).ctb**) (when necessary, not to be used on contract documents). Finally, there is a set of ctb files for printing in colours that match the Alberta One Call [standard](#) colours (**CofC AOC.ctb** and **CofC AOC (Half).ctb**).

## Registered Plan Submission

[Service Alberta](#) Land Titles Office (LTO) requires subdivision registered plans to be submitted using a specific layer format (on page 26 of [this document](#)) that differs from that used by The City of Calgary. To allow a subdivision plan to be drafted using the City's Standards and still be compliant for LTO submission with minimal effort, a layer translator has been created. This will convert layers from the City of Calgary's CAD Standard to the LTO standard. This can be downloaded [here](#). To use this translator follow these instructions:

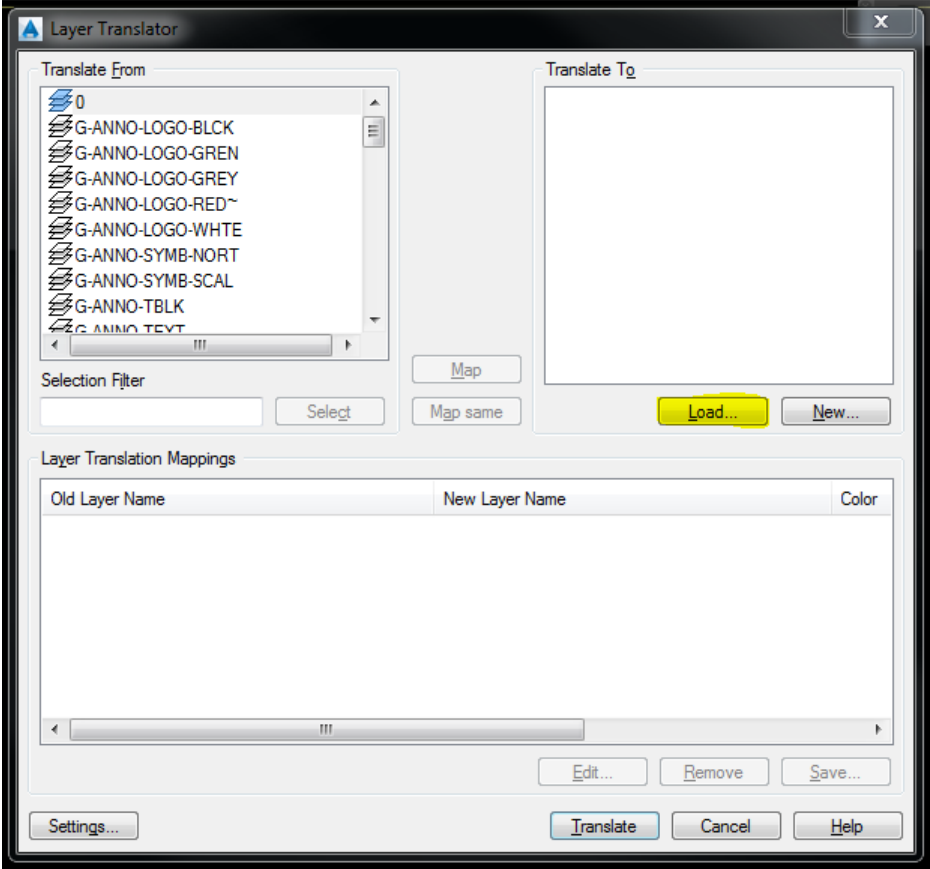
From the command line enter  
**LAYTRANS**





# CAD Standard Guidance

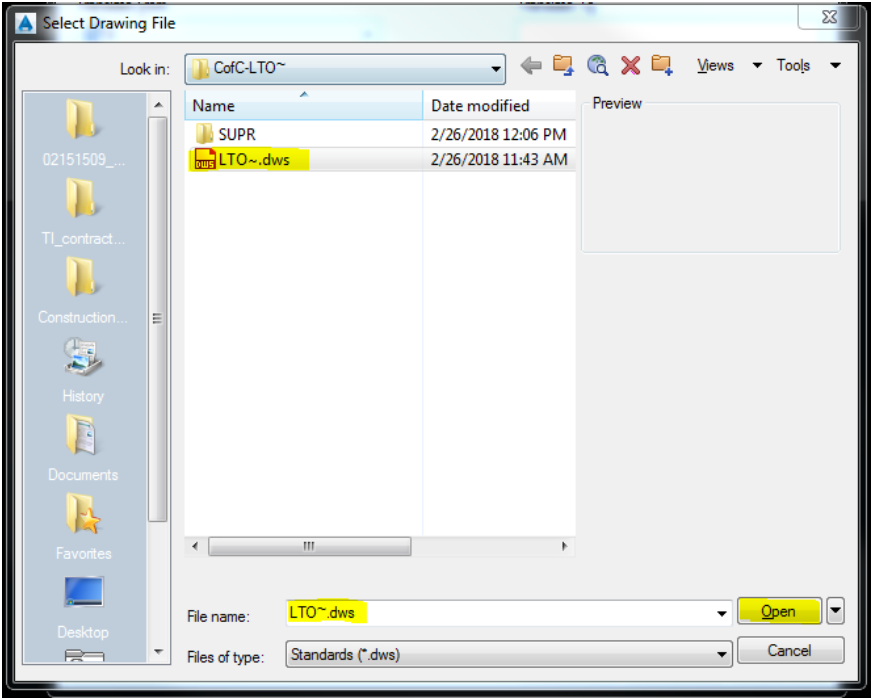
The Layer Translator dialog box will open





# CAD Standard Guidance

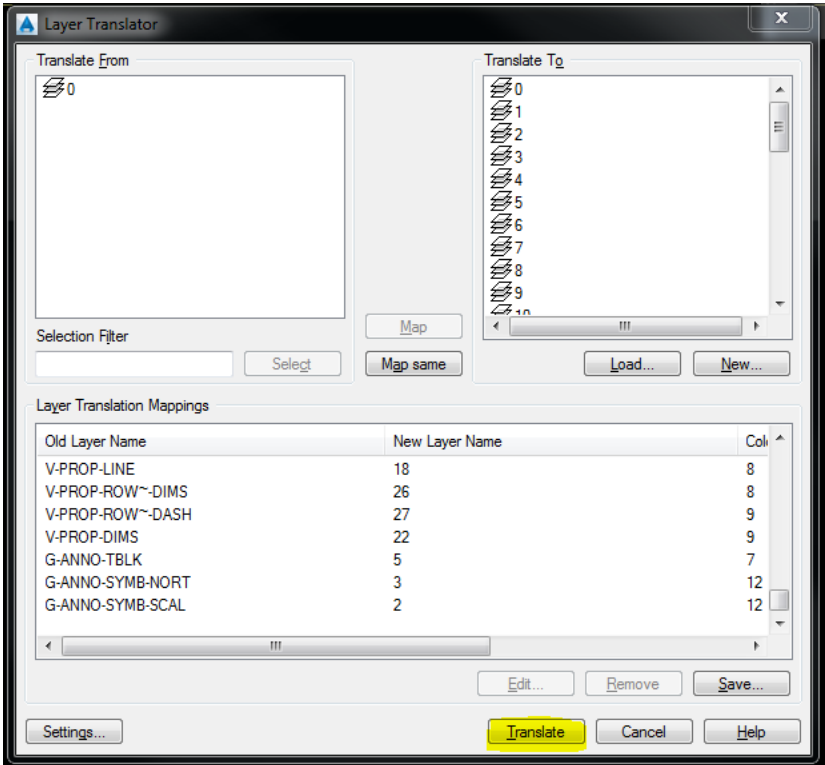
Click **Load**, search to the location where the **LTO.dws** file resides, select the file and click **Open**



The Layer Translator dialog will once again appear and display the Layer Translation Mappings that are set to occur.

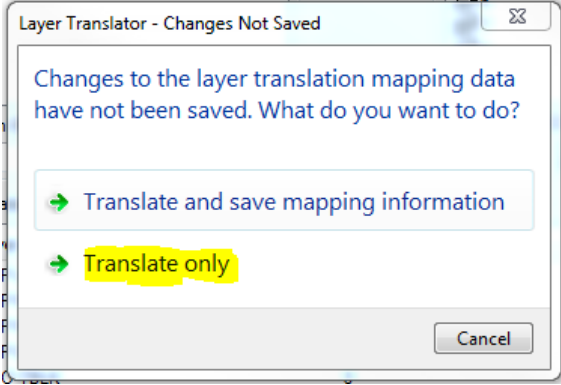
Only specific layers have been set up to translate, so there may be layers that show up in the **Translate From** area of the dialog box that will not be included in the translation. If additional layers show up in this area, it is recommended the file be cleaned (purged) of any unnecessary information before running the translation.

Once the file has been cleaned of any unnecessary information, click **Translate**.



# CAD Standard Guidance

The following dialog will appear:



Click **Translate only**

The translation will occur, and all valid layers will be translated to the LTO layers.

For the file to be converted correctly using this tool, all the features must be on specific source layers. The table below shows which layers are converted to each LTO level:

Source Layer	LTO Level	Source Layer	LTO Level
V-PROP-DESC-TEXT-RP~~	1	V-PROP-ROW~~OVDR-DIMS-RP~~	26
G-ANNO-SYMB-SCAL	2	V-PROP-ROW~~PCKT-DIMS-RP~~	26
G-ANNO-SYMB-NORT	3	V-PROP-ROW~~UTIL-DIMS-RP~~	26
V-PROP-ALS~~TEXT-RP~~	4	V-PROP-ROW~~DASH	27
G-ANNO-TBLK	5	V-PROP-ROW~~ACCS-DASH-RP~~	27
V-PROP-APRV-TEXT-RP~~	6	V-PROP-ROW~~OVDR-DASH-RP~~	27
V-PROP-PLAN-TEXT-RP~~	7	V-PROP-ROW~~PCKT-DASH-RP~~	27
V-PROP-PLAN-RP~~	8	V-PROP-ROW~~UTIL-DASH-RP~~	27
V-PROP-EXT~~RP~~	9	V-PROP-ROW~	28
V-PROP-EXT~~TEXT-RP~~	10	V-PROP-ROW~~ACCS-RP~~	28
V-PROP-SUPR-RP~~	11	V-PROP-ROW~~OVDR-RP~~	28
V-PROP-SUPR-TEXT	11	V-PROP-ROW~~PCKT-RP~~	28
V-PROP-MASC-RP~~	12	V-PROP-ROW~~UTIL-RP~~	28
V-SURV-CTRL	13	V-PROP-ROW~~TEXT	29
V-SURV-TEXT	13	V-PROP-ROW~~ACCS-TEXT-RP~~	29
V-PROP-DIMS-ARRW	14	V-PROP-ROW~~OVDR-TEXT-RP~~	29
V-ROAD-TEXT	15	V-PROP-ROW~~PCKT-TEXT-RP~~	29



# CAD Standard Guidance

V-PROP-AREA-TEXT-RP~~	16	V-PROP-ROW~~UTIL-TEXT-RP~~	29
V-PROP-BLKS-RP~~	17	V-PROP-WWAY-LOTS	30
V-PROP-LINE-RP~~	18	V-PROP-WWAY-LOTS-TEXT	30
V-PROP-LOTS-TEXT-RP~~	19	V-PROP-WWAY-LINE	31
V-PROP-BLKS-TEXT-RP~~	20	V-PROP-WWAY-LINE-TEXT	31
V-PROP-PLAN-TEXT-RP~~	21	V-PROP-WWAY	32
V-PROP-DIMS-RP~~	22	V-PROP-WWAY-TEXT	32
V-ROAD-DIMS	23	V-PROP-LOC~~TEXT	33
V-PROP-LOTS-RP~~	24	G-ANNO-LOGO-BLCK	34
V-PROP-LOTS-DPLX-RP~~	24	G-ANNO-LOGO-GREN	34
V-SURV-CTRL-ASCM	25	G-ANNO-LOGO-GREY	34
V-SURV-CTRL-ASCM-TEXT	25	G-ANNO-LOGO-RED~	34
V-PROP-ROW~~DIMS	26	G-ANNO-LOGO-WHTE	34
V-PROP-LOTS-DPLX-RP~~	24	G-ANNO-TEXT	34
V-SURV-CTRL-ASCM	25	G-ANNO-VPRT	34
V-SURV-CTRL-ASCM-TEXT	25	V-PROP-MISC-TEXT	34
V-PROP-ROW~~DIMS	26	V-PROP-TEXT	34
V-PROP-ROW~~ACCS-DIMS-RP~~	26		

## Pipe Rule Sets

The Civil 3D functionality incorporates pipe rule sets that include minimum and maximum values for parameters such as covers and slopes, and other parameters. When features are created in a drawing that are outside of these specifications, a warning message will appear. However, some specifications are dependent on pipe type, flow volume, type of fill, or other project specific factors, and Civil 3D only allows for one value to be entered for each parameter as a constraint. For this reason, warning messages may be displayed even though a drawing is within the specifications for a given project. Project specific documentation and any associated supplemental advisory notes should be referenced to confirm whether or not these warning messages are applicable.

## Background Masks on Labels

Many label styles use background masks that may be used as long as key design information is not covered. Masking should be turned off if required, but doing so in the style will affect all labels. If a combination of masked and non-masked label styles is required, additional non-masked styles may be created. These should follow the naming convention “Label Style Name + (non-mask).”



# CAD Standard Guidance

## Appendix A: Getting Started

### Installing Files

All the files may be downloaded as a [single compressed zip file](#), or just individual templates as required and/or the desired supporting files.

For the supporting files to work correctly with the templates, once the files are downloaded they should be put in the following folders:

#### Pipes Catalog

Copy the CofC Pipes Catalog folder to the default Pipe Catalog folder (C:\ProgramData\Autodesk\<Version of AutoCAD>\enu) and ensure that this folder is selected in Set Pipe Network Catalog

or

Copy the CofC Pipes Catalog folder to a user defined folder and ensure that this folder is selected in Set Pipe Network Catalog

#### Drawing Templates

Copy the .dwt files to the default Drawing Template folder (C:\Users\<username>\appdata\local\autodesk\<Version of AutoCAD>\<RXX.X>\enu\template)

or

Copy the .dwt files to a user defined folder and ensure that folder is added to the Drawing Template File Location in Options

#### Figure Prefix Database

Copy the CofC.fdb\_xdef file to the default Figure Prefix Database folder (C:\ProgramData\Autodesk\<Version of AutoCAD>\enu\Survey) and ensure that this file is selected as the Figure Prefix Database

or

Copy the CofC.fdb\_xdef file to a user defined folder and ensure that this file is selected as the Figure Prefix Database

#### Linetype and SHX

Copy the .lin & .shx files to the default Support folder (C:\Users\<username>\appdata\roaming\Autodesk\<Version of AutoCAD>\<RXX.X>\enu\support) \*

or

Copy the .lin & .shx files to a user defined folder and ensure that folder is added to the Support File Search Path in Options





# CAD Standard Guidance

## Hatch Patterns

Copy the .pat files to the default Support folder (C:\Users\\appdata\roaming\Autodesk\

or

Copy the .pat files to a user defined folder and ensure that folder is added to the Support File Search Path in Options

## Plot Style CTB

Copy the .ctb files to the default Plot Style Table folder

(C:\Users\\AppData\Roaming\Autodesk\

or

Copy the .ctb files to a user defined folder and ensure that folder is added to the Plot Style Table Search Path in Options

Copy the .pc3 file to the default Printer Configuration folder

(C:\Users\\AppData\Roaming\Autodesk\

or

Copy the .pc3 files to a user defined folder and ensure that folder is added to the Printer Configuration Search Path in Options

## Sheet Set Template

Copy the .dst file to the default Sheet Set Template folder

(C:\Users\\appdata\local\autodesk\

or

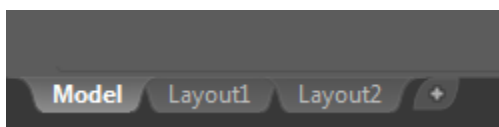
Copy the .dst file to a user defined folder and ensure that folder is added to the Sheet Set Template File Location in Options

\* Note: the <RXX.X> folder does not apply to some vertical Autodesk programs such as Civil 3D.

## Title Blocks

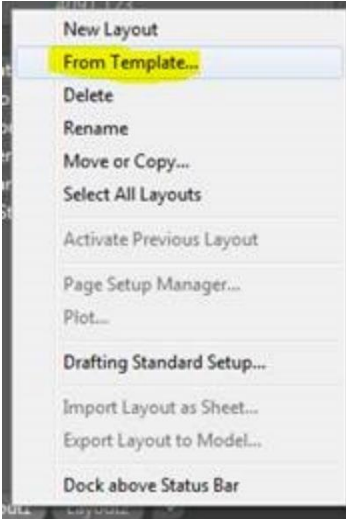
All title blocks are contained within the General Template (GNRL). When working on a drawing that has been created from a template other than this one, follow these steps to select the appropriate title block to use:

1. Click on a layout tab

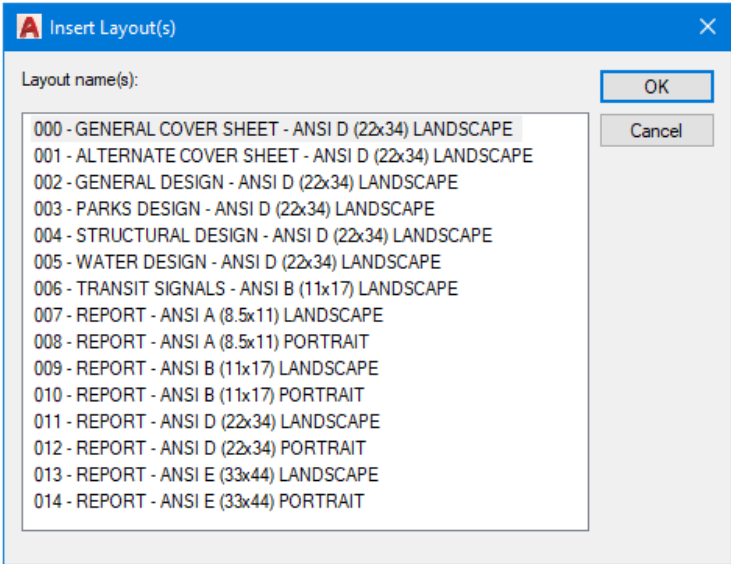


# CAD Standard Guidance

2. Select “From Template...”



- 3. Search for GNRL.dwt file and click open
- 4. Select the desired title block from the list that appears:



There are different title blocks that can be used for cover sheets, design/block profiles and general reports. Note that Parks, Bridges & Structures, and Water have different title blocks for design drawings than other types of projects, due to specific additional required fields. See below for description of available layouts:



# CAD Standard Guidance

Layout Name	Type	Size	Orientation
000 - GENERAL COVER SHEET - ANSI D (22X34) LANDSCAPE	Cover Sheet	22x34"	Landscape
001 - ALTERNATE COVER SHEET - ANSI D (22X34) LANDSCAPE	Alternate Cover Sheet	22x34"	Landscape
002 - GENERAL DESIGN - ANSI D (22X34) LANDSCAPE	Design - General	22x34"	Landscape
003 - PARKS DESIGN - ANSI D (22X34) LANDSCAPE	Design - Parks	22x34"	Landscape
004 - STRUCTURAL DESIGN - ANSI D (22X34) LANDSCAPE	Design - Bridges & Structures	22x34"	Landscape
005 - WATER DESIGN - ANSI D (22X34) LANDSCAPE	Design - Water	22x34"	Landscape
006 - SIGNALS - ANSI B (11X17) LANDSCAPE	Design – Signals	11x17"	Landscape
007 - REPORT - ANSI A (8.5X11) LANDSCAPE	Report	8.5x11 "	Landscape
008 - REPORT - ANSI A (8.5X11) PORTRAIT	Report	8.5x11"	Portrait
009 - REPORT - ANSI B (11X17) LANDSCAPE	Report	11x17"	Landscape
010 - REPORT - ANSI B (11X17) PORTRAIT	Report	11x17"	Portrait
011 - REPORT - ANSI D (22X34) LANDSCAPE	Report	22x34"	Landscape
012 - REPORT - ANSI D (22X34) PORTRAIT	Report	22x34"	Portrait
013 - REPORT - ANSI E (33X44) LANDSCAPE	Report	33x44"	Landscape
014 - REPORT - ANSI E (33X44) PORTRAIT	Report	33x44"	Portrait

All the relevant attributes in the title block should be filled in. You may use the Sheet Set File available [here](#) to help automate the population of these.

## Templates

There are several different templates available for use. All of these as well as necessary supporting files can be downloaded [here](#). As noted above, it is always necessary to at least use the general template to get the layout with the appropriate title block. Doing so will also allow you to access all the general blocks and layers in the drawings you create.

Additionally, the following templates are available for each of the following disciplines:

- Civil
- Survey and Mapping
- Landscape and Irrigation
- Process
- Electrical
- Geotechnical
- Mechanical



# CAD Standard Guidance

- Structural
- Fire Suppression
- Architectural
- Telecommunications
- Plumbing

The template files include:

- Blocks
- Layers
- Text styles
- Dimension Styles
- Multileader Styles
- Table Styles

Title Blocks, Layouts and Page Setups are in the General Template.

Additionally, the Civil Template also includes the following Civil 3D Styles:

- General
- Point
- Point Cloud
- Surface
- Parcel
- Grading
- Alignment
- Profile
- Profile View
- Superelevation View
- Sample Line
- Section
- Section View
- Mass Haul Line
- Mass Haul View
- Pipe Network
- Pipe
- Structure
- Corridor
- Intersection
- Assembly
- Quantity Takeoff
- Survey
- View Frame
- Match Line

Aside from the templates file the following supporting files are also available:

- Plot Style CTB



# CAD Standard Guidance

- Linetype and SHX
- Sheet Set File
- Hatch Patterns
- Figure Prefix Database
- Description Keys
- Pipe Network Catalog



# CAD Standard Guidance

## References

1. Alberta Government – Standards for consultant deliverables - <http://www.infrastructure.alberta.ca/Content/docType486/Production/ConsultantDeliverables.pdf>
2. Government of Canada - Public Services and Procurement Canada – National CADD Standard - <http://www.tpsgc-pwgsc.gc.ca/biens-property/documents/cdao-cadd-eng.pdf>
3. United States National CAD Standards – V6 – a product of the National Institute of building Sciences buildingSMART alliance™ - <https://www.nationalcadstandard.org/ncs6/>
4. Master Municipal Construction Documents Association - <https://www.mmcd.net/>
5. Autodesk®, Inc - <https://www.autodesk.ca/en>
6. Bureau International des Poids et Mesures - SI Brochure: The International System of Units (SI) - <https://www.bipm.org/en/publications/si-brochure/>
7. Construction Specifications Canada - UniFormat™ - <http://csc-dcc.ca/Document+Store/UniFormat/>
8. International Organization for Standardization: Date and time format – ISO 8601- <https://www.iso.org/iso-8601-date-and-time-format.html>
9. Construction Specifications Institute - MasterFormat® - <https://www.csiresources.org/practice/standards/masterformat>
10. Institute of Electrical and Electronics Engineers– IEEE Standard for Graphic symbols for Electrical and Electronics Diagrams - <https://standards.ieee.org/findstds/standard/315-1975.html>
11. International Society of Automation - ISA5.1, Instrumentation Symbols and Identification - <https://www.isa.org/isa5-1/>
12. Alberta One Call – Color code Explanation - <http://albertaonecall.com/learning-centre/color-code-explanation/>
13. Service Alberta – Digital Submission of Survey Plans for Registration - <http://www.servicealberta.gov.ab.ca/1075.cfm>