Moving from Land Desktop to Carlson Civil

The Migration Guide

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Introduction

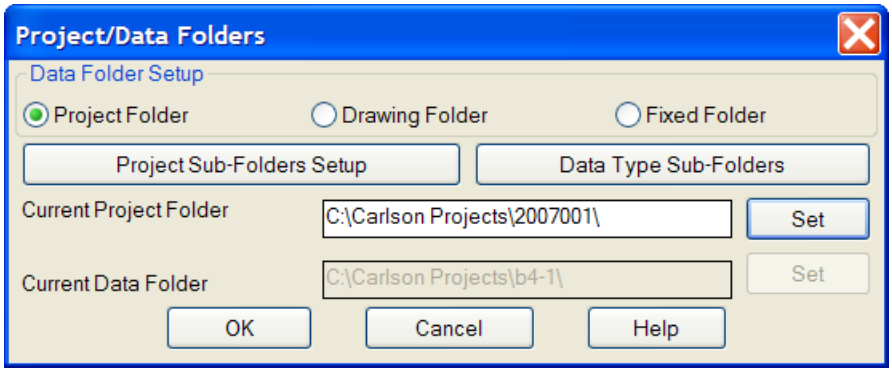
Carlson Civil 2007 is the new flagship office product from Carlson Software, encompassing all of the functionality of Survey, Site Grading, Road Design, Hydrology and GIS, along with a comprehensive set of drafting and annotation tools. Carlson Civil 2007 runs atop any installed AutoCAD executable, running as plain AutoCAD, or found within Map, Land Desktop or Civil 3D, versions 2000-2007.

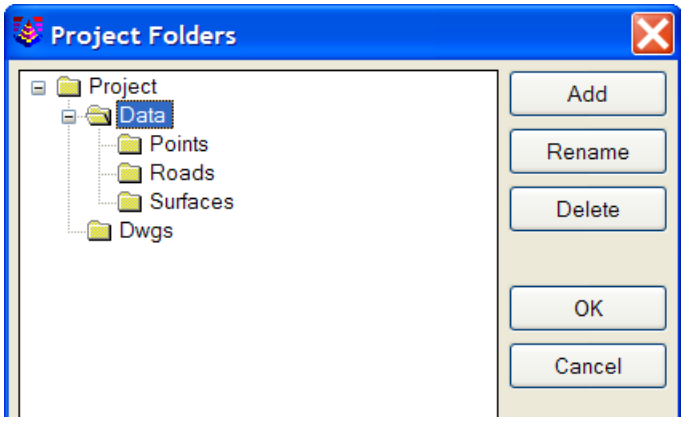
Evolved from the Carlson SurvCADD product line, first introduced in 1989, Carlson Civil 2007 introduces several brand new state of the art tools, including a dynamic road design program called RoadNet, and a dynamic storm drain design program called SewerNet. While these functions automatically respond to design changes, adjusting sections, profiles, and grading, Carlson Civil 2007 accomplishes this automation without introducing custom objects, so sharing drawings with others is not an issue.

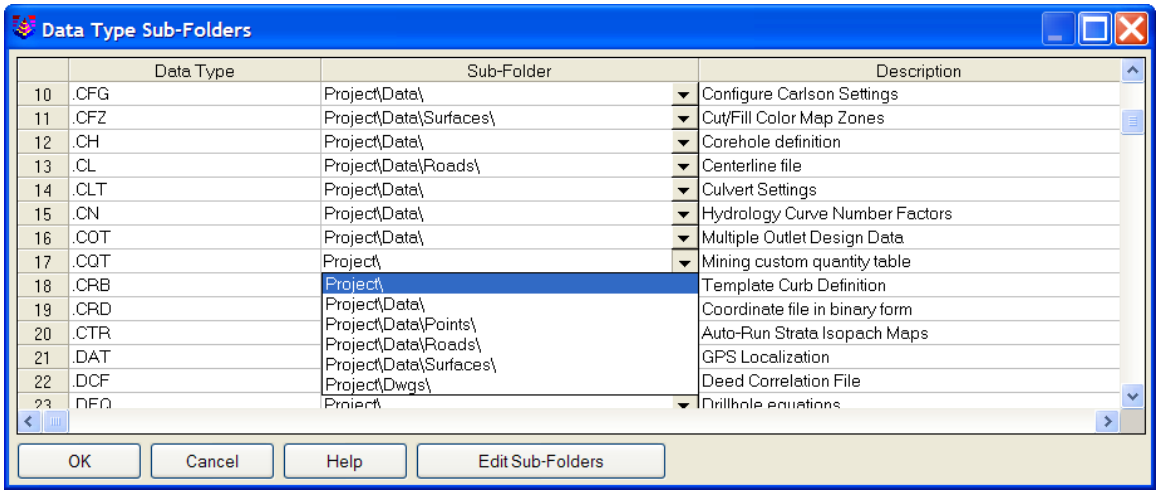
Carlson Civil 2007 continues the Carlson Software tradition of unlimited free tech support, so when needed, help is always a free phone call away, and also introduces the newest support technology in the form of an online, web-based reference manual, complete with demonstration and training movies.

Data File Types and Storage

Carlson Civil has a similarity to Land Desktop in the use of external files to store design data, but differs significantly in that in Carlson Civil the naming and placement of these files is determined by the user, not the software. Carlson Civil offers three distinct methods of file storage, the choice is up to the end user. Carlson Civil data files can either be placed in a single location, known as a data folder, placed with the drawing they are associated with, or placed in a user-defined folder structure. The placement of files within that structure is also totally user-defined, based on the assignment of file types (extensions) to folders.







File types used by Carlson Civil include:
.crd – Point data, coordinate file

.rw5 – raw survey data, contains all observations
.cl – centerline, describes a 2D alignment
.tin – Surface, newer format, more efficient than .flt in most cases, especially for machine control
.flt – Surface, original format
.grd – Surface grid file, used for volumes
.cfg – Stores configuration settings
.fld – Field to Finish file, stores rules for inserting symbols for points (LDT Description Key functionality) and automated linework functionality (Autodesk Survey Figures equivalent)
.lot – Lot file, stores parcel geometry
.adf – Annotation Default file
.pro – Profile file
.mxs – Section Alignment file
.grp – Point Group definitions
.rdn – Roadway Networks
.sct – Road Sections
.tpl – Road Templates
.rdf – Road Design Files

Settings

Carlson Civil uses several techniques to store settings. There are three main categories of settings; Drawing Setup settings, such as drawing scale and units, Command-specific settings, such as the layer to draw contours on, and Generic control settings, such as whether to link drawing points to the external coordinate file (.CRD).

Drawing Setup settings are stored directly within the drawing files (.DWG). Carlson Civil also creates a file for each drawing using the drawing name with a (.INI) file extension. This file stores a list of all of the design files that are used or created from within the drawing, such as centerline files (.CL), profile files, (.PRO), etc.

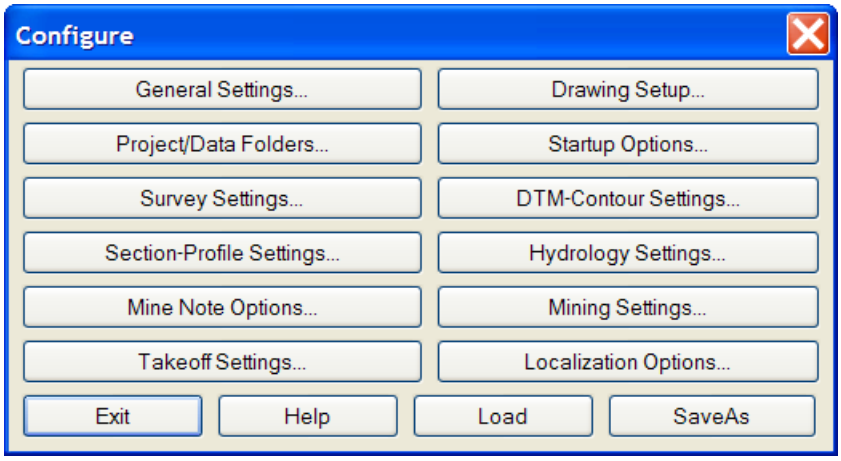
Command-specific settings are stored within a set of files with (.INI) file extensions, with the command name as a filename, such as roadnet.ini, or mapcheck.ini. These are typically stored in the \USER folder, and are created as the commands are first accessed.

Generic control settings are stored within a special (.INI) file named Carlson.ini. When new drawings are created, this file is read to set these type of generic controls.

Drawing Setup settings can be accessed directly from the Settings menu, or through the Configure command. If the Drawing Setup dialog is accessed through the Configure command, when exiting the main Configure dialog, the user is prompted whether to save changes to Current and Future drawings, or Future drawings only. Current and Future saves the Drawing Setup settings to the current drawing internally, and updates the Carlson.ini file, while the choice of Future Only does not affect the current drawing, only the Carlson.ini file, and therefore any new drawings created. To change Drawing Setup settings for only the current drawing, do not go through Configure, but use the Drawing Setup command directly off of the Settings menu.

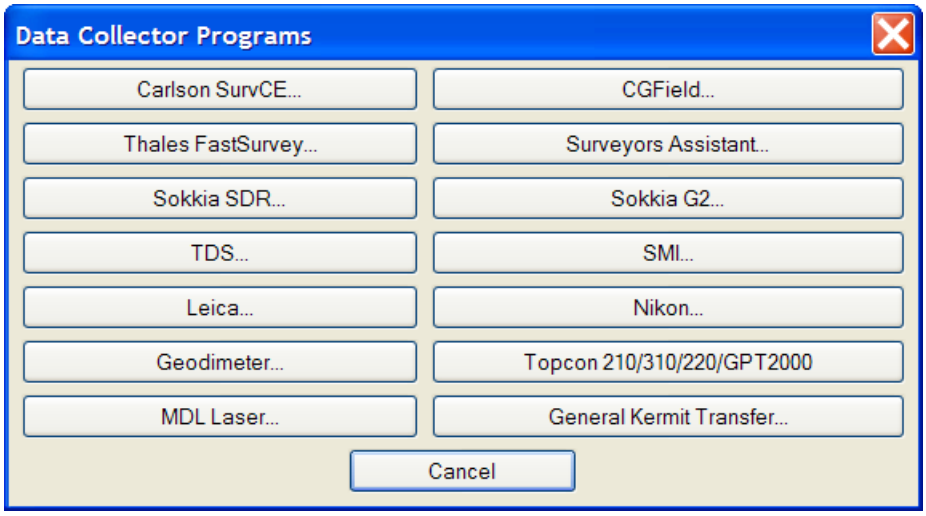
Command-specific settings are accessed when the commands are actually run. The settings displayed are being read from the command's own specific (.INI) file, and any changes made are written to the same files. This way the commands automatically recall the settings that were used for the previous run. Alternatively, the Configure command can be used to access command-specific settings.

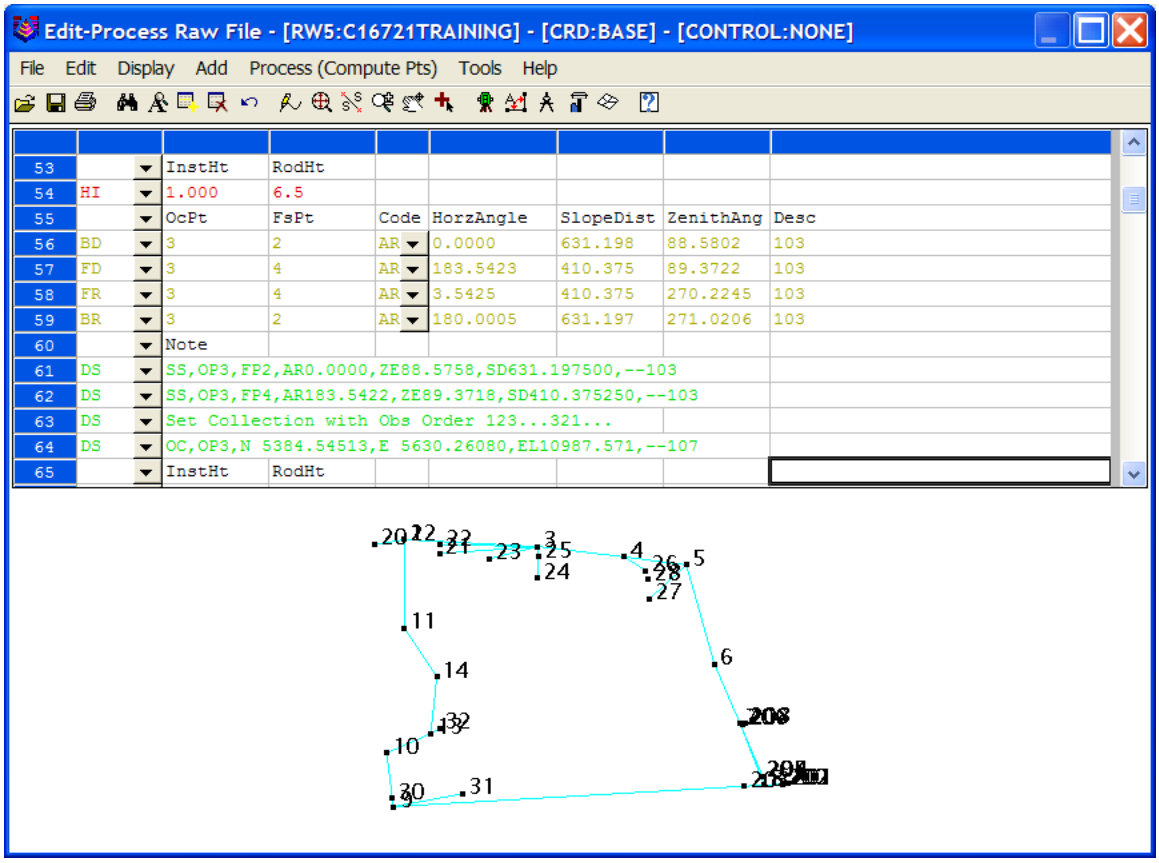
The Configure command provides access to a dialog box with 12 buttons, each leading to settings for specific aspects of the software. Changes made within any of these are also automatically saved to the corresponding command (.INI) file, or to the Carlson.ini file in the case of generic settings. The Configure command also provides a Save and Load functionality, utilizing configuration files (.CFG). Saving a configuration file (.CFG) saves all settings currently stored in all of the command-specific (.INI) files, and the Carlson.ini file. Loading a configuration file (.CFG) sets all settings within all these files.



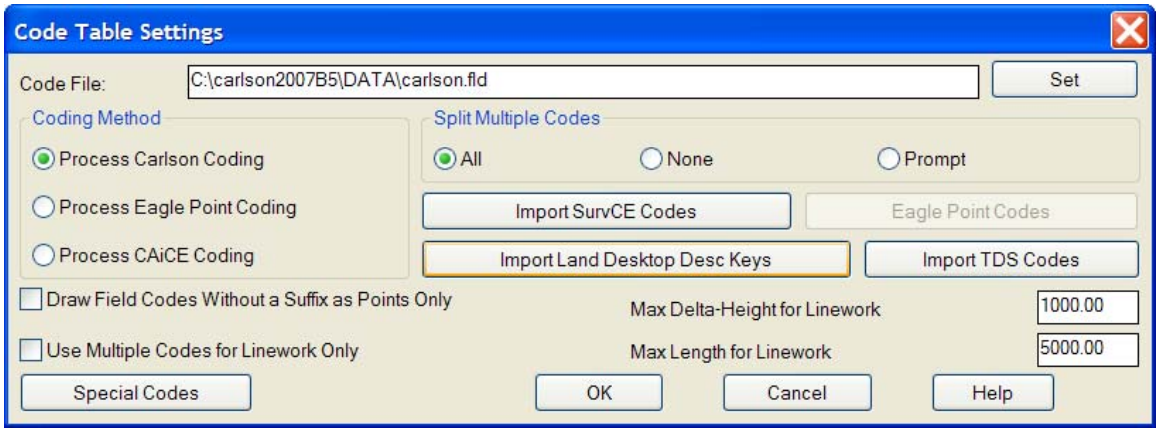
Survey

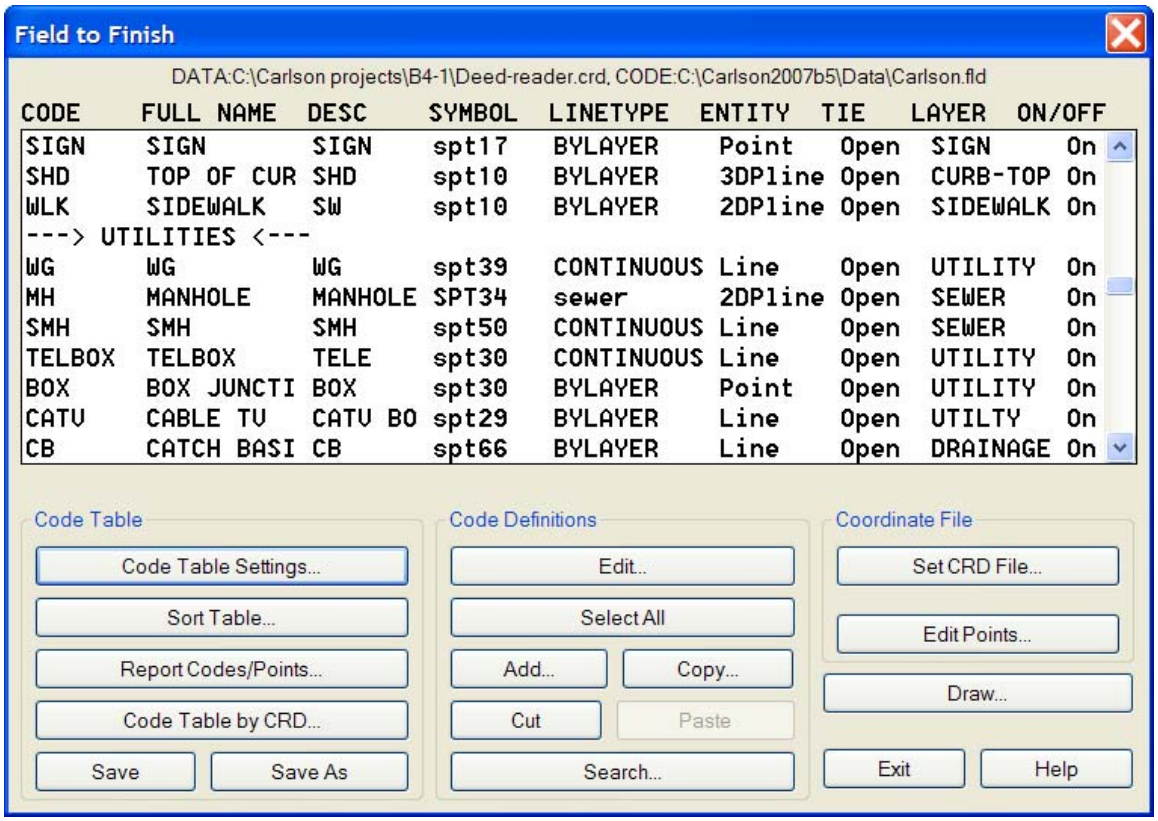
The complete range of Survey functionality is contained within the Carlson Civil, and is also available in the Carlson Survey program. This includes communication with data collectors, editing and processing of raw survey data, including traverse adjustment, and Field to Finish, which controls the generation of point symbols and linework.

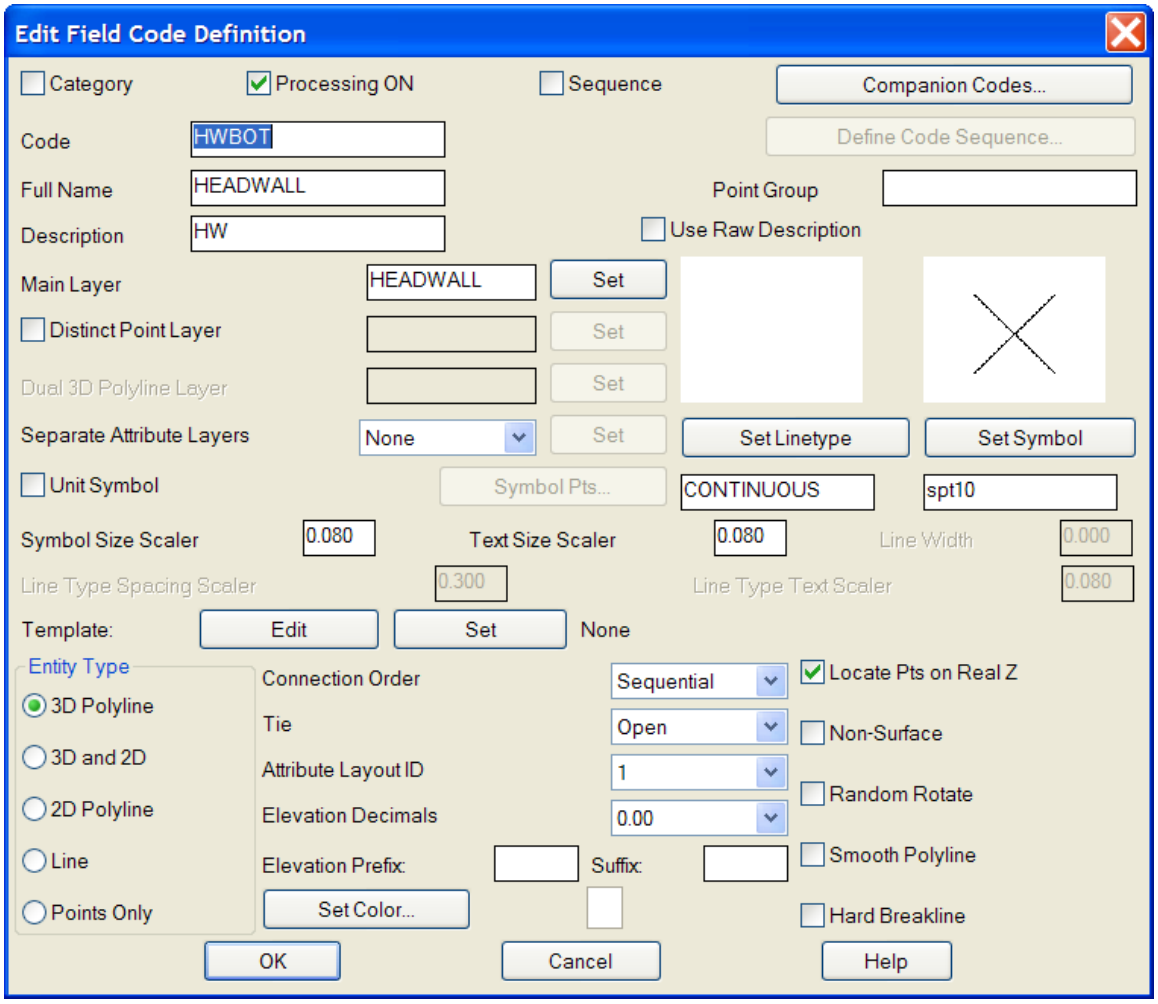




Land Desktop uses Description Keys for point-based symbol insertion, and Autodesk Survey uses Figure notation for the generation of linework. Autodesk requires field coding to produce linework, and the processing of that information takes place when the raw file (.fbk) is Imported. Carlson inserts symbols and linework with one function known as Field to Finish (F2F), and performs this task using the point descriptions from the coordinate file, not the raw observations file. So linework can actually be generated from any set of points, even if no field coding has taken place. However, the addition of field coding can certainly make the generation of linework more precise. Carlson Civil can use LDT Description Key file to start a Field to Finish Code File.


Code Table Settings
Code File:
C:\carlson2007B5\DATA\carlson.fld
Set
Coding Method
Process Carlson Coding
Process Eagle Point Coding
Process CAiCE Coding
Split Multiple Codes
All
None
Prompt
Import SurvCE Codes
Eagle Point Codes
Import Land Desktop Desc Keys
Import TDS Codes
Draw Field Codes Without a Suffix as Points Only
Use Multiple Codes for Linework Only
Max Delta-Height for Linework
1000.00
Max Length for Linework
5000.00
Special Codes
OK
Cancel
Help

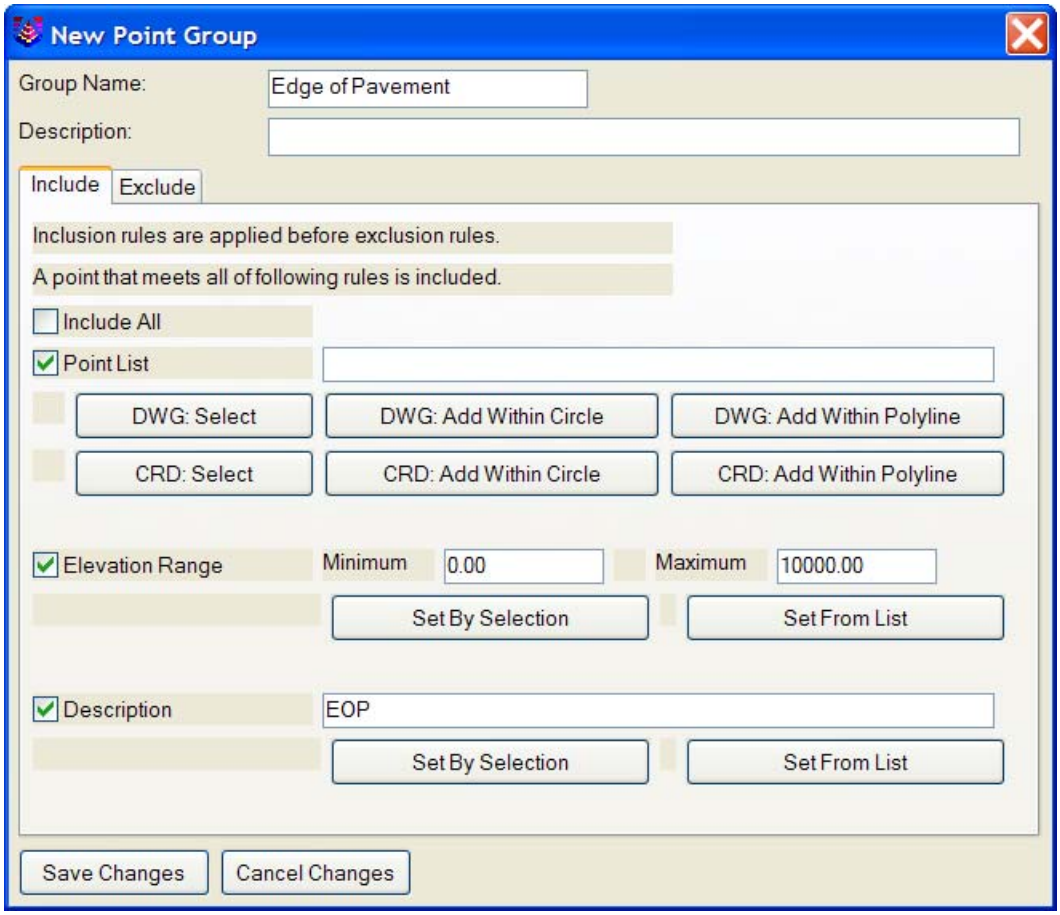

Field to Finish
DATA:C:\Carlson projects\B4-1\Deed-reader.crd, CODE:C:\Carlson2007b5\Data\Carlson.fld
CODE FULL NAME DESC SYMBOL LINETYPE ENTITY TIE LAYER ON/OFF
SIGN SIGN SIGN spt17 BYLAYER Point Open SIGN On
SHD TOP OF CUR SHD spt10 BYLAYER 3DPline Open CURB-TOP On
WLK SIDEWALK SW spt10 BYLAYER 2DPline Open SIDEWALK On
---> UTILITIES <---
WG WG WG spt39 CONTINUOUS Line Open UTILITY On
MH MANHOLE MANHOLE SPT34 sewer 2DPline Open SEWER On
SMH SMH SMH spt50 CONTINUOUS Line Open SEWER On
TELBOX TELBOX TELE spt30 CONTINUOUS Line Open UTILITY On
BOX BOX JUNCTI BOX spt30 BYLAYER Point Open UTILITY On
CATV CABLE TV CATV BO spt29 BYLAYER Line Open UTILTY On
CB CATCH BASI CB spt66 BYLAYER Line Open DRAINAGE On
Code Table
Code Table Settings...
Sort Table...
Report Codes/Points...
Code Table by CRD...
Save
Save As
Code Definitions
Edit...
Select All
Add...
Copy...
Cut
Paste
Search...
Coordinate File
Set CRD File...
Edit Points...
Draw...
Exit
Help



Points and Point Groups

This use of point data in Carlson Civil revolves around the use of .crd files, also known as coordinate files.

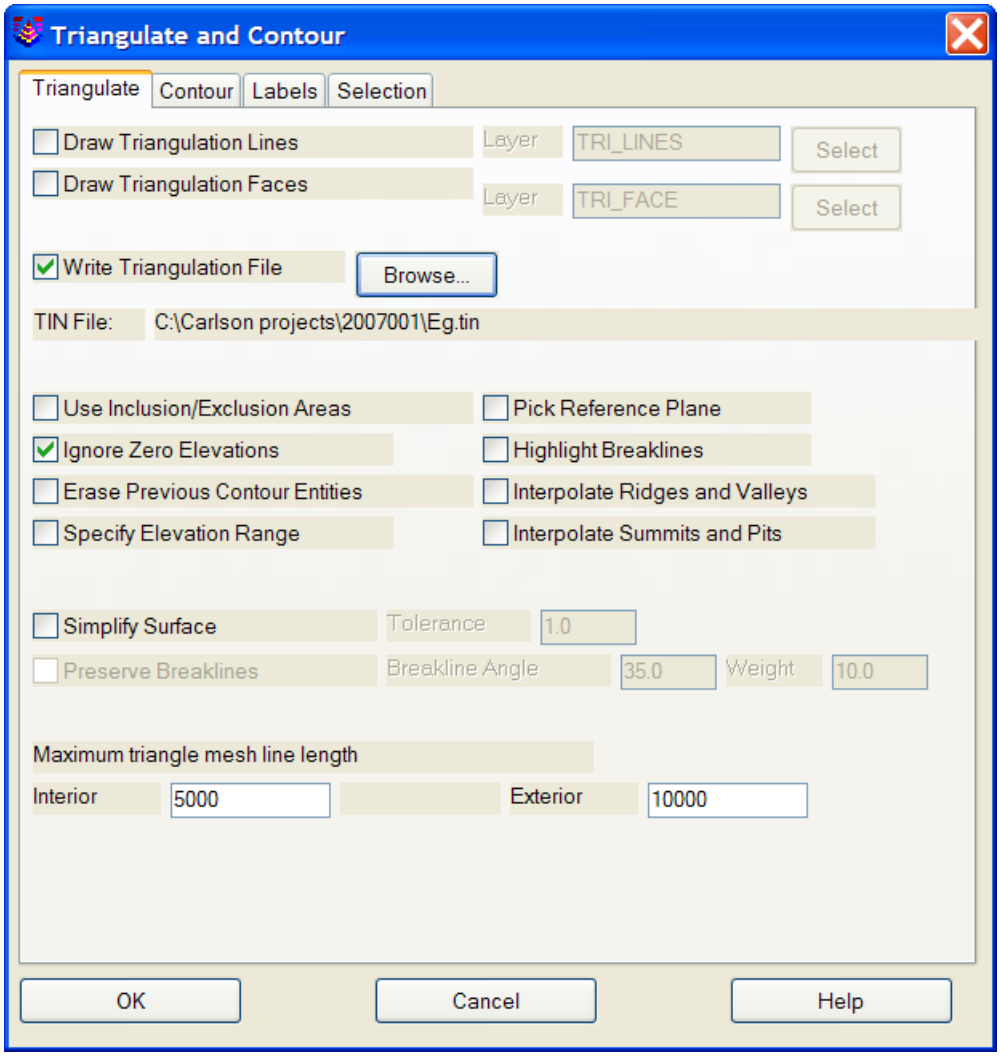
Carlson Civil supports the creation of Point Groups similar to LDT and applies them in many applications, such as using them to create surfaces, editing and listing. Carlson Civil stores Point Group definitions are associated individually to each .crd file.



Surfaces and Contours

In Carlson Civil, Surfaces can be written out as external files, but a lot of design and computations involving surfaces can also be accomplished directly within the drawing without writing out external files. Triangulation surfaces can be written out as .tin or .flt and grid surfaces as .grd files. When an external file is generated, a named Surface is also stored in the drawing. This named Surface is accessed through the Surface Manager, where it can be edited.

The main Carlson Civil command for working with Surfaces is called Triangulate and Contour. It is a single dialog box with four tabs, and covers the entire process of specifying the general settings to generate the Surface, creating Contours, generating Labels, and specifying the data source(s) for the Surface.

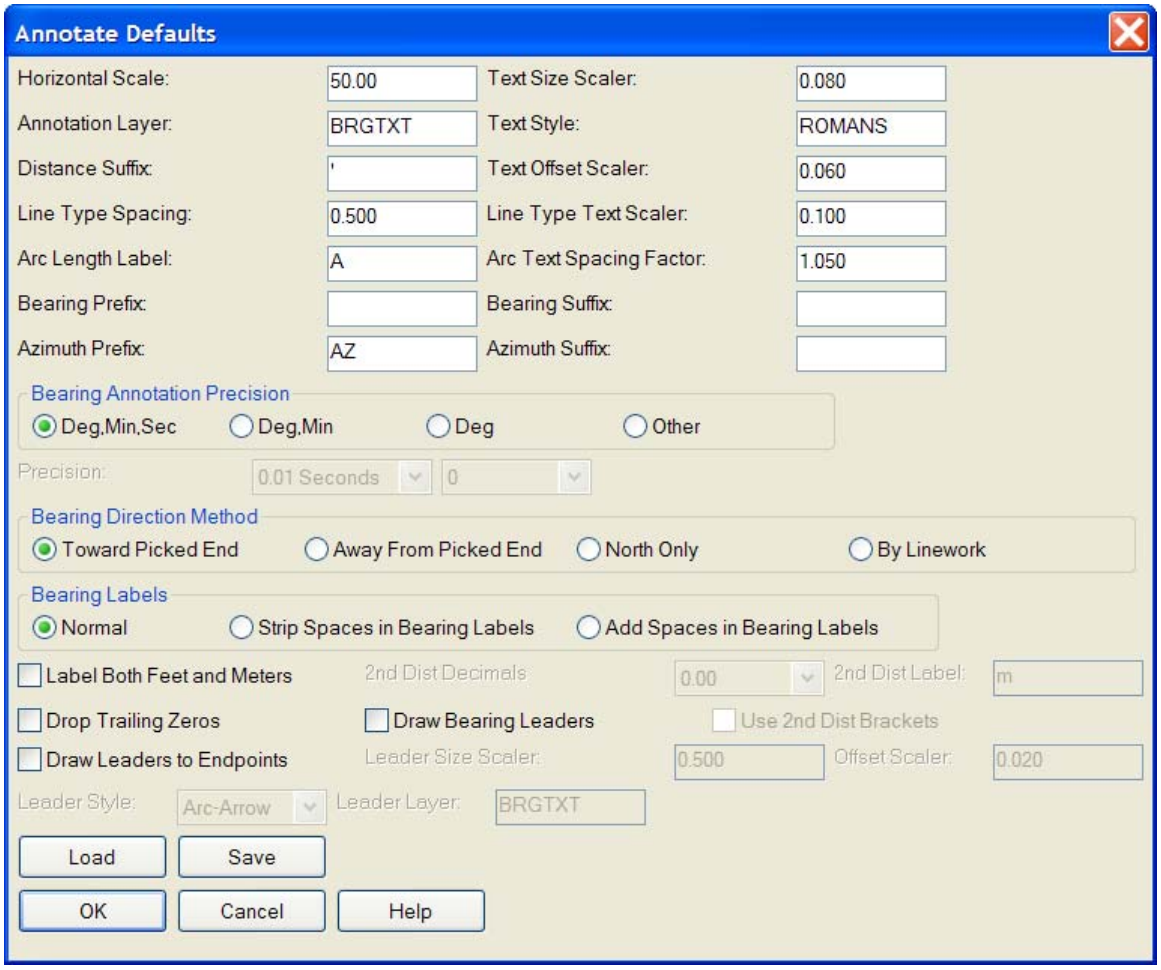


In Carlson Civil, Contours are generated as regular AutoCAD Polylines. Contours can be generated and automatically labeled simultaneously, or labeled after they are generated. Labels can be generated with wipeouts to hide the contour beneath them, and can also be slid along the contour to easily change their location.

The Triangulation Surface Manager has tools to edit, add and remove data points and breaklines and update the triangulation dynamically. It also allows you to change the display properties for the triangulation, contours and labels.

Line and Curve Labeling

Carlson Civil refers to the process of labeling lines and curves as Annotation. Lines and curves can be labeled in a dynamic or static mode, depending on the label settings. There is also a powerful set of tools to check for and correct overlapping labels.



Volumes

There are several ways to generate volumetric calculations within Carlson Civil. Volumes By Layers, Volumes by Triangulation, Calculate Section Volumes and Two Surface Volumes (Grid volumes).

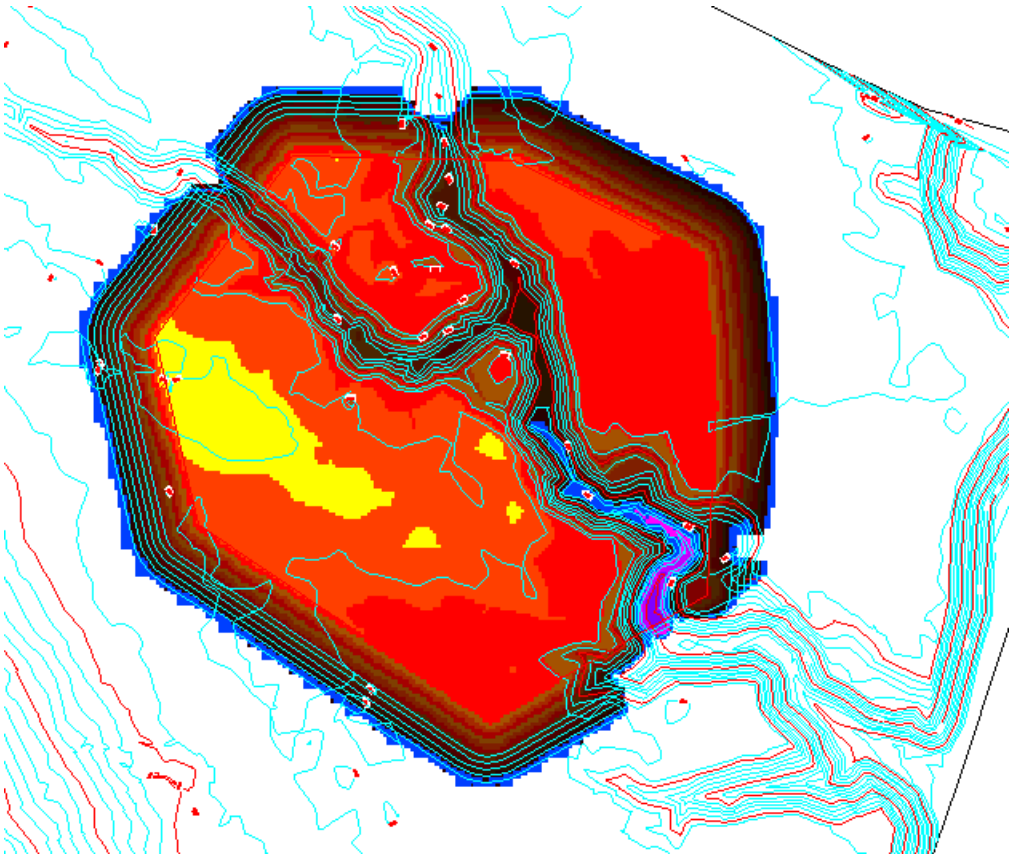
Volumes by Layers is potentially the quickest method. It needs no existing data files and creates no files in the process. You simply specify which layers to use for each of the 2 surfaces.

Volumes by Triangulation uses two triangulated surface files as the source of the data. These files are created through the Triangulate and Contour command. You can choose to create contours in the drawing when you create the TIN files, or just create the files without generating contours.

Calculate Section Volumes calculates volumes by end areas from two cross section files.

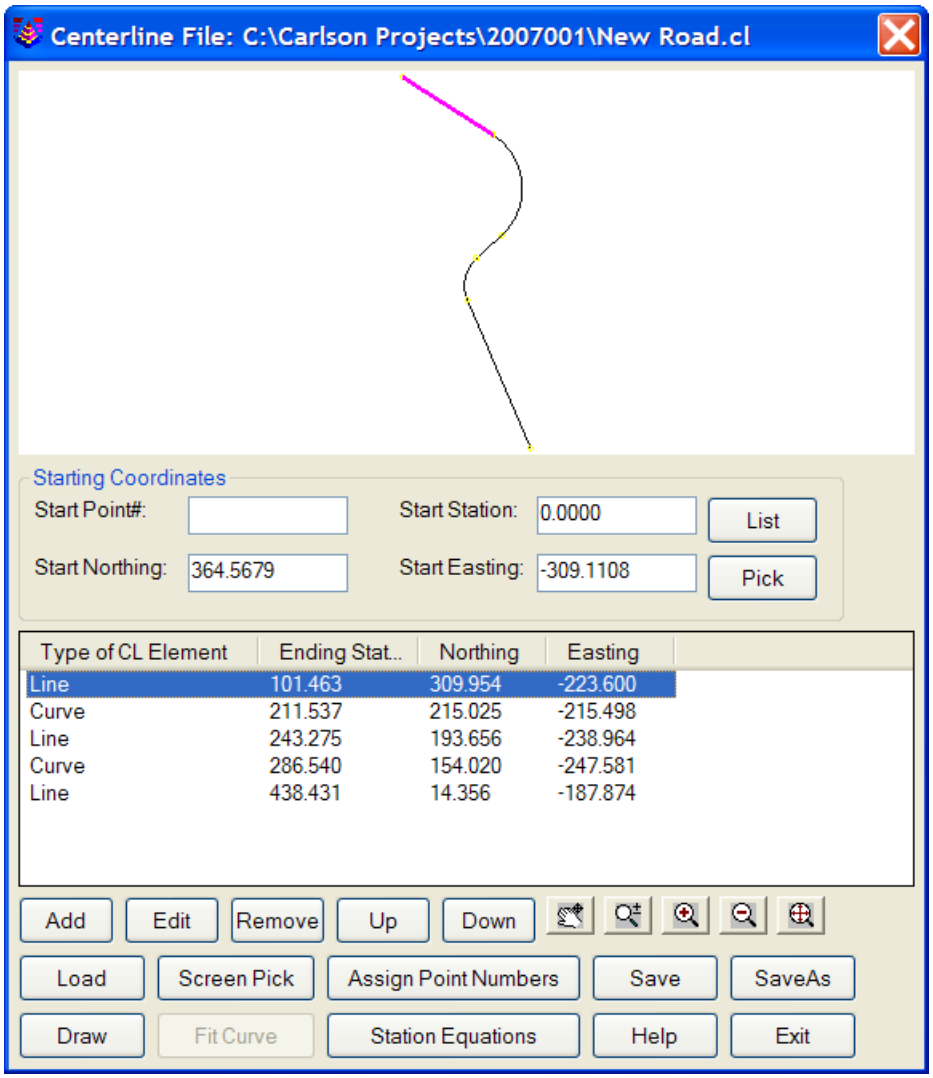
The Two Surface Volumes method uses two predefined Surface files as the data source for the calculations.

Once calculated, you can generate Cut and Fill Color Maps, Cut and Fill Centroids, and Cut and Fill Labels to illustrate the volumes.



Alignments

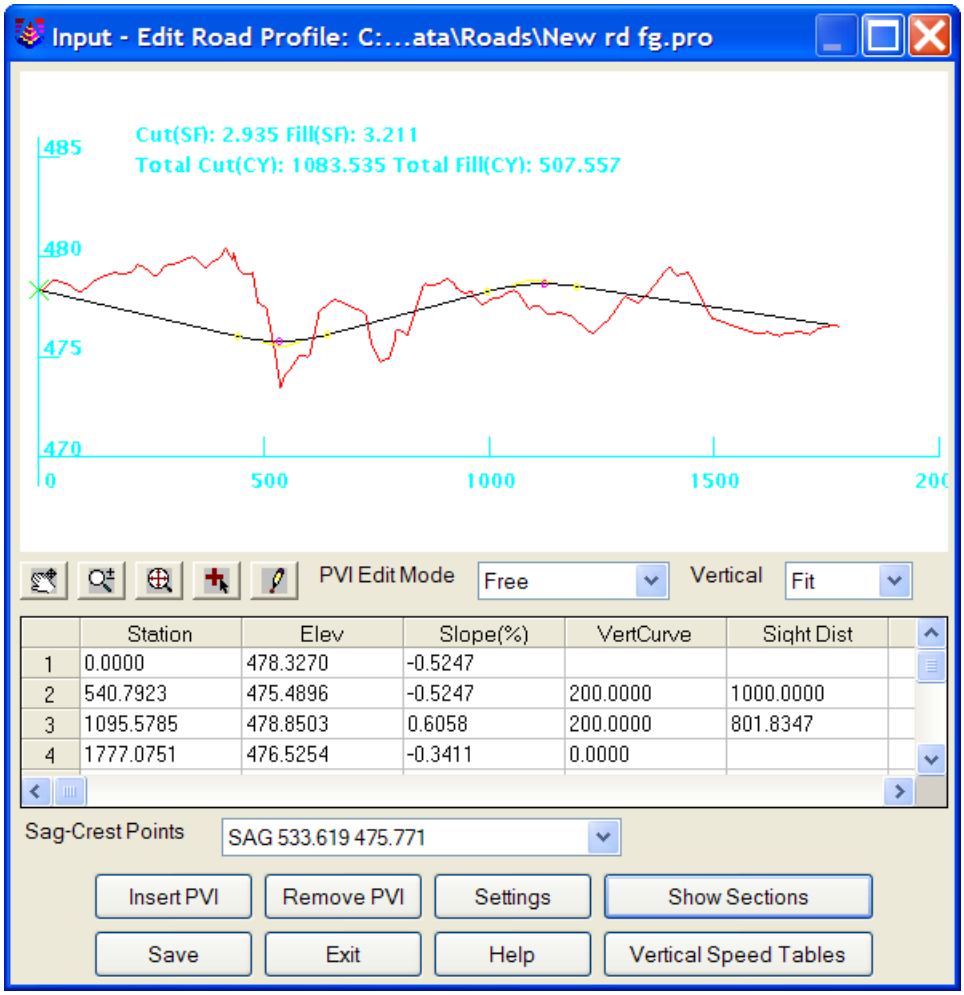
Horizontal Alignments in Carlson Civil are known as Centerlines. They are stored in .cl files. They can be created and edited through the Input-Edit Centerline File command. Polylines can be drawn first and then used to define Centerlines. Once defined as a centerline, double-clicking on the polyline invokes the Input-Edit dialog box.



Profiles

Profiles are stored within .pro files, with user-defined names. Existing Ground/Surface Profiles and Proposed Finished Grade/Design Profiles both use this filetype. Multiple .pro files can be drawn on the same Profile Grid.

There are several different routines for creating profiles including Profiles From Triangulation Files, Profile From Surface Entities and Profile From Points On Centerline. Before using these profile creation routines, the horizontal alignment needs to be created as a centerline file or polyline. The Quick Profile routine can be used to create profiles in one step.

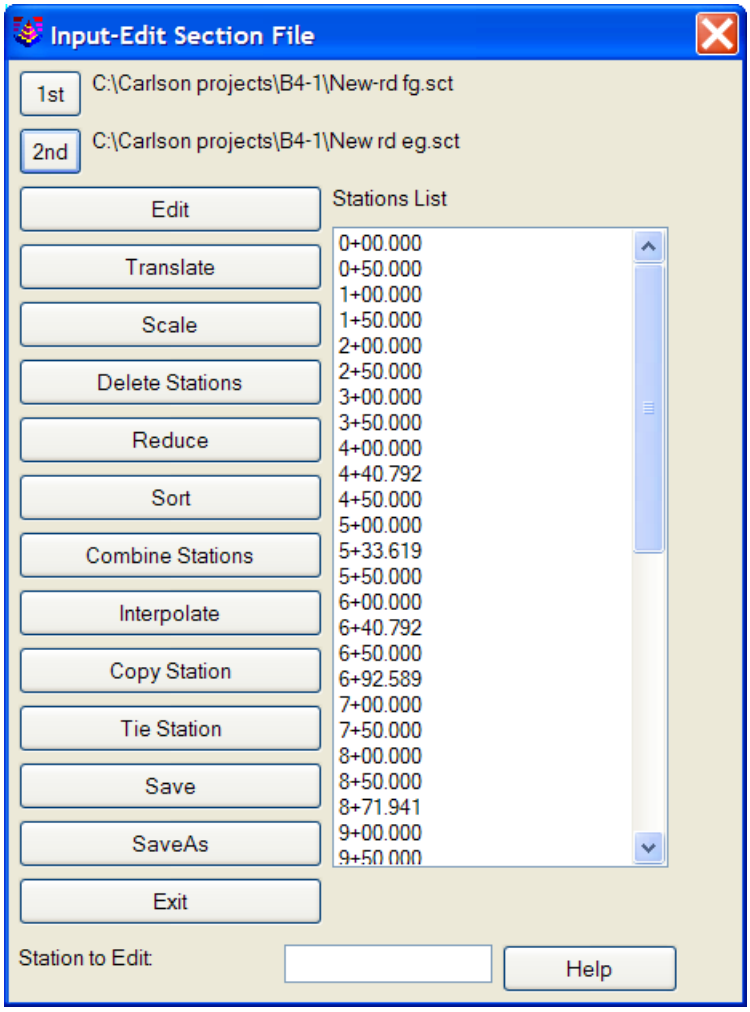


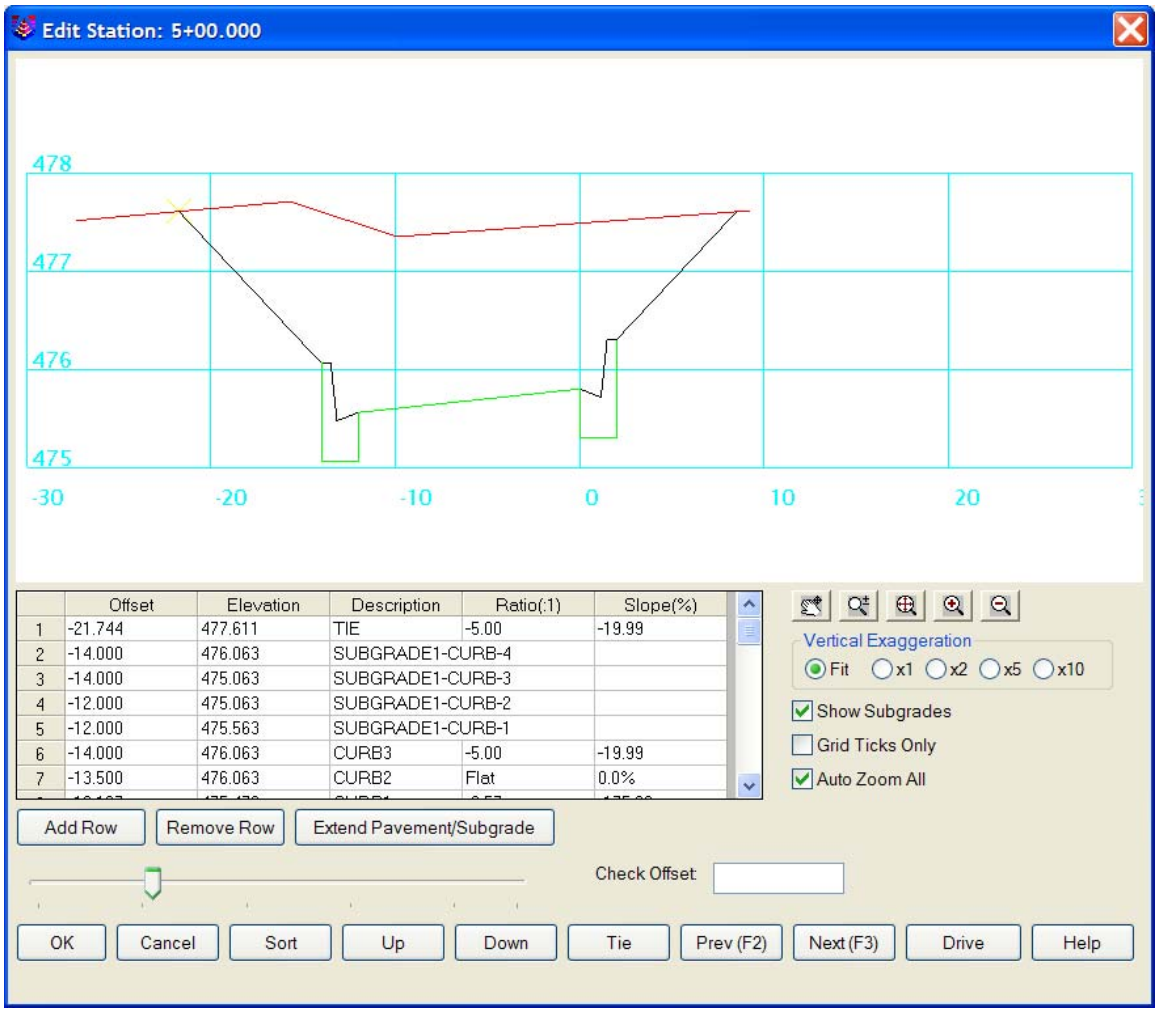
When using Process Road Design or RoadNet, the existing ground Profile can be generated automatically as part of the process, simply by specifying the Surface to use, and so is not a separate prerequisite. The Proposed Finish Grade Profile can then be added in the editor, and the Roadway processed, all without ever drawing anything in the drawing itself. The more traditional LDT approach of generating an existing ground Profile in the drawing and then adding a proposed finish grade Profile by drawing on it in the drawing is also an option.

Roadway Cross Sections

Roadway Cross Sections are based on Cross Section Alignments (.mxs files) that are defined by the Input-Edit Section Alignment command to set the station interval and max offsets left and right. Similar to profile creation, there are several routines to create sections including Sections From Triangulation, Sections From Surface Entities and Sections From Points. The Process Road Design and RoadNet commands can create final sections.

Once section files (.sct) are created, the Input-Edit Section File command allows you to review and edit the section data. Also the Draw Section File and Section Report commands can be used.

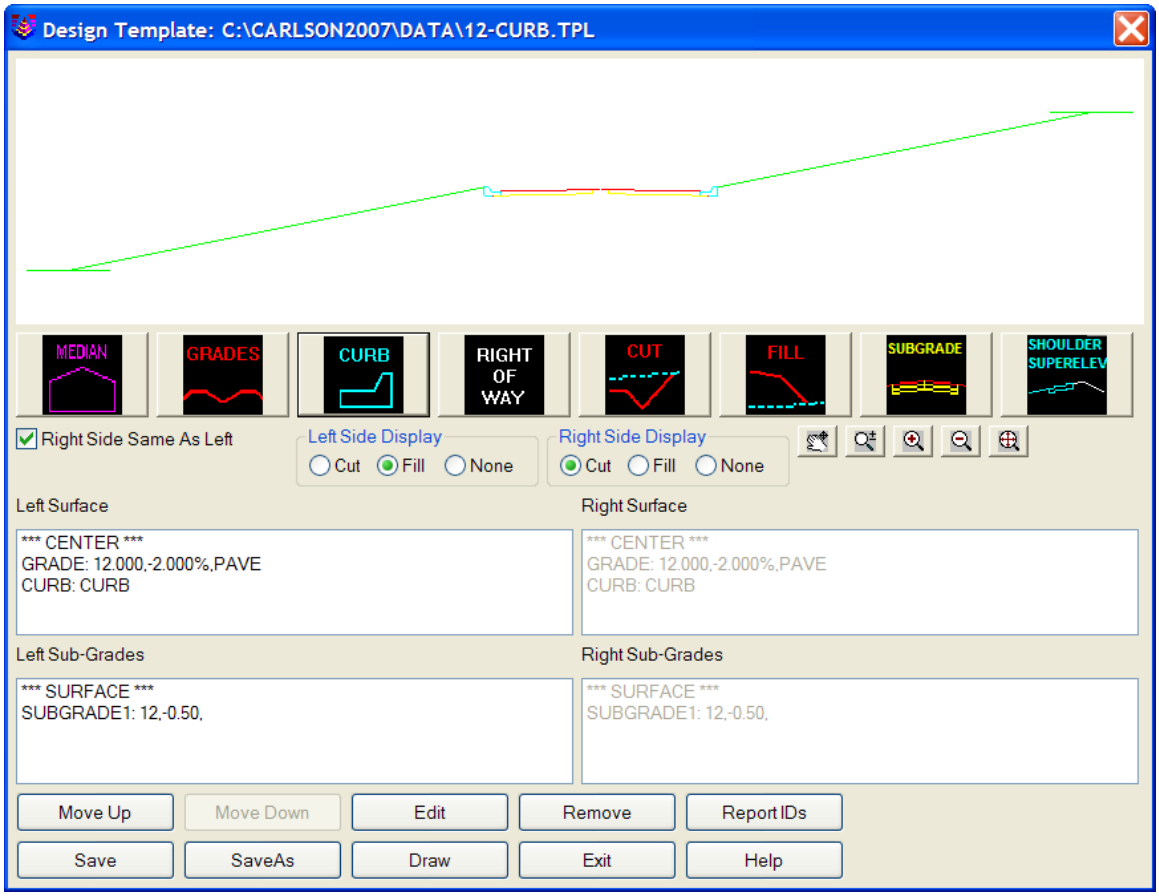

Input-Edit Section File
1st
C:\Carlson projects\B4-1\New-rd fg.sct
2nd
C:\Carlson projects\B4-1\New rd eg.sct
Edit
Translate
Scale
Delete Stations
Reduce
Sort
Combine Stations
Interpolate
Copy Station
Tie Station
Save
SaveAs
Exit
Stations List
0+00.000
0+50.000
1+00.000
1+50.000
2+00.000
2+50.000
3+00.000
3+50.000
4+00.000
4+40.792
4+50.000
5+00.000
5+33.619
5+50.000
6+00.000
6+40.792
6+50.000
6+92.589
7+00.000
7+50.000
8+00.000
8+50.000
8+71.941
9+00.000
9+50.000
Station to Edit:
Help

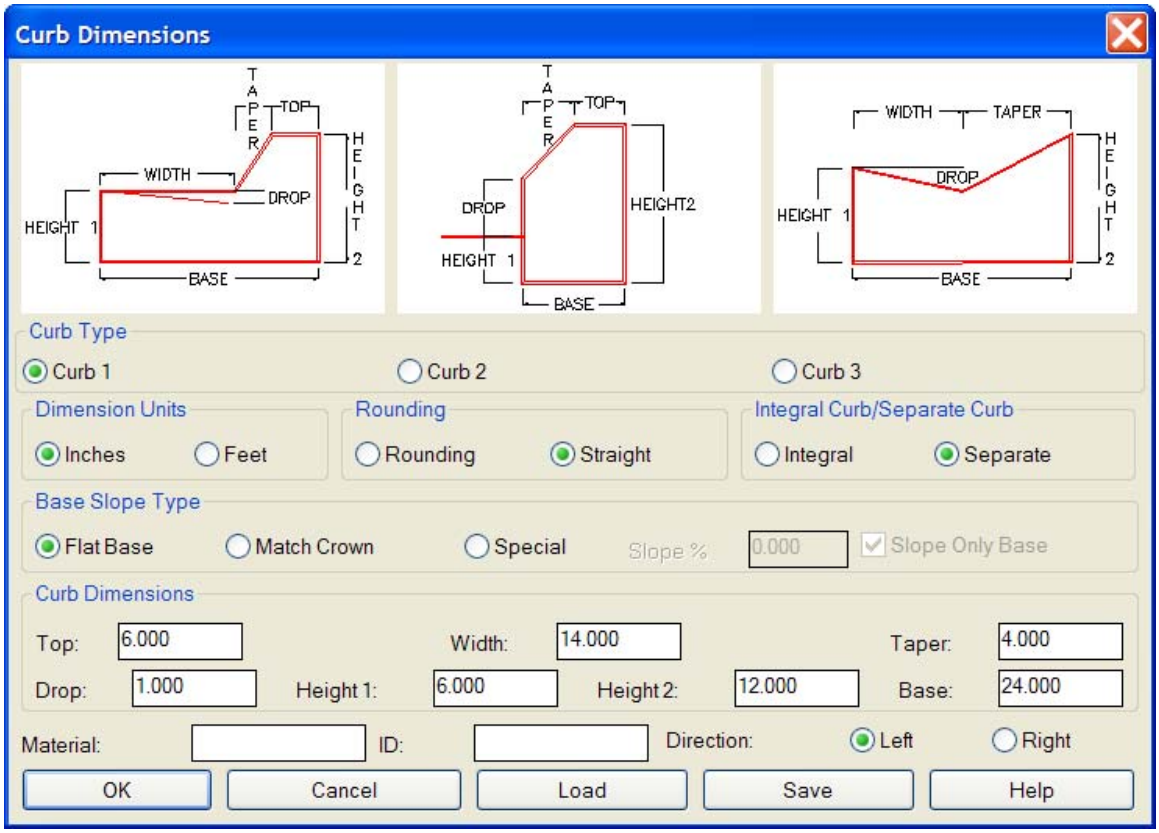


Roadway Templates

Roadway Templates are created within the Design Template dialog box. They are stored as .tpl files, and can be applied to any road design. Templates are used in Process Road Design, Road Network and within the Input-Edit Road Profile dialog.

The Design Template defines the road grades, subgrades, curb, superelevation break points and cut/fill slope treatments.


Design Template: C:\CARLSON2007\DATA\12-CURB.TPL
MEDIAN
GRADES
CURB
RIGHT OF WAY
CUT
FILL
SUBGRADE
SHOULDER SUPERELEV
Right Side Same As Left
Left Side Display
Cut
Fill
None
Right Side Display
Cut
Fill
None
Left Surface
*** CENTER ***
GRADE: 12.000,-2.000%,PAVE
CURB: CURB
Right Surface
*** CENTER ***
GRADE: 12.000,-2.000%,PAVE
CURB: CURB
Left Sub-Grades
*** SURFACE ***
SUBGRADE1: 12,-0.50,
Right Sub-Grades
*** SURFACE ***
SUBGRADE1: 12,-0.50,
Move Up
Move Down
Edit
Remove
Report IDs
Save
SaveAs
Draw
Exit
Help


Curb Dimensions
TAPER
TOP
WIDTH
DROP
HEIGHT 1
HEIGHT 2
BASE
HEIGHT2
Curb Type
Curb 1
Curb 2
Curb 3
Dimension Units
Inches
Feet
Rounding
Rounding
Straight
Integral Curb/Separate Curb
Integral
Separate
Base Slope Type
Flat Base
Match Crown
Special
Slope %
0.000
Slope Only Base
Curb Dimensions
Top:
6.000
Width:
14.000
Taper:
4.000
Drop:
1.000
Height 1:
6.000
Height 2:
12.000
Base:
24.000
Material:
ID:
Direction:
Left
Right
OK
Cancel
Load
Save
Help

Design Control

The idea of Design Control in LDT exists in Carlson Civil in a number of places.

Template Control – Templates are assigned to centerlines either in the Process Road Design dialog box, or in the Input-Edit Road Profile dialog.

Slope Control – In Carlson Civil, side slopes are actually part of the Template definition.

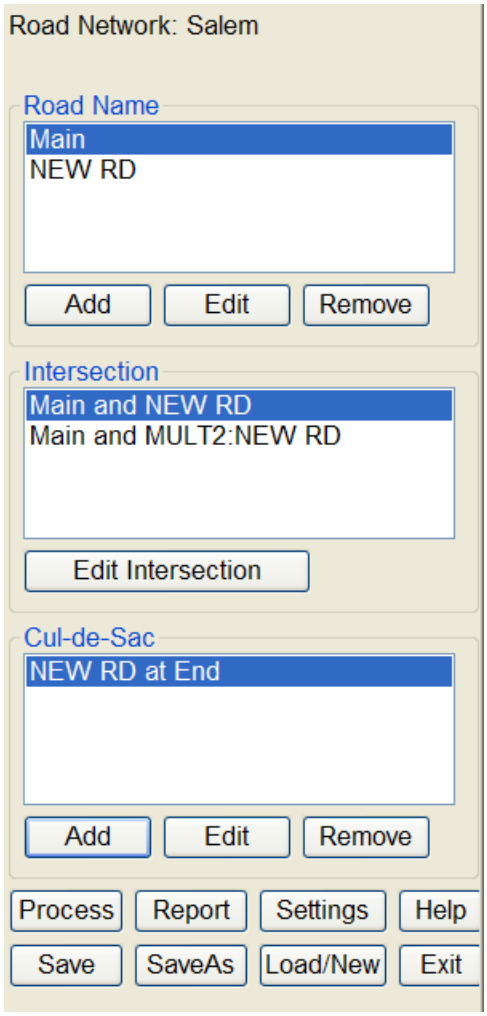
Ditches – Ditches are defined within the Design Template as part of the cut/fill treatment.

Transitions – There are four methods to work with Transitions in Carlson Civil. The first is called a Template Series, in which multiple Templates are assigned to a single Centerline at different stations. Next is a Template transition, in which a single Template is assigned to the entire Centerline and the user edits it at different stations. Next is a Template Point Centerline, in which a secondary Centerline is defined and attached to a point on the Template for specific horizontal control, such as a lane widening. Last is a Template Point Profile, in which an additional Profile is defined and attached to a point on the Template for specific vertical control, like the flow line of a ditch.

Superelevations – The template breakpoints for superelevation pivots are defined within Design Template. The stations for the superelevation transitions are set in the Input-Edit Superelevation command.

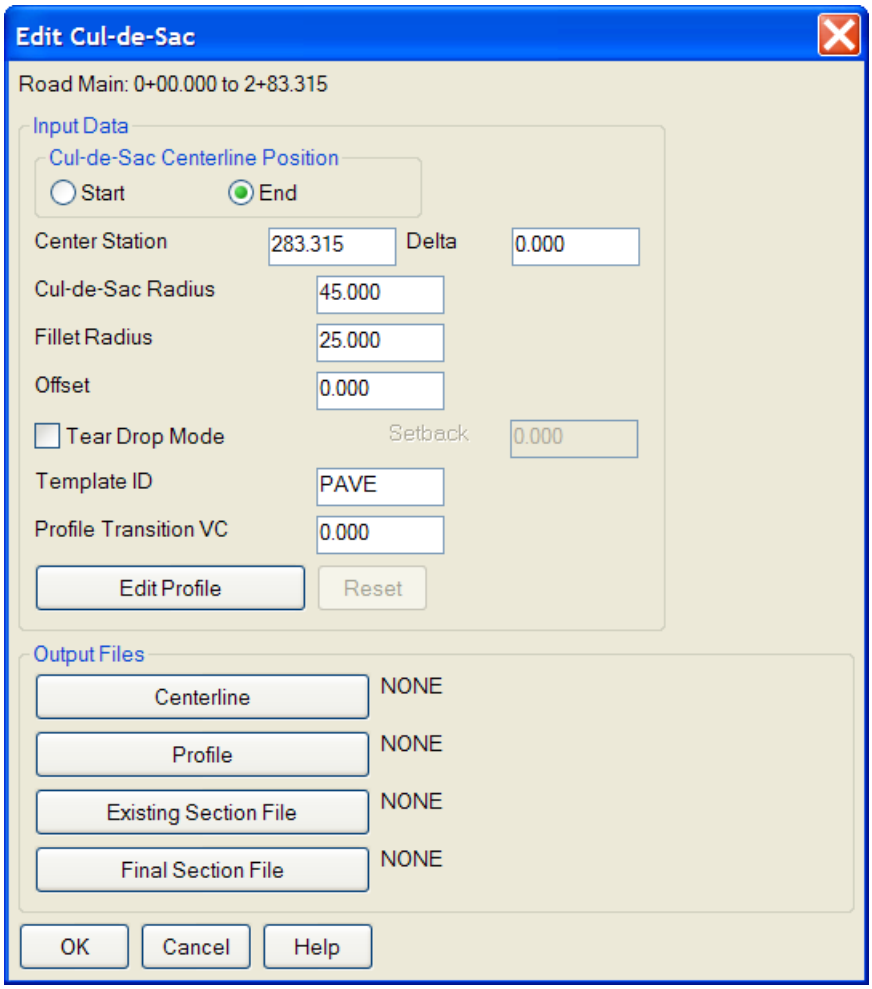
Roadway Intersections

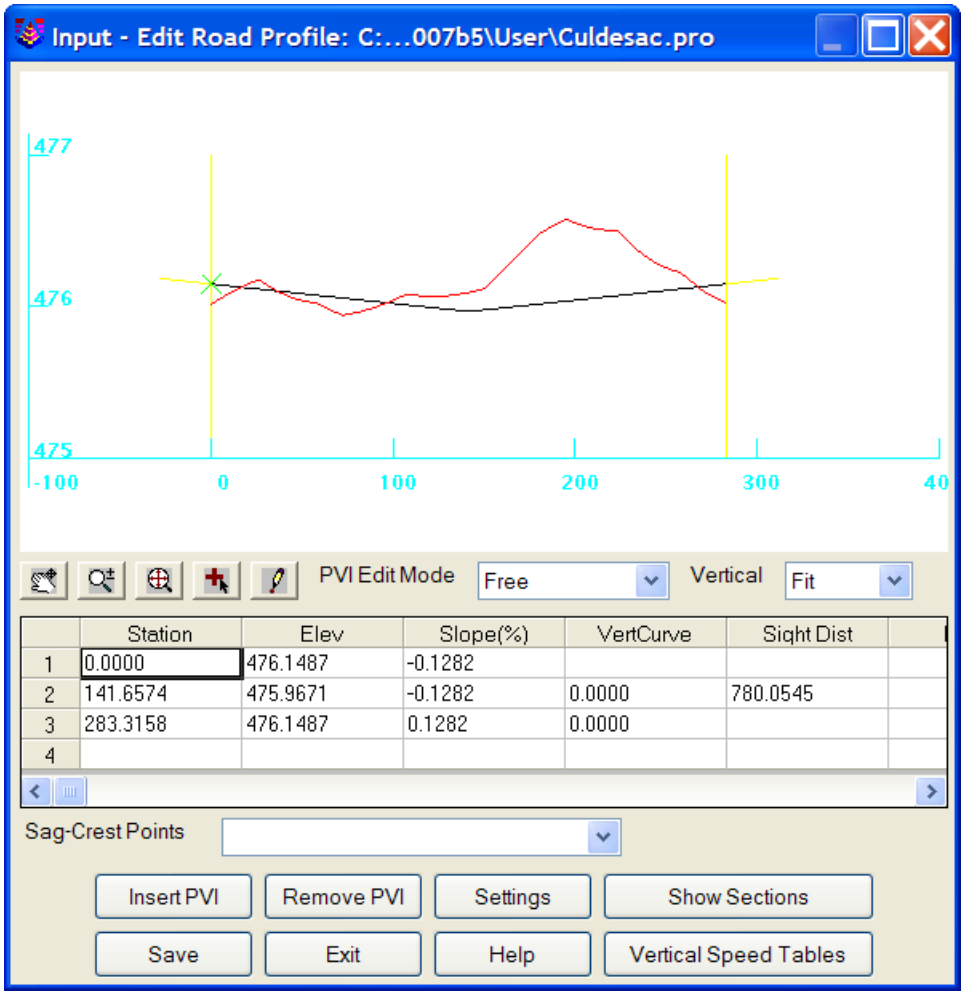
One of the very exciting features of Carlson Civil is the use of Roadway Networks. These are sets of centerlines that are aware of each other and clean up at intersections, horizontally and vertically.



Cul-de-Sacs

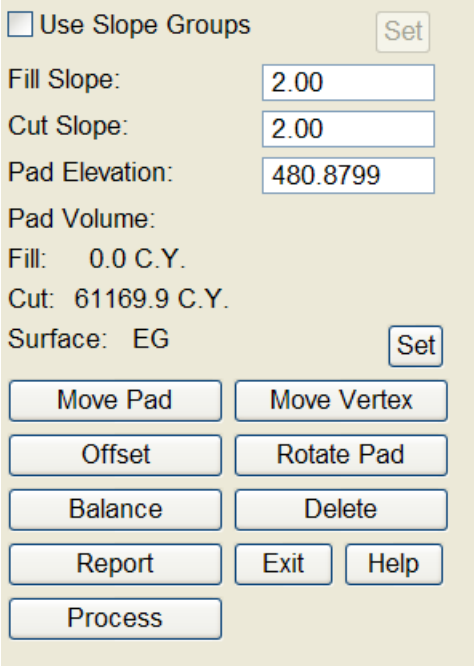
Cul-de-sacs are handled elegantly with the Road Network. Cul-de-sacs can be easily added to any roadway, and designed at a very detailed level, including a profile for the circumference.


Edit Cul-de-Sac
Road Main: 0+00.000 to 2+83.315
Input Data
Cul-de-Sac Centerline Position
Start
End
Center Station
283.315
Delta
0.000
Cul-de-Sac Radius
45.000
Fillet Radius
25.000
Offset
0.000
Tear Drop Mode
Setback
0.000
Template ID
PAVE
Profile Transition VC
0.000
Edit Profile
Reset
Output Files
Centerline
NONE
Profile
NONE
Existing Section File
NONE
Final Section File
NONE
OK
Cancel
Help



Grading

Carlson Civil does grading through the use of a Pad Template, which is essentially the equivalent of an LDT Grading Object. Pad Templates provide some significant improvements, however, such as the ability to have a separate surface for the area inside the “pad”, which moves horizontally and vertically with edits to the pad, and the ability to use a template for the side slopes, so they can project complex grading designs.



LandXML data transfer

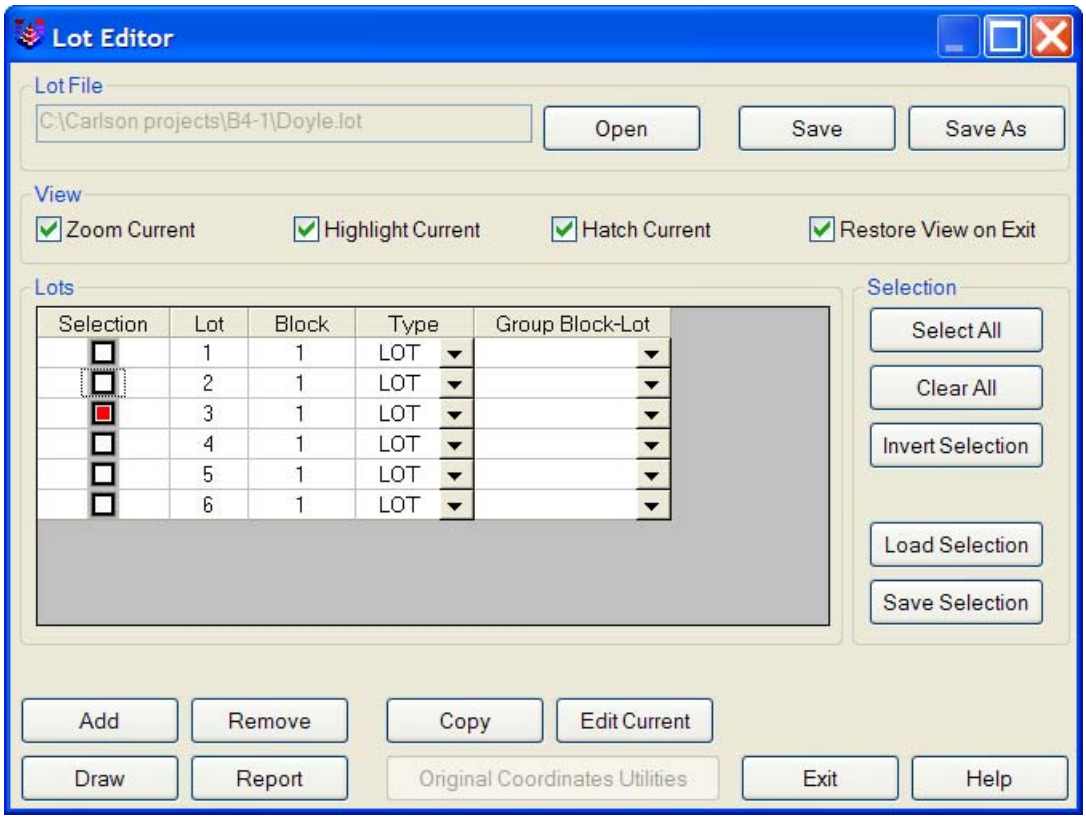
Transfer of data between LDT and Carlson Civil can be accomplished in several ways, depending on the type of data in question, but the best overall method is the use of LandXML files.

Pipes

Pipe Profiles can be entered or designed on a profile grid using the Design Sewer/Pipe Profile command. Alternatively, Pipe Profiles can be created and edited in the Input-Edit Profile dialog, and then drafted in the drawing. In Hydrology, Pipe Networks can be created, which are dynamic and “intelligent”, and so automatically respond to design changes.

Lots

Carlson Civil includes a set of tools for lot layout and lot design. Defined lots can be stored in a lot file (.lot). Another way to define a set of Lots automatically is with the Lot by Enclosed Text command, which searches for closed areas with enclosed text, and creates lots out of them, using the enclosed text for the lot name/number. Defined Lots can be accessed and edited through the Lot Editor.



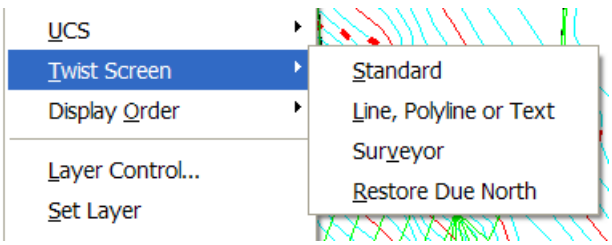
Text Height

In LDT, as part of drawing setup, a set of text styles is created based on information contained in a file with a .STP file extension, most commonly used is the LEROY.STP. These text styles all have fixed heights assigned to them, based on the current horizontal scale set in the drawing. If the horizontal scale is changed, the heights of the text styles are all changed.

In Carlson Civil, each of the various commands that involve annotation set the text style to be used and the desired height for the text, using a "scaler", which is multiplied by the current drawing scale. The AutoCAD text style should be set with a height of zero.

North Rotation

Carlson Civil does not support the concept of a secondary UCS to define and store North, as is done with LDT North Rotation. Instead, Carlson Civil relies on the use of DVIEW Twist to reorient North, and contains a thorough set of tools to work with that command.



Drawing Cleanup

If you're not running Carlson Civil on top of Map, or even if you are, Carlson Civil includes an awesome Drawing Cleanup function to find and resolve a wide range of common drawing problems.