

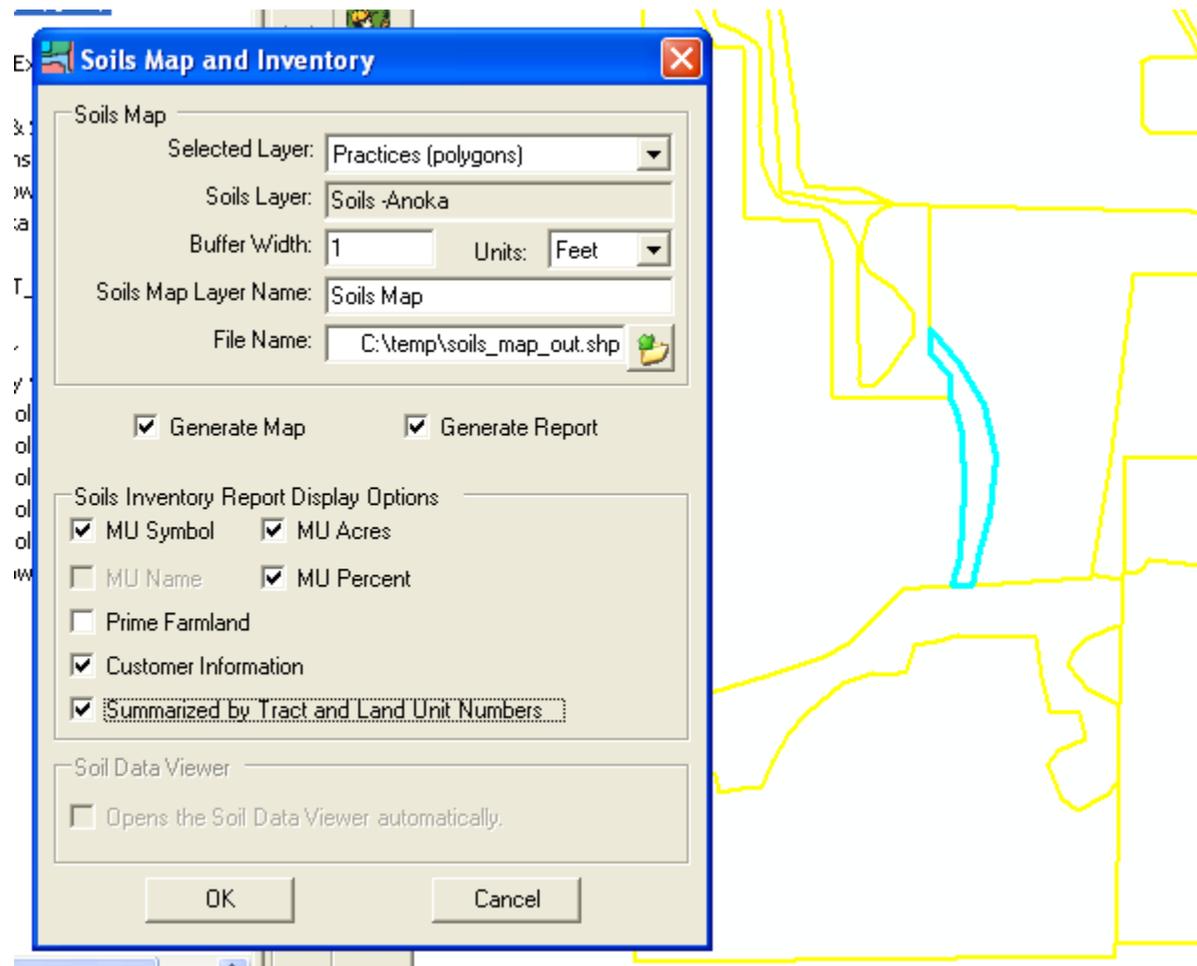
650.0703 Design process

SOIL LOOKUP INSTRUCTIONS

This is instructions for a procedure in Toolkit to obtain unified soil classification and plasticity index to use the decision matrix for design of a grassed waterway within the WDT module of Engineering Field Tools (EFT).

Within Toolkit, load the conservation plan and practices. Select the site where the waterway will be built and highlight the polygon. Click the soils button; this will clip the soils to just the area where the waterway will be constructed.

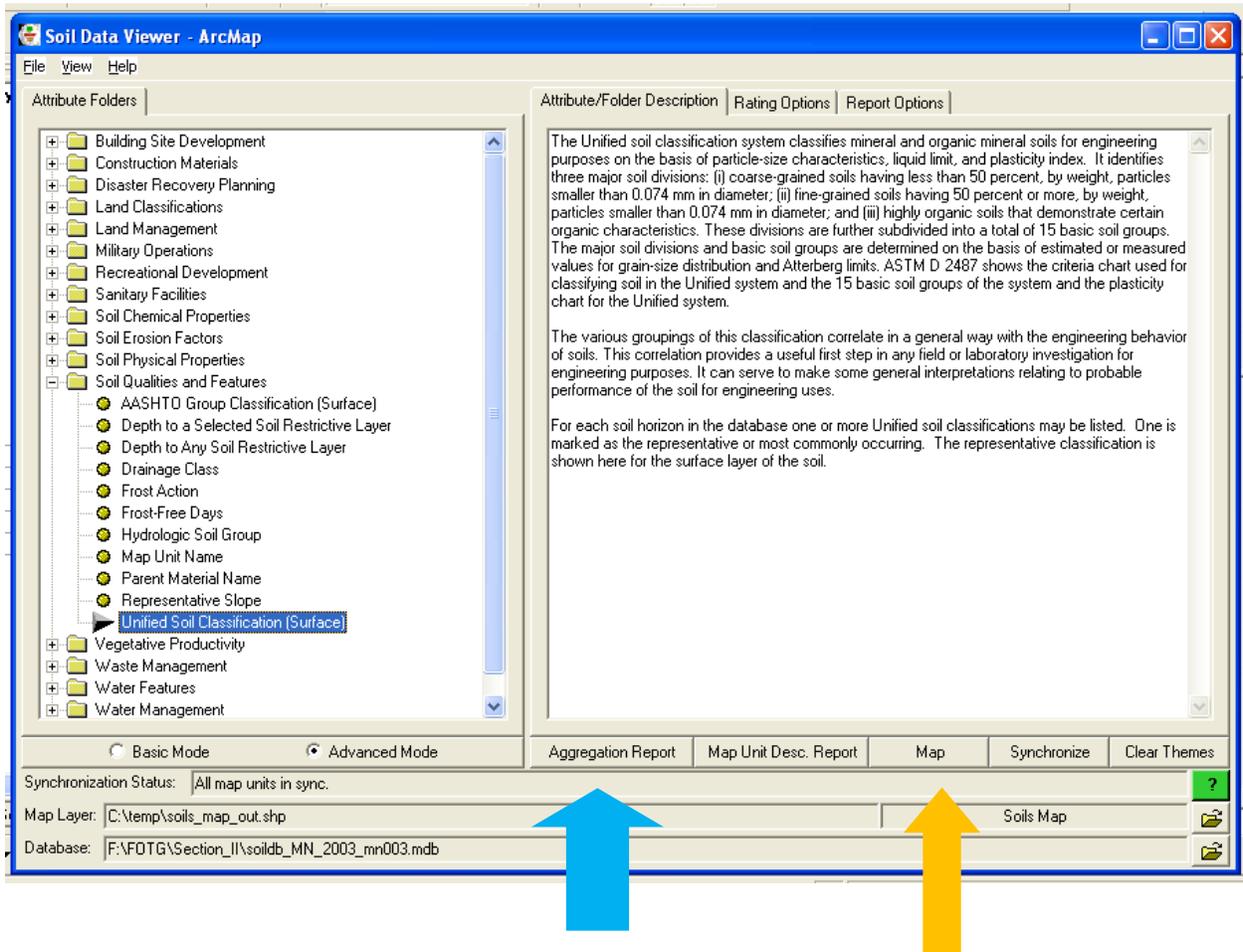
Choose soils map and inventory and generate the report. See below.



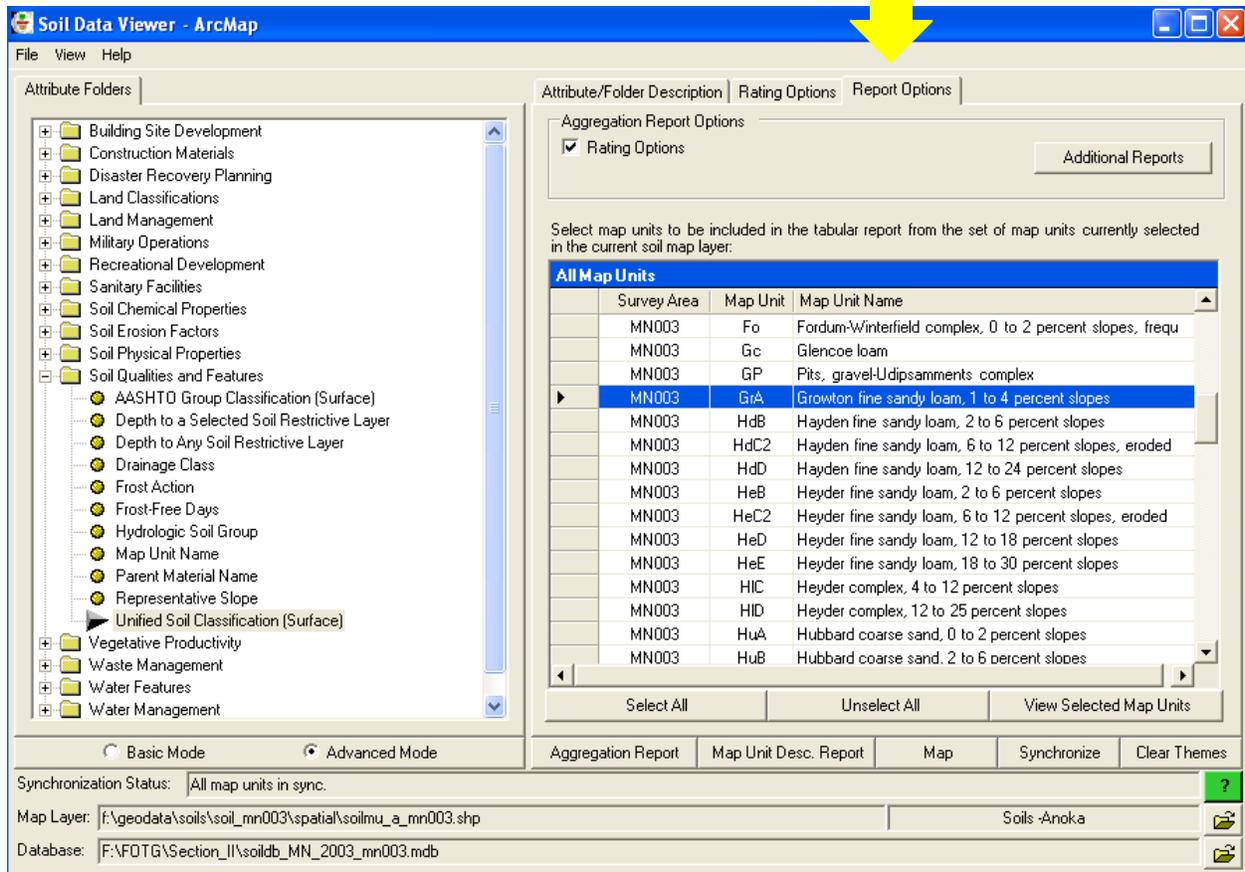
Next, click the Soil data Viewer icon. You will need to synchronize the soil tabular data with the spatial layer. If the box on the right side is red, you will need to browse to your county soils mdb file in F:\FOTG\Section_II folder. You can either point to the whole county soil spatial layer or clip your CLU to limit the soil list.



From the list of soils information available, first choose Soil Qualities and Features and expand the list by clicking on the “+” symbol. From that drop down list, choose Unified Soil Classification.

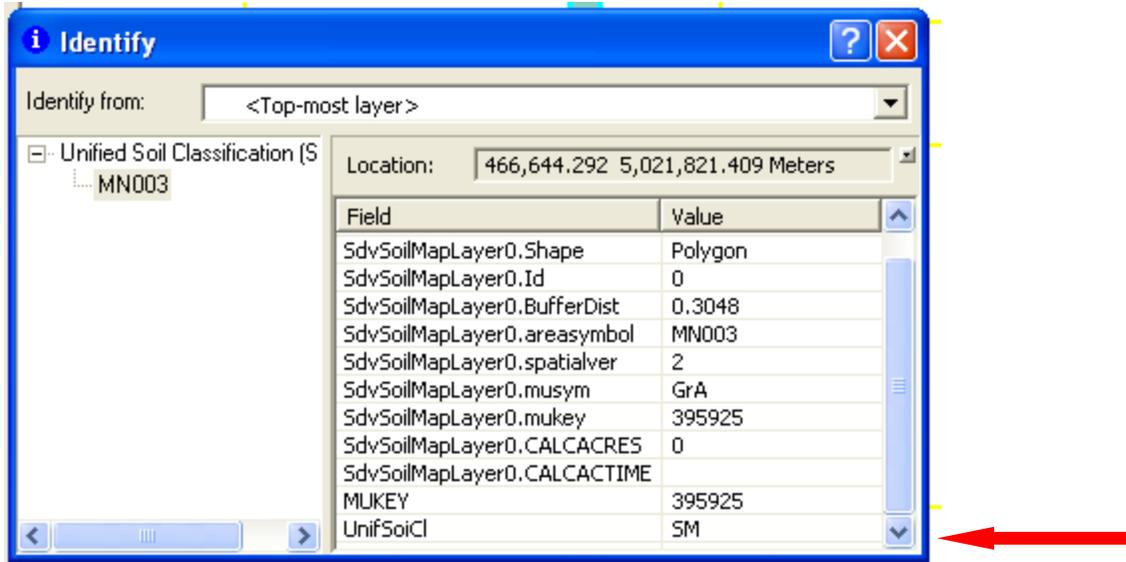


The data can be displayed as an aggregation report for selected soils, or as a map.



Under the Report Options tab, choose the soil or soils that for which the unified soil classification is desired. These will be the only ones shown in the report.

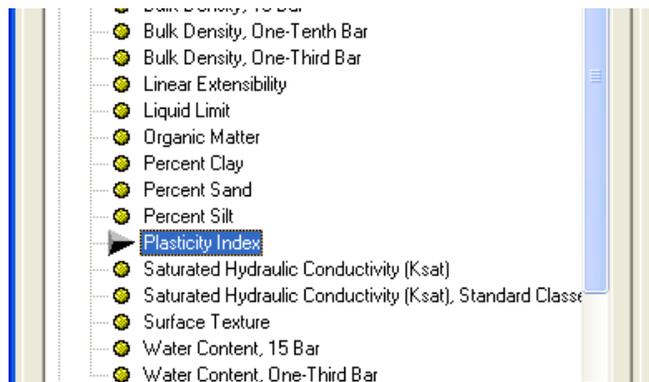
Choose the aggregation report (blue arrow above). The report will show the unified soil classification rating for the soils chosen. The soil classification can also be found using the “map” choice in the screen above (orange arrow) and then using the “identify” key to point to a soil, using the attribute table for the result as shown below.



Choose the appropriate soil classification and use it with the decision tree. If the decision tree indicates that the plasticity index needs to be used also, proceed with the steps below to obtain the plasticity index for the same soil.

Decision Tree

If the soil textural class is	And the reference PI is	the erodibility class is
CL	Any value	Erosion resistant (ER)
CH	Any value	Very erosion resistant (VER)
CL-ML	PI <= 16	Erodible (E)
CL-ML	PI > 16	Erosion resistant (ER)
ML	PI < 5	Easily erodible (EE)
ML	5 <= PI < 19	Erodible (E)
ML	PI >= 19	Erosion resistant (ER)
MH (elastic silts)	PI <= 15	Erodible (E)
MH (elastic silts)	PI > 15	Erosion resistant (ER)
SC, SC-SM, SM	PI < 5	Easily Erodible (EE)
SC, SC-SM, SM	PI > =5	Erodible (E)
SP, SP-SM, PT, organics	Any value (typically PI < 5)	Easily erodible (EE)



Going back to the list of soil attribute folders, select “Soil Physical Properties” and click the “+” sign to open it. On that list, choose Plasticity Index. On the screen to the right of the list, verify that the options are the ones you desire.

Attribute/Folder Description | Rating Options | Report Options

Basic Options
Result Column Name:

Advanced Options
Aggregation Method: Method Description

Component Percent Cutoff
 Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule
 Lower
 Higher The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero
 Yes
 No This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Layer Options
 Surface Layer
 Depth Range
 All Layers

At the red arrow, the box should display “PlasLimit”. At the green arrow, the box should display “Dominant Component”. For the yellow arrow, a choice will need to be made based on the site and soil. If the surface layer is thicker than the anticipated depth of the waterway, the user can just select “surface layer”. If the soil’s surface layer is less thick than the planned depth of the waterway, it will be better to use depth range and specify the depth of soil to be considered (often 12-24 inches – be sure the units are inches and not centimeters!).

Layer Options
 Surface Layer
 Depth Range
 All Layers

Depth Range
Top Depth:
Bottom Depth:

Units of Measure
 Inches
 Centimeters

Aggregation Report | Map Unit Desc. Report | Map | Synchronize | Clear Themes

?

If Depth Range is selected, the additional boxes above appear in the lower right corner. By choosing “aggregation report” near the bottom of the screen, a report will display like the one shown below.

Note in the heading of the report below with the blue border that the depth range was specified as 0 to 24 inches. The report with the pink border has a depth range of 0-12". Note that the values are not the same for the two depth ranges. Use this plasticity index information in the decision tree on page 5 to determine the soil erodibility class for designing the grassed waterway.

Plasticity Index		
Layer Option: Depth Range 0 to 24 Inches		
Units of Measure: percent		
Aggregation Method: Dominant Component		
Tie-break Rule: Higher		
Interpret Nulls as Zero: No		
Anoka County, Minnesota		
Survey Area Version and Date: 8 - 12/14/2009		
Map symbol	Map unit name	Rating
GrA	Growton fine sandy loam, 1 to 4 percent slopes	4.9
HeB	Heyder fine sandy loam, 2 to 6 percent slopes	4.1
HeD	Heyder fine sandy loam, 12 to 18 percent slopes	4.1

Plasticity Index		
Layer Option: Depth Range 0 to 12 Inches		
Units of Measure: percent		
Aggregation Method: Dominant Component		
Tie-break Rule: Higher		
Interpret Nulls as Zero: No		
Anoka County, Minnesota		
Survey Area Version and Date: 8 - 12/14/2009		
Map symbol	Map unit name	Rating
GrA	Growton fine sandy loam, 1 to 4 percent slopes	2.8
HeB	Heyder fine sandy loam, 2 to 6 percent slopes	4.0
HeD	Heyder fine sandy loam, 12 to 18 percent slopes	4.0