



Project Management with the ODOTcadd Standards

For MicroStation V8i (SELECTseries 3) and PowerGEOPAK V8i (SELECTseries 4)

Prepared on behalf of
The Ohio Department of Transportation,
Office of CADD and Mapping Services by

Eric Thomas

Eric Thomas Consulting LLC

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This training guide was prepared with the following software versions:

MicroStation V8i (SELECTseries 3) 08.11.09.714

PowerGEOPAK V8i (SELECTseries 4) 08.11.09.845

Windows 7 Enterprise, Service Pack 1

Prepared for the Ohio Department of Transportation, Office of CADD and Mapping Services by
Eric Thomas, Eric Thomas Consulting LLC



Eric Thomas
CONSULTING LLC
www.ericthomasconsulting.com



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1 Introduction

Course Prerequisites

This training course is intended to familiarize ODOT personnel involved in the production of highway construction plans using MicroStation and GEOPAK CADD Software with updates made to the ODOT CADD Standards for MicroStation V8i (SELECTseries 3) and PowerGEOPAK V8i (SELECTseries 4).

This training course is intended for ODOT personnel currently using MicroStation in a plan production capacity. This course does not cover MicroStation operation. It is assumed the user is familiar with the following CADD related functions:

- Proficient with basic Windows 7 operations
- Accessing MicroStation and opening Design Files
- Familiarity with ODOT's legacy V8iSTD CADD Standards
- MicroStation basics, including the following:
 - Creating Files
 - Seed Files
 - Cells
 - Editing Text
 - Plotting
 - Reference Attachments
 - Models
 - Annotation Scale
 - Etc...

CPD Credit

No CPD credits will be issued for this class.

Course Outline

The following topics are covered in the class:

- ODOTcadd Standards for MicroSTation (SELECTseries 3) and PowerGEOPAK (SELECTseries 4)
- Creating new Projects using ODOTcadd_CreateNewProjects.exe
- Standard Project Folder Structure
- Standard Design File Names
- ODOT_Sheets.mvba
- MicroStation Tags
- ODOT_Files.mvba
- ODOT_SheetManager.mvba
- ODOT_XSSheetManager.mvba
- ODOT_SheetCrossRefs.mvba



ODOT CADD Standards and Support

ODOT CADD Standards for MicroStation and GEOPAK are maintained and distributed by the ODOT Office of CADD and Mapping Services.

http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/CADD_Services/Pages/default.aspx

The ODOT CADD Engineering Standards manual is available in Adobe Acrobat PDF format on the ODOT Website:

http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/CADD_Services/Standards/Pages/Manuals.aspx

ODOT's Design Resource Reference Center is a centralized online reference center to help locate online or printed material. Additionally, several mailing lists are available to keep you informed about updates to ODOT standards. Visit the Design Resource Reference Center at the following URL:

<http://www.dot.state.oh.us/drrc/Pages/default.aspx>

Support for Bentley OpenRoads Survey is the responsibility of the Office of CADD and Mapping Services. Support questions can be sent to the CADD Support staff using the following form:

http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/CADD_Services/Support/Pages/ServiceRequest.aspx



Exercise 1 – Install the Training Files

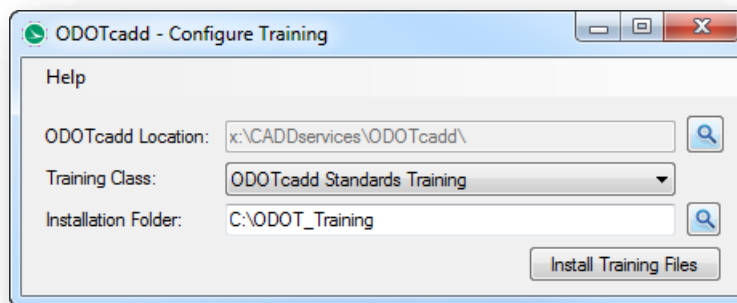
The training files for this course are typically installed to the following folder:

C:\ODOT_Training\CADDStdsTraining

If the files are not already installed, or if you would like to install a fresh set of the training files, the following ODOT program is used to install the training dataset:

I:\ODOTcadd\Standards\ODOT\Training\ODOTcadd_ConfigureTraining.exe

The dialog shown below is opened when the program is accessed:



- ✓ Choose the option for the **ODOTcadd Standards Training** class as shown above to install the training files for the course.
- ✓ Select the **Install Training Files** button.

This training course will use a customized workspace environment to access MicroStation and PowerGEOPAK for the lab exercises. The custom environment differs from the normal everyday work environment in the following ways:

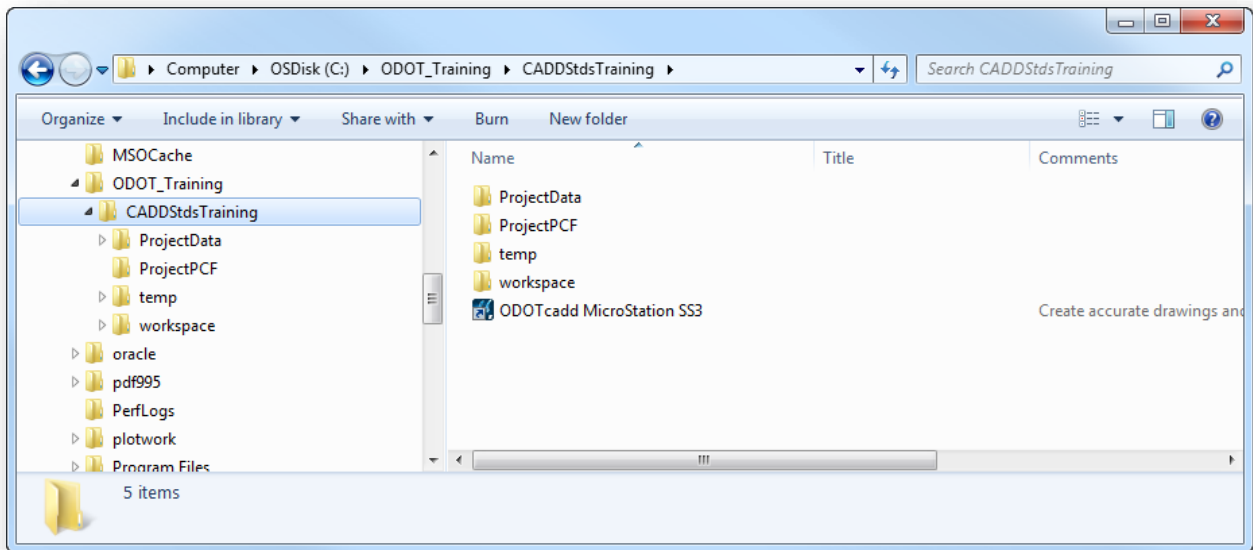
- 🕒 For the training class, users will open PowerGEOAPK using the desktop shortcut contained in the \ODOT_Training\CADDStdsTraining folder as shown on the following page.

Note: This shortcut is used only for the training class. In a typical work environment the user will open MicroStation or PowerGEOPAK by use of desktop shortcuts.

- 🕒 The configuration files for the training environment are contained in the ODOT_Training folder. This allows users to install the training files on their local computers without interfering with the normal working MicroStation configuration.
- 🕒 The training environment reads the ODOTcadd Standards from i:\ODOTcadd\Standards. The CADD Standards themselves are not contained in the ODOT_Training folders.



To open MicroStation for this training course, use the MicroStation shortcut contained in the `\ODOT_Training\CADDstdsTraining` folder as shown below.



Troubleshooting the Training Data Installation

The training configuration is driven by the shortcuts shown above. For a typical ODOT installation, the provided shortcut should work to access the training data with the correct configuration. The following assumptions are made:

- MicroStation/PowerGEOPAK are installed in the default location.
- The training files are installed to the `C:\ODOT_Training` folder

If this is not the case, it is necessary to edit the **Target** of the shortcut for the correct path to MicroStation as well as the path to the primary configuration file:

`\ODOT_Training\CADDstdsTraining\ODOTcaddstdsTraining.cfg`

Additionally, the path for the file `mslocal.cfg` will need to be edited in `ODOTcaddstdsTraining.cfg` file if MicroStation (SELECTseries 3) has been installed to a different location.

See your CADD manager if the training shortcuts do not open MicroStation properly.



2 “ODOTcadd” Standards Overview

January 2015 ODOTcadd Standards Release

The January 2015 update to ODOT’s CADD Standards represents a significant change for users of ODOT’s CADD Standards. This release was the last official update to the V8istd CADD Standards and also included the first official release of the “ODOTcadd” Standards.

The new ODOTcadd Standards are intended for use with new projects started with MicroStation and GEOPAK/PowerGEOPAK (SELECTseries 3) or higher, and are located in the following folder:

I:\ODOTcadd\Standards

The standards are maintained and distributed by the CADD Services group within the Office of CADD and Mapping services. Requests for enhancements and questions about these standards should be directed to the CADD Services group using the following form:

http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/CADD_Services/Support/Pages/ServiceRequest.aspx

ODOT CADD Engineering Standards Manual

The **ODOT CADD Engineering Standards Manual for ODOTcadd** is in the process of being updated to reflect changes made to ODOT’s CADD Standards with the ODOTcadd release. The draft version of the manual for the ODOTcadd Standards can be found on the ODOT Website in the following location:

http://www.dot.state.oh.us/Divisions/Engineering/CaddMapping/CADD_Services/Standards/Pages/Manuals.aspx

This training guide makes reference to several sections of the CADD Manual. In all cases, the CADD Manual supersedes the information presented in this training guide. It is the responsibility of the designer to familiarize themselves with the content of the manual.

ODOTcadd Compatibility with Current Projects

The ODOTcadd Standards were specifically developed for MicroStation and GEOPAK (SELECTseries 3) and beyond. These CADD Standards can be used with SELECTseries 2 software; however, there are some significant changes to the ODOTcadd Standards that are not compatible with projects currently under development using the legacy V8istd CADD Standards.

- All of the plan sheet borders contained in ODOT_Sheets.cel have been changed to use MicroStation Tag elements in place of Data Entry Regions. This was done to provide future compatibility with ProjectWise. The Data Entry Regions have been removed from the title block portion of all of the cells. The new cells are not compatible with the old sheet numbering and cross referencing applications. New MicroStation Visual Basic Applications have been developed to use the Tag elements for sheet numbering and cross referencing.



- 🕒 The project folder structure has been modified. New applications have been developed for project creation and design file creation.
- 🕒 Standard design file names have been modified to insert an underscore character between the PID number and the two character file type code.
- 🕒 The two character file type code has been changed for bridge design file names for consistency.

Due to these incompatibilities, it is recommended that users complete existing projects using the CADD Standards defined in V8istd.

ODOT Project Configuration and Directory Structure

The **ODOT CADD Engineering Standards Manual for ODOTcadd, Section 302** defines the required directory structure to be used on all ODOT projects. The folder structure has been updated for the ODOTcadd Standards with input from all 12 Districts. The folder structure is to be used for all new projects started with MicroStation and GEOPAK/PowerGEOPAK SS3 or SS4 using the ODOTcadd Standards.

See Chapter 4 for more information on the new folder structure and an ODOT program used to create new projects.

ODOT Design File Names

The **ODOT CADD Engineering Standards Manual for ODOTcadd, Section 304 File Naming Conventions**, defines the standard MicroStation design file names to be used on all ODOT projects.

The file names have changed slightly from previously published CADD Standards. An underscore character has been inserted between the PID number and the two character file type code.

ODOT provides a Visual Basic application to assist with the creation of MicroStation design files using the ODOT file naming convention. The program can be accessed from the MicroStation pull-down menu by selecting **ODOT > File Management > New Design File**.

See Chapter 5 for more information.



ODOT Seed Files and Geographic Coordinate Systems (GCS)

A seed file is an empty MicroStation design file that is used as a template for the creation of new design files. Seed files can be configured specifically to meet a particular need. When new design files are created, the seed file specified by the user is copied and renamed to create the new file. ODOT provides several seed files for use with MicroStation and GEOPAK. The seed files are located in the following folder:

I:\ODOTcadd\Standards\seed

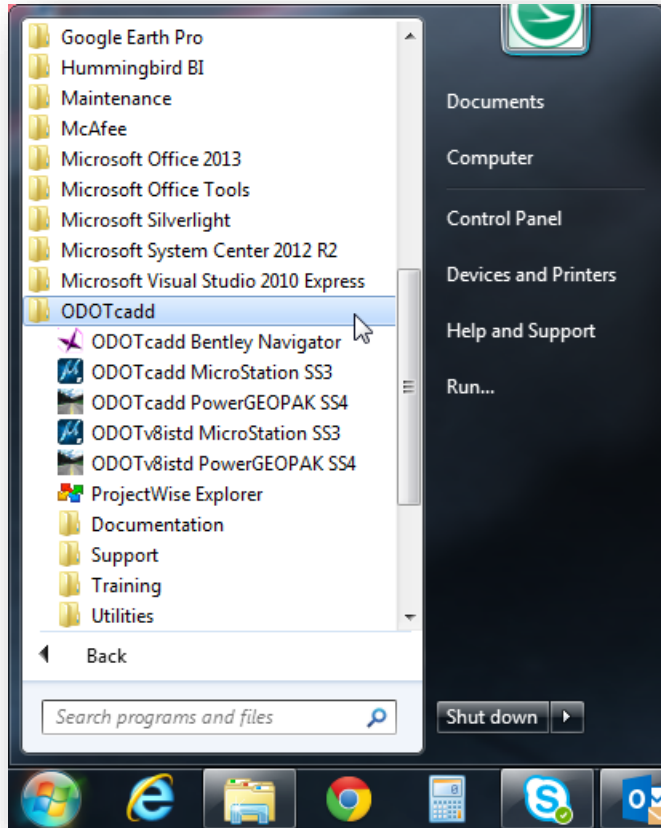
One of the parameters that can be defined in a seed file is the **Geographic Coordinate System** which allows users to specify the position of the design contents on the earth's surface. Once that position is established, the design can be easily coordinated with other data for which the geographic location is known. A library of predefined **Geographic Coordinate Systems**, or **GCS** for short, is available in MicroStation.

The use of Geographic Coordinate Systems and ODOT's Seed files is document in Chapter 5.



Windows Start Menu Commands

With the distribution of new computers to ODOT personnel in August of 2015, a new “ODOTcadd” program group has been added to the ODOT menu The Windows Start Menu. Select All Programs > ODOTcadd as shown below.



Program shortcuts to open MicroStation and PowerGEOPAK with the ODOT CADD Standards are provided along with links to commonly used documents and tools. The content of this menu will be referenced through this guide.



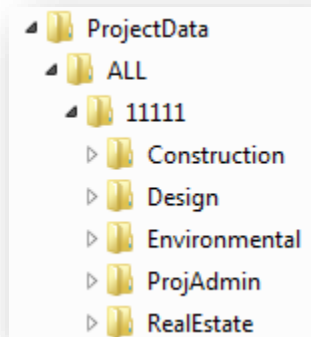
3 New Project Creation

ODOT Standard Project Directory Structure

The **ODOT CADD Engineering Standards Manual for ODOTcadd, Section 302** defines the required directory structure to be used on all ODOT projects. The folder structure has been updated for the ODOTcadd Standards with input from all 12 Districts.

- 🕒 The standards folder structure is to be used for all new projects started with MicroStation V8i (SELECTseries 3) and GEOPAK/PowerGEOPAK V8i (SELECTseries 3) or later using the ODOTcadd Standards.

An example of the folder structure is shown below.



The ProjectData Folder

New projects that are started with the ODOTcadd Standards will be stored in the ProjectData folder. This is being done to separate projects created with the legacy V8istd CADD Standards from the new projects using the ODOTcadd Standards.

The County Folder

Some Districts prefer to store the project PID folder (detailed below) by county. For these Districts, a County folder is permitted as shown in the example above. Use of the County folder is optional.

Use of a County folder is a site specific standard and should be consistent for all projects created at that specific site.



The PID Number Folder

The parent folder for all ODOT projects is the PID Number folder.

PID Number folders may be stored in a 3-Character County folder as specified above, or stored directly under the ProjectData folder.

The intent is that all data pertinent to a specific project for all phases of the project development is stored under the PID number folder.

The name of the PID Number folder can be appended with an optional 15-character description. The description is separated from the PID number by an underscore and is intended to be used for the primary County-Route-Section designation for the project. Example:

11111_ALL-111-12.34

Descriptions are limited to alphanumeric, dash, underscore, and decimal point characters.

Primary Sub-Folders

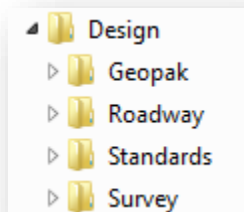
Beneath the PID Number folder, the following subfolders are defined to house all information that is generated throughout the lifecycle of a project:

- 📁 Construction
- 📁 Design
- 📁 Environmental
- 📁 ProjAdmin
- 📁 RealEstate

The Design Folder

The Design folder is used to house planning and design information for the development of a project. This folder is where the MicroStation and GEOPAK related data is stored and will be the primary focus of this training course.

The Design folder is split into several Discipline specific folders as needed for the project. An example of the folder structure for a typical ODOT project is shown below.



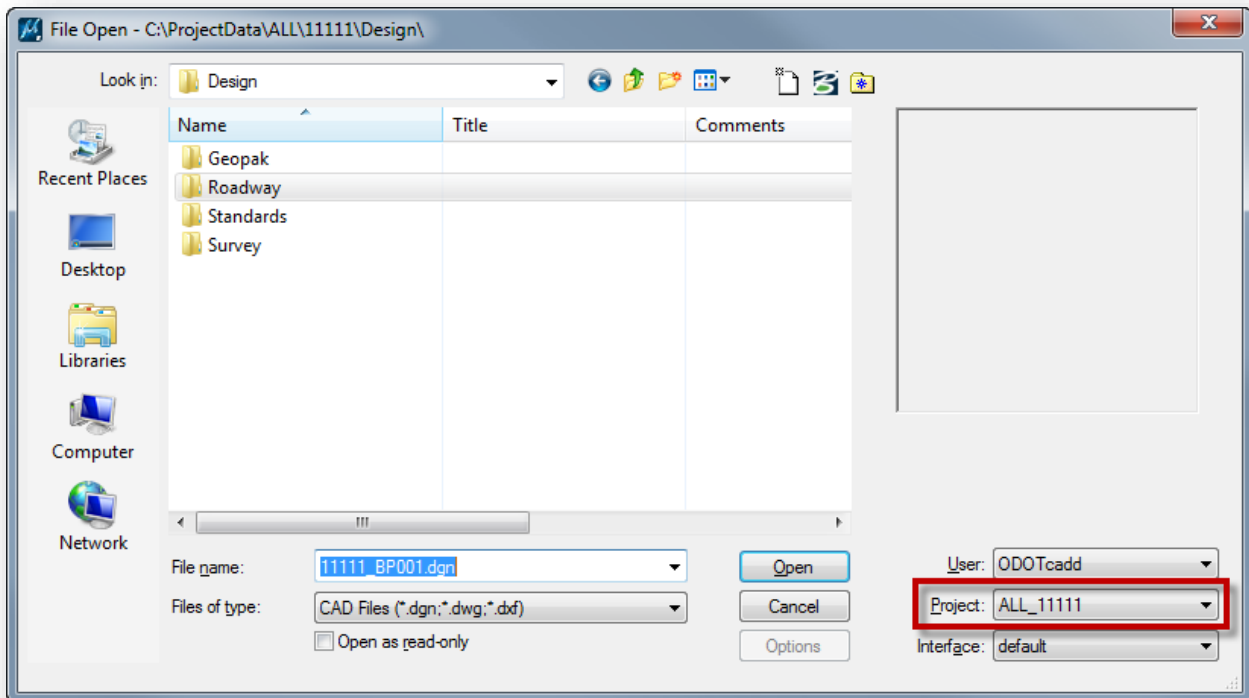
Optional sub-folders can be added as necessary for projects involving multiple design teams. See the [ODOT CADD Engineering Standards Manual for ODOTcadd, Section 302](#) for more information.



Project Configuration Files

With the ODOTcadd Standards, ODOT will transition to the use of MicroStation Project Configuration (.pcf) files.

PCF files are used to define project specific variables uniquely for each project. When MicroStation is opened using the appropriate desktop shortcut, the PCF file is selected from the *File Open* dialog as shown below.



When the **Project** file is selected, MicroStation will default to the \Design folder for the project as shown above.

It is important to select the PCF file every time a file from a new project is accessed in order to set the configuration properly for the project.

When MicroStation is opened, the Project will default to the last PCF file that was accessed. For this reason, it is necessary to open MicroStation to select the PCF file before selecting the design file that you wish to open. Double-clicking on the file name in Windows Explorer will not ensure that the correct PCF file is active when the file is opened.



ODOTcadd_CreateNewProject.exe

ODOT provides a Visual Basic program to create the project configuration file and directory structure for an ODOT project. The program provides the following functionality:

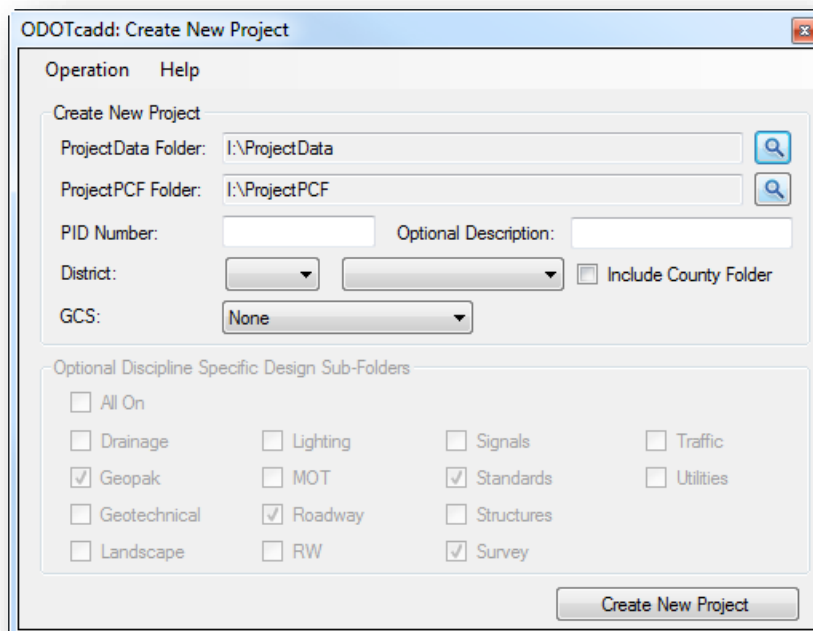
- Create the Folder Structure for a new project
- Create a MicroStation PCF file for a new project
- Add discipline specific Design sub-folders to an existing project

The program can be accessed within MicroStation by selecting **ODOT > Project Management > Create New Project** from the MicroStation pull-down menu, or from the following location:

I:\ODOTcadd\Standards\ODOT\ProjectTools\ODOTcadd_CreateNewProject.exe

The program can also be accessed from the Windows Start menu by selecting **All Programs > ODOTcadd > Utilities > ODOTcadd_CreateNewProject.exe**.

This is a stand-alone Visual Basic program that does not require MicroStation. When the program is accessed, the dialog shown below is opened.





Project Creation Frequently Asked Questions

Who should create new projects? The CADD Manager, the Project Manager, Planning, the Surveyor?

- Each ODOT District Office should establish a procedure for the creation of new projects to ensure consistency. This will typically be the CADD Manager.

What if we need to start a project before the PID number has been assigned?

- Create the project using a PID number of 00000 with a description to uniquely identify the primary County-Route-Section for the project. Example: 00000_ALL-111-12.34

How do we change the PID number for a project?

- ODOT provides a program, **ODOTcadd_ChangePID.exe** that can be used to change the PID number for a project. See **Chapter 9** of this training guide for more information.



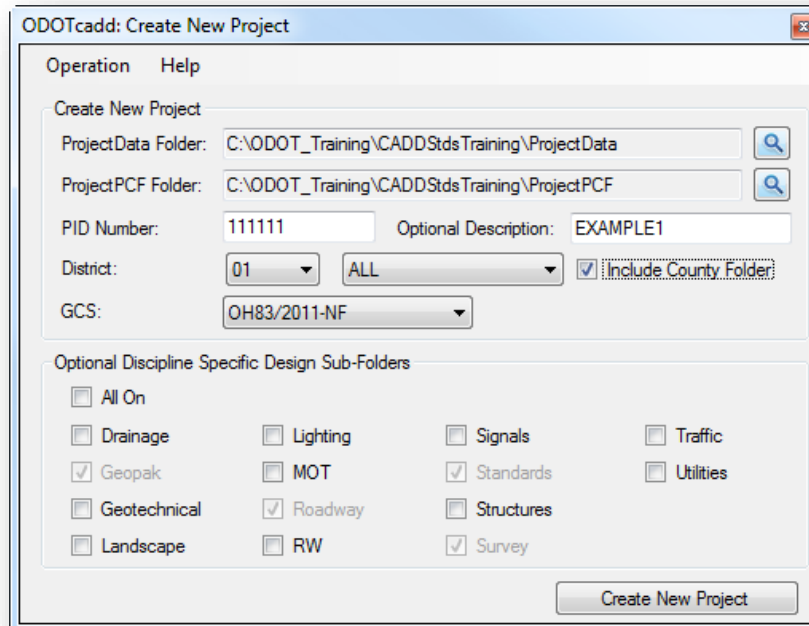
Exercise 3 – ODOTcadd_CreateNewProject.exe

In this exercise we will use the **ODOTcadd_CreateNewProject.exe** program to create two test projects. We'll also add discipline specific design folders to a project after it has been created.

- ✓ Run the **ODOTcadd_CreateNewProject.exe** application from the following folder:

I:\ODOTcadd\Standards\ODOT\ProjectTools\ODOTcadd_CreateNewProject.exe

- ✓ Create a new project using the settings shown below:



This project represents a smaller project where all of the design information will be stored in the Roadway folder. Survey data will be stored in the Survey folder. Multiple Discipline specific folders are not used but can be added later if necessary using the **Add Folders to Existing Projects** option by choosing **Operation > Add Folders to Existing Project**.

- ✓ Take a few minutes to review the project folder. Take a look at the following folders to review the files that were created with the project:

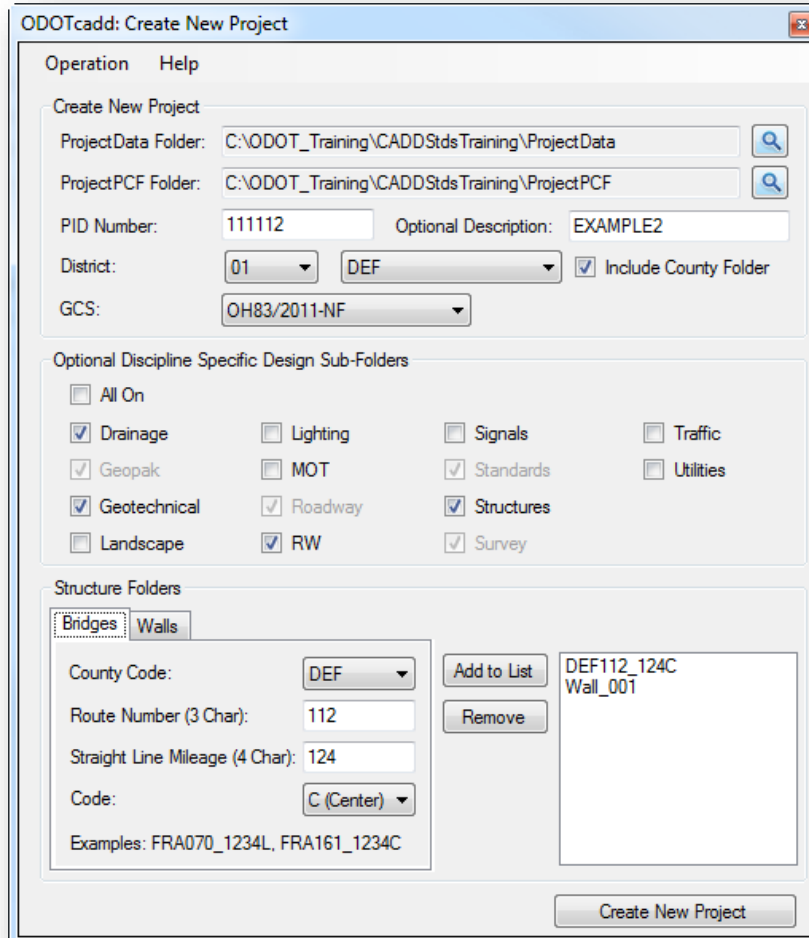
```
C:\ODOT_Training\CADDStdsTraining\ProjectData\ALL\111111_EXAMPLE1\Design\GEOPAK\
C:\ODOT_Training\CADDStdsTraining\ProjectData\ALL\111111_EXAMPLE1\Design\Standards\Seed\
C:\ODOT_Training\CADDStdsTraining\ProjectData\ALL\111111_EXAMPLE1\Design\Survey\RawData\
C:\ODOT_Training\CADDStdsTraining\ProjectData\ALL\111111_EXAMPLE1\Design\Survey\GCS\
```

- ✓ Open the PCF file for the project with Notepad to review the contents

```
C:\ODOT_Training\CADDStdsTraining\ProjectPCF\ALL_111111_EXAMPLE1.PCF
```




- ✓ Create a second project using the settings shown below:



This example represents a larger project with multiple design teams. The data for each design team is stored in a separate \Design\Discipline specific folder.

A \design\Structures folder is added to contain the structure information for a bridge and a wall.

- ✓ Take a few minutes to review the project folder for this example. Take a look at the following folders and their sub-folders:

C:\ODOT_Training\CADDStdsTraining\ProjectData\DEF\111112_EXAMPLE2\Design

C:\ODOT_Training\CADDStdsTraining\ProjectData\DEF\111112_EXAMPLE2\Design\Structures

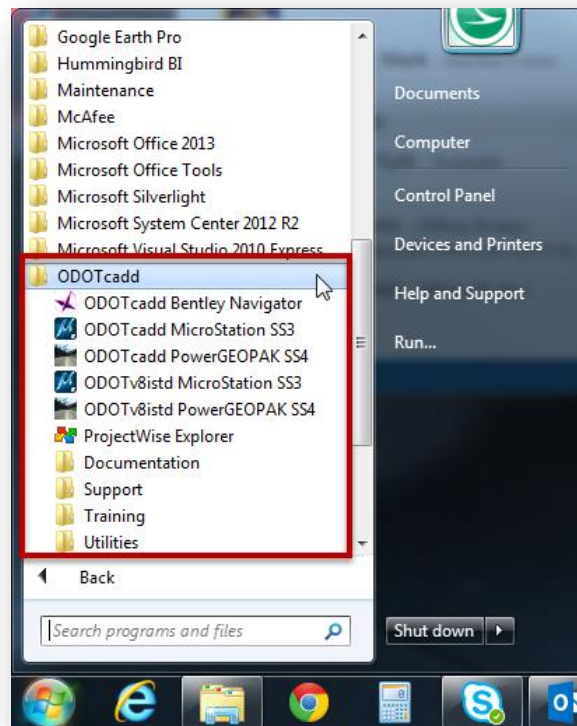




4 Accessing MicroStation

Start Menu Shortcuts

With the ODOTcadd Standards, ODOT users will open MicroStation or PowerGEOPAK by use of Start Menu shortcuts as shown below.



Notice that these shortcuts are configured to open either MicroStation or PowerGEOPAK with either the legacy V8istd CADD Standards or the new ODOTcadd Standards.

- Be sure to use the appropriate shortcut to open either MicroStation or PowerGEOPAK with the proper CADD standards configuration to access the legacy V8istd CADD Standards or the new ODOTcadd Standards.
- Existing projects started with the V8istd CADD Standards should be completed using these standards.
- New projects should be started with the ODOTcadd Standards.

For the purpose of this training class, be sure to use the shortcut in the CADDStdTraining folder:

C:\ODOT_Training\CADDStdTraining\ODOTcadd MicroStation SS3



Which should I use? MicroStation or PowerGEOPAK?

PowerGEOPAK is new to ODOT users. There is no functional difference between an installation of MicroStation with the GEOPAK suite, or PowerGEOPAK. The difference is that PowerGEOPAK is installed as a single program and has a lower license fee than a MicroStation/GEOPAK Suite installation.

ODOT is billed based on daily software usage. Please make every effort to use only one product, MicroStation or PowerGEOPAK in a given day. If you anticipate that you will need GEOPAK functions at some point through the day, use the PowerGEOPAK Shortcut for the entire day. If you do not anticipate using GEOPAK functions, use the MicroStation shortcut. Using a MicroStation license costs the State, and therefore you, a taxpayer, less than using a PowerGEOPAK license.

Be sure to access MicroStation or PowerGEOPAK using the appropriate desktop shortcut for the CADD standards that you wish to access.

Double-Clicking a File in Windows Explorer

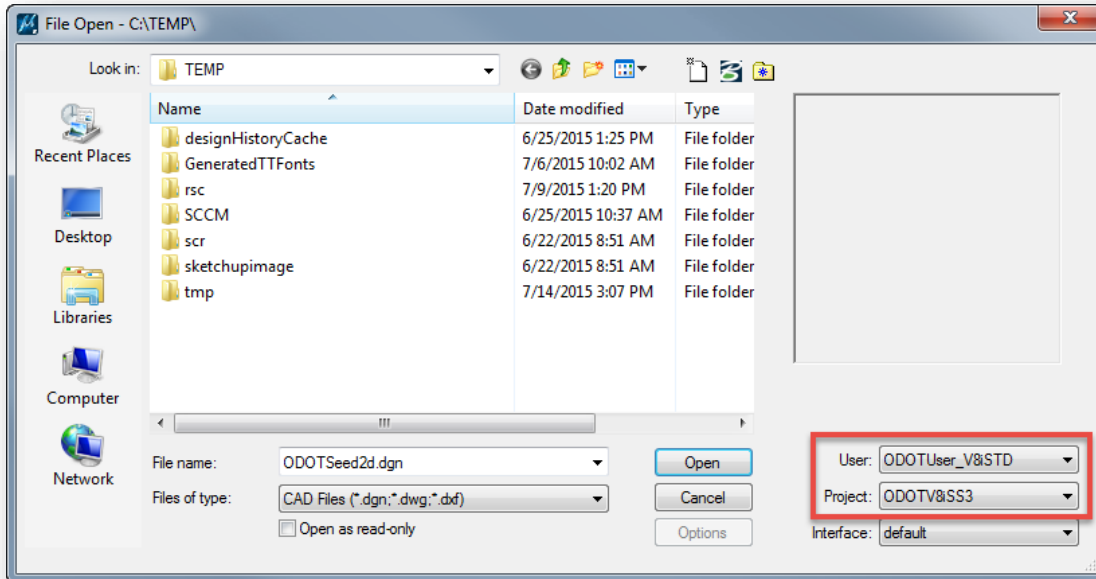
With the ODOTcadd installation of MicroStation and PowerGEOPAK it is no longer possible to open MicroStation by double-clicking on the design file name in Windows Explorer. When a file is opened by double-clicking the file name, it is opened with **Bentley Navigator** in a read-only mode.

Bentley Navigator is a free utility that can be used for read-only viewing and plotting design files. ODOT is not charged a license fee for the use of Bentley Navigator.



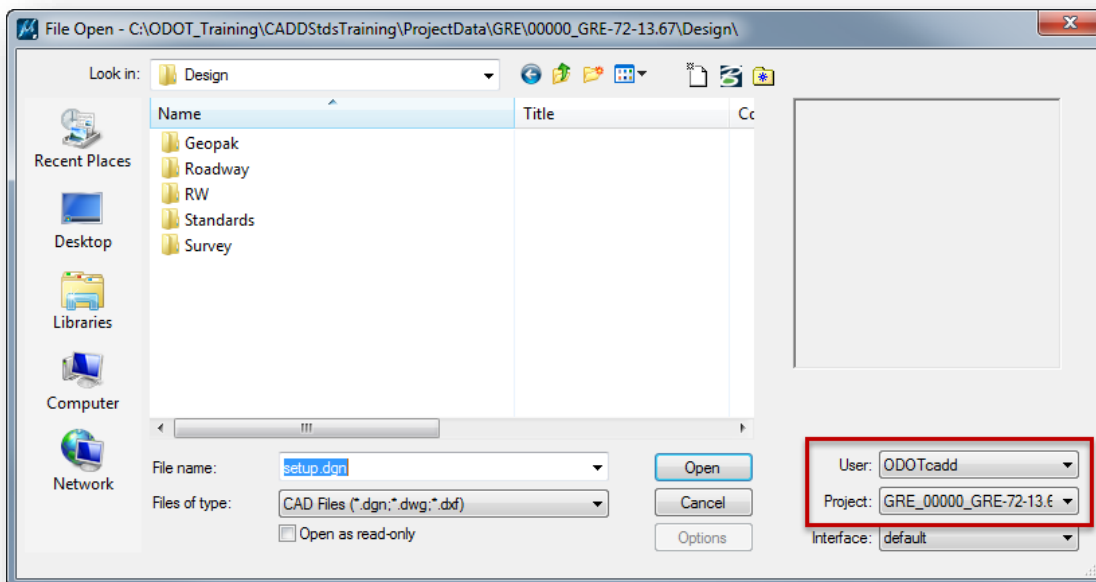
Accessing MicroStation or PowerGEOPAK with V8istd

Older projects that were started using the legacy V8istd CADD standards should be completed using the older standards. When MicroStation is accessed using one of the ODOTV8istd shortcuts, the **User** and **Project** should be set as shown below.



Accessing MicroStation or PowerGEOPAK with ODOTcadd

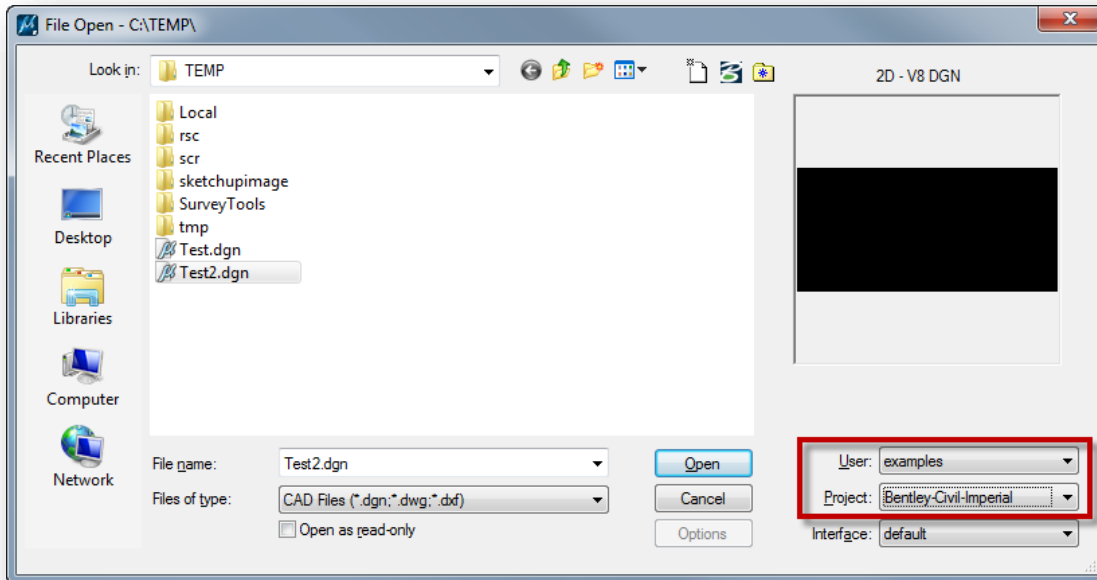
Projects started using the ODOTcadd standards are accessed by selecting one of the ODOTcadd desktop shortcuts. The **User** is set to **ODOTcadd** and the **Project** is selected from the drop-down list.





Accessing MicroStation or PowerGEOPAK with the Bentley Interface

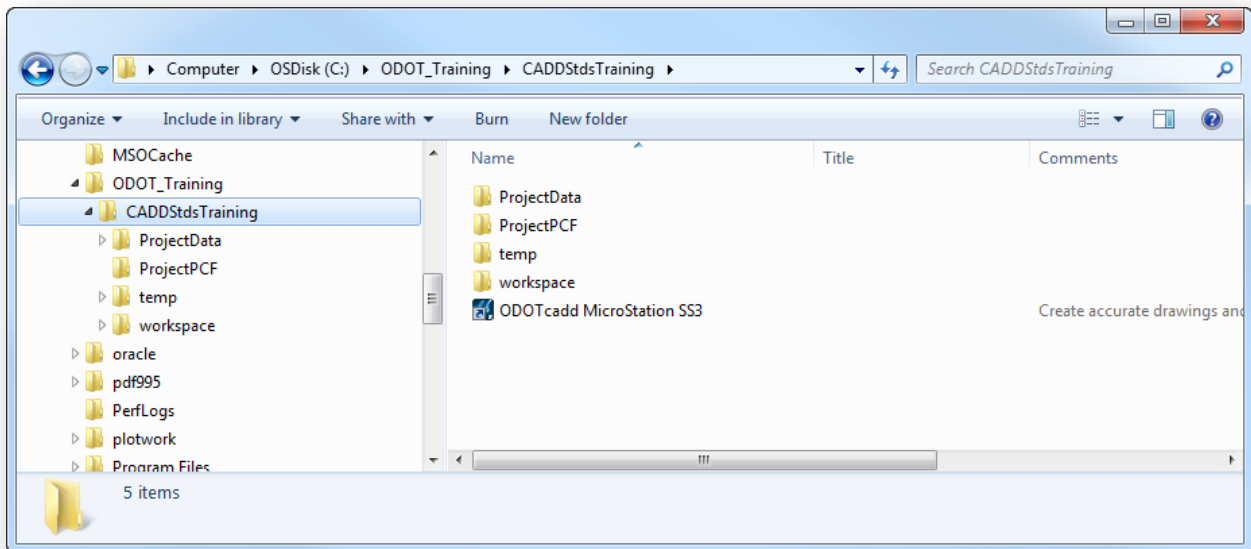
For users taking a training course through Bentley Learn, it is now possible to access MicroStation using the default interface by opening MicroStation or PowerGEOPAK from the Windows Start Menu. From the Start Menu, choose **All Programs > Bentley** and then choose either MicroStation or PowerGEOPAK. In the example below, the **User** and **Project** are set appropriately for a GEOPAK class through Bentley Learn.





Exercise 4 – Opening MicroStation with a Start Menu Shortcut

For the purposes of the training class, MicroStation will be opened using the shortcut contained in the `\ODOT_Training\CADDStdsTraining` folder as shown below.



- ✓ Open MicroStation using the **ODOTcadd MicroStation SS3** shortcut. The **User** should default to **ODOTcadd**.
- ✓ Select the project **ALL_111111_EXAMPLE1** from the **Project** menu. The *File Open* dialog defaults to the `\Design` folder for the selected project.
- ✓ Open the following design file:

`\Design\Standards\Seed\111111_Seed2d,dgn`

You will notice that the MicroStation configuration looks a little different when using the ODOTcadd Standards. We'll discuss this on the following page.

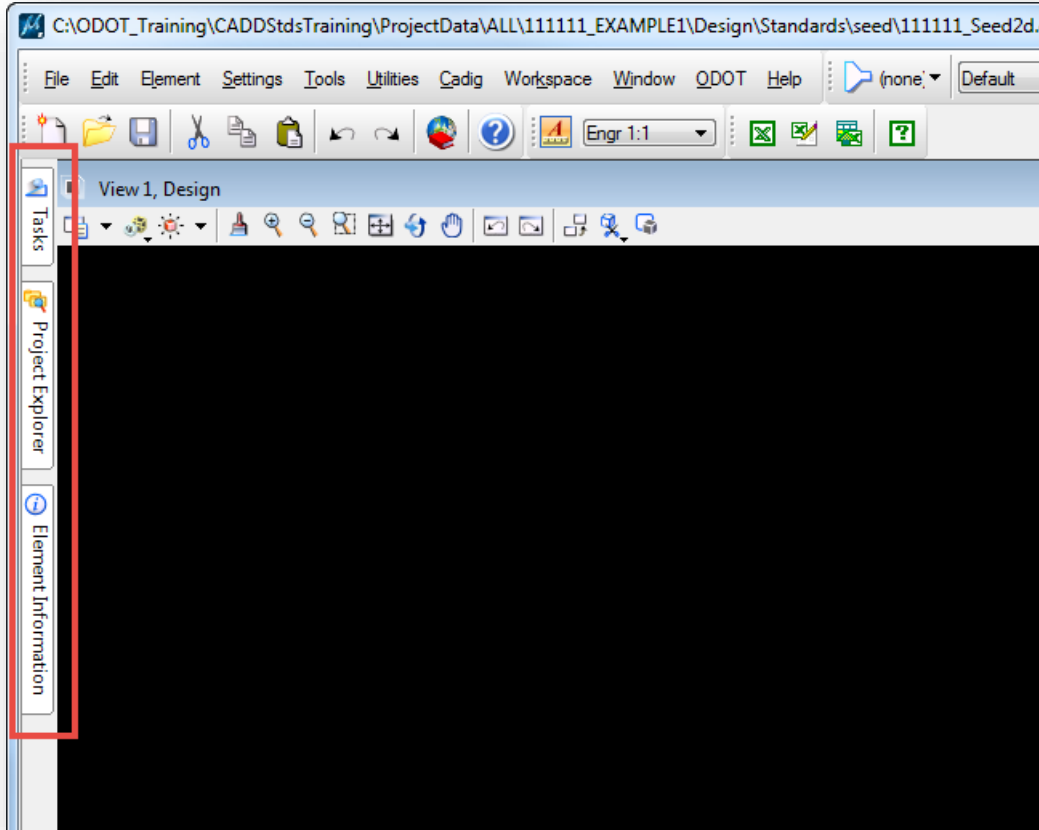
Note:

The **ODOTcadd_CreateNewProject.exe** application that was used to create this project creates three design files for a new project: two seed files and the survey basemap. All other files will be created using the **ODOT_CreateFiles.mvba** application covered in the next chapter.

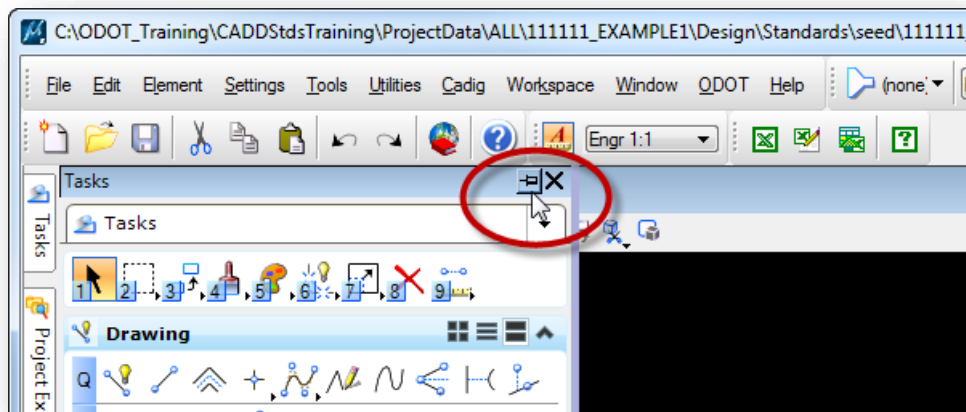


MicroStation Configuration for ODOTcadd

MicroStation tools are typically accessed from the **Task Navigation** menu with the ODOTcadd Standards configuration. By default, the **Task Navigation** menu is docked to the left of the screen, along with the **Project Explorer** and the **Element Information** dialog, as shown below.



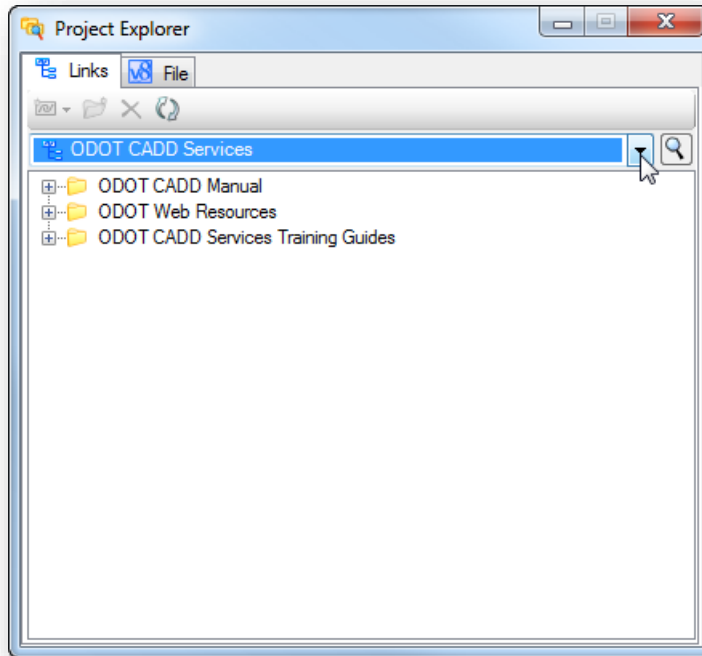
Each menu expands when the cursor is passed over one of these tabs. These icons can be docked/undocked by selecting push-pin icon.



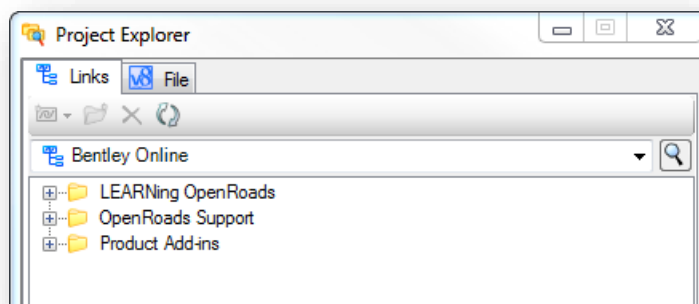


The **Project Explorer** menu is also docked and unpinned on the left side of the interface. **Project Explorer** is used extensively with the GEOPAK/OpenRoads tools. For now, we'll discuss only one aspect of the **Project Explorer** dialog.

When the dialog is expanded, it appears as shown below.

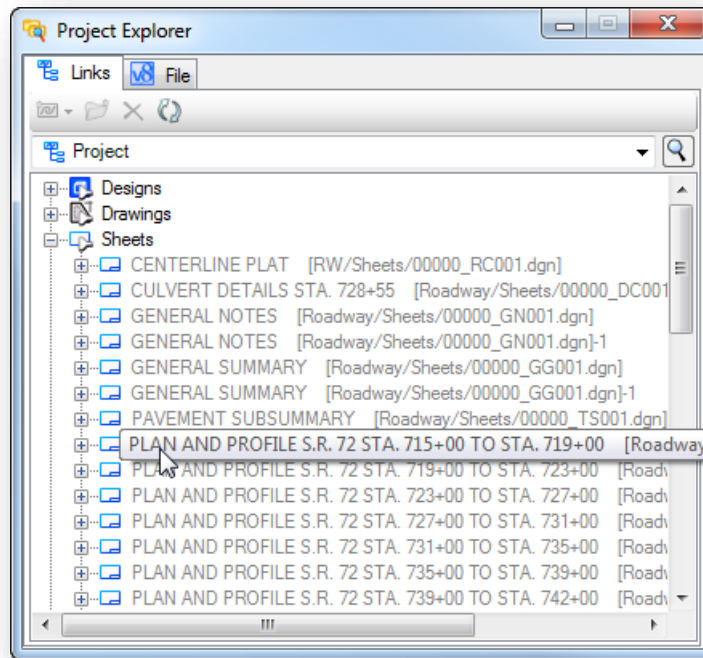


The Links tab contains a drop-down menu to select various options. All of the options will not be explained in detail at this time. The **ODOT CADD Services** options provides links to various ODOT resources as shown above. The **Bentley Online** link provides access to various Bentley materials as shown below:





Project Explorer is also used to display the content of the current project. In the example below, the **Project** option is selected with the **Sheets** item expanded.



Each design file in the project is examined to display the name of any Sheet Models found. Files can be opened by double-clicking on the sheet icon next to the file name.

NOTE!

The Task Navigation menu, Project Explorer, and Element Information dialogs are used extensively with GEOPAK and OpenRoads tools. It is recommended that users take the time to familiarize themselves with these menus as they will become increasingly important in the coming months. Take the time to get accustomed to this interface instead of customizing the interface so that it looks like it did in (SELECTseries) 2.



Function Key Menus

The ODOTcadd configuration will look for a user defined function key menu in the following location:

`$(ODOT_USER)fkeys/USER_fkeys.mnu`

Note: ODOT_USER is defined when the initial configuration is set up for the computer. By default, this variable is set to W:\ODOTcadd_User.

The function key menu must be named as shown above. If the file is found, the function key menu is loaded when MicroStation or PowerGEOPAK is opened.

If a user defined function key menu is not found, the following function key menu is opened:

`...\ODOTcadd\Standards\gui\ODOT_fkeys.mnu`

This menu is a copy of the MicroStation default menu with a few changes specifically configured for OpenRoads users. The following function key assignments have been added:

Function Key	Command	Description
Alt+F1	vba run OneView	Close all view windows except for view 1
Alt+F2	vba run TwoView3D	Turn on View 1 and View 2. View 2 displays the 3D Model
Alt+F3	vba run ToggleViewConstructions	Toggle on/off Construction Elements
Alt+F4	vba run FourView	Turn on view windows 1-4
Alt+F5	vba run SetActiveModelToDrawLast	Set the active model last in the Reference Update list
Alt+F6	vba run analyzeTerrainModelPoint	Analyze selected linear features, similar to DTM tools
Alt+F7	vba run ExaggerateZForAttachment	View exaggerated terrain surfaces
Alt+F8	Vba run DeleteUnusedFonts	Deletes any unused fonts in the file and compresses.
Alt+F9	Vba run Toggle	Toggles on/off the view window background color to white
Alt+F10	Choose none	Clear the current command and any selected elements
Alt+F11	Corridor TemplateLibraryOpen	Open the Create Templates dialog

The VBA commands defined in the function key menu are contained in the following file, which was taken from the Bentley Civil Imperial workspace:

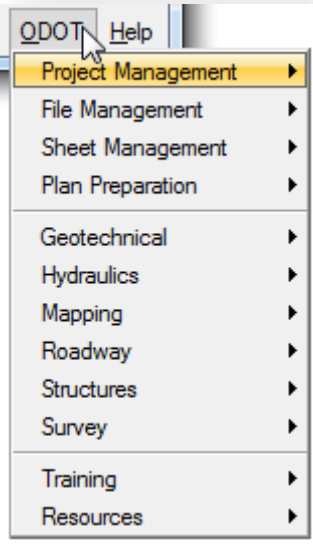
`...\ODOTcadd\Standards\vba\Viewset.mvba`

This vba application is loaded by default when using the ODOTcadd configuration.



The ODOT Pull-Down Menu

The content of the ODOT pull-down menu has been restructured to organize the applications in more logical groupings. Take a few minutes to familiarize yourself with the reorganized menu.



The menu is context sensitive. Commands that require a Sheet model, such as placing sheet cells, are not available if the current model is a Design or Drawing model.

Tools that use GEOPAK functions are only available if GEOPAK or PowerGEOPAK is active.

For more information on the available applications, see the help documents for each application.



5 MicroStation Design Files

This chapter discusses several enhancements to the way ODOT uses MicroStation design files with the ODOTcadd Standards. The following items are covered:

- 🕒 Changes to ODOT's Design File names
- 🕒 The use of Basemap and sheet Design files
- 🕒 Using Models
- 🕒 Annotation Scale
- 🕒 Geographic Coordinate Systems
- 🕒 ODOT_Files.mvba

Standard Design File Names

The **ODOT CADD Engineering Standards Manual for ODOTcadd, Section 304 File Naming Conventions**, defines the standard MicroStation design file names to be used on all ODOT projects.

The file names have changed slightly from previously published CADD Standards. An underscore character has been inserted between the PID number and the two character file type code.

Example file name: 111111_BE001.dgn

- 🕒 The standard design file names are to be used on all ODOT projects.

Basemap and Sheet Design Files

For ODOT purposes, a MicroStation design file is typically used as either a **Basemap** design file, or a **Sheet** design file.

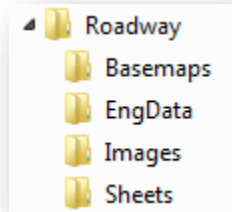
- 🕒 **Basemap** design files are used to draw plan, profile, and cross section information for your project in real world dimensions.
- 🕒 The basemap drawings are then referenced into **Sheet** design files to assemble the plan sheets for the project.

In either case, the only real difference between a Basemap and a Sheet design file is the **Model** that is used to contain the information.



\Design\Discipline Basemaps and Sheets Sub-Folders

ODOT's Standard folder structure defines separate sub-folders for Basemap and Sheet design files. For example, the \Design\Roadway folder contains the sub-folders shown below.



- The Basemaps folder is used for Basemap design files
- The Sheets folder is used for Sheet design files.
- Each \Design\Discipline folder will contain the sub-folders shown above. For example, if a \Design\Drainage folder is used on the project, the \Drainage folder will contain the sub-folders shown above.

Basemap and Sheet design files are separated into separate folders for easier access when attaching reference files. For example, if the Right-of-Way designer wishes to reference the drainage basemap in his sheets he only needs to search the \Drainage\Basemaps folder for the drainage basemap rather than sort through all the sheet files since they are contained in the \Drainage\Sheets folder.

Several basemap design files may be used depending on the project complexity. The ODOT CADD Standards allow for multiple basemap design files for each unique discipline (drainage, lighting, mot, roadway, signals, etc...).

For smaller projects, it is permissible to combine the design information into fewer basemap files; however it is not desirable to place all the information in one design file. As a minimum, the following four basemap design files are required:

- Existing Ground Survey
- Geometry (when using OpenRoads Geometry tools)
- Proposed Design
- Right-of-Way

The use of additional basemaps for larger projects is optional.



Models

A MicroStation design file is composed of one or more drawing areas called a **Model**. When users draw or place elements with MicroStation tools, the elements are added to the active Model.

- Design files can contain multiple models. Think of each model as a separate design within a design file.
- A Model can be either 2D or 3D. The same design file can contain both 2D and 3D models.
- 3D models can be referenced to 2D models, and vice-versa.
- Each Model is a completely independent drawing area and has its own set of eight views, reference attachments, etc.; however, all models within the same DGN use the same Color Table and Background Colors.

MicroStation provides three types of models:

- **Design** – This model type is used for creating design geometry that can be either 2D or 3D.
- **Drawing** – This model type serves as a “container” for centralizing annotations that need to be shared across multiple sheets. A drawing model is always a 2D model. ODOT does not currently use the Drawing model.
- **Sheet** – The Sheet model is used to assemble the plan sheets for the project.

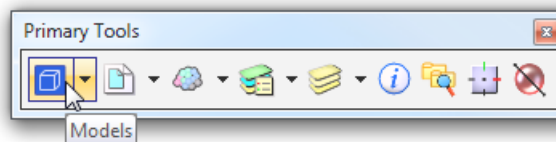
In summary, the models are used as follows:

- **Basemap** design files are used to draw the plan view graphics for the entire project in real world dimensions. The **Design Model** is used for this information.
- **Sheet** design files are used to assemble the plan sheets for a project. The plan sheet information is drawn in a **Sheet Model**.

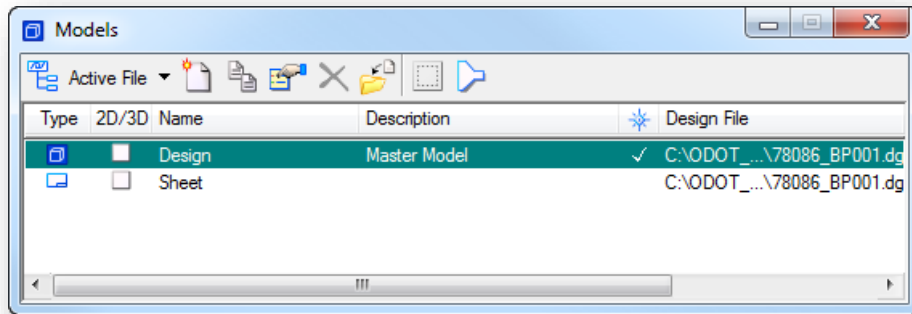
The Models Dialog

The *Models* dialog is used to manage and switch between models in the current MicroStation design file.

- Select the **Models** icon in the *Primary Tools* box as shown below:



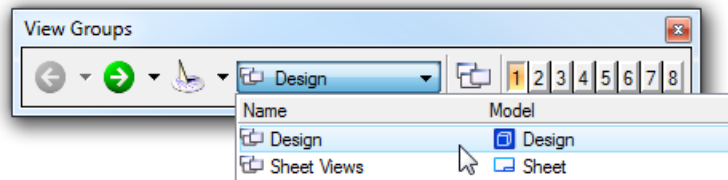
- Select **File > Models** from the MicroStation pull down bar.



When a new MicroStation design file is created using one of the ODOT seed files, there are two models available in the file for your use as shown above.

When you open the **Models** dialog box for the first time the default model is listed as the active model. The default model has the name “**Design**” with the description “**Master Model**” as shown above.

To work with another model in the design file, you must activate it. Double-clicking a **Model** within the dialog box makes the model active. Alternatively, you can use the **View Groups** window to rapidly switch between models visited in the current design session as shown below.



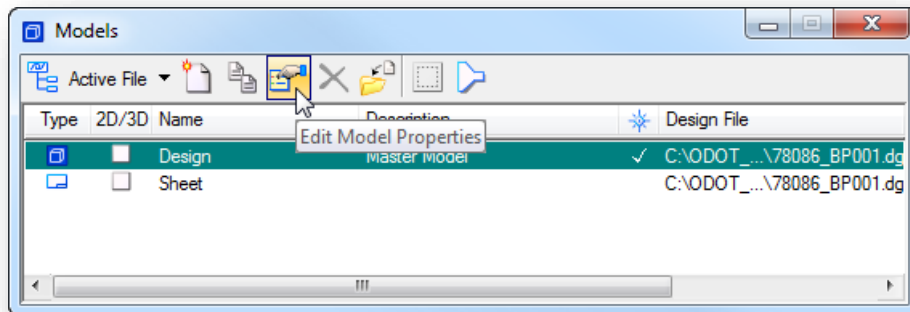
The name of the active model is also displayed in the **View** window title bar as shown below.



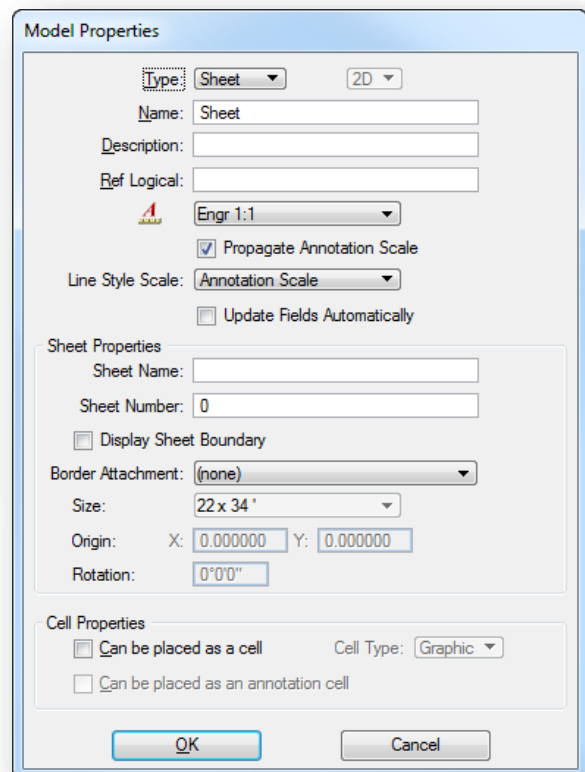
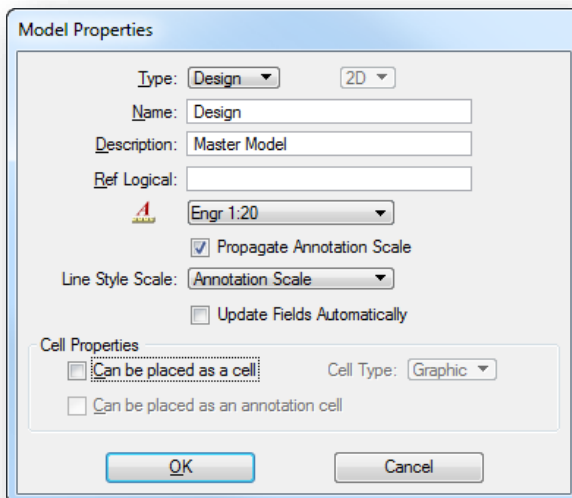


Model Properties

You can select or edit **Properties** of a model in the open DGN file. From the *Models* dialog, select **Edit Model Properties** as shown below.



The model properties are different depending on what type of model it is, **Design** or **Sheet**.



The following parameters are common to both **Design** and **Sheet** models:

Type - sets the model's type (**Design**, **Drawing**, or **Sheet**) and dimensionality (2D or 3D).

Name – is a text field to enter a name for the model.

Description – is a text field to enter a description of the model.



Ref Logical - sets the Reference Logical name for the model. The logical name identifies the model when it is attached to another model as a reference.

Annotation Scale - sets the scale for text, dimensions and cells in the model. You can select from the list of common scales used for ODOT plan sheets.

Line Style Scale - Lets you set the scale for custom line styles. This can be set to match the Annotation Scale value by selecting the **Annotation Scale** option, or can be set to a different value using the **Global Annotation Scale** option with a keyed-in value. For most ODOT work, the **Annotation Scale** option is used.

Update Fields Automatically - If set on, fields are automatically updated when a file is opened.

Cell Properties - Any model from any design file can be placed as a cell using these options.

Can be placed as a cell – if toggled on, it is possible to place the model as a cell.

Cell Type - sets the cell type (Graphic or Point). This option menu is enabled only if “Can be placed as a cell” is toggled on.

Can be placed as an annotation cell – if toggled on, (Can be placed as a cell enabled only) If on, it is possible to place the model as an annotation cell. When placed as an annotation cell, the current annotation scale is applied to the cell.

The following parameters are relevant to Sheet models only:

Sheet Properties

Sheet Name – Lets you assign a name to the sheet model. The name assigned here can be assigned to the bookmarks in a multi-page PDF file. See **Chapter 11** for more information.

Sheet Number – Lets you assign a sheet number to sheet models. This makes it easy to control the order of sheet models for presentation, printing, cataloging in a project, or generating PDFs.

Display Sheet Boundary – If toggled on, a sheet element will display in the new sheet model. This option must be toggled on in order to use the Sheet Name and Sheet Number for multi-page PDF plotting.

Border Attachment - When you associate a border attachment to a sheet model, any changes to the annotation scale for the sheet, automatically are propagated to the border attachment. The **Border Attachment** option is normally set to **None** for ODOT projects.

Size - sets the sheet size.

Origin - sets the origin of the sheet.

Rotation - sets the rotation angle of the sheet, measured in degrees counter-clockwise from the x-axis (horizontal).



ODOT's use of Models

When creating a new DGN file using ODOT's Seed files the default Design Model and a Sheet Model are already created for use.

Select the **Design** or **Sheet** model to work in depending on your workflow described below.

Design Model

The default design model named "Design" is to be used for creating all design geometry. The Description was left as "Master Model" but if necessary the description can be changed by the user.

- The Master Model cannot be deleted.
- All basemap information is drawn in the default "Design" Model using real world dimensions at a 1:1 scale.
- All Line Styles and Cells shall be placed in the basemap design model at a scale of one (1) and then scaled using the Annotation Scale setting.

Sheet Model

The sheet model named "Sheet" is to be used to assemble plan sheets for plotting the design geometry. A Description can be added if needed.

Based on the type of sheet to be built (title sheet, schematic sheet, etc.), a sheet border cell is placed in the "Sheet" model from the ODOT_Sheets.cel cell library. Final design graphics contained in the "Design" model must then be attached (referenced) to the "Sheet" model and annotations are added as needed. The "Sheet" model then contains a graphic representation of the final plan sheet, and is ready to be plotted.

The benefit of attaching the "Design" model as references to the "Sheet" model is that any changes made to the "Design" model is then reflected immediately in each "Sheet" model.

- For Roadway projects and for the Bridge site plan, when attaching basemap Design Models to the Sheet Model the user shall not scale, move, or rotate the basemap reference attachment. Basemap Design Models shall be attached using the MicroStation Coincident-World setting. If a rotated plot view is required, the user shall rotate the Sheet Model view only for proper plot orientation. The sheet border cells shall be placed in the rotated view. All reference file clipping shall be done in the rotated view. See Section 303 References in the CADD Engineering Manual.
- ODOT's CADD Engineering Standards Manual Section 303.4 Sheet Design Files states the following:
 - Each sheet of the plan shall be contained in its own separate design file when submitted to the Department.

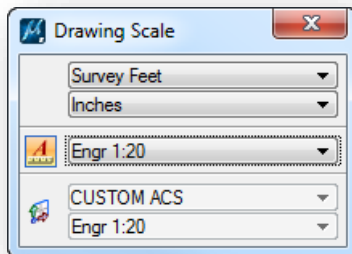


- When sheet design files are submitted to the Department, no other graphics are permitted in the Sheet model other than the graphics representing the final plotted sheet. All extra graphics used to generate the sheet, or old versions of the sheet, should be deleted or moved to a design model. No extra reference attachments that are not a part of the final sheet are permitted to be attached to the Sheet model.
- It is highly recommended to place all drawing and sheet annotations only in the Sheet model. Using this approach will enable you to reuse designs in other DGN files while avoiding conflicts in annotation. Some exceptions would be annotation that is placed in the Design model by PowerGEOPAK when designing the geometry like stationing and curve data.

Model Annotation Scale

The Model **Annotation Scale** sets the proper scale for all Annotations placed in a Design or Sheet model. Any Text, Dimensions and Cells that are placed in the model are referred to as Annotations in MicroStation.

The Annotation Scale value can be set in the Model Properties dialog, or by use of the Drawing Scale dialog. To access the Drawing Scale dialog shown below, select Settings > Drawing Scale.

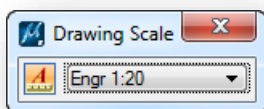


By default, the dialog has several items displayed that are not normally changed during the design process. These options can be turned off by right-clicking on the face of the dialog and toggling off the options that you do not wish to display.

The following items are typically toggled off:

- Working Units
- Sub-Units
- ACS
- ACS Scale

With these options toggled off, the dialog appears as shown below and can be easily docked for quick access:

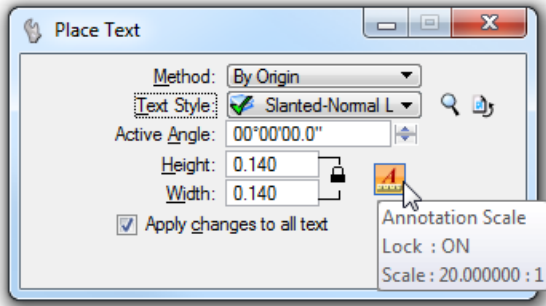




The Annotation Scale parameter is really just a multiplier that is applied to the base size of an element when the element is placed. This allows elements to be displayed correctly at a variety of plotting scales.

The Model Annotation Scale should be set prior to placing any annotations (Text, Dimensions, Cells, or custom line styles) in the current model.

For example, with the **Drawing Scale** set to a value of **Engr 1:20**, text is placed with the following parameters:



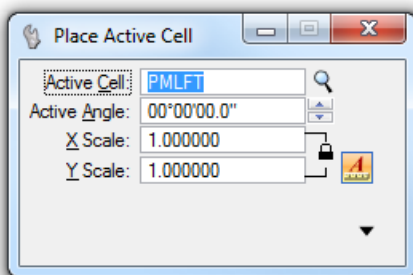
The text **Height** and **Width** is set to the default size for a 1:1 representation (0.14) as shown at left.

Annotation Scale Lock located in the tool settings window that must be ON to use the model annotation scale as shown at left.

When the text is placed in the file, it is placed at the height and width defined for the element (0.14). The initial size is then multiplied by the current Annotation Scale value to determine the displayed size of the text element ($0.14 \times 20 = 2.8$ Master Units). Changing the current Annotation Scale value will change the display size of the text element appropriately.

- All ODOT's Text and Dimension Styles and Cells were created at a 1:1 scale so they are displayed properly to the appropriate sheet scale.
- If the Model Annotation Scale Lock is off, any annotation placed in the model will not be scaled automatically.

Some of the ODOT cells have been defined using the actual dimensions of the item that they represent and cannot be scaled with the annotation scale setting. For example, pavement markings are placed at their real world size and are not scaled using the Annotation Scale parameter. The cell definition itself defines whether an individual cell is placed using the annotation scale parameter.



In the example at left, the cell PMLFT is placed at its actual size and is not scaled by the annotation scale parameter even though the annotation scale lock is toggled on.

Cells that are defined using their real world dimensions are referred to as **Physical** cells

Cells that represent the location of an item, but not the actual size (such as a mailbox or telephone pole) are referred to as **Cosmetic** cells and are scaled by the annotation scale parameter.

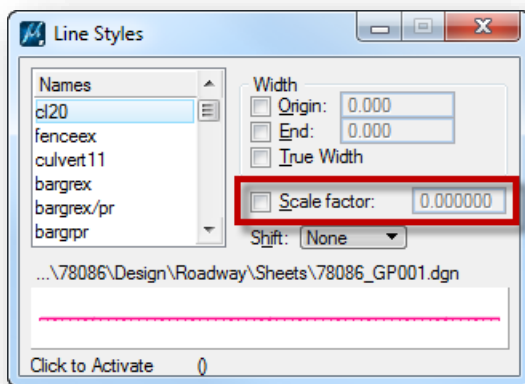


ODOT uses the Model Annotation Scale primarily for creating Sheet models for plotting a set of plans. When creating the Sheet models ODOT's drawing border is scaled to fit the design since all geometry is drawn and referenced at a 1:1 scale. With this method, where the drawing border is scaled up (or down) to cover the required area in the design, the display of text, dimensioning and cells must be scaled the same amount by use of the Annotation Scale parameter. This is to ensure that when the scaled print is created, text, dimensioning and cell elements are at the correct physical and cosmetic size.

Model Line Style Scale

Just like text, cells, and dimensions, ODOT's custom line styles are placed in the design file using a base scale value appropriate for a 1:1 scale drawing which is then multiplied by the Annotation Scale for the intended plotting scale.

When curvilinear elements are drawn using a custom line style, the scale value set in the Line Styles dialog is used to determine the initial placement size of the custom line style. Select **Element > Line Styles > Custom** to access the dialog shown below.



The **Scale Factor** item is used to set the initial placement value. If this item is toggled off, as shown at left, a value of 1 is assumed.

- All ODOT's Custom Line Styles were created at a 1:1 scale so they are scaled to the appropriate sheet scale.

Similar to ODOT's cell, some of the custom line style definitions are defined as **Physical** line styles representing real world dimensions and are not scaled when placed, while others are **Cosmetic** representations of elements used to designate the location of the feature, but not the size. The definition of the custom line style itself defines whether an individual line style is a cosmetic or physical element.



Using Multiple Sheet Models

The **ODOT CADD Engineering Standards Manual for ODOTcadd, Section 303.2** contains information on the use of multiple models for ODOT projects.

In general, it is not permissible to use multiple models in a Basemap design file other than the models that are automatically generated by the use of Bentley's OpenRoads Corridor Modeling tools. For example, it is not permissible to create a Basemap design file with one model containing the proposed plan view information and another model containing the proposed landscaping information. If the landscaping information is needed in a separate model it should be housed in a separate design file as defined in the ODOT CADD Standards.

It is permissible to use multiple sheet models in a Sheet design file, within the guidelines established in the **ODOT CADD Engineering Standards Manual for ODOTcadd, Section 303.2**. To summarize

- ODOT allows only one plan sheet per model in a sheet design file.
- Plan sheets of a like type can be separated into separate design files, or alternately separate models within one design file.
- Multiple sheet models may be used within a sheet design file for multiple sheets of the same type. For example, it is not permissible to create a model for the General Notes and another model for the Typical Sections within the same design file.



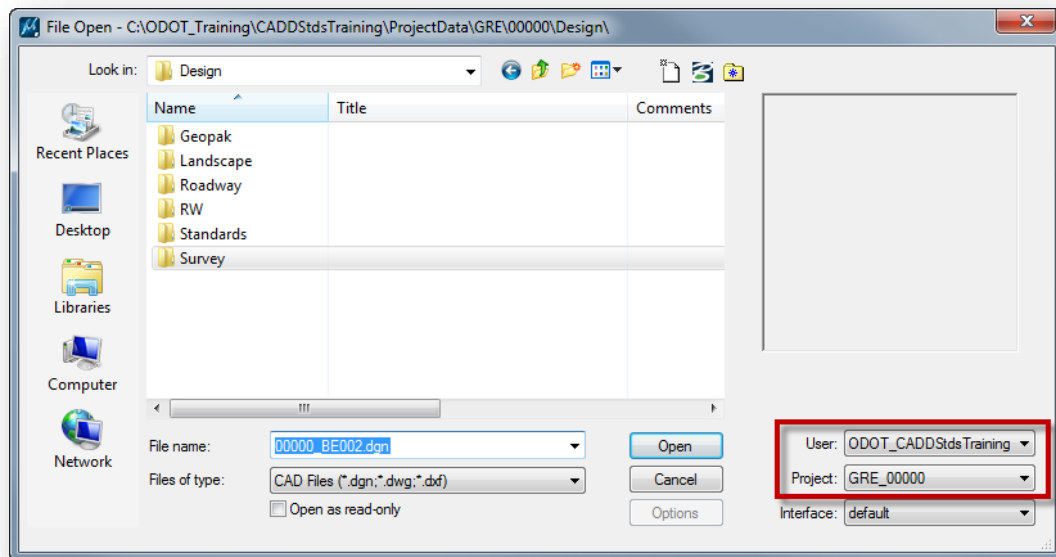
Exercise 5A – Models and Annotation Scale

In this exercise we will explore how the annotation scale is set in the survey basemap and how it can be controlled by the reference file attachments independently from the value set in the survey file.

- ✓ Open MicroStation using the desktop shortcut for the ODOTcadd Standards in the CADDStdTraining folder:

C:\ODOT_Training\CADDStdTraining\ODOTv8istd MicroStation SS3

- ✓ On the MicroStation *File Open* dialog, change the **Project** to **GRE-00000**



- ✓ Open the Survey Basemap *\Design\Survey\Basemaps\00000_BE001.dgn*

There are a few things to note about this file:

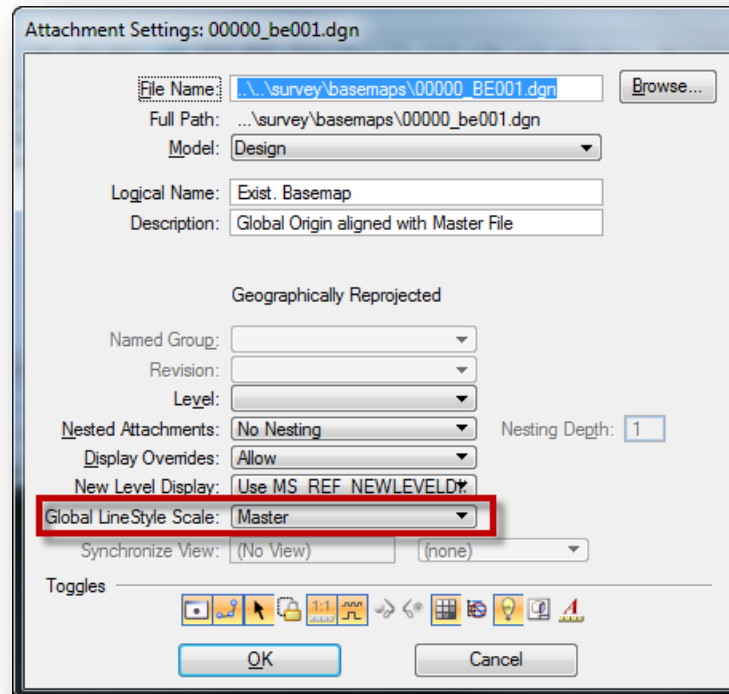
- This file was generated using the OpenRoads Survey tools and is a 3D file.
- The Terrain Model is part of the design file, not a separate GEOPAK TIN file
- The design file graphics are tied to the terrain model. Editing the design file graphics edits the terrain. Therefore, **designers are not permitted to edit the Survey file.**
- The survey data is not stored in a separate GEOPAK GPK file

The graphics contained in a Survey basemap generated with the OpenRoads Survey tools are all Annotation Scale aware. Changing the annotation scale value will change the display size of cells, text and the custom line styles in the file.

- ✓ Change the current annotation scale value to ENGR 1:50. Note the changes to the design file graphics.
- ✓ After changing the annotation scale, choose **File > Save Settings** to save this change.



- ✓ Open the Roadway Basemap: `\Design\Roadway\Basemaps\00000_BP001.dgn`
- ✓ Review the attached references. Notice that the survey basemaps is already attached as a reference file. In the *References* dialog, right-click on the survey basemap and choose the **Settings** option. The *Attachment Settings* dialog shown below is opened.



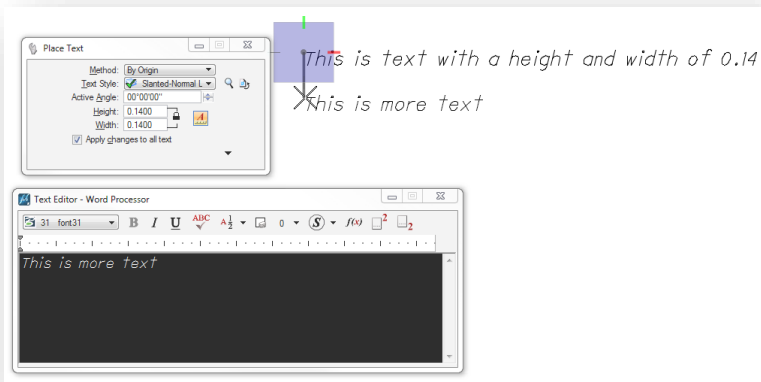
The **Global LineStyle Scale** option is used to control how linestyles are displayed for the selected reference attachment. In the example above, the reference attachment was set to **Master** when the file was initially attached. This setting allows the active (master) design file to control the annotation scale appearance of the reference attachment. Choose the **Cancel** button to close the dialog without making any changes.

- ✓ Change the **Annotation Scale** setting to **ENGR 1:10** in the active file. The display of the text, cells, and custom line styles is changed independently of the setting defined in the original Survey basemap.



Next we'll place the cells, text, and lines using a custom line style to illustrate how the annotation scale is applied to each.

- ✓ Change the active level to **SC_Scratch1**
- ✓ Select the **Place Text** command to place some text in the design file similar to the example below. Be sure the text size is set to the default value (**Height** and **Width** = 0.14) for the **Slanted-Normal LS=50** text style. Also make sure the **Annotation Scale Lock** is toggled on.



- ✓ Next we'll place a few cells in the file. Place the following cells making sure the **Annotation Scale Lock** is toggled on.
 - AC
 - BBQ
 - PMLT
- ✓ Lastly we'll draw a couple lines in the file using a custom line style. Set the active level to the levels below and draw a line on each level.
 - RD_X_Fence
 - PM_X_Lane_Line
- ✓ After the graphics have been drawn, change the annotation scale value to **ENGR 1:1**. Notice that the display of each element is scaled about its individual origin point.

The PMLT cell and the custom line style for the line drawn on the PM_X_Lane_Line level are not scaled as the cell and linestyle definition for each is defined as a "Physical" representation of each, representing their real world sizes.

- ✓ Now change the annotation scale setting to **ENGR 1:200**. Depending on the distance between the elements you have drawn several of them may overlap. The display of each element is scale about its origin and may not yield the results that you desire.
- ✓ Change the annotation scale setting back to **ENGR 1:20** at the completion of this exercise.

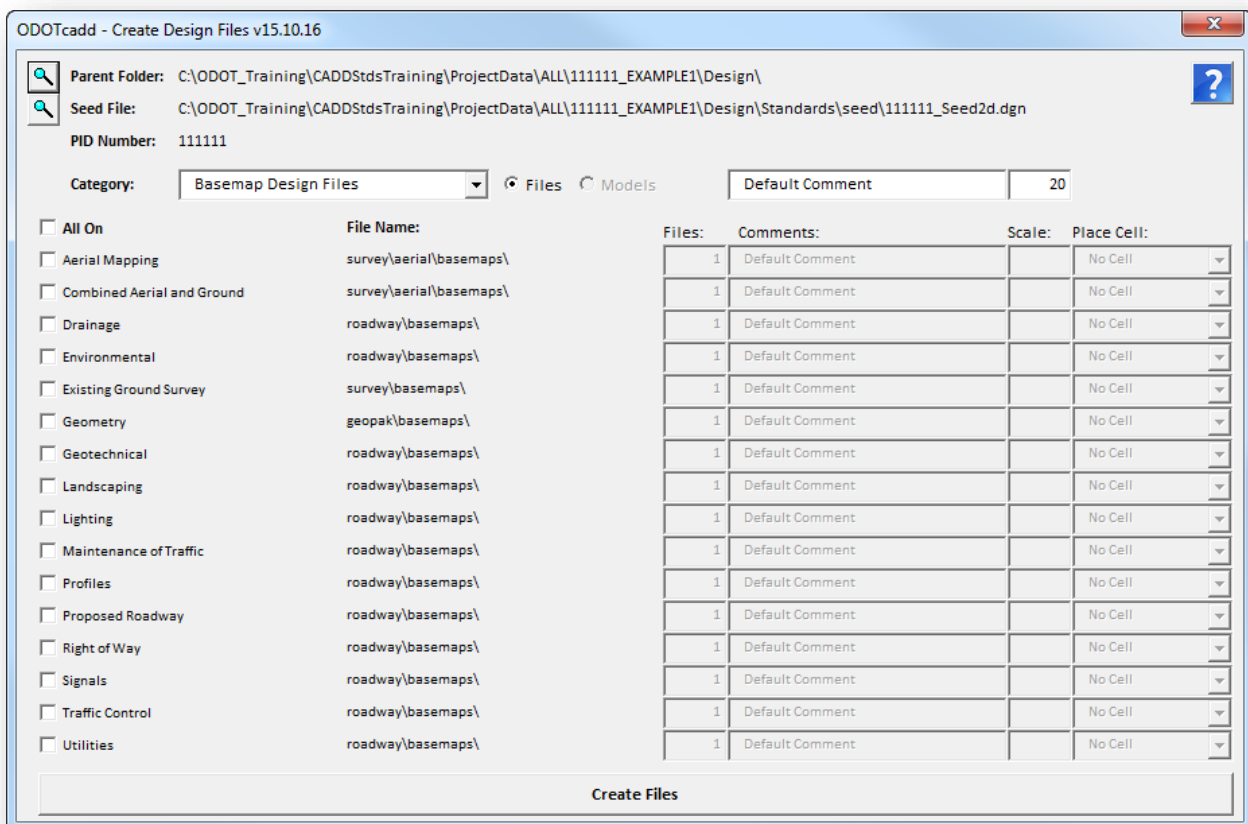


Creating Design Files

A lot of thought must go into the creation of new design files for your project as summarized below:

- The correct Seed File is used for the new design file (2D, 3D) using the appropriate Geographic Coordinate System
- Files stored in the appropriate \Design\Discipline\Basemaps or \Sheets folder
- File named according to the ODOT CADD Standards:
 - PID Number
 - Two Character Type code
 - Three Digit number
- Appropriate Model used for Basemaps (the Design model) or Sheets (the Sheet model)
- Annotation Scale set appropriately for the content
- Windows Title and Comments properties

ODOT provides a Visual Basic application to assist with the creation of MicroStation design files using the ODOT file naming convention and assigning the various parameters detailed above. The program can be accessed from the MicroStation pull-down menu by selecting **ODOT > File Management > New Design File**.



Information about the program can be accessed by selecting the **Help** icon in the upper right corner of the dialog. Before creating design files, we'll discuss each of the items in the bullet list above throughout this chapter.



Seed Files

A seed file is an empty MicroStation design file that is used as a template for the creation of new design files. Seed files can be configured specifically to meet a particular need. When new design files are created, the seed file specified by the user is copied and renamed to create the new file. ODOT provides several seed files for use with new projects started using the ODOTcadd Standards. The ODOT seed files are located in the following folder:

I:\ODOTcadd\Standards\seed

Standards seed files are provided for 2D and 3D uses, as well as seed files that have been defined with a specific **Geographic Coordinate System (GCS)** defining commonly used coordinate systems for Ohio. Additionally, a custom GCS can be defined for projects that are mapped using ground coordinates.

Projects started with the ODOTcadd Standards will typically use a project specific seed file that has been defined with the correct GCS information for the project. Project specific seed files will be stored in the following location for each project:

...\Design\Standards\Seed

Important!

Care should be taken to select the appropriate seed file when creating new design files.

Geographic Coordinate Systems

MicroStation V8i contains Geo-Coordination features which allow users to specify the position of the design contents on the earth's surface. Once that position is established, the design can be easily coordinated with other data for which the geographic location is known. A library of predefined **Geographic Coordinate Systems**, or **GCS** for short, is available in MicroStation.

The GCS tools available in **Bentley Map** allow users to define custom GCS definitions that are used to facilitate Grid-to-Ground conversion of the project data. This allows users to work in ground coordinates and distances while maintaining the ability to seamlessly integrate the project data with other Geo-referenced systems such as Google Earth, Bing Maps, Aerial mapping and imagery, and GIS systems.

The ODOTcadd Standards provide users with the tools to define the appropriate Geographic Coordinate System (GCS) on a project started with MicroStation and GEOPAK/PowerGEOPAK (SELECTseries 4). At this time, the use of a GCS is recommended, but it is not required.

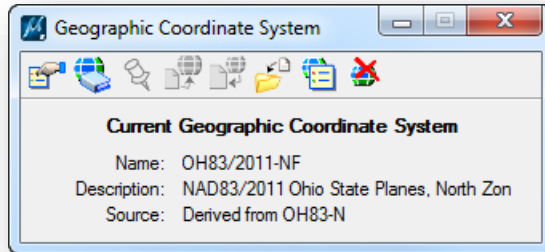
The GCS for a project can be defined on the appropriate State Plane North or South Zone or defined using a custom CGS to define a ground coordinate system. Whether a project is defined using grid coordinates or ground coordinates is up to the individual District/designer and should be coordinated with the District survey personnel before the project is started.

Detailed information about defining the GCS is available in ODOT's **GEOPAK Survey with OpenRoads Technology** training guide. This guide will discuss how to select the GCS once it has been defined by the Survey personnel.

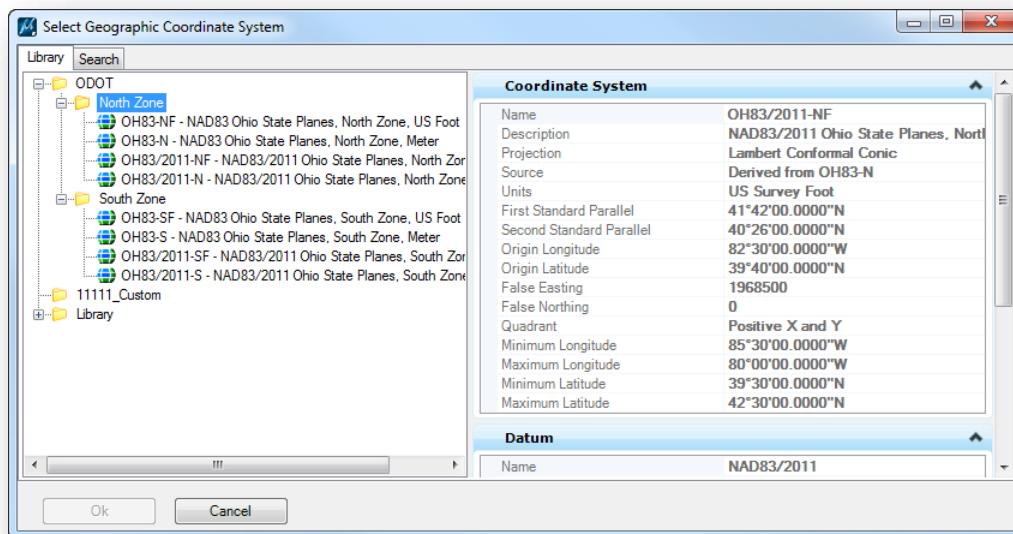


Selecting the GCS

The GCS can be selected by choosing **Tools > Geographic > Select Geographic Coordinate System** from the MicroStation pull-down menu. The *Geographic Coordinate System* dialog shown below is opened.



To choose a GCS from the library, select the second icon, **From Library**. The *Select Geographic Coordinate System* dialog shown below is opened.



The ODOT workspace defines the State Plane coordinate systems typically used on ODOT projects in the **ODOT** folder as shown above. Choose the appropriate GCS from the list. Other coordinate system definitions can be found in the **Library** folder.

If a project specific GCS has been defined, it can be found in a project specific folder within the *Select Geographic Coordinate System* dialog. In the example above, the folder **11111_Custom** contains the project specific GCS definition.

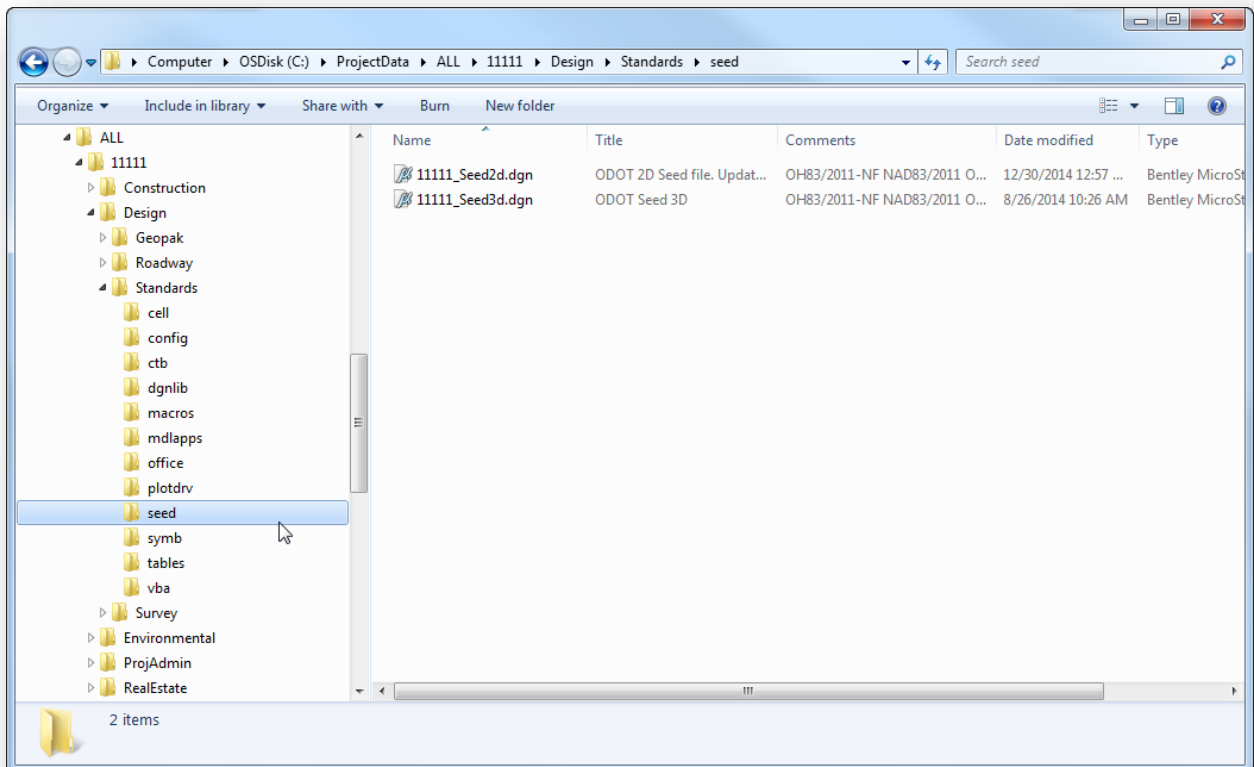
It is very important that all users of the project data use the same GCS for all files created for the project. With this in mind, we have asked ODOT's Surveyors to create project specific seed files when applicable.

When in doubt, talk to the Survey personnel to make sure you are using the correct GCS information.



Project specific Seed Files

If a custom GCS is to be used on a project, we are asking ODOT's Survey Personnel to define project specific seed files with the GCS predefined. These project specific seed files should be used for every file created on the project to ensure that the design files have the correct GCS defined. Project specific seed files can be found in the *\Design\Standards\Seed* folder for the project and are named using the PID number. An example is shown below.





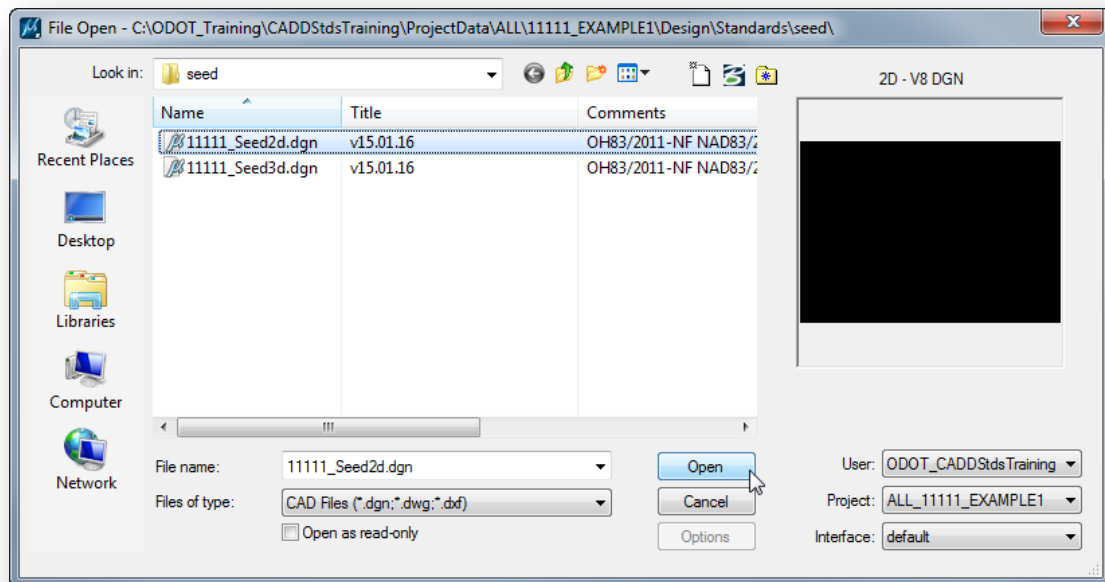
Exercise 5B – ODOT_Files.mvba

In this exercise we'll create new design files for both projects that were created in the previous exercise.

- ✓ Open MicroStation using the desktop shortcut for the ODOTcadd Standards in the CADDStdTraining folder:

C:\ODOT_Training\CADDStdTraining\ODOTcadd MicroStation SS3

- ✓ On the MicroStation *File Open* dialog, change the **Project** to **ALL_11111_EXAMPLE1**
- ✓ Open one of the seed files that was created with the project.



- ✓ From the MicroStation pull-down menu, select **ODOT > File Management > Create Design Files**
- ✓ Create the Basemap design files listed below for the project assigning the **Default Comment** to an appropriate value (“S.R. 123 Relocation” for example). Also be sure to set the **Annotation Scale** parameter appropriately for each file type

Basemap Design Files

- Drainage
- Geometry
- Profiles
- Proposed Roadway

GEOPAK Specific Basemap Files

- Clipping Borders
- Profile Motif File
- Pattern Lines
- Plan Motif File
- Cross Section Cells (Roadway)

Note the file names and the folders where the files are created. For this project, all of the files default to the \Design\roadway\basemaps folder since discipline specific sub-folders were not created.



- ✓ Toggle the **Category** to **Roadway Sheets** to create the files listed below.
 - Title Sheet
 - Schematic Plan
 - Typical Sections
 - General Notes
 - General Summary
 - Sub-Summary
 - Cross Sections

- ✓ Select the **Models** option to create multiple models for a few of the file types, where appropriate.
 - For which Sheet Types would you typically NOT want to create multiple models?

- ✓ Be sure to set the **Annotation Scale** and the **Cell** parameters appropriately for each file type.
 - What Scale should you use for the Schematic Plan?
 - What Scale Should you use for the Cross Sections?
 - Some Sheet Types do not default to place a sheet border. Why?

- ✓ Change the **Comments** property as desired.

- ✓ Select the Create Files item to create the files. Note the file names and the folder where the files are created.

Next we'll create some drainage sheets for the example project. This project does not include separate discipline specific folders, therefore drainage sheets will be added to the [\Design\Roadway\Sheets](#) folder.

- ✓ Toggle the **Category** to **Roadway Sheets** to create the files listed below. Create multiple models, assign sheet cells, comments, and the Annotation Scale as desired.
 - Schematic
 - Notes
 - Sub-Summary
 - Quantity Table

- ✓ Open the Title Sheet design file to verify the contents. The file should default to the sheet model as the active model with the title sheet cell placed in the file.

- ✓ Open one of the design files that you created with multiple models (the Typical Sections for example). The file contains multiple models, each containing a sheet border cell.



Next we'll create design files for the second example project. This one uses a larger folder structure with multiple design specific discipline basemaps.

- ✓ Completely exit MicroStation by selecting **File > Exit** from the MicroStation menu.

Note: It is required that you completely exit MicroStation when changing projects in order to clear all project specific configuration variables from memory.

- ✓ Open MicroStation using the shortcut for the ODOTcadd Standards in the CADDStdsTraining folder:

C:\ODOT_Training\CADDStdsTraining\ODOTcadd MicroStation SS3

- ✓ On the MicroStation *File Open* dialog, change the **Project** to **DEF_111112_EXAMPLE2**
- ✓ Open the 2d seed file that was created with the project.
- ✓ Create several basemap design files of your choice for the project. For a few of the basemap types, create multiple files using the **Files** option.

Take a look at the folders where the files will be created. File types that have a discipline specific folder will be created in the *\Design\discipline\basemaps* folder. File types that do not have a specific discipline folder will be created in the *\Design\roadway\basemaps* folder.

Notice that the name of the basemap design files you created by specifying more than one file are incremented.

- ✓ Create several sheet design files for several disciplines of your choice for the project setting the **Comments**, **Scale**, and **Cell** as necessary for each file type. Create multiple files, or multiple models as desired for appropriate file types.

Which file types might it be appropriate to create multiple models? Why?

Which file types would not be appropriate to create multiple files or multiple models? Why?

- ✓ On the *Create Files* dialog, use the **Browse** button for the **Parent Folder** to select the *\Design\Structures\DEF112_1234C* folder. Create basemap and sheet design files for the bridge setting the **Comments**, **Scale**, and **Cell** as necessary for each file type.
- ✓ On the *Create Files* dialog, use the **Browse** button for the parent folder to select the *\Design\Structures\Wall_001* folder. Create basemap and sheet design files for the wall setting the **Comments**, **Scale**, and **Cell** as necessary for each file type.

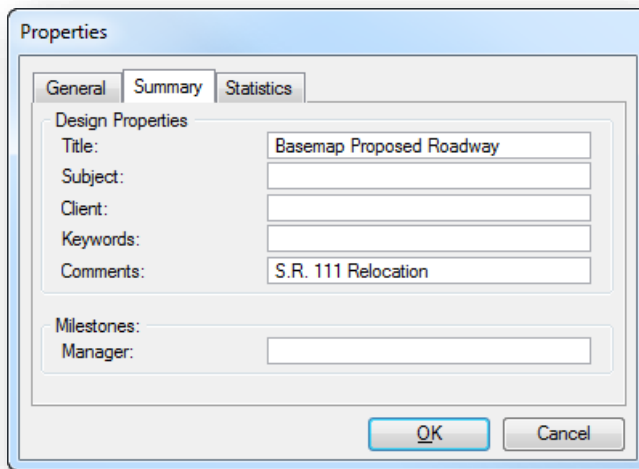


Windows File Properties

The Windows file properties Title and Comments may be used by ODOT personnel to add additional information about the design file contents that can be displayed in Windows Explorer and also in the MicroStation File Open dialog. The use of these properties is optional.

The file properties are assigned when a design file is created using the **ODOT_Files.mvba** application and can also be assigned manually in MicroStation.

To edit the file properties in MicroStation, select **File > Properties** to access the *Properties* dialog shown below. Select the **Summary** tab to review or edit the **Title** and **Comments** properties.



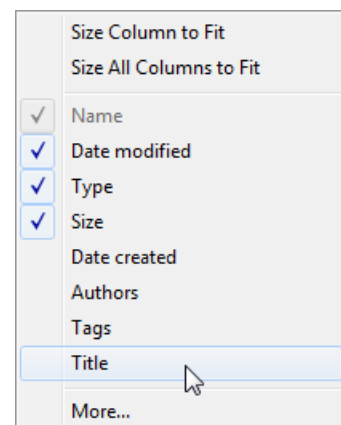
The **Title** property is typically used to define the file type.

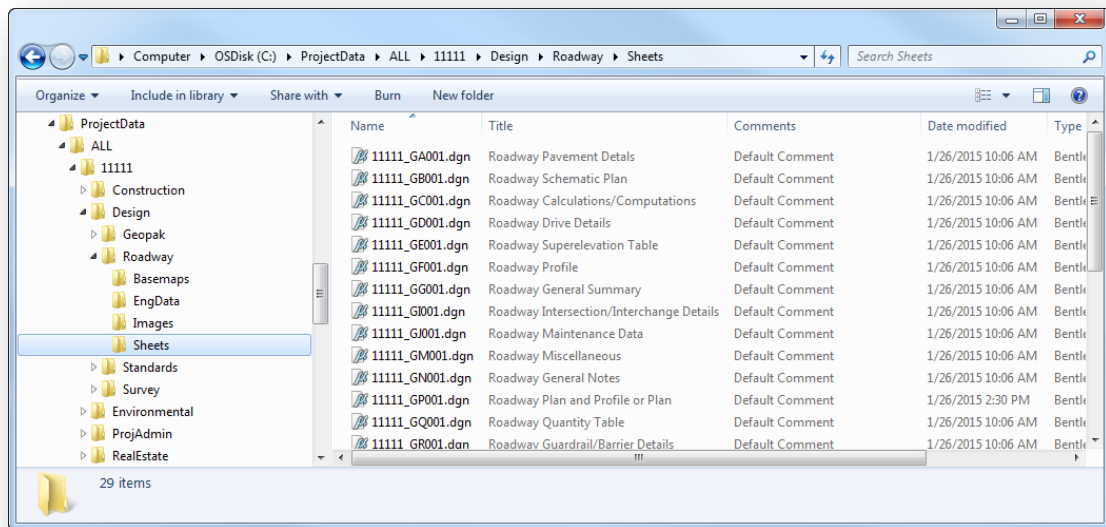
The **Comments** property is typically used to define the file contents.

Displaying the Title and Comments Properties in Windows

The Title and Comments properties can be displayed in Windows Explorer by taking the following steps:

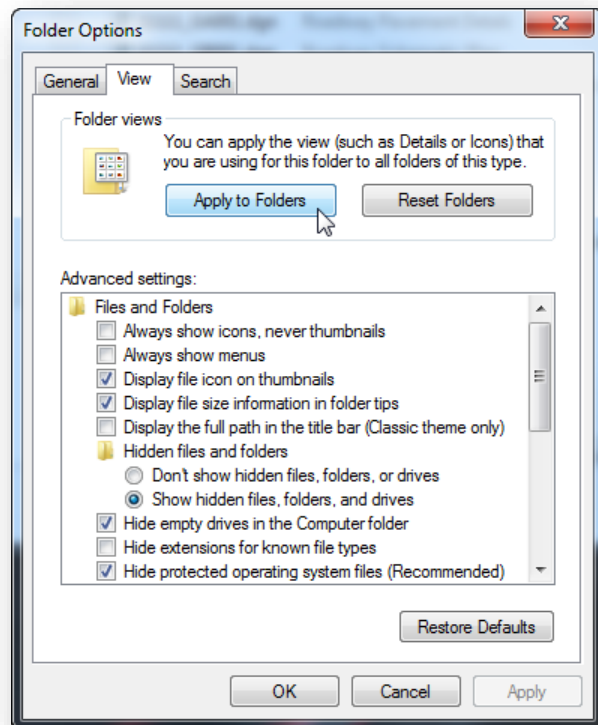
- Set the Windows Explorer View Display to **Details** by using the **Change your view** option located in the upper right corner of the Windows Explorer dialog.
- Right-Click on the column headers to reveal the menu shown at right which allows you to toggle on/off the columns that are displayed in the Details view. Toggle on Title and Comments. Use the **More...** option to toggle on the Comments column.
- The order of the columns can easily be rearranged by dragging the column header to the left or right. An example is shown on the following page.





After the window has been customized, the settings can be assigned to all of the folders by taking the following steps:

- From the **Organize** menu, located at the left of the Windows Explorer dialog, select **Folder and search options** to access the *Folder Options* dialog shown at right.
- Choose the **Apply to Folders** option



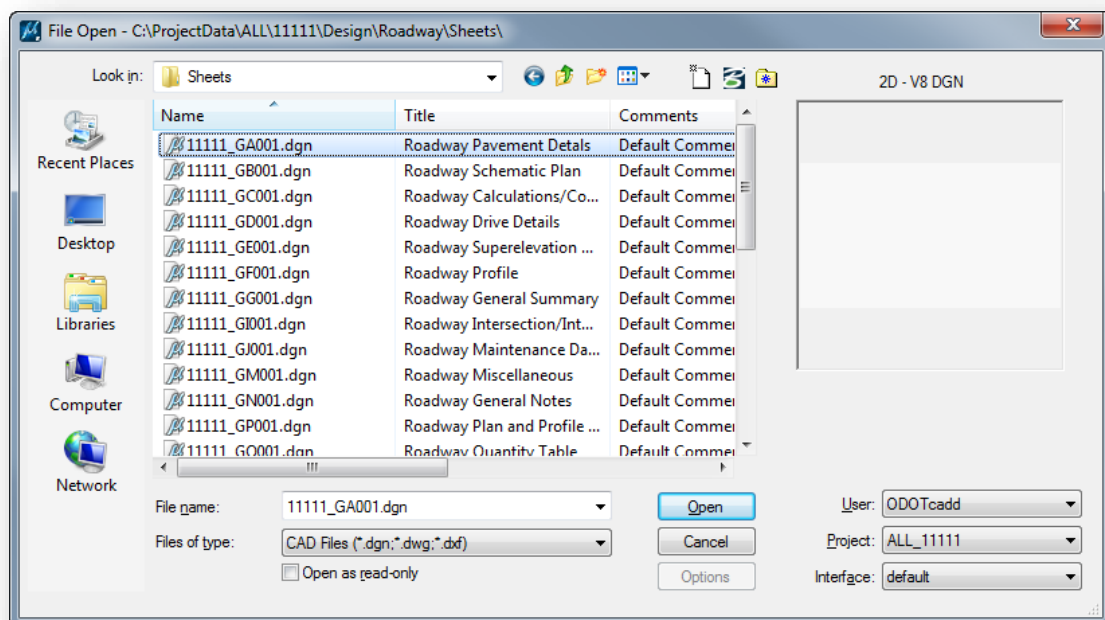


Displaying the Title and Comments Properties in MicroStation

The Title and Comments properties can also be displayed in the MicroStation File Open dialog boxes. Take the following steps to configure MicroStation to display the file properties.

- Use the **View Menu** icon in the MicroStation *File Open* dialog to set the display mode to **Details**.
- Right-Click on one of the column headers to toggle on the **Title** and **Comments** options. Use the **More...** option if the **Title** and **Comments** options are not available.

After setting the options, the MicroStation File Open dialog will appear similar to the example shown below.





6 Sheet Cells and Tags

Sheet Border Cells

MicroStation Cells are used to define the ODOT standard Sheet Border cells. These cells are contained in the following cell library:

... \ODOTcadd\Standards\cell\ODOT_Sheet.cel

The sheet border cells have been updated to provide some new functionality for the ODOTcadd Standards as well as to provide future compatibility with Bentley's ProjectWise software. The changes to the sheet border cells are summarized below:

- Data Entry Regions for the title block information have been replaced with MicroStation Tag elements
- Active points are placed at the text insertion points for the various title block attributes. These active points are tagged with the sheet parameters.
- Every item in the sheet titles has been tagged for access programmatically
- Sheet cells that are commonly edited are now split into two cells; one contain the sheet border and a second containing the sheet interior

These changes provide significant improvements to the way ODOT manages the sheet title information; however, these improvements come at a cost: It is no longer possible to drop a sheet border cell. If a sheet border cell is dropped, the tags assigned to the sheet are lost.

MicroStation Tags

Most ODOT users are unfamiliar with MicroStation Tag elements. This section will present some general information about tags and how they are defined and assigned. For additional information, see the MicroStation online help.

Tagged Elements

Specific data can be associated with an element as a Tag. The value of the tag can be displayed in MicroStation as a text element. If the element is deleted, the tag is deleted as well.

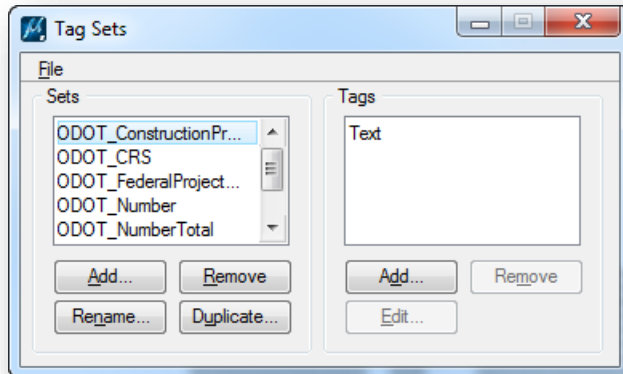
Tag Sets

Before you can attach a tag to an element, you must define a Tag Set. A tag set definition specifies the unique tag name, display attributes, data type, and default value for each tag in the set.

You do not have to create a Tag Set in order to use the Tags that have been assigned to the ODOT Sheet Border cells. When an ODOT Sheet Border cell is placed in a MicroStation model, the tags assigned to the cell are added to a Tag Set in the active design file. For example, the tags defined in the cell TITLE1 are added to the design file when the TITLE1 cell is placed in the



file. The **Tag Sets** can be reviewed in MicroStation by selecting **Element > Tags > Define**. An example is shown below.



Each ODOT tag is named using the prefix “ODOT_” followed by a descriptive name. For example, the Tag Set **ODOT_CRS** is used to define the County-Route-Section text in the title block of the sheet border cell.

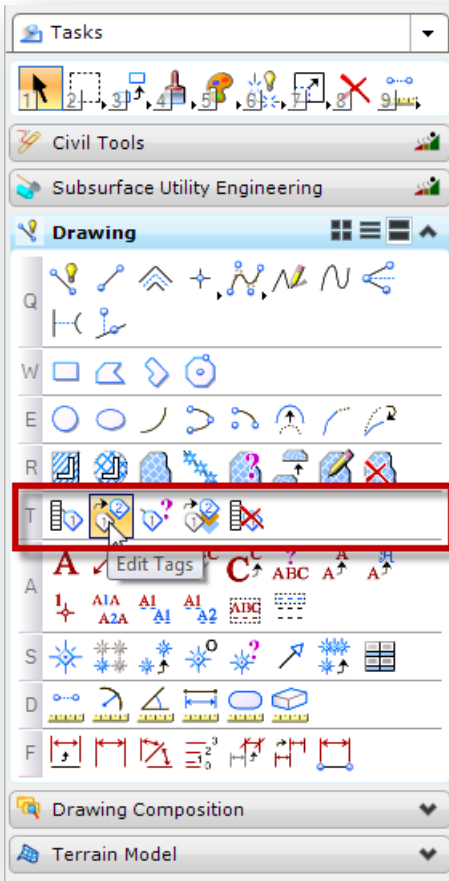
Assigning Tag Values

Initially, the tags defined on an ODOT sheet border cell are assigned a default value as shown in the example below.



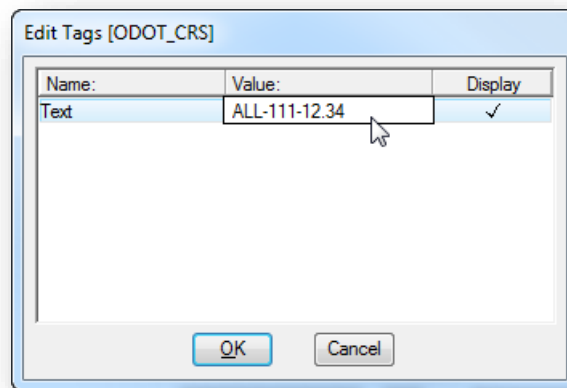
The tags for the sheet numbers have a default value of 0 assigned with the exception of the Title sheet which has a default value of 1.

Values can be assigned to tags in the ODOT cells by using the *Tags* toolbox or the *Edit Text* command. The *Tags* toolbox is accessed in the Tasks window as shown below.

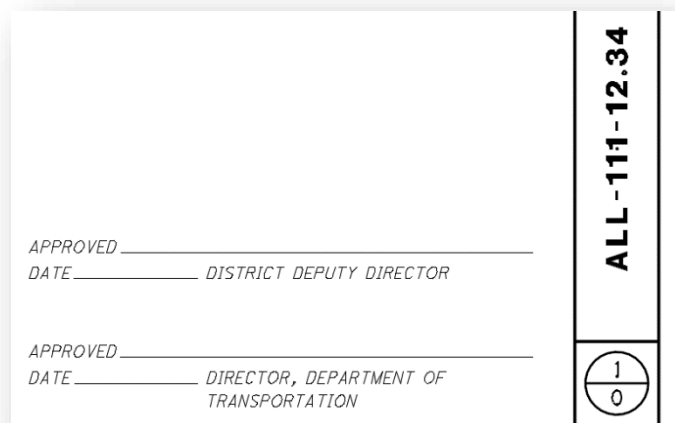


Use the second icon to edit the value of a tag.

In the ODOT sheet border cells, the tags have been assigned to the point elements at the text insertion location. An example editing the tag value for the ODOT_CRS tag is shown below.



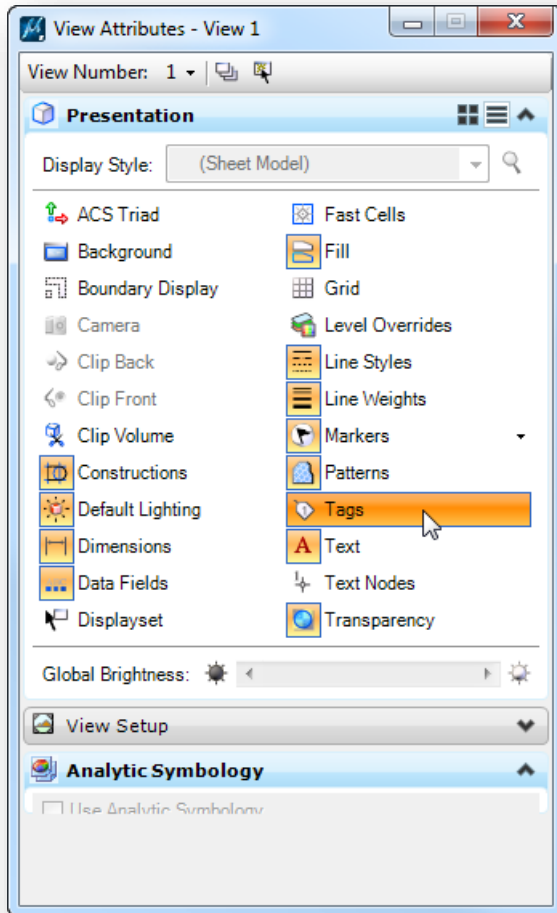
After the tag **Value** has been assigned, the text for the tag is displayed in MicroStation similar to the example shown below.





Displaying Tags

The display of tags is controlled by MicroStation's View Attributes. If you are not seeing the value of your tags displayed, make sure the **Tags** item is toggled on in the *View Attributes* dialog as shown below.



The *View Attributes* dialog is accessed by selecting **Settings > View Attributes**.



Exercise 6 –Editing Tags

In this exercise we'll take a look at placing sheet cells and editing tags manually.

- ✓ Open MicroStation using the shortcut for the training class.
- ✓ From the MicroStation File Open dialog, choose the **ALL_11111_EXAMPLE1** Project that was created in Exercise 3.
- ✓ Open the following design file:

[\Roadway\Sheets\111111_GT001.dgn](#)

- ✓ Use the **Edit Tags** command of the **Edit Text** command to assign values to the various items in the sheet title block.
- ✓ Notice that the Title Sheet border is a separate cell from the interior contents. The interior can be dropped for editing as required.

Tags can also be edited using the Edit Text command.

- ✓ Open the General Notes file from the following location:

[\Roadway\Sheets\111111_GN001.dgn](#)

- ✓ Use the Edit Text command to edit the values of the Tags.

Note that you do not need to drop the status of the sheet border to edit the Tag values.





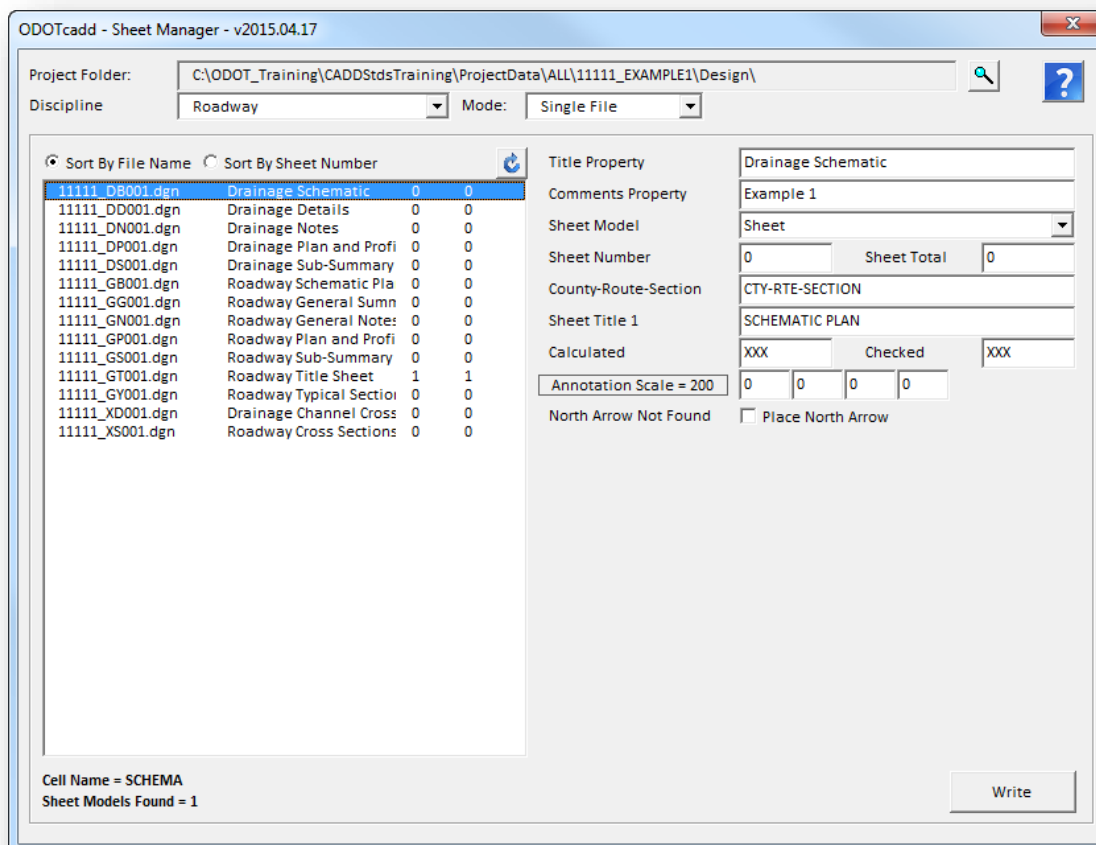
7 Sheet Manager

With ODOT's V8istd CADD Standards, the CADD Services Group within ODOT Central Office has provided a variety of applications intended to assist users with the task of managing some of the parameters within the sheet border cell title block such as the County-Route-Section or the sheet numbers. These applications have been used by some of ODOT's District offices while other Offices have developed their own solution.

As we move forward with MicroStation PowerGEOPAK (SELECTseries 4), the CADD Services group has developed a new Sheet Manager application intended to replace previous solutions for not only the sheet numbering, but as a tool to manage all of the various sheet border title block attributes.

ODOT_SheetManager.mvba

The Sheet Manager can be accessed by selecting **ODOT > Sheet Management > Sheet Manager** from the MicroStation pull down menu. In the example below, a sheet design file has been selected with the sheet attributes displayed to the right.

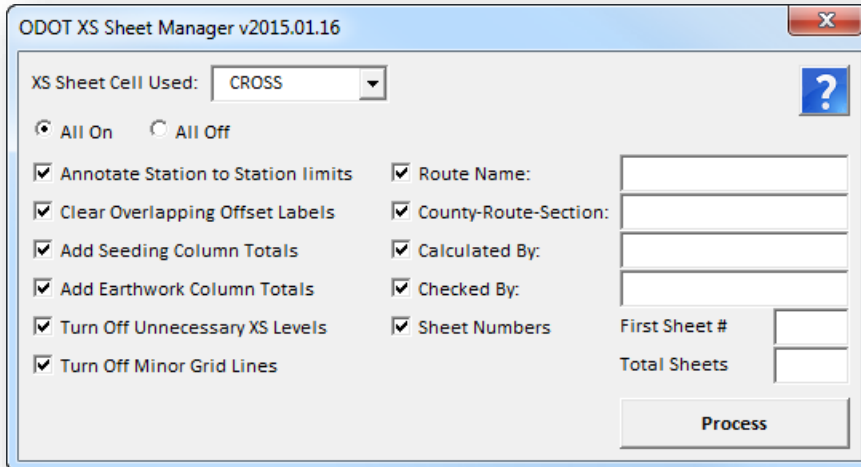


This application is used to review and edit the value of the MicroStation tag elements in the sheet title block for a selected design file. Select the **Help** icon for complete documentation.



ODOT_XSSheetManager.mvba

Cross section sheets have specific requirements that can be initially edited using the ODOT_XSSheetManager.mvba tool. This application is accessed by selecting **ODOT > Sheet Management > XS Sheet Manager** from the MicroStation pull-down menu.



Select the **Help** icon for complete documentation.



Exercise 7A – ODOT_SheetManager.mvba

In this exercise, we'll take a look at the various modes of operation for the ODOT_SheetManager application.

Part 1 – Single File Mode

- ✓ Open MicroStation using the desktop shortcut for the ODOTcadd Standards in the CADDStdTraining folder.
- ✓ On the MicroStation *File Open* dialog, change the **Project** to **DEF_11112_EXAMPLE2**
- ✓ Open the title sheet design file for the project.
- ✓ Open the Sheet Manager application by selecting **ODOT > Sheet Management > Sheet Manager** from the MicroStation pull-down menu.

Each \Design\discipline\sheets folder found in the project is listed in the **Discipline** list regardless of whether the folder contains any design files. Take a look at each available **Discipline** to review the sheet design files that are available in the project.

- ✓ Set the **Mode** to the **Single File** option.
- ✓ Toggle the **Discipline** option to Roadway. Select the **Roadway Title Sheet** from the file list. The parameters for the cell TITLE1 are listed in the dialog.

The name of the cell found in the file is listed below the **Files** list as well as the number of sheet models found in the file. There should only be one sheet model in a Title Sheet design file.

Define the following values for the Title Sheet:

- Sheet Total: 150
- County-Route-Section: DEF-555-12.34
- PID Number: 11112
- Federal Project Number: 123456789
- Railroad Involvement: NONE
- Const. Project Number: 123456

Select the **Write** button to apply the values. The Sheet Cell in the file is updated with the new values.

- ✓ You do not need to be in the file to edit the parameters. Select another file from the list, the General Notes file for example. Assign the parameters for the sheet and use the **Write** button to write the values to the file.
- ✓ Did you create more than one Model for the General Notes file, or one of the other files? Choose a file from the list that has more than one model. The **Sheet Model** list will default to the first sheet model found in the file. Assign parameters to the cell in each sheet in the models by changing the **Sheet Model** item.



Part 2 – Multi-File Mode

Multi-File mode is used to edit common parameters, such as the Sheet Total, for multiple files.

- ✓ Change the Model to Multi-Files. The dialog is limited to only parameters that are common to multiple sheet types.
- ✓ Select one of more **Files** to edit.
- ✓ Assign values for the following parameters:
 - Sheet Total: 150
 - County-Route-Section: DEF-555-12.34
 - Calculated: AAA
 - Checked: BBB

After writing the parameters to the selected files, toggle back to Single File mode to review the values.

- ✓ Change the **Discipline** to assign parameters to some of the other sheet types.

Part 3 – Excel Output Mode

The Excel Output modes are used to read the Sheet attributes and write the values to an Excel file. The Excel file can be edited and saved, and then re-read to update the sheet files to match the parameters as defined in the Excel file.

There are two Excel output modes: **Excel Output**, which will output information for the selected Discipline only, and **Excel Output All** which will output information for all the sheets in the entire project.

- ✓ Toggle the **Discipline** to **Roadway**.
- ✓ Set the **Mode** to **Excel Output**.
- ✓ Choose the **Write Excel File** option to write the parameters for the Roadway Sheets to Excel.
- ✓ Save the Excel file to the following location:

`\Design\Roadway\EngData\SheetManager_Roadway.xlsx`



Part 4 – Excel Input Mode

The Excel Input mode is used to read the contents of an Excel file generated by the Excel Output mode and update the sheets to match the parameters defined within the Excel file.

- ✓ Open the Excel file generated in the previous step.
- ✓ Assign values for the sheet parameters that do not already have a value assigned. Save the changes.
- ✓ Change the ODOT_SheetManager mode to **Excel Input**.
- ✓ Use the **Browse** button to select the Excel file
- ✓ Choose the **Read File** button to read the Excel file and update the sheets.
- ✓ Use the **Single File** mode to review the files after the Excel file has processed.



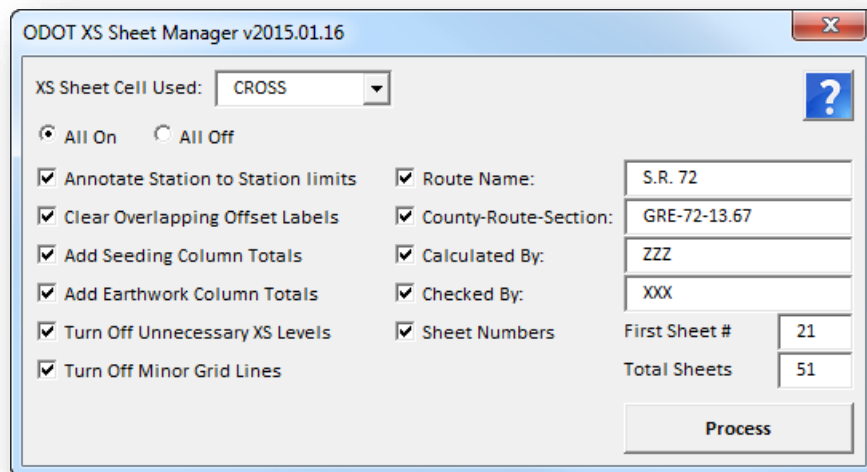
Exercise 7B – ODOT_XSSheetManager.mvba

In this exercise we'll use the ODOT_XSSheetManager application to annotate the cross section sheet borders.

- ✓ Open MicroStation using the desktop shortcut for the ODOTcadd Standards in the CADDStdTraining folder.
- ✓ On the MicroStation *File Open* dialog, change the **Project** to **GRE_00000_GRE-72-13.67**
- ✓ Open the cross section sheet design file for the project.

The cross section sheets in this file were generated with PowerGEOPAK using the **One Sheet Per Model** option. Each cross section sheet is contained in a separate sheet model. This is the recommended practice for projects using the ODOTcadd Standards.

- ✓ Open the ODOT_XSSheetManager.mvba application by selecting **ODOT > Sheet Management > XS Sheet Manager** from the MicroStation pull-down menu.
- ✓ Process the cross section sheets using the the settings shown below. After the process is complete, open a few of the sheet models to verify the results.



- ✓ Open the Sheet Manager tool to review the cross section sheet design file. Select each model in the file to verify the results.
- ✓ Save settings in the cross section sheet file and exit MicroStation.



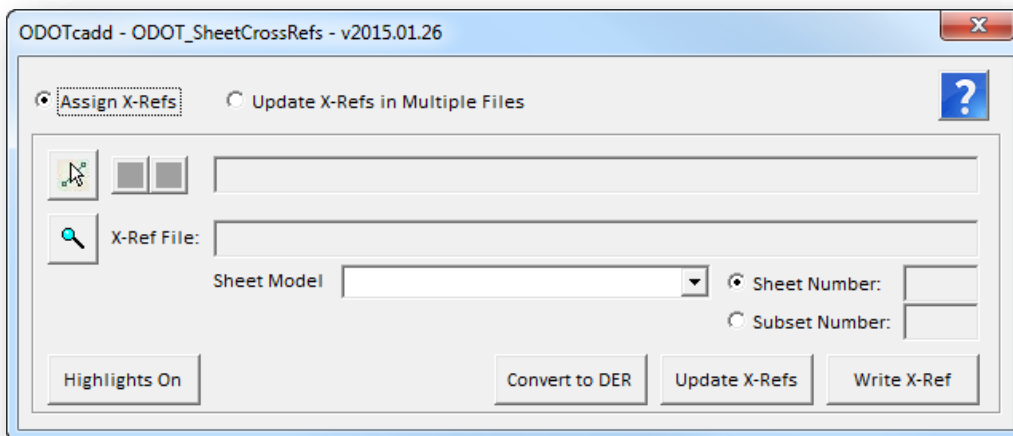
8 Sheet Cross References

ODOT_SheetCrossRefs.mvba

ODOT provides an updated sheet cross referencing application with the ODOTcadd Standards. The updated tool reads the Tag elements defined in the sheet border cell to get the sheet number as well as the subset number. The cross references can be assigned to either the sheet number or the subset number.

The new application is not compatible with cross references previously assigned using ODOT's V8istd cross referencing applications or the older ODOT cells using data entry regions.

The application is accessed by selecting **ODOT > Sheet Management > Cross References**.



Complete documentation for the application is available by selecting the **Help** icon.

A training video is also available for this application online:

<https://www.youtube.com/watch?v=XdSXe6DyOdg>



Exercise 8 – Sheet Cross References

In this exercise we'll use the ODOT_SheetCrossRefs.mvba application to assign sheet attributes to the plan sheets in a sample project.

- ✓ Open MicroStation using the shortcut for the training class.
- ✓ From the MicroStation *File Open* dialog, choose the **GRE_00000_GRE-72-13.67** Project.
- ✓ Open the following design file:

[\Roadway\Sheets\00000_GP002.dgn](#)

- ✓ The upper left of the sheet contains a table for two cross references. Use the ODOT_SheetCrossRefs application to assign cross references to the data fields in the table.
 - Assign the CL References & Benchmarks cross reference to the design file containing the Schematic Plan sheet.
 - Assign the Culvert Details cross reference to the design file containing the Culvert Detail sheet
- ✓ Open the following design file:

[\Roadway\Sheets\00000_GP003.dgn](#)

- ✓ Edit the cross reference for the cross sections.
 - The data entry regions for the cross reference are actually underscore characters. Use the Convert to DER function to convert the underscore characters to a data entry region.
 - Assign the cross reference to the XS design file. Which sheet model in the cross section design file contains the cross section sheet with the drive detail?
- ✓ Cross references are not limited to single data entry regions. Use the MicroStation Place Text command to place the following text string:

See Sheets __ and __ for details.

- ✓ Assign cross references to the two data entry regions in the text string you have placed using the design files of your choice.



9 Change PID Number

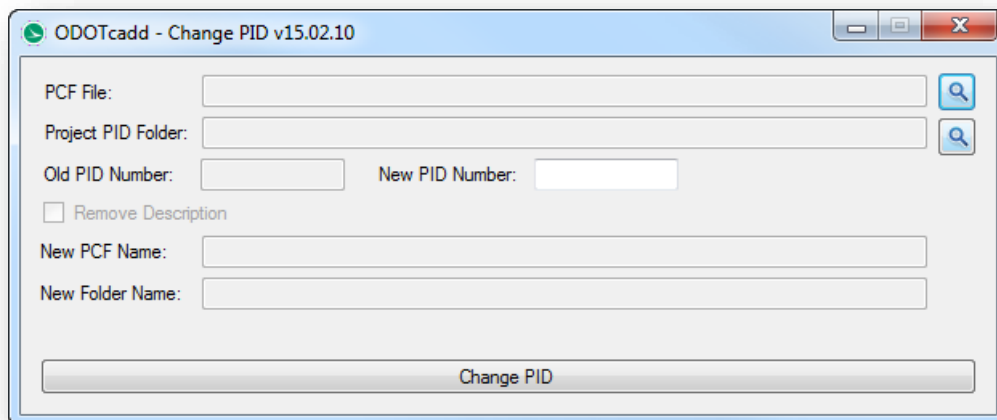
ODOTcadd_ChangePID.exe

Occasionally work is started on a project before a PID number has been assigned. In this case, the recommended practice is to use the **ODOTcadd_CreateNewProject.exe** application to create the project directory using a PID number of “00000” and a supplemental description consisting of the primary County-Route-Section designation. Example: 00000_AAA-123-12.34

When the project is assigned a PID number there are several things that need to be updated. ODOT provides an application to assist the user with the task of changing the PID number for a project. The application is found in the following location:

[\ODOTcadd\Standards\ODOT\Utilities\ODOTcadd_ChangePID.exe](#)

When the application is opened, the dialog shown below appears.



Caution!

Care should be taken before running this application. There is no Undo once the process has been initiated.

The application performs the following functions:

- Renames the Project Configuration File (PCF File) using the new PID Number
- Edits the PCF File to replace any occurrences of the old PID number with the new PID number
- Renames the primary PID folder for the project with the new PID number
- Searches all sub-directories of the PID folder for *any* file with the PID number in the name and renames the file using the new PID number.
- Opens every MicroStation DGN file to correct missing reference file attachments as a result of the PID number changes made to the design file names.



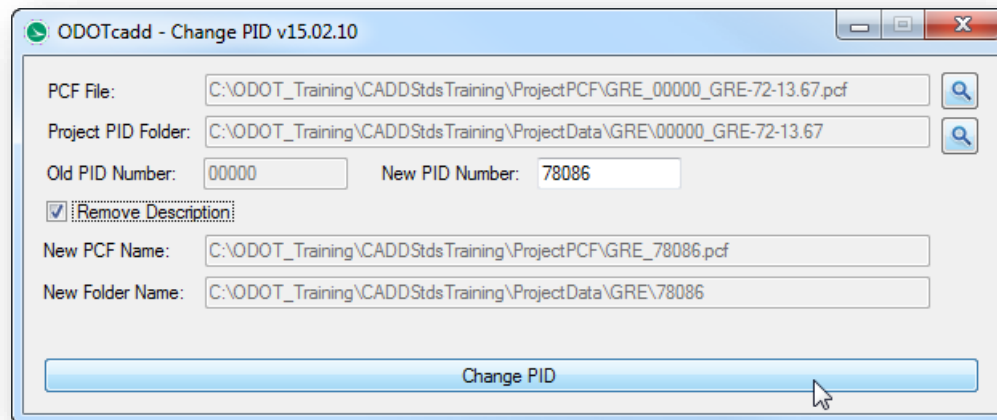
Exercise 9A – ODOTcadd_ChangePID.exe

In this exercise we'll change the PID number for a small sample project that has just a few files.

- ✓ We'll use the **ODOT_ChangePID** application to change the PID number for the following project:

[\ODOT_Training\CADDStdsTraining\ProjectData\GRE\00000_GRE-72-13.67](#)

The **New PID** number for the project is 78086.



- ✓ If the selected PCF file has an optional description after the PID Number (_GRE-72.13.67 in the example above) the can be removed by checking on the **Remove Description** option.
- ✓ Select the **Change PID** option to initiate the process.
- ✓ After the process is complete, take a few minutes to review the folders and files contained in the sample project to ensure that the files have been renamed with the new PID number

For this example, the following sub-folders contain design files:

[\Design\Roadway\Basemaps](#)

[\Design\Roadway\Sheets](#)

[\Design\RW\Basemaps](#)

[\Design\RW\Sheets](#)

[\Design\Standards\Seed](#)

[\Design\Survey\Basemaps](#)

- ✓ Open the PCF file with Notepad to review the contents.

[\ODOT_Training\CADDStdsTraining\ProjectPCF\GRE_78086.pcf](#)



Exercise 9B - PID numbers and Geographic Coordinate Systems

For plans that will be prepared using ground coordinates, the ODOT training guide for **GEOPAK Survey with OpenRoads Technology** recommends the use of custom Geographic Coordinate Systems (GCS) for Grid-to-Ground transformations. Custom GCS definitions are stored in a DTY file uniquely for each project. The recommended procedure for ODOT's Surveyors is to name the custom GCS with the County name and the PID number.

When the **ODOTcadd_ChangePID.exe** application is processed, the name of the DTY file is updated to reflect the new PID number. The project PCF file is also updated to specify the new name for the DTY file. MicroStation files that use the custom DTY file will default to the new file name; however, the name of the Coordinate System is not changed internal to the DTY file definition. It is necessary to manually edit the name of the coordinate system to use the new PID number.

Note: This is not necessary if the project is to be developed using Grid Coordinates and one of the standard Ohio North or South Zone coordinate definitions. This is only necessary for projects where a custom GCS is used to define the ground coordinate system and the name of the custom GCS includes the PID number.

- ✓ Let's review the GCS settings for one of the design files on the GRE-72 project that we used in Exercise 9A to change the PID number. The DTY file is stored in the following folder:

[\ODOT_Training\CADDStdsTraining\ProjectData\GRE\78086\Design\Survey\GCS\78086_Custom.dty](#)

Verify that the DTY file has been renamed successfully for the project.

- ✓ Open the PCF file for the project with Notepad to verify that the definition for the custom DTY file has been updated to reflect the new PID number. The PCF file is located in the following folder:

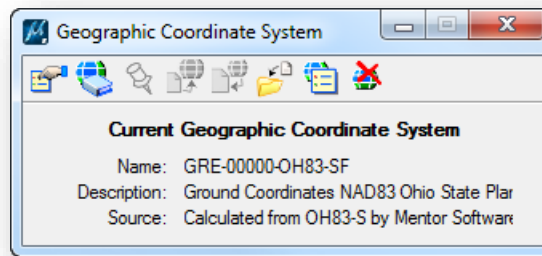
[\ODOT_Training\CADDStdsTraining\ProjectPCF\GRE_78086.pcf](#)

Close Notepad after you have verified the DTY file name.

- ✓ Open MicroStation using the **ODOTcadd PowerGEOPAK SS4** shortcut located in the *[\ODOT_Training\CADDStdsTraining](#)* folder.
- ✓ From the MicroStation *File Open* dialog, select the **Project** GRE_78086 and then open the following design file:

[\Design\Standards\Seed\78086_Seed2d.dgn](#)

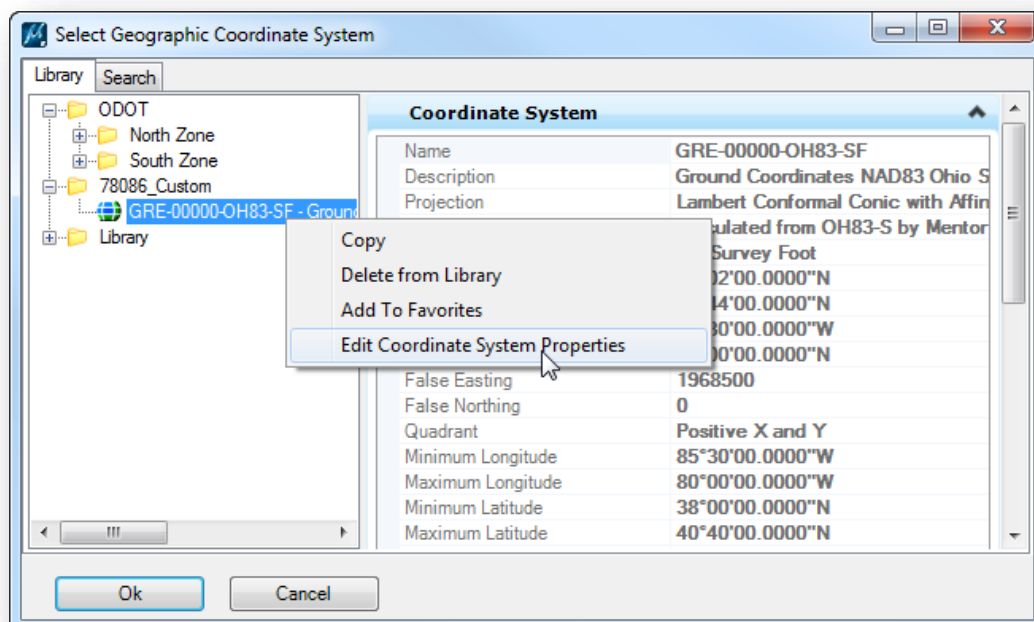
The GCS is uniquely assigned to each Model in the design file and can be reviewed by selecting **Tools > Geographic > Select Geographic Coordinate System** to access the dialog shown on the following page.



In the example above, the **Name** of the Coordinate System definition within the DTY file is still GRE-00000-OH83-SF even though the DTY file name was changed to 78068_Custom.dty.

The GCS definition cannot be edited unless **Bentley Map** is activated. Take the following steps to activate Map and edit the GCS name:

- ✓ From the MicroStation pull-down menu, select **Applications > Map > Activate Map**. If the option for Map is not available, either you did not open MicroStation using the appropriate shortcut to gain access to a PowerGEOPAK license, or Map has already been activated.
- ✓ After activating Map, choose **Tools > Geographic > Select Geographic Coordinate System** to access the *Geographic Coordinate System* dialog shown above.
- ✓ Choose the second icon, **From Library**, to access the *Select Geographic Coordinate System* dialog shown below.

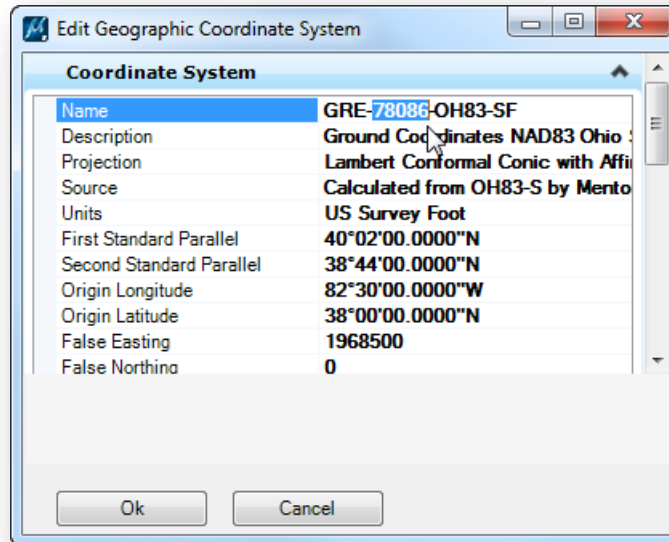


- ✓ Right-click on the custom GCS definition and choose **Edit Coordinate System Properties** as shown above. The *Edit Geographic Coordinate System* dialog is opened.

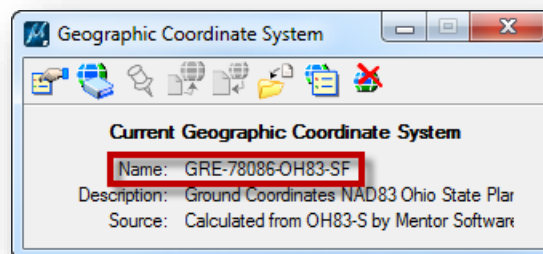


- ✓ Edit the **Name** of the Coordinate System to reflect the new PID number as shown in the example below.

Important! Be sure not to change any other values in the Coordinate System definition.

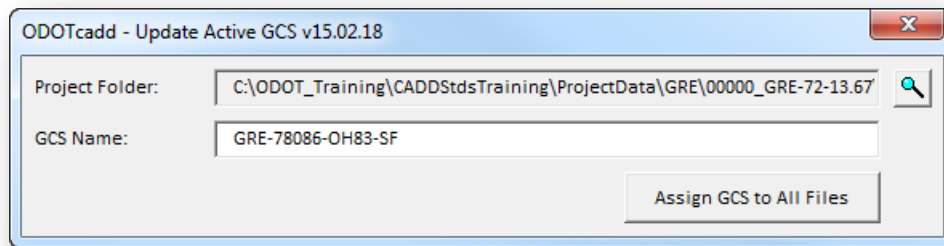


- ✓ Select **OK** to complete the edit, and then select **OK** on the *Select Geographic Coordinate System* dialog to make the GCS definition active. You should now see the renamed GCS listed in the *Geographic Coordinate System* dialog as shown below.



The GCS definition has now been updated with the correct PID number, however this change is not automatically propagated to the other Models in the active design file, or to any of the other design files in the project.

- ✓ It is necessary to reselect the GCS in every Model in every design file on the project. This can be facilitated using the **ODOT_AssignGCS.mvba** application. The application is accessed by selecting **ODOT > Project Management > Assign GCS** from the MicroStation pull-down menu. The dialog shown on the following page is opened.



The application will default to the **Project Folder** defined by the MicroStation configuration variable `_USTN_PROJECTDATA`. This variable is normally defined in the `.pcf` file for an ODOT project.

The application will display the **GCS Name** for the CGS that is defined in the active model of the current design file.

- ✓ Make sure the GCS Name is the name that you wish to propagate to all of the design files for the project.
- ✓ Select the **Assign GSC to All Files** button to initiate the process. The program will search every sub-directory from the **Project Folder** path looking for MicroStation files and will open every model in every file to assign the GCS that you have specified.

WARNING!

Running this application is going to touch every design file in the project. Make sure you want to do this before running this process.

- ✓ After the process is complete, open a few of the design files to verify that the GCS has been re-assigned to all of the models in each file.
- ✓ Exit MicroStation.



10 ODOTcadd MicroStation Utilities

ODOTcadd_ClientConfigurationTool.exe

Information for the ODOTcadd configuration for a typical ODOT installation of MicroStation V8i (SELECTseries 3) with PowerGEOPAK V8i (SELECTseries 4) can be found in the following document:

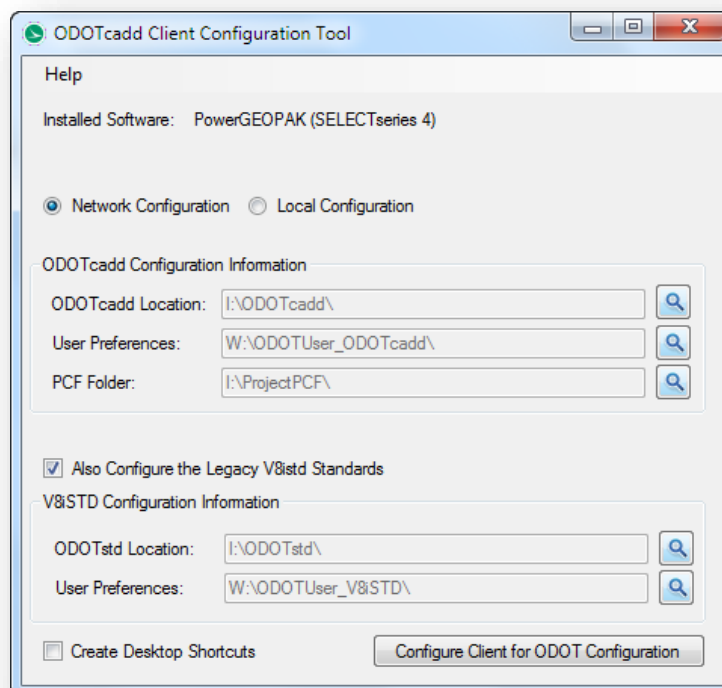
[\ODOTcadd\Standards\ReadME-ODOTcadd.pdf](#)

The **ODOTcadd_ClientConfigurationTool.exe** application, shown below, is intended to be run by the user after the system administrator has installed MicroStation and PowerGEOPAK on your computer.

The program is used to properly set up the client configuration on the local computer. The application is available from the ODOTcadd program group in the Windows Start Menu or can be accessed from the following location:

[\ODOTcadd\Standards\ODOT\Utilities\ODOTcadd_ClientConfigurationTool.exe](#)

Use of this program is optional. Administrators can have the users set up the MicroStation configuration manually following the guidelines established in the **\ODOTcadd\Standards\ODOTcadd-ReadMe.pdf** document mentioned on the previous page.



When initiated, the program will search for the default folders based on the installed software found on the local computer.



The folders for the **User Preference** files can be changed as necessary. For a typical ODOT installation, the folders shown above should be used. If the folder(s) have not been previously created, the program will show a blank entry for the applicable **User Preferences** field. The **Browse** icons include the option to create a new folder if these folders have not been previously created.

Once the folders have been defined, select the **Configure Client for ODOT Configuration** button to launch the process. The following functions are performed:

- 🕒 The program will clean out the contents of the folders specified for the **User Preferences** and reconfigure the folders with the necessary sub-folders for use with the ODOTcadd Standards as well as the ODOTstd\V8i Standards.

Note: This action completely removes all files in the specified User Preference folders. If the User Preference folders contain any customized files that you wish to retain, such as a MicroStation Function Key Menu or a Button Menu, be sure to make a copy of these files before initiating the process.

- 🕒 The contents of the C:\Temp folder will be completely removed and reinitialized with the proper sub-folders for a typical ODOTcadd installation.
- 🕒 The appropriate desktop shortcuts are copied from the ODOTcadd\Standards\config\shortcuts folder to the user's Desktop for access to MicroStation and/or PowerGEOPAK with either the legacy V8iSTD CADD Standards or the ODOTcadd Standards.
- 🕒 The program will write a redirect file named **z_ODOT_refirect.cfg** for the ODOTcadd configuration and place it in the following location:

C:\ProgramData\Bentley\MicroStation V8i (SELECTseries)\WorkSpace\Standards

The redirect file is used in conjunction with the desktop shortcuts to access MicroStation with either the legacy V8istd CADD Standards or the ODOTcadd Standards.

An example of the redirect file that was generated by the program is shown on the following page.



```
#-----
# Ohio DOT Site Configuration Redirect
#
# Written by the ODOTcadd_ClientConfigurationTool.
# Date: 2/12/2015 2:00:44 PM
#
#-----

%if defined(ODOTcadd)

    #ODOT System
    ODOT_ROOT = I:/ODOTcadd/ #ODOT data Root.
    ODOT_STD = I:/ODOTcadd/Standards/ #ODOT Standards folder path.
    ODOT_LOCAL = I:/ODOTcadd/Local/ #ODOT per site custom (in-house use)
    ODOT_USER = W:/ODOTUser_ODOTcadd/ #User data folder. Users preference files reside here.
    ODOT_PROJECT = I:/ProjectPCF/ #ODOT (*.pcf) folder path.
    ODOT_TEMP = C:/Temp/ #ODOT Temp folder for temp resources

    %lock ODOT_ROOT
    %lock ODOT_STD
    %lock ODOT_LOCAL
    %lock ODOT_USER
    %lock ODOT_PROJECT
    %lock ODOT_TEMP

    #ODOT Site Configs
    %if exists ($(ODOT_STD)config\Standards\*.cfg)
        %include $(ODOT_STD)config\Standards\*.cfg
    %endif

%elif defined(ODOTv8istd)

    ODOTSTD : I:\ODOTstd
    V8iSTD : $(ODOTSTD)\V8istd
    HOMEV8i : w:/ODOTUser_V8iSTD/
    V8iSTD_PROJDIR : $(ODOTSTD)/Projects/

    %if exists ( $(V8iSTD_PROJDIR)*.pcf)
        _USTN_PROJECT = $(V8iSTD_PROJDIR)
    %endif

    %if exists ($(HOMEV8i)*.ucf)
        _USTN_USER = $(HOMEV8i)
        _USTN_HOMEPREFS = $(HOMEV8i)
        MS_USERPREF : $(_USTN_PREFNAMEBASE).upf
        MS_DOCKINGPREF : $(_USTN_PREFNAMEBASE).docking.xml
        MS_TASKDIALOGPREF : $(_USTN_PREFNAMEBASE).TaskNavigation.xml
        MS_GROUPPANELPREF : $(_USTN_PREFNAMEBASE).GroupPanels.xml
    %endif

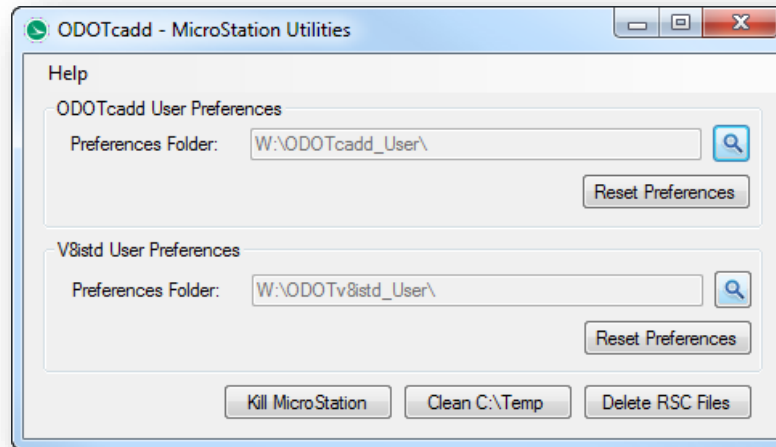
%endif
```



ODOTcadd_MicroStationUtilities.exe

The ODOTcadd Standards include a new Visual Basic program that can be used to perform some common maintenance tasks. The application is available from the ODOTcadd program group in the Windows Start Menu or can be accessed from the following location:

[\ODOTcadd\Standards\ODOT\Utilities\ODOTcadd_MicroStationUtilities.exe](#)



When accessed, the program will search for the default User **Preferences Folders** based on the software installed on the computer. The **Browse** buttons can be used to select the appropriate folders.

The application has the following four functions:

Kill MicroStation

Occasionally MicroStation or PowerGEOPAK will abort and close. In the case of a software crash, there is often an open software process still running for MicroStation or GEOAPK that should be ended. The **Kill MicroStation** function will end any running MicroStation or GEOAPK process.

Clean C:\Temp

ODOT uses the C:\Temp folder for temporary CADD files. Occasionally cleaning this folder is a good practice and is necessary when a new software version has been installed. Choosing the **Clean C:\Temp** option will delete all of the files in the C:\Temp folder and reset the folder back to the original state with the necessary sub-folders for a typical ODOT installation.

Delete RSC Files

GEOPAK uses resource files (.rsc) to store dialog box settings. Occasionally one or more of these resource files can become corrupt causing all sorts of problems. The **Delete RSC Files** function is used to delete all of the GEOPAK .rsc files found in the C:\Temp folder and the C:\Temp\rsc folder. It is good practice to delete the RSC files any time a new version of GEOPAK is installed.

Reset Preferences

It is occasionally necessary to reset the MicroStation User Preference File (.upf). Choose the **Reset Preference** option to reset the user preference back to their default state. This should always be done after installing a new version of MicroStation.



11 PDF Printing with Print Organizer

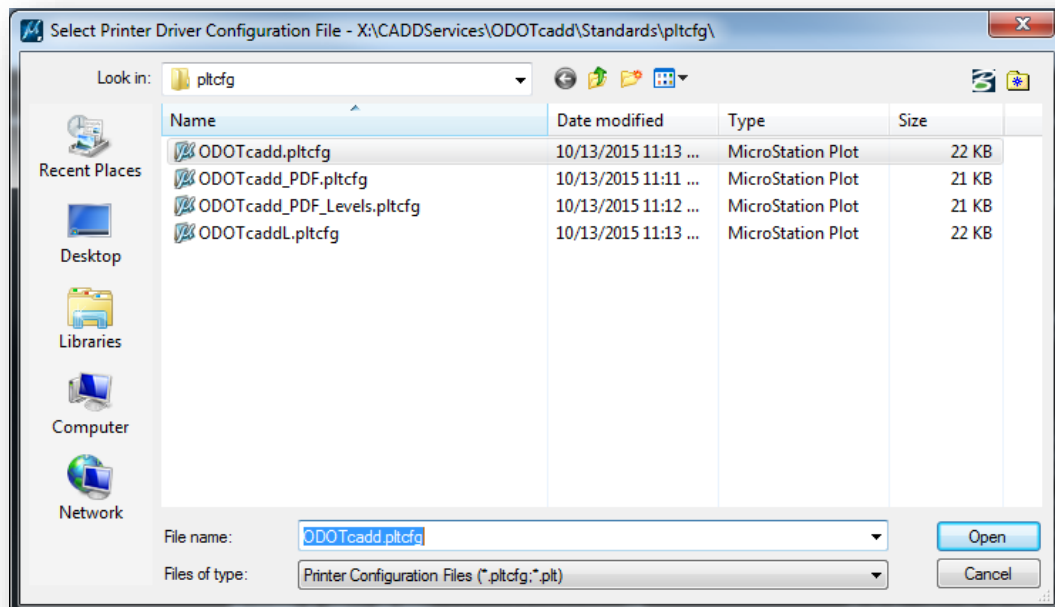
Printing Multi-Page PDF Files Process Overview

ODOT is transitioning towards the use of multi-page PDF files for plan submissions instead of TIFF images. PDF printing is facilitated using the MicroStation Print Organizer.

The **Print Organizer** is a MicroStation utility for printing and reprinting a set of design files, models, or Project Explorer links. The files that are to be printed are saved as a print set file (.pset).

The steps to create and print a multi-page PDF are summarized below:

- 1. Select **File > Print Organizer** from the MicroStation pull-down menu to launch the application.
- 2. The *Print Organizer* dialog will default to the last print driver that was used when the application was opened. If this is the first time you open the dialog, you will be prompted to select a print driver as shown below.



ODOTcadd.pltcfg

Select this print driver to plot full size or quarter size plan sheets.

ODOTcadd_PDF.pltcfg

Select this print driver to create a multi-page PDF file

ODOTcadd_PDF_Levels.pltcfg

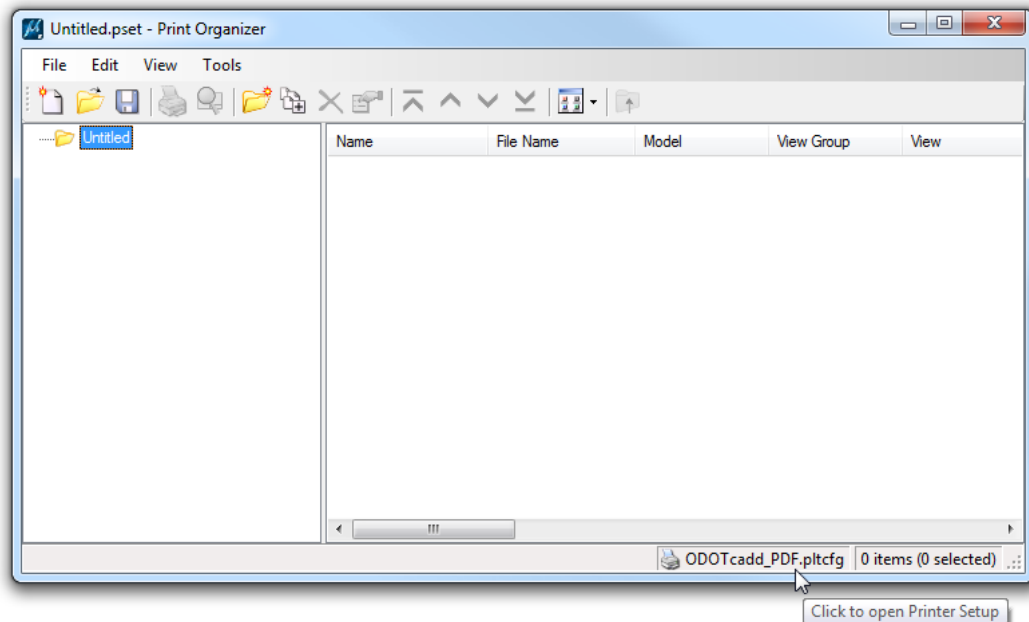
Use this print driver to create a multi-page PDF with levels. Note: The resulting PDF file size can be quite large when using this option.



ODOTcaddL.pltcfg

This print driver is used to plot letter size (8.5" x 11") plan sheets.

If the print driver has been previously selected, the current print driver is listed at the bottom of the dialog as shown below. You can click on the name of the print driver to select a different driver.

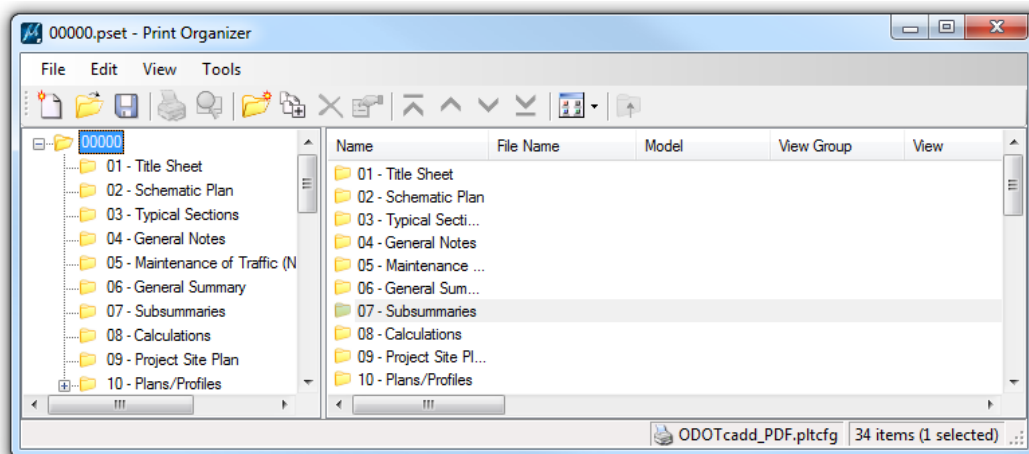


- Open the PSET file for the project.

When a project is created using the **ODOTcadd_CreateNewProject.exe** utility, a .pset file is created for the project in the location shown below. The file is named using the PID number for the project.

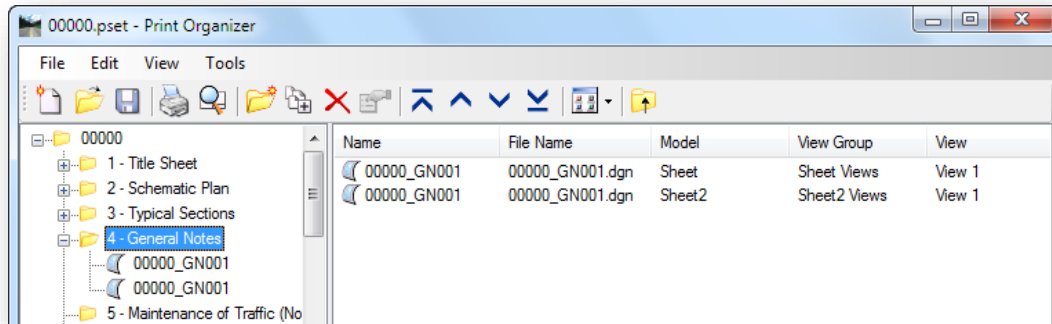
... \Design\standards\pltdrv\####.pset

The PSET file is prepopulated with folders to organize the design files that will make up the print set as shown below.





- Add the design files for the project to the Print Organizer. This can be accomplished using the **Add files to Set** icon, or by dragging and dropping files from Windows Explorer into the appropriate folder.
- As files are added to the print set, the name of the design file is used as the **Name** for the sheet in the print set. In the example below a General Notes design file was added to the print set that contained 2 sheet models.



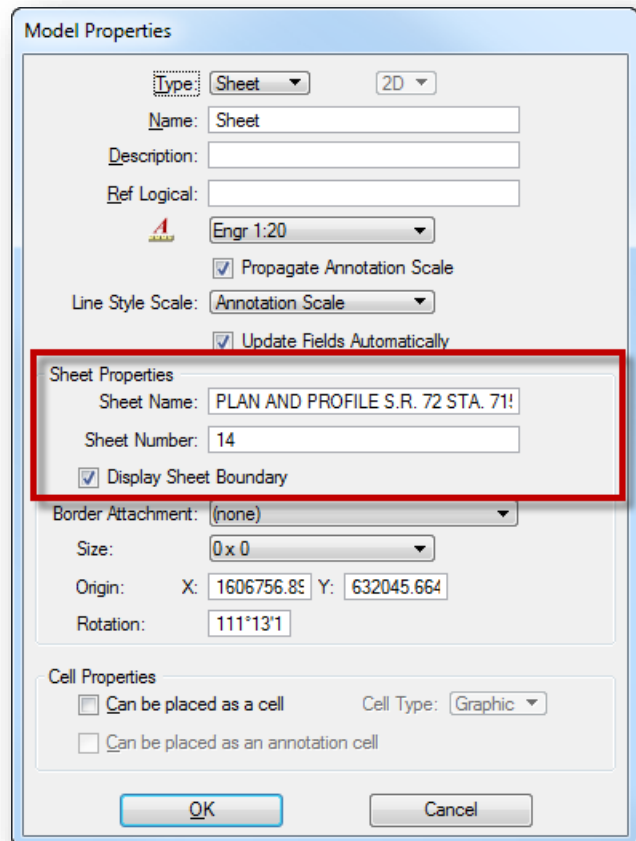
Note: Design Models are not included in the print set.

- The ODOT configuration allows for the **Sheet Name** as defined in the *Model Properties* dialog to be used as the **Name** in the PSET file.

The **Sheet Name** and the **Sheet Number** properties are automatically assigned to the *Model Properties* when the **ODOT_SheetManager.mvba** application is used.

The **Display Sheet Boundary** option must be toggled on in order for the Print Organizer to recognize the **Sheet Name** property.

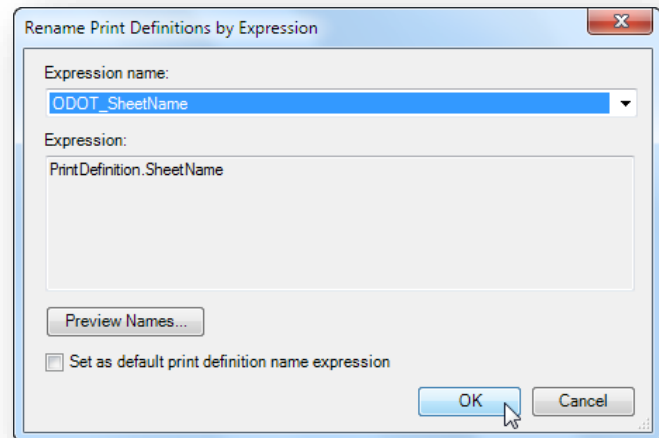
Note: The Sheet Number field is limited to numeric values only. Alphabetic characters are not supported.



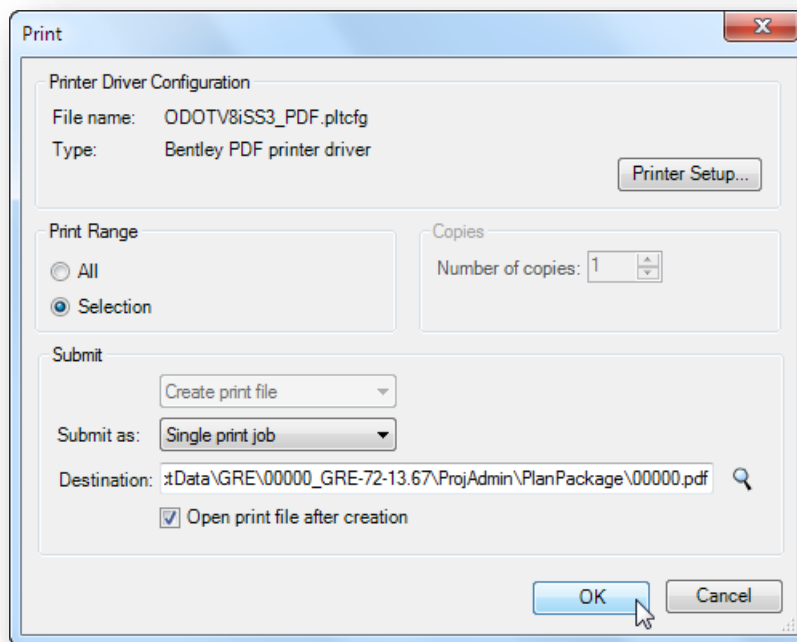
- To define the print set **Name** using the model **Sheet Name** property, take the following steps:



- Select the file or folder in the *Print Organizer* dialog that you wish to update using the model's **Sheet Name** property. To update all the files in the print set, select the top level PID Number folder.
- From the *Print Organizer* dialog, select **Edit > Rename by Expression** to access the *Rename Print Definitions by Expression* dialog.
- Change the **Expression Name** value to **ODOT_SheetName**. Choose the **OK** button to apply the model's **Sheet Name** property to the selected file(s) in the print organizer.



- Choose the **Print** icon to create a PDF file from the print set.



Print Range

The **Print Range** can be set to **All** or **Selection**. All will print the entire contents of the print set. Selection will print only the selected items.

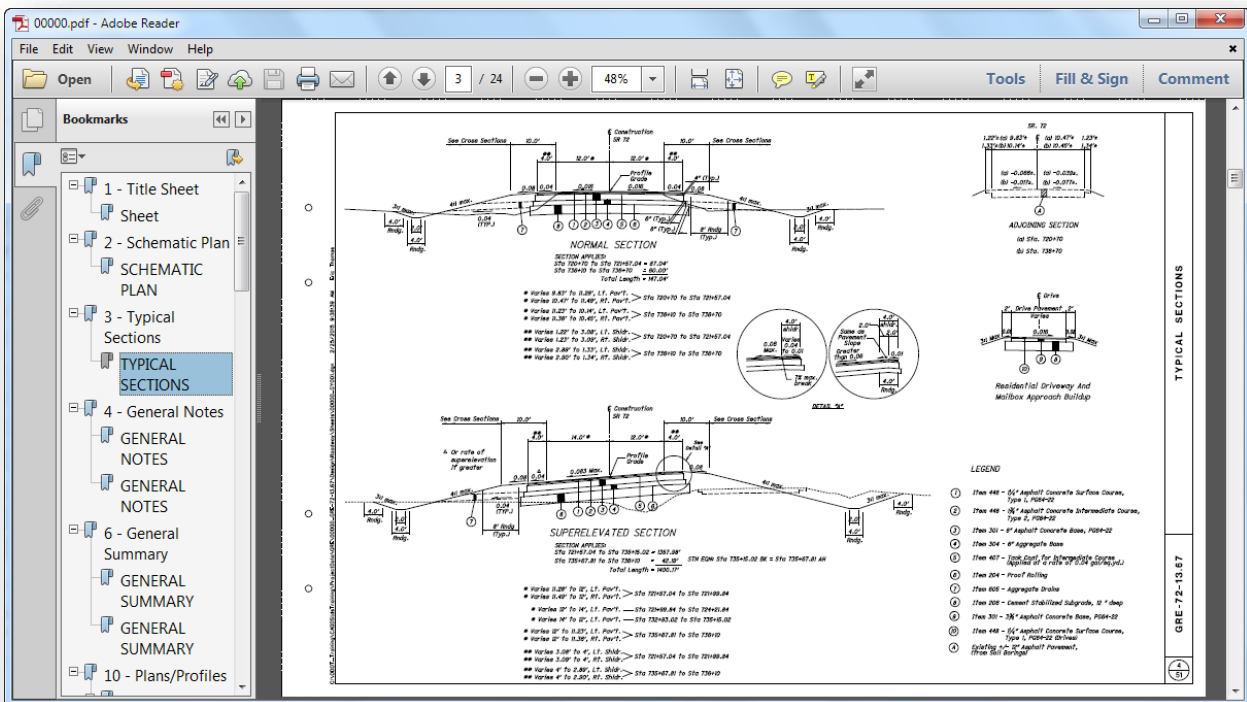


Destination

The **Destination** field is used to define the location where the PDF file is created. The MicroStation variable MS_PLTFILES is used to define the default location. This variable has been defined in the Project Configuration File (.pcf) for ODOT projects to save the PDF files in the following folder for the project:

\ProjectAdmin\PlanPackage

- 🕒 The completed PDF is organized by the order of the folders and files listed in the Print Organizer dialog. Bookmarks for each sheet in the plan set are created within the PDF file as shown in the example below.



- 🕒 After the PDF file has been generated, be sure to save the PSET file settings. Choose **File > Save** from the *Print Organizer* dialog to save the PSET file.



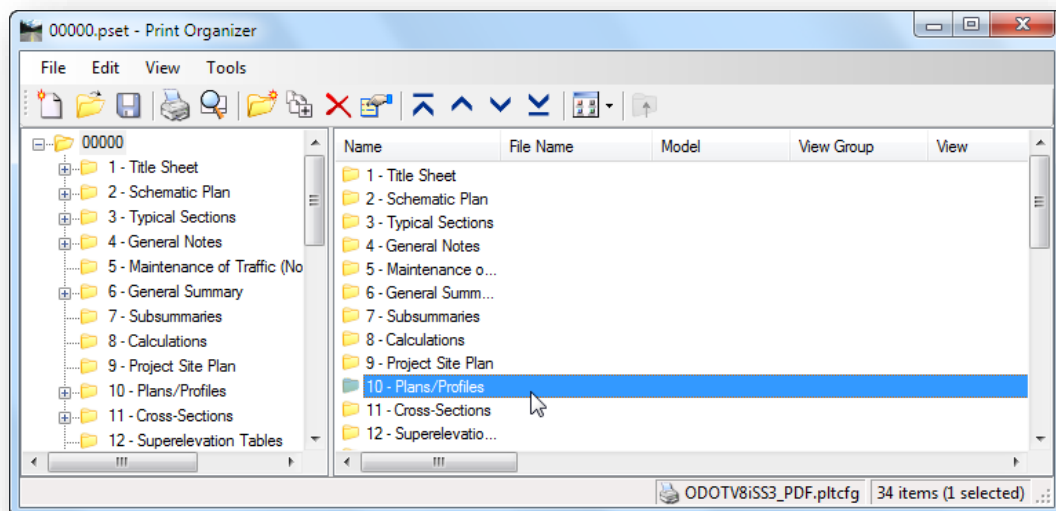
Updating a Print Set

A previously saved PSET file can be opened and reused to generate a new set of prints, or a new PDF file as needed.

The PSET file contains a “snapshot” of the design files at the time the print set was created. The PSET file is not dynamically linked to the design files and must be updated if any changes have been made to the design files since the time the PSET file was created.

Take the following steps to update the print set:

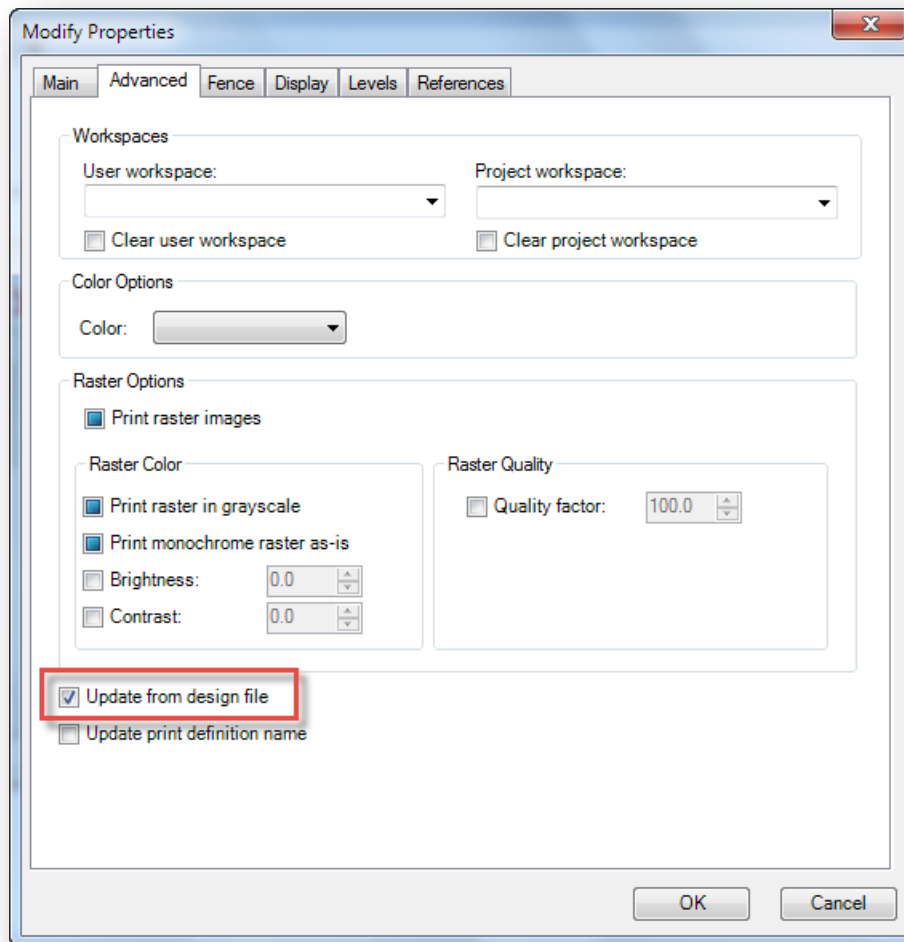
- Start Print Organizer by selecting **File > Print Organizer** from the MicroStation pull-down menu.
- Open the PSET file.
- From the *Print Organizer* dialog, select the top level folder (typically the PID Number). The sub-folders contained in the PSET are listed on the right side of the dialog. Select the sub-folder(s) that you wish to update. In the example below, the PSET definition for files listed in the **Plan/Profiles** folder will be updated.



- From the *Print Organizer* dialog, select **Edit > Properties** to access the *Modify Properties* dialog shown on the following page.



- Toggle on the **Update from design file** option on the **Advanced** tab.
- Choose **OK** to initiate the process. The PSET is updated by reading the selected files.



- After the PSET has been updated, proceed to print the files or create a new PDF as necessary.



Exercise 11 – Creating a Multi-Page PDF with Print Organizer

In this exercise we will create a multi-page PDF file for the sample project.

Note: The project and design file names may have been changed from what is shown below if you have run the **ODOTcadd_ChangePID.exe** application as detailed in Chapter 9.

- ✓ Open MicroStation using the shortcut for the training class.
- ✓ From the MicroStation *File Open* dialog, choose the **GRE_00000_GRE-72-13.67** Project.
- ✓ Open the following design file:

[\Roadway\Sheets\00000_GT001.dgn](#)

- ✓ From MicroStation, start the Print Organizer by selecting **File > Print Organizer**.
- ✓ Select the **ODOTcadd_PDF.pltcfg** print driver
- ✓ A PSET file is included with the dataset. From the *Print Organizer* dialog open the PSET file:

[\Design\Standards\pltdrv\00000.pset](#)

- ✓ Using this chapter as a guide, populate the PSET dialog with the design files for the project. Make sure to import the design files into the proper sub-folders within the *Print Organizer* dialog.
- ✓ After importing the design files, use the Rename by Expression option to set the name of the files within Print Organizer using the Model's **Sheet Name** property.
- ✓ Create the PDF file.