

Edit

Edit menu includes the following menu items:

- Points
- Codes
- Point Lists
- Layers
- X-Sect Templates (when Roads are activated)
- Roads (when Roads are activated)
- Linework
- Raw Data
- Sessions (for GPS+ post processing modes only)

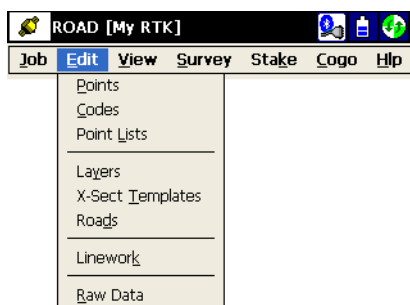


Figure 3-1. Edit Menu



TIP












To edit object properties, double-tap on the object or select the object and tap the Edit button.

Points

To edit points, tap **Edit ▶ Points**.

The *Points* screen contains the list of stored points with coordinates and codes, and a set of tools for database operation (Figure 3-2).

In the Point column, an icon displays the point type:

-  – GPS stationary (topo)
-  – offset point
-  – GPS kinematic (auto topo)
-  – RTK base
-  – TS observed
-  – control
-  – design or imported
-  – staked out
-  – TS scanned point
-  – cogo
-  – manually entered

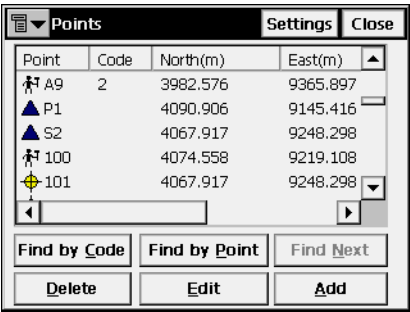


Figure 3-2. Points

- **Find by Code:** opens the *Find by Code* screen to enter a code for searching for a point.
- **Find by Point:** opens the *Find by Point* screen to enter a point name (or a part of the name) for searching.
- **Find Next:** finds next point that satisfies the same conditions as the previous found point.
- **Delete:** deletes the point from the list.

- **Edit**: opens the *Edit Point* screen to edit point parameters: name, code, coordinates and/or other parameters stored with the point.
- **Add**: creates a new point through the *Add Point* screen.
- The bitmap on the upper-left corner displays the following pop-up menu:

PTL Mode: switches on the PTL (Point-To-Line) Mode. (The screen changes its appearance on **Points (PTL)**.) For details, see “PTL Mode” on page 6-16.

- *String*: switches on the strings displaying function along with the codes.
- *Show Scan Points*: switches on the scan points displaying function.
- *Show AutoTopo Points*: switches on the AutoTopo points displaying function.
- *Help*: accesses the help files.
- **Settings**: opens the *Display* screen.

Display

The *Display* screen is used to customize the interface.

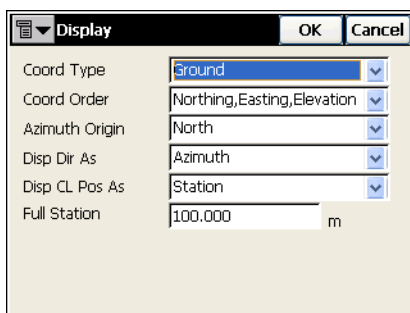


Figure 3-3. Display

- **OK**: saves the settings and returns to the *Points* screen.

For details on the screen settings, see “Display” on page 2-7.

Find by Point

The *Find by Point* screen contains settings for searching for a point by its name.

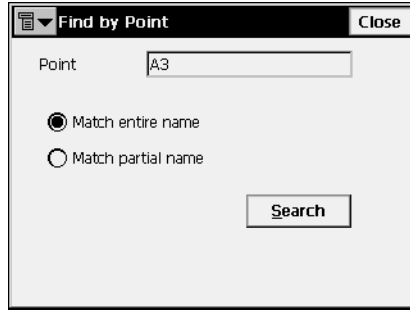


Figure 3-4. Find by Point

- *Point*: the name of a point or a part of the name.
- *Match entire name*: set if the whole name was entered in the *Point Name* field.
- *Match partial name*: set if a part of the searched name was entered in the *Point Name* field.
- **Search**: starts the search process and returns to the *Points* screen, highlighting the point found.

Find by Code

The *Find by Code* screen contains a form of searching for a point by its code.

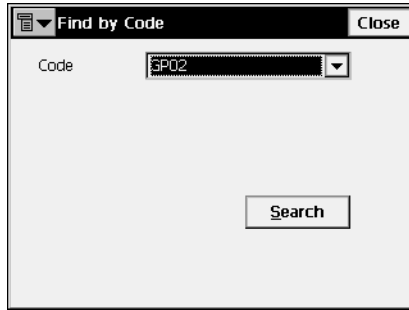


Figure 3-5. Find by Code

- *Code*: the name of the code selected from the drop-down list.
- **Search**: starts the search process and returns to the *Points* screen, highlighting the first point with the code selected.

Add (Edit) Point

The *Add (Edit) Point* screen displays the form of the point properties.

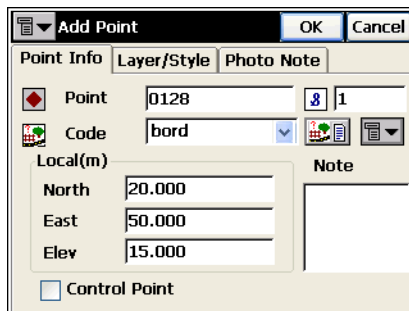




Figure 3-6. Add/Edit Point

The *Point Info* tab contains the following fields (Figure 3-6):

- *Point*: sets the name of the point.
- *Code*: sets the code for the point. Can be entered manually or chosen from the drop-down list.

-  : the *Attributes List* bitmap, opens the **Code-Attributes** screen to set values for attributes available for the code chosen (Figure 3-13 on page 3-10).
- The fields for the coordinates of the point in the current coordinate system (the field name changes with the display type).
- *Control Point*: check this field to use the point as the Control.
- *Note*: the short note for the point.
- The bitmap next to the *Attributes List* bitmap displays the following list:
 - *String*: toggles on the *String* field. Also, the  sign appears. For details, see “Topo” on page 5-24.
 - *Layer*: opens the **Select Layer** screen in which to enter the point. For details, see “Topo” on page 5-24.
 - *Note*: opens the **Note** screen. For details, see “Topo” on page 5-24.
- **OK**: saves the changes and returns to the **Points** screen. Points which have no codes, or have codes but no strings associated with the codes, are simply stored as points.

The *Layer/Style* tab contains the following fields (Figure 3-7):

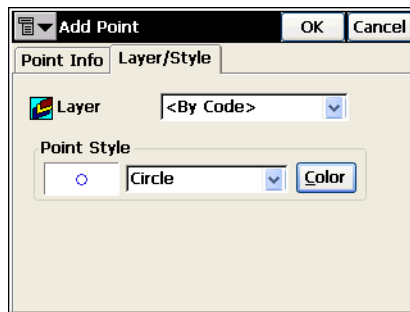


Figure 3-7. Add/Edit Point – Layer/Style Tab

- *Layer*: selects the layer to locate the point.
- *Point Style*: sets and shows the style to designate the point on the map:
 - The drop down list contains the point symbols to select.

– **Color**: opens the *Select Color* screen.

- **OK**: saves the point settings and returns to the *Points* screen.

The *Photo* tab displays a photo note—a picture of the situation at the point—if a picture has been taken and added (using the Add button).

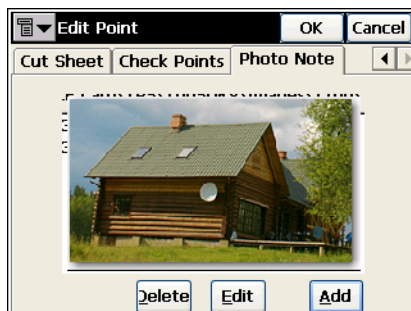


Figure 3-8. Add/Edit Point – Photo Note Tab

- **Add/Edit**: opens the *Select Image File* screen to browse for the picture.
- **Delete**: erases the picture for the point.

If the point has some duplicate points and the weighted average is used, the *Edit Point* screen will contain the *Check Points* and *Weighted Average* tabs.

The *Check Points* tab displays the coordinates of check points and the deviations from the coordinates of the original point.

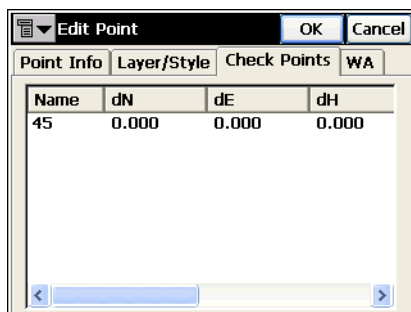


Figure 3-9. Edit Point – Check Points

The *Weighted Average* tab displays coordinate residuals of the check point.

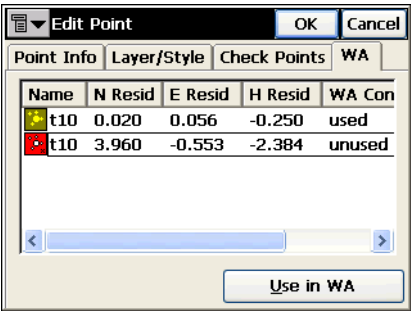


Figure 3-10. Edit Point – WA

- **Use In WA:** uses the station as a weighted average.

Select Color

The *Select Color* screen sets the color of the point mark to show on the map.

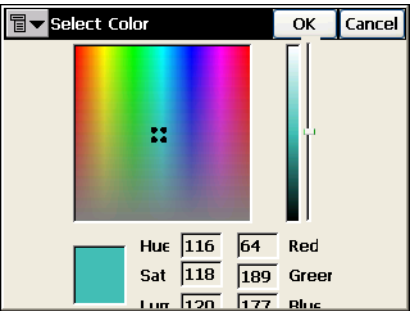


Figure 3-11. Select Color

Tap in the area of the desired color and move the slider to select the level brightness. If needed, check the color’s values.

If the PTL Mode is on, the **Add Point** screen has the *PTL* tab with the following parameters.

The screenshot shows the 'Add Point' dialog box with the 'PTL' tab selected. The 'Start Ref Pt' and 'End Ref Pt' fields are empty, each with a map selection icon and a list selection icon. The 'PTL Offsets(m)' section contains two sub-fields: 'Line' with a value of 0.000 and 'Offset' with a value of 0.000. The 'Elev' field has a value of 3.156. The dialog has 'OK' and 'Cancel' buttons at the top right.

Figure 3-12. Add Point (PTL)

- *Start Ref Pt, End Ref Pt*: the reference points. Can be selected from map, from list or entered manually.
- *PTL Offsets*: the offsets from the reference line formed by the reference points:
 - *Line*: the distance from start reference point along the reference line, where the perpendicular to this line passes through the target.
 - *Offset*: the horizontal distance from the target.
- *Elev ht*: the height of the target.
- **OK**: saves the point settings and returns to the *Points* screen.

Code-Attributes

The *Code-Attributes* screen sets attribute values for the selected code.

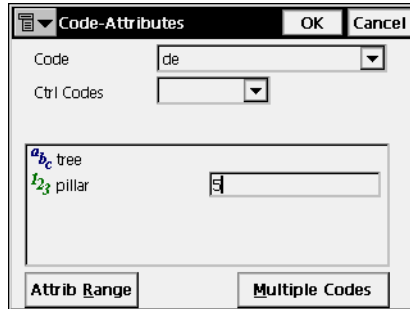


Figure 3-13. Code-Attributes

- *Code*: shows the code selected.
- *Ctrl Code*: shows the control code list. The Control Code is a special type of code that can be used by the graphic tool for the interpretation of survey results.

The supported control codes (/AS, /AE, /C, /R) control line behavior when creating arcs, closure of lines, and rectangles respectively. The /AS control code indicates the start of an arc, and the /AE control code indicates the end of the arc. Arc parameters are determined using additional points in the line.

- The lower field shows the available attributes and provides a field to enter its value.
- **OK**: saves the changes and returns to the *Add (Edit) Point* screen. The program prompts if the value is not within the range specified.
- **Attrib Range**: opens the *Attribute Ranges* screen to view the ranges for the attributes. Attributes can only be added using the *Codes - Attributes* screen.
- **Multiple Codes**: opens the *Multiple Code-Attributes* screen. Multiple codes and strings associated with a point make the point a part of numerous lines.

Multiple Code - Attributes

The *Multiple Code-Attributes* screen is used to edit multiple codes and strings.

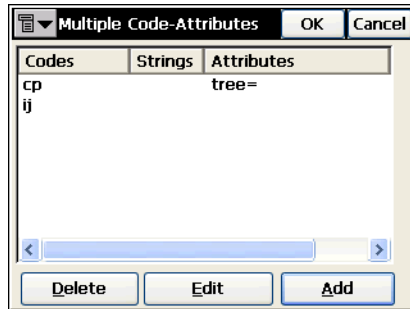


Figure 3-14. Multiple Code-Attributes

- **Delete:** deletes the code from the list.
- **Edit:** opens the *Code-Attributes* screen to edit the code.
- **Add:** creates a new code through the *Code-Attributes* screen.
- **OK:** saves the settings and returns to the *Add Point* screen.
- The bitmap on the upper-left corner displays the following pop-up menu:
 - *String:* switches on the strings display along with the codes.
 - *Show Second Ctrl Code:* switches on the field to enter another code.
 - *Help:* accesses the help files.

Codes and Attributes

To edit codes and attributes, tap **Edit ▶ Codes**.

Codes - Attributes

The *Codes - Attributes* screen contains a list of codes used for the survey, the list of attributes for each code, and a set of tools for editing the codes and attributes. Codes already in use cannot be edited or deleted.

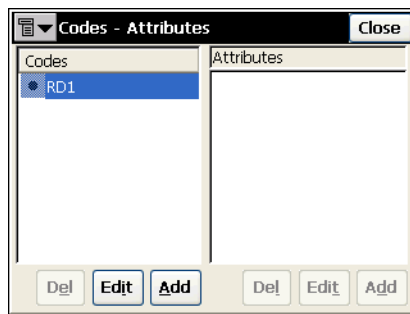


Figure 3-15. Codes – Attributes

- *Codes*: contains a list of codes.
- *Attributes*: contains a list of attributes for the selected code.
- **Del**: deletes the highlighted entry.
- **Edit**: opens the applicable *Code* or the *Attribute* screen with the properties of the highlighted entry.
- **Add**: opens the applicable blank *Code* or the *Attribute* screen. A new attribute can be added if at least one code exists and is highlighted.

The bitmap at the upper-left corner displays a pop-up menu:

- *Export To File*: opens the **To File** screen to export code library to the file format selected.
- *Help*: accesses the Help files.

Code

The *Code* screen contains the parameters of a code.

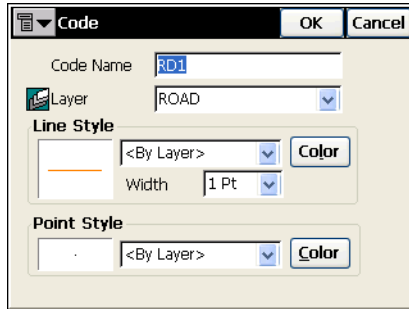


Figure 3-16. Code

- *Code Name*: the name of the code.
- *Layer*: the name of the layer in which the code resides.
- *Line Style* and *Point Style*: selects the line and point plotting attributes for the linework. The **Color** button opens the *Color* screen (see “Select Color” on page 3-8).
- **OK**: saves the changes, closes the screen, and returns to the *Codes - Attributes* screen.
- The bitmap menu in the upper right corner of the screen contains two items:
 - *Edit Layers*: opens the *Layers* screen to edit layers. For details, see “Layers” on page 3-18.
 - *Help*: accesses the help files.

Attributes

The *Attributes* screen contains the parameters of an attribute.

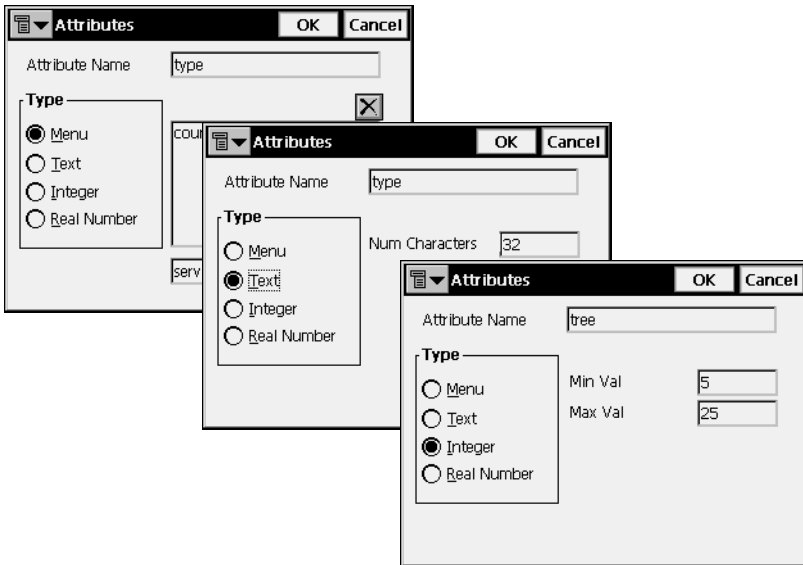



Figure 3-17. Attributes – Menu, Text, and Integer Examples

- *Attribute Name*: the name of the code attribute.
- *Type*: sets the type of the code attribute:
 - *Menu*: the attribute value can only be selected from a list of available values. The **Add** button adds admissible values entered in the *Add* entry field. The  button deletes the selected entry from the menu.
 - *Text*: the attribute value is an alpha-numeric string. Enter the number of characters available for the text value.
 - *Integer*: the attribute value is an integer. Enter the minimum and maximum values of the attribute.
 - *Real Number*: the attribute value is a real number. Enter the minimum and maximum values of the attribute.
- **OK**: saves the changes, closes the screen and returns to the *Code - Attributes* screen.

Point Lists

The Point List is a group of points that can be simultaneously processed. Point list is tightly intergrated throughout TopSURV. Depending on the context, the points may or may not be connected with a line. A Point List with its points connected forms a polyline.

To use the Point Lists, select **Edit ► Point Lists**.

List of Point Lists

The *List of Point Lists* screen contains a list of existing Point Lists on the left part of the screen, and the two windows on the right part, that present the general view of the selected list in the horizontal and vertical planes. To view the current selected point list in a larger map, double-tap one of the map plots.

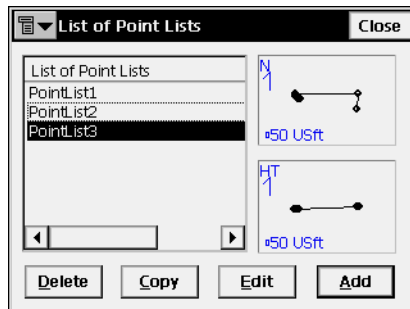


Figure 3-18. List of Point Lists

- **Delete:** press to delete the Point List from the list.
- **Copy:** press to create a copy of the selected List.
- **Edit:** opens the *Edit Point List* screen. Press to edit the properties of the selected List.
- **Add:** opens the *Add Point List* screen. Press to create a new List.
- The bitmap on the upper-left corner displays the following pop-up menu:
 - *Edit Points:* displays the *Points* screen. For details, see “Points” on page 3-2.
 - *Help:* accesses the help files.

Add/Edit Point List

The *Point List* tab displays general properties of the Point List.

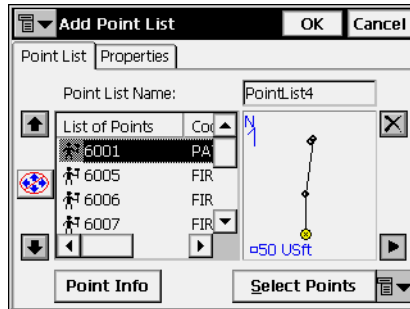





Figure 3-19. Add Point List – Point List Tab

- *Point List Name*: the name of the Point List.
- *List of Points*: the list of currently selected points. Adding the point to the list can be performed in two ways.
 - Through the map: tap the plot on the right. The large **Map** screen opens (for details on the screen icons, see Chapter 4). Select the points by tapping them on the map; the two sequentially tapped points will be connected with a line. Press **Close** to return to the **Add/Edit Point List** screen.
 - Through the Select Points button: pressing the button displays the floating menu of five items: *By Range*, *By Code*, *By CodeString*, *By Radius*, *From Map*, and *From List*. Select the desired way of adding points and enter in this way: set the range, check the codes, set the center point and the radius of the area, select the points from the map or using the list.
- **Point Info**: shows the point information of a current selected single point.
- The up and down arrows to the left of List of Points move the highlighted point up or down in the order of the points.
-  : switches on/off the keyboard arrow keys that duplicate the arrows on the screen.

-  : deletes the highlighted point from the list.
-  : closes the plot of the point list. Only the list of points table will be available.
- The bitmap on the upper-left corner displays the following pop-up menu:
 - *Edit Points*: displays the ***Points*** screen. For details see “Points” on page 3-2.
 - *Help*: accesses the help files.

The *Properties* tab shows only the *Name* field, that duplicates the *Point List Name* on the *Point List* tab.

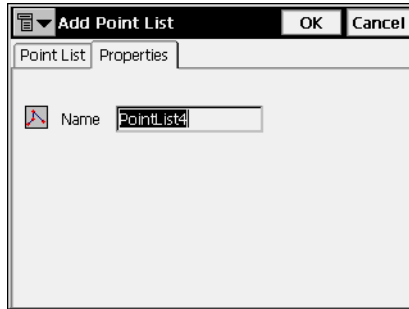


Figure 3-20. Add Point List – Properties Tab

Layers

To edit layers, tap **Edit ► Layers**.

The **Layers** screen displays the list of all layers existing in the current job and layer status.

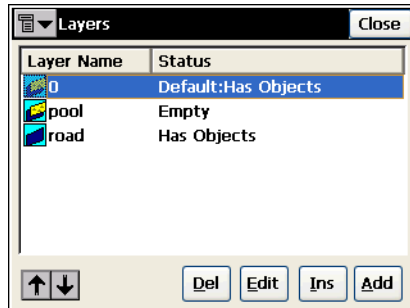



Figure 3-21. Layers

- **Layer Name**: contains a list of Layers. Each layer has an icon to show whether it is visible (📺) or hidden (📴). To turn on/off the visibility of the selected Layer, tap on the Layer Name column header.
- **Status**: shows if the layer is empty or has objects.
- **Del**: deletes the highlighted layer.
- **Edit**: opens the applicable **Edit Layer** screen with the properties of the highlighted layer.
- **Add**: opens the **Add Layer** screen to add a new layer.
- **Ins**: opens the **Add Layer** screen to insert a new layer below the selected layer.
-  : moves the highlighted layer up or down in the order of the layers.

The bitmap at the upper-left corner displays a pop-up menu of the *Help* item.

Add Layer

The *Add Layer* screen sets properties for a new layer. The *Layer* tab contains general settings.

- *Layer Name*: sets the name of the layer.
- *Visible*: hides or shows the layer objects on the map.
- *Note*: any additional information on the layer.
- **OK**: saves the settings and returns to the *Layers* screen.

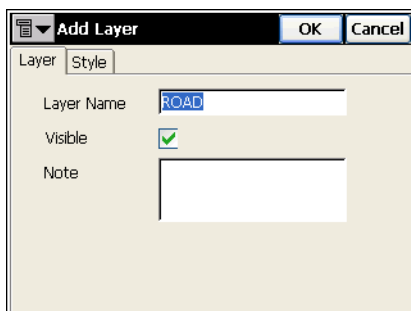


Figure 3-22. Add Layer Name

The *Style* tab sets plotting parameters for lines and points on the layer.

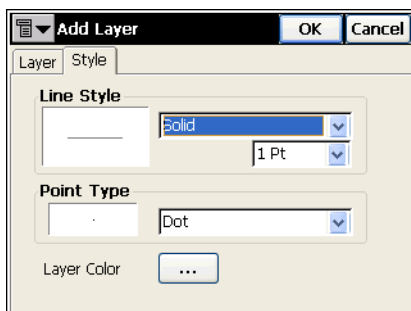


Figure 3-23. Add Layer Style

- *Line Style*: selects the shape and width of the line.
- *Point Type*: selects the shape of the point.
- *Layer Color*: the browse button opens the *Select Color* screen to set the color for the layer (see Figure 3-11 on page 3-8).

Edit Layer

To edit the selected layer, tap the **Edit** button on the *Layers* screen. The layer properties can be changed in the Layer and Style tabs (see Figure 3-22 and Figure 3-23 on page 3-19).

If the layer has objects, the *Edit Layer* screen contains the *Objects* tab that displays points and other objects of the given layer.

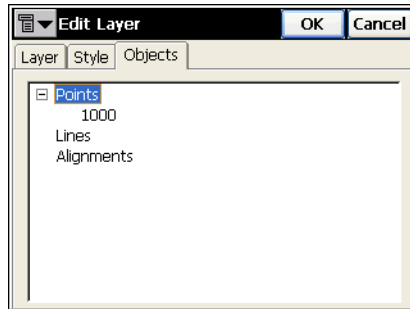


Figure 3-24. Edit Layer Objects

Edit Multiple Layers

To turn on/off the visibility of multiple layers at a time, select desired layers using the **Ctrl** or **Shift** buttons on the controller's keyboard and tap on the Layer Name column header.

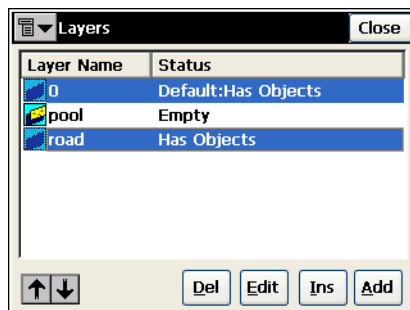


Figure 3-25. Edit Multiple Layers

X-Sect Templates

A cross section template is a template for the creation of a complex cross-section view of the road. The cross section template consists of several sets of segments, cut slope and fill slope.

The *X-Sect Templates* screen displays a list of the existing templates in the upper part of the screen and a plot of the highlighted template in the lower part.

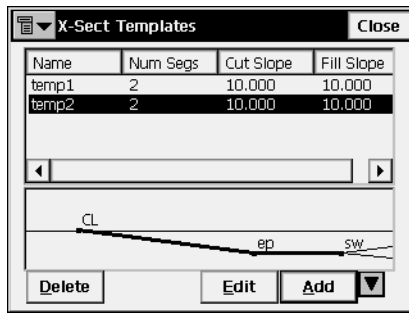



Figure 3-26. X-Sect Templates

The list contains four columns: *Name* (the name of the template), *Num Segs* (the number of segments), *Cut Slope*, and *Fill Slope* values.

- **Delete:** deletes the template from the list.
- **Edit:** opens the properties of the selected template in the *X-Sect Templates* screen.
- **Add:** opens the blank *X-Sect Templates* screen to enter the properties for a new template.
- : hides and shows the plot of the highlighted template.
- **Close:** saves the changes and returns to the main screen.

The *X-Sect Templates* screen opened for editing contains parameters of the highlighted template.

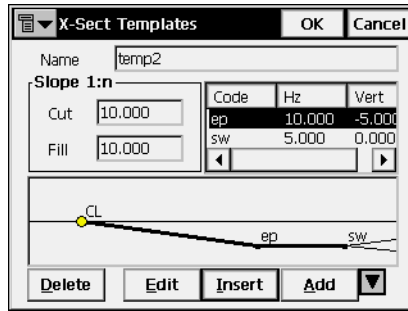



Figure 3-27. Edit X-Sect Template

- **Name:** the name of the template.
- **Slope:** the cut and fill parameter values (run values for cut and fill for a unit rise). These values represent the horizontal increment of the slope for a unit vertical increment. The cut slope is used when the road surface is below the terrain, and the fill slope is used when the road surface is above the terrain.

Also the screen contains a list of segments comprising the template and a plot of the template. A list of segments consists of three columns: *Code* (the code of the segment), *Hz* (the horizontal offset), *Vert* (the vertical offset).

- **Delete:** deletes the segment from the template.
- **Edit:** opens the *Segment* screen with the parameters of the highlighted segment.
- **Insert:** opens the blank *Segment* screen. The added segment is inserted in the list above the currently highlighted segment.
- **Add:** opens the blank *Segment* screen. The added segment will be attached after the last segment in the list.
- : hides and shows the plot of the highlighted template.
- **OK:** saves the changes and returns to the *X-Sect Templates* screen.

The **Segment** screen contains the parameters of the highlighted segment.

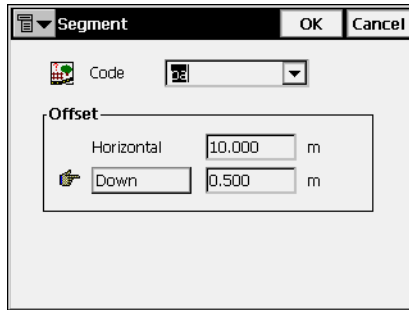


Figure 3-28. Segment

- **Code:** the code of the segment. Select the code from the drop-down list or type a new code.
- **Offset:** the horizontal and vertical offsets. Press the **Down/Up/Grade** button to select the type and value of the vertical offset. Being input as **Grade** (in %), the vertical offset will be recalculated to meters (or other selected units) after the **OK** button is pressed.



TIP

The “hand” symbol means the function is selectable.

- **OK:** saves the changes being made and closes the screen.

Roads

The road as an object can be described through the horizontal and vertical projections of the center line, called *alignments*, and the line describing the surface of the road and lying in the plane perpendicular to the center line, called a *cross section*.

The alignment can be divided into sections, each described with the help of algebraic functions. The horizontal alignment can be described through *lines*, *spirals*, *arcs* and *intersection points*. *Intersection point* is defined as the intersection of the two lines tangential to the 'incoming' and 'exiting' spirals, or to the central curve at the PC and PT points, if spirals are not specified. The vertical alignment can be described through *vertical grades* and *parabolas*, or *long sections*.

The cross section can be described using templates (see “X-Sect Templates” on page 3-21 for details).

The **Roads** screen displays a list of the created roads, and plots of the horizontal and vertical alignments for each road.

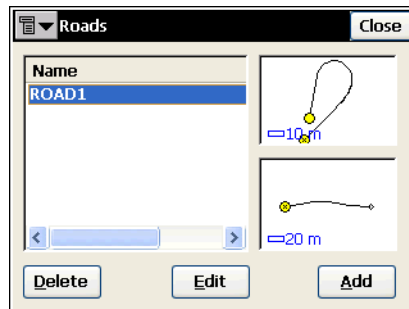


Figure 3-29. Roads

The left part of the screen displays the list of created roads. The right part shows the corresponding plots of alignments.

- **Delete:** deletes the road from the job.
- **Edit:** opens the **Edit Road** screen, displaying the parameters of the selected road.
- **Add:** opens the **Add Road** screen.

The first **Add Road** screen sets the name of the road and selects the VAL (vertical alignment) type of the created road.

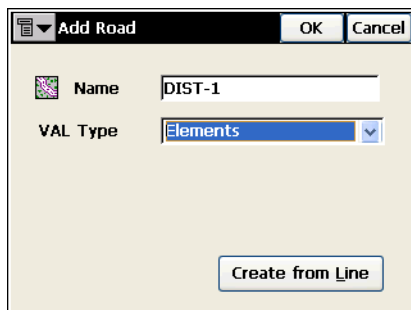


Figure 3-30. Add Road – VAL Type Selection

There are two ways of creating roads.

- **Long Section:** select Long Section to create the road by sections. The vertical alignment is presented as a set of sections between the stations where the heights are known (usually these are the extremes of the vertical alignment line), and the interval around the station where the vertical alignment line has a parabolic shape.
- **Elements:** select Element to create the road element by element, finishing wherever desired and starting again.
- **Create From Line:** opens the **Linework** screen to select a line for creating a road.
- **OK:** opens the second **Add Road** screen.


The second **Add Road** screen contains the features of the road.

Start Point

The *Start Pt* tab displays the parameters of the road's starting point.

Field	Value	Unit
Point	P110_CL	
Code	[Dropdown]	
North	4089.715	m
East	9150.744	m
Height	193.473	m
Start Sta	0+00.000	m
Sta Interval	10.000	m

Figure 3-31. Add Road – Start Point

- *Point*: the point name. Can be entered manually (if a new point name is entered, the point will be created with the coordinates entered in the *North*, *East* and *Height* fields), chosen from the map, or selected from the list.
- *Code*: the point code. Can be entered manually or chosen from the drop-down list. The code of an existing point cannot be edited.
-  : the *Attributes List* bitmap opens the *Code-Attributes* screen to set the values for the attributes available for the code chosen.
- *North*, *East*, *Height*: the local coordinates of the point.
- *Start Stn/ Start Chain*: the starting station number with distance to it, or the starting chain distance.
- *Stn Interval*: the interval between the points where the road related computations are made.

Horizontal Alignment

The *H_z* tab shows the list of horizontal alignment elements, the horizontal alignment plot and the starting station (or chainage) of each element.

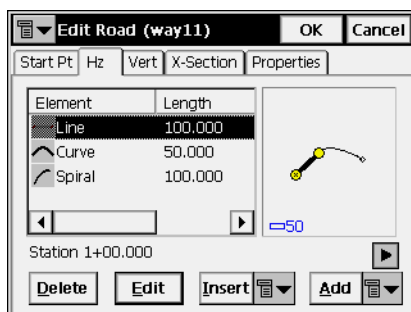


Figure 3-32. Add Road – Horizontal Alignment

The element list has the following columns:

- *Element*: the icon and the name of the element: line, spiral, curve, or intersection point.
- *Length*: the length of the element.
- *Azimuth*: the azimuth at the beginning of the element.
- *Radius*: the radius of the curve, spiral or intersection point (the radius of the spiral is the radius at the end of the 'incoming' spiral or at the beginning of the 'exiting' spiral; the radius of the intersection point is the radius of the corresponding curve).
- **Delete**: deletes the element from the road.
- **Edit**: opens a screen with properties of the selected element.
- **Insert**: displays a floating menu from which to select elements for insertion at the selected location in the list.
- **Add**: displays a floating menu from which to select elements for addition after the last element.

Select a horizontal alignment, then double-click the *Station* information under the element list to display start and final positions for the selected element (Figure 3-33 on page 3-28).

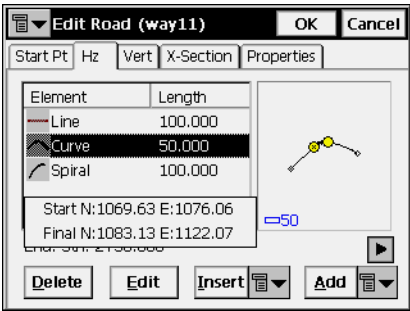


Figure 3-33. Element Information

Also the graphics interface can display information on the selected element. Double-tap in the horizontal plot area to open the greater *Map* screen for horizontal alignments.

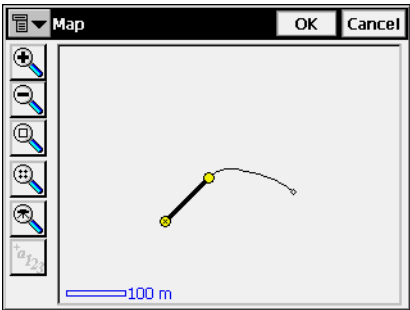


Figure 3-34. Map

Select the alignment element, then double-tap it to display information on the alignment.

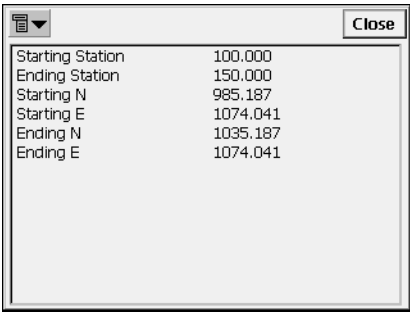


Figure 3-35. Alignment Element Information

Line

To add a line, press the **Insert** or **Add** buttons in the *Hz* tab of the **Add Road** screen and select the *Line* item from the floating menu. The *Line* screen will open.

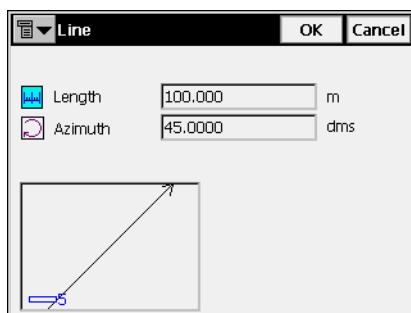


Figure 3-36. Line

The plot at the bottom-left corner will show the element's appearance.

- *Length*: the length of the line element.
- *Azimuth*: by default, the azimuth is set tangent to the previous element. This field is editable only for the starting element of the road. To change the azimuth of all other elements, the check mark from the *Tangent to Previous Item* menu on the bitmap in the upper-left corner of the screen should be removed.



NOTICE

Caution should be exercised when setting the azimuth, since road elements are usually tangential to each other.

- **OK**: saves the element to the Road and returns to the **Add Road** screen.

Curve

To add a curve, press the **Insert** or **Add** buttons in the *H_z* tab of the **Add Road** screen and select the *Curve* item from the floating menu. The **Curve** screen will open.

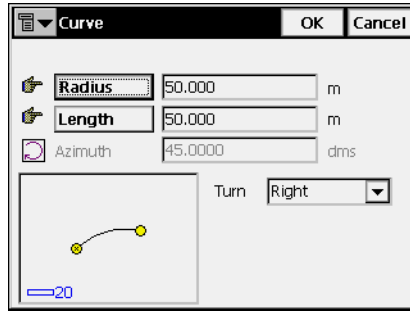


Figure 3-37. Curve

The plot in the bottom-left corner will show the element's appearance.

- *Radius/ Deg Chord/ Deg Curve*: the radius of the curve, or one of the two parameters unambiguously defining the radius: degree of chord, or degree of curve.

Using the degree of chord (DCH) or degree of curve (DCV) parameters, the radius can be calculated as follows:

$$R = \frac{50}{\sin\left(\frac{DCH}{2} \times \frac{\pi}{180}\right)}, R = \frac{100 \times 180}{\pi} \times \frac{1}{DCV}$$

- *Length/Chord/Tangent/Mid Ord/External/Delta*: the length of the curve element, or one of five parameters unambiguously defining the curve length: chord, tangent, middle ordinate (the distance from the midpoint of a chord to the midpoint of the corresponding curve), external (the distance from the midpoint of the curve to the tangent), or delta (the angle between the radii corresponding to the curve).
- *Azimuth*: by default, the azimuth is set tangent to the previous element. This field is editable only for the starting element of the road. To change the azimuth of all other elements, the check mark from the *Tangent to Previous Item* menu on the bitmap in the upper-left corner of the screen should be removed.

NOTICE

Caution should be exercised when setting the azimuth, since road elements are usually tangential to each other.

- **Turn:** the direction of turn. The *Right* value stands for clockwise direction, the *Left* value for counter-clockwise direction.
- **OK:** saves the element to the road and returns to the **Add Road** screen.

Spiral

To add a spiral, press the **Insert** or **Add** buttons in the *Hz* tab of the **Add Road** screen and select the *Spiral* item from the floating menu. The *Spiral* screen will open.

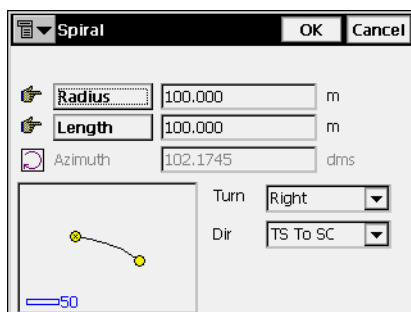


Figure 3-38. Spiral

The plot in the bottom-left corner displays the element's appearance.

- **Radius/ Deg Chord/ Deg Curve:** the radius of the curve, or one of two parameters unambiguously defining the radius: degree of chord, or degree of curve (as shown in “Curve” on page 3-30).
- **Length/Sp Const:** the parameter is the square root of the product of the length and the radius of the spiral, as defined above. Consequently, the spiral constant has the units of length.
- **Azimuth:** by default, the azimuth is set tangent to the previous element. This field is editable only for the starting element of the road. To change the azimuth of all other elements, the check mark from the *Tangent to Previous Item* menu on the bitmap in the upper-left corner of the screen should be removed.



NOTICE

Caution should be exercised when setting the azimuth, since road elements are usually tangential to each other.

- **Turn:** the direction of turn. The *Right* value stands for clockwise direction, the *Left* value for counter-clockwise direction.
- **Dir:** the direction of movement along the spiral, TS to SC (entering the turn), or CS to ST (exiting the turn)¹.
- **OK:** saves the element to the road and returns to the **Add Road** screen.

Intersection Point

To add an intersection point, press the **Insert** or **Add** buttons in the *H_z* tab of the **Add Road** screen and select the *Intersection Point* item from the floating menu. The *Intersection Point* screen will open.

Intersection Point		OK	Cancel
Point	P110_CL		
North	4089.715	m	
East	9150.744	m	
Deg Chord	200.000	dms	
Length 1	30.000	m	
Length 2	30.000	m	

Figure 3-39. Intersection Point

- **Point:** the name of the intersection point. Either enter the name manually (with the coordinates specified in the *North* and *East* fields and a height of zero), or select it from the map or the list.
- **North, East:** the local coordinates of the intersection point; cannot be changed for an existing point.

1. The traverse points on the turn have the following markers: TS - traverse-spiral; SC - spiral-circle; CS - circle-spiral; and ST - spiral traverse.

- **Radius/ Deg Chord/ Deg Curve:** the radius of the corresponding curve, or the parameter, unambiguously defining the radius, degree of chord, or degree of curve as shown in “Curve” on page 3-30.
- **Length1/Sp Const 1, Length2/Sp Const 2:** the length of the corresponding spiral elements, or the spirals constants. The spiral constants are defined as shown in “Spiral” on page 3-31.
- **OK:** saves the element to the road and returns to the *Add Road* screen.

Vertical Alignment

The *Vert* tab shows the list of vertical alignment elements, or long sections (for the Long Section vertical alignment type), the vertical alignment plot, and the starting station (or chainage) at each element.

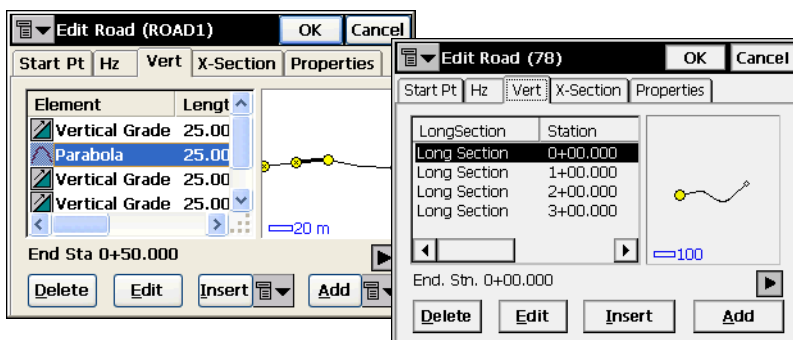


Figure 3-40. Add Road – Vertical Alignment

For Element vertical alignment types, the element list has the following columns:

- **Element:** the icon and name of the element: vertical grade or parabola.
- **Length:** the length of the element.
- **Start Grade, End Grade:** the grades of the element, in percentage, at the starting and ending points. For a *Vertical grade* element, values are the same.
- **Insert:** displays a menu of two elements (*Vertical Grade* and *Curve*) to select.

- **Add:** displays a menu of two elements (**Vertical Grade** and **Curve**) to select.

In the case of the Long Sections vertical alignment type, the element list has the following columns:

- **Long Section:** the name of the element.
- **Station:** the station distance.
- **Elevation:** the elevation value on the station.
- **VC Length:** the vertical curve length is the length of the interval near the station, where the alignment has a parabolic shape.
- **Delete:** deletes the element from the road.
- **Edit:** opens a screen with properties of the selected element.
- **Insert:** opens a blank **Long Section** screen in which to insert an element at the selected location in the list (Figure 3-43 on page 3-36).
- **Add:** opens a blank **Long Section** screen for adding an element to the end of the list (Figure 3-43 on page 3-36).

Vertical Grade

To add a vertical grade, press the **Insert** or **Add** buttons in the *Vert* tab of the **Add Road** screen and select the *Vertical Grade* item from the floating menu. The **Vertical Grade** screen will open.

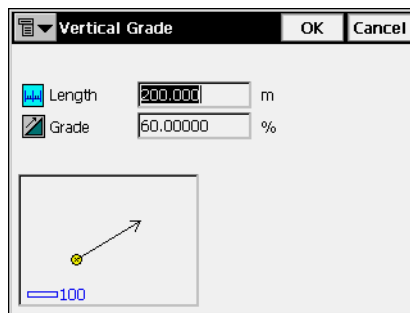




Figure 3-41. Add Vertical Grade

The plot in the bottom-left corner will show the element's appearance.

-  **Length:** the length of the vertical grade element.

-  *Grade*: the grade of the element, in percents. If the grade is falling, the value should be set negative.
- **OK**: saves the element to the road and returns to the **Add Road** screen.

Curve

To add a curve, press the **Insert** or **Add** buttons in the *Vert* tab of the **Add Road** screen and select the *Curve* item from the floating menu. The *Curve* screen will open.

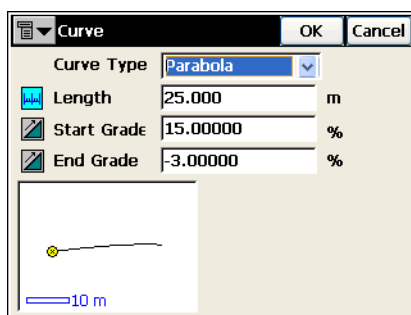


Figure 3-42. Add Vertical Curve

- *Curve Type*: selects the type of the curve to add, either *Circular Arc* or *Parabola*.
The plot in the bottom-left corner will show the element appearance.
- *Arc Radius* or *Length*: the radius of the arc or the length of the parabola element depending on the type of the curve selected.
- *Start Grade*, *End Grade*: the starting and ending grades of the element, in percents. If the grade is falling, use a negative value.
- **OK**: saves the element to the road and returns to the **Add Road** screen.

Long Section

The *Long Section* screen contains parameters of the section.

Figure 3-43. Long Section

- *Station*: the station distance from the beginning of the road.
- *Elevation*: the height at the station.
- *Curve Type*: selects the type of the curve to add, either *Parabola* or *Circular Arc*.

The plot in the bottom-left corner will show the element appearance.

- *VC Length* or *Arc Radius*: the length of the parabola at the station (with the assumption that the station is located in the middle of the interval), or the radius of the arc depending on the type of the curve selected.
- **OK**: saves the element to the road and returns to the *Add Road* screen.

The graphics interface can display information on the points stationing a vertical curve.

Double-tap the vertical plot area to open the greater **Map** screen for vertical alignment. The **Map** screen will display the PVC point where the curve begins, the PVI point of intersection of two tangents, and the PVT point where the curve ends (Figure 3-44 on page 3-37).

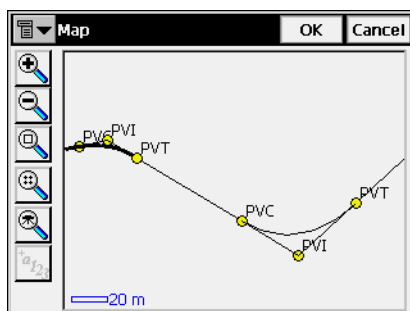


Figure 3-44. PV Points

X-Section

The *X-Section* tab contains a list of stations where cross section templates are applied, and a general view of the cross section.

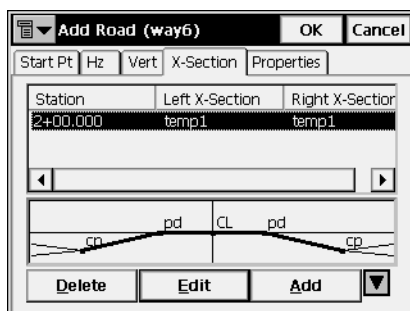


Figure 3-45. Add Road – X-Section Tab

The list of templates contains the following columns:

- *Station*: the station where the template is applied.
- *Left X Section, Right X Section*: the names of the templates for the left and right parts of the road relative to the center line. The left and right cross sections can be different.



NOTICE

If two or more templates are defined, the intermediate cross sections are calculated using interpolation.

- **Delete**: deletes the station from the list.

- **Edit:** opens the *X-Section* screen displaying properties of the selected cross section.
- **Add:** opens a blank *X-Section* screen.

The *X-section* screen contains cross section parameters and a plot.

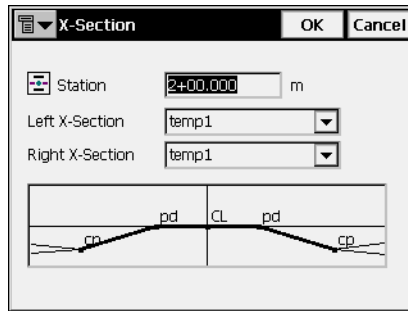


Figure 3-46. X-Section

- *Station:* the station distance.
- *Left X-Section, Right X-Section:* the cross section templates for the left and right parts of the road. These can be chosen only from the existing cross section templates.
- **OK:** saves the X-section in the list and returns to the *Add Road* screen.

Properties

The *Properties* tab contains general properties of the road.

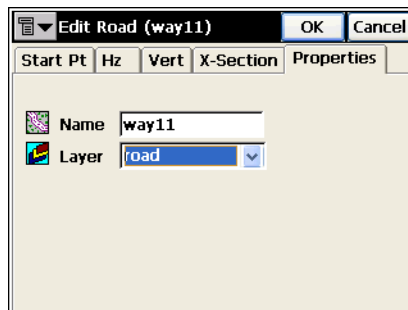



Figure 3-47. Add Road – Properties Tab

- *Name:* sets the name of the road.

- *Layer*: selects the layer for the road from the drop down list.
- **OK**: saves the road and return to the *Roads* screen.

After the Road is created, calculate the road points. The  bitmap displays the menu of the following items:

- *Calculate Road Points*: opens the *Calculate Road Points* screen.
- *Edit Points*: opens the *Points* screen (see “Points” on page 3-2).
- *Help*: accesses the Help files.

Calculate Road Points

The *Calculate Road Points* screen generates points along, to the right and to the left of the center line of the road, along all its entire length.

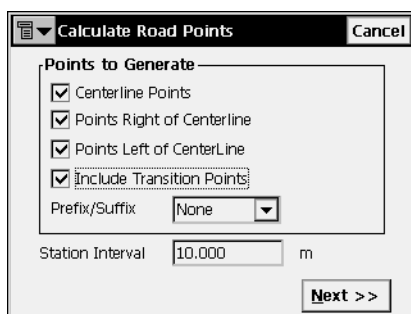


Figure 3-48. Calculate Road Points

- *Points to Generate*: defines the points to generate - center line points, the points to the right of the center line, and/or the points to the left of the center line. Also, if it is desired to include the transition points, place the check mark in the corresponding field and select a prefix/suffix for them, if necessary, in the appearing field below.
- *Station Interval*: sets the interval between the generated points. By default it is the Station Interval set in the *Start Pt* tab in the *Roads* screen.
- **Next**: opens the *Centerline Points Params* screen.

The **Centerline Points Params** screen displays the parameters of points to be computed along the center line (Figure 3-49).

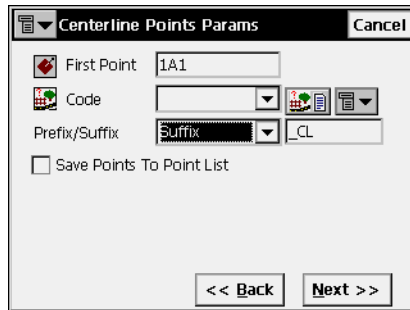








Figure 3-49. Centerline Points Parameters

- **First Point**: the name of the first point.
- **Code**: the code of the points being generated; enter manually or select from the drop-down list.
- : accesses the attributes of the chosen code and opens the **Code-Attributes** screen (see “Code-Attributes” on page 3-10).
- : displays the following list:
 - **String**: toggles on the **String** field. Also, the  sign appears. For details, see “Topo” on page 5-24.
 - **Layer**: opens the **Select Layer** screen to put the point. For details, see “Topo” on page 5-24.
 - **Note**: opens the **Note** screen. For details, see “Topo” on page 5-24.
- **Prefix/Suffix**: when chosen, sets the prefix or suffix to be added to the generated point name.
- **Save points to Point List**: check if it is necessary to save the generated points to a separate points list. When checked, a field appears where the name for the list can be set.
- **Back**: returns to the previous screen.
- **Next**: opens the **Right Offset Points Params** screen.

The **Right Offset Points Params** screen displays the parameters of points to be computed to the right of the center line.

Figure 3-50. Right Offset Points Parameters

- *First Point*: the name of the first point.
- *Code*: the code of the points being generated; enter manually or chose from the drop-down list.
-  : accesses the attributes of the chosen code and opens the **Code-Attributes** screen (for details see “Code-Attributes” on page 3-10).
-  : displays the following list:
 - *String*: toggles on the *String* field. Also, the  sign appears. For details, see “Topo” on page 5-24.
 - *Note*: opens the **Note** screen. For details, see “Topo” on page 5-24.
- *Prefix/Suffix*: when chosen, sets the prefix or suffix to be added to the generated point name.
- *Save points to Point List*: check if it is necessary to save the generated points to a separate points list. When checked, a field appears where the name for the list can be set.
- *Offsets*: set the offset of the point from the center line along two dimensions: horizontal (the *Right* field) and vertical (the *Up/Down* field) relative to the surface (*Surface Offset* type) or to the horizontal line (*Flat Offset* type).

- **Back:** returns to the previous screen.
- **Next:** opens the *Left Offset Points Params* screen.

The *Left Offset Point Params* screen is similar to the *Right Offset Points Params* screen, except for the direction of the offset.

Figure 3-51. Left Offset Points Parameters

- **Calc:** calculates the points and stores them to the data set.

Linework

The Linework is a group of points connected with a line and defined by the same code and string.

To edit a linework, tap **Edit ► Linework**.

The *Linework* screen contains a list of existing Lineworks on the left part of the screen, and the two windows on the right part, that present the view of the selected linework in the horizontal and vertical planes (Figure 3-52 on page 3-43).

To view the current selected linework in a larger map, double-tap one of the map plots.

- **Delete:** press to delete the Linework from the list.
- **Edit:** opens the applicable *Edit Line* screen.
- **Add:** opens a blank *Edit Line* screen.

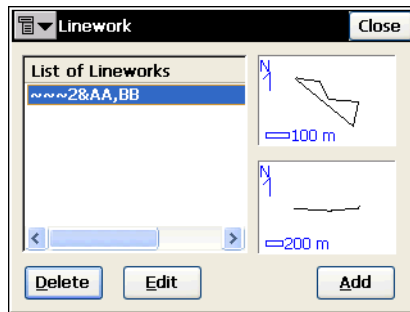


Figure 3-52. Linework

The bitmap on the upper-left corner displays the following pop-up menu:

- *Edit Points*: displays the **Points** screen. For details, see “Points” on page 3-2.
- *Help*: accesses the help files.

Edit Line

The **Point in Line** tab of the **Edit Line** screen displays a list of existing points in the selected Linework on the left part of the screen, and the general view of the linework on the right part. To view the current selected linework in a large map, double-tap on the map plot.

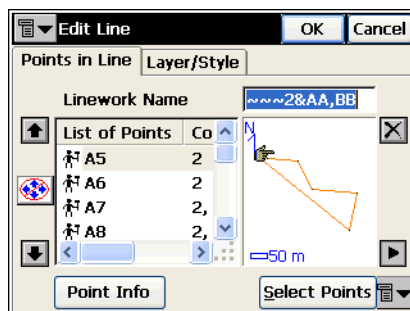





Figure 3-53. Edit Line – Points in Line

- *Point List Name*: the name of the Linework.
- *List of Points*: points in the currently selected linework.

- The up and down arrows to the left of List of Points move the highlighted point up or down in the order of the points.
-  : switches on/off the keyboard arrow keys that duplicate the arrows on the screen.
-  : deletes the highlighted point from the linework.
-  : closes the plot of the point list. Only the list of points table will be available.

The bitmap on the upper-left corner displays the following pop-up menu:

- *Edit Points*: displays the **Points** screen. For details see “Points” on page 3-2.
- *Help*: accesses the help files.

The *Layer/Style* tab of the **Edit Line** screen sets a type and color to display the line in the selected Linework on the map.

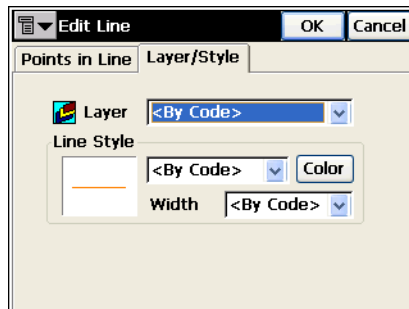


Figure 3-54. Edit Line

- *Layer*: selects the layer for the line from the drop down list.
- *Line Style*: selects the form and width of the line from the drop down lists and shows the result.
- *Color*: opens the **Select Color** screen to choose the color for the line (see “Select Color” on page 3-8).

Raw Data

To edit raw data, tap **Edit ► Raw Data**.

This screen has the following columns and buttons.

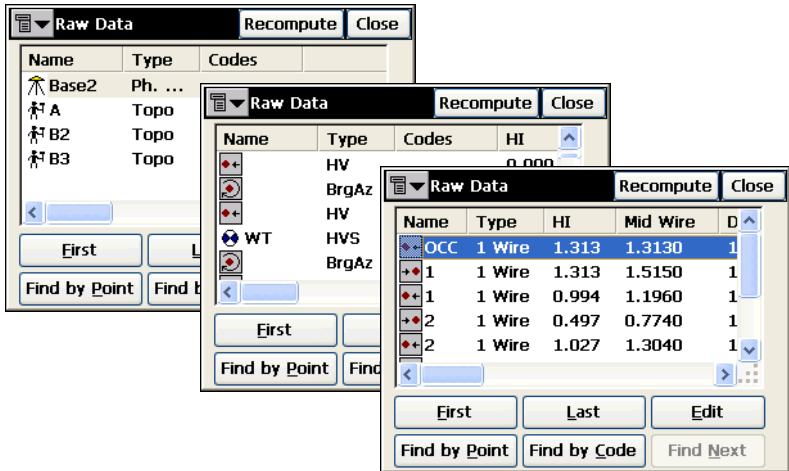


Figure 3-55. Raw Data - GPS, TS and DL, respectively

- *Name*: point name and the icon displaying the type of the point
- *Type*: the type of measurement
- *Codes*: codes for the point
- *HI*: for TS mode, the height of the instrument; for a Level survey, the elevation of the line of sight of the leveled instrument above the datum.
- *Ant Ht*: for GPS+ mode, the antenna height.
- *Coordinates*: the coordinates of the point (TS and GPS+ modes).
- *Mid Wire*: the reading on the middle wire for Level survey.
- *Distance*: the horizontal distance between the Level and the rod for Level survey.
- *Ctrl Code*: control code for the point.
- *Notes*: additional information on the point.
- *Local Time*: the local time when the point is collected.

- **First** and **Last**: moves the cursor to the first or last point.
- **Edit**: opens the *Edit Raw Data* screen to edit user-entered raw data.
- **Recompute**: recomputes the point coordinates after editing the point's raw data.
- **Find by Point**: finds a point by its name or a part of its name.
- **Find by Code**: finds a point by its code or by a part of the code.
- **Find Next**: finds the next point that satisfies the same conditions as the previous found point.
- **Close**: closes the screen.

The button in the upper-left corner of the screen enables the menu of three items:

- *Job Info*: displays the *Job Info* screen.
- *Show Raw GPS+/TS*: toggles between displaying GPS+ raw data and TS raw data.
- *String*: displays strings for points among raw data.
- *Help*: opens the Help files.

Edit Raw Data

The *Edit Raw Data* screen is used to edit the name and code of the surveyed point, and the antenna/instrument height at this point. The title of the first tab is the survey type for the point being edited.

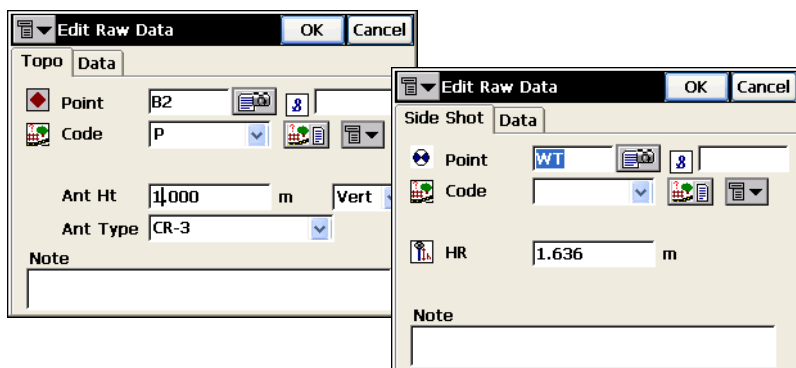


Figure 3-56. Edit Raw Data - GPS and TS measurements

The *Data* tab displays information on the point's measurements.

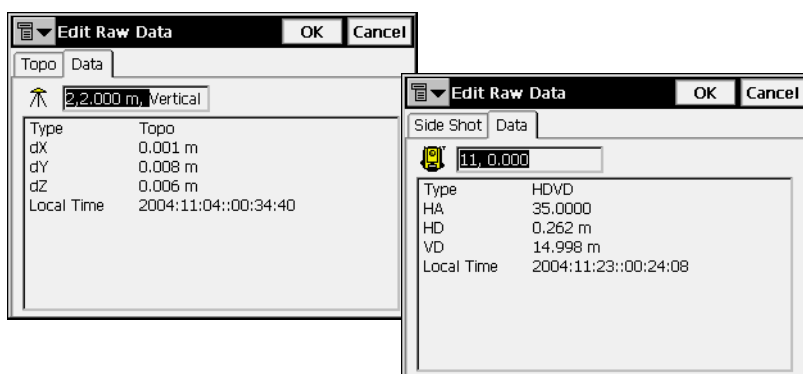


Figure 3-57. Edit Raw Data – Data Tab

In addition to these two tabs, the **Edit Raw Data** screen for DL measurements contains a *Meas* tab to adjust rod readings, distances, and vertical offsets.

Edit Raw Data		OK	Cancel
Side Shot	Meas	Data	
Mid Wire	1.515	m	
Distance	10.000	m	
V. Offset	0.0000	m	

Figure 3-58. Edit DL Raw Data – Meas Tab

For the base station, the **Edit** button opens the **PC Coords** screen to display the base coordinates available for editing.

PC Coords		OK	Cancel
WGS84(m)			
Lat	55.432002817		
Lon	37.390288802		
Ell ht	158.684		

Figure 3-59. Base Station Coordinates

Sessions

To create or edit session of the automatic survey for the post-processing, select **Edit ▶ Sessions**.

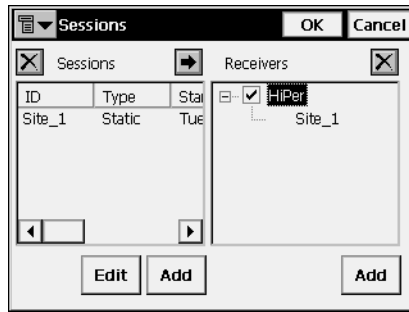




Figure 3-60. Sessions

- **Sessions**: a list of the available sessions. The table contains the following columns: *ID*, *Type*, *Start Day*, *Start Time*, *End Day*, *End Time*, and *End Date*.
- **Receivers**: the list of the available receivers and their session plans. To hide/display the session plans of the receiver, tap on the “-/+” sign located near the receiver name.
- **Edit**: press to edit the existing session. The *Session Setup* screen opens.
- **Add: (left)** press to create a new session. The *Session Setup* screen opens.
- **Add: (right)** press to add a receiver. Enter the receiver name in the *Receiver Name* screen being opened.
-  : use to put the session to the session plan of the receiver. In the *Sessions* screen highlight the desired session in the left panel and the necessary receiver in the right and press this button.
-  : use to delete the session from the sessions list or receiver.
- **OK**: saves the changes and close the screen.

Session Setup

The *Session Setup* screen contains the parameters of the session.

Figure 3-61. Session Setup

- *Site Name*: the name of the occupation point.
- *Type*: the type of the session survey, *static* or *kinematic*.
- *Start Time*, *End Time*: the time and date of the start and end
- *Interval*: the interval between measurements,
- *Min SVs*: the minimum satellites available for the survey
- *Ant Type*: the type of the antenna.
- *Ant Ht*: the value and type of the antenna height.
- **OK**: saves the changes and returns to the Sessions screen.

NOTICE

The antenna type specified in this screen will not display in the receiver file. But the antenna height recorded in the file includes offsets for the specified antenna type.

View

The View menu contains the following menu items:

- Enable
- Zoom In
- Zoom Out
- Zoom Window
- Zoom All
- Zoom To Point
- Toolbar
- Background Images
- Properties

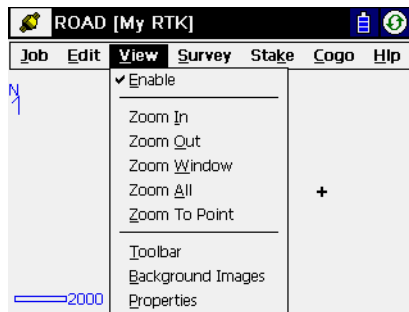


Figure 4-1. View Menu

Enable

To display the job map on the main screen, tap **View ► Enable**.

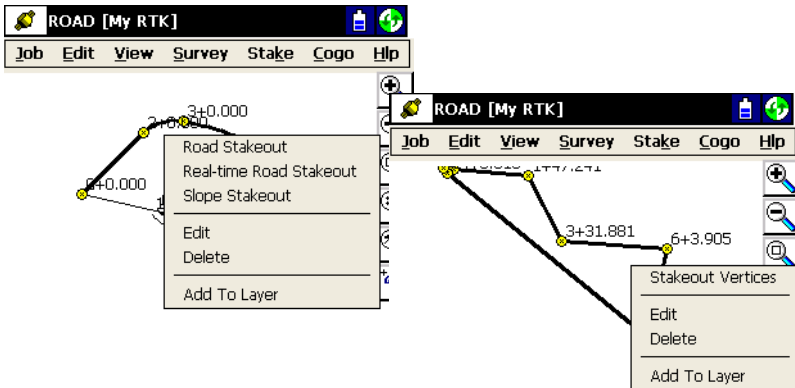



Figure 4-2. Main Map

The Main Map allows:

- Selecting/deselecting objects on the map. To do this, tap on the desired object (point, line, road).
- Selecting objects with a window. Click the  button and draw a frame from right to left to define the desired objects.
- Access to the stakeout from the Main Map. Select the object to be staked, press **Alt** on the controller's keyboard and tap the object, or hold the stylus on the selected object for a while. A pop-up menu displays the options available for the selected object (Figure 4-2).
- Editing a single selected object (point, line, road). Select *Edit* from the pop-up menu.
- Deleting selected objects. Select *Delete* from the pop-up menu.
- Adding selected objects to Layers. Select the *Add to Layer* option from the pop-up menu.

Zoom In/Out/Window

For display customizing, tap **View ▶ Zoom In**, or **View ▶ Zoom Out**, or **View ▶ Zoom Window** to zoom the plot inwards, or outwards, or scales the plot to fit it the screen, respectively.

Zoom All

To return the map to the initial view, tap **View ▶ Zoom All**.

Zoom To Point

To select a point for centering, tap **View ▶ Zoom To Point** and choose the point in the Select point screen.

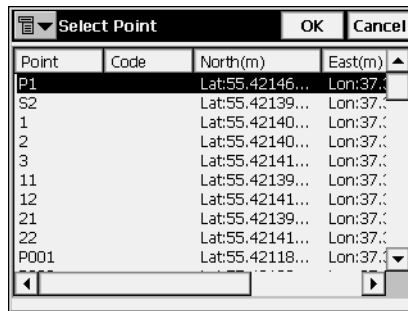


Figure 4-3. Select Point

Toolbar

To display the bar of control buttons of viewing options, tap **View ▶ Toolbar**.

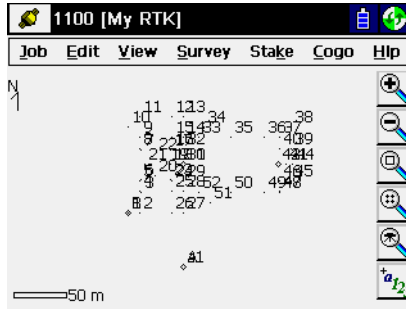








Figure 4-4. Toolbar

-  : zooms in
-  : zooms out
-  : selects a frame for display
-  : displays all points in the job
-  : opens the *Points* screen
-  : opens the *Map Properties* screen

Background Images

Background images of different types are supported to be read and positioned correctly under all observed data on the map screen.

To load an image, tap **View ► Background Images**. The *Background Images* screen displays a list of available image files. Initially, the list is empty.

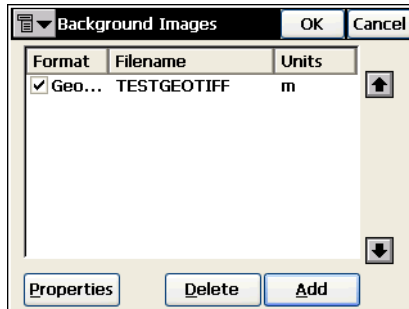


Figure 4-5. Image List

- **Properties:** opens the *Properties* screen for the highlighted file.
- **Delete:** deletes the currently selected file from the list.
- **Add:** opens the *Add Image* screen to browse the controller's directories for the desired file.
- **Cancel:** exits out of the screen without changes.
- **Up/Down** arrows: moves the selected images up or down in the list.
- **OK:** opens the selected file (Figure 4-8 on page 4-7). If no world file exist for the background image file selected, a warning displays, and the Background Images screen will appear again to select another file.

Multiple background images can be selected, but is limited by the amount of free space in the controller memory.

Add Image

The *Add Image* screen selects an image file to add to the *Background Images* list.

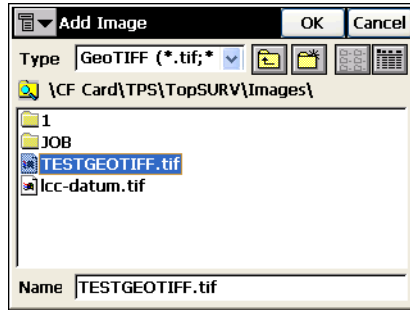


Figure 4-6. Add Image

- *Type*: selects the type of the image to be added, either GeoTIFF, TIFF, JPEG or BITMAP.
- *Name*: displays the name of the selected file.
- **OK**: opens the *Properties* screen for the selected file.

Properties

If the selected image uses a World File, select the projection in which the coordinates in the World File are given: either *Current* job projection or *UTM*.

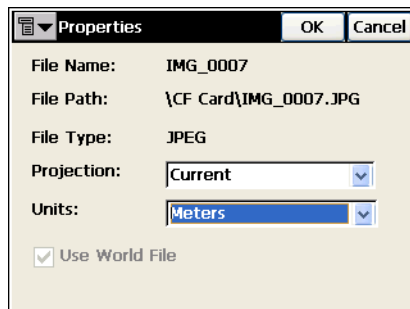


Figure 4-7. Properties of Background Image

- **OK**: returns to the *Background Images* screen with the file added to the list. To use a file once it is added, make sure the file is checked in the list.

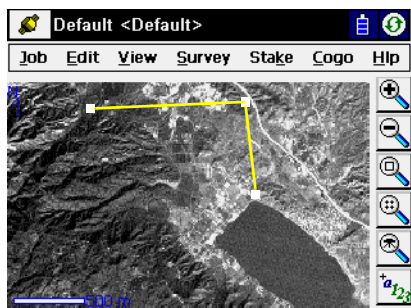


Figure 4-8. Background Image (on Main Map)

Properties

The *Map Properties* screen customizes the map view by adding properties to the points (names, codes, heights, etc.), displays the Auto Topo points, or sets the application to adjust the scale automatically (the *Autoscale* field).

Autoscaling works to display 30 most recent points of a survey on the map screen.

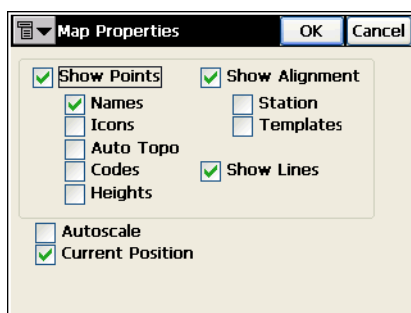


Figure 4-9. Map Properties

To enable the points displaying, place a check mark in the *Show Points* field. Along with the points their names, codes, icons, heights, and/or auto topo points can be displayed.

Also it is possible to display alignments, turn on the linework on the map, perform autoscaling and start each time from the current position. Checking the *Current Position* field also means that if the current position moves off the edge of the map it will automatically snap back to the center.

Most TopSURV functions can be performed with the help of the Map view (for example, see Figure 4-10 for a Topo survey). Depending upon the task, the appearance of the view changes. Mostly it duplicates the controls located on the main task page. But it also contains some controls that do not depend on the function being performed. These controls correspond to the viewing options and display customizing.

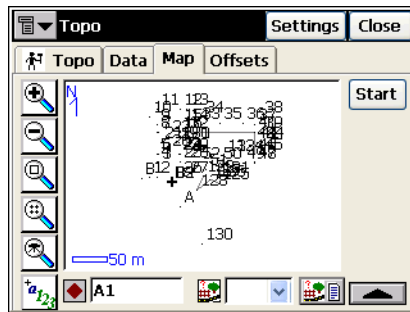


Figure 4-10. Topo – Map

Points can be selected from the Map when the point selection is needed (for instance, to stake out).

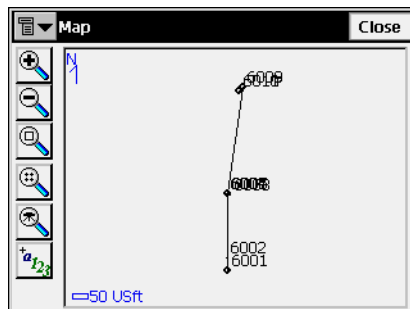


Figure 4-11. Map