Overview: Use the NRCS Wave Protection tool (TR-56) in AutoCAD Civil 3D to design a vegetated sloping berm to protect a pond embankment from wave erosion. The tool determines the effective fetch distance.

Software: AutoCAD Civil 3D 2014, NRCS C3D 2014 Customization, NRCS C3D 2014 template

Prerequisite: Create a ground surface using the instructions for *Original Ground Contours* or *LiDAR*, or *Exporting Pool Data*. Determine the CL of embankment location and the normal pool elevation.

Notation: Button to Press *Displayed Text* **Icon** Action {Text to Enter} *Menu Item…*

Wave Analysis at Normal Pool Elevation

Create user defined contours to identify the normal pool elevation.

1. Toolspace> Prospector… *Surfaces...* Right click *Ogrnd…* Click *Surface Properties…*
2. Click the *Information* tab and Set the *Surface Style* to *User Defined Contours*.
3. Click the *Analysis* tab and Set the *Analysis type* to *User Defined Contours*.
4. Set the *Ranges* to *3* and click the **down arrow**
5. Input the elevations of the normal pool {e.g. 1083.5}, auxiliary spillway {e.g. 1086.5}, and top of settled dam {e.g. 1088.5} into the *Range Details.*
6. Click OK

Create a 2D Polyline at the Normal Pool elevation.

7. Select a contour of the surface.
8. Click *Tin Surface:"SurfaceName"… Surface Tools… Extract Objects…*
9. In the Extract Objects box checkmark *User Contours.* Click OK

Determine the wave height and effective fetch using the NRCS Wave Protection tool.

10. Click *NRCS… NRCS Dams… Wave Protection …*
11. Click Select the Pool Polyline
12. Click on the polyline for the normal pool.
13. In the dialog box Input a name for the trial run. {e.g. RunA} Click OK
14. Click a location along the upstream face of the dam where you think the wind effect will be the worst.
15. Click a point upstream of the dam to set the wind alignment that you think will cause the worst damage.
16. View the resulting Effective Fetch for this trial run. Click OK
17. The results of the trial run will open up in Notepad.
18. Close out of Notepad.
19. The wind fetch computation lines will show up in CAD.
20. Run the Wave Protection tool again to evaluate multiple wind alignments.

Remove the 2D Polylines.

21. Select the contour polylines. Be sure to **NOT** select the surface. Press Delete.