



Plan Development CADD Standards

Design Manual
Chapter 20
Automation Tools
Instructions

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Consultant / Designer Resources

The [Consultant / Designer Resources Home](#) web page contains links for nearly all necessary Plan Preparation information. Brief descriptions of separate Plan Preparation topics are listed below:

MicroStation

MicroStation Automation

The Office of Design presently uses three forms of programming for MicroStation automation, including MicroStation Basic, Visual Basic, and MicroStation VBA (Visual Basic for Applications).

Most of the automation tools are launched from within the Geopak D&C Manager program. Geopak D&C was created as the primary drafting tool for Geopak, but it also serves as the command menu system for the Office of Design. While it is possible to launch these tools directly from MicroStation and not from within the D&C Manager program, this is not recommended. Most of the automation tools are designed to assign an additional Geopak attribute to each of the drawn elements, which will not occur if not using D&C. While the D&C is definitely linked to the automation tools, it is available as a separate download on the Geopak portion of the Office of Design website, as it may be updated on a different schedule than the automation tools.

1. **MicroStation Basic** is based on the *Basic* programming language and all MicroStation Basic macros include two files. The uncompiled .BAS file can be written with any text-editing software. The compiled .BA file includes all custom dialog boxes that were developed for the macro. The compiled .BA file cannot be edited, so changes must be made to the .BAS file, and then recompiled to create a new .BA file. The MicroStation Basic macros are found on the Office of Design Web site, grouped into the [Macros Zip file](#).
2. **MicroStation VBA** is **V**isual **B**asic for the MicroStation **A**pplication. Each macro is saved as a single compiled file with the file extension of “.MVBA”. Because the file is compiled, it can only be edited by using the Visual Basic Editor found inside the MicroStation V8 program. The VBA macros are also grouped into the [Macros Zip file](#).
3. **Visual Basic**, (VB), is a “stand alone” programming language, therefore VB programs are not run from within MicroStation. At this time, there are only a few VB programs that have been modified to run with MicroStation, but the number may increase over time. For inclusion on the web site, the VB programs have been grouped into the [Programs Zip file](#).

MicroStation Configuration

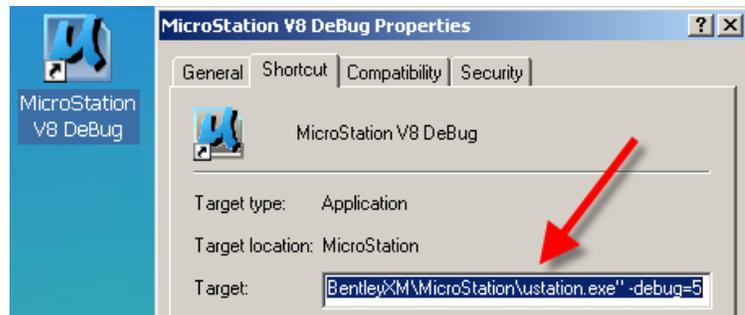
The configuration of MicroStation can be considered complex, as it has been implemented by the Iowa DOT. The reason for the complexity is due to the various offices within the DOT, and the differences with the implementation needs of each. (A Zip file, containing all configuration files, can be downloaded from the [Office of Design, Automation Tools](#) web page.) However, there are a few configuration files common to the entire Iowa DOT and they are explained below:

- **Agency.cfg** – The *Agency.cfg* file should be located in the folder where the MicroStation program is installed, which can be on either the local computer or on the network server. This file intercepts the ordinary startup process of MicroStation and causes it to read an additional set of configuration files located on the DOT network. It does this by stating: “If a local.cfg file exists, (at the proper location), then read it and do what it says”.
- **Local.cfg** – The *Local.cfg* file must be located as indicated in the *Agency.cfg* file. It is convenient to place the *Local.cfg* file on the network server so it can be found regardless of the computer being used. The purpose of this file is to define the location of the next two config files to be included, which are the *Cadd.cfg* and the *Dsn.cfg*. Each login ID has a separate *local.cfg* file, but *local.cfg* files throughout the same office, (such as Road Design), will probably be identical.

- **Cadd.cfg** – The *cadd.cfg* file defines the value for several MicroStation configuration variables used by the Highway Division. While most of these settings can be overwritten by the other config files that follow, some are locked and cannot be changed later.
- **Dsn.cfg** - The *dsn.cfg* file is a Highway Division level file that simply points to the office level *RoadDesign.cfg* file.
- **RoadDesign.cfg** – The *RoadDesign.cfg* file defines several configuration variables and paths specific to the Office of Road Design, such as those for Seed File and Cell Library locations.
- **username.ucf** – The path to the *username.ucf* file is established in the *Agency.cfg* file. This is the **U**ser **C**onfiguration **F**ile (.UCF), and includes personal, (or User), environment variable additions or changes to previously defined definitions, (if not locked). This file also includes a definition of the variable locating the correct **P**roject **C**onfiguration **F**ile (.PCF) to open. This file can be manually changed, and MicroStation also writes to this file, with a new PCF file definition, each time a new Project is selected in MicroStation Manager.
- **projectnumber.pcf** – Every Iowa DOT project is located in a unique “project” folder, residing under the Project Directory folder, W:\Projects\. Also, every project has a unique **P**roject **C**onfiguration **F**ile (.PCF), which has the MS_RFDIR environment variable definitions containing the Reference File paths for the project. The name of the PCF file is read from the *username.ucf* file.

During the MicroStation start-up sequence, the chronological processing of the above files (and many more “.cfg” files), is as listed below. A complete expanded version of the listing shows when and how each variable value was originally assigned, or even reassigned. The expanded listing can be as long as 50 to 100 pages, if printed. This expanded listing, including a final summary of all variable

assignments, is produced in an ASCII file called “msdebug.txt”. The file is created by entering the “-debug=5” line (list below), in the *Windows > Start > Run* dialog, or by creating a Windows desktop icon and placing the “-debug=5” line in the *Properties > Shortcut > Target* field, as shown at the right.



"C:\Program Files\BentleyXM\MicroStation\ustation.exe" **-debug=5**

The chronological processing order of the MicroStation start-up config files is shown below:

```
C:\Program Files\BentleyXM\MicroStation\config\mslocal.cfg
C:\Program Files\BentleyXM\MicroStation\config\msdir.cfg
C:\Program Files\BentleyXM\MicroStation\config\msconfig.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\dotnetlocalest.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\ecom.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\gui.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\helpwinforms.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\msdirs.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\msfiles.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\mslocale.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\mstrans.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\msweb.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\security.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\spdocmgmt.cfg
```

```

C:\Program Files\BentleyXM\MicroStation\config\system\spellchecker.cfg
C:\Program Files\BentleyXM\MicroStation\config\system\workmode.cfg
C:\Program Files\BentleyXM\MicroStation\config\appl\geopak.cfg
C:\Program Files\BentleyXM\MicroStation\config\appl\plotmal.cfg
C:\Program Files\BentleyXM\MicroStation\config\appl\modeler.cfg
C:\Program Files\BentleyXM\MicroStation\config\appl\sketchup.cfg
C:\Program Files\BentleyXM\Workspace\standards\Agency.cfg
\\nthomedirA\user2\UserName\config\local.cfg
w:\DOTCadd\config\cadd.cfg
W:\DotCadd\App\bridgedb.cfg
W:\DotCadd\App\dcartes.cfg
W:\DotCadd\App\lirasc.cfg
W:\DotCadd\App\liv.cfg
W:\DotCadd\App\NetAxiom.cfg
W:\DotCadd\App\zicso.cfg
W:\DotCadd\App\zigrid.cfg
W:\DOTCadd\Config\OfficeCfgs\Dsn.cfg
W:\Highway\Design\CADD\MicroStation\Config\RoadDesign.cfg
C:\Program Files\BentleyXM\Workspace\standards\standards.cfg
\\nthomedirA\user2\dolson\config\user\UserName.ucf
w:\projects\Config\ProjectName.pcf

```

Seed Files

The concept of a Seed File is similar to that of a pre-made Shell Letter, in that much of the file set-up work has been done in advance. In the case of the Seed File, the initial file settings have been pre-set, many of the commonly used Models have been created, and many of the commonly utilized graphic files or text files have already been referenced (attached), scaled, rotated, and located, as necessary. When new files are needed, the Seed Files are to be copied, (and renamed), by utilizing the CopySeed program.

For additional information, see section [21C-54](#).

Often, a Seed File contains no active elements, and is merely a collection of several attached reference files. Many Seed Files contain references of other files containing the “original” graphic elements, such as a file containing an original sheet border drawing. This one sheet border file may be attached to thousands of other files that were created by copying a seed file with an attachment of the border file. The “seed file associated” files containing the original graphics are generally named with the letters “orig” within the file name, such as “dsnOrigEng.border.” The parts of this file name are “dsn” for the Office of Design, “Orig” for original graphics file, “Eng” for English file, and “.border” as a file extension brief explanation of what is contained in the file. The Seed Files are named similarly to the “orig” files, but contain the word “Seed” within the filename. The name of the English Seed File for the “A” series sheets is “dsnSeedEng.A”.

For a complete list of Seed files and Orig files, see section [20B-1](#).

File Names and Project Directory Structure

The Design File Naming convention, “CCRRRPPP”, refers to the 2-digit **C**ounty, 3-digit **R**oute, and the 3-digit project **P**arenthesis number. Project Directory folder names are developed from a rearrangement of the numbers in the Project Identification Number, (PIN), and should be named according to the approved procedure.

For additional information on naming files and the Project Directory folder structure, see sections [20A-1](#) and [20B-71](#).

Models

Simply stated, a Model is a file within a file, and a file can contain any number of models. Each model, (within any given file), has a unique name and has its own drawing properties, such as resolution, scale, etc. A Model can be attached as a reference file to another Model within the same file, or to any other Model within a different file. All Office of Design element placement commands are programmed to read a specific portion of the Model name to determine the scale of the model, which then determines the scale at which the element is to be placed. Therefore, the Model naming convention is to be followed precisely. The easiest and the recommended way to accomplish this is to use commands, from within the Geopak D&C Manager program, to create new models and to place new elements.

For additional information on creating new models and model naming, see section [20A-1](#).

Levels

Prior to the V8 version of MicroStation, each file had 63 element levels available, and only 63. By MicroStation's definition, the number of V8 levels is unlimited. We are therefore limited only by agency standards. The Office of Design presently has over 500 Roadway Design levels, nearly 200 Photogrammetry/Survey levels, and about 100 levels for Soils. The Offices of Bridges & Structures, Right of Way, and others, have their own sets of levels.

MicroStation V8 has provided the ability to create levels in one MicroStation file, and then call on that file from a different file to have it act as a level library. This allows the standardization of a set of levels that everyone can use to get consistent results.

MicroStation can read several different level libraries at the same time, and make all of the resulting levels available to a graphics file at the same time. This is possible so long as none of the level library files use the same level numbers. The DOT has chosen to approach leveling on an office-by-office basis, with specific level number ranges being assigned to each office, (as shown at the right). Each office develops and maintains its own level libraries. The level library files are then stored in one common location on the network so they are all available to the entire agency. The file named **DesignLevels.dgnlib** is the level library for the Office of Design. Beginning with the V8 version of MicroStation, levels could be named as well as numbered. Within the Office of Design, the level naming convention has been structured into groups or disciplines, each with a three-letter prefix unique to that group. Examples: "dsn" for Design, "pho" for Photogrammetry, and "sol" for Soils levels. Within these groups, there are additional prefix naming conventions, as listed below.

Office	Level Range
Bridges & Structures	1000-1250
Construction	1500-1750
Design	2000-2499
Photogrammetry	2500-2699
Soils	2700-2849
Standards	2850-2999
District Design	3000-3250
ROW Design	4000-4499
Row Condemnation	4500-4600
Traffic Engineering	5000-5499
Traffic Tech	5500-5549
Engineering Operations Techs (EOT)	6000-6199
OLE Hearing	6200-6300
OLE Wetlands	7000-7199
OLE Cultural	7300-7350
TransData	7500-7999
Systems Planning	

A summary of the approximate Design level number ranges and associated names is shown below: *(The following level list may be revised at any time without changes to this document.)*

<u>General</u>	<u>Level No. Range</u>	<u>Level Naming Scheme</u>	<u>Total Levels Available</u>
	2000 – 2224 2256 & 2286 2850 – 3022	dsnLevelName (general) (All dsn levels except those listed below) including groups such as: dsnAutoturn , dsnCells , dsnInDGN , dsnIntake , dsnMass , dsnPaint , dsnPattern , dsnPavementShapes , dsnProfile , dsnPubHear , dsnShading , dsnShtPort , dsnShtPlot , dsnStd , dsn3D , and more	500 levels
	2250 - 2299 2888 - 2890	dsnTextLevelName	> 50 levels
	2375 – 2480 and 2887	dsnXsLevelName	> 105 levels
	2500 – 2689	phoLevelName Includes groups such as: phoAlignment , phoTxt , phoUtil , phoEdge , phoFence , phoSurvey , and more	190 levels
	2695 – 2849	solLevelName Includes groups such as: solBorrow , solCells , solPattern , solText , solXS , and more	155 levels

Design Levels (dsn) – The largest group of Design levels is devoted to general design items used by several groups (Design squads, Geometrics, Roadside Development, Methods, etc.) The five main divisions within this group are:

- **dsnLevelName** – (such as **dsnSideWalk**) Design items that appear in the plan or profile portion of a plan sheet. *(This group also includes a few miscellaneous sheeting and specialty levels.)* The plan sheet items are drawn at real-world coordinates and rotations, so they are not rotation-dependent, such as text elements would be.
- **dsnInDgnLevelName** – (such as **dsnInDgnROWProp**) Geopak InDGN elements that Geopak criteria refers to when drawing cross sections.
- **dsnTextLevelName** – (such as **dsnTextCulvertProp**) Text elements describing roadway items that will appear in the plan or profile portion of a sheet. These elements are affected by scale and rotation, which is why they are in a separate level group.
- **dsnXsLevelName** – (such as **DsnXSDitchBottom**) Roadway information on the Geopak roadway cross sections.
- **dsnStdLevelName** – (such as **DsnStdDimension**) Levels used by the Methods section to create the Road Standards.

Photogrammetry/Survey Levels (pho) – These levels are used by the Photogrammetry and Survey sections to create what are traditionally known as the “pho” and “sur” files. These files contains all of the existing topography, as well as contours and existing utility information. The three main divisions within this group are:

- **phoLevelName** – (such as **PhoEdgeDraw**) Existing roadway items that appear in the plan portion of a sheet. Usually, these items are drawn at real-world coordinates and rotations, so they are not rotation-dependent like text elements may be.
- **phoTxtLevelName** – (such as **PhoTxtEntrance**) Text elements describing existing roadway items that will appear in the plan portion of a sheet. These elements are affected by scale and rotation, which is why they are in a separate level division.
- **phoUtilLevelName** – (such as **PhoUtilElectric1**) - Existing utility lines. There is a level available for each utility encountered on a project, so a single utility or a group of utilities can be isolated in a drawing as needed.

- **phoSurveyLevelName** – There are presently nine levels within the “pho” series that are specifically designated for Survey items, (such as **phoSurveyNotes**, **phoSurveyPoints**, etc.) All other items collected during field survey utilize other “pho” levels, (such as **phoBuilding**, **phoEdgeBank**, etc.)

Soils Levels (sol) – This group of levels is used by the Soils Design section to create the collection of soils files. These files contain all of the existing soils information and the proposed treatments and designs. The three main divisions within this group are:

- **solLevelName** – (such as **SolSubdrain**) Soils roadway items that appear in the plan or profile portion of a sheet. Usually, these items are drawn at real-world coordinates and rotations, so they are not rotation-dependent like text elements may be.
- **solTextLevelName** – (such as **SolTextBoring**) These are text elements describing soils roadway items that will appear in the plan or profile portion of a sheet. These elements are affected by scale and rotation, which is why they are in a separate level division.
- **solXsLevelName** – (such as **SolXsCI10LayorCustomLine**) These levels are used in drawing soils information on Geopak cross sections.

Color Tables

The graphical representation of MicroStation color tables, (as shown below), is used to correlate the visual color display and the RGB color values with the assigned color table number. The **hwyclr.tbl** is the one standard color table used by the Iowa DOT Highway Division for colored products

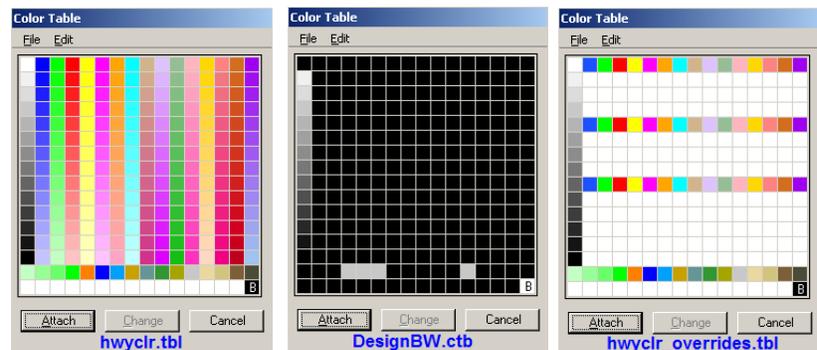
The **DesignBW.ctb**, (Black & White), color table is used for printing non-color products.

The eye can only easily differentiate the color of elements placed using the top row of the **hwyclr.tbl** color table. Therefore, the **hwyclr_overrides.tbl** is used to either visualize

or plot products as they would appear in the final color plan PDF files. The “overrides” color table will override the colors used when placing elements with the **hwyclr.tbl**. This will cause the elements that were placed using the colors from **hwyclr.tbl** rows 2, 3, and 4 (and also the other “white” rows, excluding the gray-scale colors on the left), to view or plot as if placed with color “0”, (which is white on a black background or black on a white background). Example: This would allow using the “yellow, color 20”, (in row two of the **hwyclr.tbl** color table), for a yellow display on the computer monitor, and then cause it to print as black, (just like color “0”), by printing with the “overrides” color table.

The **hwyclr.tbl** is used for all MicroStation files except for those files created prior to 2007 for public meeting displays, which were created using the now outdated **pubhear.tbl** color table. The old color table used colors specifically chosen as the standard for preparing and plotting uniform public meeting displays. The colors used for the public meeting displays were standardized, and are now the colors that are expected for those displays. These colors have been correlated to the **hwyclr.tbl** file so only one color table is now necessary. For additional information, see section [1D-15](#).

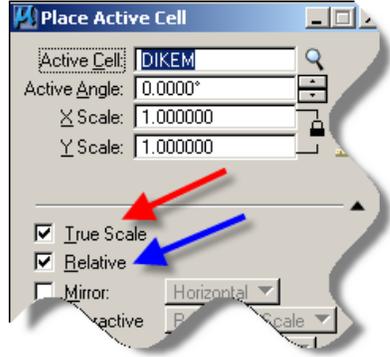
Even though the **hwyclr.tbl** file is the only color table accepted for use for MicroStation display purposes in Design, different offices within the Highway Division may use various other color tables to obtain specific desired printing results. Additional details of color tables for printing purposes are included in sections [21E-1](#), [21E-3](#), and [21E-4](#).



Cell Libraries

- **Cell Library Names** – The cell libraries have been renamed and condensed into topic groupings to better organize their contents. The cell libraries that currently exist are:
 - **dsnDBG_Guide_Shapes.cel** – These cells can be used as an optional visual guide while placing ditch bar graph information, profile grade elevations, and possibly earth work balances on the profile portion of plan and profile sheets. The cell names closely resemble the sheet name options available in the Geopak P&P sheeting procedure and therefore correspond to the same sheeting method.
Example: cell “3000-10-1-2” should be used with sheet “Eng 3000-10-1-2”.
 - **dsnDrainage.cel** – The Geopak Drainage software program uses these cells that contain construction elements that are specifically configured for this purpose.
 - **dsnDrainageCell3D.cel** – 3D drainage item cells, (such as intakes, etc.), for the Geopak Drainage software.
 - **dsnGuardrail.cel** – Contains detailed graphics of various guardrail sections.
 - **dsnMethods.cel** – These cells are used by the Design Methods Section for the creation of Standard Road Plans and Road Design Details.
 - **dsnPhoto.cel** – This library contains cells used by the Photogrammetry and Survey Sections for the creation of existing topographic files.
 - **dsnPLNapron1X1_English.cel** – English roadway pipe apron plan view cells
 - **dsnPubHearing.cel** – Contains legend and highway symbol cells for Public Information Meeting layouts.
 - **dsnRoad.cel** – Cells in this library are used by the design sections for the creation of general purpose roadway design sheets.
 - **dsnSoils.cel** – These cells are used by the Soils Design section for the creation of Soils Information sheets.
 - **dsnXSapron1X1_English_Ent.cel** – English entrance pipe apron XS cells
 - **dsnXSapron1X1_English_RD.cel** – English roadway pipe apron XS cells
 - **dsnXSapron1X1_Metric.cel** – Metric pipe apron XS cells
 - **trfeng-PAVEMENT_MARKINGS.cel** – Pavement marking symbols that coincide with the pavement marking tabulation

- **English versus Metric Cells** – If cells are not specifically either English or Metric, they are created in the cell library as full size, 100 scale English cells, when placed at active scale = 1. When a cell is placed in either an English or Metric model, the cell placement macro, (launched from within Geopak D&C Manager), will read the scale portion of the model name, (example: “50” in ML_0050), and place the cell at the correct size for that model. If a cell is not to be scaled up or down, (such as a plan sheet scale block cell), the D&C Manager cell placement macro will still read the scale portion of the model name to place the correct cell. If the model name does not include the correctly formatted scale numbers, a warning will be issued stating the model scale can not be determined and the cell will not be placed.

- **Cell Library Resolution** – All cell file models have a resolution of either 10,000 per Survey Foot or 10,000 per Meter. For cells to be placed at the correct size in any file and model with any resolution, the “True Scale” place cell option should be checked ON, () , in the Place Cell Tools Settings dialog, (as shown by the red arrow at the right). The “True Scale” setting is automatically turned on when any Place Cell program is run from the Geopak D&C Manager.
 

- **Cell Library Leveling** – All recent cells have been created on the named level dsnCellElements. All D&C Manager Place Cell programs turn on the “Relative” Place Cell option, (as located by the blue arrow, above), so cells will be placed on the active level, which has also been set by the D&C Manager Place Cell program.

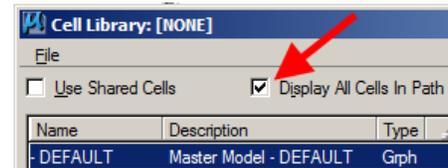
Resource Files

The Iowa DOT Highway Division uses a MicroStation Line Style resource file named `idotline.rsc`, and a Font resource file named `idotfont.rsc`. Due to pre-set MicroStation variable definitions, these resource files are automatically accessed when MicroStation is initiated. The `idotfont.rsc` font resource file contains all the fonts that can be used in a MicroStation file and each font is defined by a font number and a font name. The `idotline.rsc` line style resource file contains all the custom line styles that are available for use in a MicroStation file and each custom line style is defined by a custom line style name.

 **NOTE:** These resource files should not be modified without the approval of the Office of Design.

The two resource files listed above must be used on Iowa DOT roadway projects.

- Specifying Cell Names without Specifying Cell Library** – If the full file paths to all cell library locations are included in the definition of the MicroStation variable `MS_CELLLIST`, all cells will be located automatically by entering the cell name only, without entering the specific file path. For all cells in the `MS_CELLLIST` path to display in the Cell Library dialog, the “Display All Cells in Path” option (in the Cell Library dialog) must be checked on () , as shown above.



Plan Set Organization

The final plan sheet CADD file name extension will be “.sht”, but the file type will be embedded as the last three characters in the file name, such as `97029028B01.sht` for the first “B” sheet file. Each plan sheet file can contain several sheets. If a second file is required, the numbering sequence will likely increase by one, such as “B02” or the first sheet number contained in that file.

The non-Plan/Profile type sheet files, (such as A, B, C, G, J, etc.), will normally contain up to 20 sheets per file, in a horizontal row, but 20 sheets is not required. The first “C” file may contain the first five sheets, and the next one may contain the next seven sheets. The cross-section (XS) sheet files may contain up to 100 sheets, in five horizontal rows of 20 each. However, each XS sheet file is associated with a specific Geopak horizontal alignment, so a file may contain only a few sheets, or many. The Plan/Profile type of sheet file is also associated with a specific Geopak horizontal alignment and may contain only a few or many sheets per file.

The plan is organized alphabetically, with the “A” sheets first, followed by the B’s, C’s, etc. For complete details, see [1E-2](#).

Color Plans

For details on Color Plans, see Design Manual sections [21E-4](#), and [21E-3](#).

Road Design Details

Road Design Details are a collection of standard drawings and notes that have been developed to aid the designer in the development of detailed design plans. There are four types of road design details: design and tabulation forms, standard notations, design detail sheets, and typicals. Additional information is available in [1E-4](#).

On the [Road Design Details](#) web site, the downloadable file links have been divided into English and Metric versions and many items are available in PDF, DGN (MicroStation), and xlsx (Excel) format. The PDF files are available for immediate viewing, but the MicroStation and Excel versions must be downloaded for viewing or use. Some of the PDF files may contain several design details, resembling a layout page in a book, and other PDF’s may contain only one detail.

Either individual topics or the entire book can be downloaded. Each MicroStation Detail file may contain as few as 5 models, up to possibly 25-30 models for separate tabs, typicals, standard notes, etc.

The following examples list the MicroStation graphics version of the Tabulation (Tab) files.



NOTE: The MicroStation graphics version of the tabulations is presently being replaced by a Microsoft Excel version. The Excel “Tabulation File” version is capable of performing calculations on the input data. The “Tabulation File” can also produce final “C” plan sheets from within Excel without importing graphics and text into a MicroStation file.

See section [20J-61](#) for additional Calc File information.

Examples of the Graphics versions:

- There are several files containing Tabulations, named e0100.dgn through e0111.dgn (English), or m0100.dgn through m0111.dgn (metric).
- (Then 200 series Standard Notes are now in Excel format)
- There are several files containing Design Detail Sheets, named e0500.dgn through e0560.dgn (english), or m0500.dgn through m0560.dgn (metric)
- There are currently 9 files containing Typical Cross Sections, named e1000.dgn through e9000.dgn (english), or m1000.dgn through m9000.dgn (metric)
- There is a file called eTypicalCells.dgn containing component Typical Backbone cells

Each model contains a single unique drawing for possible use in a plan set. The model names match the name of the “tab”, “typical”, etc., contained within the model, such as *e0101-16*. The file extension contains the month and year the drawing was last revised. The above model name could resemble *e0101-16.1009*, indicating the last revision was in 10, 09 (October, 2009). The Design Detail drawings have each been drawn near the XY coordinates of 0,0 and can therefore easily be placed in sheet file as cells.

All Design Detail files, (English and Metric), are maintained by the Office of Design Methods Section. The files are no longer available in a printed book form and must be downloaded for use.

Standard Road Plans

Standard Road Plan drawings have been developed to show standardized design features, construction methods and approved materials to be used in design plans for interstate, primary and secondary road construction in the state of Iowa.

On the [Standard Road Plans](#) web site the downloadable file links have been divided into English and Metric versions. Either the entire book can be downloaded or just individual topical sections, such as Erosion Control, Drainage, Earthwork, etc.

NOTE: Standard Road Plans are in color and must be converted to grayscale when modified and included in the “U” sheets.

Shell Letters

The [Shell Letters](#) web site contains many example letters for use during the various Design events, for Plan Revisions, etc.

Geopak

Geopak Road Project Manager Set-up and User Preferences

Project Manager may be used to organize information associated with each specific design project, which includes Geopak User Preferences, Design File information, Coordinate Geometry information, DTM information, and more.

For additional information see section [21B-65](#).

Element and File Naming conventions

A specific naming convention has been established for all Geopak files, Coordinate Geometry points, Alignment Chains, Horizontal and Vertical curves, etc.

For additional information see section [20D-2](#).

Survey Tools

The Design Manual includes an extensive grouping of instruction files for **Geopak Survey Tools** and **Survey Feature Codes**, as follows:

[40A-1, Setting up a Survey Project](#)
[40A-2, Geopak Load XYZ](#)
[40A-3, Geopak Zones and Models](#)
[40A-4, Geopak Crossing Chains](#)
[40A-5, Geopak Build DTM](#)
[40A-6, Geopak Build DTM from Survey Data](#)
[40A-7, Geopak DTM Edit](#)
[40A-8, Geopak Loading Contours](#)
[40A-9, Geopak D&C Manager](#)
[40A-10, Geopak Station Offset Report](#)
[40A-11, Geopak Plotting Horizontal Chains](#)

[40B-1, Feature Codes and Descriptions only](#)
[40B-2, Feature Code Use Categories](#)
[40B-3, Feature Code and Full Descriptions](#)
[40B-4, Feature Code Modifications](#)
[40B-5, Zone and color Descriptions](#)

Printing

The Office of Design primarily uses two procedures to produce both paper sheet plots and PDF sheet plot files. See the following Design Manual sections for addition printing information:

[21C-33, PDF Scroll: Creating and Plotting](#)

[21E-1, MicroStation Batch Printing to PDF](#)

Chronology of Changes to Design Manual Section:

020A-003 Plan Development CADD Standards

6/30/2011 Revised
Corrected level list, added graphics, general rewrite.

12/10/2010 Revised
Updated

4/15/2010 NEW
Replaces 1G-1 through 1G-13 series