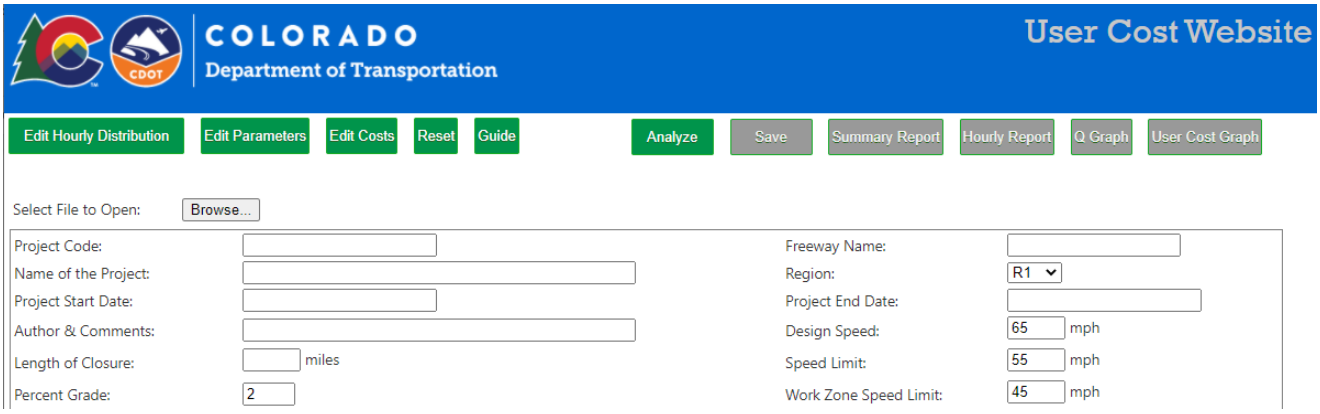
User Cost

A guide to the system

Overview

The UserCost website is a tool to calculate the user cost associated with work zones. These costs are considered to be indirect "soft" costs accumulated by the facility user in the work zone as they relate to roadway condition, maintenance activity, and rehabilitation work over the analysis period. For example, these costs include user travel time, increased vehicle operating costs (VOC), and crashes. Though these "soft" costs are not part of the actual spending for CDOT, they are costs borne by the road user and should be included in the LCCA. Due to the lack of crash cost data, for certain types of work zone activities, CDOT will not consider the costs due to crashes.

How to use the program



Project Data

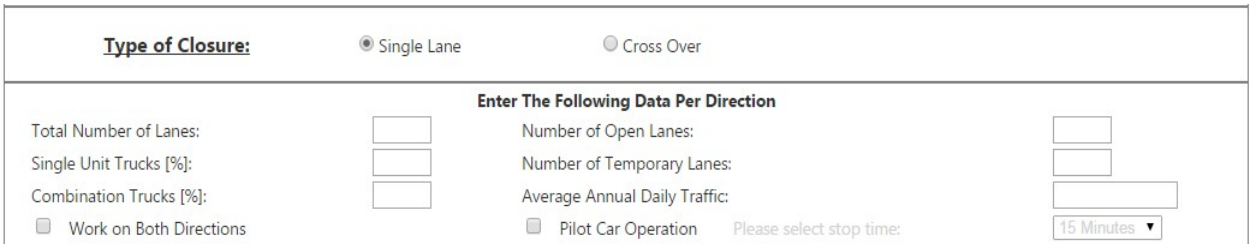
When you first come to the website, you will be looking at a fresh project page. First, enter project specific data in Project Data fields. Accessing the data cells can be done by pointing and clicking, or by using the tab key on the keyboard. This program only runs in English units, not metric.

- Project Code: 5 digit CDOT code
- Start Date, End Date, Author & Comments are all optional fields that are helpful for the reports, however not required for calculations.

- According to the Highway Capacity Manual, grades less than 2 percent (including going downhill) will not need adjustments to the highway capacity (CDOT has a default value of 2 percent). Any grade less than 3% and longer than 1 mile, or any grade greater than 3% and longer than ½ mile should be analyzed separately. The average grade of the project may be used.

1. Type of Work Zone

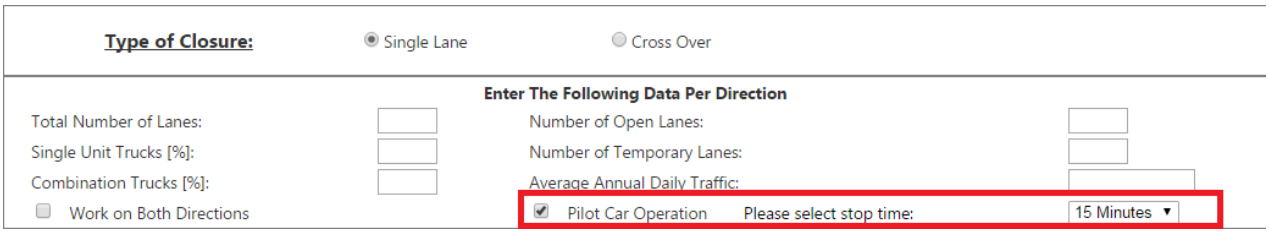
Single Lane Closure (SLC):



For a SLC enter the total number of lanes in each direction, the number of open lanes, and the number temporary lanes. The temporary lanes are like temporary detours in the work zone. If you use the shoulder, that is counted as a temporary lane. Enter the percent single and combination trucks along with the Average Annual Daily Traffic (AADT) for the direction you are working in. (A good place to start is to use the same percent trucks as shown in the Traffic Volume Report and 50 or 60 percent the AADT for each direction). If you have better directional AADT, please use it. If you are working in both directions, then you need to check **Work on Both Directions**.

NOTE: The sum of open and temporary lanes must be less than or equal to (≤) the total number of lanes in each direction.

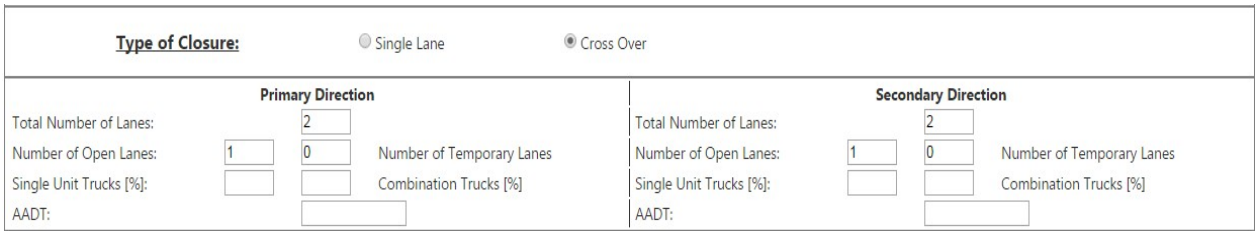
Pilot Car Operation:



If you will have a pilot car, the program will calculate it as a separate **Type of Work** line item in your reports. You can select a stopped vehicle time of 15 or 30 minutes. The cost is based on the number of vehicles and trucks, 80% of the AADT, and stop time.

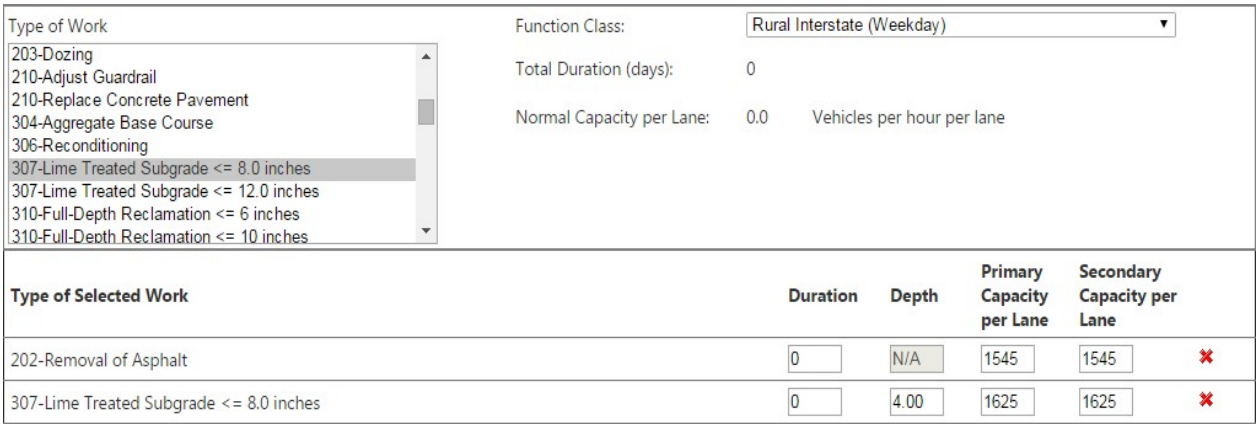
Cross Over:

In a Cross Over, the traffic volumes are the same as described in the SLC.



Example: A divided 4-lane (2 primary lanes and 2 secondary lanes) of I-70 will be reconstructed using a cross over. The phasing is such that the Secondary direction is closed first. The input for the cell for the **Secondary Direction Total Number of Lanes** is 2, the **Number of Open Lanes** is 1, and the **Number of Temporary Lanes** is 0. The input for the **Primary Direction** is then 2 for the **Total Number of Lanes**, 1 for the **Number of Open Lanes** and 0 for the **Number of Temporary Lanes**.

2. Type of Work Zone



We have 52 different types of work listed according to CDOT's items. To select a **Type of Work** just point and single click on the item. You can arrow down (right side of the type of work box) to scroll to more items.

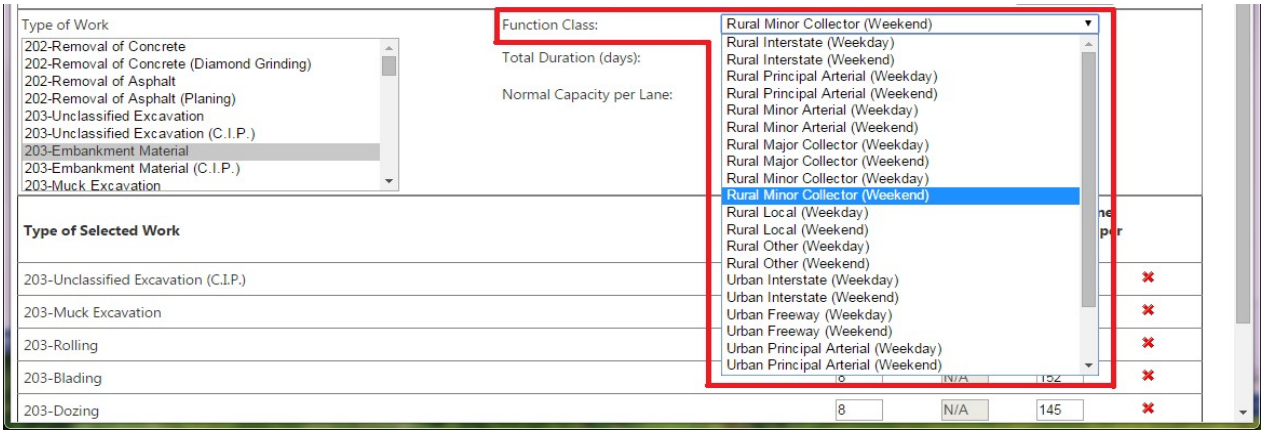
Once you point and click on an item, the type of work moves down into the **Type of Selected Work** area of the page. After the item has been selected, if you don't want to do that type of work just single click on the little red X to the right of the line item and the item will be removed from the list. A good

practice is to pick the major item of the work to be constructed, not having more than 5 at most. However, you can select up to 25 types of work.

Once a **Type of Work** is selected, default values have been assigned in order to determine the duration of the work and the capacities of the lanes. If you think the duration or capacity is different, click in the box for Duration, Depth, or Capacity and simply type a new value. The capacity adjustment factor has a set default value based on data from the Highway Capacity Manual, if you have equipment very close to the travelling public, you should decrease the default value. The following table gives you the range in capacity that you can use to modify for your particular type of construction.

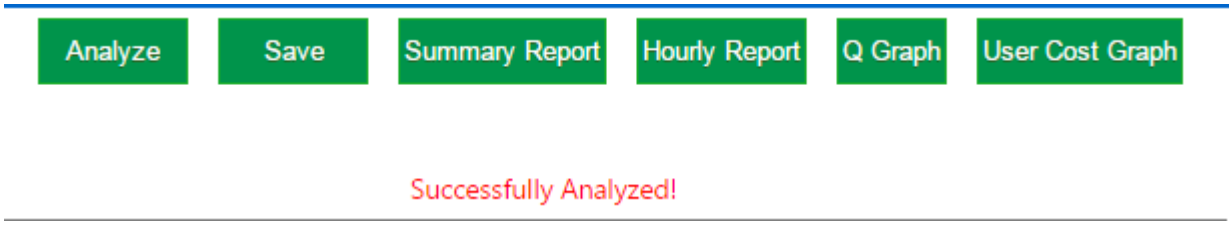
Item	Description	Int. Adj. Factor	Item	Description	Int. Adj. Factor
202	Removal of Concrete	-160 to +50	403	HMA Stone Matrix Asphalt	-100 to +160
202	Rem. of Concrete (Planing)	+120 to +160	403	HMA (Patching)	0 to +160
202	Removal of Asphalt	-160 to + 50	403	HMA (Asphalt) ≤ 1.0”	-100 to +160
202	Rem. Of Asphalt (Planing)	+120 to +160	403	HMA (Asphalt) ≤ 2.0”	-100 to +160
203	Unclassified Excavation	-100 to +100	403	HMA (Asphalt) ≤ 3.0”	-100 to +160
203	Uncl. Excavation (C.I.P.)	-50 to + 100	405	Heating and Scarifying	-50 to +100
203	Embankment Material	-100 to +100	406	Cold-in-Place Recycle	-50 to +100
203	Emb. Material (C.I.P.)	-50 to +100	408	Hot Poured Joint & Crack Sealant	-100 to +160
203	Muck Excavation	-50 to +50	409	Microsurfacing	-100 to +160
203	Rolling	+100 to +160	412	Concrete Pavement System	-160 to +160
203	Blading	+50 to +160	412	Concrete Pavement ≤ 6.0”	-160 to +160
203	Dozing	-50 to +100	412	Concrete Pavement ≤ 10.0”	-160 to +160
210	Adjust Guardrail	-50 to +50	412	Concrete Pavement ≤ 14.0”	-160 to +160
210	Replace Concrete Pvmt.	0 to +50	412	Routing & Sealing PCCP Cracks	-100 to +160
304	Aggregate Base Course	-50 to +50	412	Cross Stitching	-100 to +100
306	Reconditioning	-50 to +160	412	Rubbilization of PCCP	-120 to –160
310	Process Asphalt Mat for Base	-50 to +100	***	Misc. Other Roadway Constr.	-160 to +160

3. Function Class



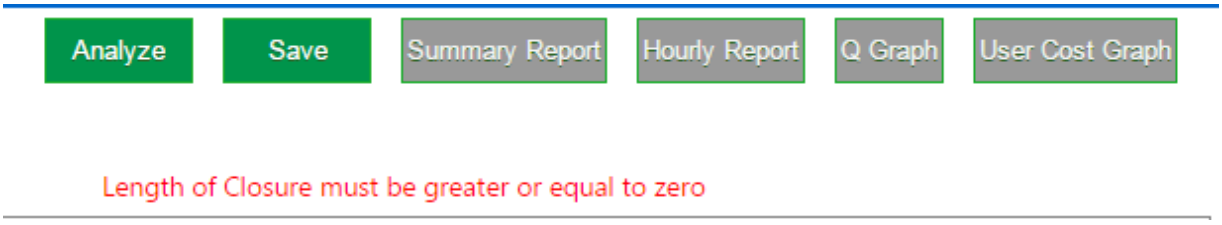
The **Function Class** is a scroll down menu. Weekend and weekday options are provided for each functional class. For lane closures spanning weekdays and weekends, both scenarios should be run and a weighted average user cost calculated. Point and single click on the item to select it.

4. Run the Program



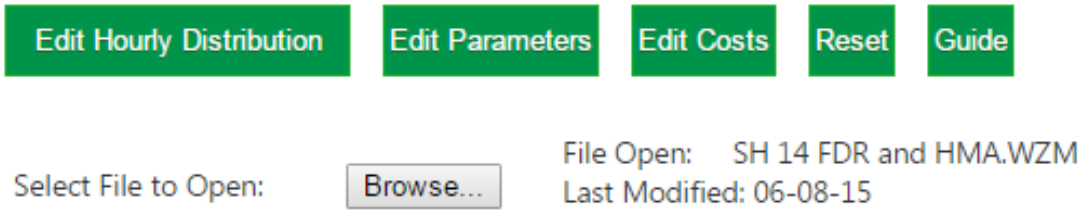
When you click the **Analyze** button you will either get a success, or an error message. If all your data verifies, then the Report buttons will turn green and you can see all of your reports by clicking their button. A new page with the report will open in your browser, which you can then print by right click and select **Print**.

If entries are invalid in some way, you will get an error message that will let you know where to look to fix the problem:



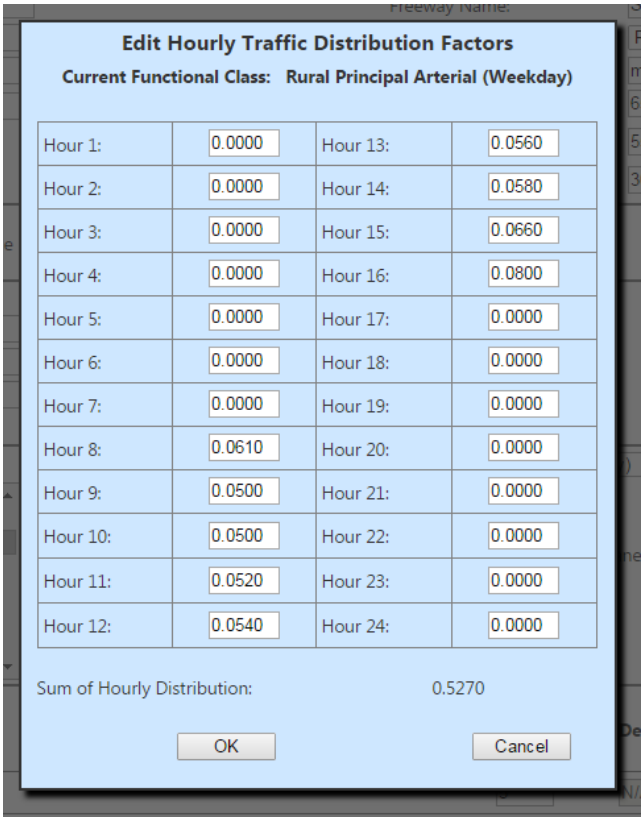
Other Input Edits

Buttons that will allow you to customize your information and impress the engineers are available on the top row.



IMPORTANT NOTE: Once you have changed any information with these Input Edits, you must save it by selecting **OK** to close the Edit box you opened. If you click on Cancel to close the box, it will not save any changes you entered.

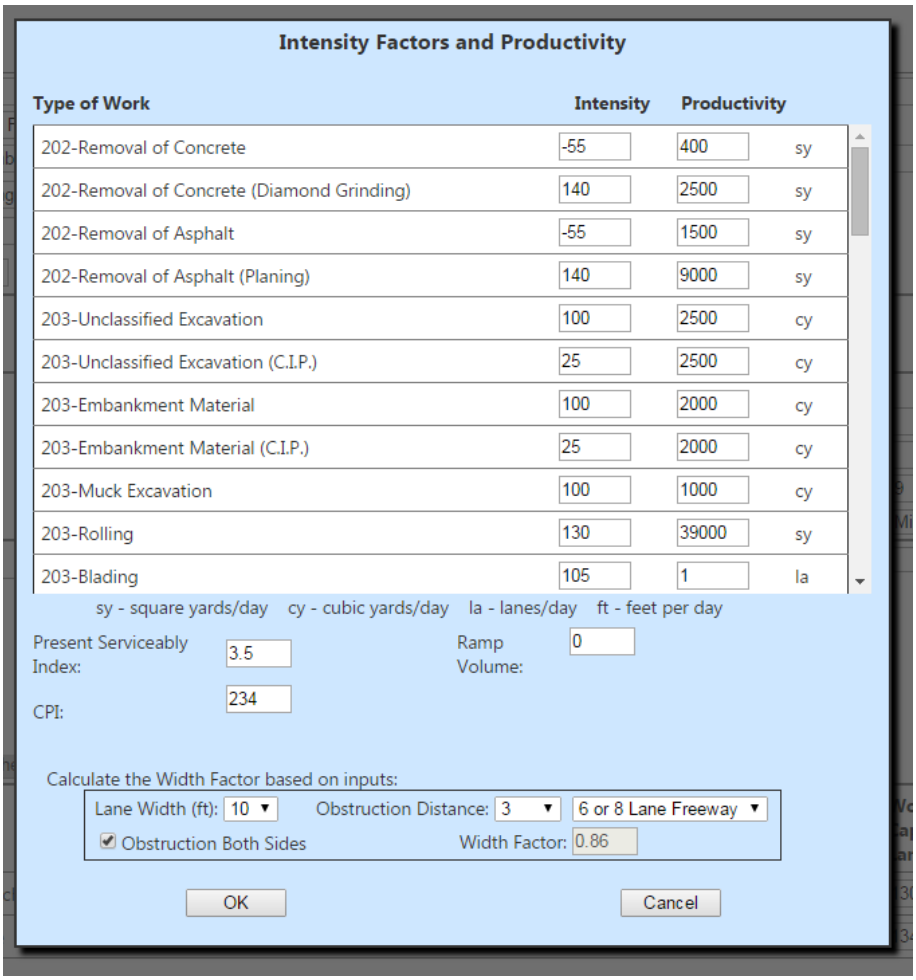
Edit Hourly Distribution:



Allows you to change the values for your project. Staff traffic has an internal web site (http://internal/App_DTD_DataAccess/index.cfm with a tab for traffic counts). You may not find the traffic distribution for your project at the DTD site because not all the data is available at this time. The total sum of distribution factors cannot exceed 1.0.

IMPORTANT NOTE: **We should not allow a queue greater than 5 miles to form or a delay greater than ½ hour (As per Dan Hopkins)**. We are only looking at the user cost when a work zone is in place therefore, if the contractor only works from 9:00 a.m. to 5:00 p.m. on a SLC then all the hourly traffic distribution values **outside** the working time should be changed to zero (0).

Edit Parameters:



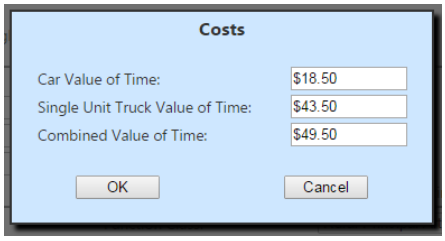
If you change the intensity value (how close the contractor is working to the travelling public) you will change the lane capacity. If you change the productivity you will change the duration.

The Present Serviceability Index, PSI, describes the road quality, a lower value means that the road is rougher and it slightly increases the user cost due to wear and tear on the vehicles.

If you change the lane width factor you will change the capacity. The Width Factor will be determined according to the Highway Capacity Manual with the 4 inputs: Lane Width, Obstruction Distance, Freeway size, and whether the obstruction is on both sides.

If you have ramps that are not metered in your project, the traffic accelerating and slowing down will affect the capacity in the work zone so you may want to include the increased volume from the ramps.

Edit Costs:

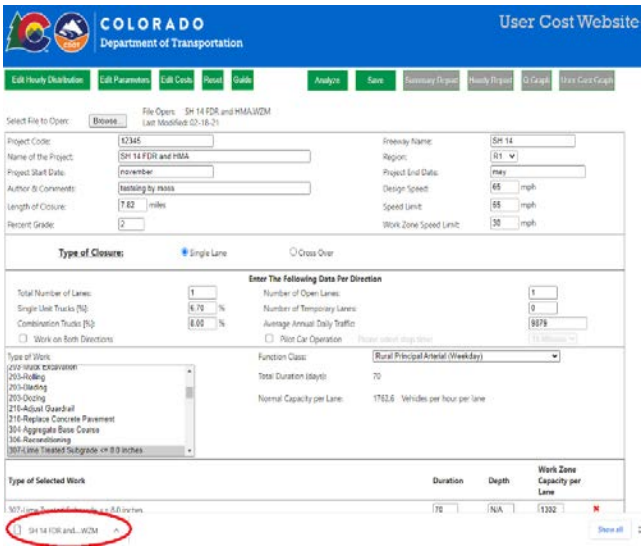


You can change the Value of Time for Car, Single Unit and Combine Trucks. Again, remember to hit **OK**, not **Cancel** if you want the program to save your changes.

Reset:

Careful! This will clear your page and reset all defaults!

Save:



This will save all inputs, including any changes to the Hourly Distribution, Parameters, and Costs. when it was last modified. When you click **Save**, the file will appear in the bottom left of your web window.

If the file does not appear, you may have pop-ups blocked. You can allow them only for this site by clicking the red x on the top navigation bar of your web browser that will appear when the program tries to download the file. Next, simply click on the file, select **Open**. A text file will open. From the notebook text editor, select **File**, then **Save**, to save it onto your computer. Next time into the program, you can open that file from the **Browse**… button at the top of the screen.

Have fun with the program; it beats doing it by hand!

If you have any problems or comments on the program, please call the Pavement Design Unit in the Materials and Geotechnical Branch, CDOT Headquarters at 303-757-9493.