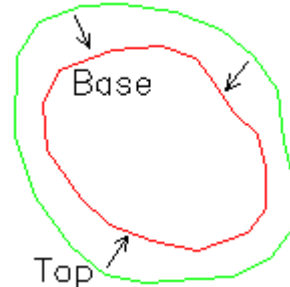


Pond design

Also see all menu items in *Design, Ponds*

Method 1 Edge of excavation down to pond base



Step 1

Define the "hole in the ground"

Starting with a ground model representing the existing site and a 2D Polyline representing the edge of extraction or top of bank follow this sequence :-

- Ground Modelling, Drape, Drape entities* to convert the 2D Polyline into a 3D Polyline.
- Consider the water level. Use menu item *3D Polylines, Lowest vertex* to mark and report at the command line the lowest level from the 3D Polyline vertices. Use this value together with suitable freeboard value to define the water level – if a higher water level is required then a bund will need to be constructed.
- The pond base needs to be represented as a ground model (for the embankment program to "look down to"). Use menu item *Ground Modelling, Create model, Uniform surface*. A suitable way to define a non horizontal pond base will be with menu item *3D utilities, Enquire and define Slope* that draws a slope definition Polyline (a 3D Polyline with two vertices that defines the slope) at a specified direction and gradient. Use each end of this slope definition Polyline to define the uniform surface (using End object snaps). Call the model Pond base.kgm for example.
- Ground Modelling, Embankments* to draw embankments from the edge of extraction 3D Polyline to the pond base model. There are two possibilities now :-

Use the bottom of the embankment 3D Polyline to directly represent the pond base or :-

"Sketch in" a 2D Polyline to represent a modified or smoothed pond base within the initial one so that the gradient is no steeper and then use menu item *Ground Modelling, Drape, Drape entities* with the pond base model to convert this plan design into a 3D Polyline.

The base may be further defined with contours using *Contour utilities, Draw a contour* ensuring that "the laws of contours" are obeyed or with design levels (*Levels, Levels*).

e. Confirm that the results look OK by creating a section (from a suitably located 2D Polyline) over the model and one from the design with menu item *Sections, Create Sections from Drawing entities, 2D Polyline crossing 3D Polylines* using the 3D Polyline (tops and bottoms of embankments). Draw the existing section and superimpose the design one.

Offset interval	<input type="text" value="5.000"/>
Cut:	<input type="text" value="11.310"/> deg <input type="text" value="20.000"/> % 1: <input type="text" value="5.000"/>
Fill:	<input type="text" value="11.310"/> deg <input type="text" value="20.000"/> % 1: <input type="text" value="5.000"/>
	<input checked="" type="radio"/> Up and Down <input type="radio"/> Up only <input type="radio"/> Down only
Start Chainage	<input type="text" value="0.000"/>
End Chainage	<input type="text" value="END"/>
Max angle around vertices	<input type="text"/>
<input type="checkbox"/> Write Report File	<input checked="" type="checkbox"/> 3D Polylines
<input type="checkbox"/> Offsets at vertices	<input type="checkbox"/> 3D Faces

Step 2

Make the "hole in the ground" model and earthworks calculation

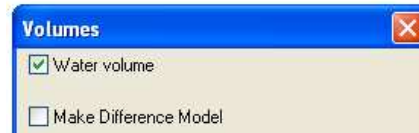
Ground Modelling, Create Model, from Drawing entities using the top and bottom Polyline (plus any other entities used to define the base). Note that an improved triangulation may be achieved after applying *Polyline utilities*,

Additional vertices. Define active and passive triangles if required. To calculate the volume of the excavation use menu item *Ground Modelling, Volumes* to compare the existing site model with the “hole” model.

Step 3

Water volume calculation

Ground Modelling, Volumes using the “hole in the ground” model.

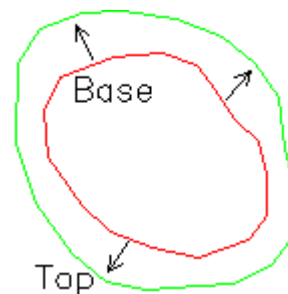


Step 4

Display water extents

Ground Modelling, Analysis and Colour mapping, Z value on the “hole in the ground model”. For typical use set the CAD colours definition with a single band (e.g. from 0.000 to 16.25 for a water level of 16.25) and with the **Z values to Upper limits** set “on” to draw Solids for a plan view.

Method 2 From pond base up to existing ground



Step 1

Define the “hole in the ground”

Starting with a ground model representing the existing site and a closed 2D Polyline drawn on the required elevation using menu item *Contour utilities, Draw a contour* representing the base of the pond.

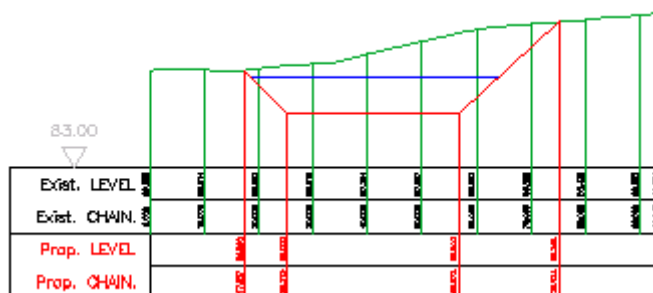
a. If the pond base has been drawn with a zero elevation this 2D Polyline now needs to be converted to a 3D Polyline. Use menu item *Design, Vertical, Drape onto Uniform surface*. Only one location needs to be used to define a horizontal surface but a suitable way to define a non horizontal pond base will be to run menu item *3D utilities, Enquire and define Slope* first that draws a slope definition Polyline (a 3D Polyline with two vertices that defines the slope) at a specified direction and gradient. Use each end of this slope definition Polyline to define the uniform surface (using End object snaps).

b. *Ground Modelling, Embankments* to draw embankments from the pond base 3D Polyline to the existing ground model. Typical settings might differ from those in step 1 with Offset interval set to 2.5 and Offsets at vertices “on” providing better results.

c. Confirm that the results look OK by creating a section (from a suitably located 2D Polyline) over the model and one from the design with menu item *Sections, Create Sections from Drawing entities, 2D Polyline crossing 3D Polyline* using the 3D Polyline (tops and bottoms of embankments). Draw the existing section and superimpose the design one.

Step 2 onwards

As method 1



Existing ground section from model with design section superimposed and water level added



Extract from rendered image of 3D Grid and water surface. Output as in step 4 but water represented as 3D Faces and not Solids.