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Digital Design Environment Guide

ENGINEERING APPLICATIONS-OFFICE OF ENGINEERING-CTDOT

Digital Design Environment Guide

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Section 1 Introduction

1.1 CTDOT's Digital Design Environment (DDE)

The Digital Design Environment (DDE) at CTDOT is an environment that allows the creation, modification, and exchange of high-value electronic engineering data. The information contained in CTDOT's DDE was developed for use with CTDOT's foundation CAD platform MicroStation from Bentley Systems Inc.

The goals of CTDOT's DDE Guide are:

- To provide an environment that will enable users of all skill levels to produce engineering drawings and documents in accordance with CTDOT standards.
- To maintain interoperability and collaboration with Consultant Engineers and State Design staff.
- To provide one storage location for all project planning, design and construction electronic data.
- To create high-value electronic data that maintains its attributions well into the future and can be used in an interactive decision system.
- To meet the Governor's Executive Order No. 3 "All state agencies in the executive branch and all higher education agencies and institutions shall post all bids, requests for proposals and all resulting contracts and agreements on the State Contracting Portal and shall, with the assistance of the Department of Administrative Services and the Department of Information Technology as needed, develop the infrastructure and capability to electronically communicate with the State Contracting Portal."
- To publish contracts in a common format – PDF.

A term that is becoming more important within many state DOT's is "High Value Data (HVD)". HVD is electronic data that is a byproduct of the design process. HVD includes digital terrain models (DTM's), alignments (ALG's) and others. These files can be used during the Construction phase of the project for digital terrain queries and optional GPS driven earth moving equipment. More importantly, these files can also be used in the life cycle maintenance of a designed transportation facility. Coming full circle, these files can be used for any rehabilitation or modification of the existing project in the future. Previously, CTDOT has only supplied the paper contract drawings and specifications to the Contractor and Construction Inspectors. With CTDOT's project container electronic file storage approach, this data is now in place and searchable for future queries. HVD can be used in a Management Information System (MIS) and Geographical Information System (GIS).

1.2 Engineering Applications Staff Responsibilities

The Engineering Applications (EA) Section is responsible for the development and maintenance of CTDOT's DDE. Since there are many components to the DDE, each EA staff member is allocated to specific subject areas.

[Table 1-1 Engineering Applications Contact List](#) shows the Engineering Applications staff and their responsibilities:

Table 1-1 Engineering Applications Contact List

Name	Responsibilities	Tel Number	Email
William Pratt P.E	All	860.594.3320	William.Pratt@po.state.ct.us
Julie Annino	ProjectWise Coordinator, GIS, Documentation	860.594.2730	Julie.Annino@po.state.ct.us
Eric Bergeron	ProjectWise Business Functions, Internet/Intranet apps, Project and PDF Development	860.594.3152	Eric.Bergeron@po.state.ct.us
John Rinaldi Betty Bolden	MicroStation/ProjectWise Production	860.594.3323 860.594.3216	John.Rinaldi@po.state.ct.us Betty.Bolden@po.state.ct.us
Elaine Richard Greg Sardinkas	InRoads Development/Training Storm & Sanitary Quantity Manager	860.594.3278 860.594.3453	Elaine.Richard@po.state.ct.us Greg.Sardinkas@po.state.ct.us
Bruce Bourgoin	Project Marketing, Training, MicroStation Apps	860.594.2760	Bruce.Bourgoin@po.state.ct.us
Kathleen Zimmerman	AASHTO Trans.port, Project Accounting	860.594.3326	Kathleen.Zimmerman@po.state.ct.us

1.3 Discipline Representatives

Each engineering discipline within CTDOT has one or more representatives. They are the lead contacts for any applications required by that discipline. [Appendix B](#) contains the Discipline Representatives and their contact information.

1.4 Purpose of CTDOT's Digital Design Guide

The intent of this guide is to define uniform procedures as well as to explain the structure of CTDOT's DDE. This guide will identify standard resource files, configurations, and CAD functions used in the creation, management and publishing of electronic data.

This guide does not replace the need for other references and training. Additional publications and training may be needed for further clarification of CAD procedures and functions. This guide is not intended to prevent or limit individual initiatives and engineering judgment used in project design and development. Rather, it is meant to document standard digital design procedures in practice at CTDOT.

Users of this guide include Designers, Planners, Surveyors, and CAD Managers that work at or with CTDOT staff. The information provided in this guide is subject to change as technology and experience warrant. Therefore, this guide will be updated as major revisions in design software and CTDOT DDE policies occur. Addendum to this guide will be available in digital format only.

The DDE guide is available on the web at the following address:

<http://www.ct.gov/dot/digitaldesign>

The website also contains all legacy versions to this guide. Any comments regarding this guide should be forwarded to:

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Section 2 Overview of the DDE

2.1 General

This chapter will describe the DDE, the software requirements and its related components including the project container and the engineering discipline workspaces.

The following software was used for CTDOT's 2007 DDE Development

- MicroStation® Version 8.05.02.35
- InRoads® Version 8.05.00.00 (SP v08.05.04.00)
- Microsoft Windows® XP Professional (with service pack 2)
- Bentley XM Prerequisites® 08.09.00.20
- ProjectWise Plot Organizer® Version 08.09.02.26

Any support calls to Engineering Applications will require at least these versions for support to initiate.

Please refer to <http://www.ct.gov/dot/digitaldesign> for the latest versions and types of design software being utilized by CTDOT.

(MicroStation, ProjectWise Plot Organizer and InRoads are registered trademarks of Bentley Systems, Inc., AASHTO is a registered trademark of AASHTO, and Windows is a registered trademark of Microsoft, Corp.)

Throughout this guide, the terms "design file" and "data file" will be used in place of references to a particular file type. That is, the term "design file" refers to a MicroStation .dgn file, and "data file" refers to any file that is not MicroStation .dgn file. Data files include spreadsheets, databases, any portion of a database such as tables, queries, and text documents. Also, the terms "directory, subdirectory, folder and subfolder" will be used interchangeably in the text. Hyperlinks are in bold letters throughout this guide.

Section 3 DDE Installation and Setup

CTDOT's MicroStation Workspaces and Project containers were developed to reside on servers. This allows DOT standards and project files to be centrally maintained, MicroStation workspaces to roam with users, and pc's to be upgraded without deleting customizations. Minimal customizations, however, are done locally such as program installs, printer setup, folder creation, and desktop shortcut modifications.

3.1 Local Program Locations

CTDOT recommends that Bentley software be installed under C:\Bentley_V8 and C:\Bentley_XM due to IT security restrictions in "Program Files". Users must have read/write permissions to these folders and their subfolders. Even if MicroStation XM will not be installed, the Bentley_XM folder is still necessary for **ProjectWise Plot Organizer** to run with **MicroStation** 2004. Currently, the Department is running **InRoads** 8.5 which is installed under C:\Bentley_V8\Civil. InRoads 8.9, if installed, should be under C:\Bentley_XM\Civil. (see [2007_step_by_step_DDE_install.pdf](#) – Step 1)

3.2 Project and Workspace Installation

The two DDE main folders are CTDOT_V8_Workspaces and CTDOT_Projects. We recommend installing them on a server for all users to access through a network, but they can also be installed locally on a laptop as well. They do not have to reside on the same drive or server, but may. The two folders are simply extracted from a zip file. (see [2007_step_by_step_DDE_install.pdf](#) – Step 2)

3.2.1 Directing MicroStation to the DDE Folders

CTDOT uses a startup configuration file MicroStation to point to the DDE folders. This configuration file, CTDOT_Startup.cfg, is found under the main CTDOT_V8_Workspaces folder and must be edited to point to both the Project and Workspace locations. (see [2007_step_by_step_DDE_install.pdf](#) – Step 2.2)

3.2.2 MicroStation Desktop Shortcut Modifications

Windows desktop shortcuts are a quick way to access programs. CTDOT uses customized desktop shortcuts to execute sessions of MicroStation. The shortcut target contains the MicroStation (or InRoads) executable path and the CTDOT_Startup.cfg path. Careful attention must be paid to the Program and Workspace locations. The shortcut also sets a "Discipline" configuration variable which allows users to work in various environments such as Bridge, Highways, Surveys, etc. (see [2007_step_by_step_DDE_install.pdf](#) – Step 2.3)

3.3 Printing and Plotting Setup

The local pc requires that a folder to be created, a virtual printer to be added, and DLL's to be registered. On the server end, IPLOT set files can be created for each print queue to allow printer specific settings. (see [2007_step_by_step_DDE_install.pdf](#) – Step 3)

3.3.1 C:\Plots Folder

C:\Plots must be created on all clients. It is used as a temporary storage folder for plot files and plotting resources. Like the Bentley_V8 and XM folders, C:\Plots must be accessible by all users.

3.3.2 Virtual Printer Setup

A virtual printer is not a physical computer printer. It is used to create a document rather than print it on paper. A virtual printer must be added on each client using the available printer driver supplied by ProjectWise Plot Organizer. This “printer” is used to compile interactive PDF sets using a custom paper size. (see [2007 step by step DDE install.pdf](#) – Step 3.2)

3.3.3 Custom DLL's

DLL's (Dynamic-link libraries) must be locally installed and registered. They are commands used to mine MicroStation tag data. This information is used within ProjectWise Plot organizer to prepare a plot set for PDF compilation or batch printing. (see [2007 step by step DDE install.pdf](#) – Step 3.3)

3.3.4 Plotter Specific *.set Files

A *.set file must be created for each output device, including the above virtual printer. Set files define plotting areas, color and pen tables, design scripts, and printer specific setting. (see [2007 step by step DDE install.pdf](#) – Step 3.4)

Section 4 MicroStation \ DDE

Configuration and Customization

The installed MicroStation program has two main configuration files – Msconfig.cfg and Mslocal.cfg. The DDE does not modify these files because a software upgrade would reset them. CTDOT uses a server-based approach for customization whenever possible to avoid this.

4.1 Configuration Levels and Files

MicroStation configuration variable files are text files that set or retrieve values such as cell library paths, the MicroStation version which is running, default plotting files, etc. The DDE customizes many of these variables and takes advantage of the order in which MicroStation processes them. Configuration file levels include: System (MicroStation 2004 v. XM), Site (Architectural Disciplines vs. Highway Design), Project (Old Standards vs. New), and User (Preferences and Interfaces).

4.2 Processing the DDE Configuration

Users enter the DDE by starting MicroStation (or InRoads) through a desktop shortcut modified to use a specific Discipline environment (see [3.2.2 MicroStation Desktop Shortcut Modifications](#)). The shortcut runs the local executable and immediately jumps to a remote location to set Project and Workspace paths. Both a Discipline Workspace and the Department Standards are processed to access plot resources, barmenus, cells, design libraries, etc. Based on the selected Project Workspace, reference file paths are resolved, linestyle and font resources are set, and project specific resources are made available. Any specific user settings and tools are also available. (see [2007 step by step DDE install.pdf](#) – Step 4)

4.3 Initial User Customization

Each user must initially customize a MicroStation user workspace and interface. If the DDE Workspace folder is server based, the user only needs to do this once for each MicroStation 2004 and XM. If the environment is local, this must be repeated on every client for every new user who accesses MicroStation. The initial customization involves creating a new MicroStation User Workspace, User Preference, and User Interface that is based on their Windows login name. (see “Step by Step Instructions” – Step?)

4.4 Project Driven Standards

In order to develop new standards based on software enhancements and to accommodate existing ones, MicroStation must be able to discriminate between old and new projects. The project configuration file (*.pcf) defines the project type (old or new) and points MicroStation to the proper subfolders in the Workspace directory.

(see [2007 step by step DDE install.pdf](#) – Step 4.2.4)

Section 5 CTDOT's DDE Contents

CTDOT's Digital Design Environment (DDE) consists of a CTDOT_Projects folder and a CTDOT_Workspace folder. The combination of these folders, all files found within them, along with the required software from [Section 2 Overview of the DDE](#), give the user all the resources required to develop designs and contract plans that meet CTDOT standards and organization.

The project container, when in use, includes raw data, works-in-progress, along with the final contract documents. The files in the project container encompass all types of project information in various formats including design files (.dgn), correspondence files (.doc), images (.jpg), preliminary and final contract documents (.pdf) and other essential data files needed during the design life of a project. Within the project container, each engineering discipline has a file naming convention for project work in their particular project subfolder. The discipline-specific naming conventions will be discussed in [Appendix C File Naming Conventions](#) of this guide.

Workspaces are created exclusively for each engineering discipline, such as Bridge Design, Facilities, Highways, Planning, Traffic and Survey. The discipline workspace is considered a working environment that contains the resources needed to maintain CTDOT's standards. A further discussion of these workspaces will be provided in the text.

5.1 CTDOT's Project Container

[Figure 5-1 CTDOT_Projects](#) displays a list of projects in the CTDOT_Projects folder of CTDOT's DDE. This folder is typically on a network shared directory (//sh3dgs18/CTDOT_Projects/) and likewise on a Consultant installation outside of the Department.

CTDOT will be migrating this to the ProjectWise Document management system in the future. Consultant Engineers working for the Department will not be required to install ProjectWise; rather they will use ProjectWise's Web Portal for secure file transmission, similar to a ftp site..

In this folder, projects are typically named with three numerical designations (Town No.) followed by an underscore, and then followed by four alphanumeric characters (Project No. within that town). For example, 004_0123 and 025_H017 are typical project numbers. Any project number that contains an alpha character indicates one of two possibilities; either the project is in an initiation stage or the project is in a concept stage. The list below shows the typical designations:

- "H", then the project is in the initial phase, and the project number is considered a temporary number.
- "X", then the project is in the concept stage.

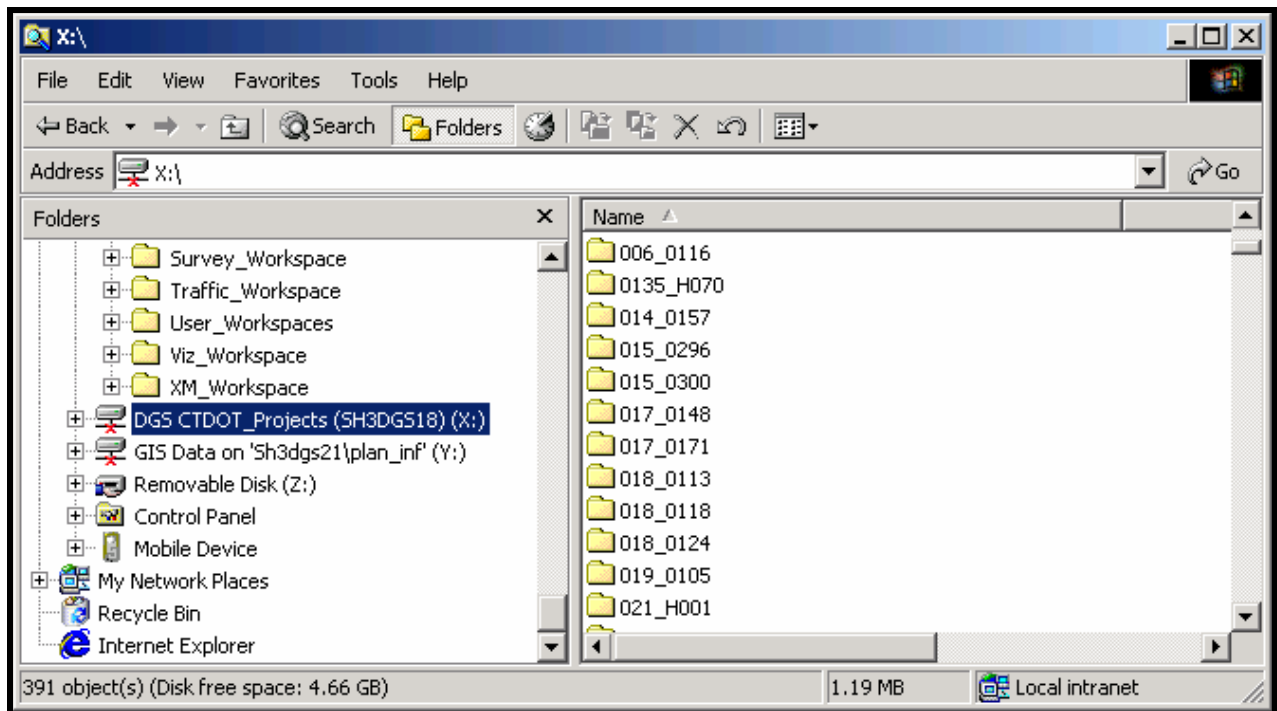


Figure 5-1 CTDOT_Projects

5.1.1 Creating the Project Container

A standard project template has been developed and shall be used for any new projects created. This template will evolve over time as new enhancements become available to CTDOT's DDE.

When a project is created, the engineering discipline subfolders in the project directory are initially empty. As project data develops, the folders are populated with MicroStation files, InRoads files, digital terrain models, spreadsheets, databases, email correspondence and other documents.

In the future, as ProjectWise moves from a development environment into a production environment, the project container will migrate into the ProjectWise document management system.

Along with each project container a project configuration file (.pcf) must exist for selection upon entering MicroStation. For more on configuration files, see [2007_step_by_step_DDE_install.pdf](#) – Step 4.2.5.

For CTDOT staff, Engineering Applications has the authority to create new projects. A form is available on the Intranet under Engineering Applications/ New Project Container Folder: <http://CTDOT/common/forms1.aspx>

For Consultant Engineers working outside of CTDOT, a project template is delivered with the DDE at: <http://www.ct.gov/dot/digitaldesign>

5.1.2 Project Container Subfolders

In each project container folder there are subfolders organized by data type.

The “100” series of folders represent Contract Documents. The “200” series of folders are areas for digital submissions. The “300” series of folders represent an area for administration of the contract. Any data written to these folders will require special access.

The remaining folders store high value data, design data and contract drawing files in MicroStation format from various disciplines. [Figure 5-2 Typical Project Container Subfolders](#) displays the directory structure for a typical project:

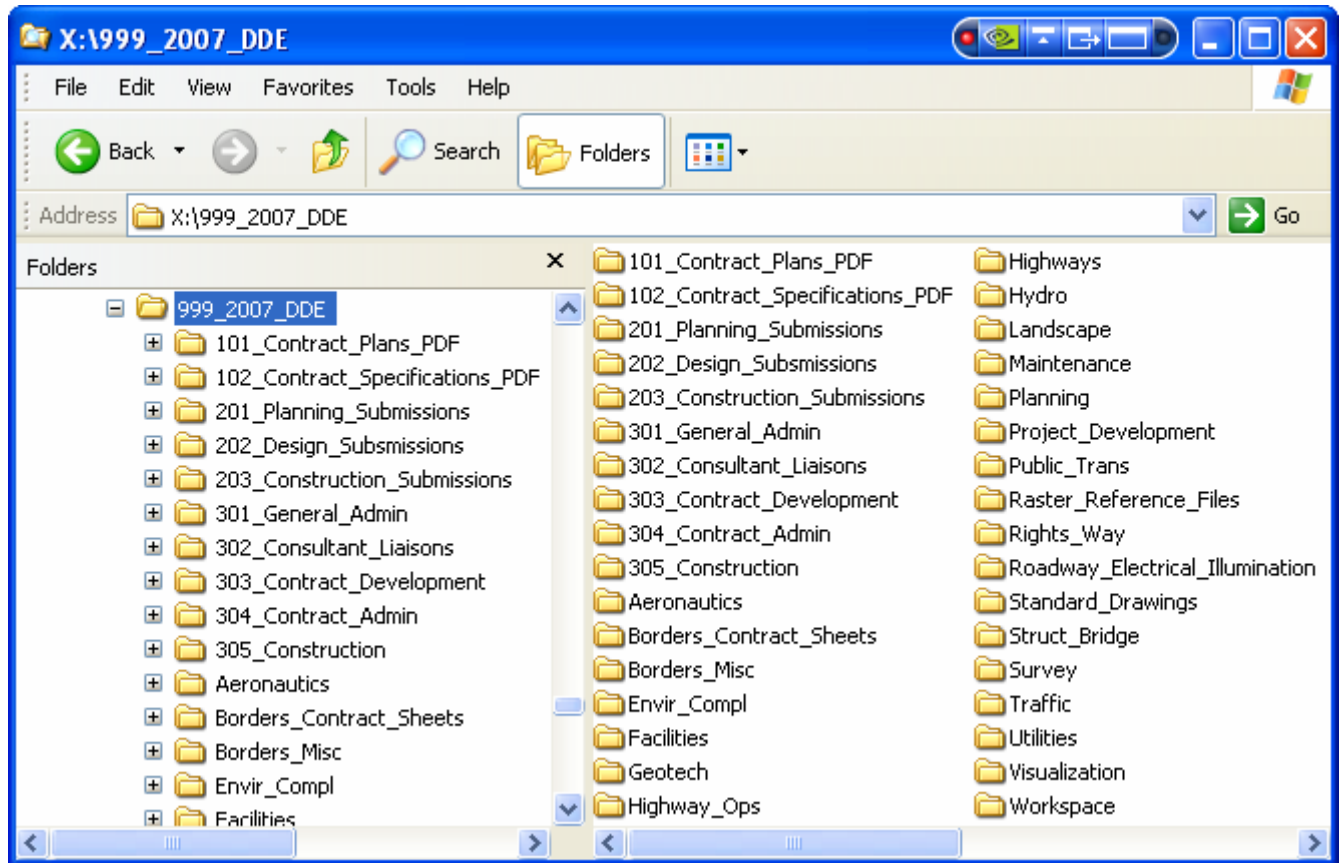


Figure 5-2 Typical Project Container Subfolders

5.1.2.1 101_Contract_Plans_PDF (Work-in-Progress)

Figure 5-3 101_Contract_Plans_PDF shows the future contents of this folder. This folder is the final storage location for future digitally signed contract plan information.

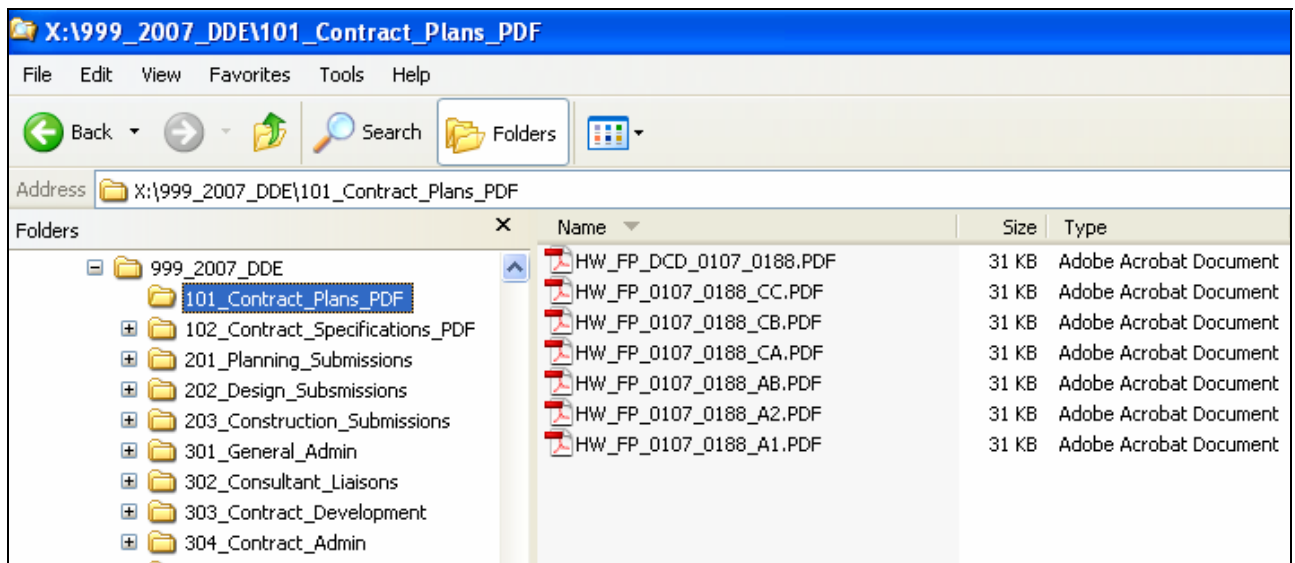


Figure 5-3 101_Contract_Plans_PDF

At this time, all the data within this subfolder shall conform to Adobe PDF format and to Appendix C File Naming Conventions.

Below is an example of a typical Highway Design final plan submittal. For further details regarding submissions, please refer to [Section 9 Design Submissions](#) and [Appendix C](#). Security on this folder will allow for write access for Contract Development and Contract Administration. Contractors will not be able to read or write to this folder.

- **HW_FP_DCD_0107_0188.PDF** = This file represents the final set of contract drawings available at contract advertising and will likely be required to be a digitally signed and certified document. Note that a workflow will be required to check an unsigned PDF plan set prior to placement of digital signatures on a document. The unsigned plan set will likely reside in the 202_Design_Submissions folder.
- **HW_FP_0107_0188_A1.PDF** = This file is an addendum (Addendum 1). The HW_FP_DCD_0107_0188.PDF file listed above must also be revised to include custom stamping performed in Acrobat, which denotes sheets that are being revised, replace or deleted.
- **HW_FP_0107_0188_CA.PDF** = This file is the consolidated final plans, addendums, construction orders with any as-built information placed as comments by the Office of Construction.
- **HW_FP_0107_0188_AB.PDF** = This file would be the typical as-built set of drawing and of federal aid mapping.

5.1.2.2 102_Contract_Specifications_PDF (Work-in-Progress)

Figure 5-4 102_Contract_Specifications_PDF shows the contents of this folder. This folder is the final storage location for contract special provisions.

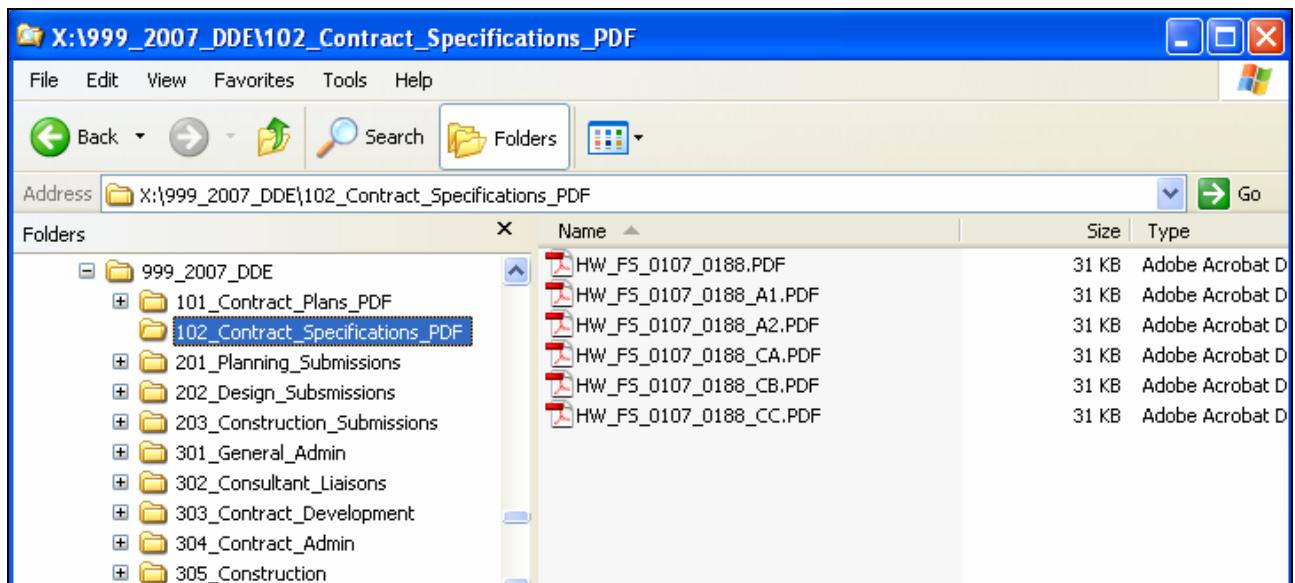


Figure 5-4 102_Contract_Specifications_PDF

At this time, the data within this subfolder shall conform to Adobe PDF Format and have a naming convention in conformance with [Appendix C File Naming Conventions](#). For this example a Highway designed project was used. Security on this folder will allow for write access for Contract Development and Engineering Applications.

- **HW_FS_0107_0188.PDF** = This file represents the final set of contract special provisions available at contract advertising.
- **HW_FS_0107_0188_A2.PDF** = This file represents the naming convention of addendum special provisions and specifications.
- **HW_FS_0107_0188_CA.PDF** = This file represents the naming convention of a construction order issued.

5.1.2.3 201_Planning_Submissions (Work-in-Progress)

This folder stores all project planning submissions.

5.1.2.4 202_Design_Submissions (Work-in-Progress)

This folder stores all project design submissions by both State designers (Division of State Design), (Division of Traffic Engineering) and consultant engineers (Division of Consultant Design) and others. This folder also stores additional information that is generated by the Department. This additional information would include review comments and other correspondence that is generated in the review process. [Figure 5-5 Typical Design Submission](#) represents a typical submission set of PDF documents based on highway design milestones.

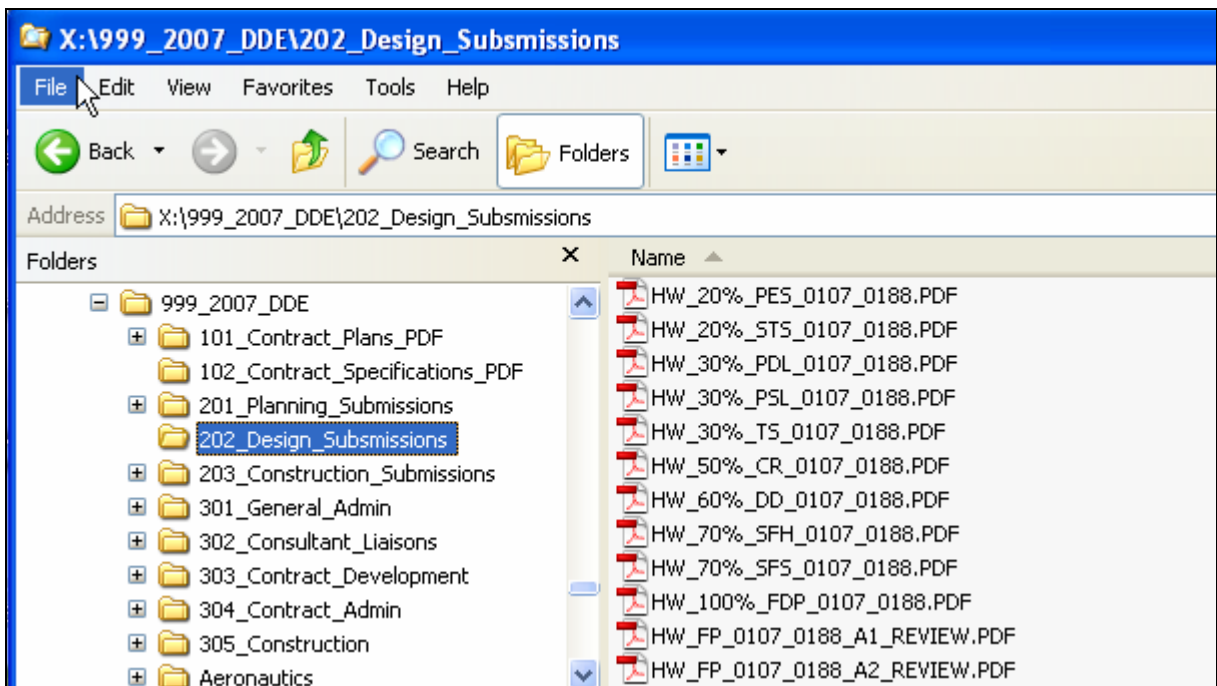


Figure 5-5 Typical Design Submission

Any Consultant submitting files from outside of the Department will not see or read any files within this folder other than those submitted by them or attributed for their reading. Designers are encouraged to begin using this folder for the submission of specifications and special provisions, according to Contract Development's procedures. File naming conventions for have been developed for Highway, Bridge and Facilities Design. Further information regarding submissions and naming conventions can be found in [Section 9](#) and [Appendix C](#).

5.1.2.5 203_Construction_Submissions (Work-in-Progress)

This folder stores all project related construction submissions (i.e. Shop Drawing, RFI's, Construction Order Submittals and Requests). All files within this folder are in Adobe PDF format. Any Contractor submitting files from outside of the Department will not see or read any files within this folder other than those submitted by them or attributed for their reading.

5.1.2.6 301_General_Admin

This folder stores all project administration data. General correspondence and other information that is used to administer the project should be stored in this location. The Office of Fiscal/Special Projects should maintain their data in this folder. Applications for the project container would also be located here.

5.1.2.7 302_Consultant_Liaison

This folder will be used by the Department's Consultant Liaison Engineer and Project Manager assigned to the subject project. Information such as memorandums and other correspondence should be stored in this folder.

5.1.2.8 303_Contract_Development

Contract information for cost estimates along with reviewing and contract compliance data should be stored in this location by the Contract Development and the Estimating section.

5.1.2.9 304_Contract_Admin

Any project information developed by the Contracts Section which is within the Department's Division of Contract Administration should be stored in this folder.

5.1.2.10 305_Construction

Any project information developed by the Office of Construction should be stored in this location. This location would also be used for future integration with Construction's Site Manager and Expedition applications. This folder may be used for archiving the data from those applications when the project is completed.

5.1.2.11 306_Maintenance

The Office Maintenance should use this folder for any project related information that they would generate.

5.1.2.12 CTDOT Discipline Folders

The discipline folders are the main storage areas for all design and contract production data. All disciplined produced data shall reside in these subfolders. See [Appendix C File Naming Conventions](#) for more information regarding this subject.

At this time the following discipline folders reside in CTDOT's Project Container:

<u>Subfolder</u>	<u>Discipline</u>
Aeronautics	(Aeronautics)
Envir_Compl	(Environmental Compliance)
Facilities	(Facilities Design)
Geotech	(Soils and Foundations)
Highway_Ops	(Highway Operations)
Highways	(Highway Design)
Hydro	(Hydraulics and Drainage)
Landscape	(Landscape Design)
Maintenance.....	(Maintenance)
Planning	Intermodal Planning)
Project_Development.....	(Project Development)
Rights_Way	(Rights of Way)
Roadway_Electrical_Illumination	(Roadway Electrical Illumination)
Structure_Bridge	(Bridge Design)
Structure_Signs	(Bridge Design)
Survey	(Surveys)
Traffic	(Traffic Engineering)
Utilities	(Utilities)
Visualization	(Visualization and Project Marketing)

5.1.2.13 Additional Project Container Subfolders

Within CTDOT's project container folder exists some additional folders that are shared by disciplines for additional electronic project data. The following list shows these folders and describes their contents:

- **Raster_Reference**\ = (Location for storing project related raster imagery that gets accessed by high value data files)
- **Standard_Drawings**\ = (Location for storing standard drawings)

5.1.2.14 Project Workspace Folder

The project \Workspace\ folder is the central resource and output directory for all project data, as supported by the Engineering Applications Section (see [Figure 5-6 Project Workspace Folder](#)). When MicroStation is launched and a project is selected from the MicroStation Manager dialog box, it is this location that it points to for any project resource files. It is this folder that insures the future integrity of the data within the project container. The list below and [Figure 5-6 Project Workspace Folder](#) illustrates the files located within the project specific workspace folders.

- **Data**\ (This folder stores MicroStation definition files)
 - Scales.def = The scales.def file stores the available scales for the Annotation Scale factor in the Models dialog box. Currently CTDOT does not use this function.
 - sheetsizes.def = The active sheetsizes.def file stores the available sheet sizes (printable area) in the Models dialog box. Currently CTDOT is defining custom sheet file sizes within this file.
 - Units.def = The units.def file is consulted when converting data from file formats with incomplete unit information and is also used for accessing CTDOT's standard Architectural and Engineering custom units. Currently CTDOT is using the custom units defined in this file for all disciplines. For more information on the custom units and CTDOT's drawing scales see [Error! Reference source not found.- D.3 Drawing Scales and Custom Units](#).
- **Out**\ (This folder is pointed to by MicroStation for any output created, such as a print or a filed fence.)
- **Materials**\ (This folder is responsible for all MicroStation rendering palettes, bump maps and image maps. When a project requires computer renderings, all associated material files used to create that rendering shall get stored for future access.)
- **Symb**\ (This folder houses all MicroStation symbology resource files for the project)
 - CTDOT.ctb = CTDOT's standard color table
 - CTDOTbw.ctb = CTDOT's standard black and white color table
 - CTDOT_Font.rsc = CTDOT's standard font resources
 - ctdoteng40.rsc = CTDOT's standard highway linestyles

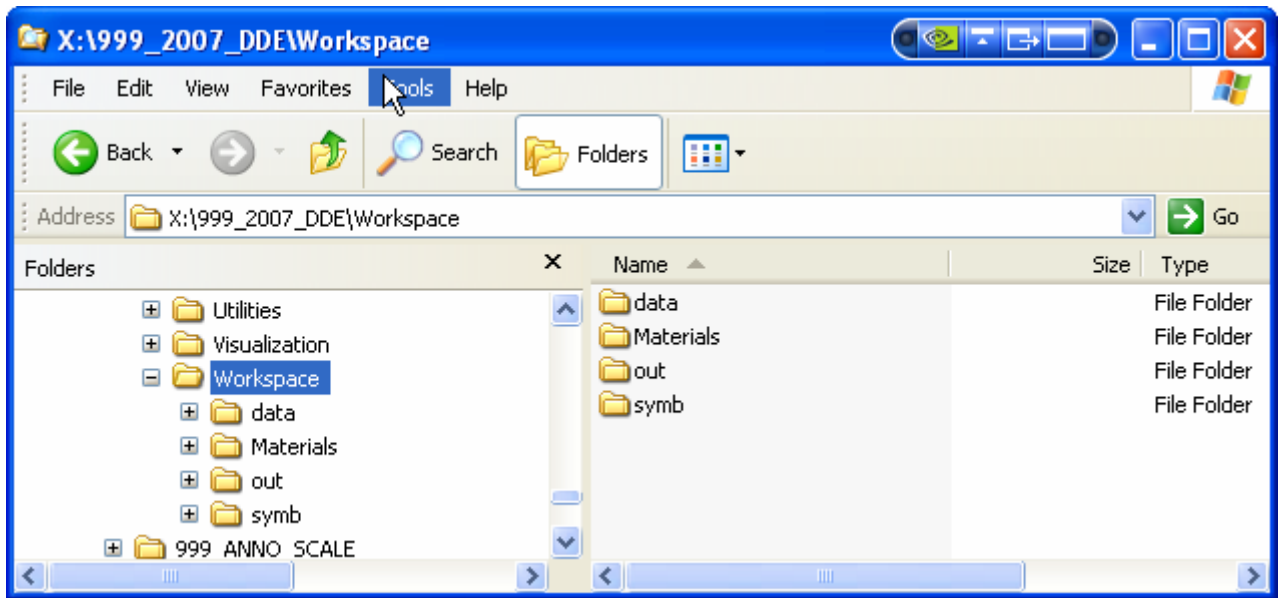


Figure 5-6 Project Workspace Folder

5.2 CTDOT_V8_Workspaces

The main purpose of this section is to describe the function of the discipline workspaces in the CTDOT's DDE. Much like the Project Container folders, this folder is typically on a network shared directory (//sh3dgs18/CTDOT_V8_Workspaces/) and likewise on a Consultant installation outside of the Department. By storing these files off of the client computer, it becomes very simple to upgrade or replace a user's workstation. This also lends itself to developing and maintaining Department wide design standards. [Figure 5-7 CTDOT_V8_Workspaces](#) displays the CTDOT Workspaces Directory for all engineering disciplines.

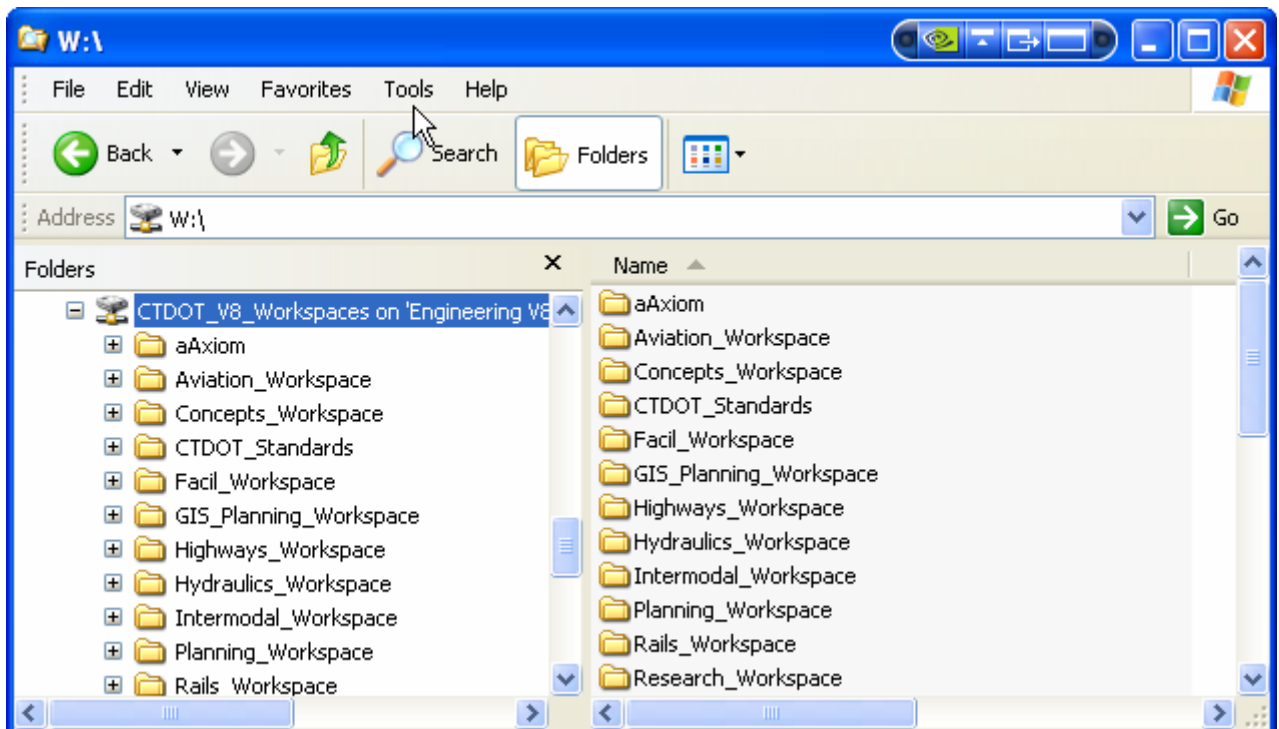


Figure 5-7 CTDOT_V8_Workspaces

5.2.1 CTDOT_Standards

All users within CTDOT's DDE are reading files from within this folder along with configuration files from one of the available discipline workspaces. This gives Engineering Applications one location to place applications and develop enterprise standards. This folder structure is based on MicroStation's local system folder. See [Figure 5-8 CTDOT_Standards](#). This folder also contains important configuration files for the DDE.

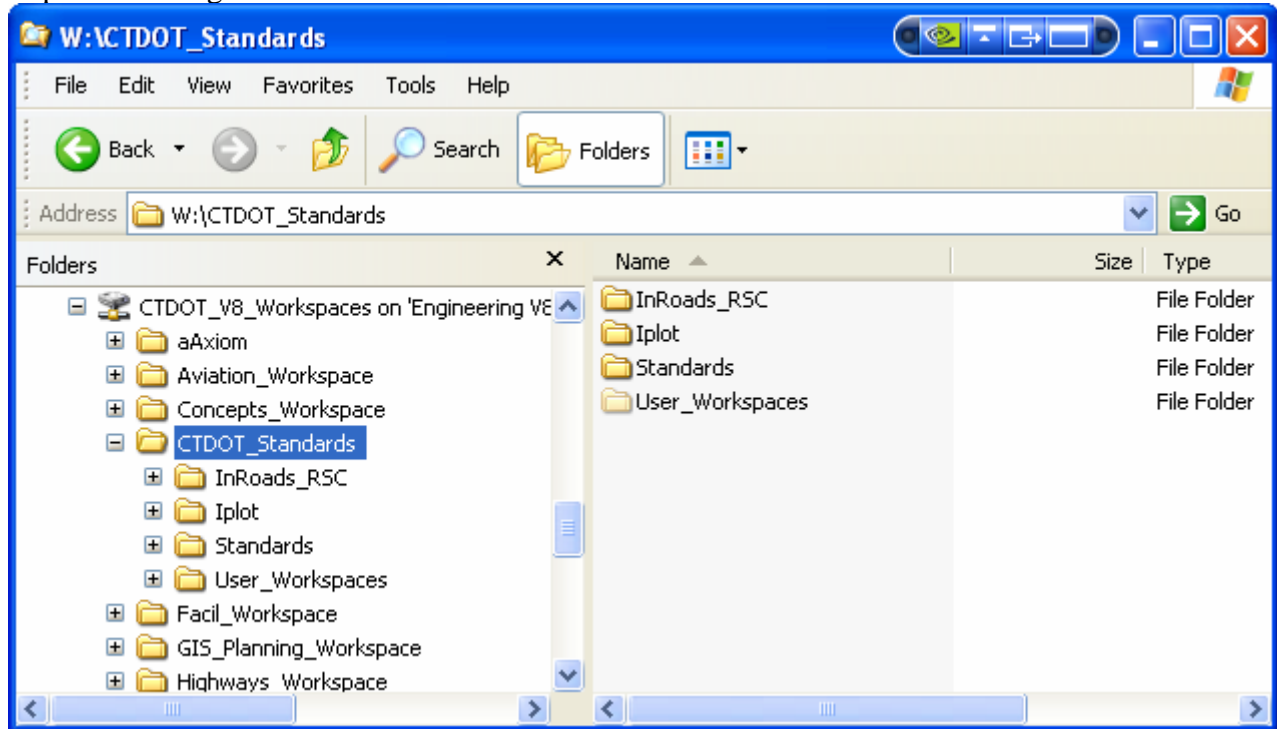


Figure 5-8 CTDOT_Standards

5.2.1.1 CTDOT_Standards\InRoads_RSC\

See [Section 6 InRoads – CTDOT's Civil Design Application](#).

5.2.1.2 CTDOT_Standards\Iplot\

CTDOT is standardized on Bentley's ProjectWise Plot Organizer for plotting and PDF creation for contract plans. It is this location where all standardized plotting files will be located.

For more on plotting configurations, plotting and PDF creation see [Section 8 Plotting and Adobe PDF Publishing](#).

5.2.1.3 CTDOT_Standards\Standards\

The information contained within this folder and its subfolders is accessed by every user within CTDOT's DDE. The contents included in this folder are subfolders and configuration files. For more on configuration files see [Appendix E MicroStation Configuration Levels and Files](#). See [Figure 5-9 CTDOT_Standards\Standards\](#) below for a screen capture of the Standards folder.

Again, it must be noted that this folder represents the location for enterprise wide standards. Any application or standard that needs to get published to all disciplines can be placed in this location and be read by all.

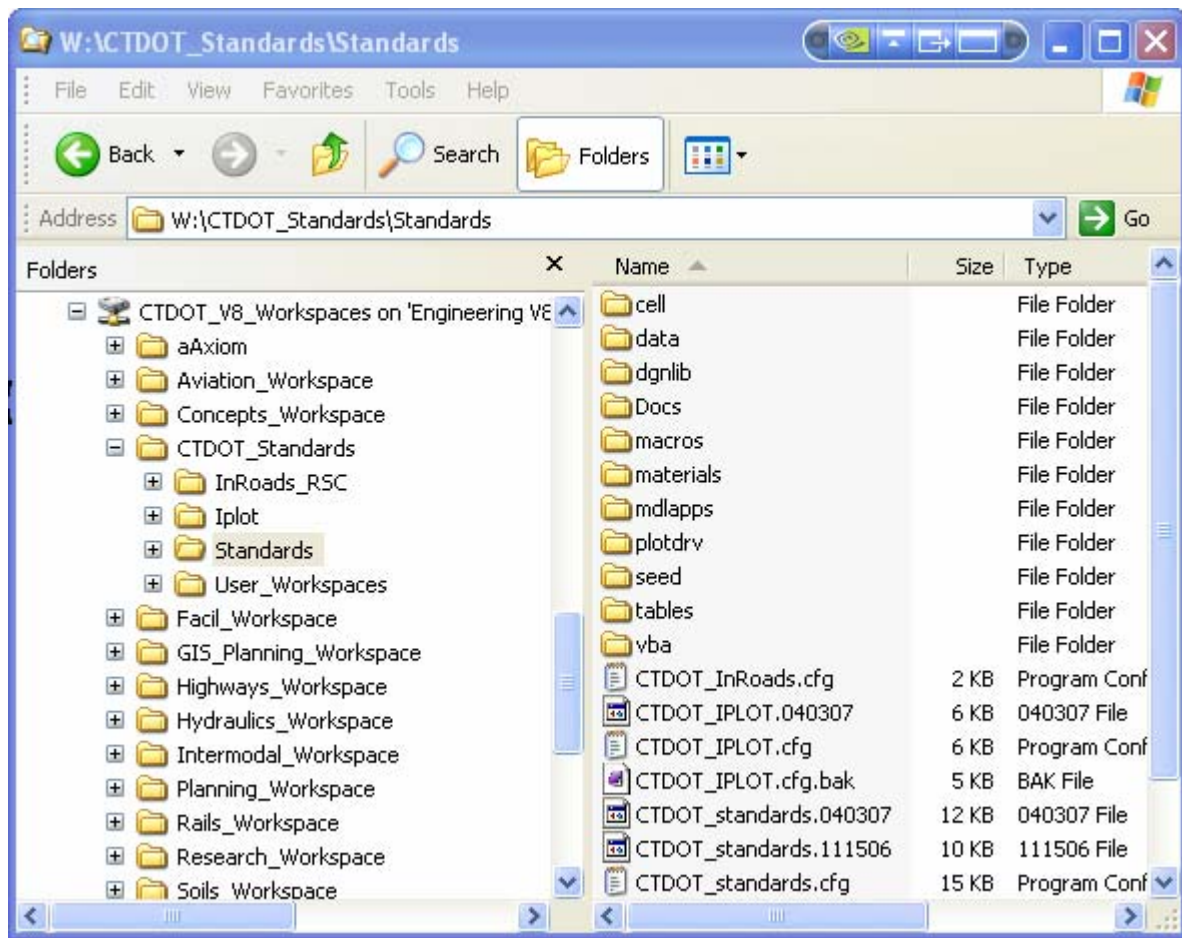


Figure 5-9 CTDOT_Standards\Standards\

The contents of these subfolders are described below:

- **cell** = CTDOT standard cell libraries for all disciplines.
- **data** = CTDOT standard Barmenu definition files. For more on Barmenu and definition files see [Appendix F CTBarmenu Custom Menus](#).
- **dgllib** = CTDOT standard dgllib libraries for all disciplines. Library files within this folder include CTDOT standard dimension and text styles. For more on design libraries see [D.11 CTDOT Design Libraries](#).
- **macros** = Common macros shared among the disciplines.
- **materials** =All material palettes and images used in creating computer renderings are stored in this location.
- **mdlapps** =Any common mdl (MicroStation Development Language) applications used by all disciplines.
- **plotdrv** =Custom print drivers would be located here. Again, CTDOT has standardized on ProjectWise Plot Organizer for plotting and PDF development.
- **seed** =CTDOT's standard seed files are located here. For more on seed files, see [D.2 Seed Files](#).
- **tables** =AutoCADD dwg translation tables are stored in this location. At this time CTDOT only accepts files in MicroStation format. Also included within this folder are pen tables. Pen tables are used for plotting and PDF development. For more on plotting and PDF development see [Section 8 Plotting and Adobe PDF Publishing](#).
- **vba** =Custom Visual Basic for Applications programs that have been developed by CTDOT to work in the MicroStation environment.

Each of the subfolders described above may have additional subfolders within based on yearly updates. For example, /2007/ would contain updates that have been released that year. Projects get pointed to the correct location based on a version variable within their respective project configuration files.

5.2.1.4 CTDOT_Standards\Tools_Menus\

Available location for File Menus and Toolboxes for all users.

5.2.2 Discipline Workspaces

Alongside the CTDOT_Standards directory CTDOT has multiple discipline workspace directories. When a user enters into CTDOT's DDE, they are pointed to one of these workspaces along with the CTDOT Standards. This is done through configuration files.

Currently there are multiple discipline workspaces available to the user. The discipline workspaces delivered with the DDE are:

- Facil_WorkspaceFacilities Design
- Highways_WorkspaceHighways Design
- Structure_Bridge_Workspace.....Bridge Design
- Surveys_Workspace.....Surveys
- Traffic_WorkspaceTraffic
- Rails_WorkspaceRails

The CTDOT_Standards workspace is also included containing enterprise wide standards.

Ongoing development by Engineering Applications will generate additional discipline workspaces in the future. If a discipline workspace is not available or a new one is required, a request can be made to Engineering Application for a new Discipline Workspace.

5.2.2.1 Highways_Workspace

For this section, Highway's workspace will be used as an example. Other discipline workspaces are similar. It is this location where all Highway Design standards are stored and maintained.

[Figure 5-10 Highways_Workspace displays the Highways_Workspace folder.](#)

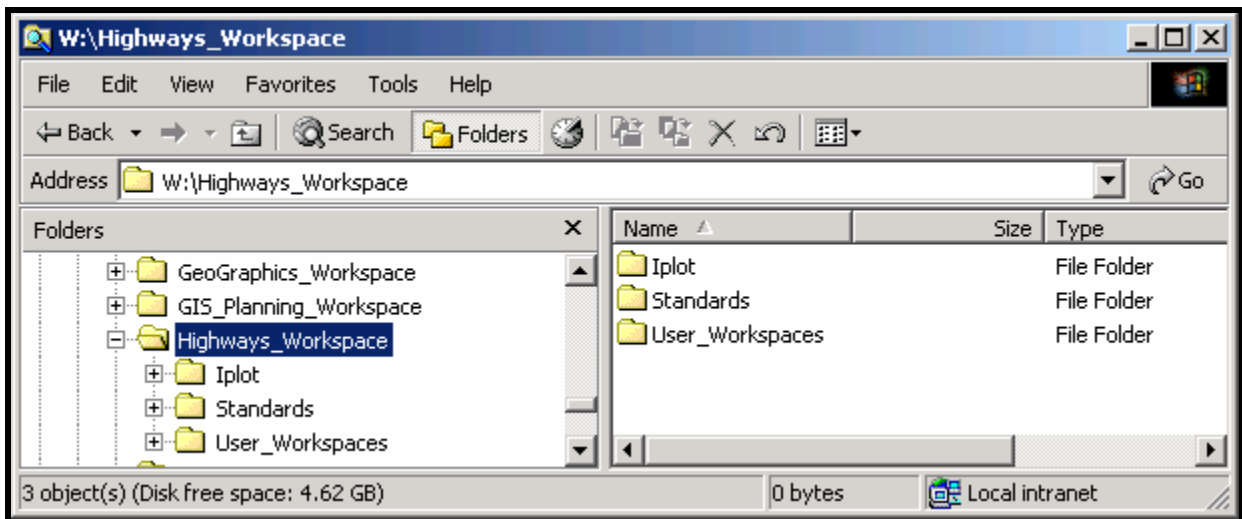


Figure 5-10 Highways_Workspace

5.2.2.2 Highways_Workspace\Iplot\

This folder stores any custom plotting settings and resources for Highway Design. For more on plotting configurations, plotting and PDF creation see [Section 8 Plotting and Adobe PDF Publishing](#).

5.2.2.3 Highways_Workspace\Standards\

This folder has the following subfolders within:

- **cell** = Highway Design custom cell libraries.
- **data** = Highway Design Barmenu definition files. For more on Barmenu and definition files see [Appendix D CTBarmenu Custom Menus](#).
- **dgnlib** = Highway Design dgnlib libraries. Library files within this folder include Highway Design level names and filters..
- **macros** = Highway Design custom macros.
- **mdlapps** = Highway Design custom mdl (MicroStation Development Language) applications.
- **plotdrv** = Highway Design custom print drivers.
- **seed** = Highway Design custom seed files.
- **Tables** = Highway Design custom tables.
- **vba** = Highway Design custom vba applications.

Each of the subfolders described above may have additional subfolders within based on yearly updates. For example, /2007/ would contain updates that have been released that year. Projects get pointed to the correct location based on a version variable within their respective project configuration files.

Also located in this folder are Highway Design custom configuration files.

5.2.2.4 Highways_Workspace\Tools_Menus\

Available location for File Menus and Toolboxes for Highways users.

5.2.3 User_Workspaces_V82004

This folder stores all individual user information for users working within the DDE. This allows a user to log onto any machine on the network. A user can work in any discipline while maintaining their distinct user interface. This also allows very simple and quick support for a computer that needs replacement.

5.2.4 User_Workspaces_V8XM

Same as above, for Microstation XM. By keeping this information separate, it reduces possible corruption.

5.3 CTDOT's Accounting Process for State Forces

The CTDOT Accounting application is used to access all Engineering software supported by Engineering Applications and the Engineering Support IT Group. This application is only for those working within CTDOT. A database of active project coding numbers is maintained by the discipline representatives for user selection. For modification of active project numbers within this database see [Appendix G CTDOT Accounting](#). Links to installed applications reside in the local configuration file "Account.cfg". Command line variables are used within this file to point to network share folders for each application.

The user is required to select a project number and an application, then click "Start". This starts a timer that records the elapsed time the user spends within the selected application. At one month intervals the recorded times are compiled. The associated projects are then journal vouchered for the elapsed time multiplied by the CADD Rate.

5.3.1 CADD Rate

The CADD Rate is a cost per hour for using software applications supported by Engineering Applications and Engineering Support IT Group. This rate is derived annually by the total expenditures to support all applications mentioned in the CTDOT's Accounting Process. The expenditures are then divided by the total hours spent working on projects for that year. The CADD Rate may be adjusted for any additional expenditures or revenues.

- The expenditures include:
- Software Licensing
- Software Maintenance
- Personal Services
- Software Support
- Training
- Hardware
- Plotting
- Others

Section 6 InRoads – CTDOT's Civil Design Application

6.1 InRoads Resource Files

The purpose of this section is to provide a guide to where critical InRoads resource files reside in the DDE and where they should be copied to the InRoads folder within the project container once a new project is created.

6.1.1 InRoads Environments

Below, [Figure 6-1 InRoads Resource Folder](#), shows the contents of the folder. The latest versions of all resource files will be kept in the workspace under \CTDOT_Standards\InRoads_RSC. Before starting an InRoads project, copy the necessary files from the workspace into the designated folder. For design it will be in the highway discipline folder within the project container and for Surveys it will be in your local directory under Bentley_V8 to enhance performance during the processing of the data.

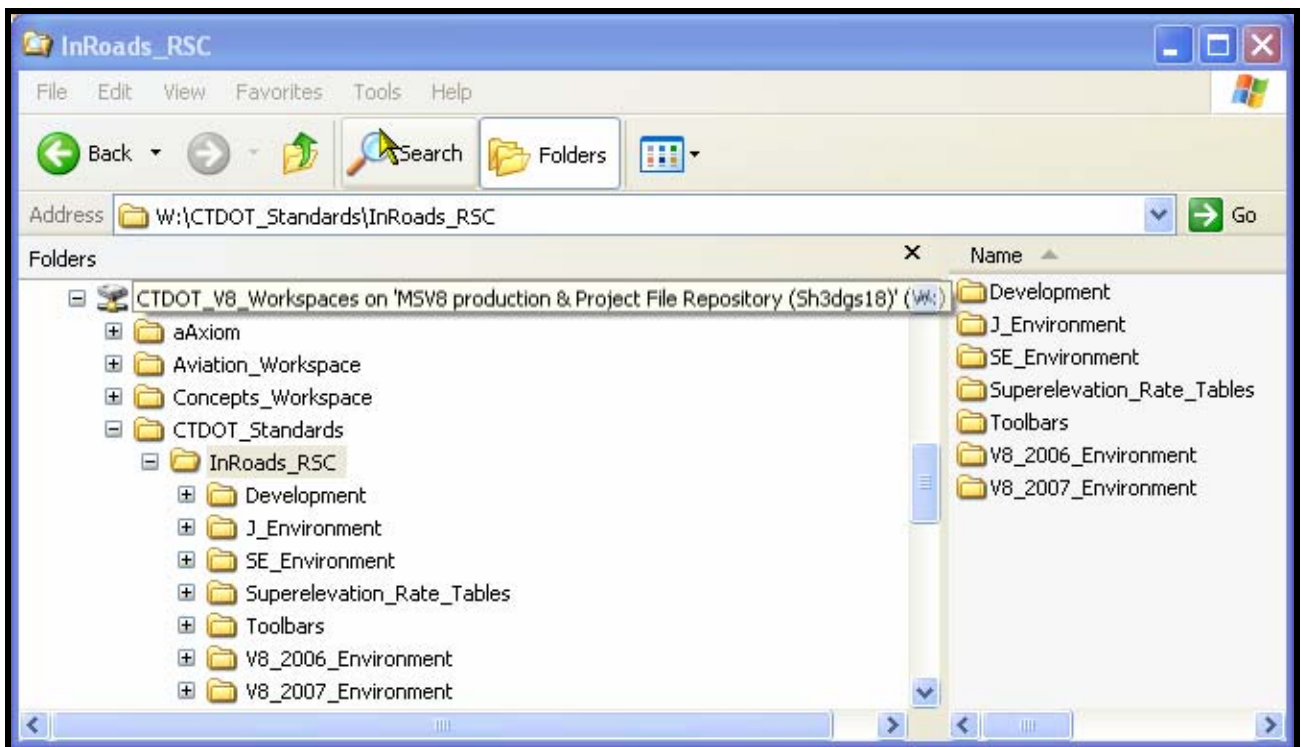
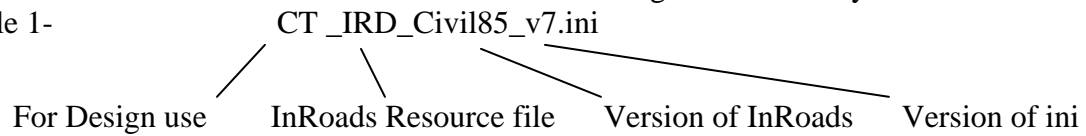


Figure 6-1 InRoads Resource Folder

There are four environment folders (SE, J, V8_2006 & V8_2007) containing InRoads resource files set up to work with the level structure for the each version of MicroStation. The J, SE & V8 2006 Environment folders are intended for survey data only. If additional Survey is requested this will allow surveys to modify an existing ground file and DTM in its current version of MicroStation and not have to convert the data to the current version V8. Moving forward with new projects, designers will always use the resource files in the V8_2007 environment.

The V8_2007 environment contains resource files for designers and surveyors.

Example 1-



Example 2-

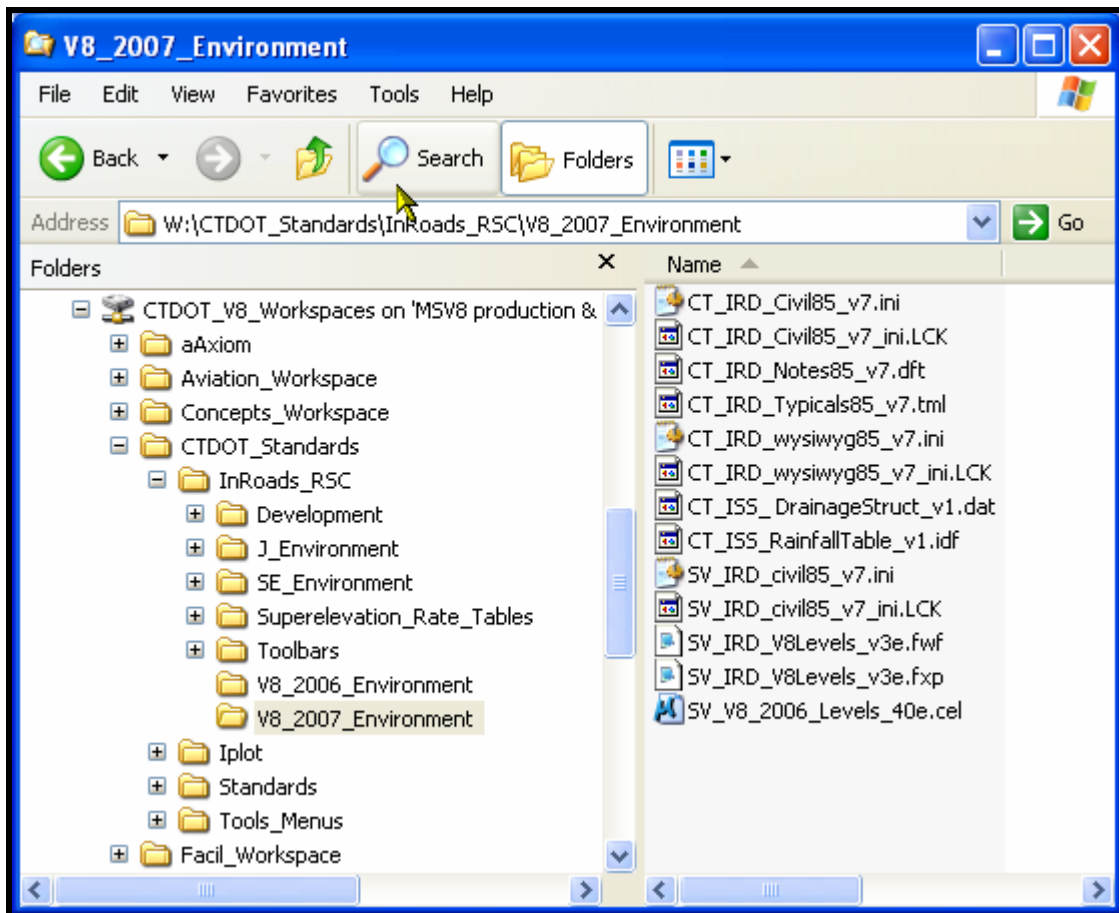
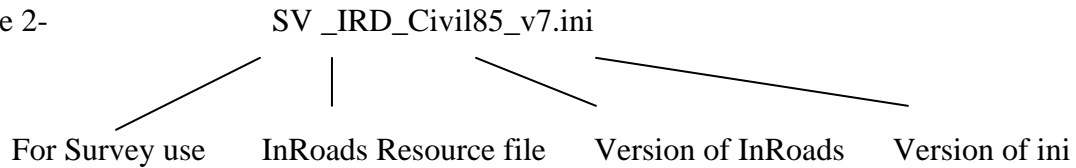


Figure 6-2 InRoads V8_2007_Environment

6.1.2 InRoads File Name Descriptions

The following preference files have been configured for the 2007 Environment.

Preferences and Styles (*.ini)

Preference files containing the control settings of all the dialog boxes within the product.

- **Preferences (*.ini)** - Control all the settings except the horizontal geometry (CT_IRD_Civil85_V7.ini).
- **Styles (*.ini)** - Control the horizontal geometry settings (CT_IRD_wysiwyg85_V7.ini).

Typical Section Libraries (*.tml)

A file containing a storage place for typical sections, cut-and-fill tables, material tables, and decision tables.

Survey Preference (*.fxp)

A file containing settings that affect a variety of operations in InRoads Survey.

Survey Feature Table (*.fwf)

The feature table in InRoads Survey manages survey feature styles and control codes, and it allows you to create a legend.

Style Sheet (*.xsl)

All style sheets have been provided by Bentley and are located on the hard drive where Inroads was installed under Civil/XML Data. The View XML Reports command allows you to choose an XSL style sheet, which specifies exactly what information to pull from the XML file and how to format it. The XML file contains raw or computed data; the XSL file specifies how to format the data into a report.

Drafting Notes (*.dft)

This file is used to enhance the production of final drawings. Use the commands across the design session to place intelligent annotation notes on features and geometry in plan, profile, and cross section views as well as at the intersection of two alignments.

The following files will need to be created to retain project design high value data.

Projects (*.rwk)

Opens all the files you need to run your InRoads project. It is a project file containing the paths to the surfaces (DTM), typical section libraries (TML), coordinate geometry (ALG files), roadway libraries (RWL), and preference files related to a particular project.

Roadway Libraries (*.rwl)

A file containing roadway modeling definitions. This file stores station and typical section information used by the Roadway Modeler command to create surface models along a horizontal alignment.

Surfaces (*.dtm)

A digital terrain model file (surface).

Geometry Projects (*.alg)

A file containing coordinate geometry information, superelevation, and alignment information for a specific geometry project.

Survey Data (*.fwd)

This command lets you manage your field data. You can add, edit, delete, and find stations and observations with the resizable Fieldbook Data dialog box.

XML Data (*.xml)

The XML Reports command, available as an application add-in under Tools on the pull down menu, generates XML data files. The XML files are not themselves reports, but they contain data that can be formatted into reports by the View XML Reports command. XML data files are ASCII files, but they are not formatted for direct viewing as a report. A report is the output generated when you display data from an XML file using the View XML Reports command.

CTDOT preferences for InRoads Storm and Sanitary and Quantity Manager are still under development.

The following files are currently being developed for use at CTDOT.

Pay Items (*.mdb)

This file is used with Quantity Manager. Quantity formulas and CTDOT pay items are stored in this pay item database, which is a Microsoft Access database.

Drainage Structures (*.dat)

This file is used with Storm and Sanitary. The Drainage Structures File command allows you to add and modify parameters in your Drainage Structures file - an ASCII file that contains standards (sizes, shapes, materials, and other parameters) for your drainage structures.

Rainfall Table (*.idf)

This file is used with Storm and Sanitary. This file contains a table of Rainfall/Time of Concentration data that conforms to CTDOT drainage standards.

Quantity Manager (*.mdb)

A file containing a database for all the quantity information for the project.

Drainage (*.sdb)

A file containing all the drainage design information for the project.

6.1.3 Cell Library List

InRoads looks for cells from MicroStation Cell Library Lists. These lists can be found if you click on Workspace-Configuration-Cells-Cell Library List. Below [Figure 6-3 Cell Library List](#), is a MicroStation screen-shot of the directories included in the Cell Library List.

For Designers to utilize InRoads DTM features you will need the following paths assigned to your Cell Library List:

```
... \CTDOT_Standards\Standards\cell\2007\*.cel  
... \Highways_Workspace\Standards\cell\*.cel  
... \Survey_Workspace\Standards\cell\SV_V8_levels_40e.cel
```

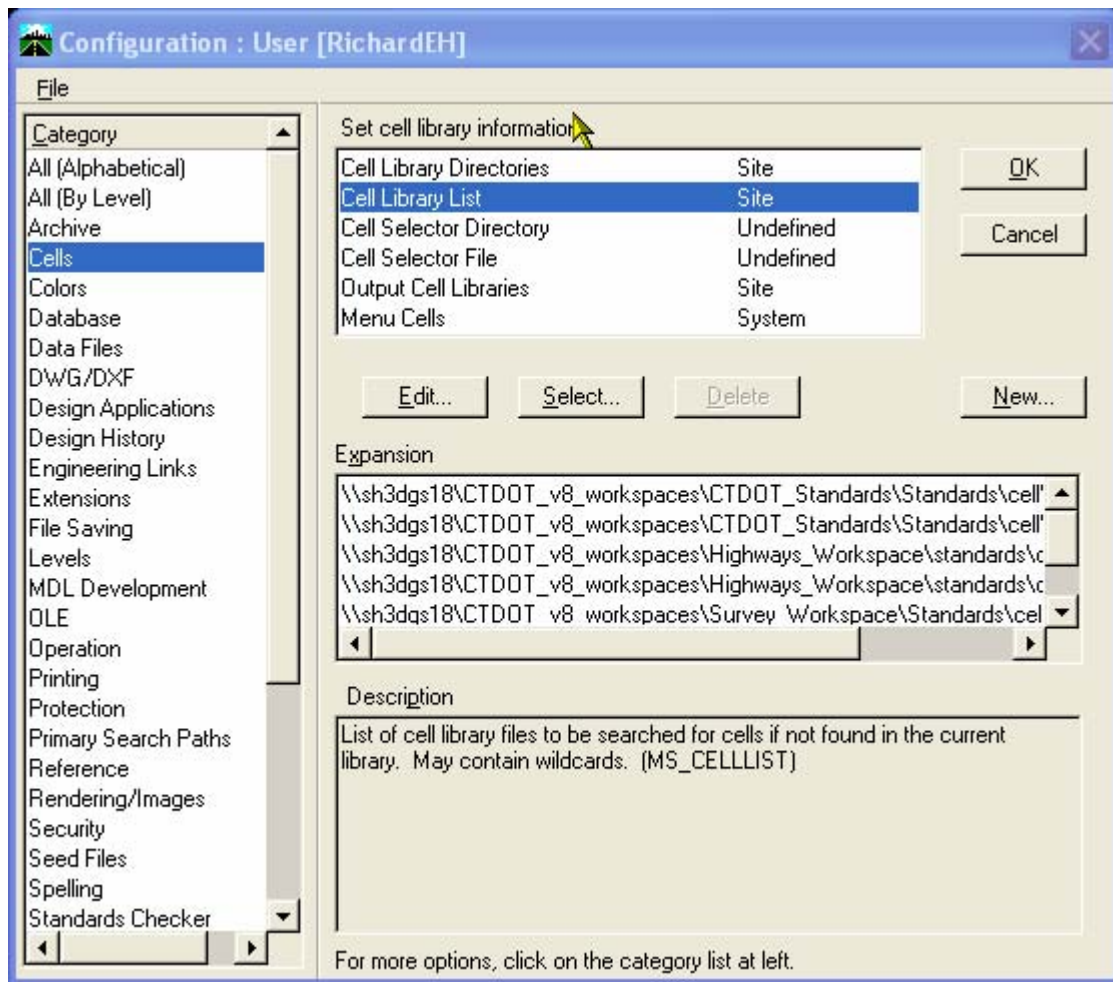


Figure 6-3 Cell Library List

6.1.4 Level Libraries

The InRoads Symbology Manager places all features By-Level so the Highway DGN Library List needs to be mapped. Below [Figure 6-4 DGN Library List](#), is a MicroStation screen-shot of the directories included in the DGN Library List. These lists can be found if you click on Workspace-Configuration-Primary Search Paths-DGN Library List. The paths to the DGN libraries should be listed here.

For Designers to utilize InRoads the Symbology Manager you will need the following paths assigned to your DGN Library List:

```

... \Highways_Workspace\Standards\dgnlib\*.dgnlib
... \CTDOT_Standards\Standards\dgnlib\*.dgnlib

```

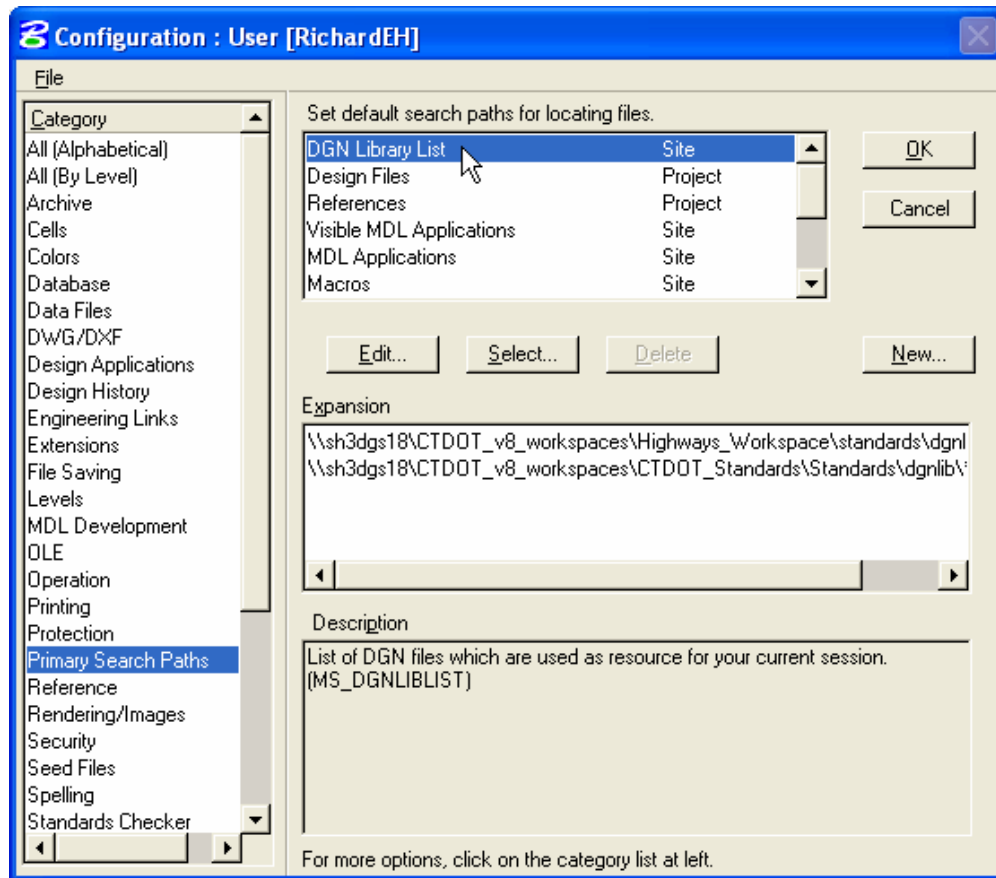


Figure 6-4 DGN Library List

6.1.5 Superelevation Rate Table

Below Figure 6-5 InRoads Superelevation Tables is a windows screen-shot of the superelevation tables. The tables can be found in `\CTDOT_Standards\InRoads_RSC\Superelevation_Rate_Tables`.

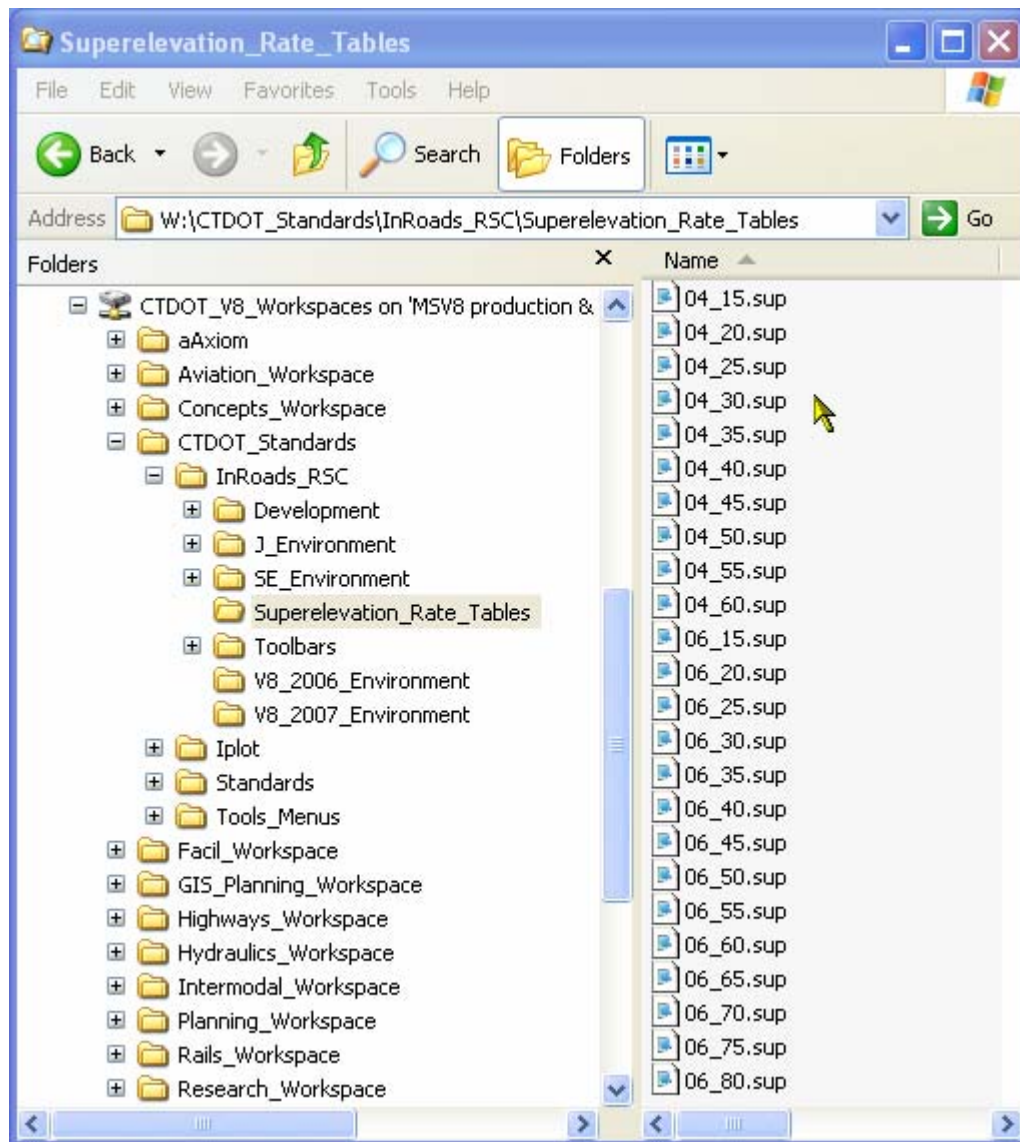


Figure 6-5 InRoads Superelevation Tables

6.1.6 Custom Highway Toolbars

Below [Figure 6-6 Highway's Custom InRoads Toolbars](#) is a windows screen-shot of the custom toolbars. The custom toolbars can be found in ...\[CTDOT_InRoads_RSC\Toolbars](#). These toolbars help to automate workflows instead of having to search through the InRoads pull down menus for tool selections.

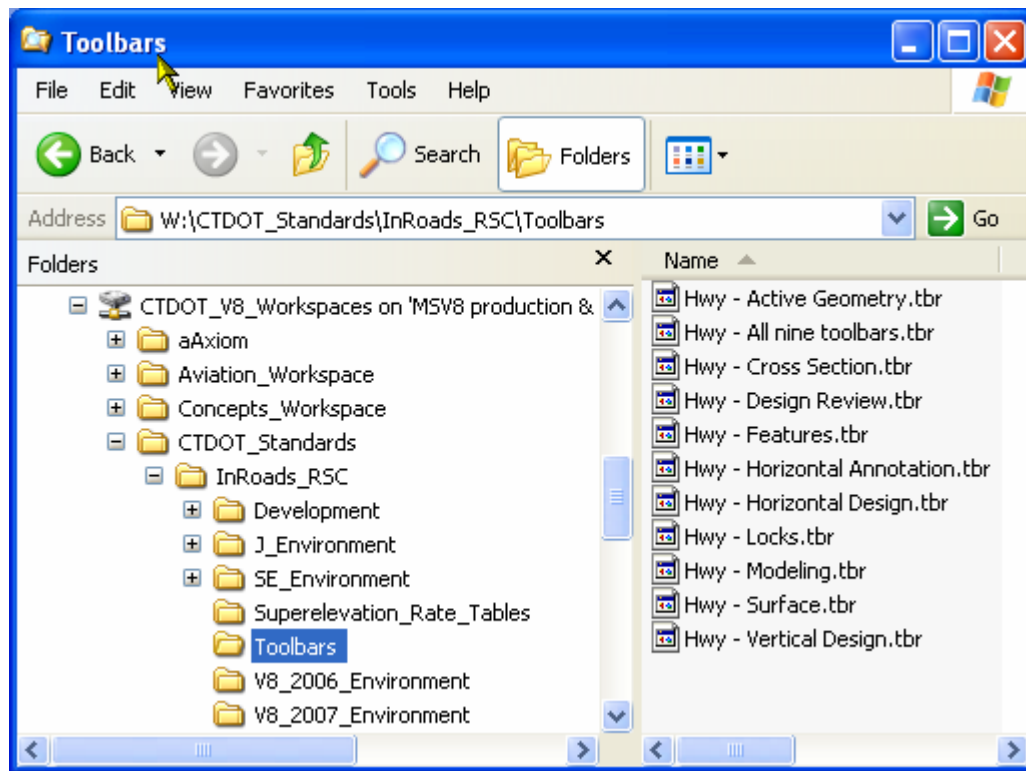


Figure 6-6 Highway's Custom InRoads Toolbars

6.2 InRoads Project Start up for Designers

For workflow see [2007_IR_Project_Startup.pdf](#).

6.3 Roadway Templates and Decision Tables

6.3.1 Roadway Templates

This section discusses the CTDOT customized templates located in the CT_IRD_Typicals85_v6 typical section library. There are 27 templates in the CTDOT typical section library. See [Figure 6-8 InRoads Template Library Names and Descriptions](#) for a complete list of available templates.

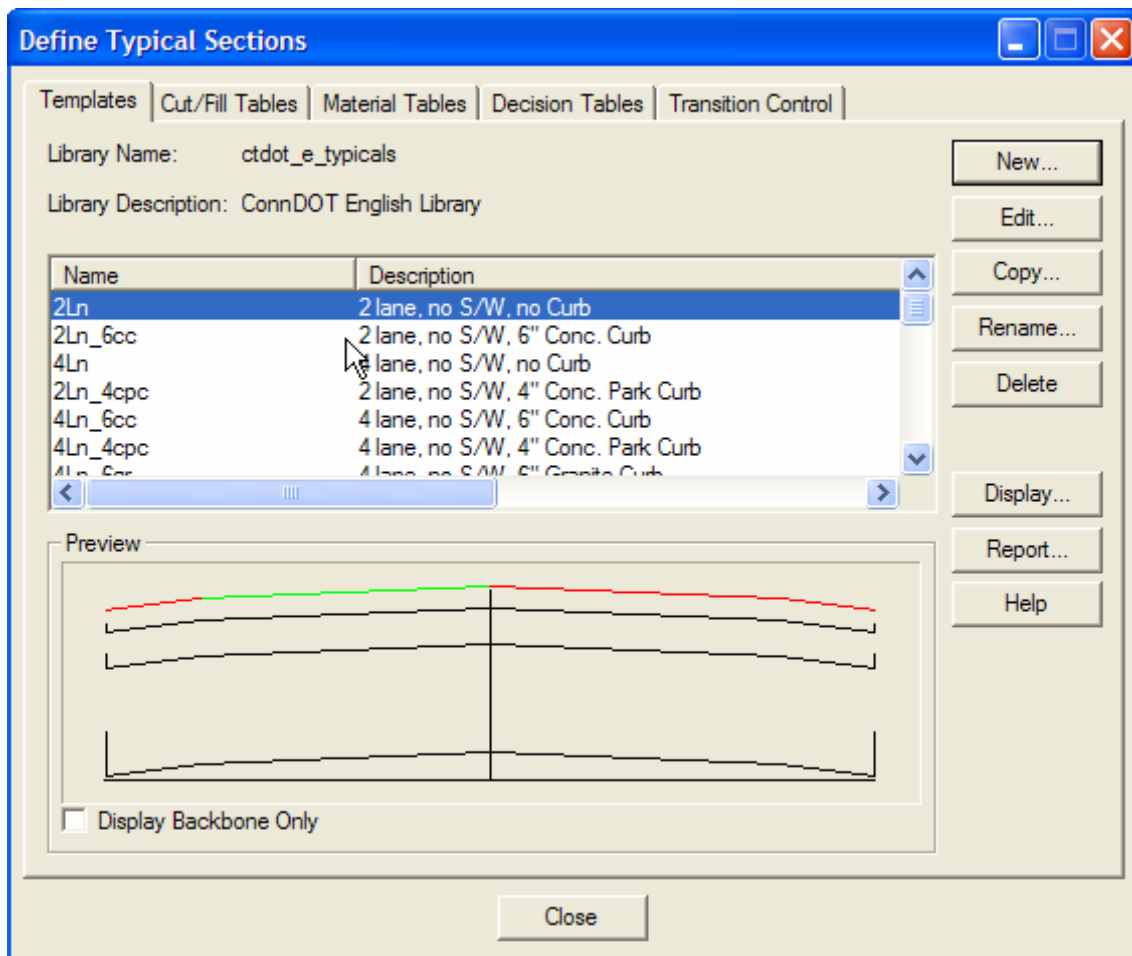


Figure 6-7 InRoads Template Library

<u>Template Name</u>	<u>Description</u>
2Ln	2 lane, no sidewalk, no curb
2Ln_6cc	2 lane, no sidewalk, 6" concrete curb
4Ln	4 lane, no sidewalk, no curb
2Ln_4cpc	2 lane, no sidewalk, 4" concrete park curb
4Ln_6cc	4 lane, no sidewalk, 6" concrete curb
4Ln_4cpc	4 lane, no sidewalk, 4" concrete curb
4Ln_6gr	4 lane, no sidewalk, 6" granite curb
2Ln_6bcl	2 lane, no sidewalk, 6" concrete bituminous lip curb
2Ln_4bcp	2 lane, no sidewalk, 4" bituminous conc. park curb
2Ln_6gr	2 lane, no sidewalk, 6" granite curb
4Ln_6bcl	4 lane, no sidewalk, 6" bituminous conc. lip curb
4Ln_4bcp	4 lane, no sidewalk, 4" bituminous conc. park curb
2Ln_6cc_5sw	2 lane, 5' sidewalk, 6" concrete curb
2Ln_4cpc_5sw	2 lane, 5' sidewalk, 4" concrete park curb
2Ln_4bcp_5sw	2 lane, 5' sidewalk, 4" bituminous conc. park curb
2Ln_6bcl_5sw	2 lane, 5' sidewalk, 6" bituminous conc. lip curb
2Ln_6gr_5sw	2 lane, 5' sidewalk, 6" granite curb
4Ln_4bcp_5sw	4 lane, 5' sidewalk, 4" bituminous conc. park curb
4Ln_4cpc_5sw	4 lane, 5' sidewalk, 4" concrete park curb
4Ln_6bcl_5sw	4 lane, 5' sidewalk, 6" bituminous conc. lip curb
4Ln_6cc_5sw	4 lane, 5' sidewalk, 6" concrete curb
4Ln_6gr_5sw	4 lane, 5' sidewalk, 6" granite curb
2Ln_6cc_5sw_no_buffer	2 lane, 5' sidewalk, 6" concrete curb, no buffer
2Ln_6cc_4sw_no_buffer	2 lane, 4' sidewalk, 6" concrete curb, no buffer

Figure 6-8 InRoads Template Library Names and Descriptions

6.3.2 Editing a Template

The environment requires the designer to copy and rename if there are changes that need to be made to a particular template. The copied templates only exist within the file you are currently working in, and they are saved to the CT_IRD_Typicals85_v6.tml file located within your project folder.

Surface Naming

When modeling a second roadway the designer must change the names of the surfaces. This will prevent emptying the design surface when running the roadway modeler this is done in this box.

Note: In the roadway modeler there is a check box to empty design surface, if this is not check off the surface renames or appends the features in the surface. This can cause duplicate features, it is recommended to empty the design surface when running the roadway modeler, so it is very important to change the surface names.

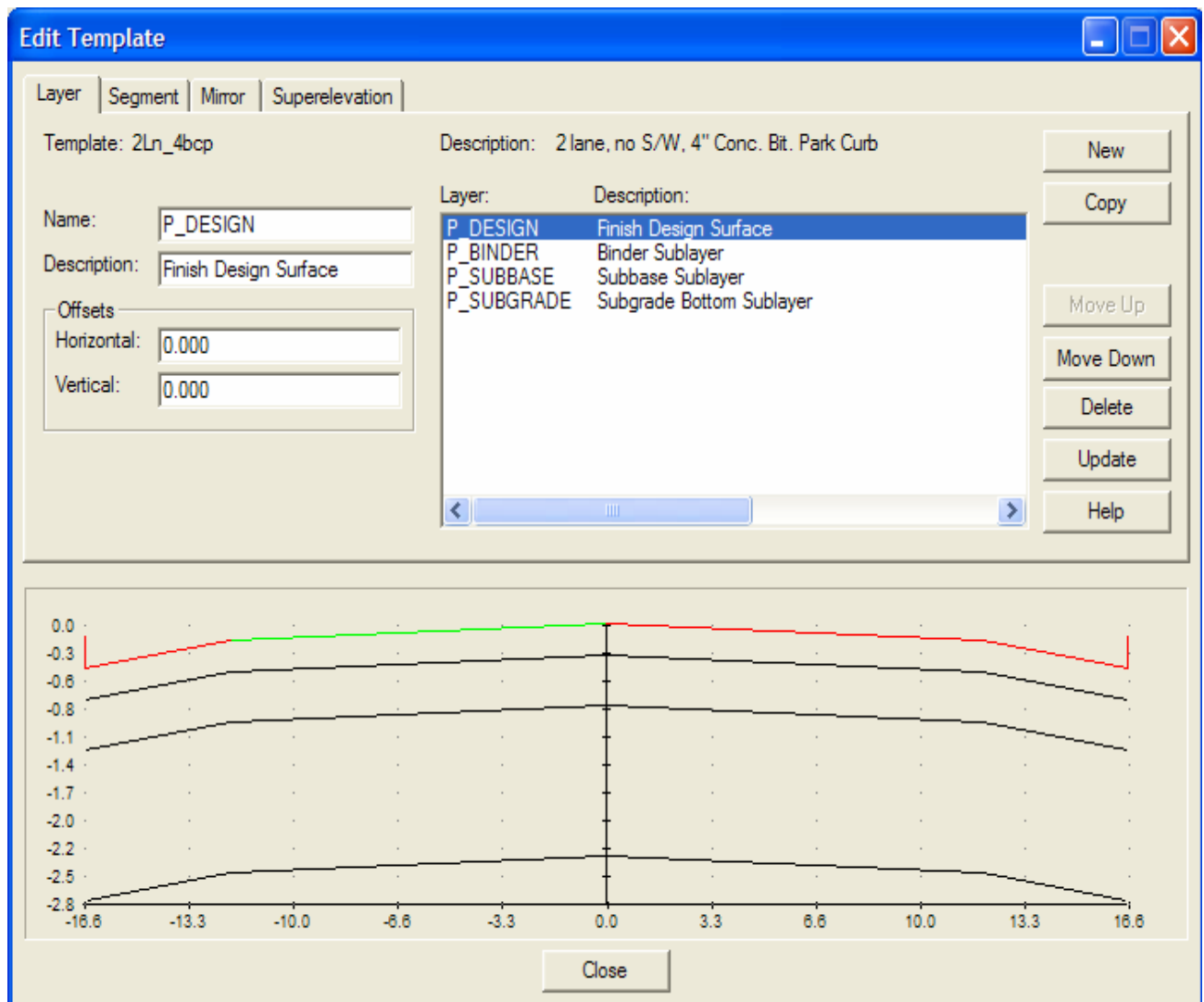


Figure 6-9 – InRoads Edit Template Layer Tab

The proposed symbology uses P_Design for the top design surface, when the name is changed for example Rte 20_P_Design the surface loses the symbology, the designer must re-point the symbology back to P_Design in the Surface Properties box in the Advanced tab shown below.

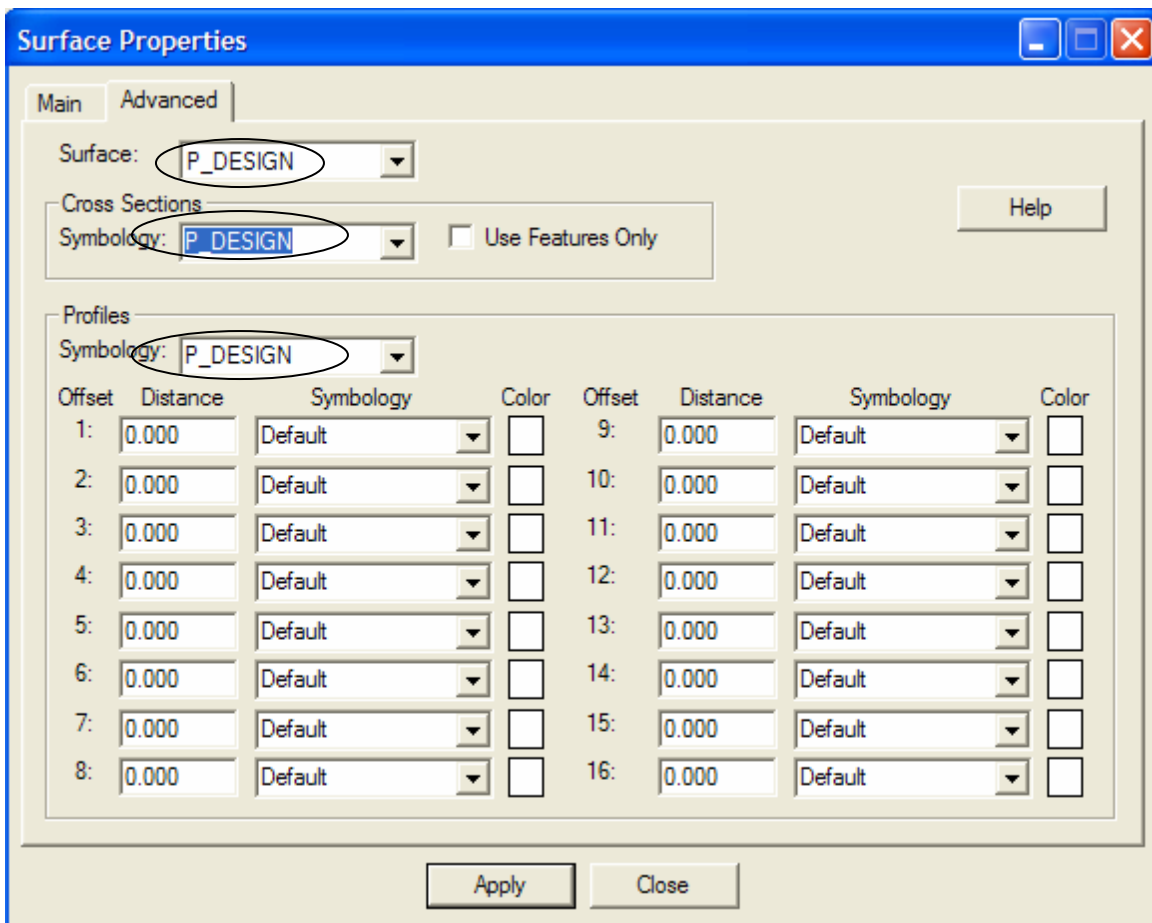


Figure 6-10 InRoads Surface Properties

Segment Editing

To edit your copied template open the Edit Template box within InRoads and select the segment tab.

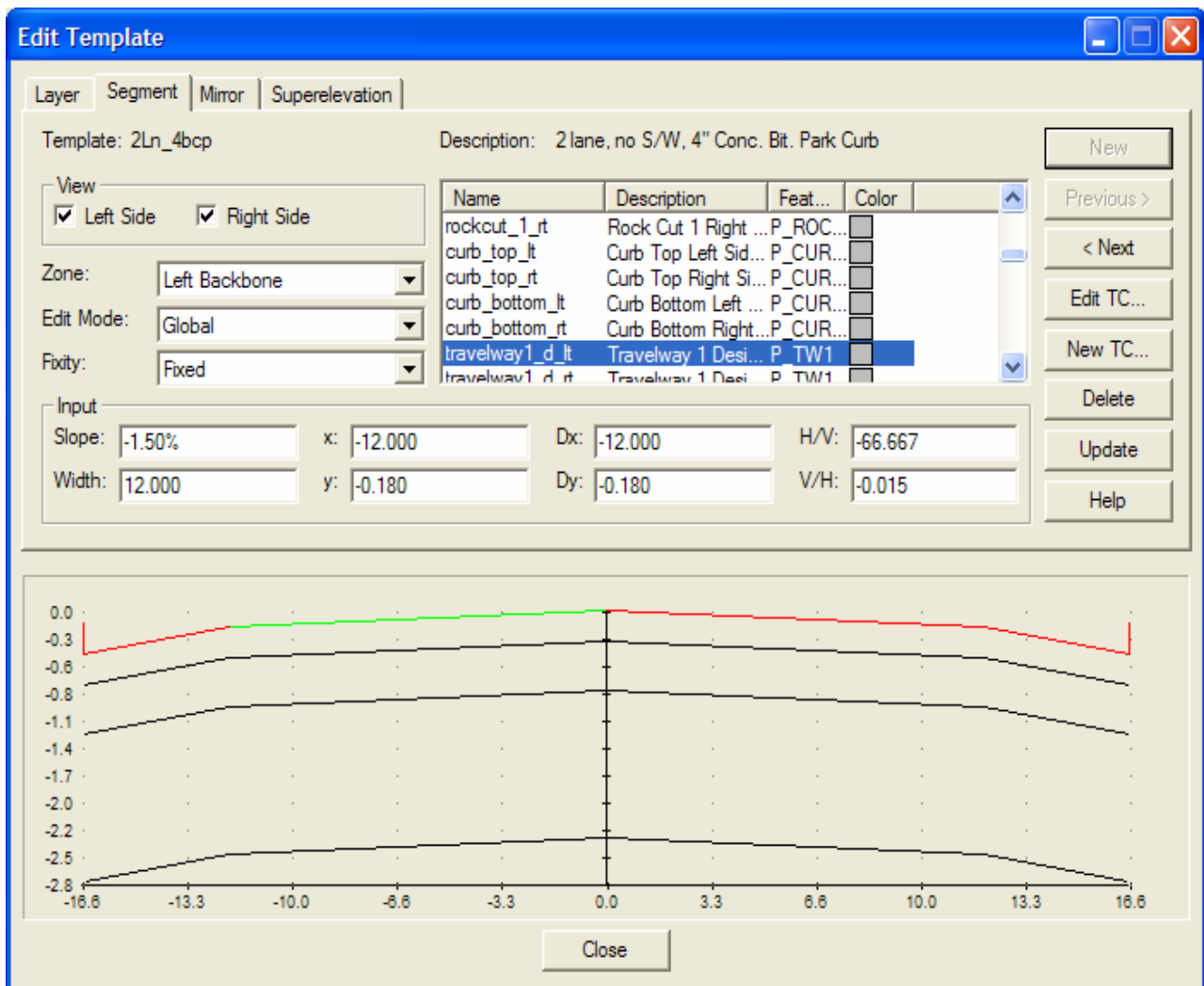


Figure 6-11 InRoads Edit Template Segment Tab

6.3.3 Decision Tables

This section discusses how to use decision tables for road design. There are 22 decision tables available in the typical section library. See [Figure 6-13 InRoads Decision Table Library Names and Descriptions](#) for a complete list of available Decision Tables. The decision table needs to be copied and renamed if there are changes that need to be made to the table.

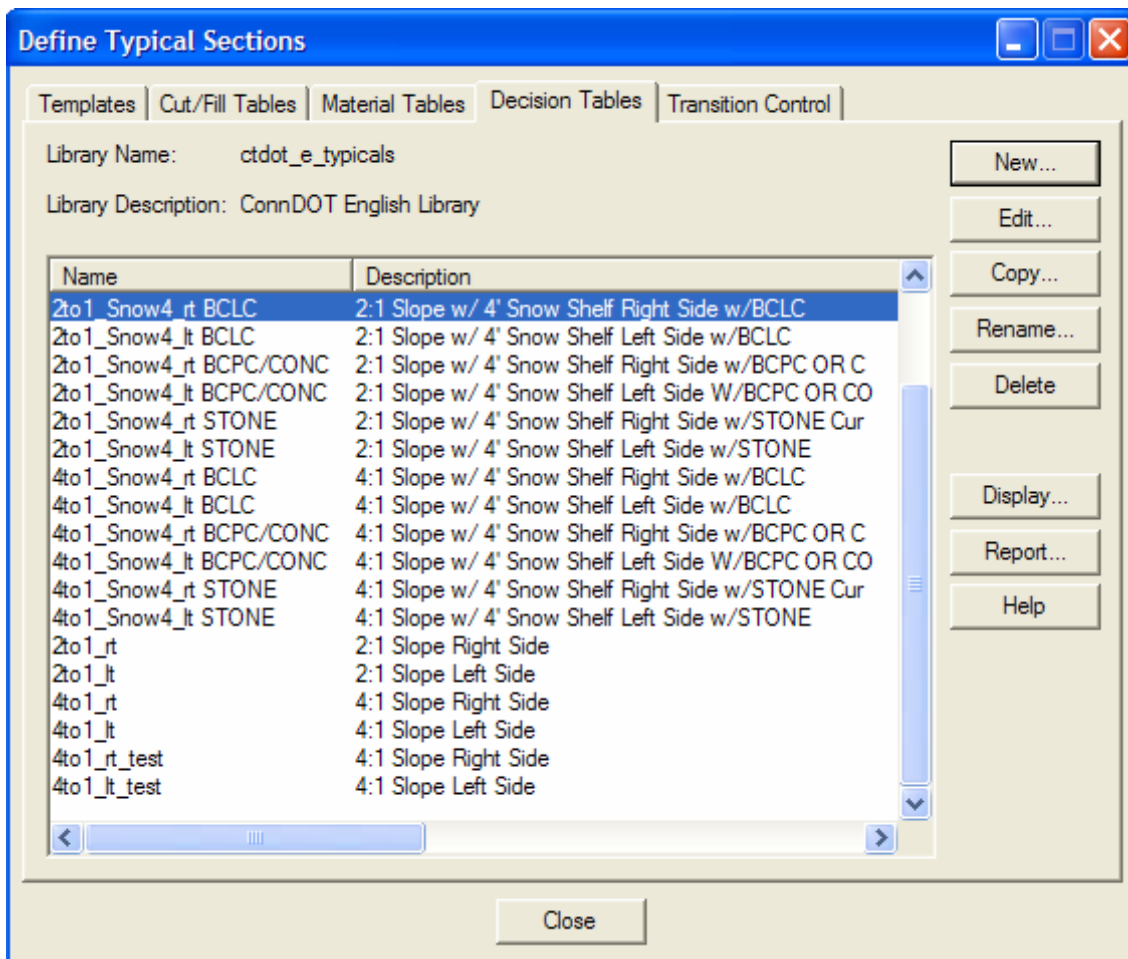


Figure 6-12 InRoads Decision Table Library

<u>Decision Tables Names</u>	<u>Descriptions</u>
2to1_Snow4_rt	2:1 Slope with 4' Snow Shelf Right Side
2to1_Snow4_lt	2:1 Slope with 4' Snow Shelf Left Side
4to1_Snow4_rt	4:1 Slope with 4' Snow Shelf Right Side
4to1_Snow4_lt	4:1 Slope with 4' Snow Shelf Left Side
2to1_Snow4_rt BCLC	2:1 Slope with 4' Snow Shelf Right Side with BCLC
2to1_Snow4_lt BCLC	2:1 Slope with 4' Snow Shelf Left Side with BCLC
2to1_Snow4_rt BCPC/CONC	2:1 Slope with 4' Snow Shelf Right Side with BCPC or Concrete
2to1_Snow4_lt BCPC/CONC	2:1 Slope with 4' Snow Shelf Left Side with BCPC or Concrete
2to1_Snow4_rt STONE	2:1 Slope with 4' Snow Shelf Right Side with stone curb
2to1_Snow4_lt STONE	2:1 Slope with 4' Snow Shelf Left Side with stone
4to1_Snow4_rt BCLC	4:1 Slope with 4' Snow Shelf Right Side with BCLC
4to1_Snow4_lt BCLC	4:1 Slope with 4' Snow Shelf Left Side with BCLC
4to1_Snow4_rt BCPC/CONC	4:1 Slope with 4' Snow Shelf Right Side with BCPC or Concrete
4to1_Snow4_lt BCPC/CONC	4:1 Slope with 4' Snow Shelf Left Side with BCPC or Concrete
4to1_Snow4_rt STONE	4:1 Slope with 4' Snow Shelf Right Side with stone curb
4to1_Snow4_lt STONE	4:1 Slope with 4' Snow Shelf Left Side with stone
2to1_rt	2:1 Slope Right Side
2to1_lt	2:1 Slope Left Side
4to1_rt	4:1 Slope Right Side
4to1_lt	4:1 Slope Left Side

Figure 6-13 InRoads Decision Table Library Names and Descriptions

6.3.4 Defining your Roadway

The Environment is setup to use the right and left mode shown in the box below when defining your roadway. The decision table chosen needs to match the template being used, for example 2Ln_6bcl template uses the 2to1_snow4rt BCLC and 2to1_Snow4lt BCLC decision tables. The curbing is the indicator as to which decision table to use.

Each decision table requires the correct Transition Control. TC's are descriptive names assigned to template segment end points. Each TC name is associated with an InRoads feature style that defines the graphical appearance of the TC when displayed in plan, cross section or profile view.

Figure 6-14 InRoads Define Roadway Entry

6.4 Creating Plan and Profile Sheets

The InRoads Plan and Profile Generator tool is set up to automate the creation of Plan and profile sheets. See [2007 IR Plan Profile.pdf](#) for an example of this application.

6.5 Creating Cross Section Sheets

The InRoads Cross Sections Generator tool is set up to automate the creation of Cross Sections placed as a set in a design model. See [2007 IR Cross Sections.pdf](#) for an example of this application.

Section 7 Managing Contract Sheets with Tag Manager

CTDOT uses a MicroStation Tags for all title block information and revision blocks for all Contract Sheets. This insures all Title Block text is the same throughout a set of drawings. More importantly, this allows the management of all title-block information through an application developed in MicroStation VBA (Visual Basic for Applications) and Microsoft Excel. The creation of Adobe PDF contract sets will also leverage these title block tags.

The Tags are located within the CTDOT standard drawing borders that are placed as cells on all Contract Sheets.

7.1 Using the Title Block Tags

A workflow for modifying the tagged cells using the Tag Manager can be viewed at [2007 MSta Tag Manager.pdf](#).

The MicroStation command, Edit Tags is also used to edit the tagged cells from within each contract sheet.

7.2 Tag Manager

The Tag Manager is used to manage tag sets of multiple sheets of the entire project. Ideally, this application allows renumbering, re-titling and other title block text manipulation.

This application uses a custom MicroStation VB application to scan selected MicroStation files for Title Block Tags. It then stores all tag information in a Microsoft Excel file that is created from a predefined template. Within this Excel file, columns can be manipulated (copied and numbered sequentially). When editing is complete, you must save this file (saves to folder of active dgn). Back in MicroStation, selecting “Set Tags” will push the info from the saved Excel file back to the listed MicroStation files. The application can also import a ProjectWise Plot Organizer file and determine the list of dgnos from this file.

This will work for both sheet models and design models (InRoads cross sections).

The application will not place tag sets, it only modifies existing ones.

Any problems or recommendations for this application can be made to Engineering Applications.

Section 8 Plotting and Adobe PDF Publishing

8.1 General Plotting Information

This Section describes the options a user has when creating paper and mylar plots along with single Adobe PDF documents and compiled Adobe PDF Sets. These sets are created using Bentley's ProjectWise Plot Organizer (PPO) and MicroStation. Licensing of Adobe Acrobat Professional is not required to produce Adobe PDF documents or Adobe PDF Sets.

For information on installation and configuration for all plotting files see Section 3.3 .

8.2 Plotting Process Options

CTDOT's DDE with Bentley's ProjectWise Plot Organizer allows for multiple options for outputs. See Table 8-1 MicroStation Plotting Options below to compare these options:

Output	MicroStation Print	ProjectWise Plot Organizer – Iplot	ProjectWise Plot Organizer (Batch)
Paper	√	√	√
Mylar	√	√	√
JPEG	√	√	√
PDF Document	√		√
Paper Plot Sets			√
Mylar Plot Sets			√
Compiled PDF Sets			√
Plot Order Management			√
Data Mining of Title Block Tags			√
Cross Section and Detail Hyper-linking			√

Table 8-1 MicroStation Plotting Options

8.2.1 MicroStation Print Option

This option uses MicroStation's built in printing utilities along with delivered drivers for creation of paper, mylar, jpegs and single PDF plots. This utility uses the Microsoft Windows drivers that are resident on the user's computer.

8.2.2 ProjectWise Plot Organizer – Iplot Option

This option uses the Iplot dialog within MicroStation after installing Bentley's ProjectWise Plot Organizer. Like MicroStation Print, Iplot can create paper, mylar, jpegs and single PDF plots.

8.2.3 ProjectWise Plot Organizer (Batch) Option

Bentley's ProjectWise Plot Organizer (Batch Plotting) utility is the most robust of the plotting options. This option allows for all of the available outputs. Most important, is the ability to create plot sets which in turn can be outputted to hard copy (Paper or Mylar) or an intelligent PDF set.

The following additional functionality is gained when using PPO (Batch Option) :

- Data Mining - Allows ProjectWise Plot Organizer to mine out the Drawing Numbers of plot sheets to allow for proper sorting of plot sheets.
- Plot Sorting – Allows ProjectWise Plot Organizer to sort plots based on the Drawing Numbers and a defined sorting template.
- Callouts and Links – Allows ProjectWise Plot Organizer to automatically create hyperlinks between details when creating PDF sets. The hyperlinks are created from the MicroStation Drafting Tools Markers and Circle Callouts.
- Bookmarks – Allows ProjectWise Plot Organizer to automatically create bookmarks when creating PDF sets. The bookmarks are created from the Drawing Numbers and Drawing Titles of all the sheets included in the plot set.

8.3 Using ProjectWise Plot Organizer for PDF Sets

The following Section describes the prerequisites and steps required to use ProjectWise Plot Organizer for creating intelligent PDF sets.

8.3.1 Prerequisites for Creating PDF's

For creating PDF's there will be two different workflows. One for in-house designers, and one for outside consultant designers. In-house designers will only need to map the PH3DGS00_PDF virtual printer, consultants will have to setup the virtual printer included with ProjectWise Plot Organizer.

8.3.1.1 Software Requirements for ProjectWise Plot Organizer

- Windows XP
- Select Server Licensing
- Bentley MicroStation V8 version 8.05.02.35
- CTDOT's 2007 Digital Design Environment
- MicroStation V8 XM Software Prerequisite Pack 08.09.00.16
- Projectwise Plot Organizer 08.09.02.26

8.3.1.2 Attaching the Virtual Printer

Within CTDOT, browse for a printer on the CTDOT domain. Find the print server SDCDGS01 and expand. Attach the virtual printer PH3DGS00_PDF.

For installation and configuration of the virtual printer, see [2007 step by step DDE install.pdf](#) – Step 3.2

8.3.2 Using ProjectWise Plot Organizer

ProjectWise Plot Organizer is designed to submit plots and plot sets to a plot server for printing and/or PDF creation. These plots and plot sets can consist of numerous types of documents. At this time CTDOT is focused on using only MicroStation files within the plot sets. There are two types

of MicroStation files that will be used within a plot set. The first, Sheet Models will contain one contract drawing per MicroStation file. Second, a Design Model will contain a set of contract drawing cross sections per MicroStation file. For more on Sheet Models and Design Models see [Appendix D CTDOT CAD Drawing Standards Design](#) and Sheet Models.

NOTE: CTDOT has developed an application to run ProjectWise Plot Organizer from within MicroStation. We have done this so that all project defined variables can be captured, insuring reference files and other file resources are resolved and found correctly.

A workflow for creating an Adobe PDF packaged set of contract drawings is located here [2007 MSta PDF Publishing.pdf](#).

Section 9 Design Submissions

9.1 Standard CAD File Naming and Storage Areas

[Appendix C File Naming Conventions](#) represents CTDOT's standard CAD file naming, data types and proper storage location for both in-house design and consultant designed projects. CAD file naming is vital in order to maintain the integrity of design data and to assure future interoperability with GIS management systems. In general, CTDOT is standardizing on the use of MicroStation sheet models (with exception to InRoads Cross-Sections) to represent contract plan sheets (Appendix E). A designation of MSH = MicroStation sheet file has been added after each disciplines designator. Also contained in [Appendix C File Naming Conventions](#) are naming conventions for addendums and change orders.

9.2 Standard CAD Final Design Submission Expectations for Selected Consultant Engineers

At the present time, consultant engineers are expected to begin working in CTDOT's Digital Design Environment, adhere to the Department's [Consultant Design Manual](#), and be capable of delivering CAD data according the methods outlined in the body of this guide. Should there be a need to create a project directory structure outside of the normal convention (i.e. multiple projects/one contract or PE projects that contain multiple sub projects) the designated consultant engineer should contact the Department's Consultant Liaison and/or the Engineering Applications Section so that a custom project template can be created. Unless agreed to otherwise by lead Department Consultant Engineering Liaison, CAD data is not expected to be delivered until final design. Present acceptable media for delivery of CAD data is either via CD or DVD ROM. In the future Consultant Engineers will be expected to make submissions via ProjectWise's Web Explorer.

9.3 Standard Design Submissions – Special Provisions, Specifications and Permits

The standard application used to develop special provision and specifications is **Microsoft Word 2003**. Instructions for special provision creation are located here: [Instructions & Templates](#). Always consult with the Contract Development Unit with questions regarding the format of special provisions or specifications. Further information regarding Form 816, special provisions and specification requirements can be found under [Contract Development's Website](#) and/or [Department Publications](#).

The preferred workflow in handling special provisions, specifications and/or permits electronically is to keep *Draft* (preliminary design) special provisions, specifications or permits in their designated sub directory. Once they have been checked according to CTDOT's [Contract Checker Program](#), the Project Manager or Lead should move them to the 202_Design_Submissions folder. Contract Development will then assemble the individual word documents into a single document that is located in the 303_Contract_Development folder. **Appendix C File Naming Conventions** represents the naming conventions for special provisions and/or specifications.

9.4 “Work-In-Progress” ProjectWise and PDF Design Submissions

In general, ProjectWise provides a means to store, secure and control the flow of documents during every phase of a project. All types of project documents including design files, spreadsheets, databases, and correspondence can be stored in ProjectWise. ProjectWise retains project-related documents during the life of a project, and later archives the documents for historical reference. (At this time, guidelines for archiving documents are being developed.) Documents can also be searched, queried and sorted using the basic ProjectWise functions.

At this time ProjectWise is in a development environment with ongoing migration to a production environment. CTDOT will be piloting digital submissions from Consultant Designers into ProjectWise through a thin client (web) interface. Additional information will be available as developments occur.

Appendix D - Section 0 represents an overview of the naming conventions for future PDF design submissions and their proper location within the project container. At this time, only Highways, Bridge and Facilities Design are being considered for submission naming conventions. In the future, others will be added. Engineering Applications is developing end-user training in order to take advantage of Adobe Acrobat’s Comment and Review Tools. This application provides features to allow for live review or to allow participants to work-offline. The benefits to a live review enable the review coordinator and participants to see each others comments as they are being worked on (live), thus allowing for a reduction of conflicting comments. Each type of review (offline or live) will allow for a higher level of approval. In other words Supervisors and/or Principals will be offered opportunities to approve comments. Adobe Acrobat’s Review Tracker allows for more efficient organization and tracking of multiple review sessions. Figure Figure 9-1 - Acrobat Design Review Initiation, Figure 9-2 - Acrobat Review Tracker, and Figure 9-3 – Acrobat Comment and Markup Tools represents Acrobat’s primary Commenting and Review Tools.

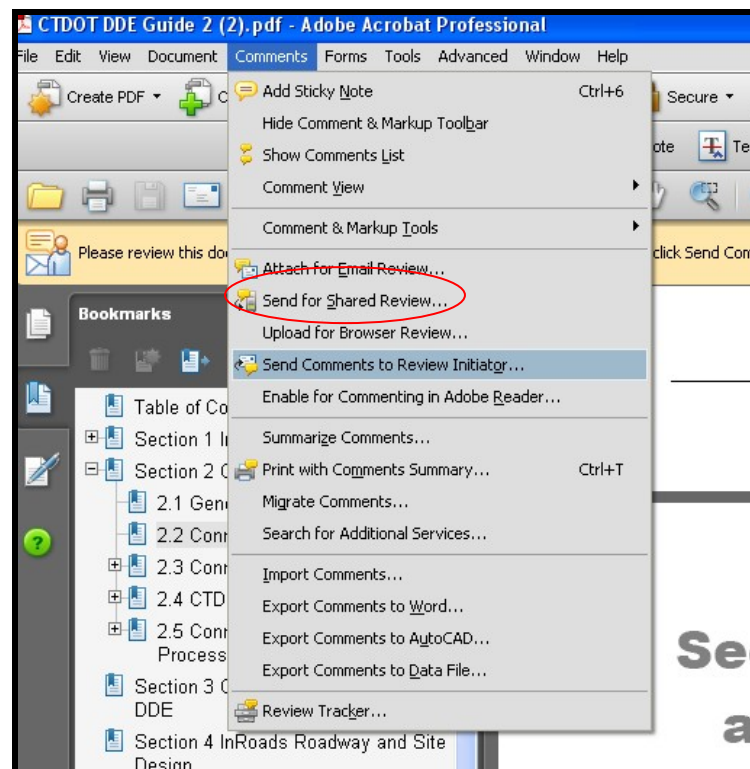


Figure 9-1 - Acrobat Design Review Initiation

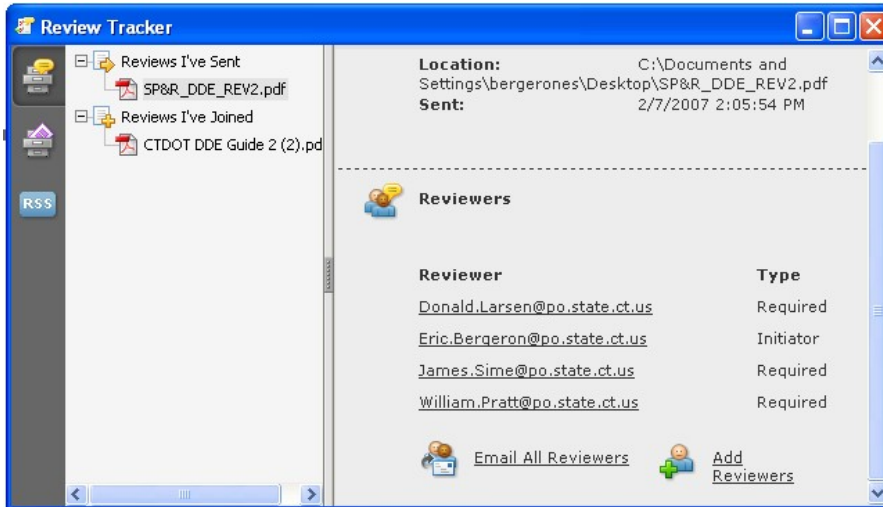


Figure 9-2 - Acrobat Review Tracker



Figure 9-3 – Acrobat Comment and Markup Tools

Appendix A Policy Statement No. F&A-24 dated March 5, 2007



CONNECTICUT DEPARTMENT OF TRANSPORTATION POLICY STATEMENT

POLICY NO. F&A-24
March 5, 2007

SUBJECT: Computer Aided Design, Survey, and Roadway Design Software File Formats

It is the policy of this Department to adopt the following software formats for all of its Computer Aided Design, Survey, and Roadway Design related business:


CAD (Computer Aided Design)Bentley Microstation
Survey and Roadway DesignBentley InRoads

All future assignments are to be performed using this technology. Exceptions to this policy must be approved by the Strategic Information/Communications Systems Committee. This standard applies to the Department's entire business needs, whether performed by in-house staff or by Consultant Engineers retained by the Department.

Note: This policy only represents Computer Aided Design, Survey, and Roadway Design file formats. The Department has additional required software format standards for disciplines that can be found in the discipline specific Design Manuals and on the Department's Internet Site.

Current acceptable versions of the Computer Aided Design, Survey, and Roadway Design file formats can be found at www.ct.gov/dot/digitaldesign.

(This Policy Statement supersedes Policy Statement No. F&A-24 dated March 16, 1993)



Ralph J. Carpenter
COMMISSIONER

Appendix B CTDOT's Discipline Representatives – Contact List

Eng Discipline	Representative	Telephone No. (860)	Email
Aviation & Ports	Bruno, Robert	594-2535	Robert.Bruno@po.state.ct.us
Bridge Design	Cardinali, Andrew	594-3315	Andrew.Cardinali@po.state.ct.us
Bridge Design	Reed, Bryan	594-3418	Bryan.Reed@po.state.ct.us
Consultant Bridge	Abramowicz, Gary	594-3206	Gary.Abramowicz@po.state.ct.us
Consultant Design	Cunningham, Brian	594-3198	Brian.Cunningham@po.state.ct.us
Environmental Planning	Sabrosky, Paul	594-2929	Paul.Sabrosky@po.state.ct.us
Facilities - Electrical	Andrews, Jon	594-2792	Jon.Andrews@po.state.ct.us
Facilities	John Wyskiel	594-3303	John.Wyskiel@po.state.ct.us
GIS	Spencer, Jim	594-2014	James.Spencer@po.state.ct.us
Highway Design	Richard, Elaine	594-3278	Elaine.Richard@po.state.ct.us
Highway Design	Sardinkas, Greg	594-3453	Greg.Sardinkas@po.state.ct.us
Highway Operations	Cruz, Dave	594-3457	David.Cruz@po.state.ct.us
Hydraulics & Drainage	Kelley, Mike	594-3240	Michael.Kelley@po.state.ct.us
Planning	Cless, Robert	594-2952	Robert.Cless@po.state.ct.us
Planning	Dickey, Paul	594-2945	D.Paul.Dickey@po.state.ct.us
Planning	Head, Dave	594-2149	David.Head@po.state.ct.us
Planning - Environmental	DeLuca, Jessica	594-2135	Jessica.DiLuca@po.state.ct.us
Project Development	Burns, Monique	594-3292	Monique.Burns@po.state.ct.us
Project Development	O'Keefe, Paul	594-3483	Paul.Okeefe@po.state.ct.us
Public Transportation	Kuljis, Yure	594-2791	Yure.Kuljis@po.state.ct.us
Research	Lisitano, Alan	258-0330	Alan.Lisitano@po.state.ct.us
Rights of Way	Durling, John	594-2469	John.Durling@po.state.ct.us
Soils & Foundations	Fontaine, Leo	594-3180	Leo.Fontaine@po.state.ct.us
Soils & Foundations	Pion, Robert	594-3183	Robert.Pion@po.state.ct.us
Surveys	Bosse, Miguel	594-2519	Miguel.Bosse@po.state.ct.us
Surveys	Coleman, Mike	594-2526	Michael.Coleman@po.state.ct.us
Traffic	Fascione, Gerald	594-2797	Gerald.Fascione@po.state.ct.us
Traffic	James, LeVance	594-3401	LeVance.James@po.state.ct.us
Traffic	LaLone, Mike	594-2768	Michael.LaLone@po.state.ct.us
Traffic	Swinburne, Diane	594-2799	Diane.Swinburne@po.state.ct.us
Utilities	Brown, Derek	594-2555	Derek.Brown@po.state.ct.us
Utilities	Piteo, Mike	594-3266	Michael.Piteo@po.state.ct.us

Appendix C File Naming Conventions

All discipline file naming conventions differ slightly due to preferences that have been demonstrated to Engineering Applications. Changes to these naming conventions must be discussed with the designated Discipline/Consultant Liaison and the Engineering Applications Section.

C.1 Surveys CAD File Naming

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
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Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Built, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
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Discipline Designator	Data File Category	Unit No.*	Sub Cat.Code	Description	File Naming Standard Examples	Proper Storage Location (In-House)	Proper Storage Location (CE)
SV	MST	CS, D#, or CM	PM	Property Maps	SV_MST_CS_0107_0288**_PM.dgn	Surveys\Property_Map	Surveys
SV	MST	CS, D#, or CM	PLA	Planimetric	SV_MST_D1_0107_0288_PLA.dgn	Surveys	Surveys
SV	MST	CS, D#, or CM	GRN	Ground File	SV_MST_CM_0107_0288_GRN.dgn	Surveys	Surveys
SV	IRD	CS, D#, or CM	DTM	Existing Digital Terrain Model	SV_IRD_CM_0107_0288_existing.dtm*	Surveys	Surveys

* CS = Central Surveys, D# = District No., CM = Consultant Mapping

* The InRoad's Application "inside" file name must be named "existing"

** Project No.

C.2 Highway Design CAD File Naming

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
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Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Builts, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
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Discipline Designator	Data Category	Type	Sub Cat. Code	Description	File Naming Standard Examples*	Proper Storage Location (For In-House Design)	Proper Storage Location (CE's)
HW	MST	Design Model	MDL	Design Model	HW_MST_0107_0288**_MDL.dgn	Highways\MSta_Design	Highways
HW	MSH	General	TSH	Title Sheet	HW_MSH_0107_0288_TSH.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	General	EST	Detail Estimate Sheet	HW_MSH_0107_0288_EST-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Survey/Mapping	INX	Index Plan	HW_MSH_0107_0288_INX-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Survey/Mapping	TIE	Survey Data	HW_MSH_0107_0288_TIE-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Misc. Details	TYP	Typical Cross Sections	HW_MSH_0107_0288_TYP-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Misc. Details	MDS	Misc. Details	HW_MSH_0107_0288_MDS-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	IGP	Intersection Grading Plans	HW_MSH_0107_0288_IGP-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Misc. Details	BOR	Boring Logs	HW_MSH_0107_0288_BOR-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways

HW	MSH	Roadway	STG	Stage Construction Plan	HW_MSH_0107_0288_STG-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	LDS	Landscape/Planting/Grading Plan	HW_MSH_0107_0288_LDS-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	AEC	Hazmat Details	HW_MSH_0107_0288_AEC-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	WMT	Wetland Mitigation	HW_MSH_0107_0288_WMT-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	ALN	Alignment Design/Layout	HW_MSH_0107_0288_ALN-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	PLN	Plan Cut Sheet	HW_MSH_0107_0288_PLN-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	PRO	Profile Cut Sheet	HW_MSH_0107_0288_PRO-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	XSC	Cross Section Cut Sheet	HW_MSH_0107_0288_XSC-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Roadway	DRG	Breakout Drainage Sheet	HW_MSH_0107_0288_DRG-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways
HW	MSH	Survey Mapping	ROW	Breakout Right of Way Sheet	HW_MSH__0107_0288_ROW-01.dgn	Highways\MSta_Contract_Sheet_Files	Highways

***Addendum Example:**

HW_MSH_0107_0288_SAN-01_A1.dgn (Add1 = A1, Add2 = A2, Add3 = A3, etc.)

***Construction Order Example:**

HW_MSH_0107_0288_SAN-01_CA.dgn (CA = Construction Order A, CB = Construction Order B, CC = Construction Order C, etc.)

****Project No**

C.3 Structure Bridge CAD File Naming

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
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Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Built, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
--	--

Discipline Designator	Data File Cat.	Site Designator*	Sub Cat. Code	Descrip.	File Naming Standard Examples*	Proper Storage Location (For In-House Design)	Proper Storage Location (CE's)
SB	MSH	Br#, Site#, or RW#	GPN	General Plan	SB_MSH_GPN_0107_0288**.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MSH	Br#, Site#, or RW#	BOR	Borings 1	SB_MSH_Br00345_0107_0288_BOR-1.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MSH	Br#, Site#, or RW#	ABT1	Abutment 1	SB_MSH_Br00345_0107_0288_ABT1.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MSH	Br#, Site#, or RW#	WW1A	Wingwall 1A	SB_MSH_Br00345_0107_0288_WW1A.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MSH	Br#, Site#, or RW#	BRS	Bearings	SB_MSH_Br00345_0107_0288_BRS-1.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MSH	Br#, Site#, or RW#	FRM	Framing Plans	SB_MSH_Br00345_0107_0288_FRM.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MSH	Br#, Site#, or RW#	STD	Steel Details	SB_MSH_Br00345_0107_0288_STD.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MSH	Br#, Site#, or RW#	RLD	Rail Details	SB_MSH_Br00345_0107_0288_RLD.dgn	Struct_Bridge\MSta_Sheet_Files	Struct_Bridge
SB	MST	Br#, Site#, or RW#	Model	3D design model	SB_MST_Br00345_0107_0288_Model.dgn	Struct_Bridge\MSta_Design	Struct_Bridge

*Site Designator, i.e.
Bridge No., Site No. or
Retaining Wall No.

***Addendum Example** SB_MSH_Br00345_0107_0288_RLD-1_A1.dgn (Add1 = A1, Add2 = A2, Add3 = A3, etc.)

***Construction Order Example** SB_MSH_Br00345_0107_0288_RLD-2_CA.dgn(CA = Construction Order A, CB = Construction Order B, CC = Construction Order C, etc.)

****Project Number**

C.4 Facilities Design CAD File Naming

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
-----------------------------------	---

Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Built, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
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Discipline Designator	Data File Category	Category	Sub Cat. Code	Description	File Naming Standard Examples*	Proper Storage Location (In-House)	Proper Storage Location (For CE's)
FD	MSH	General	TSH	Title Sheet	FD_MSH_TSH_0107_0288**.dgn	Facilities\Misc	Facilities\Misc
FD	MSH	General	IDX	Index Plan	FD_MSH_IDX_0107_0288.dgn	Facilities\Misc	Facilities\Misc
FD	MSH	General	EXT	Existing Survey Cut Sheets	FD_MSH_EXT_0107_0288.dgn	Facilities\Misc	Facilities\Misc
FD	MSH	General	LIM	Limitation of Operations	FD_MSH_LIM_0107_0288.dgn	Facilities\Misc	Facilities\Misc
FD	MSH	General	TYP	Typical Sections	FD_MSH_TYP_0107_0288.dgn	Facilities\Misc	Facilities\Misc
FD	MSH	Architectural	ARC	Architectural Plans	FD_MSH_ARC_0107_0288_A001.dgn	Facilities\Arch	Facilities\Arch
FD	MSH	Catenary	CAS	Catenary Assembly Sheets	FD_MSH_CAS_0107_0288_CT001.dgn	Facilities\Elec	Facilities\Elec
FD	MSH	Catenary	CBG	Catenary Bonding and Grounding Sheets	FD_MSH_CBJ_0107_0288_CT001.dgn	Facilities\Elec	Facilities\Elec
FD	MSH	Catenary	CED	Catenary Erection Diagrams	FD_MSH_CED_0107_0288_CT001.dgn	Facilities\Elec	Facilities\Elec

FD	MSH	Catenary	CGD	Catenary General Detail Sheets	FD_MSH_CGD_0107_0288_CT001.dgn	Facilities\Elec	Facilities\Elec
FD	MSH	Catenary	CSS	Catenary Structure Steel Sheets	FD_MSH_CSS_0107_0288_CT001.dgn	Facilities\Elec	Facilities\Elec
FD	MSH	Catenary	CWS	Catenary Wire Sheets	FD_MSH_CWS_0107_0288_CT001.dgn	Facilities\Elec	Facilities\Elec
FD	MSH	Civil	APT	Airport Plan Sheet	FD_MSH_APT_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	BOR	Boring Logs	FD_MST_BOR_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	CIV	Site Plans / Civil Sheets	FD_MSH_CIV_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	DET	Detail Sheets	FD_MSH_DET_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	DRG	Drainage Sheet	FD_MSH_DRG_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	EST	Detail Estimate Sheet	FD_MSH_EST_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	EXT	Existing Survey	FD_MSH_EXT_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	GRD	Grading Sheets	FD_MSH_GRD_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	GRN	Ground File	FD_MST_GRN_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	PRO	Profile Sheet	FD_MSH_PRO_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	RDW	Roadway Sheets	FD_MSH_RDW_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	RTS	Railroad Track Sheets	FD_MSH_RTS_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	SED	Sedimentation Control	FD_MSH_SED_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	SGN	Signing Plan (Only) Sheets	FD_MSH_SGN_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	SPM	Signing and Pavement Marking Plan (Combined) Sheets	FD_MSH_SPM_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH	Civil	STG	Stage Construction Plan	FD_MSH_STG_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil

FD	MSH	Civil	UTL	Utility Plan	FD_MSH_UTL_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH or MST	Civil	XSC	Cross Section	FD_MSH_XSC_0107_0288_C001.dgn	Facilities\Civil	Facilities\Civil
FD	MSH or MST	Demolition	DMO	Demolition	FD_MSH_DMO_0107_0288_D001.dgn	Facilities\Demo	Facilities\Demo
FD	MSH or MST	Electrical	ELE	Electrical Plans	FD_MSH_ELE_0107_0288_E001.dgn	Facilities\Elec	Facilities\Elec
FD	MSH or MST	Electrical	COM	Communications Plans	FD_MSH_COM_0107_0288_E002.dgn	Facilities\Elec	Facilities\Elec
FD	MSH or MST	Electrical	ESS	Electronic Safety and Security	FD_MSH_ESS_0107_0288_E001.dgn	Facilities\Elec	Facilities\Elec
FD	MSH or MST	Mech/Elec.	EQP	Equipment Plans	FD_MSH_EQP_0107_0288_M001.dgn	Facilities\Elec or Mech	Facilities\Elec or Mech
FD	MSH or MST	Mech/Elec	BHS	Baggage Handling	FD_MSH_BHS_0107_0288_M001.dgn	Facilities\Elec or Mech	Facilities\Elec or Mech
FD	MSH or MST	Environmental	ENV	Environmental Site Plans	FD_MSH_ENV_0107_0288_EN001.dgn	Facilities\Misc	Facilities\Misc
FD	MSH or MST	Fire Protection	FRP	Fire Protection Plans	FD_MSH_FRP_0107_0288_FP001.dgn	Facilities\Misc	Facilities\Misc
FD	MSH or MST	Industrial	IDS	Industrial Plans	FD_MSH_IDS_0107_0288_I001.dgn	Facilities\Misc	Facilities\Misc
FD	MSH or MST	Landscape	LDS	Landscape Plans	FD_MST_LDS_0107_0288_L001.dgn	Landscape	Landscape
FD	MSH or MST	Mechanical	MEC	Mechanical Plans	FD_MST_MEC_0107_0288_M001.dgn	Facilities\Mech	Facilities\Mech
FD	MSH or MST	Plumbing	PLM	Plumbing Plans	FD_MST_PLM_0107_0288_P001.dgn	Facilities\Mech	Facilities\Mech
FD	MSH or MST	Salt Sheds	SSS	Salt Sheds Plans	FD_MST_SSS_0107_0288_SS001.dgn	Facilities\Saltshed	Facilities\Saltshd
FD	MSH or MST	Structural	STR	Structural Plans	FD_MST_STR_0107_0288_S001.dgn	Facilities\Struct	Facilities\Struct
FD	MSH or MST	Environmental	HAZ	Building Environmental	FD_MSH_HAZ_0107_0288_EN001.dgn	Facilities\Misc	Facilities\Misc

*** The Last 4 - 5 Letters and Numbers (Non-Addenda or Change Orders#'s) in Facility Design's Naming Convention represents their Discipline Categories and Drawing Numbers.**

***Addendum Example:** FD_MSH_DMO_0107_0288_D001_A1.dgn (Add1 = A1, Add2 = A2, Add3 = A3, etc.)

***Construction Order Example:** FD_MSH_DMO_0107_0288_D001_CA.dgn (CA = Construction Order A, CB = Construction Order B, CC = Construction Order C, etc.)

****Project Number**

C.5 Traffic CAD File Naming

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
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Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Built, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
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Discipline Design.	Data File Category	Data Cat.	Code	Description	File Naming Standard Examples*	Proper Storage Location (For In-House Design)	Proper Storage Location (For CE's)
TR	MSH	General	TCS	Traffic Control Signal Plan	TR_MSH_TCS_107266***_0107_0288**.dgn	Traffic\Signals	Traffic
TR	MSH	General	TSH	Title Sheet	TR_MSH_TSH_107266_0107_0288.dgn	Traffic	Traffic
TR	MSH	General	EST	Detailed Estimate Sheet	TR_MSH_EST_107266_0107_0288.dgn	Traffic	Traffic
TR	MSH	General	TYP	Typical Sheet	TR_MSH_TYP_107266_0107_0288.dgn	Traffic\Standard_Typical_Sheets	Traffic
TR	MSH	General	STD	Standard Sheet	TR_MSH_STD_107266_0107_0288.dgn	Traffic\Standard_Typical_Sheets	Traffic
TR	MSH or MST	General	DTR	Detour Plan	TR_MSH_DTR_107266_0107_0288.dgn	Traffic	Traffic
TR	MSH	General	XSC	Cross-Section	TR_MSH_XSC_107266_0107_0288.dgn	Traffic	Traffic
TR	MST	General	COL	Collision Diagram	TR_MSH_COL_107266_0107_0288.dgn	Traffic	Traffic

TR	MSH	General	PVT	Pavement Marking Plan	TR_MSH_PVT-01_107266_0107_0288.dgn	Traffic\Signing_Pvmt_Markings_Plans	Traffic
TR	MSH	General	SPM	Signing and Pavement Marking Plans	TR_MSH_SPM_0107_0288.dgn	Traffic\Signing_Pvmt_Marking_Plans	Traffic
TR	MSH	General	SGN	Signing Plan	TR_MSH_SGN_0107_0288.dgn	Traffic\Signing_Pvmt_Marking_Plans	Traffic
TR	MSH	General	MPT	Maintenance and Protection of Traffic	TR_MSH_MPT-01_0107_0288.dgn	Traffic\Signing_Pvmt_Marking_Plans	Traffic
TR	MSH or MST	General	FLA	Flashing Beacon	TR_MSH_FLA_107266_0107_0288.dgn	Traffic\Signals	Traffic
TR	MSH or MST	General	INT	Interconnect Plan	TR_MSH_INT_107266_0107_0288.dgn	Traffic\Electrical	Traffic
TR	MSH	General	DET	Detail Sheet	TR_MSH_DET_107266_0107_0288.dgn	Traffic\Sign_Details	Traffic

***Addendum Example:**
***Construction Order Example:**

TR_MSH_TCS_107166_0107_0288_A1.dgn (Add1 = A1, Add2 = A2, Add3 = A3, etc.)
 TR_MSH_TCS_107166_0107_0288_CA.dgn (CA = Construction Order A, CB = Construction Order B, CC = Construction Order C, etc.)

****Project Number, *** Intersection Number**

Discipline Design.	Data File Category	Sign Detail Designator	Town No./Location No./Highway or Route No.	File Naming Standard Examples*	Proper Storage Location	Proper Storage Loc. (For CE's)
TR	MST	SIN	XXXYYYYZZZ*	TR_SIN_01070166067.dgn	Traffic\Sign Details	Traffic
		Traffic Sign Details	*XXX= Town Number, YYYY = Location Number, ZZZ = Route No.			

Discipline Design.	Data File Category	Sign Detail Designator	Class Series/Sign Material/Sign Type/Sign Number	File Naming Standard Examples*	Proper Storage Location	Proper Storage Location (For CE's)
TR	MST	SIN	WWYYXR	TR_SIN_32RG02.dgn	N/A	N/A
		Traffic Catalog Sign Details	WW = Series Class [3,4,5,8,9], YY = Sign Material [0=Unknown,1=Sheet Aluminum, 2=Extruded Alum, etc] X = Sign Type [R= Regulatory, G = Guide, and C =Const/Maint], R = Specific Sign No.			

C.6 Design Submission File Naming – Highways and Bridge

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
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Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Builts, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
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The below items are a Work-In-Progress and will be standardized during the ProjectWise Implementation Project. At this time, only Highways, Bridge and Facility Design have been considered for Submission Naming Conventions. In the future, other disciplines will be required to develop similar naming conventions. The below submission naming conventions only considers plans and specifications at this time. We encourage users to begin proper file naming as soon as possible.

Project Lead Discipline Designator	Data File Category	Code	Description	File Naming Standard Examples	File Type Required	Proper Storage Location for Both In-House Design and CE Design
HW or SB	20%	PES	Preliminary Engineering Submssion	HW_20%_PES_0107_0188.PDF	PDF	202_Design_Submissions
HW or SB	20%	STS	Structure Type Study	HW_20%_STS_0107_0188.PDF	PDF	202_Design_Submissions
HW or SB	30%	PDL	Preliminary Design Layout	HW_30%_PDL_0107_0188.PDF	PDF	202_Design_Submissions
HW or SB	30%	PSL	Preliminary Design - Structure Layout	HW_30%_PSL_107_0188.PDF	PDF	202_Design_Submissions

HW or SB	30%	TS	Traffic Specifications	HW_30%_TRS_107_0188.PDF	PDF	202_Design_Submissions
HW or SB	50%	CR	Constructability Review	HW_50%_CSR_0107_0188.PDF	PDF	202_Design_Submissions
HW or SB	60%	DD	Drainage Design	HW_60%_DRG_0107_0188.PDF	PDF	202_Design_Submissions
HW or SB	70%	SFS	Semi-Final Structures	HW_70%_SFS_0107_0188.PDF	PDF	202_Design_Submissions
HW or SB	70%	SFH	Semi-Final Highways	HW_70%_SFH_0107_0188.PDF	PDF	202_Design_Submissions
HW or SB	n/a	FDP	Final Design Plans – Unsigned for Review	HW_100%_FDP_0107_0188.PDF	PDF	202_Design_Submissions
n/a	n/a	n/a	Final Specification /Special Provisions Submission	Item# or NTC Description.DOC	.DOC	202_Design_Submissions
HW or SB	FP	n/a	Final Digitally Signed Plans	HW_FP_DCD_0107_0188.PDF	PDF	101_Contract_Plans_PDF
HW or SB	FS	n/a	Final Specifications assembled by Contract Dev.	HW_FS_DCD_0107_0188.PDF	PDF	102_Contract_Specifications_PDF
HW or SB	FP	n/a	Addendum Plans for Review	HW_FP_0107_0188_A1_REVIEW.PDF	PDF	202_Design_Submissions
HW or SB	FP	n/a	Final Addendum Plans	HW_FP_0107_0188_A1.PDF	PDF	101_Contract_Plans_PDF
HW or SB	FS	n/a	Final Specifications with Addenda	HW_FS_0107_0188_A1.PDF	.PDF	102_Contract_Specifications_PDF
HW or SB	FP	n/a	Construction Order Plans for Review	HW_FP_0107_0188_CA_REVIEW.PDF	.PDF	203_Construction_Submissions
HW or SB	FP	n/a	Final Construction Order Plans	HW_FP_0107_0188_CA.PDF	.PDF	101_Contract_Plans_PDF
HW or SB	FS	n/a	Final Specifications with Construction Order	HW_FS_0107_0188_CA.PDF	.PDF	102_Contract_Specifications_PDF

HW or SB	N/A	n/a	Final As-Built Plans	HW_FP_0107_0188.PDF	.PDF	101_Contract_Plans_PDF
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C.7 Design Submissions File Naming – Facilities Design

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
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Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Built, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
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The below items are a Work-In-Progress and will be standardized during the ProjectWise Implementation Project. At this time, only Highways, Bridge and Facility Design have been considered for Submission Naming Conventions. In the future, other disciplines will be required to develop similar naming conventions. The below submission naming conventions only considers plans and specifications at this time. We encourage users to begin proper file naming as soon as possible.

Project Lead Discipline Designator	Data File Cat.	Code	Description	File Naming Standard Examples	File Type	Proper Storage Location for Both In-House Design and CE Design
FD	10%	SCD	Schematic Design Submission	FD_10%_SCD_0107_0188.PDF	.PDF	202_Design_Submissions
FD	30%	PDS	Preliminary Design	FD_30%_PDS_0107_0188.PDF	.PDF	202_Design_Submissions
FD	60%	DD	Design Development	FD_60%_DD_0107_0188.PDF	.PDF	202_Design_Submissions
FD	90%	FD	Final Design	FD_90%_FD_0107_0188.PDF	.PDF	202_Design_Submissions
FD	100%	FDP	Final Design Plans – Unsigned for Review	FD_100%_FDP_0107_0188.PDF	.PDF	202_Design_Submissions

n/a	n/a	n/a	Final Specification Submission	Item# or CSI Spec# or NTC.DOC	.DOC	202_Design_Submissions
FD	FP	DCD	Final Digitally Signed Plans	FD_FP_DCD_0107_0188.PDF	.PDF	101_Contract_Plans_PDF
FD	FS	n/a	Final Specifications	FD_FS_0107_0188.PDF	.PDF	102_Contract_Specifications_PDF
FD	FP	n/a	Addendum Plans for Review	FD_FP_0107_0188_A1_REVIEW.PDF	.PDF	202_Design_Submissions
FD	FP	n/a	Final Addendum Plans	FD_FP_0107_0188_A1.PDF	.PDF	101_Contract_Plans_PDF
n/a	n/a	n/a	Final Addenda Specification Submittal for Review	Item# or CSI Spec# or NTC.DOC	.DOC	202_Design_Submissions
FD	FS	n/a	Final Specifications with Addenda	FD_FS_0107_0188_A1.PDF	.PDF	102_Contract_Specifications_PDF
FD	CS	n/a	Construction Order Plans for Review	FD_FP_0107_0188_CA_REVIEW.PDF	.PDF	203_Construction_Submissions
FD	FP	n/a	Final Construction Order Plans	FD_FP_0107_0188_CA.PDF	.PDF	101_Contract_Plans_PDF
n/a	n/a	n/a	Final Const. Order Specification Submittal for Review	Item# or CSI Spec# or NTC.DOC	.DOC	203_Construction_Submissions
FD	FS	n/a	Final Consolidated Specifications with Construction Order	FD_FS_0107_0188_CA.PDF	.PDF	102_Contract_Specifications_PDF
FD	AB	n/a	Final As-Built Plans	FD_0107_0188_AB.PDF	.PDF	101_Contract_Plans_PDF

C.8 General Project Information – File Naming Conventions

Standard Disc. Designators	DD= General Discipline Designator: SV = Surveys, HW = Highways, FD = Facilities Design, SB = Structure Bridge, TR = Traffic
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Data Categories	MST = Any MicroStation File, MSH = MicroStation Contract Sheet Files, IRD = InRoads Data, DS = Design Submissions, FP = Final Digitally Signed Plans, FS = Final Specifications, AB = As-Built, PS = Planning Submission, CS = Construction Submission, GEN = General, COR = Correspondance, PER = Permits, CAL = Calculations
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Addendum and Change Order Conv.	A1= Addendum 1, A2 = Addendum 2, A3 = Addendum 3 etc. : CA = Construction Order A, CB = Construction Order B, CC = Construction Order C.
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The below items are a Work-In-Progress and will be standardized during the ProjectWise Implementation Project. In the future, other disciplines will be required to develop similar naming conventions. The below submission naming conventions only considers plans and specifications at this time. We encourage users to begin proper file naming as soon as possible.

Project Lead Discipline Designator	Data File Cat.	Description	File Naming Standard Examples	File Type	Proper Storage Location for Both In-House Design and CE Design
DD	PROJ	Project Information: Project description, commitment sheet, schedule of owners, attendance sheet, Design Report	DD_PROJ_0082_0287_Description.doc DD_PROJ_0082_0287_Description.XLS	Misc.	Designated Discipline Subdirectory
DD	CAL	Project Related Engineering Related Calculations	DD_CAL_0082_0287_Description.doc DD_CAL_0082_0287_Description.XLS	Misc.	Designated Discipline Subdirectory
DD	LTR	Letters: residents, log letter, Town Roads Meeting, Utility Meeting	DD_LTR_0082_0287_Description.doc	Misc.	Designated Discipline Subdirectory
DD	MEMO	General: ROW, Processing, change orders, addenums	DD_MEMO_0082_0287_Description.doc	Misc.	Designated Discipline Subdirectory

DD	MEMO	Informational Requets: task 100 + 210, test pits, title search, property maps, Item, Environmental review, Historic Review, Hydrauliv Permit att.,	DD_MEMO_0082_0287_Description_Req.doc	Misc.	Designated Discipline Subdirectory
DD	MEMO	Meeting Request: Survey, scoping, ROW, Utility, Design Exeption	DD_MEMO_0082_0287_Description_MtgReq.doc	Misc.	Designated Discipline Subdirectory
DD	MEMO	Design Requests, Structure, Traffic, Hydraulics, Pavement, soils, landscaping	DD_MEMO_0082_0287_Unit Name_DgnReq.doc	Misc.	Designated Discipline Subdirectory
DD	MEMO	Review: PD, Drainage, Constructability, Semi- final, final, Permits	DD_MEMO_0082_0287_Type_Review.doc	Misc.	Designated Discipline Subdirectory
DD	MEMO	Response to Review Coments: Typical Design Review Responses	DD_MEMO_0082_0287_Description_Disc.Reps.doc	Misc.	Designated Discipline Subdirectory
DD	EMAIL	Email: Any Project Related Email	DD_EMAIL_0082_0287_Description.pdf	Misc.	Designated Discipline Subdirectory
DD	FAX	FAX: Any Project Related Fax	DD_FAX_0082_0287_Description.doc	Misc.	Designated Discipline Subdirectory
DD	TELE	Telephone Reports: Typical Project Related Telephone Conversations	DD_TELE_0082_0287_Description.doc	Misc.	Designated Discipline Subdirectory
DD	ROM	Report of Meeting: ROW, Constructability, Scoping, PD, Town Roads, Utility, Public Info	DD_ROM_0082_0287_Description.doc	Misc.	Designated Discipline Subdirectory
DD	PUBLIC	Public Information or Hearing: News Release, AD, Handout, Coment Form	DD_PUBLIC_0082_0287_Description.doc	Misc.	Designated Discipline Subdirectory
DD	IMG	Pictures: General Project Related Pictures	DD_IMG_0082_0287_Description.jpg	Misc.	Designated Discipline Subdirectory

DD	AG	Agreements: Sidewalk, Maintenance, Detour, Preemption	DD_AG_0082_0287_Type.doc DD_AG_0082_0287_Type_CON127 Transmittal.doc DD_AG_0082_0287_Type_LTR1.doc DD_AG_0082_0287_Type_CON128 Transmittal.doc DD_AG_0082_0287_Type_LTR2.doc	Misc.	Designated Discipline Subdirectory
DD	APROV	PD statement	DD_APROV_0082_0287_PD-Statement.doc	Misc.	Designated Discipline Subdirectory
DD	APROV	Categorical Exclusion Check List	DD_APROV_0082_0287_CatexCheckList.doc	Misc.	Designated Discipline Subdirectory
DD	APROV	Categorical Exclusion Concurrence	DD_APROV_0082_0287_CatexConcurrence.doc	Misc.	Designated Discipline Subdirectory
DD	APROV	Design Approval	DD_APROV_0082_0287_DesignApproval.doc	Misc.	Designated Discipline Subdirectory
DD	APROV	Waiver to Advertize	DD_APROV_0082_0287_WaviertoAdvertise.doc	Misc.	Designated Discipline Subdirectory
DD	APROV	Waiver to DCD	DD_APROV_0082_0287_WaviertoDCD.doc	Misc.	Designated Discipline Subdirectory
DD	TRANS	Transmittal forms	DD_TRANS_0082_0287_transmittal_form.doc	Misc.	Designated Discipline Subdirectory
DD	PER_IWRD_INDV	Inland Water Resources - Indv: Wetland, Dam, 401, Flood, Stream Ch., Water Div.	DD_PER_IWRD_INDV_0082_0287_app.doc DD_PER_IWRD_INDV_0082_0287_AttC.doc DD_PER_IWRD_INDV_0082_0287_AttD.doc DD_PER_IWRD_INDV_0082_0287_AttE	Misc.	Designated Discipline Subdirectory
DD	PER_IWRD_GEN	Inland Water Resources - General Approval	DD_PER_IWRD_GEN_0082_0287_GenApp.doc	Misc.	Designated Discipline Subdirectory
DD	PER_STORM_WTR	Stormwater	DD_PER_STORM_WTR_0082_0287_App.doc	Misc.	Designated Discipline Subdirectory
DD	PER_OLISP_FULL	OLISP FULL	DD_PER_OLISP_0082_0287_Full_App.doc	Misc.	Designated Discipline Subdirectory
DD	PER_OLISP_COP	OLISP COP	HW_PER_OLISP_COP_0082_0287_App.doc	Misc.	Designated Discipline Subdirectory
DD	PER_CAM	CAM Consistency	HW_CAM_0082_0287_App.doc	Misc.	Designated Discipline Subdirectory
DD	PER_ACOE	Army Corp. of Engineers	HW_ACOE_0082_0287_App.pdf	Misc.	Designated Discipline Subdirectory
DD	PER_XXX xxx	Attachments	HW_PER_XXX xxx_0082_0287_description.doc	Misc.	Designated Discipline Subdirectory
DD	PER_XXX xxx	Plates	HW_PER_XXX xxx_0082_0287_plate#.dgn	Misc.	Designated Discipline Subdirectory

DD	PER_XXX xxx	Drainage Comps	HW_PER_XXX xxx_0082_0287_Drainage_Cmps.pdf	Misc.	Designated Discipline Subdirectory
DD	EST	Estimates (Cost, earth, drainage, proposal)	HW_EST_0082_0287_Description.doc	Misc.	Designated Discipline Subdirectory
DD	DRAINAGE	All Drainage Info and Design	CT_ISS_DrainageStruct_v1.dat CT_ISS_RainfallTable_v1.idf	Misc.	Designated Discipline Subdirectory
DD	IRD	Resource files	CT_IRD_Civil89_v1.xin CT_IRD_CustomXSCbdr.cel CT_IRD_Notes89_v1.dft CT_IRD_Typicals89_v1.itl SV_IRD_Civil89_v1.xin SV_IRD_xmLevels.cel SV_IRD_xmLe	Misc.	Designated Discipline Subdirectory
DD	IRD	Geometry File	DD_IRD_Description.alg	Misc.	Designated Discipline Subdirectory
DD	IRD	Roadway Designer	DD_IRD_Description.ird	Misc.	Designated Discipline Subdirectory
DD	IRD	Surfaces	DD_IRD_Description.dtm	Misc.	Designated Discipline Subdirectory
DD	IRD	Project Container	DD_IRD_Description.rwk	Misc.	Designated Discipline Subdirectory
DD	IRD	Reporting Files	DD_IRD_Description.rpt DD_IRD_Description.bin DD_IRD_Description.mhd DD_IRD_Description.se	Misc.	Designated Discipline Subdirectory

Appendix D CTDOT CAD Drawing Standards

D.1 Design and Sheet Models

Starting with MicroStation Version 8, Bentley Systems Inc. introduced Models. Each MicroStation DGN file can contain one or multiple Models. CTDOT has standardized on one Model per DGN file. These Models can be 2D or 3D.

D.1.1 Design Models

Design Models can be 2D or 3D as previously mentioned. However the majority of the time these Models will be used in a 3D environment. They are mainly used for designing an entire corridor using InRoads. They will also be used for developing 3D models for Bridges and Structures as well as Traffic Signing layout. Typically this file is used at a custom drawing scale of one inch equals forty feet. However all other drawing scales function as required. The Design Model is intended to be referenced into smaller cut sheets where annotation and dimensioning occur.

D.1.2 Sheet Models

Sheet Models are commonly 2d work areas, located in a DGN file used for composing finished contract sheets. These sheet models could be geo-referenced or non geo-referenced. Geo-Referenced sheet models attach design models to the correct real world x,y,z coordinates, this way users can obtain real world coordinates and elevations from the MicroStation geometry. Non Geo-Referenced sheet models attach design models or other sheet models to an arbitrarily coordinate location.

A Civil type sheet model would reference a corridor design model to make up a highway plan contract sheet. This sheet model would be geo-referenced.

An Architectural type sheet model would contain multiple details drawn at different scales. This sheet model would be non geo-referenced.

Each sheet model contains a gray rectangle called the transient shape. This shape represents the printing extents for each model, and is automatically located when performing batch plotting on dgn files.

Civil type sheet models will be created using the CT_Sheet_Civil_2007.dgn seed file. The transient shape will initially be turned off. Once the user locates the sheets plotting extents the transient shape needs to be turned on and placed manually at this location, and rotated if necessary. After placing the transient shape in the correct location the user will then need to superimpose the appropriate border cell directly on top of it.

Architectural type sheet models will be created using the CT_Sheet_Arch_2007.dgn seed file which already has the transient shape turned on located with its lower left corner at x,y,z = 0,0,0, and the CT_Plan_Border cell superimposed onto it. For more information on Connecticut seed files see [D.2 Seed Files](#).

D.1.3 Contract Sheet Border Cells

CT_Borders_Contract.cel is a cell library, located in the Workspace CTDOT_Standards/Standards/Cells/2007/, that contains all contract plan sheet borders that should be used in a set of contract drawings, including the title sheet. The most common being the CT_Plan_Border. This plan border cell also includes title block tags that are discussed throughout this guide. Below is the list of available Contract Border Cells and their corresponding transient shape. As listed below the new CTDOT Contract Borders are now 20.75”x 31.75”. The new 2007 Contract Border size was reduced slightly from the 2006 border to enable users to print a sheet - half scale (true half scale) to a local printer on 11” x 17” paper.

Contract Border Cells	Size (inches)	Corresponding Transient Shape
Contract_BDR_Plan	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_Profile	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_StandardDrawings	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_TitleSheet2_Fac	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_TitleSheet_Fac	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_TitleSheet_Hwy	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_TitleSheet_Traf	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_List_Of_Drawings	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_Traffic_Signal40_long	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_Traffic_Signal40	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_XSC	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_DetailEst_Full	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_DetailEst_Full_Earth	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_DetailEst_Half	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE
Contract_BDR_DetailEst_Half_Earth	20.75 x 30.75	CT_DOT_21x32 CT 2007 DDE

D.1.4 Miscellaneous Sheet Border Cells

CT_Borders_Misc.cel is a cell library, located in the Workspace CTDOT_Standards/Standards/Cells/2007/, that contains the miscellaneous plan sheet borders that are used for permits, location, and USGS sheets. Please use the table below for selecting the appropriate border cell and corresponding transient shape.

Miscellaneous Border Cells	Size (inches)	Corresponding Transient Shape
Location Borders		
MISC_BDR_LOC_L11x17	10.375 x 15.875	CT_DOT 11hx17w
MISC_BDR_LOC_P11x17	15.875 x 10.375	CT_DOT 17hx11w
MISC_BDR_LOC_P8x11	10.25 x 7.75	CT_DOT 11hx08.5w
MISC_BDR_LOC_L8x11	7.75 x 10.25	CT_DOT 08.5hx11w
Plan Permit Borders		
MISC_BDR_PER_PLN_L11X17	10.375 x 15.875	CT_DOT 11hx17w
MISC_BDR_PER_PLN_P11X17	15.875 x 10.375	CT_DOT 17hx11w
MISC_BDR_PER_PLN_P8x11	10.25 x 7.75	CT_DOT 11hx08.5w
MISC_BDR_PER_PLN_L8x11	7.75 x 10.25	CT_DOT 08.5hx11w

USGS Permit Border		
MISC_BDR_PER_USGS_P8X11	10.25 x 7.75	CT_DOT 11hx08.5w
MISC_BDR_PER_USGS_L8X11	7.75 x 10.25	CT_DOT 08.5hx11w
Cross Section Permit Borders		
MISC_BDR_PER_XSC_P8X11	10.25 x 7.75	CT_DOT 11hx08.5w
MISC_BDR_PER_XSC_L8X11	7.75 x 10.25	CT_DOT 08.5hx11w

D.2 Seed Files

From MicroStation Help:

“When you create a DGN file, you identify a seed file as a template for the DGN file. The new DGN file is actually a copy of the seed file. Seed files do not (necessarily) contain elements, but, like other DGN files, they do contain at least one (default) model, settings, and view configurations. Having a seed file with customized settings frees the user from having to adjust settings each time a new DGN file is created.”

The following CTDOT standard seed files for all discipline users are stored In the CTDOT_Standards/Standards/Seed/2007/ folder: If these seed files do not meet a discipline’s or user’s specific needs, they may copy any one of these seed files, modify it, and store it in their discipline_workspace/standards/seed/2007/ folder

D.2.1 CT_Design.dgn

Contains one borderless 3d design model set to 40 scale. Used for creating 3d designs where typically elements are placed at the correct coordinates and elevation. The active scale may be changed to any engineering or architectural scale required.

D.2.2 CT_Sheet_Civil_2007.dgn

Contains one 2d sheet model set to 40 scale. Typically used for civil contract cut sheets such as highway plans. The active scale may be change to any engineering or architectural scale require. Users are required to manually display the transient shape and attach the border cell.

D.2.3 CT_Sheet_Arch_2007.dgn

Contains a 2d sheet model with a displayed transient shape and the CT_Plan_Border cell attached at xyz=0,0,0. Typically used for architectural detailed contract sheets.

D.3 Drawing Scales and Custom Units

The CTDOT DDE uses a unique style of detailing within MicroStation files. The method used is very similar to original drafting of details by hand and uses both Architectural and Engineering scales. The method uses MicroStation’s Units.def file. This file is located within the Project Container, see [5.1.2.14 Project Workspace Folder](#).

The units.def file is consulted when converting data from file formats with incomplete unit information. It is also used to store configured “Custom Units”.

CTDOT’s DDE’s Custom Units were developed based on the Bentley article “How to use varying units of measure when detailing with MicroStation V8”.

CTDOT's DDE gives the ability to work in Geo-Referenced models and models containing different scaled details (Non Geo-Referenced models).

The current custom unit or drawing scale of a model is checked upon opening and displayed via a custom VB application delivered with our workspaces.

Geo-Referenced files are Typically 1"=40' (Survey, Highway and Bridge Models Etc....) for designing complete corridors.

Architectural Details are generally non geo-referenced and can have an unlimited amount of details at any Architectural or Engineering scale.

Dimension Styles are used for each different custom unit or drawing scale. By working in this manner, different drawing scaled details can coexist with live dimensions in the same model.

D.4 Text Styles

Text Styles are made up of the following attributes; font, size, style, and justification. Text Styles are compilations of these attributes, which are saved and can be placed in an automated and consistent fashion, creating clear and professional detail text.

CTDOT Text styles are saved in the CTDOT DGNLIB.

All text placed on CTDOT Contract Sheets shall conform to one of the following CTDOT "Text Styles". Below, shown in actual size, are the approved text styles for the CTDOT DDE 2007.

Text Style	Font	Style	Height & Width	General Use
CT_080	Verdana	Normal	0.080"	Civil Detail Dimensions, Call Outs on Traffic Signal Plans
CT_120	Verdana	Normal	0.120"	All General Notes & Call Outs
<i>CT_120I</i>	Verdana	Italic	0.120"	Non-Pay Item Call Outs
CT_175	Verdana	Normal	0.175"	Grid Numbers
CT_175B	Verdana Bold	Bold	0.175"	All Detail Titles, & Limit of Construction Call Outs
CT_200	Verdana	Normal	0.200"	Title Block Tags
CT_200B	Verdana Bold	Bold	0.200"	Headers*, Start & End of Project Call Outs

*Headers are used to describe one or more titles

All sizes are measured at full scale.

D.4.1 Font

All text and annotation used on CTDOT Contract Sheets shall be either Verdana or Verdana Bold. These fonts are MicroStation fonts that have been developed with custom symbols and are

contained within the CTDOT_Font.rsc. This file is delivered with the CTDOT project container folder under Project/Workspace/Symb/.

Below is an example of each respectively.

229 VERDANA
ABCDEFGHIJKLMNOPQRSTUVWXYZ

147 VERDANAB
ABCDEFGHIJKLMNOPQRSTUVWXYZ

D.4.2 Justification

Notes

All notes shall be top left justified by default and may be changed to center or right as necessary.

Dimensions

Call outs (except end of project call outs – right top), shall be left top justified.

D.4.3 Underlined

All titles and headers shall be underlined with one line; weight = 3

D.5 Dimension Styles

Dimension styles are made up of saved settings such as custom units, text style, arrow size, line attributes; color, weight, and style, etc.. There is a CTDOT Dimension Style for each possible Drawing Scale custom unit (see D.3 Drawing Scales and Custom Units). These Dimension Styles are automatically set when changing drawing scales using the CTDOT Bar Menus.

CTDOT dimension styles are saved in the CTDOT_Workspace/Standards/dgnlib/.

All contract drawings containing dimensions shall use the dimension styles delivered with the CTDOT DDE.

D.6 Microstation Drafting Tools

Microstation offers a set of detailing annotation commands called Drafting Tools. CTDOT disciplines Facilities Design and Bridge Design make use of these tools. Design scripts have been developed to create navigation links from these symbols when the contract drawings are exported to a PDF set (see 8.3.2 Using ProjectWise Plot Organizer).

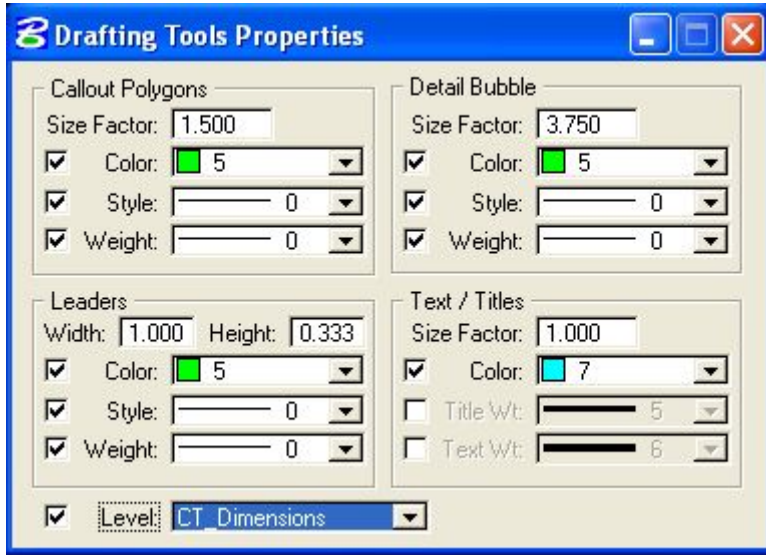
The Drafting Tools have been added to the Bridge, Facilities, and Highway Design Barmenus. The advantage to using these tools through the barmenu is that the appropriate drafting level, the correct text style, and the drafting tool properties are automatically selected.

Drafting Tools



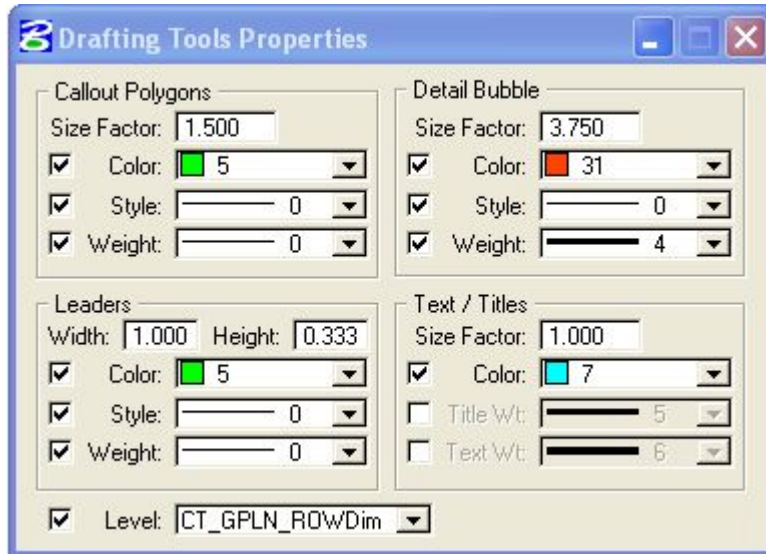
To launch the Drafting tools go to to tools /tool boxes then check the drafting tools box and click okay

Architectural Drafting Tool Properties



The following properties shall be used for all CTDOT detailed contract sheets, Except for ROW notes, see callout out polygons below for ROW properties.

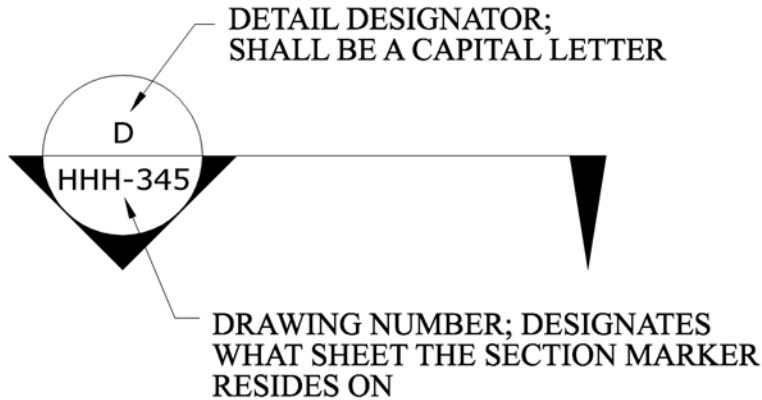
Civil ROW Drafting Tool Properties



The following properties shall be used for all ROW notes on CTDOT detail contract sheets.

Arrow Marker

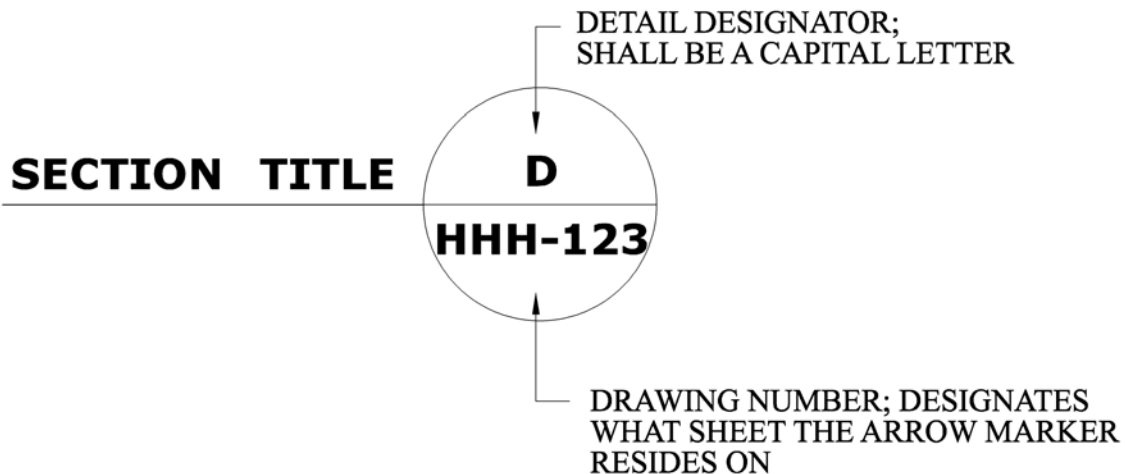
Arrow markers typically are used to show where a detail is being cut to show the section detail. The bubble includes the designator and the sheet that the detail resides on. In a PDF document the bubble arrow becomes a hyperlink to the corresponding section marker. The direction of the arrows corresponds to the view the section detail is drawn.



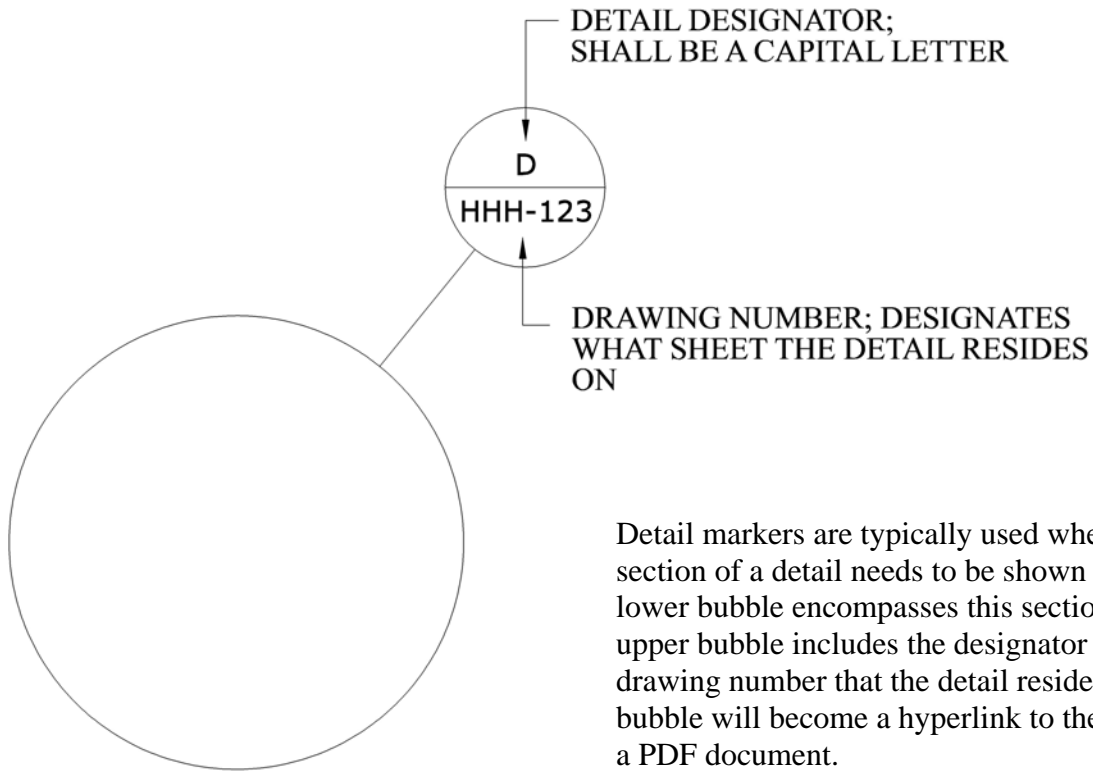
If corresponding Section and Arrow Markers reside on the same drawing a dash should be placed in the lower half of the bubble instead of the actual drawing number.

Section Marker

Section markers are used to add a title to a section detail. The bubble includes the designator and the sheet that the detail resides on. In a PDF document the bubble becomes a hyperlink to the corresponding arrow marker.



Detail Marker



Call-Out Bubble

Call-Out Bubbles are typically used when a note will not fit on a detail. The designator describes where in the plans the note that it represents is located



- DETAIL DESIGNATOR; SHALL BE A CAPITAL LETTER.
CALL OUT BUBBLE; SHALL BE A HEX FOR ROW NOTES



- DETAIL DESIGNATOR; SHALL BE A CAPITAL LETTER.
CALL OUT BUBBLE; SHALL BE A CIRCLE FOR GENERAL NOTES

D.7 Contract Sheet Order

Contract Sheet Order:

Contract sheets shall be placed in the order as shown in the following lists. These list include all potential drawings per discipline. If any sheet is not needed simply leave it out. However, if a drawing number prefix is needed that does not exist in the list below please call the appropriate CTDOT discipline representative ([Appendix B](#)) for guidance on drawing number prefix and order location.

	Drawing No. Prefix	HIGHWAY PROJECTS
1	TSH	Title Sheet
2	TSH	List of Standard Drawings
3	EST	Detail Estimate Sheets
4	INX	Index Plans
5	TIE	Survey Data
6	ALN	Alignment - Geometry
7	ROW	ROW Breakout
8	TYP	Typical Sections
9	MDS	Misc. Details
10	IGP	Intersection Grading Plans
11	BOR	Boring Logs
12	PLN	Highway Plans
13	DRG	Breakout Drainage
14	PRO	Highway Profile
15	XSC	Highway Cross Section
16	S	Structure
17	Various	Traffic
18	AEC	Env. Compliance Hazard Mat.
19	LDS	Landscaping Plan
20	WMT	Wetland Mitigation Plan
21	Util-A	From Utility Co.
22	Util-B	From Utility Co.

	Drawing No. Prefix	BRIDGE PROJECTS
1	S	General Plan Title Sheet
B	S	Layout Plan Detail
3	S	Boring Logs
4	S	Stage
5	S	Construction Plans
S	S	Foundation Plans
7	S	Abutment and Wingwall Plans
8	S	Pier Plans

9	S	Framing Plans
10	S	Beam and Girder Details
11	S	Bearing Details
12	S	Slab Plans
13	S	Slab and Approach Slab Details
14	S	Joint Details
15	S	Metal Bridge Rail Detail Sheet
16	S	Pedestrian Railing or Bicycle Railing Detail Sheet
17	S	Protective Fence Detail Sheet
18	S	Deck Drainage Details
19	S	Scuppers
20	S	Electrical Detail Sheet
21	S	Utility Sheets
22	S	Existing Structure Plans

	Drawing No. Prefix	TRAFFIC PROJECTS
1	TSH	Title Sheet
2	EST	Detail Estimate Sheets
3	INT	Interconnect Plan
4	TCS	Traffic Control Signal
5	FLA	Flashing Beacon
6	COL	Collision Diagram
7	SGN	Signing
8	DET	Detail Sheet
9	SPM	Signing and Pavement Markings
10	PVT	Pavement Markings
11	XSC	Cross-Section
12	DTR	Detour Plan
13	MPT	Maintenance and Protection of Traffic
14	TYP	Typical Sheet
15	STD	Standard

	Sub. Category Code.	FACILITIES PROJECTS
1	TSH	Title Sheet
2	DMO	Demolition Plans
3	IDX	Index Plan
4	EXT	Existing Survey
5	BOR	Boring Logs
6	LIM	Limitation of Operations
7	STG	Stage Construction Plans
8	TYP	Typical Sections

9	CIV	Site Plans
10	DRG	Drainage Sheets
11	UTL	Utility Plans
12	GRD	Grading Plans
13	PRO	Profile Sheet
14	XSC	Cross Sections
15	RTS	Railroad Track Sheets
16	SPM	Signing and Pavement Marking Plans
17	SED	Sedimentation Control Sheets
18	DET	Detail Sheets
19	LDS	Landscape Plans
20	ARC	Architectural Plans
21	SGN	Signage Plans
22	STR	Structure Plans
23	PLM	Plumbing Plans
24	FRP	Fire Protection Index Plans
25	MEC	Mechanical Plans
26	ELE	Electrical Plans
27	EQP	Equipment Plans
28	BHS	Baggage Handling
29	COM	Communications
30	ESS	Electronic Safety & Security
31	CAT	Catenary Plans
32	SSS	Salt Shed Plans
33	ENV	Environmental Site Plans
34	HAZ	Environmental Building Plans

D.8 Drawing Numbers

All disciplines, except facility design, please use the chart below when determining the number of characters to follow the drawing number prefix. Facilities, regardless of drawing count shall always use three digits.

Number of Sheets with common prefix	Drawing No. Characters to follow prefix	Example
9 or Less	1	S-1, S-9
10 - 100	2	S-10, S-99
Greater Than 100	3	S-100

Drawing Numbers:

Drawing numbers start with an alpha prefix to help separate the sheets by detail type, and discipline. Also the drawing number will become a bookmark when creating a pdf document. With the exception of structure bridge sheets, the sub-category codes listed in [Appendix C - File Naming Conventions](#) shall be the drawing number prefix.

A capital letter S will be the drawing number prefix for all structure bridge sheets. When more than one site occurs per project the prefix will include the site number, for example site number one will be S1; site two will be S2.

Example:

This is an example of a highway miscellaneous detail sheet, the prefix is MDS and the sheet number is 04. The 04 indicates that the total MDS sheet count is less than 100 but greater than 10.

PROJECT NO. 123-4567
DRAWING NO. MDS-04
SHEET NO. \$\$\$

D.9 Levels

Standard level names and attributes (style, weight, and color) have been created for all CTDOT and discipline standards. To create a consistent and professional set of dgn files it is imperative that user's create all MicroStation elements on their proper level.

Referencing other discipline dgn files is a standard practice, and many times referenced elements need to be turned off or on, and level symbology attributes need to be changed. However if the elements are not placed on the correct levels, using the standard bylevel attributes, these simple operations may become extremely difficult and time consuming.

Example: Bridge Design elements representing concrete abutment stems should be place on level sb_Stem_Concrete. Also the bylevel attributes (color-3, style-0, weight -6) that were selected for this level shall not be changed. When it is necessary to plot or view any level differently than the bylevel attributes please use the level symbology override attributes and turn on level symbology.

If a level name is needed that is not currently available in your discipline, or CTDOT dgnlib please contact your discipline representative to have it added.

D.10 Border Title Block

Title block text is made up of text tags that are located in the CT Border Cells. Once a border is placed in the active dgn file the user can edit the text tags by using the MicroStation Tool Set "Tags", located on the main tool bar or the tag manager, located on the CTDOT_Uilities_2007 Barmenu. It is important to use these tag sets because these tags are also used to create plot set

information. For example, the drawing number tag will be used to create the bookmark in the PDF document. For more on Tag Manager, see [Section 7 Managing Contract Sheets with Tag Manager](#).

Tag Attributes

TAG	LEVEL	SIZE	FONT	JUSTIFICATION
Project Title	CT_Bdr_Titleblock	0.200"	Verdana	Center
Drawing Title	CT_Bdr_Titleblock	0.200"	Verdana	Center
Town	CT_Bdr_Titleblock	0.200"	Verdana	Center
Project No	CT_Bdr_Titleblock	0.200"	Verdana	Center
Drawing No	CT_Bdr_Titleblock	0.200"	Verdana	Center
Sheet No	CT_Bdr_Titleblock	0.200"	Verdana	Center
Designer/Drafter	CT_Bdr_Titleblock	0.120"	Verdana	Left
Checked by	CT_Bdr_Titleblock	0.120"	Verdana	Left
Revision Tags	CT_Bdr_revision_Block.	0.120"	Verdana	Center

D.11 CTDOT Design Libraries

MicroStation Design Libraries (dgnlib) are standard MicroStation files that have been populated with level names and attributes, level filters and dimension and text styles. These settings are then referenced into the user's active MicroStation file based on what discipline workspace is current.

The CTDOT DDE has two sets of design libraries being referenced at all times. These Libraries are discussed in detail below:

D.11.1 CT_Dim_Text_Styles.dgnlib

This design library is located in \CTDOT_Standards\Standards\dgnlib\2007\ and is used by all disciplines when running MicroStation within the DDE. It is CTDOT's main configuration for enterprise standards.

Note: The \2007\ folder indicates this is a standard for projects starting after June 1st 2007.

It contains the following:

Level Names:

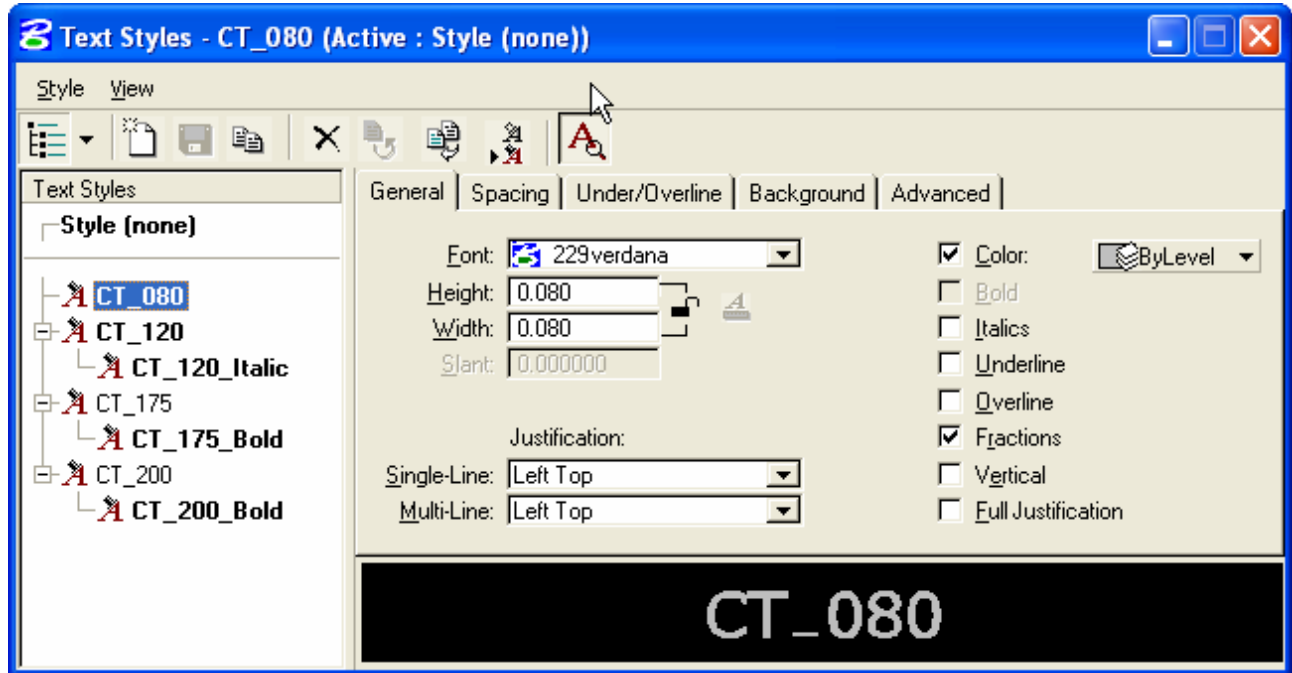
Name	Number	Description
Default	0	
CT_Dimensions	1000	Dimension level for entire CTDOT call outs for all notes or misc.
CT_CSHT_GeneralLabel	1600	notes
CT_CSHT_DrainageLabel	1601	call outs for drainage items
CT_CSHT_NonPayLabel	1602	call outs for all non pay items call outs for all notes or misc.
CT_CSHT_PdByOthersLabel	1603	notes
CT_CSHT_ProjLimitLabel	1604	project limits – begin & end
CT_CSHT_ConstrLimitLabel	1605	Call outs for construction limits
CT_CSHT_ROWLabel	1606	call outs for ROW labels

CT_GPLN_RdwyDim	1607	Roadway Dimension
CT_GPLN_LaneDim	1608	Lane Dimension
CT_GPLN_ROWDim	1609	text for right of way line labels

Note: Additional level information such as by-level attribute settings are not shown.

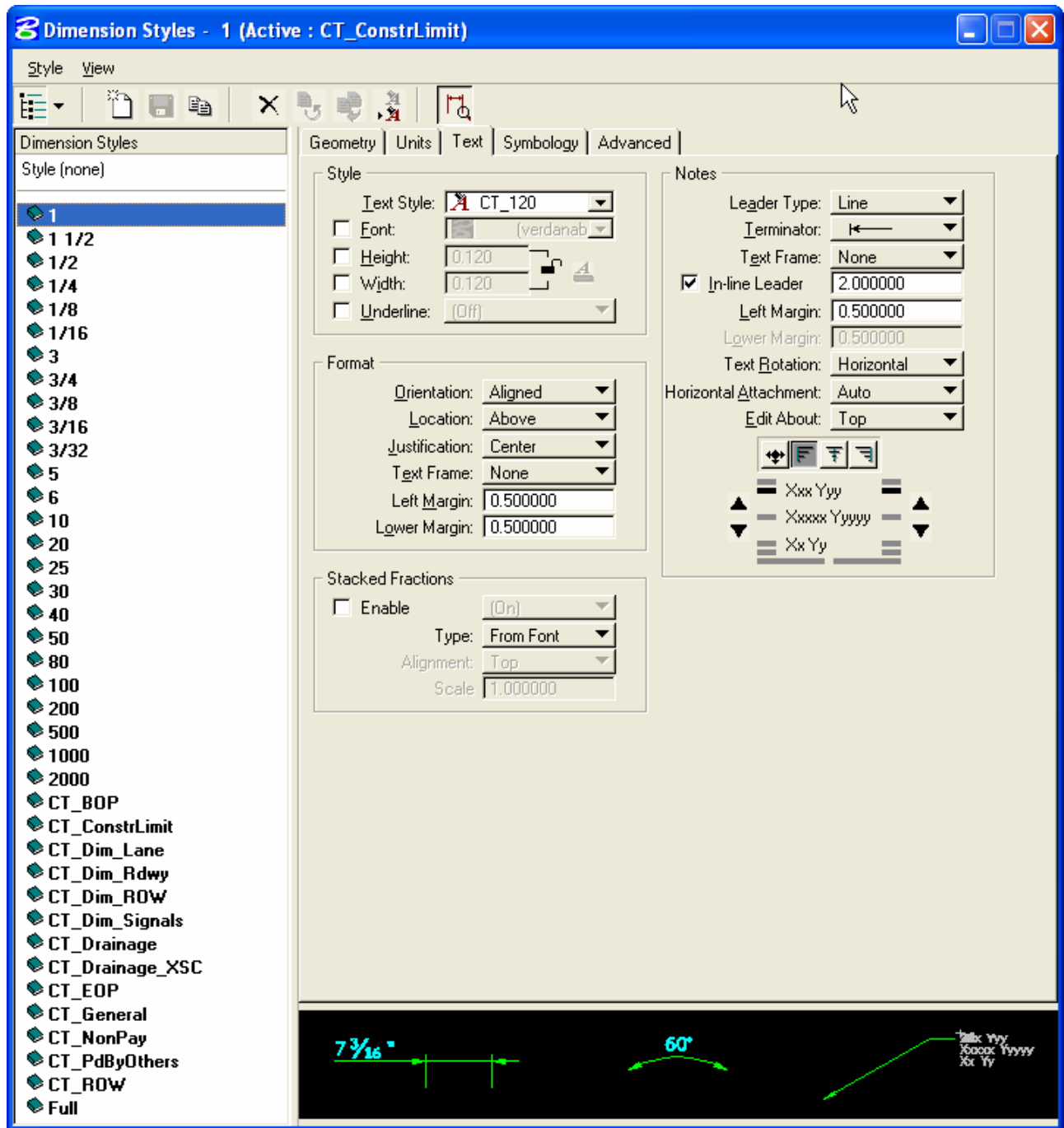
Text Styles:

All text styles used in CTDOT contract drawings are included in this library.



Dimension Styles:

Dimension styles store attributes associated with that dimension. The size of the terminator arrows, the text style used, the color, weight, and style of the extension lines are just a few examples of attributes stored in the dimension styles. All dimension styles used in CTDOT contract drawings are located in this library. Every drawing scale has a dimension style associated with it along with additional styles.



D.11.2 Discipline Design Libraries

All Discipline's have their own design library. They each have both level names along with their assigned attributes and discipline filters.

See the facilities example below, all other disciplines are similar in structure, but vary in content.

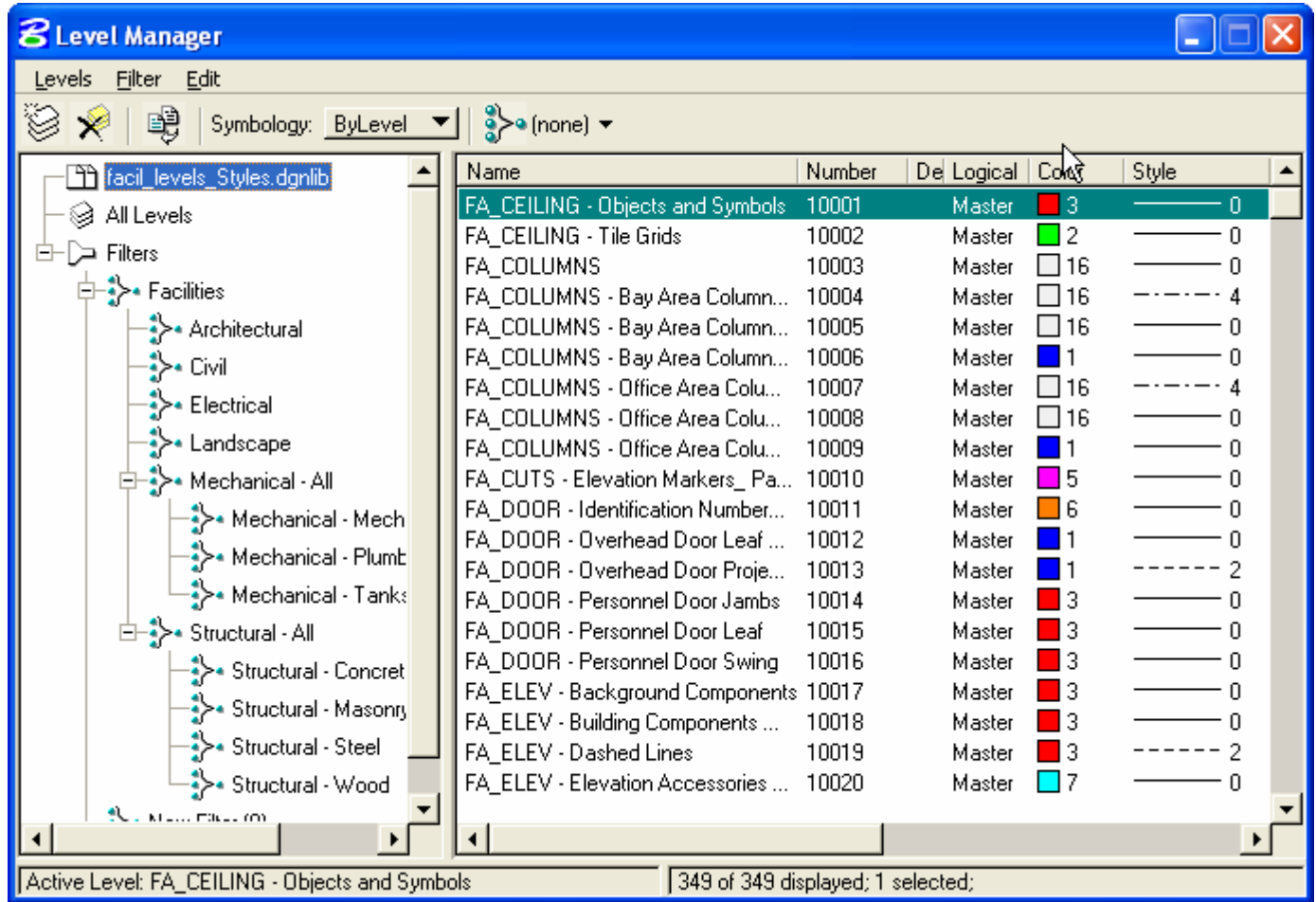
Facil_Levels_Styles.dgnlib

The following section describes the design library for Facilities Design. The remaining delivered disciplines are configured similar with there own data sets.

This library is located in \Facil_Workspace\Standards\dgnlib\ and is called when working in a Facilities Design workspace along with the CT_Dim_Text_Styles.dgnlib.

It contains Level naming and attribution information for Facilities design projects. It also contains filtering information for filtering Facilities levels.

The level names, bylevel attributes, and filters shown below in the level manager dialog box are a few examples of the type of information stored in the Facil_Levels_Styles.dgnlib.



Appendix E MicroStation Configuration Levels and Files

E.1 Microstation Configuration Levels

MicroStation 2004 has five levels of configurations. Listed in order of priority, they are: System, Application, Site, Project, and User. User configuration has final precedence. Starting with System, we can tell MicroStation how to start up, how to configure MicroStation related programs, increase the effectiveness of workgroups, manage projects, and allow individual user customization without disturbing others.

E.1.1 The Modified Configuration Process

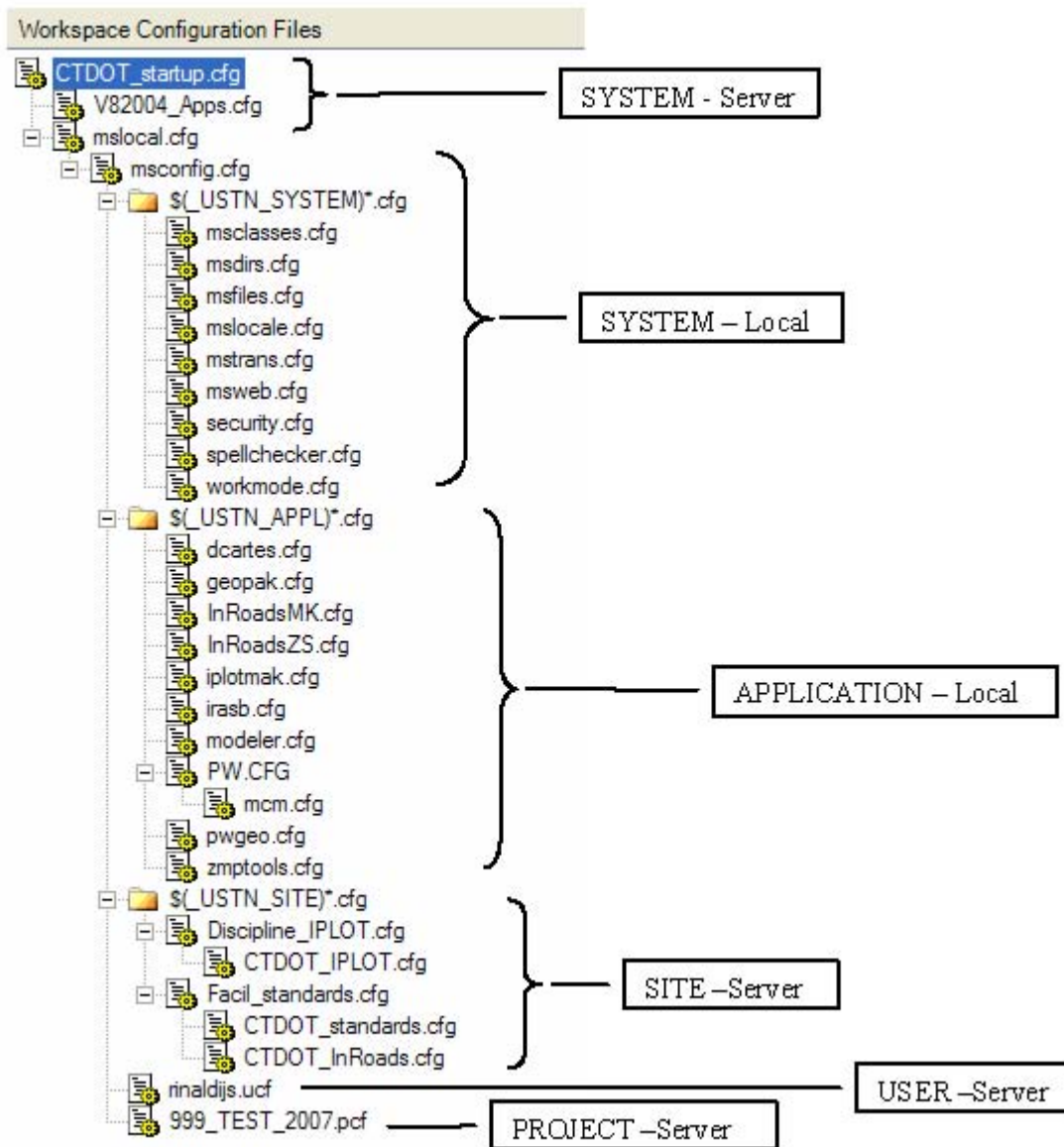
CTDOT has modified all of the MicroStation configuration levels in one way or another. Because the DDE was designed to be installed on a server rather than on individual pc's, the configuration files are all in central locations for easy maintenance. This allows CAD Managers to implement standards, Project Managers to organize data, and IT staff to upgrade software all more efficiently.

The majority of MicroStation customization in the DDE occurs at the Site level. CTDOT has split Site into sublevels which allows both Department (or corporate) and Discipline (or workgroup) standards to coexist. Common Department standards and defaults are set in CTDOT_standards.cfg, but can be added to or overwritten by each Discipline workgroup through a discipline_standards.cfg. Additional Site level variables are also broken out into plotting configuration files, CTDOT_IPLOT.cfg and Discipline_IPLOT.cfg, used with ProjectWise plot Organizer.

During a typical session using the CTDOT DDE, the MicroStation program executes from a local pc then jumps to a server for additional System settings. Department standards are set, Discipline standards are added, Project specifics are read, and User customizations become available. A detailed flowchart explaining this configuration process is included in this appendix.

E.1.2 Configuration Files

The following Workspace Configuration File tree shows the MicroStation configuration levels, where they are located, and what files they are associated with. The individual configuration files are explained in the subsections that follow. In this MicroStation session example, user "rinaldijs" began "MicroStation 2004" using a "Facilities" discipline workspace and picked "999_TEST_2007" for a project:



The following configuration files are not included in this manual since they are frequently revised. They should be viewed from within the most current version of the DDE.

E.1.2.1 CTDOT_startup.cfg

This is CTDOT's main SYSTEM configuration file. It is found on the CTDOT_V8_Workspaces root. CTDOT_startup.cfg is a centrally customized file that all users begin MicroStation with. It eliminates the need of locally modifying mslocal or msconfig on each pc. All variables that begin with a "CT_" prefix were added by CTDOT. This file is where CAD Managers can set the Project and Workspace directories. The file checks to see what MicroStation version is running and separates user workspaces into two folders. This helps avoid user workspace corruption when switching between MicroStation V8 2004 and XM. These user workspace folders include function key menus, interfaces, and user preferences. They have been pulled out of the individual Discipline folders and consolidated since 2005.

It is important to note that CTDOT_startup.cfg changes the default _USTN_WORKSPACEROOT value. This is how MicroStation can use different Discipline workspaces based on which desktop shortcut is selected.

E.1.2.2 V82004_Apps.cfg (V8XM_Apps.cfg)

Most MicroStation Applications are locally installed and include additional configuration files such as Inroads, IRAS, and ProjectWise, but some, such as third party applications, are more easily managed on the server through the DDE. Applications are also platform dependent.

V82004_Apps.cfg and V8XM_Apps.cfg can help point to common licenses and variables based on which version of MicroStation is running.

E.1.2.3 Discipline_IPLLOT.cfg (CTDOT_IPLLOT.cfg)

IP.cfg, IPLLOT.cfg, and IPLLOTSRV.cfg are also locally installed configuration files. They are used with ProjectWise Plot Organizer. Modifications to variables associated with these files are done on the server at the SITE level in Discipline_IPLLOT.cfg and in CTDOT_IPLLOT.cfg.

CTDOT_IPLLOT.cfg sets values like default plot settings paths, pen tables, and design scripts and instructs MicroStation on such things as whether or not to save plotting metafiles. Based on the CTDOT project version, we can also determine which standard sheet size to use.. Usually Discipline_IPLLOT.cfg is left blank in most Discipline workspaces, but it exists to accommodate groups that usually do not work on the contract drawing set. For example, a designer may wish to plot a four foot long color presentation without rotating and offsetting the plot like a typical monochrome contract document sheet.

E.1.2.4 Facil_standards.cfg (Rails_standards.cfg, Traffic_standards.cfg, etc.)

A SITE configuration file exists for every Discipline listed under CTDOT_V8_Workspaces. Most variables are defined in CTDOT_standards.cfg (see below). In the above session, CTDOT_V8_Workspaces\Facil_Workspace\Standards\Facil_standards.cfg was used. The Discipline specific configuration file allowed a Facilities user to default to a Facilities specific barmenu and a custom architectural sheet model as a default design seed file.

E.1.2.5 CTDOT_standards.cfg

This is CTDOT's main SITE configuration file. It is found under CTDOT_V8_Workspaces\CTDOT_Standards\Standards\ and contains many components from MicroStation's Standards.cfg. It is the baseline for Department Standards. The file defines search paths, start up mdl's, vba's, workmodes, and default reference file settings for all users regardless of which Discipline configuration is running. It checks to see if a user workspace exists based on their Windows login, if not, it assigns a read only default. This file also checks for project type (old or new) to use the appropriate workspace subfolders.

E.1.2.6 CTDOT_InRoads.cfg

This additional SITE level file exists mainly for InRoads development. It is included for Disciplines who are running the design software and may need to see additional resources such as Survey cell libraries or Highway design libraries to place InRoads features.

E.1.2.7 Rinaldijs.ucf

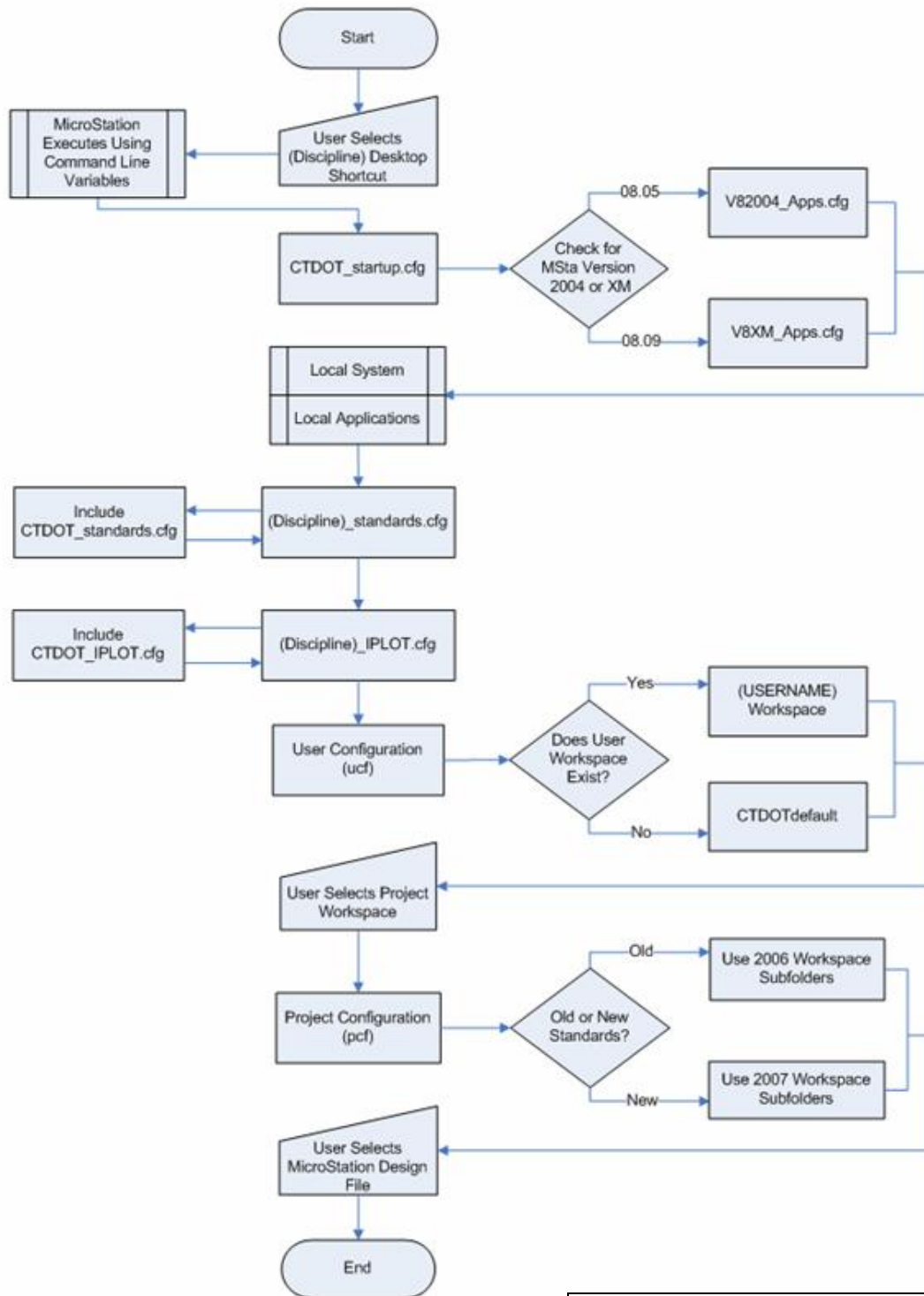
So much DDE customization has been in the MicroStation configuration files up to this point, that there is not much left to be done at the USER level. The ucf used in the above example merely calls up the user's last project and interface. The USER level still has the greatest precedence in the MicroStation configuration process if needed. This MicroStation V8 file was created under CTDOT_V8_Workspaces\User_Workspaces_V82004\. If an XM session was running, we would use a different user configuration file from CTDOT_V8_Workspaces\User_Workspaces_V8XM.

E.1.2.8 999_TEST_2007.pcf

All project folders listed under CTDOT_Projects must have an accompanying project configuration file with the same name. These pcf's appear as choices in the MicroStation Manager dialog box and are processed at the PROJECT level. The variables, CT_PROJECT_NUMBER and CT_PRJ_VER, are defined at the beginning of each pcf. (see [2007 step by step DDE install.pdf](#) – Step 2.4.2) They tell MicroStation which project folder to use and what standards were used to create the project. Reference files in project subdirectories can be a problem due to MicroStation search path limitations. The pcf specifies each subdirectory path used in a project. It also defines resources such as linestyles, fonts, and custom rendering files and any other project specific information.

E.2 Microstation Configuration Flowchart

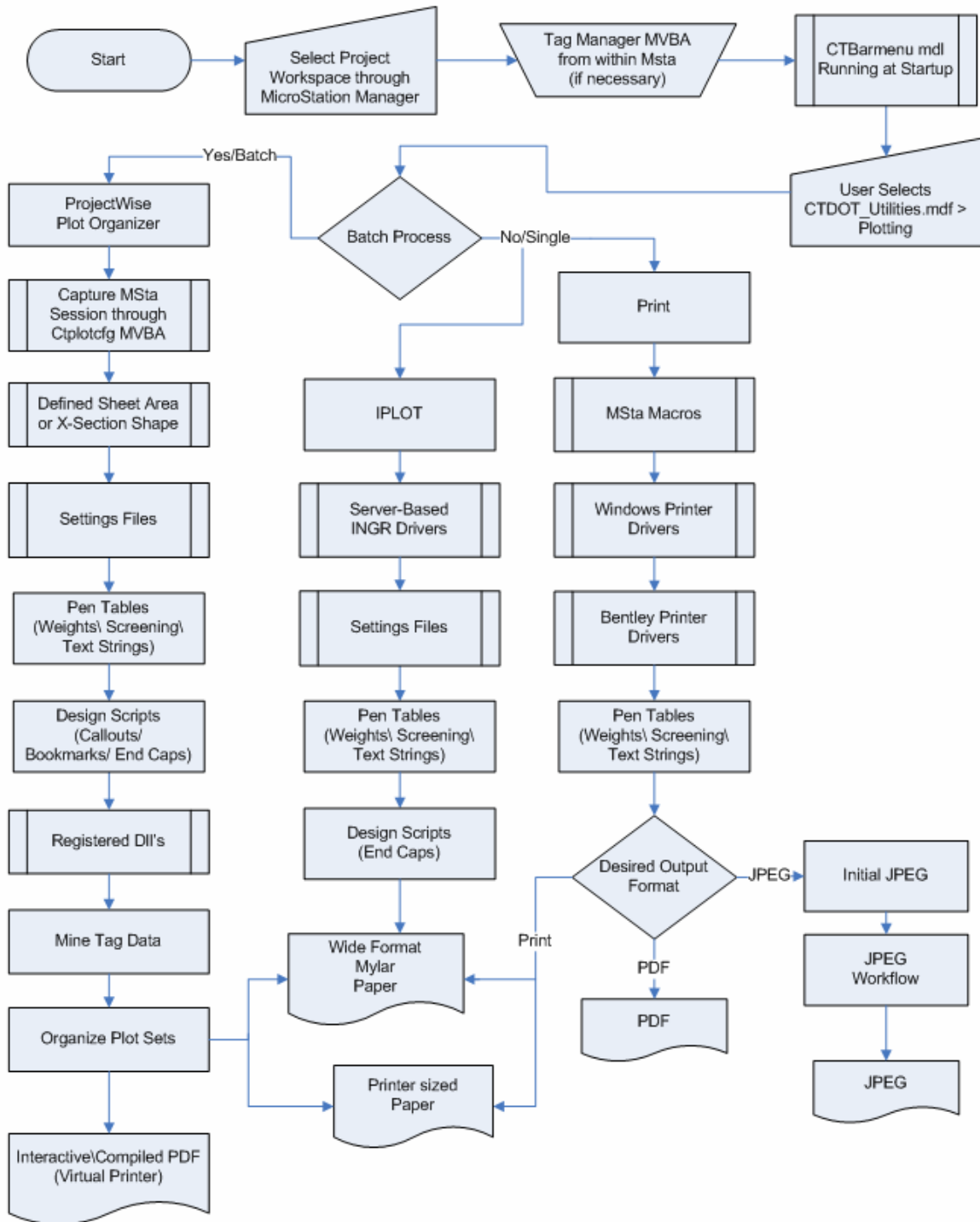
The following flowchart shows how MicroStation configurations are processed. Most DDE interaction is automated and goes unnoticed by the user. Note that in a typical session, the MicroStation user selects only a desktop shortcut, a project, and a design file.



Configuration Flowchart

E.3 Printing and Plotting Flowchart

The following flowchart illustrates the steps and processes taken in order achieve a particular plot output format using MicroStation. Note that the left column also uses ProjectWise Plot Organizer for added benefits.



Printing and Plotting Flowchart

Appendix F CTBarmenu Custom Menus

The primary purpose of the custom bar menus are to enforce consistency when drawing and to automate the operation of frequently used MicroStation tools. Discipline specific bar menus have been created along with the CTDOT_Utilities bar menu which is available to all disciplines. When entering MicroStation your discipline bar menu will be opened automatically. The MDL application has been modified by CTDOT to accommodate multiple bar menus. The CTDOT_Utilities bar menu can be opened by clicking on <<MDF located on the right of the bar menu.

Discipline Bar Menu

When selecting a particular drawing production item on the bar menu your discipline custom settings (level, text style, dimension style, color, weight, line style) and tools will become active. The discipline Bar Menus are located in the discipline workspaces under Standards/Data/2007/*.mdf

Bar menus have been created for the following disciplines:

Traffic
Structure Bridge
Highways, Facilities
Concepts
Survey
Aviation

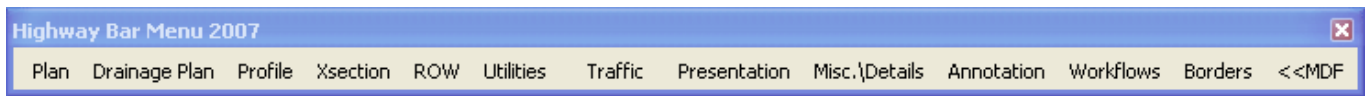


Figure App G - 1 – Highways Barmenu

CTDOT_Utilities Bar Menu

The tools in this bar menu have been set up to work across all disciplines. This multi-discipline bar menu is located in the CTDOT_Standards workspace under Standards/Data/2007/CTDOT_Utilities_2007.mdf

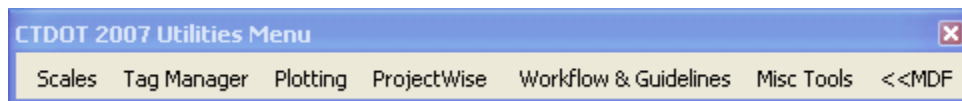


Figure App G - 2 – CTDOT_Utilities Barmenu

Appendix G CTDOT Accounting

This appendix details operations of CADD Accounting with CTDOT.

G.1 Editing project numbers within CADD Accounting

Note: This appendix is for users working within CTDOT.

To add, delete or modify an active project number on the accounting menu, you must contact the person who has been designated as the “account editor” for your unit. Account editors can modify project numbers via the ‘Edit accounts’ button on the accounting screen. **That button will show up only for those individuals in the AcctEditors global group.**

The users in the AcctEditors global group are as follows:

Gary Abramowicz	860-594-3206	Mike Hogan	860-594-3241
Jeff Beckwith	860-823-3107	Bob Kennedy	860-594-3458
Eric Bergeron	860-594-3152	Charles LaChance	860-823-3110
Betty Bolden	860-594-3216	Liz Manna	860-594-2029
Bruce Bourgoin	860-594-2760	Everett Maynard	860-594-2372
Andy Cardinali	860-594-3315	Patrick McGuire	860-585-2728
Michael Cloutier	860-594-2798	Robert Pion	860-594-3183
Michael Coleman	860-594-2526	Bill Pratt	860-594-3320
Brian Cunningham	860-594-3198	Bryan Reed	860-594-3418
Jay Doody	203-389-3110	Mike Ryan	860-594-3400
Scott Elsdon	860-594-2520	Jim Sime	860-258-0309
Robert Fasciani	860-594-4588	Jim Spencer	860-594-2014
Geral Fascione	860-594-2797	Ed Szkoda	860-258-4578
Dave Gosselin	860-823-3293	John Wyskiel	860-594-3303
John Hagert	860-594-3417	Kathy Zimmerman	860-594-3326
Dave Head	860-594-2149		
Jacqui Henry-Rafiq	860-594-2089		

Account editors should pay particular attention to the order and accuracy of the number added. The correct format for new project numbers is town, project, appropriation, function and activity. (town= 3 char., project= 4 char., appropriation =3 char., function =3 char., activity =3 char.) Use leading zeros where necessary.

Account editors are also responsible for deleting closed projects from their .dbs list.

Appendix H CTDOT Custom VBA's

H.1 Tag Manager

`\CTDOT_Standards\Standards\vba\ChangeTags.mvba`

The Tag Manager is used to manage tag sets of multiple sheets of the entire project.

See [Section 7 Managing Contract Sheets with Tag Manager](#).

H.2 Data Miner & Plot Sorter

`\CTDOT_Standards\Standards\vba\CTplotcfg.mvba`

The Data Miner and Plot Sorter get used when running the ProjectWise Plot Organizer Batch Plotting application.

See [Section 8 Plotting and Adobe PDF Publishing](#). Plot sorter is still under development.

H.3 Drawing Scales

`\CTDOT_Standards\Standards\vba\CTscales.mvba`

The Drawing Scale application displays the MicroStation file's current custom unit setting when entering a design file. This application is also used to display the drawing scale when user changes occur.

See [Appendix C - D.3 Drawing Scales and Custom Units](#).
