CHAPTER 8
Cross-Sections and Volumes

INTRODUCTION
This chapter is the last one that discusses Civil 3D roadway design basics. Chapters 5, 6, and 7 covered creating the horizontal alignment, profiles, and corridor. This chapter covers creating cross-sections that document the design. Cross-sections document the roadway assembly and the existing ground to the alignment’s right and left.

OBJECTIVES
This chapter focuses on the following topics:
- Roadway Cross-Section Settings
- Sample Line Groups
- Roadway Volumes Review
- Importing Cross-Sections
- Annotating Design Results
- Creating Section Sheets
- Creating Plan and Profile Sheets
- Assigning Pay Items
- Creating Pay Item Reports

OVERVIEW
The design itself is not necessarily the design process’s end. While a design solves engineering issues, it must be reviewed, documented, and have calculated volumes (see Figure 8.1). The alignment and profile view documents the design’s horizontal and side views. The last view, cross-sections, completes the design documentation. This view looks from the design’s starting station toward the highest station with an offset from left to right of the centerline. A left offset is always a negative value, and a right offset is always a positive value.
Offset’s overall left-to-right distance is known as swath width, and it is wider than the Right-of-Way (ROW). ROW distances may vary along a road’s path, but the swath width stays the same. Swath width distance is an office standard or mandated value.

Civil 3D samples a corridor with sample line group. A corridor can have any number of sample line groups documenting a corridor. By applying different styles and sampling different data, each group produces completely different-looking sections. If you add new data to a corridor—for example, a pipe network—the sample lines need to be resampled.

After you create sample lines, next you will create section views. To create section views, you use one of three methods: individual, as a page(s), or all sections. A section view is a grid with basic annotation. Much like profile views, a section view can have bands. Even though it defines annotation for all grid axes and extra band annotation, it is the Section View style’s Display settings that control what is visible.

The process of creating a section view draws the grid, its annotation, and its sections (existing ground and the corridor). Other sampled sections may not be displayed, but are used for material and earthwork volumes (corridor shapes and Datum).

Section annotation comes from two different style groups: Section and General’s Multipurpose. The section styles annotate a sampled surface’s offsets and elevations, grade breaks, etc. These label types are not frequently used in section views. General’s Multipurpose styles use the corridor as their label data: grades/slopes; offsets; and elevations from the roadway assembly points, links, and shapes. These styles are the typical sections view labels.

Unit 1

Section’s settings and styles are the first unit’s focus. There are three style types that affect sections: sample lines, section views, and sections. Each type has its own Edit Feature Settings that contain values for each object type. These styles control layer names, sampling, annotation (spot and grade), and page layout.
Unit 2
The second unit’s focus is a sample line group and its sections.

Unit 3
After sampling the corridor, the section commands create views that contain sampled sections. Unit 3 covers importing sections and their annotation. This unit also discusses section view properties.

Unit 4
Unit 4 reviews General’s Multipurpose styles and what they annotate within a section view.

Unit 5
This unit focuses on earthwork calculations, material estimates for quantity takeoffs, and pay items.

UNIT 1: CROSS-SECTION SETTINGS AND STYLES

There are myriad settings and styles for sections and section views. Of the styles, section and section view styles are the most complex.

EDIT DRAWING SETTINGS
The Edit Drawing Settings dialog box affects basic object layers and their initial values (see Figure 8.2). If a project contains more than one section sample line group, it is best to assign either a prefix or suffix to the base object layer name. This places sample lines, sections, and section views on their own layer.

FIGURE 8.2
EDIT FEATURE SETTINGS
Each object type’s Edit Feature Settings dialog box assigns initial values to sample line, section view, and section elements. These values affect styles and commands that are lower in their respective branches.

Sample Line
Sample Line’s Edit Feature Settings dialog box includes assigning object and label styles and defining their naming convention (see Figure 8.3).

![Edit Feature Settings - Sample Line](image)

FIGURE 8.3

Section View
Section View’s Edit Feature Settings dialog box sets section view object styles, label styles, plotting styles, and the default Add Labels command styles (see Figure 8.4). The settings also assign the initial band style and label placement. Whether working with band or label sets, their names are an alias for a collection of styles.

A Section Label Set defines what section labels appear in the section view. Group Plot Style defines how to organize the sections in a drawing. The last step is defining the section view naming convention.
SECTION

Section’s Edit Feature Settings dialog box defines initial styles for a section and their naming convention (see Figure 8.5).
OBJECT STYLES
Each sample line, section, or section view has an object style. The style defines its shape and component layer names and display properties.

Sample Line
Sample line object styles assign layers and their properties to the sample line object (see Figure 8.6).

SECTION VIEW
Section view object styles assign grid properties, title, basic annotation, and layers and their properties.

Graph Panel
This panel controls section’s vertical exaggeration. Traditionally, a vertical scale is a 10:1 ratio (horizontal scale/vertical).

Grid
Grid defines its clipping parameters, station padding, and axes offset. Clipping removes one or both grids above their line work. Padding places one or more grid lines around the sections, and axes offset pushes the axes outward from the grid (see Figure 8.7).
Title Annotation

Title Annotation’s left side defines a section view’s title, size, location, text style, justification, and if it has a border. Title Annotation’s right side defines axes titles, their content, and properties. See Figure 8.8.
Horizontal Axes
Horizontal Axes defines a section view’s major and minor stationing annotation (see Figure 8.9). A section view has vertical lines that demark and annotate horizontal section offsets. The panel’s left side defines the major offset distance and its annotation for a grid’s top and bottom. The panel’s right side defines minor station interval and its annotation. Major and minor settings are for size, text style, height, and other properties. The text icons display the Text Component Editor, thus giving access to the offset label’s format (precision, sign, and so on).

![Section View Style - Road Section](image)

**FIGURE 8.9**

Vertical Axes
Vertical Axes defines a section view’s elevation annotation. A Section view has horizontal lines that demark and annotate elevations. This panel’s controls are similar to those on the Horizontal Axes panel, except they affect the annotation of a view’s elevations.

Display
Even though a view style has tick, label, and title definitions for each axis, the Display panel settings control what the style actually displays.

SECTION
A section style assigns the component’s layer names and properties (see Figure 8.10).
LABEL STYLES
Civil 3D has label styles for sample lines, section views, and sections.

Sample Lines
A sample line label style defines the sample line, its look, and any notations (generally a station value) (see Figure 8.11).
**Section View Band Set**

Section views can have station annotation as a band above or below the grid (see Figure 8.12). A band set is an alias that includes several individual styles. By changing a section’s band set, a section view’s annotation may radically change.

In a section’s Properties dialog box, users can modify the section’s assigned label styles. This is done by clicking the Band Type drop-list arrow, selecting the desired style, and adding it to the styles list.

If the section view has band sets above and below, assign them in a band set. When you are creating a section view, the assignment of above and below band sets is not recognized. The alternative is assigning the band sets to individual section views in a drawing.

![Section View Band Set - Offsets Only](image)

**FIGURE 8.12**

**Band Set Styles**

A band set style’s Band Details panel defines the title and it properties: text style, height, location, etc. (see Figure 8.13).

The panel’s right side defines each label type listed at the dialog box’s center. To view, create, or modify a label’s values, from the list label type, select a type and click the Compose Label … button. The Label Style Composer displays a selected label’s definition (see Figure 8.14).

The panel’s upper right defines if the label has any ticks and, if it does, their size.

Even though the Display panel contains all possible label components and ticks, the Display panel settings determine what is actually displayed.
Section Data
These styles have six possible functions: major and minor increment, centerline, sample line vertices, grade breaks, and incremental distance. The properties used by these labels include distance from centerline, offset from centerline, and elevations from Section1 (generally Existing) or Section2 (proposed). The style types include major station offset, EG elevation, and FG elevations.

Section Segment
These styles annotate section segment lengths, slopes, elevations, offset sides, etc.

Section View — Spot Label Styles
These styles label selected points within a section view. The Add Labels dialog box lists these styles and places them in a drawing, and are discussed in Unit 4 of this chapter.

Section Label Styles
Section label styles annotate section offset and elevation, grade break elevations, and segment values (length, grade, etc.). These styles are not roadway section annotation. Corridor section annotation comes from the Multipurpose code set styles. These are a part of the Unit 4 discussion of section annotation.

Section Label Sets
A section label set is an alias for a collection of several individual styles (see Figure 8.15). Changing the section label style’s list may completely change a section’s annotation.

Label sets use a combination of the following label type styles: Major and Minor Offsets, Grade Breaks, and Segments.

FIGURE 8.15

Major and Minor Offsets
Major and Minor Offset styles label a section’s offset and elevation at a major and minor increment.
Grade Break
Grade Break styles label a grade break’s offset, grade, and length.

Segment
Segment styles label a section’s segment length and grade.

COMMAND SETTINGS
Sample lines, section view, and sections commands contain critical values that determine swath widths, section spacing, and default ranges, default styles, etc.

Create Sample Lines
The Ribbon’s Home tab, Profile & Section View panel’s, Sample Lines command settings affect how the corridor is sampled (see Figure 8.16). The Default Swath Widths section defines a sample line’s maximum left and right offset. The Sampling Increments section defines if the sampling is incremental, and, if incremental, the sampling interval for tangents, curves, and spirals segments. Additional Sample Controls section settings determine which additional sample lines to create: beginning and ending alignment stations, horizontal geometry points, and critical superelevation stations.

The Miscellaneous section Lock to Station setting, when true, tells the sample lines to update if the alignment changes.

After creating a sample line group, Prospector displays all sample line data under the alignment. This list includes the surface names, corridors, and pipe networks that are a part of the section’s data.
Section View — Create Section View

Create Section View or Create Multiple Section View command settings are the same (see Figure 8.17). The Default Styles section assigns section view, band sets, section labels styles, section view group plot, and default Add Labels styles. The Default Name Format section defines the section views naming convention.

![Create Section View command settings](image)

**FIGURE 8.17**

**SUMMARY**

- The section view is the most complex Civil 3D object.
- A section samples surface, corridor stations, and/or pipe networks along an alignment’s path.
- If you are designing pipe networks, it is best to design them before you create sample lines.
- A section view is a grid with sections within it.
- A section view has annotation on all four axes, plus it has bands that appear at its top and bottom.
- When you create a section view, the command assigns the section label styles and/or sets.

**UNIT 2: CREATE SAMPLE LINES**

Sample lines are the link between a corridor and a section view and its sections. It is easiest to first define all corridor content before you create sample lines. For example, if you are creating sample lines and then you add a piping network, the sample line group must be resampled with the pipe network data.
CREATE SAMPLE LINES
The process starts by identifying which roadway elements to sample (see Figure 8.18). The Create Sample Line Group dialog box reports the sample line group name format (upper left), the current sample line style, label style, and layer (upper right), and the alignment in the middle left.

The dialog box’s lower half lists all elements available for sampling along the named alignment. There are four types of section data: surface(s), corridors, corridor surface(s), and pipe network(s). Each data type has a unique icon. The dialog box identifies each potential data source, if sampled, and uses the style, layer, and updating mode listed to the source’s right. At this point, it is best to set the styles for each data type.

After you identify sample elements and click OK, the Sample Line Tools toolbar is displayed. The Sample Line Tools toolbar creates sample lines, views their content, and deletes individual sample lines (see Figure 8.19). Users can define sample lines by stations, by selecting drawing points, by selecting existing polylines, by a station range, or from the corridor sections. When you define sample lines, you can use a combination of sampling methods (for example, by station range and by selecting points along the centerline of the corridor). After you create sample lines, the toolbar reverts to defining sample lines by stations.

At the toolbar’s center is the current sample line group (SLG), at its lower left is the current definition method, and at the lower right is the current alignment. Creating sample line methods are in an icon stack on the toolbar’s middle right.

The toolbar has editing tools and tools to delete existing groups, create new groups, and review a sample line’s values.
The By Station method uses a station jig to identify a station and then prompts for the left and right swath width. When you use By range of stations ... or From corridor stations, the methods display the Create Sample Lines – By Station Range dialog box (see Figure 8.20). This dialog box sets right and left swath width and the sampling increments.

If you are creating sample lines where existing sample lines are duplicated, a warning dialog box opens and has options to resolve the sample line duplication (see Figure 8.21). You can resolve duplicates by adding them as new, overwriting old sample line data, or ignoring new sample line data. You can also use the duplicates to append to the current sample line group or you can delete the existing list and replace it with the duplicate data.
The Sample Line Tools toolbar has a cell-based viewer that displays a section’s properties (see Figure 8.22). To view a section’s Sample Line properties editor, click the Select/Edit Sample Line icon, and select a sample line. At the Editor’s bottom are buttons that display the section’s previous or next vertex’s information (Center, Left 1, and Right 1).
EDITING AND REVIEWING SAMPLE LINES
Reviewing and editing sample lines occurs in the Sample Line Tools toolbar. The toolbar’s SampleLine Entity view icon displays the Edit Sample Line dialog box. The Ribbon’s Modify, Section panel’s Edit Sample lines command displays the Sample Line Tools toolbar and presents the Edit Sample Line dialog box.

SAMPLE LINE GROUP PROPERTIES
Each Sample Line Group has a multi-tabbed Properties dialog box. The Information tab sets the group’s name. The Sections tab lists all sample lines, and Edit Group Labels modifies the sample line group’s labeling. The Sections tab lists the sampled corridor components. The panel lists the objects sampled when creating the sample lines (see Figure 8.23). If you want to calculate quantities, this list must include surfaces and/or a corridor for the material lists defined in the Material List tab. Material lists are the focus of this chapter’s Unit 5. Clicking the Sample more sources … button displays the Section Sources dialog box (see Figure 8.24). Section Sources adds and removes components from section sampling. After you change the components list and click OK, Section Sources resamples the sections.

The Section Views tab lists all sections that are using the sample line group’s data. As mentioned before, the Material List tab contains the definitions for quantities.

FIGURE 8.23
The Sample Line Properties dialog box's tabs lists data (name, alignment, number, and station), sampled components, and views using the section's data (see Figures 8.25 and 8.26). In Prospector's Preview, select a sample line and press the right mouse button to display a shortcut menu with a Properties … pick. The menu also includes zooming to and deleting the selected sample line (see Figure 8.27).
FIGURE 8.26

FIGURE 8.27
SUMMARY

- Sample lines sample what exists along an alignment.
- It is best to have all data present before you create the sample lines.
- If you add data to a corridor, you must resample the sample lines.
- Define sample lines first by station range, by corridor sections, by selecting multiple points, by existing polylines, and by points, and then specify their left and right offsets.
- Sample line’s properties list individual section vertices, the sample line’s station, and what section views use its data.
- A sample line lists its sections and their styles.
- Corridor sections use styles from the General, Multipurpose style list.

UNIT 3: CREATING ROAD SECTIONS

The last step in documenting a roadway design is to create the section views. Commands import sections one at a time, all at once (as an array), or as organized section pages.

Section views contain section offset and elevation data. Sections contain within them all of their data and can be relocated anywhere in the drawing without affecting their data. To create section sheets, you must take care when planning and experimenting with settings that affect their creation.

Civil 3D has two section view creation methods. The first is creating the views in a drawing’s model space. All that is needed is to create a border for the sections and plot them. The second method publishes the section views to model space, but uses a layout to create each page of sections. This process takes two steps; first plotting the sections to the drawing’s model space and then using a Create Section Sheets command. The section sheets are layouts in the current drawing. If you are creating several sheets, you may want to create them is a drawing that is only for cross-sections.

CREATE SECTION VIEW

Create Section View displays the Create Section View wizard. The General panel sets the alignment, section and its station, sample line group, the section view name, the section view style, and its layer (see Figure 8.28).
The Offset Range panel sets the sampled offset or a user-specified value for the section view.

The Elevation Range panel sets the sampled elevation range or a user-specified range for the section view.

Section Display Options list the section’s components with drafting, styles, and labeling options (see Figure 8.29). You may have to change settings that do not carryover from previous commands.
Data Bands assigns the data band type and its location (see Figure 8.30).

Section View Tables assign tables associated with material lists. This will be the focus for this chapter’s Unit 5.

**FIGURE 8.30**

**CREATE MULTIPLE VIEWS**
Create Multiple Views uses the same interface as Create Section View, but has changes to the first panel. These changes include the station range and assigning a group plotting style (see Figure 8.31).

**FIGURE 8.31**
GROUP PLOT STYLES

When plotting more than one section, a group plotting is necessary. A group plot's styles define section view sheets or arrays.

Plot by Page
A page style defines a sheet for sections.

Array Panel
Array defines the section’s distribution (rows or columns), number of sections (per row/column), and the rows/columns spacing between the sections (see Figure 8.32). The spacing distance (on the left) is the number of grid lines between views. A sheet style defines the grid size.

The panel’s lower left sets the array’s beginning point (such as the Lower Left corner), section justification (Centerline), and if section cells are Uniform Per Row, Column (variable width), or All (same width for all). Uniform per row or column means the sections in the column or row have the same number of horizontal or vertical cells. Uniform for all means all sections have the same number of horizontal and vertical cells based upon the page’s widest and tallest section.

![Group Plot Style - Plot By Page](image)

FIGURE 8.32

Plot Area Panel
Plot Area defines the major and minor grid spacing for the page (see Figure 8.33).
SHEET SIZE STYLE
A sheet size style sets a section sheet’s plotting area (see Figure 8.34). The sheet sizes and margins should reflect the plotter’s specifications.

The margins define space around the sheet’s edge, thus allowing a border to be anywhere on the sheet. The panel’s left side defines a horizontal and vertical spacing grid for the sheet’s printable area. The grid acts as a section location “snap.” Group plot styles use these values to determine a section’s horizontal and vertical spacing location.

When you are setting a sheet size and the page layout is set to Default (Model), the model space page setup must be set to the same sheet size. For example, if you set the sheet size to D (24 × 36), make sure the model space tab plot setup is for a D size sheet. The same is true if using Default (Layout). The paper space layout must match the size that existed prior to creating the section views.
Plot All

Plot All plots all sections in an array defined by the Array tab’s settings (see Figure 8.35).
SECTION VIEW BAND SET
When you create section views, a traditional section band labels only offsets. A Section View Band set may also include EG (existing) and FG (top of corridor) surface elevations. If you are using surface elevations, they must be assigned in the Create Section View or Create Multiple Section View commands. The Data Bands panel makes the assignments (see Figure 8.30).

ERASING EXISTING SECTION VIEWS
If you are erasing and you want to re-create the existing section views, the sample line group must be resampled. Resampling is a Section Line Groups’ property. A better strategy is to save the drawing, import the sections and if not correct, undo the section import.

CREATE SECTION SHEETS
To create section sheets you must first create section views using the plot all section view style. After creating the section views, you run the Create Section Sheets command. The sections are layouts defined from an external template file. The template file contains the border for a section sheet. The process is similar to creating plan, profile, or plan and profile sheets from a view frame group. The view frame group defines the scale and border used to create each layout. You must set the annotation scale to the scale of the final section sheets.

After creating the section views, you use from the Output tab, Plan Production panel, the Create Section Sheets command. When starting the command, the routine scans the drawing for sections and displays all possible sections to plot. See Figure 8.36.

The sheet set numbering can be set to integrate into an existing sheet set or the section sheets can be their own sheet set. The sheet set can be located anywhere you have access.

FIGURE 8.36
SUMMARY

- Create Multiple Section Views imports section views and sections in an array or page format.
- When you create sections using a sheet size, the page setup for model or paper space must be set to the specified sheet style's size.
- The Create Section View command creates one section view at a time.
- Section View Properties' Sections panel assigns, removes, or changes a section's label styles.

UNIT 4: MULTIPURPOSE CODE STYLES

Section view and section label styles focus annotation on surfaces. Corridor assembly annotation comes from General's Multipurpose Style, Code sets and their styles. The code styles reference subassembly points, links, and shape properties for their label data. Even though an assembly has more than one curb, there is only one code for back-of-curb, flange, and so on. Code set label style assignments create labels for all code occurrences.

CODE SET STYLES

Code Set Style – All Codes has all possible point, link, and shape assembly codes (see Figure 8.37). Each entry has a description, style, label style, and render material. The Style columns define how the subassembly's points, links, and shapes are displayed. The Label Style column assigns each entry a label style. If you assign a label style to an entry, the label appears in the drawing.
CODE LABEL STYLE

Code label styles affect point, link, or shape objects. The style’s Layout panel focuses on the object type and its properties.

Marker Label Styles

Marker label styles annotate a subassembly’s point code offset and elevation of (see Figure 8.38).

Link Label Styles

Link label style annotates a subassembly’s link slope or grade (see Figure 8.39).
Shape Label Styles
Shape label style annotates a subassembly’s shape (see Figure 8.40).

**PROJECTING OBJECTS TO SECTION VIEWS**
See the discussion on projecting objects to profile and section views in this textbook’s Chapter 6, Unit 5.

**SUMMARY**
- Section view and section styles do not label the corridor components.
- Code set styles label assembly markers, links, and shapes.
- Adding a label to the code set updates sections using the set.

**UNIT 5: QUANTITY TAKEOFFS AND REPORTS**
This last unit covers calculating corridor and subassemblies quantities: earthworks and materials. A volume surface or a quick comparison of the Existing Ground and Rosewood – Datum calculates roadway earthwork volumes. However, a third calculation method creates section material lists for formatted earthwork and materials volume reports.

Before you calculate a volume, you must define the takeoff criteria. This is done in the Settings, Takeoff Criteria branch. There can be multiple material lists for earthwork or material volumes.

Section volumes use one of three calculation methods; Average End, Prismoidal, and Composite. The Average End method is best when each succeeding section is
similar in shape. Prismodial is best when succeeding sections have more terrain change. Both methods have better volume results when the sample lines are more frequent. The last method, Composite, is best in complex terrain situations. The reason for this is the method uses actual surface data, not sectional changes. This method can only be used for earthworks or cut and fill volume calculations and not material volumes.

Also important to section volume calculations are gaps. A gap is where the volume calculation does not apply, for example, a bridge. There are no earthwork volumes in the sections representing the bridge. Therefore, the bridge is a gap in the volume calculation. The Sample Line Group Properties’ Material list panel manages the gap lists for each volume entry, including material volumes (pavement, sidewalk, granular, etc.).

**MATERIALS**
When calculating subassembly material volumes, the focus is on subassembly shapes (Pave1, Pave2, Subbase, Base, Curb, etc.) (see Figure 8.41).

![Sample Line Group Properties](image)

**FIGURE 8.41**

**EARTHWORKS**
Earthworks is a quantity takeoff criteria and is a comparison of two surfaces’ elevation differences: a base and comparison surface. Civil 3D uses this information, first, to hatch cut and fill areas (see Figure 8.42) and second, to calculate volumes. Reading the cut and fill criteria definition may be confusing. The above and below is not a position reference, but rather is an area reference, that is, the area below EG and the area above Datum define the cut area.
CUT AND FILL
Cut and fill defines respective areas for each section, and this data is used for hatching these areas in roadway sections.

QUANTITY TAKEOFF
After defining criteria sets, you next assign corridor components to the criteria values. There are two places to define the material list: Sample Group Properties and from the Ribbon’s Modify, Sample Line panel, Compute Materials command. When you use Sample Line’s command, a Select a Sample Line Group dialog box opens. After setting the correct alignment and sample line group, when you click OK, the Compute Materials dialog box opens (see Figure 8.43). This dialog box defines one material list at a time. Sample Group Properties defines any number of material lists.
When defining the material list in Sample Line Group Properties dialog box, you add new criteria and its materials here. At the dialog box’s lower right, clicking Import another criteria opens a Select Quantity Takeoff Criteria dialog box to set the new criteria (see Figure 8.44). After you select the Criteria, the Compute Materials dialog box opens (see Figure 8.45). Compute Materials sets the initial material list and its assigned components. The list is set and cannot be modified until you click OK and add the new material list to the Compute Materials dialog box. Once added, at Compute Materials' top left, click Add new material to add a material. The new material must be renamed and assigned a corridor component. You add a component at the dialog box's top center. If this is a surface assignment, change the Data type to Surface, and from the Select surface drop-list, select the new surface and click the plus sign, (+). If it is a Corridor Shape, change the Data type to Corridor Shape, and from the Select corridor shape drop-list, select the appropriate corridor shape (see Figure 8.46).

**FIGURE 8.44**
QUANTITY REPORTS
After defining material lists, next you create a report. The most important step in the report process is having a correctly defined material list.

MASS HAUL DIAGRAM
A mass haul diagram is a chart that diagrams the status of cut/fill materials and a design’s overall balance. A mass haul diagram has free haulage parameters (from points of balance) and borrow and dump parameters. Borrow adds available fill material and Dump subtracts from the fill material.

PAY ITEM REPORTS
Objects with pay item assignments are available for reports using the item’s values. There are two types of pay item reports; summary and detailed. A summary report lists the pay item ID, its description, total quantity, and unit of measure for each pay item. A detailed report contains a line of information for each selected object.

- A pay item report’s scope is a drawing, sheet, or selected objects.
- A summary report does not calculate values for corridor codes.
- A detailed (itemized) report calculates Corridor codes assignments.
- If the pay item relates to an alignment, the report can be limited by alignment station values.

SECTION REPORTS
The Section Reports create reports for subassembly points, links, and surfaces. The Feature Line Reports creates a report for each selected corridor feature line, for example the datum feature line for each subassembly.

The Slope Stake Report also focuses on assembly links. The report lists point codes, offsets, elevations, grades, and cut and fill slopes. See Figure 8.47.

FIGURE 8.47
SUMMARY

- Quantity takeoff criteria define the base and comparison surfaces.
- Quantity takeoff criteria use assembly shapes to calculate material volumes.
- A materials list links a quantity takeoff criteria entry subassembly shape or surface.
- Materials list are the basis of volume-calculation tables and reports.

This ends the section view and section chapter. A section is the roadway design cross-section view. It is an important part of design evaluation and documentation.