





# Mobility Fundamentals

## *Training Outline*

This class provides users a foundation in the basic operation and function of Mobility. Main topics include the Roadlog, Inventories, Canned, and Custom Reports.

**DAY 1**  
8:00AM – 11:30 AM

### ■ Introductions

- Discuss Mobility's purpose and background

### ■ Mobility User Interface

- Navigation & Data Entry
- Road Building Exercise
- Road Log/Fuel Tax/Standards of Good Practice

### ■ Inventories

- Reference Points
- Signs
- CLAS
- Traffic Studies
- Culverts
- Other

### ■ Lunch

### ■ Reporting

- Canned Reports
- Custom Reports
  - Discussion
  - Hands – On
    - Query the Database
    - Format Report Layout
    - Design a Report Layout
    - Export a Layout
    - Report File Management of the FTP Site

**DAY 1**  
12:30 – 4:00 PM



# Mobility Pavement Management

## *Training Outline*

This class provides users a foundation in the basic operation and function of Mobility's Pavement Management System (PMS). Users will understand what makes up a good Pavement System, review pavement related inventories in Mobility, create decision trees, and how to configure and run the Pavement Management processes in Mobility.

**DAY 2**  
8:00AM – 11:30 AM

### ■ Introduction

- Discuss PMS purpose and background

### ■ Create Decision Tree

- Pre-Planning your decision tree
- Decision Tree Exercise

### ■ Run Mobility Pavement Management

- Generate Projects
- What Analysis
- When Analysis

### ■ Review Pavement Management Inventories

- RoadLog
- Surface History
- Surface Condition
- Planned Projects
- Projects

### ■ Generate Pavement Management Reports

### ■ Upon Request

- Pavement Rating Class
- VisRate Pavement Rating Software

## Create a new Road

In order to add road segments and other inventory features to a new road, you must first create the road. Follow the steps below to create a new road.

- 1) From the **File** menu select **New** OR right-click in the feature list (in the center of the screen), then click on **New**, and choose **Road** from the menu list. The **Create New Road** screen displays in figure 1.
- 2) Type in the new road number and road name in the fields below and then click the **Create New Road** button.

Figure 1

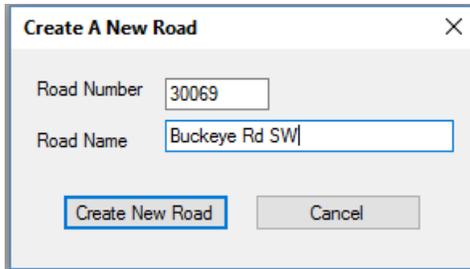
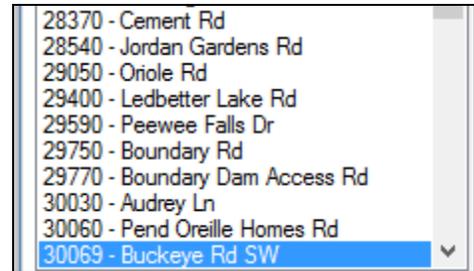


Figure 2



The new road displays in the road list (on the left side of your computer screen) as pictured in figure 2 above. A new reference point displays as **0.000 \*unknown\*** at the top of the Feature List (middle pane). You can now add features to the new road (covered below under ‘Create a new record’).

The next step is to modify the new unknown reference point and then define the remaining reference points and new road segments for the road. Follow the steps below to create reference point records.

## Reference Points

Reference Points serve two main purposes. They assign road names to sections of a road and reference points order and define many segments as a road system network.

One big advantage of reference points is the location information provided by Mobility dynamically.

Reference Points can be intersections, beginning-ending mileposts, and other county points of interest such as but not limited to the following:

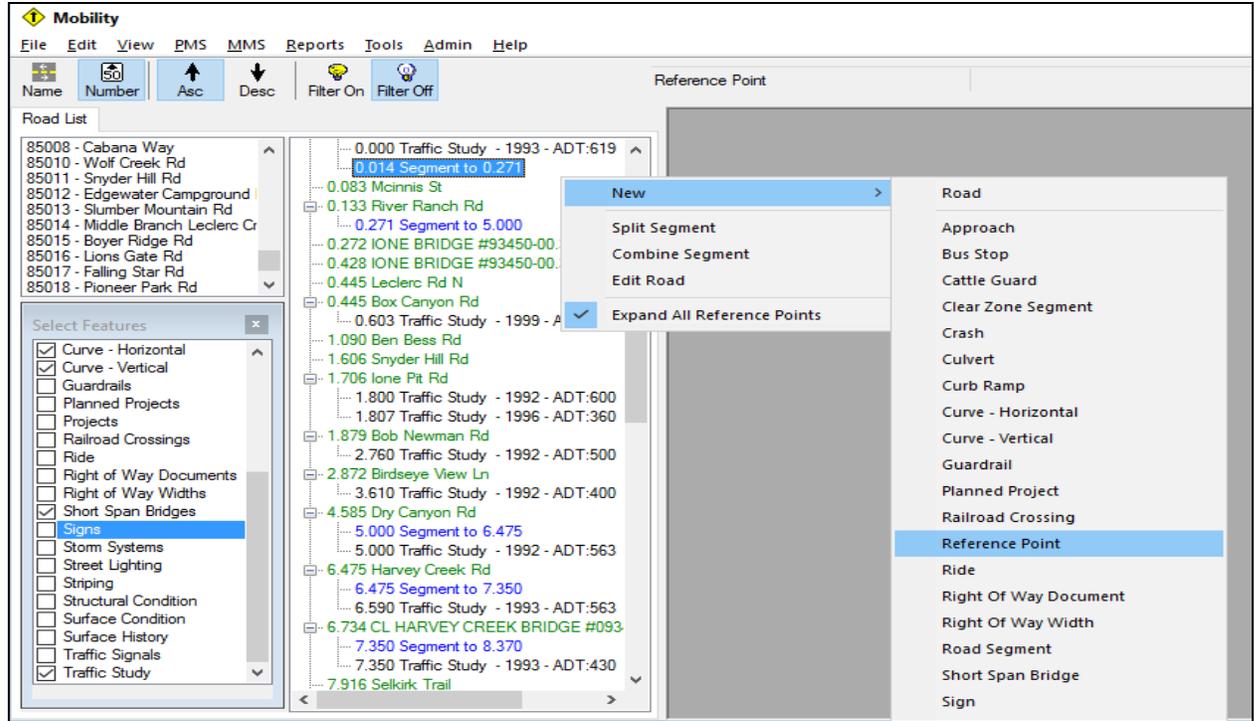
- Landmarks
- Road Name Changes
- Pavement Type Changes
- Pavement Year, Pavement Width, etc.

The Reference Points form now includes fields to assist in Systemic Safety Analysis that works with Mobility’s Systemic Safety Project Selection Tool. The fields display to the right of the **Ahead** field on the Description Tab. Safety analysis includes data on intersections, horizontal and vertical curves.

Create an Intersection Reference Point

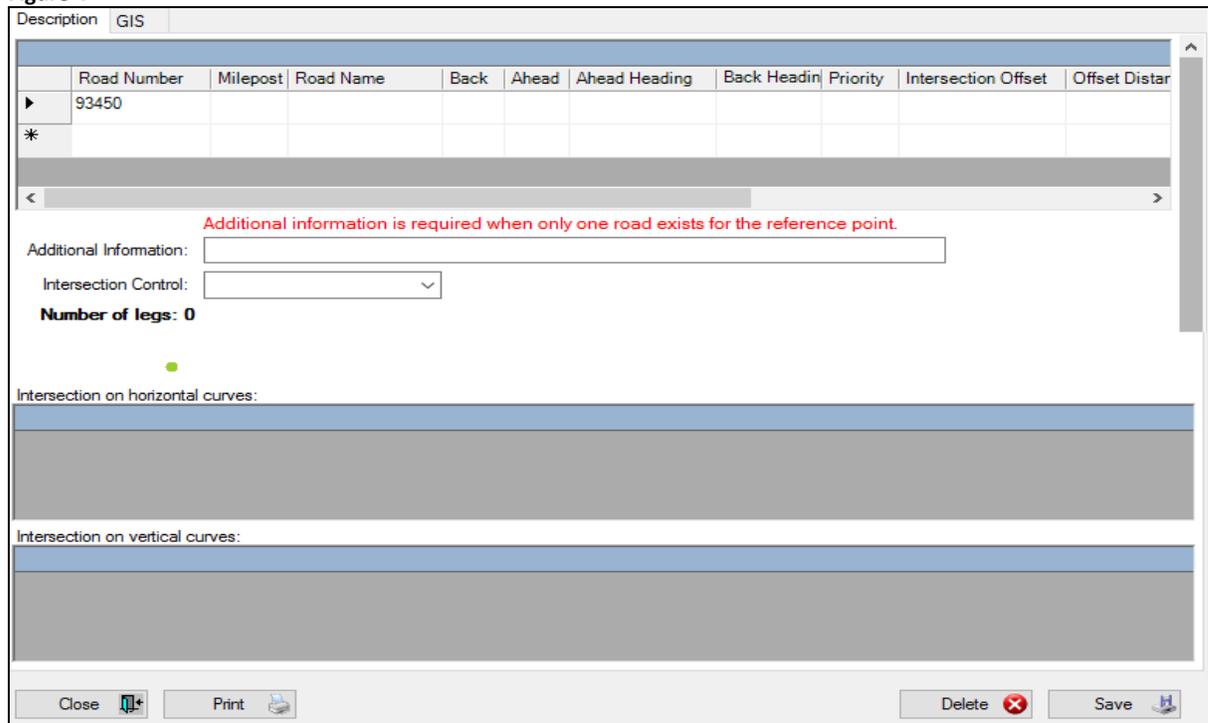
1. Either click **File** on the menu bar and click **New** then **Reference Point** OR
2. Right-click in the **Feature List** (middle pane), click **New** then click **Reference Point**. See Figure 3

Figure 3



A blank Reference Point form shown below displays in the form window (right-pane) Figure 4.

Figure 4



In the **Description** tab click in the milepost field and enter the milepost of the selected road where the intersection is located. The milepost is 0.445 in Figure 4.

1. Press the **TAB** key to display the road name in the **Road Name** field (Note: The road must be in Mobility for this to display automatically).
2. Press the TAB key to advance to the direction **Back** and **Ahead** fields.
3. Enter one of the following: N, S, E, W, NE, SE, SW, NW, NNE, ENE, ESE, SSE, SSW, WSW, WNW, and NNW.
4. TAB over to the **Priority** field. Enter a number for the priority. A priority of 1 is sometimes assigned to the road with a higher Federal Function Class. This is optional and varies from county to county.
5. TAB to each field and fill in the remaining fields.
6. TAB down to next row and enter the road number for the intersecting road (In Figure 4 we are using road number 36690 Box Canyon Rd in this example).

You will see a diagram of the intersection begin to render in the center of the reference point form.

Figure 5

The screenshot shows a software window with a 'Description' tab. At the top, there are two tabs: 'Description' and 'GIS'. Below them is a table with the following data:

	Road Number	Milepost	Road Name	Back	Ahead	Ahead Heading	Back Heading	F
▶	93450	0.445	Sullivan Lake Rd	W	NE			
	36690	0.000	Box Canyon Rd	N				
*								

Below the table, there are several input fields: 'Additional Information:' (text box), 'Intersection Control:' (dropdown menu), and 'Number of legs: 3'. A diagram shows three roads meeting at a central point: a horizontal road labeled '93450', a vertical road labeled '36690', and a diagonal road labeled '93450'. Below the diagram are two sections: 'Intersection on horizontal curves:' and 'Intersection on vertical curves:', both with empty text boxes. At the bottom, there are buttons for 'Close', 'Print', 'Delete', and 'Save'.

7. TAB over to the **Milepost** field and enter the intersecting milepost. **Note:** The road name displays automatically in the Road Name field.
8. TAB over to fill in the direction **Ahead** and **Back** fields.
9. TAB over to the **Priority** and enter a value for the road priority.
10. TAB down to the next row and the intersecting road that you have just entered now displays in the diagram. Fill in the **Additional Information** field if needed.

11. Select an option from the **Intersection Control** field.
12. Enter another intersecting road or click the **Save** button to save your changes.

**Note:** when you add a new intersecting road the **Number of Legs** updates automatically when you **TAB** down to the next row.

Create a new Reference Point Record (non-intersection)

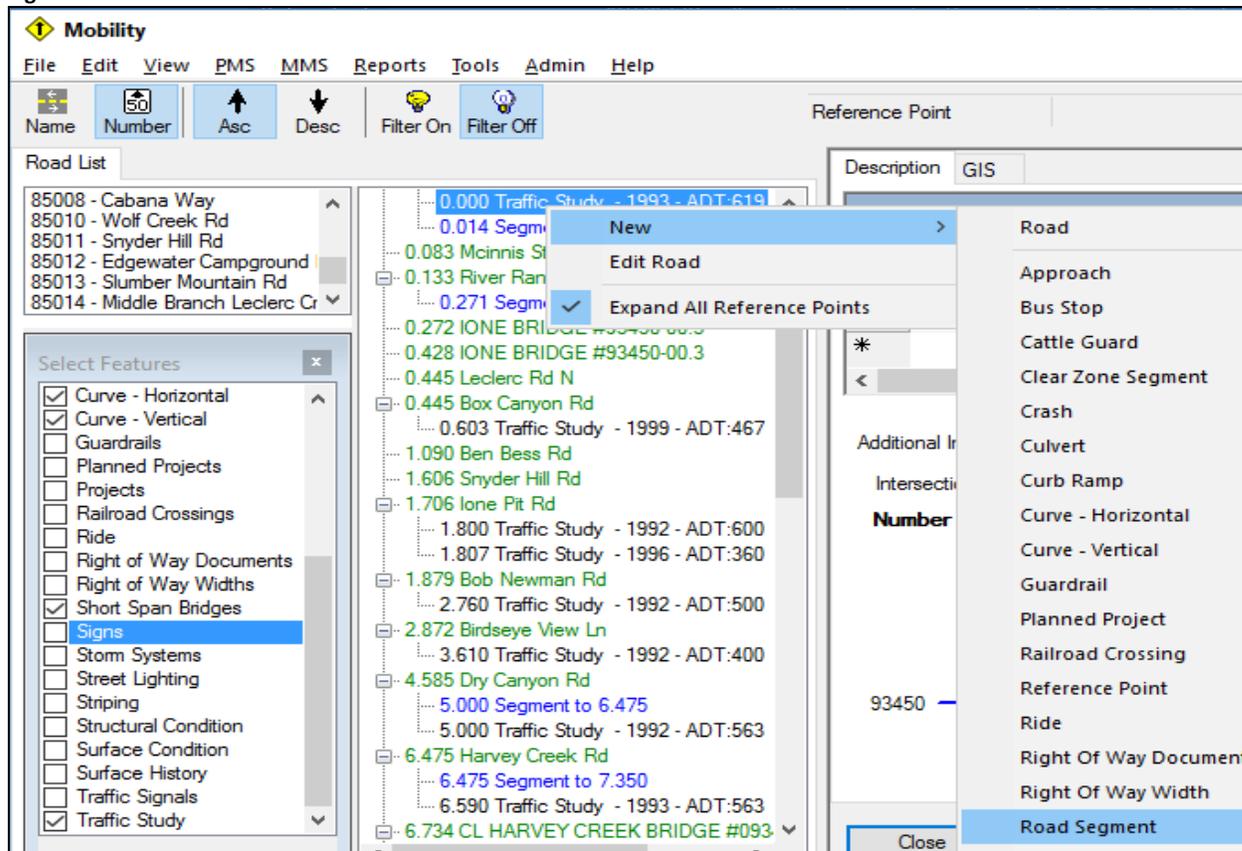
1. From the **File** menu select **New > Reference Point** OR right-click in the feature list and click **New > Reference Point**.
2. Fill in the Milepost field.
3. TAB to the Road Name field and the Road Name will display automatically.
4. TAB to and fill in the Back and Ahead fields.
5. Fill in the Priority field if desired.
6. TAB to and fill in any remaining fields that you desire to track.
7. Fill in the Additional Information field if needed.
8. Click the Save button.

It is a common practice to define your reference points and then create road segment records for a new road.

Create a new Road Segment

1. Either go to click **File** on the menu bar, click New then click Road Segment OR
2. Right-click in the Feature List, click New then click Road Segment. See figure 6.

Figure 6



A blank road segment form will display in the form window as shown in figure 7 below.

3. Click the Save button to see the information notices that inform you that there are required fields to save the road segment record. In this case, these fields are Motor Vehicle Fuel Tax (MVFT) related fields. See figure 7.

Figure 7

The screenshot shows a software window titled "Reference Information" with several input fields and tabs. The "Reference Information" section includes fields for Road Number (93450), Road Name (Sullivan Lake Rd), From Milepost, To Milepost, From (at State Highway 31), and To (at State Highway 31). Below this are tabs for Classification, Enhanced Cross Section, Structure, Traffic, Needs Analysis, Districts / Routes, Area, Misc, and GI. The main form area contains dropdown menus for Federal Function Class, Local Function Class, Jurisdiction, Primitive Road, National Hwy System, HPMS Segment, In Urban Growth, Federal Urban Area, Build to Urban Standards, and MPO / RTPO. There is also a "Truck Route" section with fields for Class, Route, and Season. At the bottom, there are buttons for Close, Print, Clone, Delete, and Save. Red exclamation mark icons indicate required fields.

4. Fill in the all of the required MVFT fields and all other fields that you want to track or report on.
5. Click the **Save** button to save your data entry.

When you change a MVFT field, or add or delete mileage, the Audit Trail Dialog will display. Document your changes using the **Comment** and **Reference #** fields as shown in figure 8.

Figure 8

The screenshot shows a dialog box titled "Audit Trail Dialog" with a message: "This action affects gas tax control field(s) or is a truck route classification change. Enter the next reference number and add it to the documentation for this update." It contains a "Comment:" field with the text "New Plat", a "Reference #:" field with "JTO1601", and a "Last Reference # Used:" field with "N/A". At the bottom are "Cancel" and "OK" buttons.

Click the **OK** button and your new record will display in the feature list. Note the “**Inventory item saved**” message in the middle status box at the top of your screen.

Road Log Edit Checks

In the Roadlog you are required to fill in all of the Motor Vehicle Fuel Tax (MVFT) fields to save a road segment record. Additionally, Mobility checks to ensure that the **Federal Function Class, Urban Area, and Federal Route** fields are compatible and filled in correctly. See figure 9 below.

If they are not, you cannot save the record and the fields in question are marked with red circles **!** and triangles **▲**. Place your mouse over the highlighted fields to display a tool tip to help you correct the entry.

- A **Federal Route** is now required whenever a road log segment has a Federal Function Class of 02 (Major Arterial), 06 (Rural Minor Arterial), 07 (Rural Major Collector), 08 (Rural Minor Collector), 12 (Urban Principal Arterial, other freeways or expressways), 14 (Urban Principal Arterial, other), 16 (Urban Minor Arterial), or 17 (Urban Collector)
- An **Urban Area Code** is now optional when a road log segment has a Federal Function Class of 00 (Proposed or projected; private; non-county system road). (Jurisdiction must not be 05)

Figure 9

MOBILITY ROADLOG EDIT CHECKS				
<b>RURAL</b>	<b>FFC</b>	<b>FEDERAL ROUTE</b>		<b>URBAN AREA</b>
	00	null OR NFA		Optional
	02	3N1A		Not in urban area or null
	06	2N1A1N		Not in urban area or null
	07	1A3N		Not in urban area or null
	08	2N2A		Not in urban area or null
	09	null OR NFA		Not in urban area or null
<b>URBAN</b>	12	4N		<b>1-98</b>
	14	4N		
	16	4N		
	17	4N		
	19	null or NFA		
3N1A = three numeric characters and 1 alpha character				
2N = the county number from 01-39				
1-98 = Urban Area				

### Delete a road

To delete a road, you must have administrator rights. Use Delete Road very carefully. Ensure you fully understand what you are deleting and the consequences. ALL inventories on the deleted road will be deleted too. If you are not sure if this is the correct step to take, please call or email CRAB before deleting.

- 1) Click on the road that you want to delete in the road list to select it. It will highlighted in blue once you click on it.
- 2) Click on **Admin Tools** on the menu bar.
- 3) Click the **Delete Road** button and the **Confirm Road Delete** dialog displays.
- 4) Click the **OK** button to delete the road.

### Create a new record

Create all Inventory records the same way no matter what inventory you are using. Follow the steps listed below.

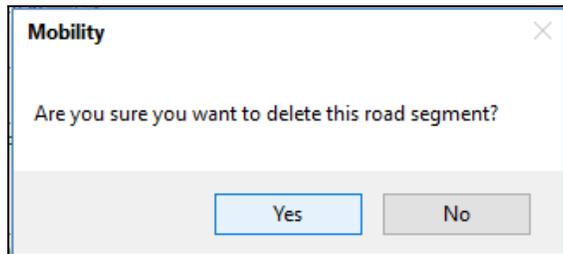
1. From the **File** menu select **New** OR right-click in the road list or feature list and then click **New** on the menu.
2. Click on the type of record that you want to create from the menu.
3. Enter data in the fields on the displayed inventory form.
4. Click the **Save** button to save the record and it will then display in the feature list.

### Delete a record

Delete all inventory records using the steps listed below.

1. In the road list, select the road on which the inventory feature record is located.
2. Double-click on the record in the feature list to open the record in the form window.
3. Click the **Delete** button on the bottom of the form in figure 10 to display the message below.

Figure 10



4. Click the **YES** button to confirm and delete the record.

Do not forget to fill in the required **Motor Vehicle Fuel Tax** fields. You cannot save the record unless they are filled in. See the online Mobility Help topic under RoadLog/Gas Tax Control Fields for more information.

Now that you have added reference points and road segments to the road, next comes Mobility Inventory items. We will begin with signs.

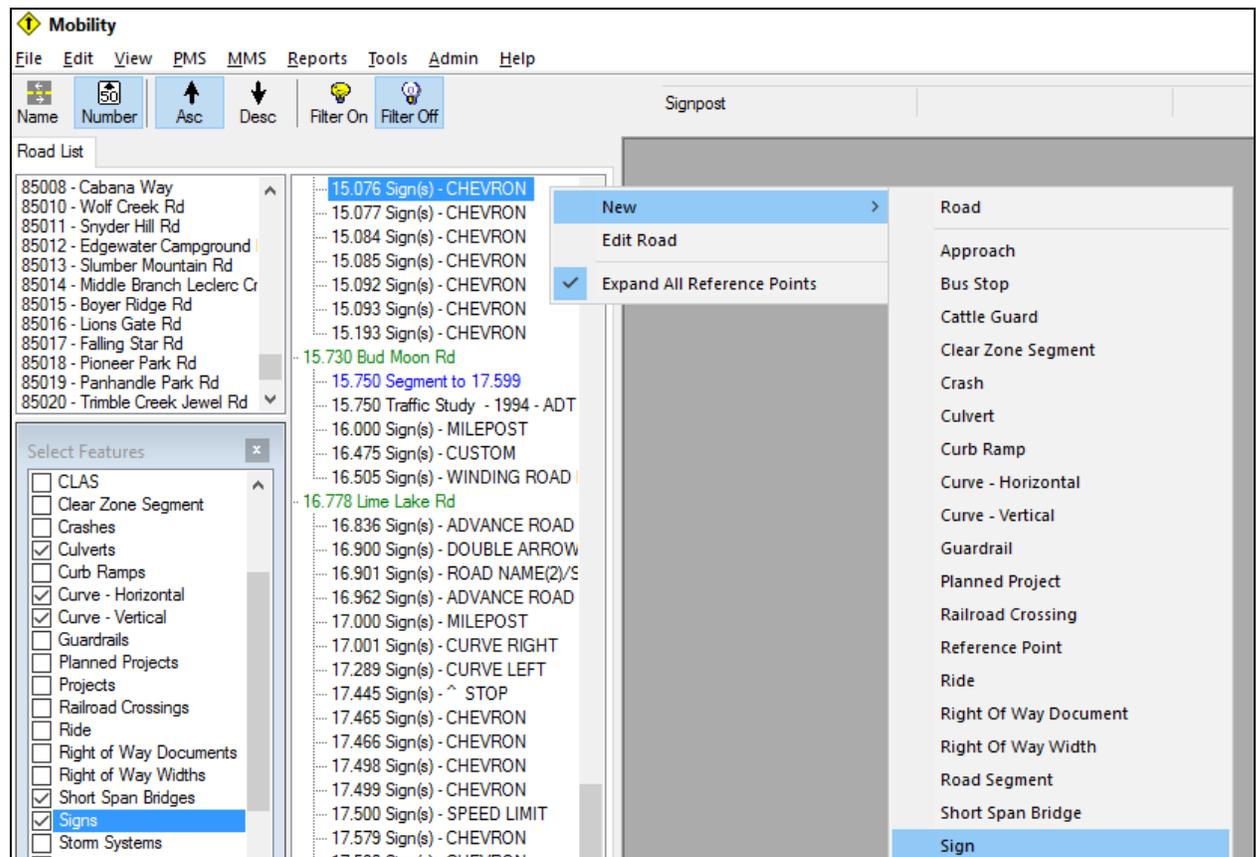
## Signs

### Create a new sign record

Creating a sign record is a two-step process. First, create and save the signpost and then add the sign plate(s) to the post. Finish by the saving the complete record as outlined in the steps below.

1. Either click **File** on the menu bar, click **New** then click **Sign** OR
2. Right-click in the Feature List, click **New** then click **Sign**. See figure 11.

Figure 11



**Note:** Check with your Mobility Administrator prior to entering Sign Data or other Inventories that you perform maintenance on. You may to decide to set up Maintenance Activities and Codes for each inventory. This action will save you steps in data entry and prompt you automatically to choose to create a maintenance record for Signs or other Mobility Inventories.

## Mobility User Training

If a maintenance code was linked to the installation. You get asked to add a new maintenance record before filling in the SignPost form. If a maintenance code has not been linked to the installation a blank Signpost form will display on your screen (figure 12 next page).

A blank Signpost form will display in the form window.

3. Click the **Save** button to view required fields to save the record. The field will have an exclamation point next to them and a red triangle will display to inform you that there is a required field on a tab.

Figure 12

The screenshot shows a web-based form for creating a signpost record. At the top, there is a 'Reference Information' section with fields for 'Road Number' (93450), 'Road Name' (Sullivan Lake Rd), 'Milepost' (empty, with a red exclamation point icon), and 'Location' (at State Highway 31). Below this is a tabbed interface with 'Description', 'Maintenance', and 'GIS' tabs. The 'Description' tab is active, showing fields for 'Date Installed' (with a calendar icon), 'Type' (dropdown), 'Side of Road' (dropdown with a red exclamation point), 'Number of Posts' (input), 'Treatment Type' (dropdown), 'Offset' (input), 'Post Length' (input), 'Distance Requirement' (input), and 'Condition' (dropdown set to '9 - Excellent. No defects'). Below the form fields is a 'Sign Plates' table with columns for Pos., Orient., Serial #, Date Inst., and Legend. The table contains one row with a blue '<edit>' link in the Pos. column and '--- Add new record ---' in the Legend column. At the bottom of the form is a 'Comment:' text area and a toolbar with buttons for 'Close', 'Print', 'Clone', 'Delete', and 'Save'.

Pos.	Orient.	Serial #	Date Inst.	Legend
<edit>				--- Add new record ---

4. Click the date control to select the **Date Installed**.
5. Fill in the required **Milepost** and the **Side of Road** fields as a minimum, plus any other desired fields. You can save the signpost record now.
6. Click on the blue **<edit>** text in the **Signplates grid** in the row that has “**Add new record**” in the legend column to display the Signplate form (figure 13 on the next page).

Figure 13

The screenshot shows a software window titled "Signplate" with a close button in the top right corner. The window is divided into several sections:

- Description:** Includes a "Retroreflectivity" tab, a "Date Installed" field with the value "9/15/2016" and a calendar icon, and a larger "Description" area containing:
  - "Type/Legend": A dropdown menu showing "R1-1 STOP".
  - "Color": A dropdown menu showing "W/R White legend, Red backgro".
  - "Legend Detail": An empty text input field.
  - "Plate Material": A dropdown menu showing "Aluminum".
  - "Size": A dropdown menu showing "30X30".
  - "Sheeting Material": A dropdown menu showing "High Intensity".
- Installation:** Contains fields for "Serial Number", "Mount Position" (value "1"), "Height", "Orientation" (dropdown showing "South"), and "Bar Code".
- Condition:** Contains four dropdown menus, all showing "9 - Excellent. No defects": "Plate", "Visibility", "Reflectivity", and "Overall".
- Comment:** A large empty text area.
- Buttons:** At the bottom, there are buttons for "Close", "Print", "Clone", "Delete", and "Save". The "Save" button is highlighted with a blue border.

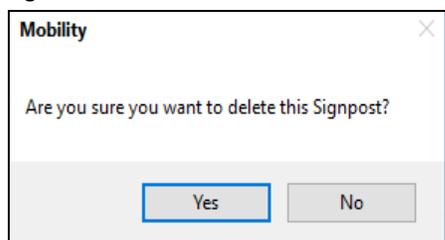
7. Fill in the Signplate fields and choose the plate from the **Type/Legend** field drop-down list.
8. Click the **Save** button when you are finished and return to the signpost form and the new sign record will display in the feature list.

Delete a sign record

1. In the feature list, double-click the sign record that you want to delete. The sign record's form will open and display in the form window.
2. Click the **Delete** button at the bottom of the form.

Confirm the delete operation as shown in figure 14 on the next page.

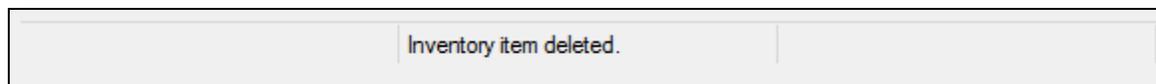
Figure 14



3. Click the Yes button to delete the Sign record.
4. If a maintenance code has been linked to the removal, you will get prompted to add a new maintenance record before deleting the sign. This allows you to enter the actual date that sign was removed, instead of the date that you deleted in from Mobility. If a maintenance code has not been linked to the installation, the Sign is deleted when you click the Yes button.

The sign form closes; the sign record is removed from the feature list, and note that the **“Inventory item deleted message”** displays in the status box at the top of the form as pictured in figure 15.

Figure 15



To review deleted sign records, you can create a custom report using the qSignHistory view in Custom Reports or use the canned Sign History report.

**All records in Mobility are deleted in the same manner. You must open the record and press the Delete key at the bottom of the form.**

## Traffic Study

### Create a new Traffic Study Station

Counties annually conduct Traffic Study counts on portions of their road system. With the ever-increasing importance of Vehicle Miles Traveled (VMT) a current, accurate traffic volume is very important. Traffic studies determine potential Truck Routes (T-1 thru T-5), update the classification of existing Truck Routes and for verifying and updating average daily traffic (ADT) volumes.

Traffic Study information is also an integral part of Mobility’s Pavement Management System (PMS). Traffic counts are often one of the deciding factors on when, what type, and where a county road will receive a Pavement Rehabilitation treatment.

### Create a new count station

1. Select the road from the Road List that you want to collect traffic county data.

## Mobility User Training

2. Right- click in the feature list.
3. Click **New** and then click on **Traffic Study** to display a blank Traffic Study Station form as seen in figure 16 on the next page.
4. Fill in the desired fields then click the **Save** button to save the results data to the station.

Figure 16

Reference Information

Road Number:  Road Name:

Milepost:  Location:

Description

Count Station ID:

Intersecting Road:

Intersection Leg:  Side of Road:

Traffic Study Results						
		End Date	ADT Year	ADT Volume	Lanes Studied	Comment
▶	<a href="#">&lt;edit&gt;</a>					--- Add new record ---

Comment:

## Mobility User Training

- Information entered into the Count Station ID field will display in the feature list when the record is saved as shown in figure 17.

Figure 17

The screenshot displays a software interface with a feature list on the left and a detailed form on the right. The feature list includes items like '0.010 Traffic Study - Speed Study - 2001 - ADT:196', which is highlighted with a red box. The form on the right has a 'Reference Information' section with fields for 'Road Number' (56000), 'Road Name' (OYLER RD), 'Milepost' (0.010), and 'Location' (53 ft. South of HWY 12 @ 72.16). Below this is a 'Description' section with a 'GIS' tab and a 'Count Station ID' field containing 'Speed Study', also highlighted with a red box. At the bottom right, there is a 'Traffic Study Results' table with columns for 'End Date', 'ADT Year', 'ADT Volume', 'Lanes Studied', and 'Comment'. The table contains several rows of data, with the last row having a comment that says '--- Add new record ---'.

Traffic Study Results						
		End Date	ADT Year	ADT Volume	Lanes Studied	Comment
▶	<edit>	4/3/2001	2001	196	All through lanes	15.4% TRUCKS
	<edit>	3/15/1991	1991	198	All through lanes	M.P. 0.02
	<edit>	8/15/1986	1986	90	All through lanes	250' SOUTH OF HWY #12
	<edit>	6/17/1983	1983	141	All through lanes	US #12 INT
	<edit>					--- Add new record ---

- Click on the blue <edit> text in the **Traffic Studies Results Grid** in the row that has “Add new record” in the Comment column to display the Traffic Study Result form show in figure 18.

Figure 18

### Traffic Study Result ✕

Update Date:   Update Road Log? (All Through Lanes Studied required)

Lanes Studied:  Equipment ID:

Studied By:  Weather:

Study Purpose:

Data File:

Comment:

#### Average Daily Traffic

Volume:

Year (4 digit):

Source:

#### Time Period

Begin Date:  End Date:

Begin Day:  End Day:

Begin Time:  End Time:

#### Percentages or Counts

Numbers are:

Total Truck:	<input type="text"/>	<input type="text"/>
Truck-Single:	<input type="text"/>	<input type="text"/>
Truck-Double:	<input type="text"/>	<input type="text"/>
Truck-Train:	<input type="text"/>	<input type="text"/>
Bus:	<input type="text"/>	<input type="text"/>
RV:	<input type="text"/>	<input type="text"/>

#### Peak Hours

AM Volume:  Start Hour:

PM Volume:  Start Hour:

#### Truck Route

Gross Annual Tons:

Truck Route Class:

Truck Route Season:

Truck Route recommendation based on WSDOT specs

Update the Road Log with the Traffic Study results.

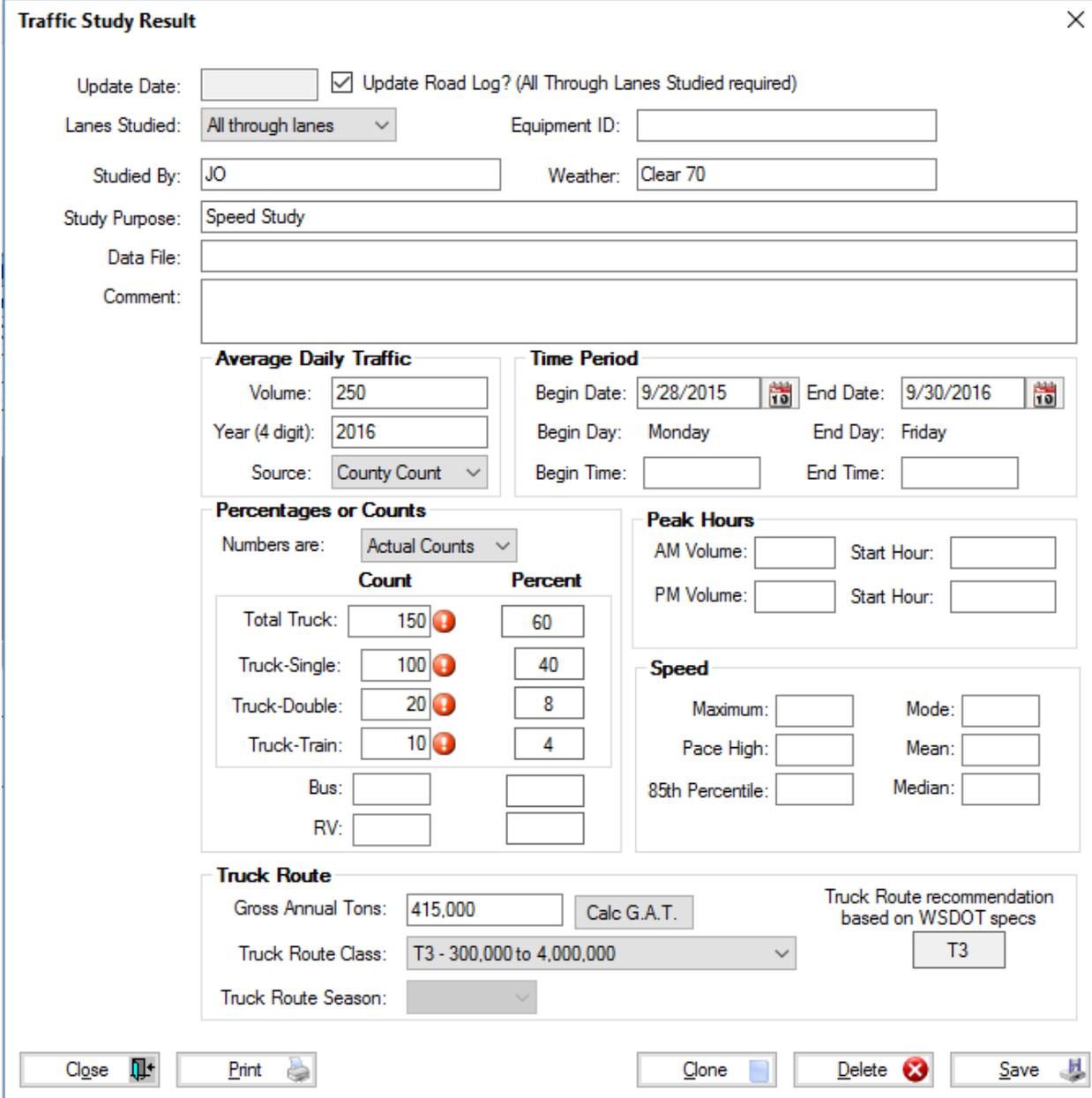
7. Select All through lanes from the **Lanes Studied field** (You can only update the Road Log when All thru lanes is selected.)
8. Place a check in the box next to Update Road Log? (All Thru Lanes Studied required).
9. Enter a value in the **Volume** field.
10. Enter a value in the **End Date** field.
11. Select a value in the **Source** field.
12. These fields are required to Save the record and update the Road Log.

## Mobility User Training

13. You can also update the Truck Route Class in the Road Log from the Traffic Study Result form by using the following steps.
14. Specify whether you are entering Percentages or Counts in the **Numbers are:** field.
15. Enter the value in the **Total Truck** field.
16. Fill in the values for the **Truck-Single, Truck-Double, Truck-Train fields.**

These values must add up and match the value in the Total Truck field or the warning icons  will display as seen in figure 19.

Figure 19



The screenshot shows the 'Traffic Study Result' form with the following data:

- Update Date:   Update Road Log? (All Through Lanes Studied required)
- Lanes Studied: All through lanes  Equipment ID:
- Studied By: JO  Weather: Clear 70
- Study Purpose: Speed Study
- Data File:
- Comment:

**Average Daily Traffic**

- Volume: 250
- Year (4 digit): 2016
- Source: County Count

**Time Period**

- Begin Date: 9/28/2015  End Date: 9/30/2016 
- Begin Day: Monday End Day: Friday
- Begin Time:  End Time:

**Percentages or Counts**

Numbers are: Actual Counts

	Count	Percent
Total Truck:	150 	60
Truck-Single:	100 	40
Truck-Double:	20 	8
Truck-Train:	10 	4
Bus:	<input type="text"/>	<input type="text"/>
RV:	<input type="text"/>	<input type="text"/>

**Peak Hours**

- AM Volume:  Start Hour:
- PM Volume:  Start Hour:

**Speed**

- Maximum:  Mode:
- Pace High:  Mean:
- 85th Percentile:  Median:

**Truck Route**

- Gross Annual Tons: 415,000
- Truck Route Class: T3 - 300,000 to 4,000,000   T3
- Truck Route Season:

Buttons: Close , Print , Clone , Delete , Save

You can also add values to the Bus and RV fields. They are not included in the counts or percentage calculation. These fields get updated in the RoadLog Traffic tab in the ADT section.

17. Click the **Calc G.A.T** button to calculate the Gross Annual Tonnage (G.A.T.). The calculation is determined by the values that you entered into the Count or Percent fields
18. Accept or Select a different value in the Truck Route Class drop-down list field.
19. Click the **Save** button to display the Choose Road Log Segments screen in Figure 20.

Figure 20

**Choose Roadlog Segments**

Select the Roadlog Segments to be updated:

		Road #	BMP	EMP	Road Name	ADT	Year	Source	Truck
<input checked="" type="checkbox"/>		56000	0.0000	0.2410	OYLER RD	149	2010	County Count	T5
<input checked="" type="checkbox"/>		56000	0.2410	3.6680	OYLER RD	318	2013	County Count	T5

Update truck route classification

20. Click to check the box of the Road Log segments to update.
21. Click to check the box in the lower left corner to update the Truck Route Classification.
22. Click the **OK** button and the Audit Trail Dialog screen in Figure 21 displays.
23. Fill in the **Reference #** field.

Figure 21

**Audit Trail Dialog**

This action affects gas tax control field(s) or is a truck route classification change. Enter the next reference number and add it to the documentation for this update.

Comment:

Reference #:  Last Reference # Used:

24. Click the **OK** button to save the transaction to the Audit Trail.

The road segments specified in figure 20 (above) update with new Traffic and Truck Route data. You can now open and review the updated data in the Road Segment records.

See the following sections in this manual and Mobility’s Online Help for more information on Mobility Inventories, Pavement Management, Custom Reports, Systemic Safety Project Selection Tool, and the Mobility Map.

Remember!

1. Look in this manual and Mobility's Online Help.
2. Your support is a phone call or email away. 360-753-5989
3. We can do a remote session by phone and computer.

## Mobility Reports - Canned Reports

Mobility includes a set of canned reports that can quickly generate a formatted report. You can choose to export or print the reports. We continue to add canned reports when we receive feedback reports from county staff. See page three in this section for Custom Reports.

### Create a canned report

- 1) Click on **Reports** on the Mobility menu bar and select the area of interest for your report. Each area has several reports listed with it. This example uses the Roadlog Summary Report. Click on Reports on the menu bar and then Inventories ► Roadlog ► Roadlog.
- 2) Fill in the fields in the top section to specify your criteria for the returned record set. For this example, the filters selected were **Road Number** 63551, **Jurisdiction** = County, **Function Class** = any, **Pavement Type** = any, **Sort**: Road
- 3) Click the **Generate** button to create the report. The report will display as pictured in figure 1.

Figure 1

Road #	Mileage	Stationing	Year	Function Class	Pavement Type	Condition
63551	0.000	0.640	09	52	2007	Non
63551	0.640	0.760	09	52	2007	Non
63551	0.760	1.060	09	52	2007	Non
63551	1.060	2.110	08	49	2011	01BA 054 T5
63551	2.110	2.430	08	49	2011	01BA 054 T5
63551	2.430	3.260	08	49	2011	01BA 054 T5
63551	3.260	5.260	08	39	2012	01BA 054 T5
63551	5.260	5.780	08	39	2012	01BA 054 T5
63551	5.780	5.950	08	39	2012	01BA 054 T5
63551	5.950	7.360	08	39	2012	01BA 054 T5

### Print or Export a canned report

1. Click the **Print** button (3<sup>rd</sup> button from the left on the report tool bar).
2. View the prompt and select the printer name, number of copies, etc.

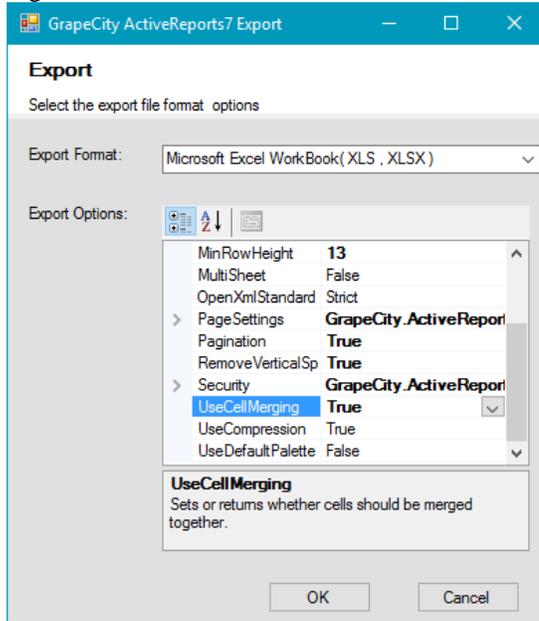
You can export canned reports in several different formats. The steps for exporting canned reports and custom reports are identical.

1. Click the Export Report button (2<sup>nd</sup> button from left on toolbar) to display the **Export** screen shown in figure 2 on the next page.

## Mobility User Training

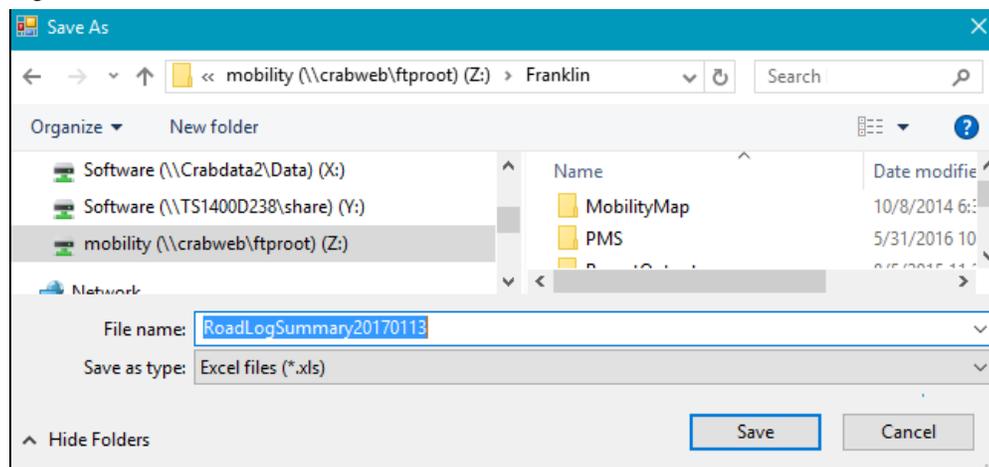
- Click the triangle on the **Export Format** field to display the drop down list.
- Select a format from the list. We chose Microsoft® Excel in figure 2.

Figure 2



- Click the **OK** button to open the **Save As** screen shown in figure 3.
- Navigate to your county folder on the CRAB ftp site.
- Type in a meaningful filename.
- Click the **Save** button to save the exported report.

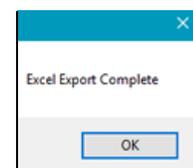
Figure 3



The Excel Export Complete message displays in figure 4.

- Click the **OK** button to close the message

Figure 4



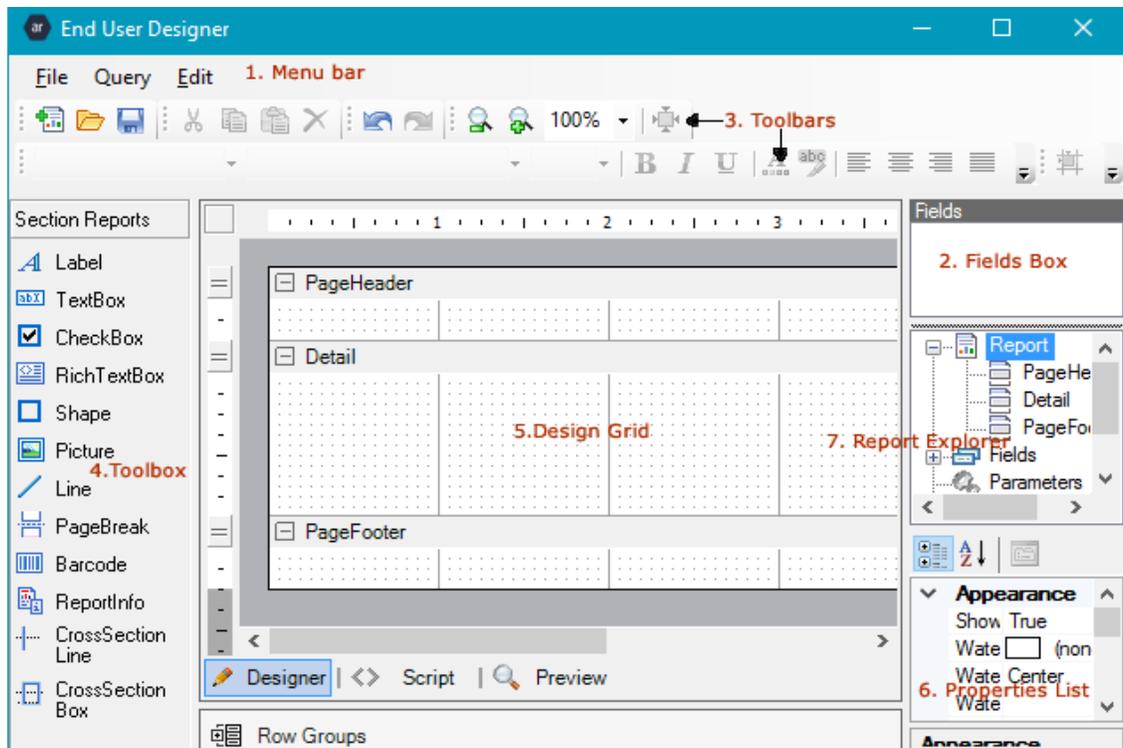
## Mobility Custom Reports

Mobility’s Custom Report Designer provides a great deal of flexibility and detail not possible with canned reports. CRAB has created ‘views’ of different parts of the database. This not only provides security; it also makes data retrieval much easier for you. Build custom reports around the data retrieved by the views.

### Create a custom report

To create a custom report, you must first query the Mobility database to return the fields that you want included in your report. Mobility queries use Structured Query Language (**SQL**) to tell the database what fields to return. Click **Reports** on the Mobility menu bar and then click **Custom** to display the Custom Report Designer (figure 5).

Figure 5



Report Designer (figure 5 above)

1. **Menu bar: File:** Commands include New, Open, View Report, Page Setup, Save, and Exit  
**Query:** Opens the Query Tool screen.  
**Edit:** Commands include Undo, Redo, Cut, Copy, Paste, Delete, Select All
2. **Fields box.** Your query’s fields display here when you successfully create a query.
3. **Tool Bars:** The top tool bar contains File and Edit commands. The lower toolbar contains formatting commands.
4. **Toolbox:** Contains objects that you can click to move to the report design grid.
5. **Design Grid:** Drag and drop fields from the fields box to the detail section of the design grid to view your data when you view your report.
6. **Properties List:** Use the properties list to format objects and perform calculations.

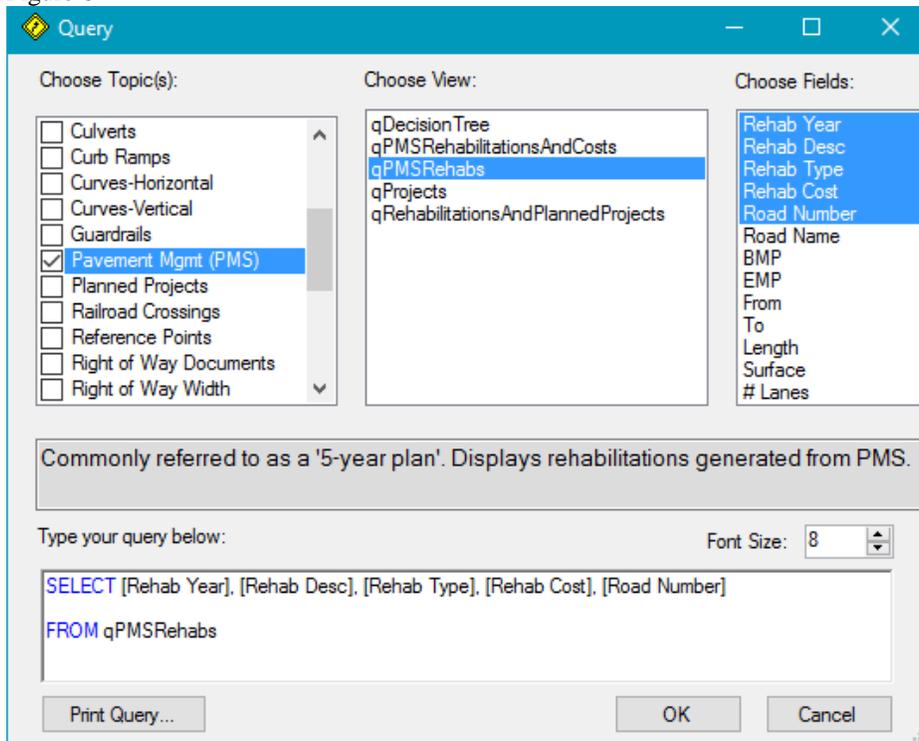
### Query the database

In the following sections, we will work with the qPMSRehabs (Pavement Management Rehabilitations) topic. We will query the database, drag and drop the query's fields onto the report design grid and format the report. These steps will work for all Mobility Inventories' custom reports.

1. At the Custom Report Designer screen, click **Query** on the menu bar to display the Query screen shown below in figure 6.
2. Click on one or more topics in the **Choose Topic(s)** list to display views available for your chosen topic(s) in the **Choose View** list.
3. Click on a view to see the available fields display in the **Choose Fields** list. A description of the selected view displays in the grey box located below the list.
4. Click on the fields that you want to add to the query from the **Choose Fields** list. Click on fields and they display automatically in the query text box when clicked, including the SQL required syntax of the **SELECT** and **FROM** clauses. See detailed instructions on how to customize queries on page eight.

In figure 6, the Pavement Management (PMS) topic is selected (check marked and highlighted on the left) and that topic's available database views display in the **Choose View** pane (in the center). The qPMSRehabs view is selected and the fields available for that view display in the **Choose Fields** pane. Figure 6 displays the selected fields.

Figure 6



5. Execute the query by clicking the OK button. If the query runs successfully, the selected fields display in the **Fields** box of the Custom Report Designer as shown on the upper right in Figure 7 item 1 on the next page.

### Move fields to the report layout

The fields in the 'Fields' Pane must now be move to the **Detail** section on the report design grid. You can design reports to display data in an attractive format.

Alternatively, you can display data in a format more suitable for exporting to Excel. Many counties export to excel to manipulate, perform calculations and export data into their county GIS systems.

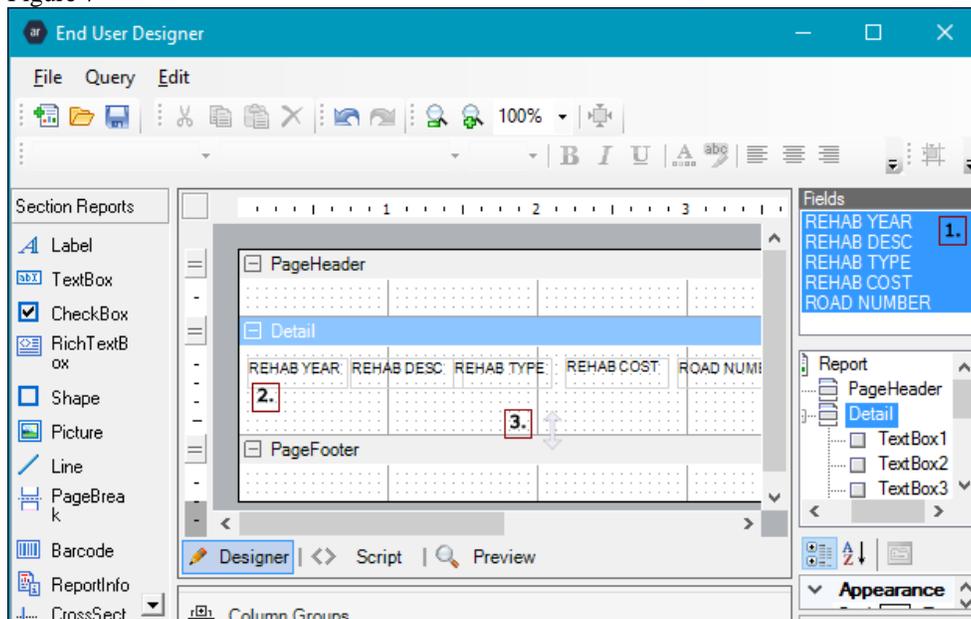
### Move individual fields

- 1) Click on a field in the field list to highlight it.
- 2) Hold the left mouse button down and drag the field over to the **Detail** section of the report design grid. Drag the field toward the left margin of the detail section and then release the mouse button.
- 3) Repeat these steps to place the remaining individual desired fields on the report layout.

### Move all fields or a contiguous set of fields

1. Click on the first field in the list. Press and hold the SHIFT key down and then click on the last field in the list (or the last field in the list that you want to add to the report). Continue to hold the mouse button down after clicking on the last field. Let go of the SHIFT key, continuing to hold the left mouse button down. Do not let up on the left mouse button.
2. Drag the fields near the top-left margin in the **Detail** section of the report design grid.
3. Let go of the mouse button. The fields will be visible in the report design grid. See figure 7 item 2.

Figure 7



### Move only some fields or non-contiguous fields

1. Click on the first field needed for the report.
2. Press and hold down the CTRL key and then click on the other fields that you need for the report.
3. Continuing to hold the left mouse button down, let go of the CTRL key and drag your fields to the **Detail** section of the report design grid.
4. To move fields around on the report design surface, click on the field, and hold the left mouse button down, move the field to the desired location.

Move the Page footer just underneath the fields in the detail section to improve readability and remove extra space when you view the report.

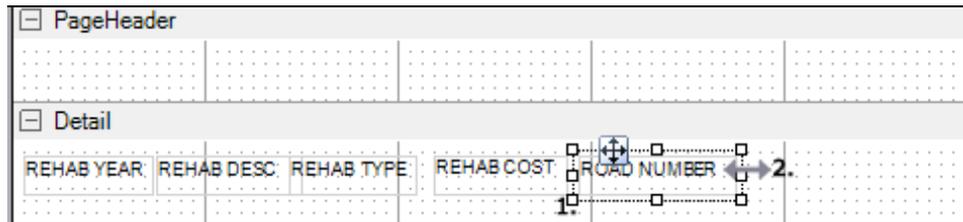
1. Place your mouse over the top border of the Page Footer section. Double vertical arrows will display. See item 3 in figure 7 on the previous page.
2. Double click when you see the vertical arrows. This will close up the extra white space in the detail section of the report. Alternately, place your mouse at the top of the page footer border and drag the footer up when the double arrow displays.

### Sizing fields and objects

See figure 8 for sizing objects.

1. Click on a field to select it. Selection squares will display on the selected object (figure 8 item 1).
2. Place your mouse over the center selection square on the desired side. Horizontal arrows display (figure 8 item 2).
3. Hold your left mouse button down and drag to increase or decrease the size of the field object.

**Figure 8**



### Selecting Multiple Objects

There are multiple methods to select more than one field object or any report object such as labels and textboxes:

1. Click anywhere in the section you are working in and then press the CTRL + A.
2. Click on the first object. Press and hold down the **CTRL** key and click on the remaining objects that you want to select.
3. Place your mouse pointer in the white margin to the left of the **'line'** that you want to select and click the left mouse button. All the objects in that 'line' are now selected. Note: this method is very precise about where the mouse is located. It may take a few tries to get it to the correct place in the left margin.

\*\*Click in any blank area of the report design grid to deselect an object. The selection squares do not display when no objects are selected.

## Mobility User Training

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4. Place your mouse pointer anywhere in a white section on the Report Design Surface. Click the left mouse button and hold it down. Drag the mouse so that a box draws around the objects. The box you draw selects all objects that it touches.
5. Click the mouse on the title of the section to change. It will turn blue. Click on Edit (on the Menu Bar) and then click 'Select All'. This will select all fields in that section.

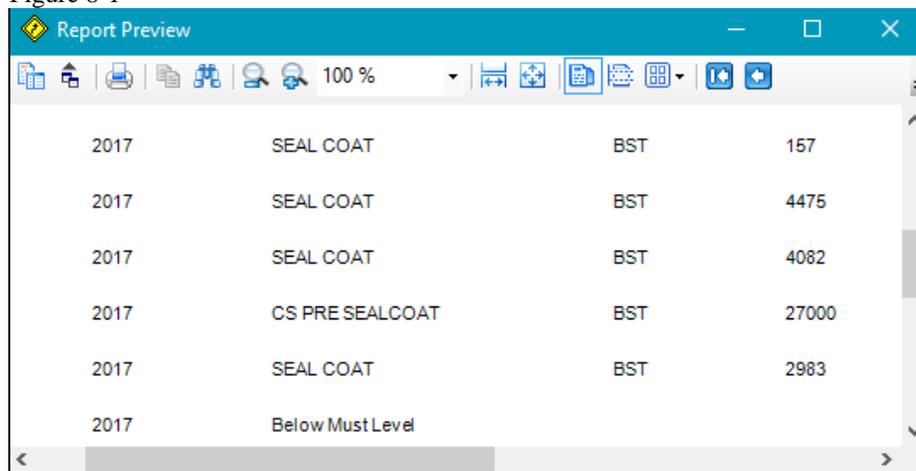
### Display data in the report

Position the fields in the detail section shown in figure 8 on the previous page.

1. Click on **File ► View Report** on the menu bar at the top left of the screen.

Your report will display on the Report Preview screen as shown in figure 8-1.

Figure 8-1



The screenshot shows a window titled "Report Preview" with a toolbar at the top. The main area contains a table with the following data:

2017	SEAL COAT	BST	157
2017	SEAL COAT	BST	4475
2017	SEAL COAT	BST	4082
2017	CS PRE SEALCOAT	BST	27000
2017	SEAL COAT	BST	2983
2017	Below Must Level		

You now have 2 options. You can export the returned data to another file format (spreadsheet or other) to your county folder on the CRAB ftp site. Alternately, you can continue to design the report in Mobility and save the report to your county folder.

2. Click the X "close button" at the top right corner of the screen to return to the Report Designer screen.

**\*\*** Users on Remote Desktop Services (RDS) can save report layouts and export report files to their county folder on the CRAB ftp site. To obtain your exported reports, go the Internet and browse to your county folder on the CRAB ftp site (<ftp://ftp.crab.wa.gov/>). Copy exported reports down to your local computer (Spreadsheets, .PDF, etc.) and then remove them from your county folder on the ftp site. Reports designed in Mobility have a .rpx file extension and can remain in the county folder on the ftp site for future use.

### Writing and Customizing Queries

Custom reports allow users to be creative with data retrieval. To retrieve data, SQL (Structured Query Language) is used within the Mobility reporting tool. Users must specify **what** data to select, and **where** it comes from.

SQL 'select' statements must have, at a minimum, 3 parts:

1. The keyword '**Select**'
2. The data being selected (field names)
3. Where the data will come from (a view name in Mobility), using the keyword '**from**'

Example:

**Select** fieldname1, fieldname2 **from** ViewName

### Mobility Custom Reporting Hints

- \* Field names are NOT case sensitive (bmp = BMP)
- \* Enclose fields in [brackets] if the field name contains more than one word.  
e.g. [Road Name] needs brackets, but EMP does not.
- \* Fields must have a comma separating them. Do not put a comma after the last field in the list.
- \* SQL ignores multiple spaces and line breaks in the query. If a query is easier to read by placing the different 'sections' on different lines or indenting a section, SQL will ignore everything except the text for the query.
- \* Enclose text strings and dates using an opening and closing apostrophe, e.g. '[Property Damage]'
- \* The **between** operator is *inclusive* - both the beginning value and ending value will be included in the selection.
- \* Several different criteria can be specified in the **where** clause.
- \* Parentheses should be used to separate logic ('and' and 'or') in the **where** clause. 'And' will take precedence over 'or'.
- \* The auto type feature works in the SELECT portion of the query only. You must type the WHERE, ORDER BY, GROUP BY clause fields and criteria manually. The auto-type feature works for the *initial* selecting of the desired fields. After you add a WHERE, ORDER BY, or a GROUP BY clause(s) you must manually type in any fields that you wish to add to the select clause.
- \* The Mobility Report Designer can handle formatting, field sub-totals, running totals, grand totals, summing and counting.
- \* A line of the query (except *required* parts) can be commented out rather than deleted by typing two dashes (--) at the beginning of the line. This line will be ignored by SQL when the query executes.

### SQL query examples

The examples below demonstrate some of the various features and capabilities of SQL:

Basic selection statement, which would be created by clicking on the fields in the 'Choose Fields' list:

**Select** [Road Number], [Road Name], BMP **from** qGuardrails

#### **WHERE**

Specifies criteria for the selection

**Select** [Road Number], [Road Name], BMP **from** qGuardrails  
**where** [Jur Code] = 5

#### **SORT**

Order the data

**Select** [Road Number], [Road Name], BMP **from** qGuardrails  
**where** [Jur Code] = 5  
**order by** [Road Name]

#### **WILDCARDS**

Select all fields from the view

**Select** \* **from** qCulverts

(Note that larger, more complex views such as qRoadLog can take several minutes to complete.)

Any number of characters in place of % can be used before and/or after word(s)

**Select** [Road Number], [Road Name] **from** qRLShort  
**where** [Road Name] **like** 'Yelm%'

**Select** [Road Number], [Road Name] **from** qRLShort  
**where** [Road Name] **like** '%yellow%place%'

#### **NOT/ <> (not equal to)**

Select records that do not have specified criteria

**Select** [Road Number], [Road Name], BMP, Hazard **from** qGuardrails  
**where not** ([Anchor Cond] = 7)

**Select** [Road Number], [Road Name], BMP, Hazard **from** qGuardrails  
**where** [Anchor Cond] <> 7

**BETWEEN**

Select records with criteria falling within a range of values

Select [Road Number], [Road Name], MP, Legend, [Jur Code] from qSigns  
where [Date Post Installed]  
between '01/01/02' and '12/31/02'

Select [Road Number], [Road Name], MP from qSigns  
where [Road Number]  
between 20000 and 29090

**DISTINCT**

Displays unique values, evaluating entire 'row' for duplicates

Select distinct [Road Name] from qRLShort  
where [Road Number] = 11415

**IN**

Select records with criteria in a defined list

Select [Road Name], [Road Number] from qGuardrails  
where [Jur Code] in (02, 06, 07)

**Combine with NOT**

Select [Road Name], [Road Number] from qGuardrails  
where [Jur Code] NOT in (02, 06, 07)

**GROUP BY**

Combines records into groups in preparation for use with sub-totals

Select [Road Number], FFC, [Thru Lane Surf] from qRLShort  
where [Jur Code] = 5 and ADT > 500  
group by [Road Number], FFC, [Thru Lane Surf]  
Order by FFC, [Thru Lane Surf]

**NULL/NOT NULL**

Not the same as an empty field. Syntax is different! Do not use '= NULL' (equal sign) or '<> NULL'

Select distinct [Road Number] from qRoadLog  
where [Acct ID] is null  
order by [Road Number]

Select distinct [Road Number] from qRoadLog  
where [Plat Name]  
is not null order by [Road Number]

## Formatting Custom Reports

Report “objects” include all items and sections of report the report design grid including labels, text boxes and data fields. These objects all have “**properties**”, such as font size or color that can be assigned. Calculations and other formatting capabilities are possible. Modify a report object’s properties in the Report Designer’s **Properties Window** as described below.

**NOTE:** If you misplace a report object, or accidentally delete an object from the report layout: Press CTRL + Z. This is the undo command and you can undo several steps by pressing and holding the CTRL key down while pressing the Z key. Alternately, you can use the  Undo button on the toolbar.

The two most common objects used and formatted on a report will be labels and text boxes (figure 9). Formatting will help in designing a professional report. The table below displays suggested uses for labels and text boxes. The next few pages cover creating and formatting labels and text boxes.

Figure 9

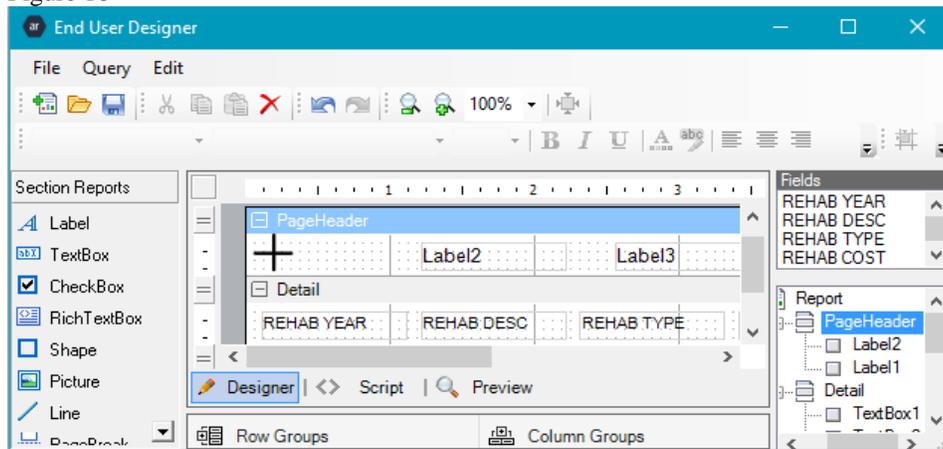
<b>Label and Text Box Functions</b>	
<b>Label</b>	<b>Text box</b>
Report Title	Calculations
Report Headings	Functions
Page Numbering	Grouping
Labeling report sections or groups	

### Add report labels

1. Click on the **Label** tool  from the Section Reports toolbox on the left side of the screen.
2. Move your mouse over to the design grid in the **PageHeader** section.
3. Your cursor will change to a cross hair  (figure 10). Draw a box in a left to right motion starting the bottom-left corner moving to the top right corner and let go of the mouse button. OR
4. Click on the label tool,  move your mouse over to the design grid in the PageHeader section.
5. Double-click to display the new label object.

Your label objects will look similar to labels 2 & 3 in the figure 10 **PageHeader** section.

Figure 10

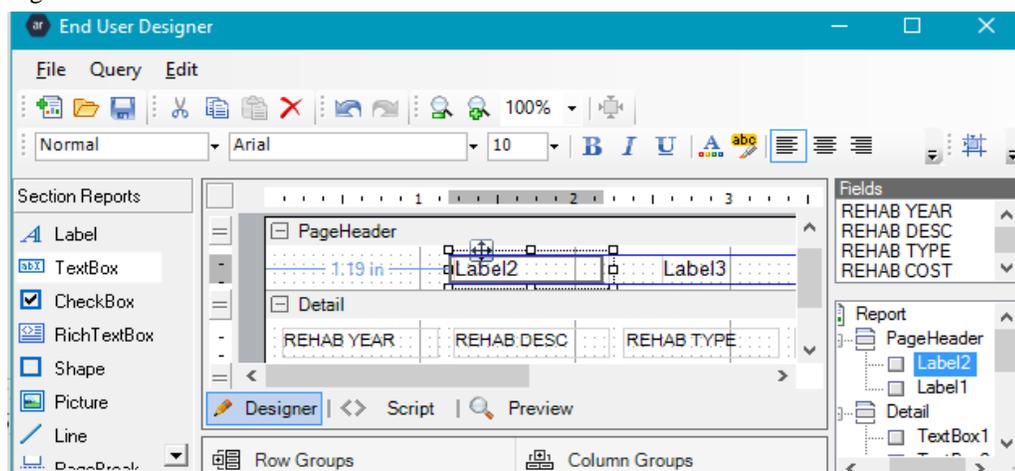


6. Create a label directly above each data field in the **PageHeader** section (figure 10 above).
7. Click the **Snap Lines** button on the toolbar below the report design grid (figure 11) to display blue align guides to help you align fields both vertically and horizontally as shown in figure 12.

Figure 11



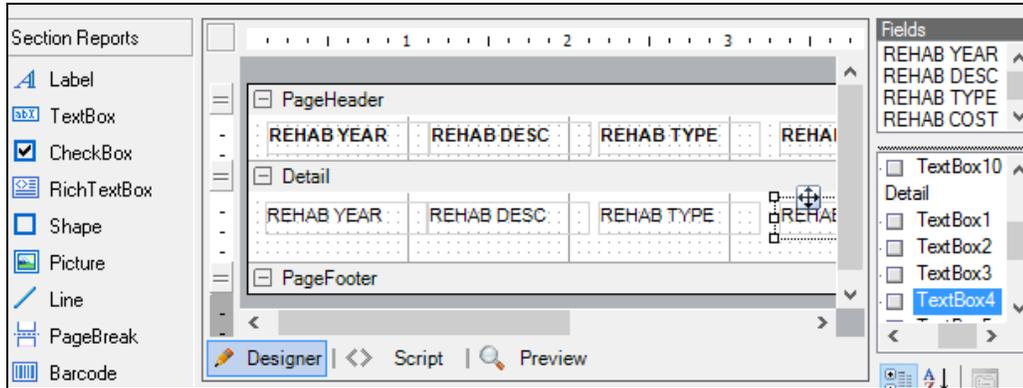
Figure 12



8. Click a label and type in the desired name for the column heading. TAB over to the next label and type in the text for that label. Repeat to finish naming each label (figure 13).

Your report labels display at the top of each page as column headers for your data fields. You can size label objects the same way as field objects on page 6 in figure 8.

Figure 13



Left-align each label above each field to align your report headings and fields using the blue snap lines in figure 12 on the previous page. Alternately you can use the buttons on the formatting tool bar. Place your mouse over each button to view a tooltip of what each button does. See figure 14.

Figure 14



8. Click on **File ► View Report** on the menu bar at the top left of the screen. Your report displays with column names at the top of each page.

### Using the Property List

Modifying an object’s properties enables you to add color, font type, alignment and other formatting attributes. When you click on an object, its properties will display in the Properties Window. Follow the steps listed below to change the properties of an object.

### Formatting object properties

In this example, we will use the property list to change the font style to bold.

1. Click on the object to format and selection squares display on the object (object is selected).

The property list display will change based on what object or objects that you select. The selected objects’ properties display options or attributes that you can change.

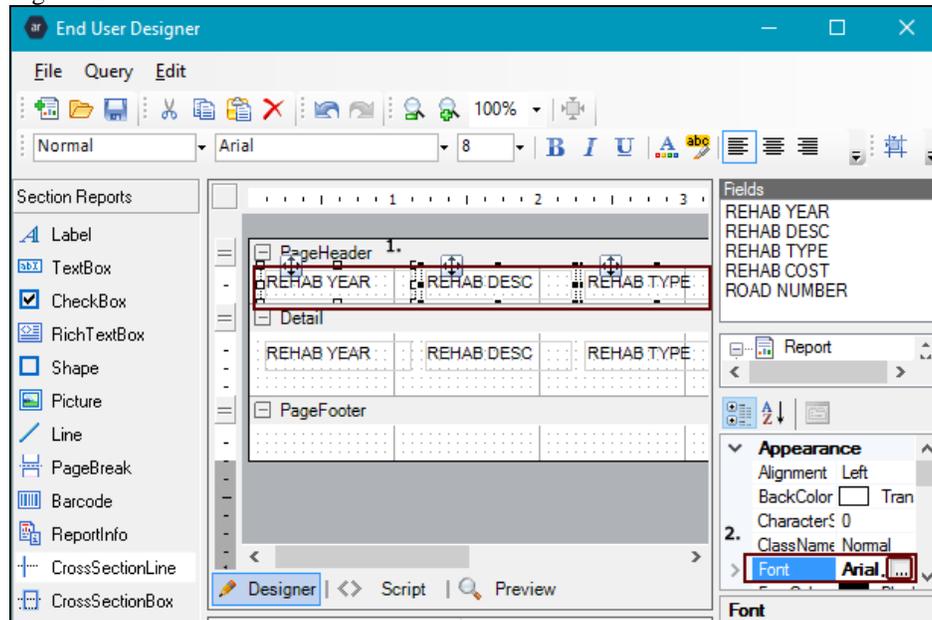
Select multiple objects:

2. Click one label and then press, hold the CTRL key down, and click other objects that you want to format at the same time (selecting multiple objects).

Use step 2 to select all the labels at once. All of the label objects display selected in figure 15.

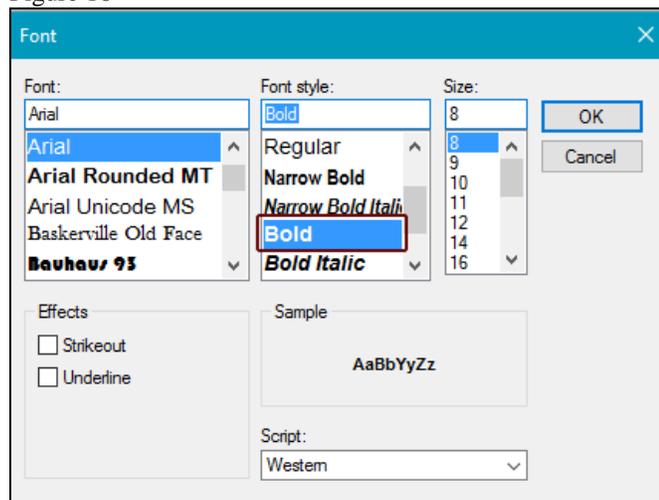
All the labels in the PageHeader section are selected.

Figure 15



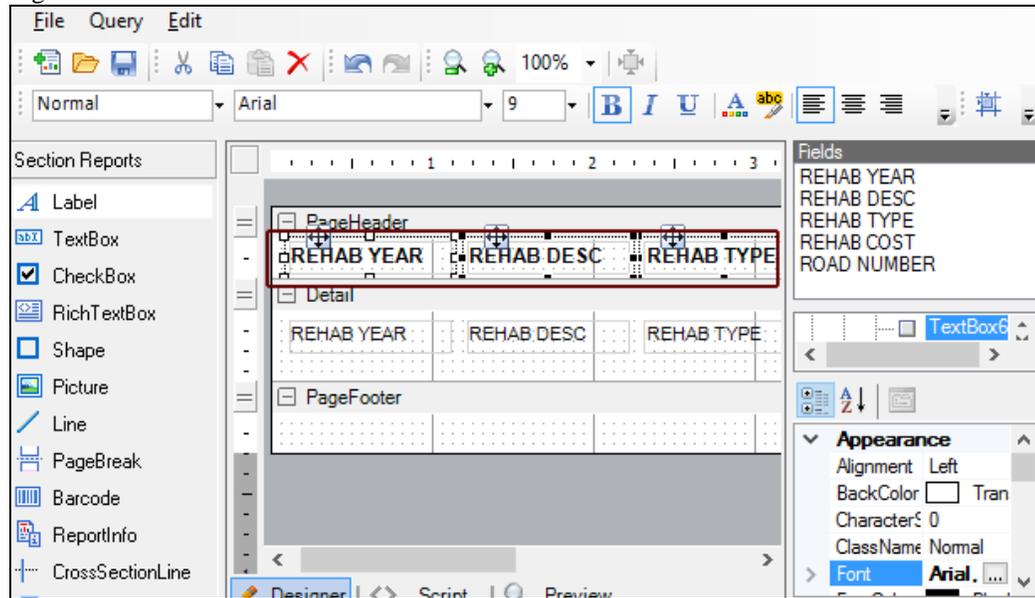
3. Click the **Font** property in the **Appearance** section of the property list (figure 15 above).
4. Click the three-dot box to display the **Font** screen in figure 16.
5. Click **Bold** in the **Font style** window.

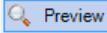
Figure 16



6. Click the **OK** button and the selected labels display in bold font (figure 17 next page).

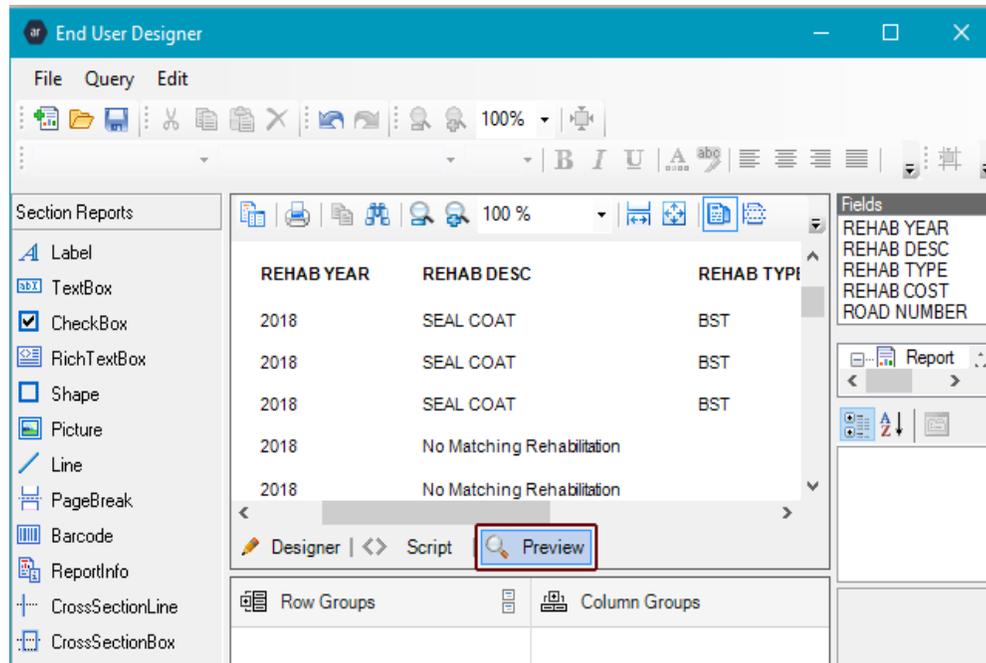
Figure 17



7. Preview your report by clicking the  Preview button at the bottom of the report designer shown in figure 18.

This allows you to preview the first ten pages without leaving the report designer.

Figure 18



- Click on **File ► View Report** on the menu bar to view the entire report as shown in figure 19.

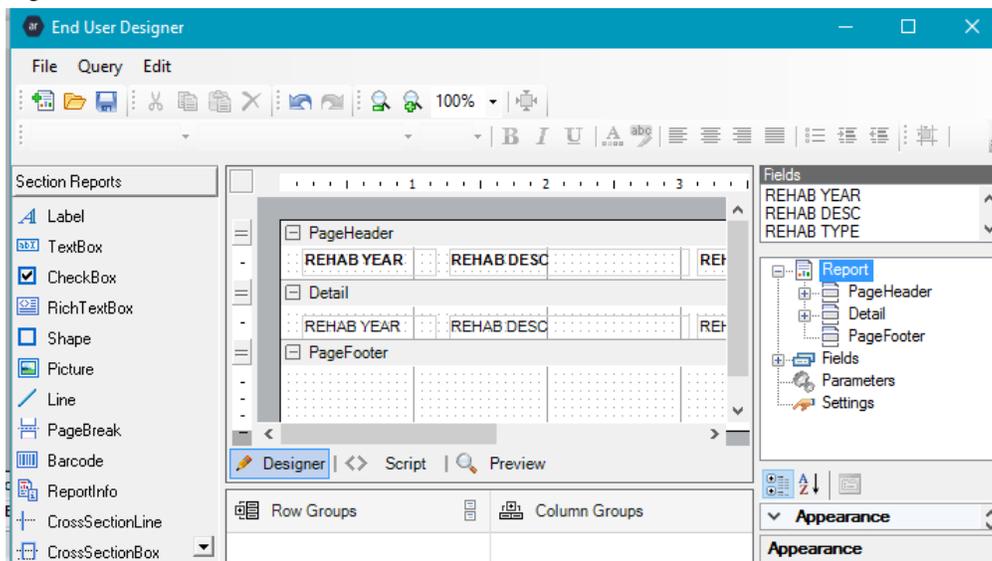
Figure 19

REHAB YEAR	REHAB DESC	REHAB TYPE	REHAB COST	ROAD NUMBER
2021	SEAL COAT	BST	8478	23304
2021	SEAL COAT	BST	7850	23304
2021	SEAL COAT	BST	7144	85982
2021	SEAL COAT	BST	7850	85981
2021	SEAL COAT	BST	2198	85981
2021	SEAL COAT	BST	7850	33784
2021	SEAL COAT	BST	78	33784
2021	No Matching Rehabilitation			63804
2021	SEAL COAT	BST	2748	63804
2021	CS PRE SEALCOAT	BST	18000	22421

Column headings display at the top of every page. Next, we will look at the PageFooter object. Content in a page footer will display at the bottom of every page.

- Click the close button on the report preview screen to return to the report designer screen (figure 20).

Figure 20



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Refer to figures 21 & 22 for steps 2 & 3.

2. Place your mouse at the bottom of the page footer to display vertical arrows. See figure 21.
3. Hold your left mouse button down and drag the border down a bit to give you enough space to add some content (figure 22).

Figure 21

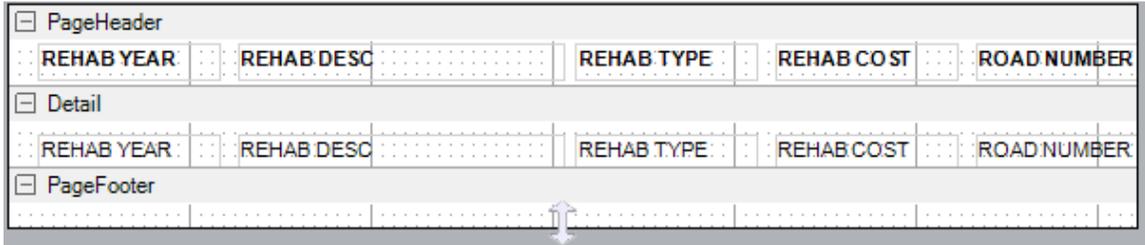
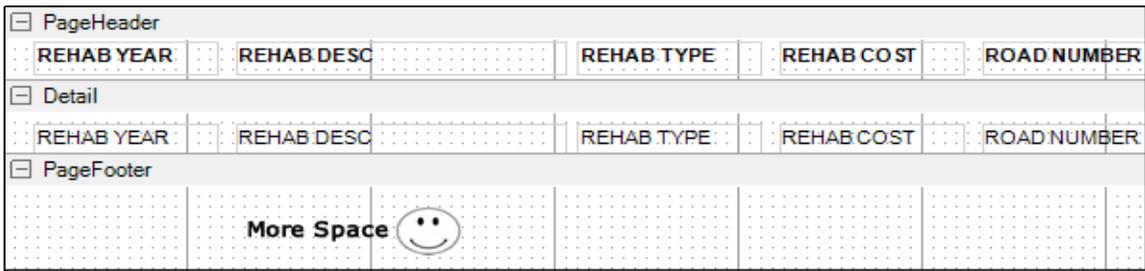
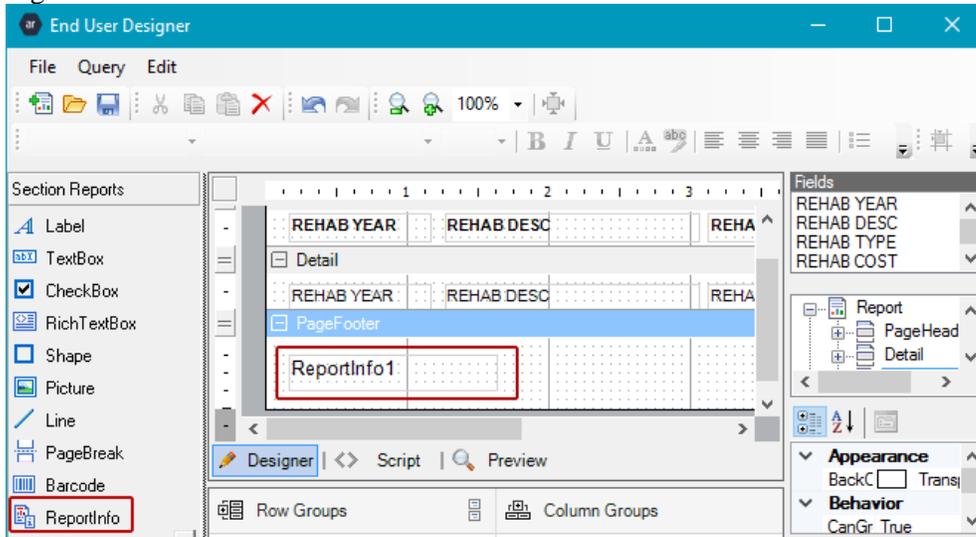


Figure 22



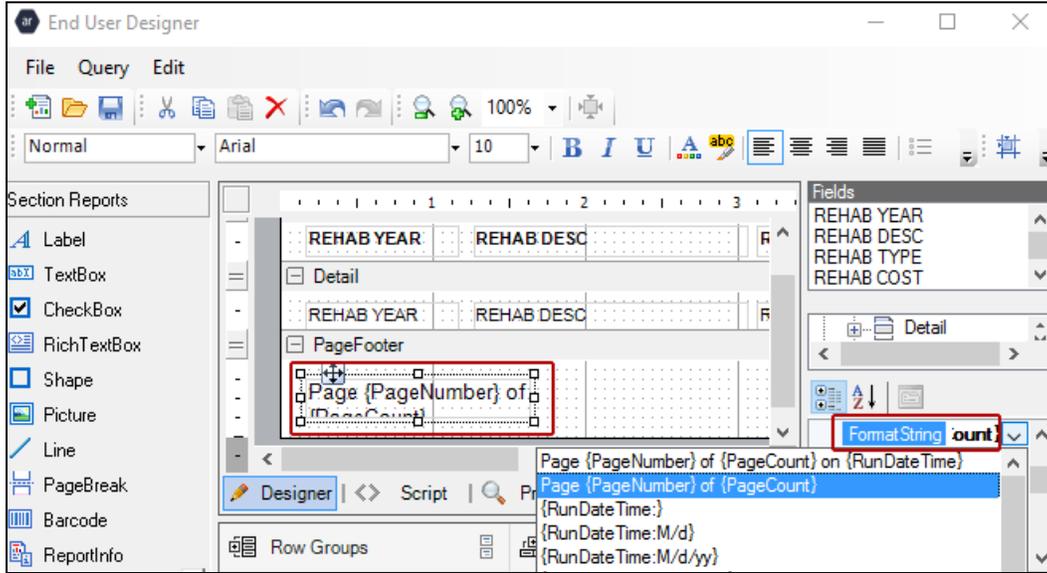
4. Click on the **ReportInfo** object from the toolbox.
5. Drag it over to the PageFooter section and let go of the mouse. See figure 23.

Figure 23



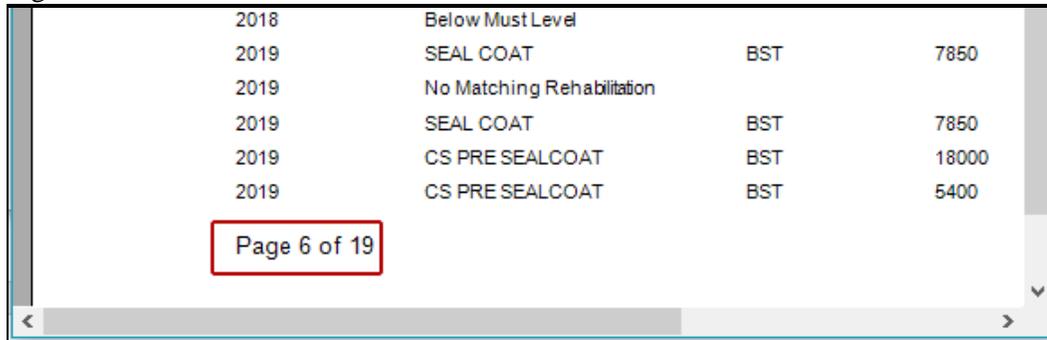
6. Click on the **ReportInfo** object in the PageFooter to select it.
7. Click on **FormatString** in the property list.
8. Click on the chevron (triangle) to display the list in figure 24.
9. Click on the 2<sup>nd</sup> item in the list: `Page {PageNumber} of {PageCount}`.
10. Note the change in the **ReportInfo1** object in the PageFooter in figure 24. Compare it with figure 23.

Figure 24



11. Click on File ► View Report on the menu bar to view the report.
12. Scroll down through the report to see the page numbering at bottom of each page (figure 25).

Figure 25



Next, we will add a new section to the report. See Report Header & Footer on the next page.

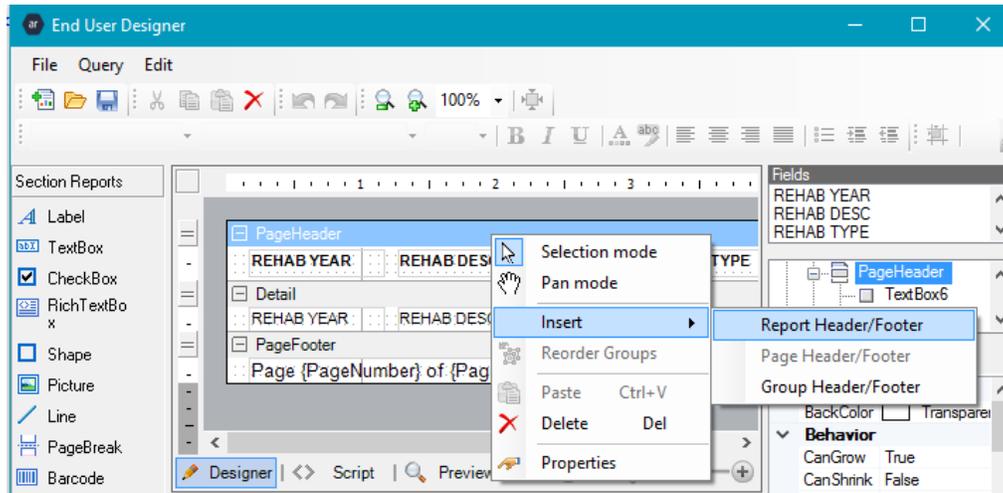
## Report Header & Footer

Inserting a report header and footer adds two new sections to the report. Any objects added to the report header will display only on the first page of the report. Any object added to the report footer will display only on the last page of the report.

### Add a report header & footer

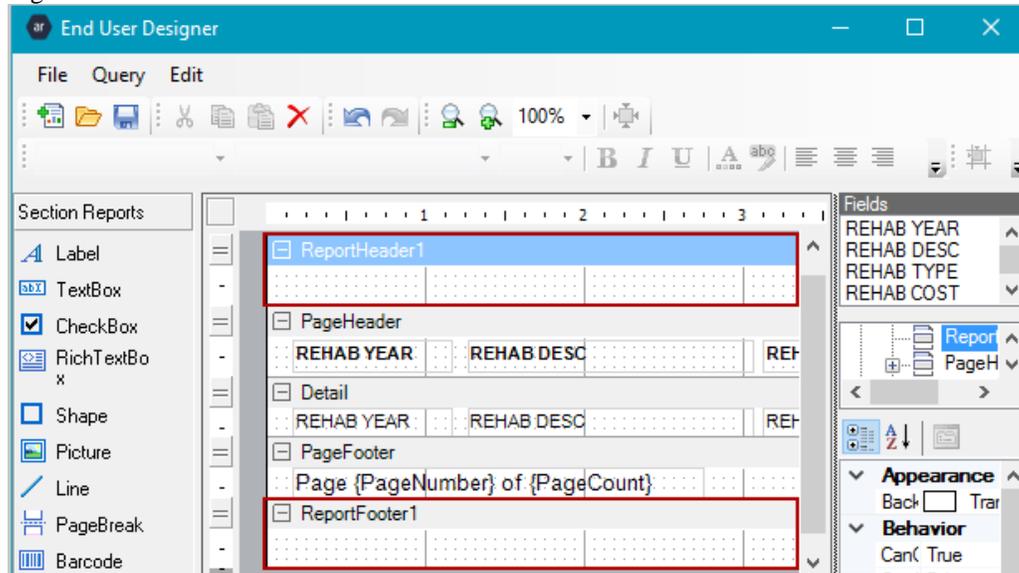
1. Right-click anywhere on the Report Design Surface,
2. Click **Insert**, and then click **Report Header/Footer** (figure 26).

Figure 26



The report now has two new sections: ReportHeader1 and ReportFooter1. See figure 27

Figure 27



## Mobility User Training

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You can add labels, textboxes, and other report objects to the **ReportHeader1** and **ReportFooter1** sections. These options make your report a more descriptive and informative document. We will use some of these options in the next steps.

Remember! Once you create and save a custom report in Mobility, it becomes your own report and you can open it any time in the future. It will contain the most current data every time you open it. Save the report with a different filename each time you open it. This will help you maintain a history of the specific report data for analysis and to determine trends.

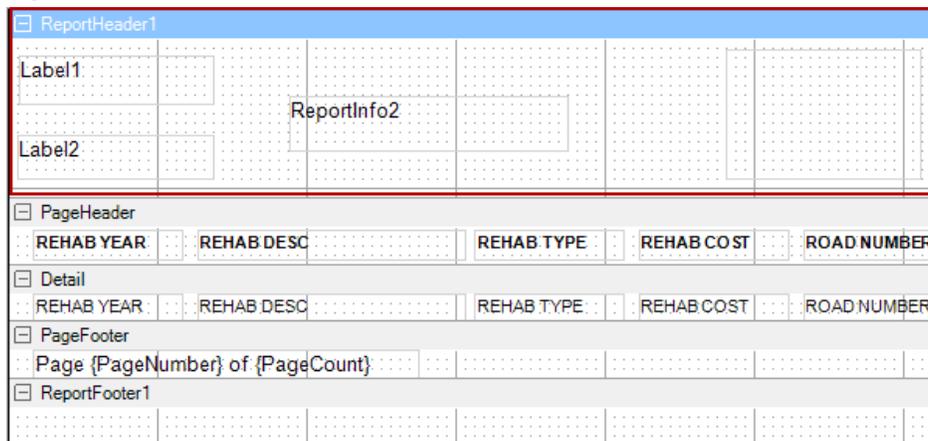
### Add Objects to the Report Header

See figures 28-30 to visualize the following steps for adding objects to the report header section.

1. Click on the **Label** tool  from the **Section Reports** toolbox to draw 2 labels near the left margin of the **ReportHeader1** section of the report. See the Add report labels heading on page 12 for a refresher.
2. Enter your County name in the first label object you created.
3. Enter a title for your report in the second label object.
4. Click the **ReportInfo** object from the **Section Reports** toolbox and draw it near the middle of the **ReportHeader1** section. See figure 23 on page 17 if you need help.
5. Click to select the ReportInfo object (selection squares will display) indicating it is selected.
6. Click the **Picture** tool from the **Section Reports** toolbox and draw a box near the right margin in the **ReportHeader1** section.

The ReportHeader1 section of your report should now look similar to figure 28.

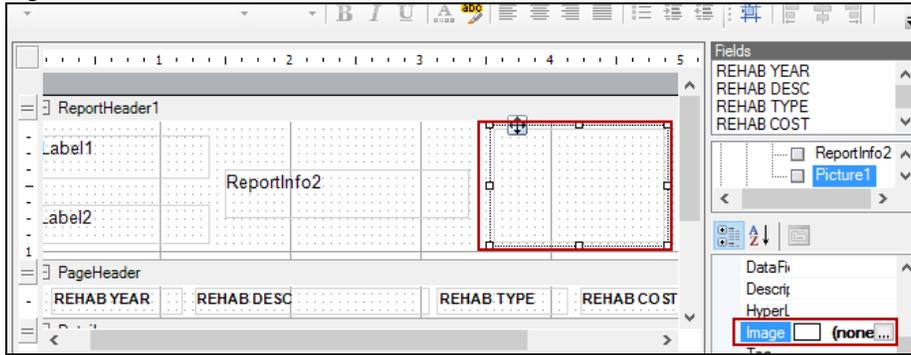
Figure 28



7. Click the box you just drew for the picture to select it (figure 29 next page).

- Click the **Image** property in the Properties list and then click the 3-dot box (figure 29).

Figure 29



- Navigate to your County folder on the CRAB ftp site using the **Open** screen in figure 30.
- Select your image and click the **Open** button. This will display your image in the picture box in the ReportHeader section of the report (figure 31).

Figure 30

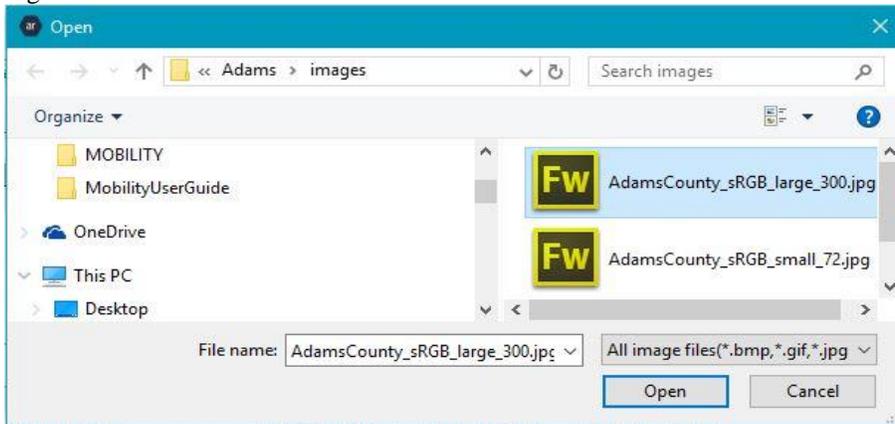
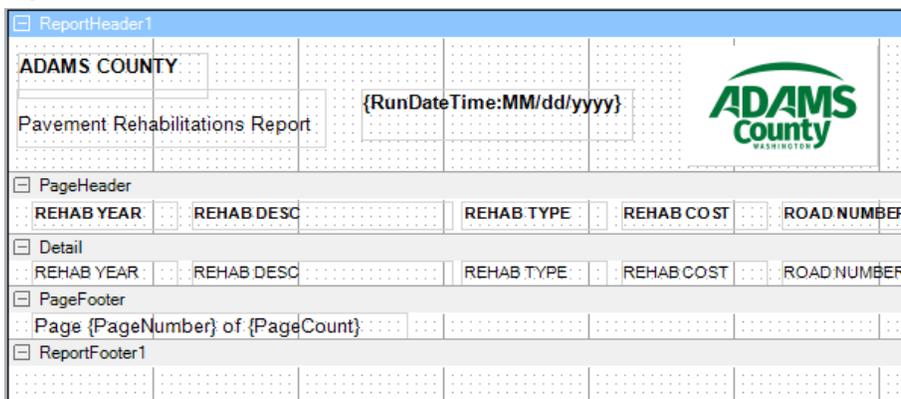


Figure 31



Note: You must first copy images to your County folder on the CRAB ftp site to put them in a custom report.

11. Click on File ► View Report on the menu bar to view objects added to the report header and the column headings in figure 32.

Figure 32



### Grouping and Calculations

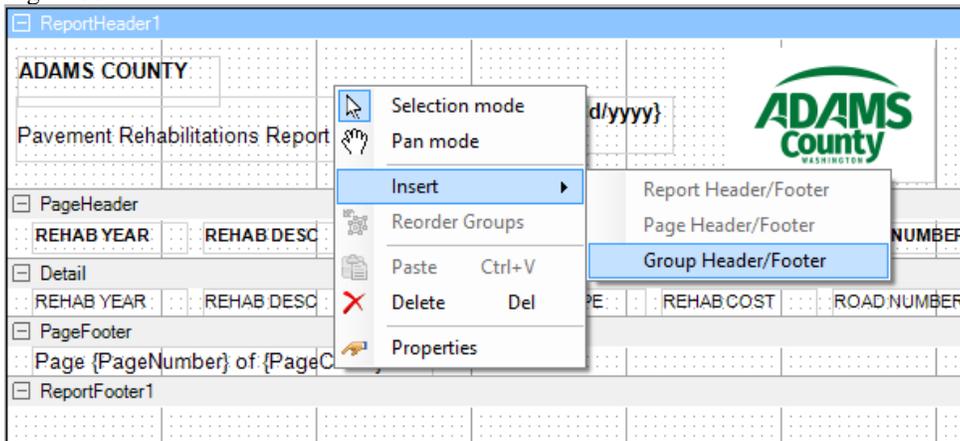
In the remaining sections, we will create calculations with textboxes. We will add a new section, the **GroupHeader/Footer** section to the report. Summary information and calculations go in this new section. Additionally, this helps you learn how to add a grouping level to your report.

Use text boxes to perform calculations and store functions. Perform count, sum, average, and other calculations with text boxes. Put textboxes in most sections of the report except for the detail section. Reserve the detail section of the report for database fields only.

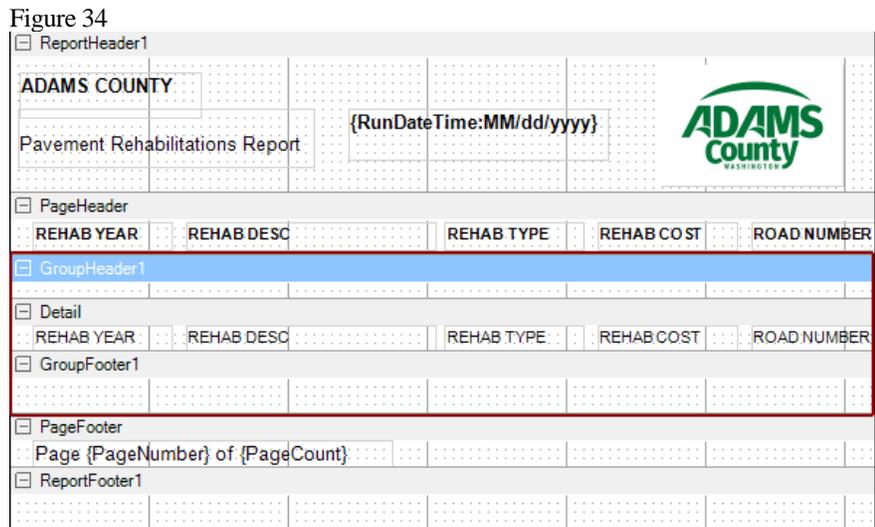
### Add a Group Header & Footer Object

1. Right-click anywhere on the report design grid.
2. Click **Insert**, then click **Group Header/Footer** to display the new section in the report (figure 33).

Figure 33



The new GroupHeader/Footer section in figure 34 displays in the report.

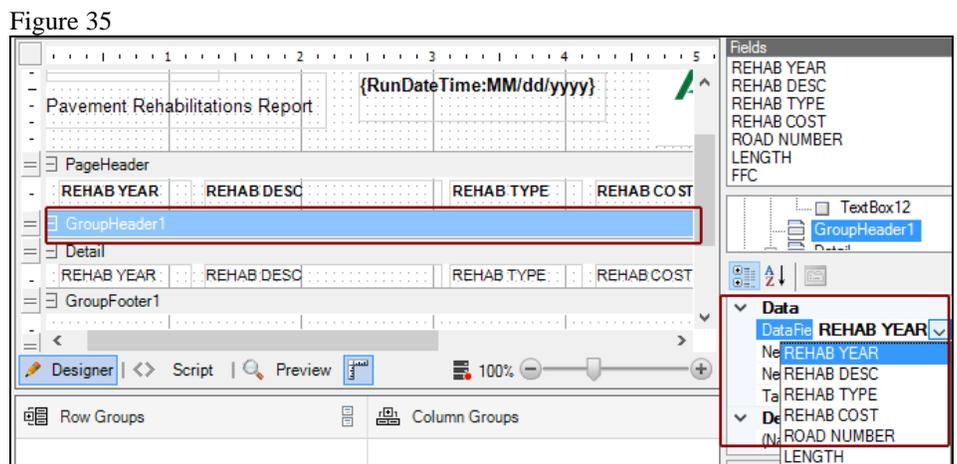


GroupHeader1 in figure 34 above highlights in blue. This means it is selected. You can click any blank area of the report to deselect it.

Next, we are going to specify the Rehab Year field to group the report. We will add a calculation for the rehabilitation cost for each Rehab Year (Rehabilitation Year).

3. Click the **GroupHeader1** section if not already selected. It will highlight in blue.
4. Click on the **DataField** property in **Data** section of the property list on the lower right.
5. Click on the triangle to display a field list.
6. Click on the **REHAB YEAR** field to select it and link it to the **GroupHeader1** object.

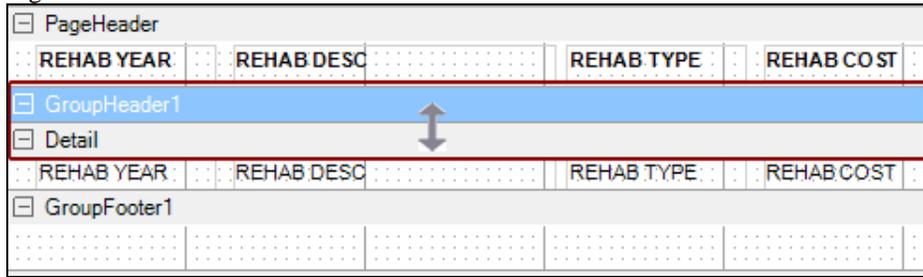
We have just specified that we want to group this report by the **REHAB YEAR** (Rehabilitation Year). See figure 35.



7. Place your mouse on the top of the **Detail** section border. Vertical arrows will display.

8. Drag it up to reduce the white space in the GroupHeader1 section. See figure 36.

Figure 36



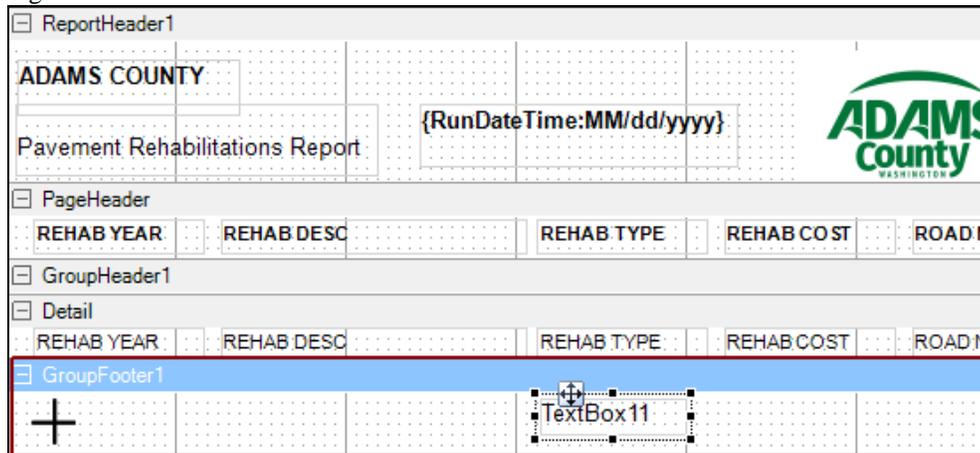
Closing up the white space in GroupHeader1 will allow more records to display on each report page.

Next, we will draw a textbox in the **GroupFooter1** section for our calculation (figure 37). The calculation will display below each Rehabilitation Year when you view the report. It will show the costs involved for each Rehabilitation Year.

9. Click on the **Textbox** tool  from the **Section Reports** toolbox on the left side of the screen. We want to draw the text box under the REHAB COST field.
10. Move your mouse over to the design grid in the **GroupFooter1** section. Your cursor will change to a cross hair. 
11. Draw a box in a left to right motion starting the bottom-left corner moving to the top right corner and let go of the mouse button.

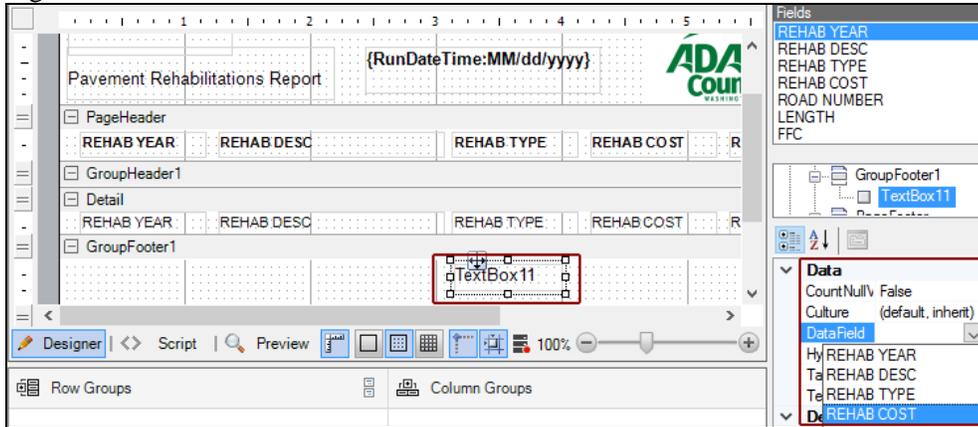
The **GroupFooter1** section should look similar to figure 37.

Figure 37



12. Click the **TextBox** object if not already selected. Selection squares display on the object.
13. Click on the **DataField** property in **Data** section of the property list. See figure 38.
14. Click on the triangle to display a field list.
15. Click on the **REHAB YEAR** field to select it and link it to the text box object.

Figure 38



We have just set the calculation of the REHAB COSTS to the text box. The calculation will display at bottom of each REHAB YEAR.

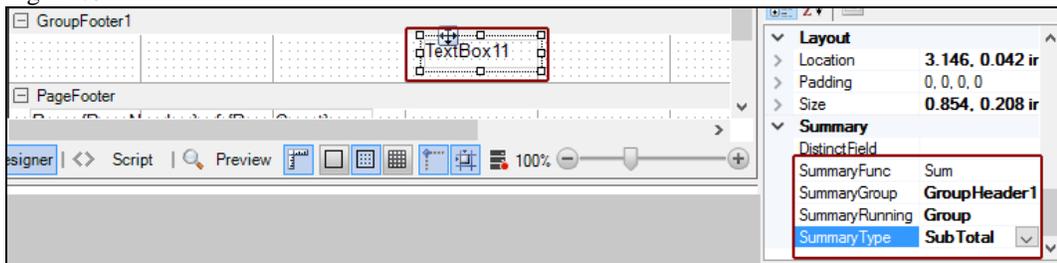
We are almost there! We will now specify what type of calculation we want. For this example, we want a subtotal of Rehabilitation Costs for each Rehabilitation year.

16. Select the textbox if not still selected.
17. Click the bold button **B** on the formatting toolbar.

This will make the calculation easier to spot when you view the report.

18. Go to the properties list and scroll down if needed, to the **Summary** section.
19. Select the property attributes in figure 39.

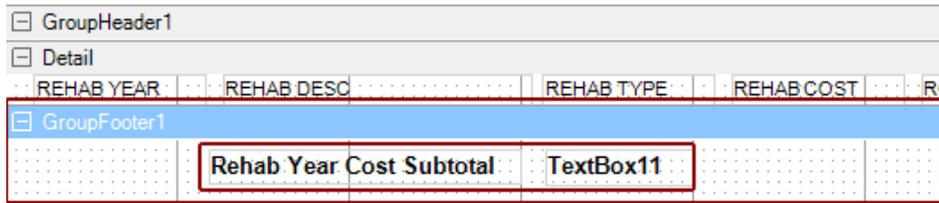
Figure 39



20. Finally, lets add a label object to the left of the textbox in **GroupFooter1** (for descriptive purposes).
21. Click the bold button **B** on the formatting toolbar to make the label object bold.
22. Type in **Rehab Year Cost Subtotal** in the label object.

It should look similar to figure 40.

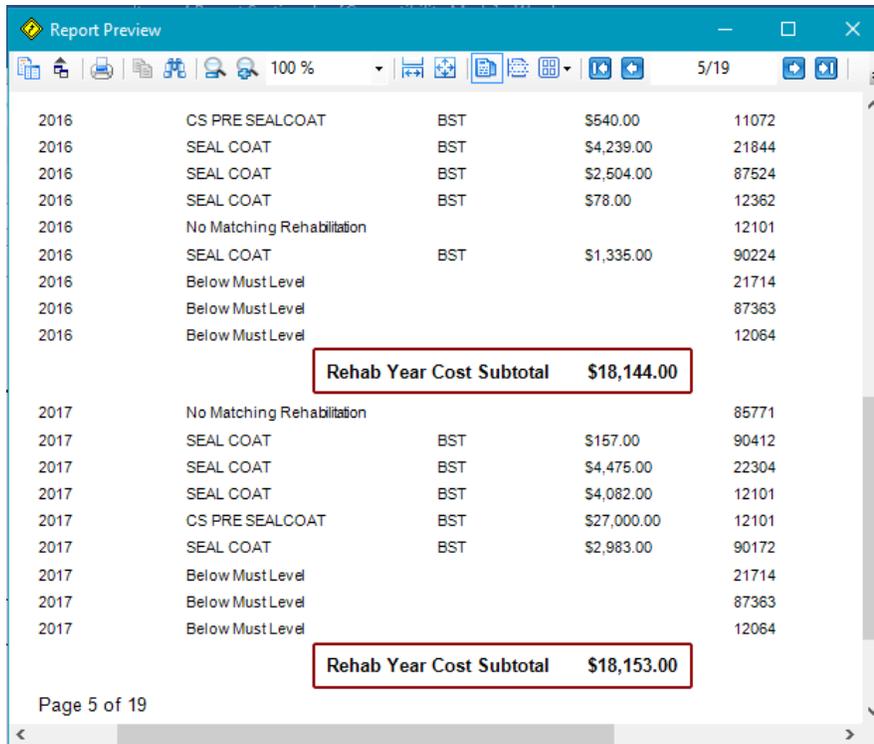
Figure 40



23. Click on File ► View Report on the menu bar to view the entire report as shown in figure 41.

The grouping level by REHAB YEAR and a subtotal displays for each REHAB YEAR listed in the report.

Figure 41



Remember to save your work often as you go!!!

1. Click on File ► Save or Save AS.
2. Navigate to your county Mobility folder on the CRAB ftp site.
3. Enter a meaningful filename if this is your first time saving the report.
4. Click the **Save** button.

You can open your reports or ones created by other county users.

1. Click on File ► Open.
2. Navigate to your or another County's folder.
3. Select a report to open and review it.

## Mobility User Training

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4. Save it to your county folder under a new name if you like it.
5. Review the query code for accuracy before using someone else's report. Mobility Support can help you if needed.

**\*\*** The report will open with your county data. You can only save reports to your county folder.

It is important that you copy exported reports to your computer. Delete them from your county folder after you review them locally. This will save space in your county folder. Each county gets 40MB of space for saving reports and map files. See your County Mobility Administrator for more information. We have just scratched the surface. You learn more about this tool every time that you use it. Like any new skill: Practice, Practice, Practice! Your reports will look great. Rely on your peers as resource. They have created some awesome reports. CRAB's Mobility Support team is here for you too! Please use us. That is it for now. We have done a lot of work. This work pays off the next time you need this report. All the formatting is complete. Save it the next time that you open it with a different filename to maintain your report data history.

**NOTE:** You can load report layouts from other county folders. They will display YOUR county data when viewed. You can only save report layouts (.rpx files) in YOUR county folder and the CRAB folder. Exported **reports (.xls, .pdf** etc.) will display your data when opened. Locate your exported reports in your Mobility County folder on the CRAB ftp site on the internet. Copy exported reports to your local PC. Review, save, and print them from your computer – then you can delete the exported reports from your county ftp folder to save space. Contact your Mobility Administrator if you have questions.

## Mobility Map Tool Help

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## 1. Initialize Mobility Map

### 1.1 Upload Road Base Layer to CRAB FTP

The process for creating spatial layers from Mobility's linear inventories requires a base layer of a county's road system (Road Base Layer). There are many file types for spatial layers; Mobility **requires** that the road base layer be of the ESRI Shape file type (.shp).

The additional **requirement** for the road base layer is that it include the following attributes: Road Number, From Milepost, and To Milepost. Attributes for an ESRI Shape file are kept in an accompanying file with the same name, but instead of the .shp extension will have a .dbf extension. For example, your road base layer should consist of two files:

**Road\_Layer.shp**  
**Road\_Layer.dbf**

If you have questions on how to obtain these files you will need to contact your county GIS department.

After you have obtained the appropriate files remote Mobility users will need to upload them to the CRAB FTP site. The address for this site is: <ftp://ftp.crab.wa.gov/Mobility>. Open your county's ftp folder, then open the folder named "MobilityMap." Copy and paste your files (.shp and .dbf) into the "MobilityMap" folder. For organizational purposes, feel free to create subfolders in "MobilityMap" and paste your files into those folders.

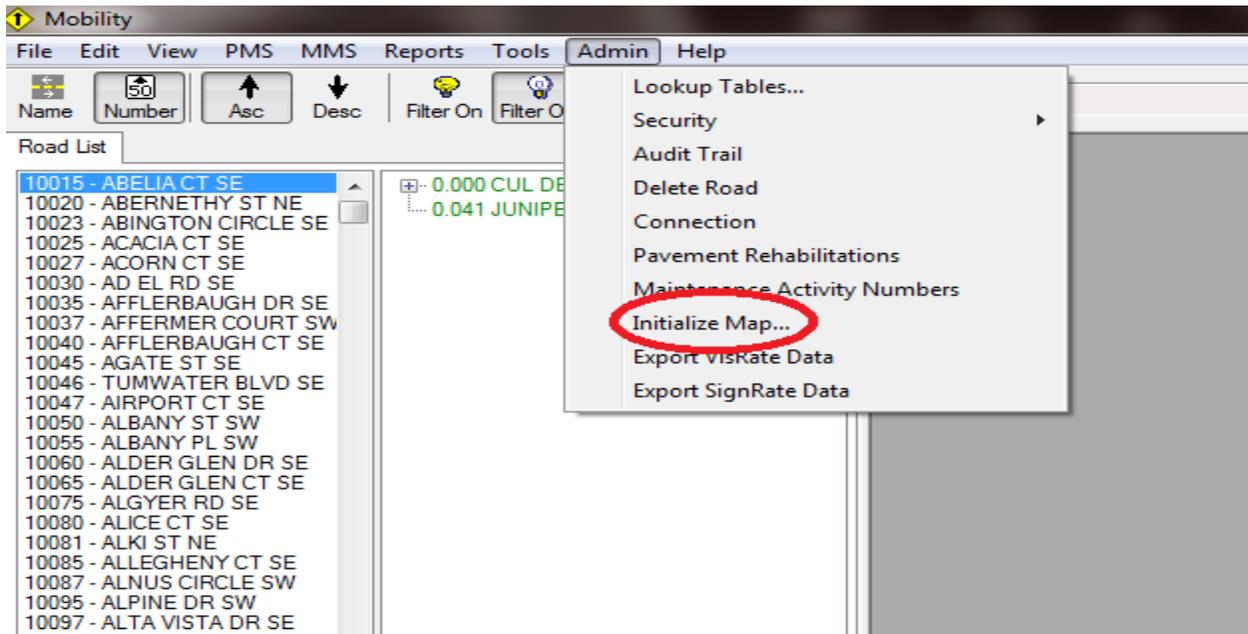
Mobility only requires the road base layer for the mapping tool to be functional; however, you can upload additional spatial layers if you were to find them useful in Mobility. For example, you may choose to upload spatial layers for bodies of water, urban boundaries, county boundary, etc. Keep in mind that your county is limited to a 40MB storage limit on our FTP site. This storage limit includes map layers, report exports, report formats, etc.

### 1.2 Initialize Mobility Map

After the road base layer has been uploaded, see section 1.1, the map tool can be initialized for your county. This initialization process will create spatial layers for the linear Mobility inventories. This is done by computing the spatial coordinates for Mobility inventory records from distance measurements in the road base layer.

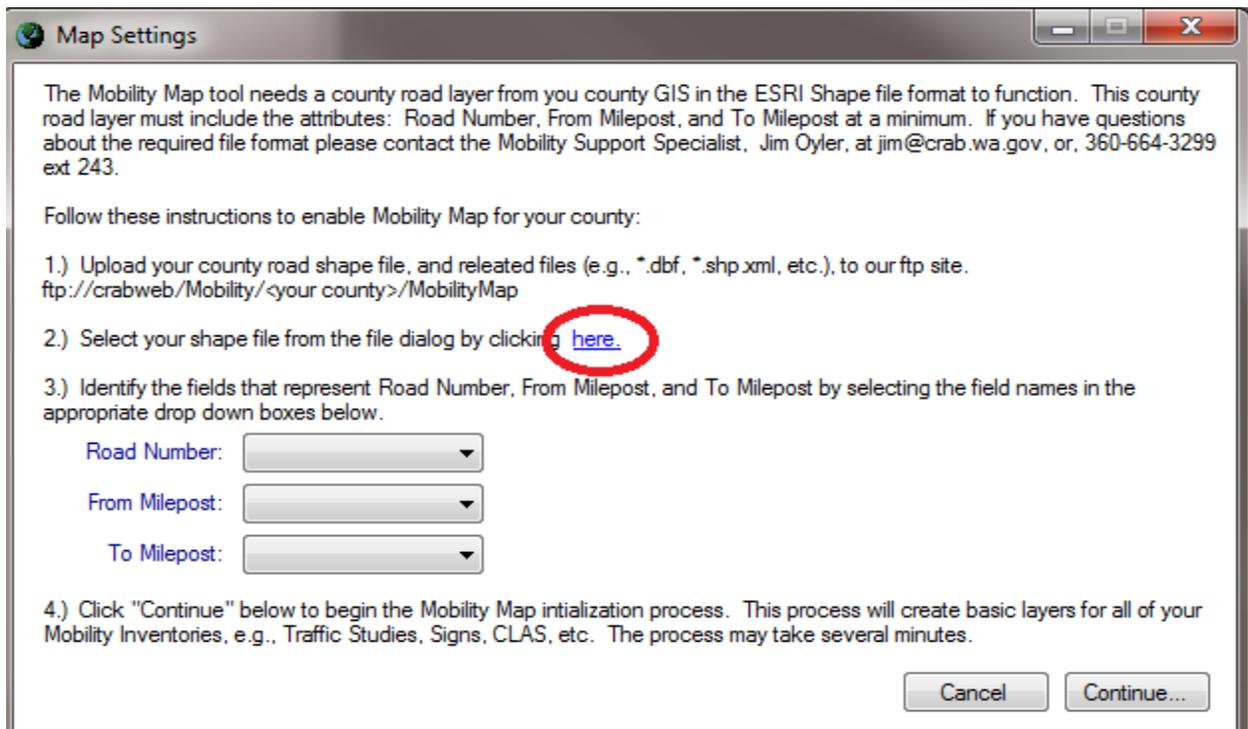
The Mobility map initialization process can only be performed by a Mobility administrator. To access the map initialization screen, click "Initialize Map..." from the "Admin" menu (Figure 1.2 A).

Figure 1.2 A



After accessing the map initialization screen take a few seconds to read through the instructions. Before clicking continue, identify the road base layer. This can be done by clicking the hyperlink labeled “here” (Figure 1.2 B). A file open dialog will appear, navigate to the “MobilityMap” folder on the CRAB FTP for your county, and select the road base layer, e.g., road\_layer.shp, and click “Open.”

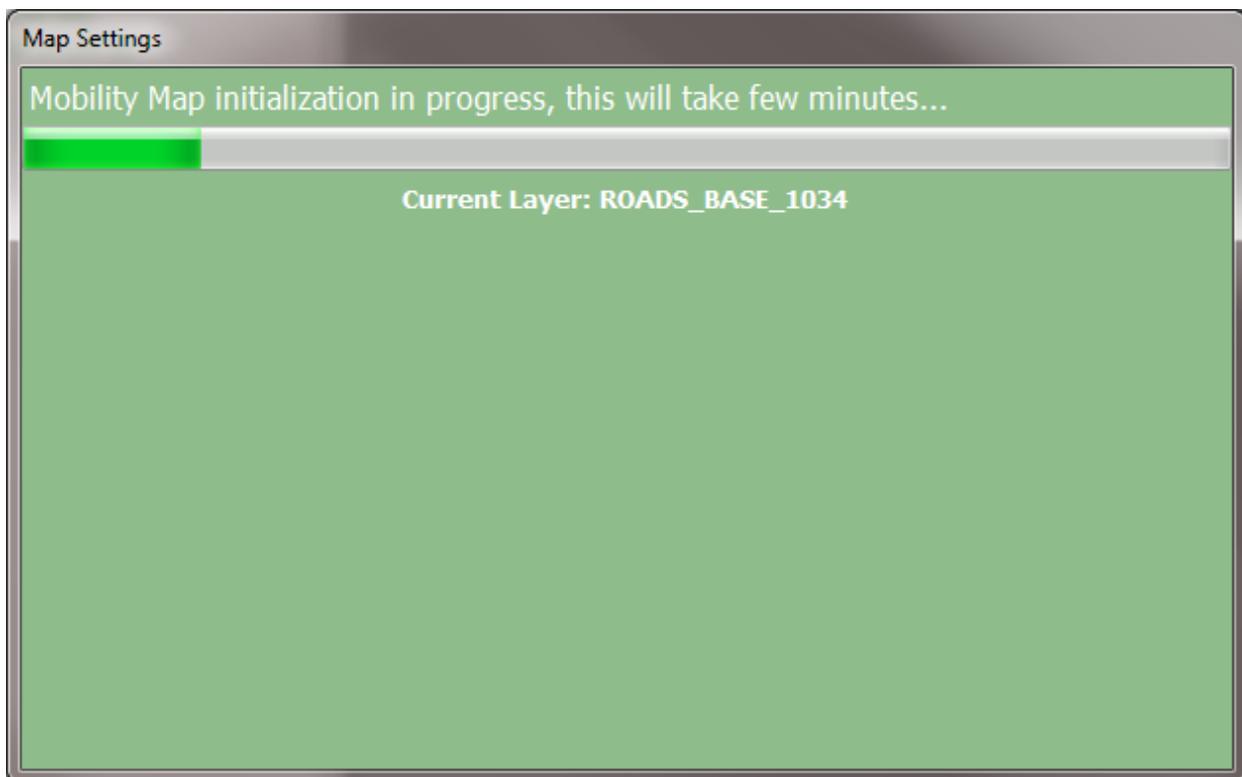
Figure 1.2 B



After the road base layer has been identified the drop down lists for road number, from milepost, and to milepost will be populated with the available attributes names. Select the attribute name that represents the appropriate data. For example, road number = rd\_num, from milepost = bmp, and to milepost = emp.

Now click “Continue...” A progress screen will be displayed and will take several minutes to complete (Figure 1.2 C). When the initialization completes a message will appear signifying that the process was either successful or unsuccessful. If the process was successful you can begin using the Mobility map tool (continue reading for assistance). If the process was unsuccessful, repeat the steps in the instructions and ensure the appropriate road base layer is selected, and the correct road number, from milepost, and to milepost attribute names are identified.

**Figure 1.2 C**



### **1.3 Make Map Tool Visible**

The map tool is contained in the tab “Map” on the main Mobility screen. To make this tab visible, ensure “Map” is checked from the “Tools” menu (Figure 1.3 A). If “Map” is checked the “Map” tab will appear next to the “Road List” tab directly below the road list sorting toolbar (Figure 1.3 B).

Figure 1.3 A

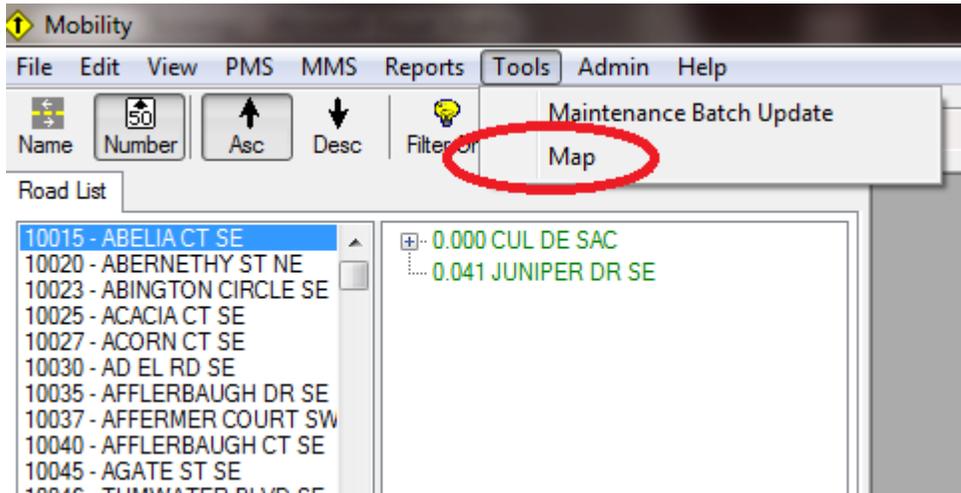
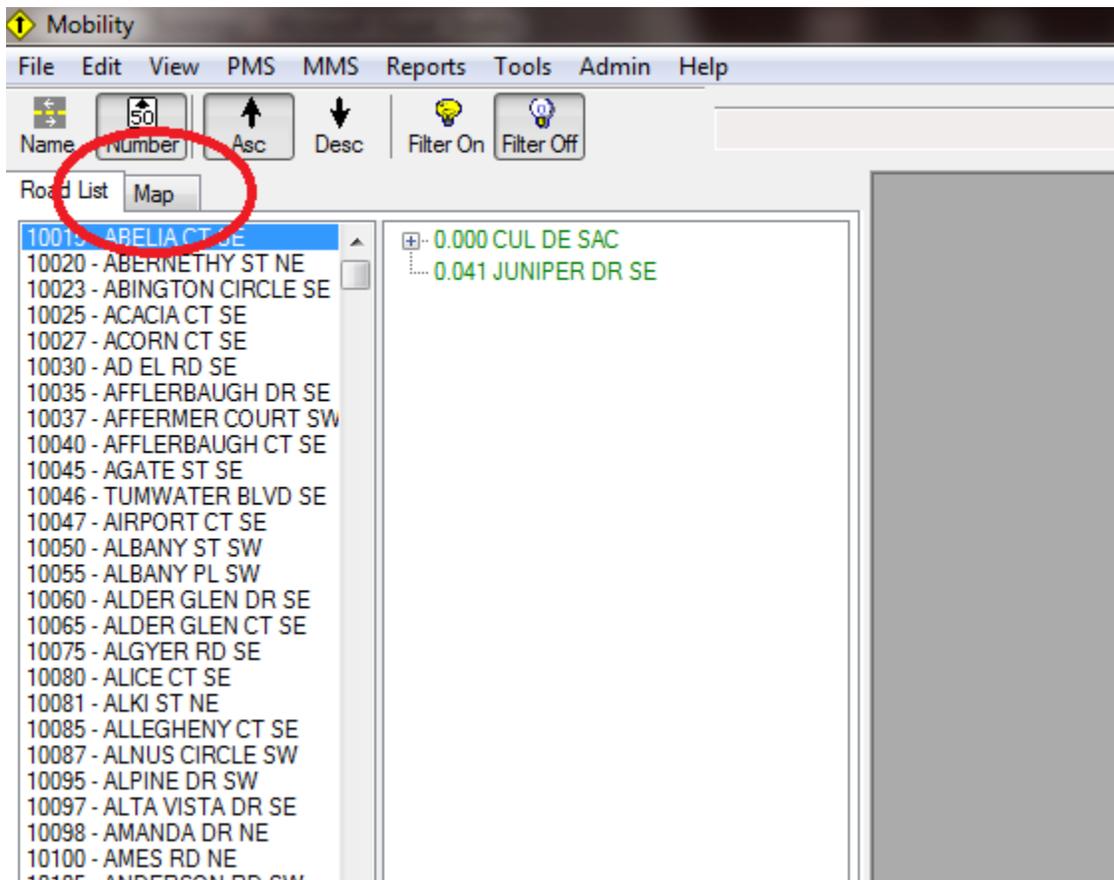


Figure 1.3 B

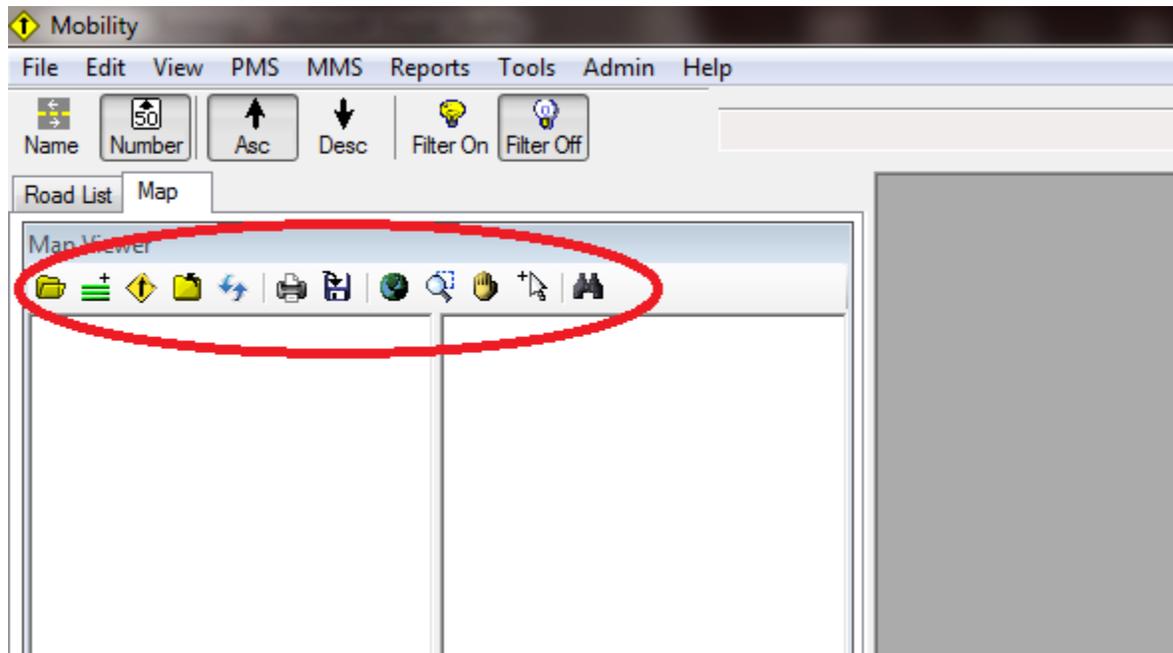


## 2. Mobility Map Tool Orientation

### 2.1 Mobility Map Toolbar

The Mobility Map toolbar (Figure 2.1 A) allows for many actions to be performed on the map by clicking one of the icons. This section will cover each one of the actions in detail.

Figure 2.1 A



#### 2.1.1 Open Project

Toolbar Icon = 

The Mobility map tool utilizes a project file for maintaining the state of the map when Mobility is closed. This “state” information includes which layers you had opened, which layers were active, what labels each layer has, etc.

The “Open Project” toolbar command can be used to open a project file (extension .ttkqp), or to open a single layer to begin a new project. By default your project file is saved when closing Mobility, and reloaded when Mobility is opened.

#### 2.1.2 Add Spatial Layer

Toolbar Icon = 

The map supports multiple layers. The “Add Spatial Layer” toolbar command can be used to append an ESRI Shape file layer. These layers won’t be your Mobility data layers, but layers that may be useful with Mobility data, e.g., bodies of water, city boundaries, etc.

### 2.1.3 Add Mobility Layer

Toolbar Icon = 

Mobility layers are kept in a database, not ESRI Shape files. The map initialization process creates layers for most of the linear Mobility inventories. These layers can be added by clicking the “Add Mobility Layer” command. A dialog will open with two options (Figure 2.1.3 A):

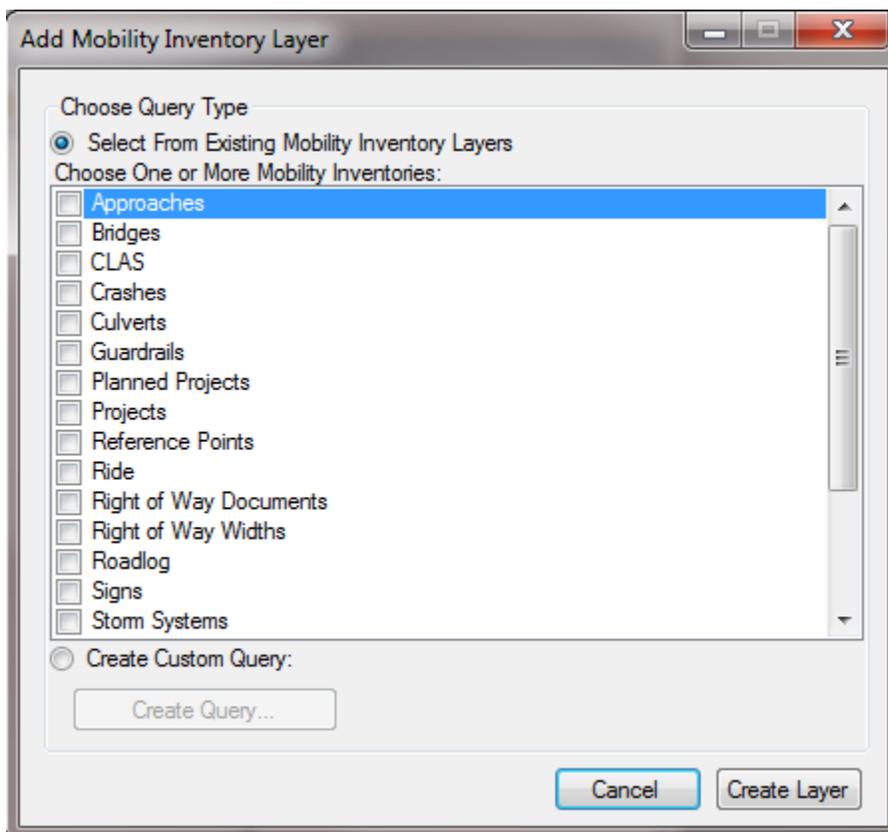
Option 1: Select From Existing Mobility Inventory Layers

Option 2: Create Custom Query

Option 2 will create a new layer based off of the query written in the custom query window. This custom query window is very similar to the one used in custom reports. To access the custom query window click “Create Query.” For help on writing custom reports see the Custom Report section of the Mobility help file.

After selecting option 1 or 2 and identifying the layers to add to the map, click “Create Layer.”

Figure 2.1.3 A



#### 2.1.4 Close All Layers

Toolbar Icon = 

All layers will be closed immediately by clicking this toolbar command.

#### 2.1.5 Refresh

Toolbar Icon = 

The static Mobility layers that are stored in the database are updated when changes are made to the inventory. The Mobility map tool does not refresh automatically when changes are made to the database. To get the latest changes to appear on the map, click the “Refresh” toolbar command.

Note: The refresh command does NOT refresh custom query layers.

#### 2.1.6 Print

Toolbar Icon = 

This command will send the map to the printer.

#### 2.1.7 Save to Image

Toolbar Icon = 

This command will save the map as an image to the CRAB FTP site.

#### 2.1.8 Full Extent

Toolbar Icon = 

The “Full Extent” toolbar command will bring the entire map into view.

#### 2.1.9 Zoom Mode

Toolbar Icon = 

Click the “Zoom Mode” command, the click and draw a box on the map to zoom to that area of the map. Drawing the box from left to right and top to bottom will zoom in, and any other direction will zoom out. The mouse wheel can also be used to zoom in and out.

### 2.1.10 Pan Mode

Toolbar Icon = 

Click the “Pan Mode” toolbar command, then click and hold the mouse down over the map pane. Move the mouse up, down, left, and right to pan the map in those directions.

### 2.1.11 Select Mode

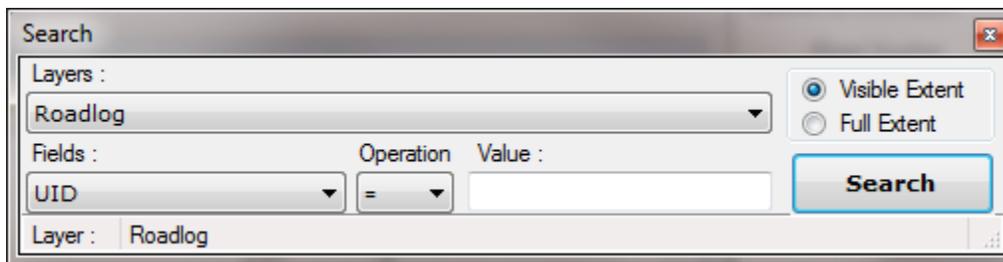
Toolbar Icon = 

Click the “Select Mode” toolbar command. Select a layer from the layer pane. When a layer is selected it will be highlighted yellow. Click an event on the map. The selected event will flash yellow and red. After the event is done flashing it will remain red while selected. The Attributes pane will fill with the attributes of the event. If you have selected an event that belongs to a Mobility layer, the inventory form will open.

### 2.1.12 Find

Toolbar Icon = 

Click the “Find” toolbar command to open the find dialog (Figure 2.1.12 A).



Follow these instructions to search:

1. Select the layer you want to search
2. Select “Visible Extent” (search only the area of the map that is visible) or “Full Extent” (search the entire map).
3. Select the attribute you want to search on, e.g., road\_number, federal function class, etc.
4. Select the logical operator to use, i.e., =, <>, <, >, >=, <=.  
Note: <> is the symbol for not equal to.
5. Enter the value you would like to search on.
6. Click “Search”

After clicking search, the events on the map that match your search criteria will flash yellow and red.

## 2.2 Layer Pane

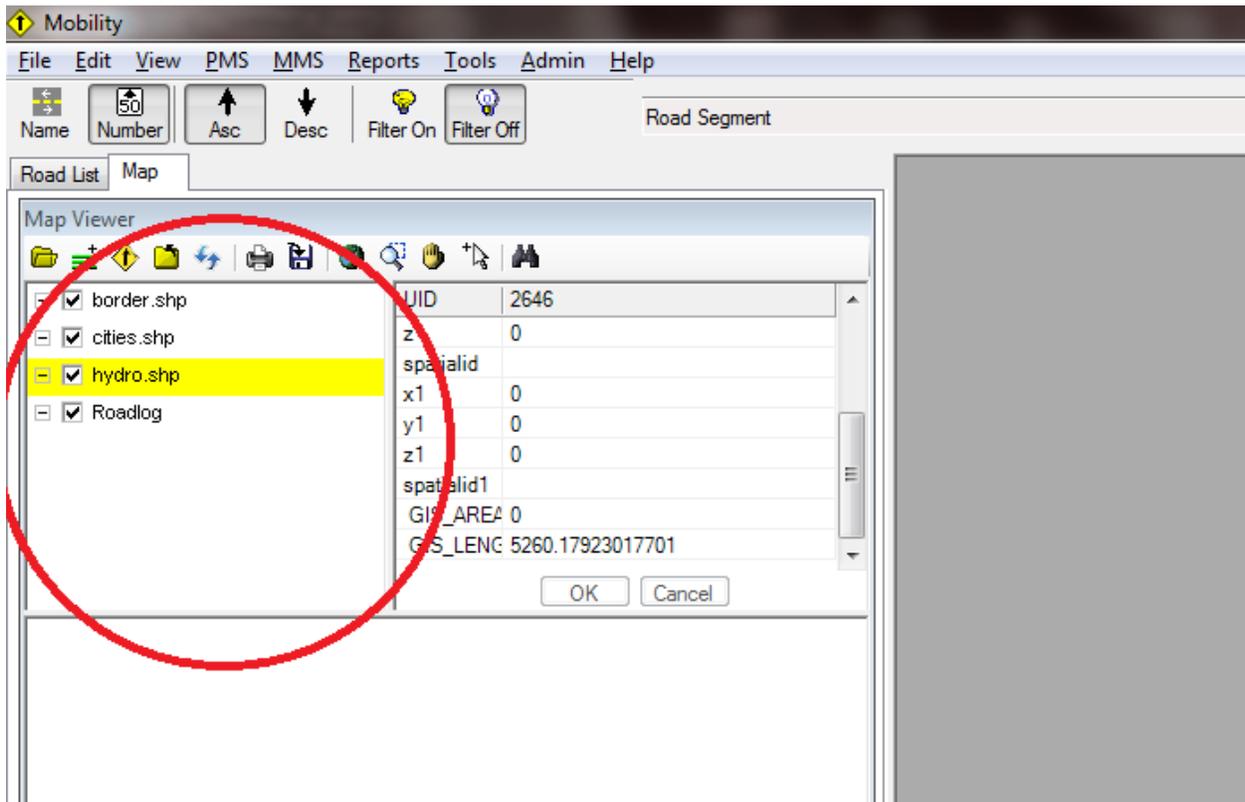
The layer pane (Figure 2.2 A) will list all layers currently loaded into the map tool. If the checkbox to the left of each layer is checked, it will be visible on the map. Unchecking the checkbox will hide the layer on the map.

When a layer in the layer pane is clicked it will be highlighted yellow. This makes the layer “active” when using the “Select Mode” toolbar command ([see section 2.1.11](#)). Also, if you right click the “active” layer, the one highlighted yellow, a context menu will appear with options the either remove or export the layer. Click “Remove Layer...” to remove the layer from the layer pane and the map tool. Click “Export Layer...” to export the “active” layer to the CRAB FTP site.

The order of the layers in the layer pane will determine the Z-order of the layers on the map. The first layer in the layer pane will be the lowest layer in the map, and the next layer in the layer pane will be on top of the first layer in the map, so-on and so-forth. If you would like to change the order of the layers, click and drag the layer in the layer pane to a different position.

Lastly, if you double click a layer in the layer pane the properties dialog window will be opened. These properties will be covered in [Section 3: Layer Properties Dialog](#).

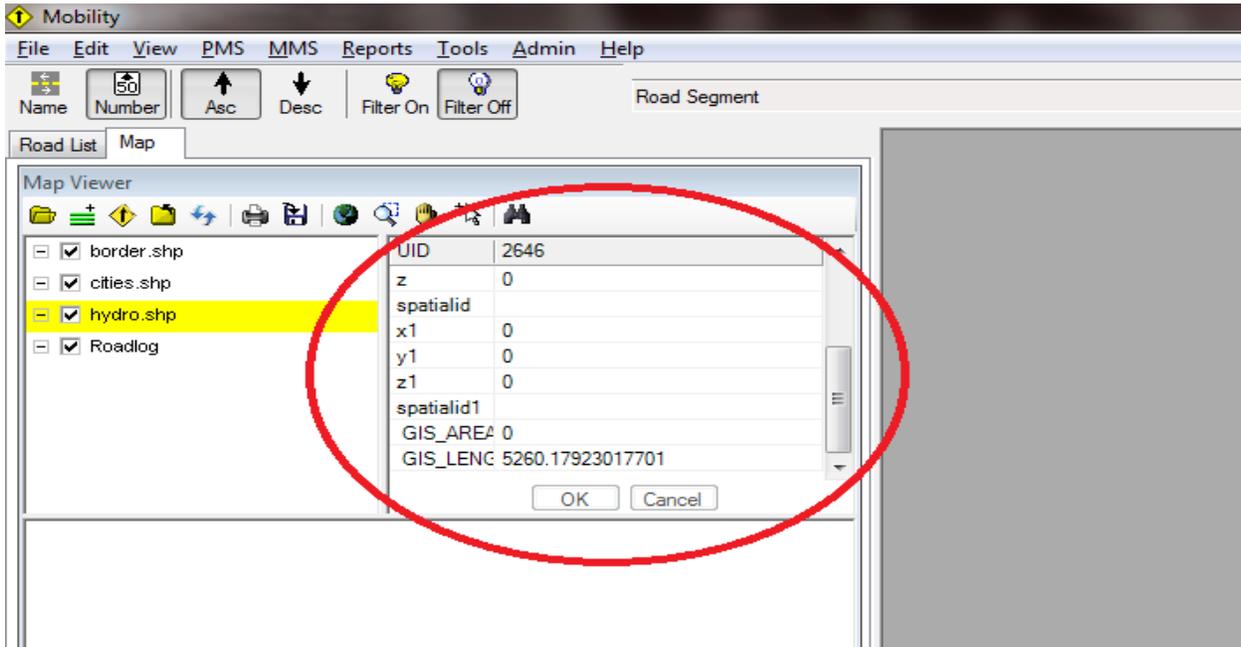
Figure 2.2 A



## 2.3 Attribute Pane

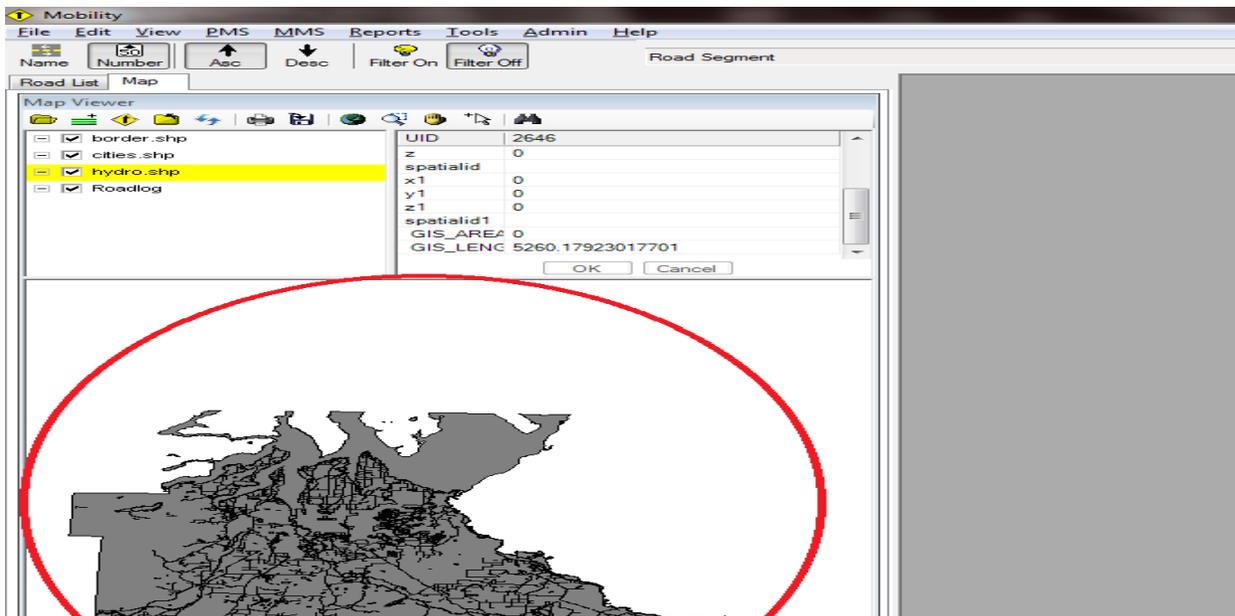
The attributes pane (Figure 2.3 A) will display the attributes associated with a selected event on the map. For help selecting a map event see [Section 2.1.11: Select Mode](#).

Figure 2.3 A



## 2.4 Map Pane

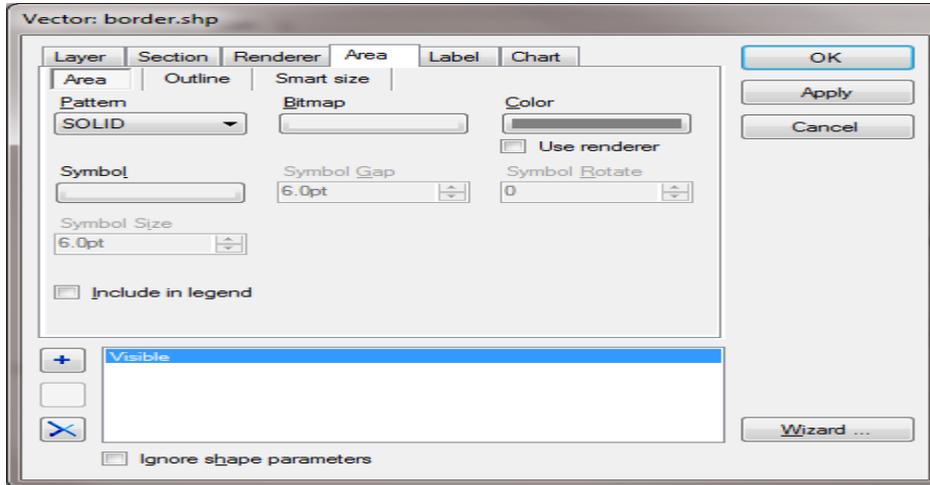
The map pane (Figure 2.4 A) displays the visible layers from the map pane.



### 3. Layer Properties Dialog

Open the layer properties dialog (Figure 3 A) by double clicking a layer in the layer pane. For more information on the layer pane see [Section 2.2: Layer Pane](#). There are many options in the layers properties dialog and this section will cover a few of the most important. You are encouraged to explore the properties dialog to discover different possibilities.

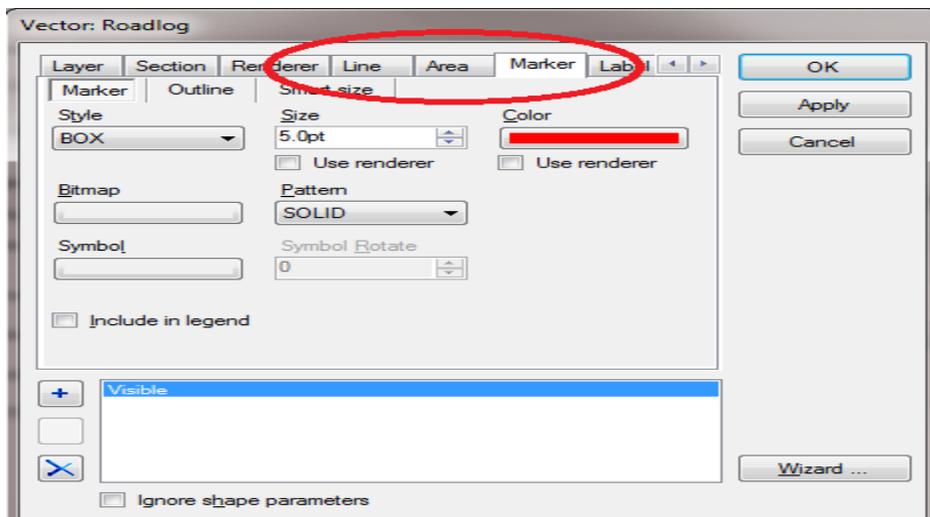
Figure 3 A



#### 3.1 Change Layer Color, Width, Style, etc.

There are three primary types of layers: polyline, polygon, and point. Polyline would be used for inventories such as roads, polygon is used for inventories like bodies of water, and point is used for inventories such as reference points. This distinction is important when setting the color, width, or style of your layer. The properties dialog has three tabs for this: Line, Area, and Marker (Figure 3.1 A). Line = Polyline, Area = Polygon, and Point = Marker.

Figure 3.1 A



### 3.2 Add Labels to Layer

Add a label to your layer from the “Label” tab of the layer properties dialog (Figure 3.2 A). From the “Label” tab use the drop down list under “Field” to select what attribute you want to use as your label. If you are setting a label for roadlog, or any polyline layer, you may want to set the label position to have the label follow the line (Figure 3.2 B).

Figure 3.2 A

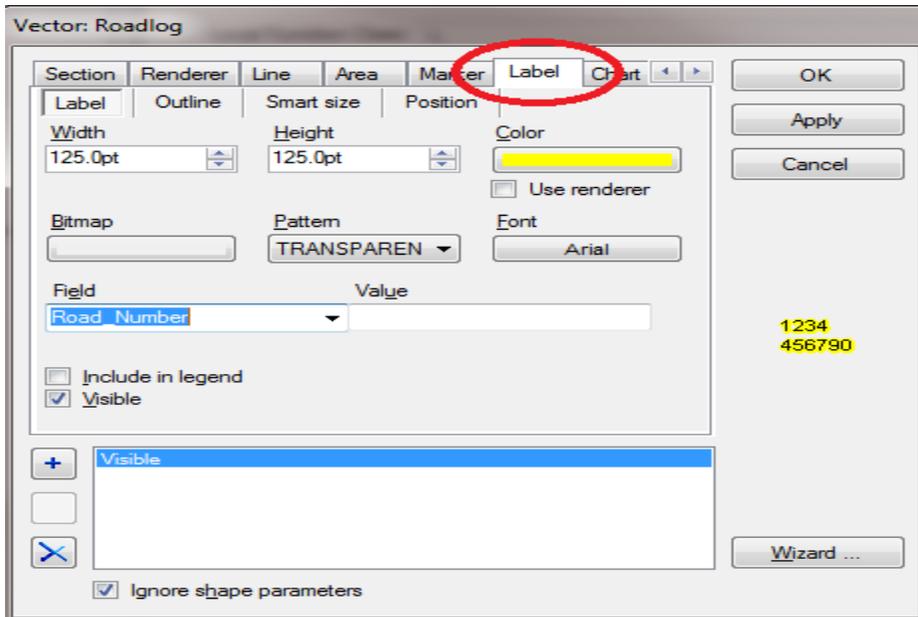
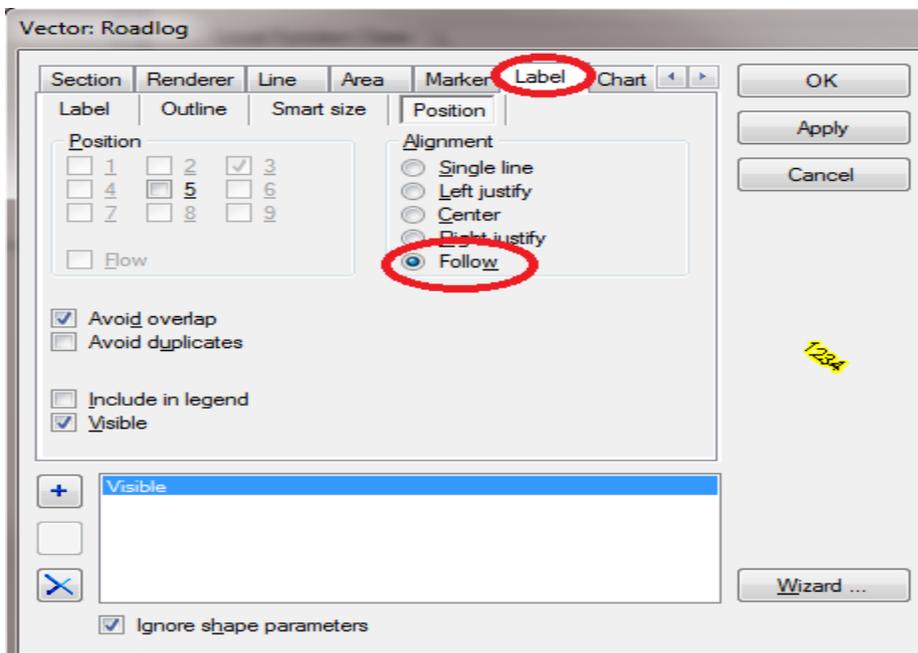


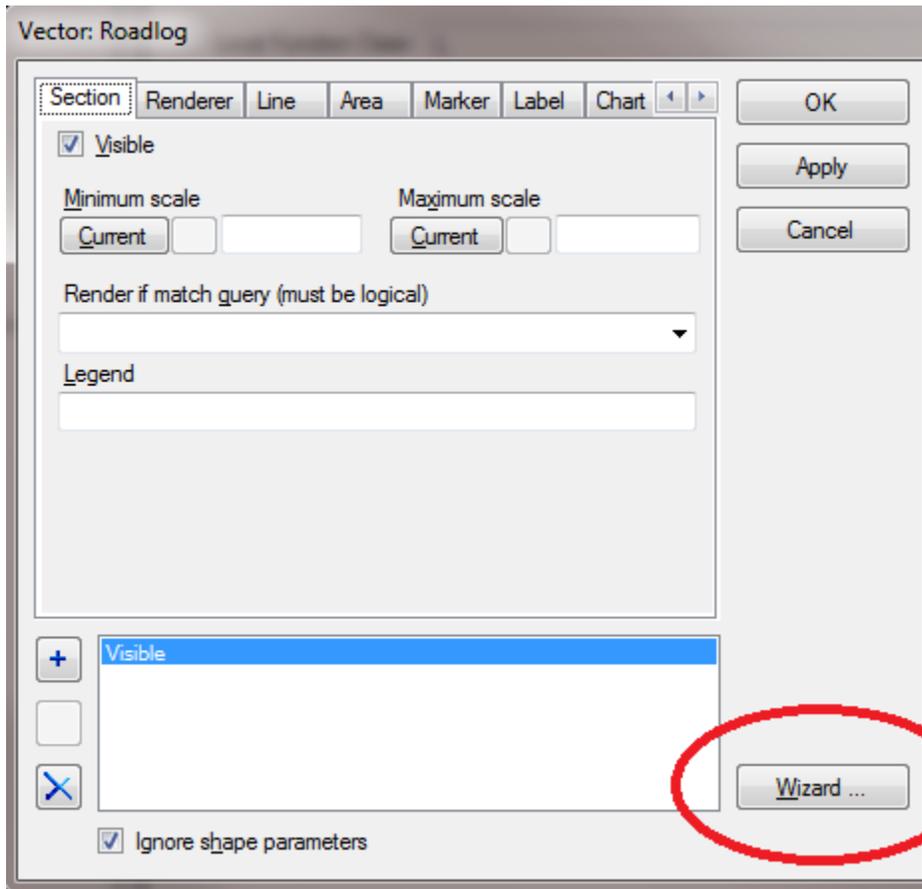
Figure 3.2 B



### 3.3 Property Wizard

The property wizard (Figure 3.3 A) can be used to quickly render events in your layer based on the attributes. For instance, a roadlog layer can be color coded by jurisdiction very easily.

Figure 3.3 A



### 4. Glossary

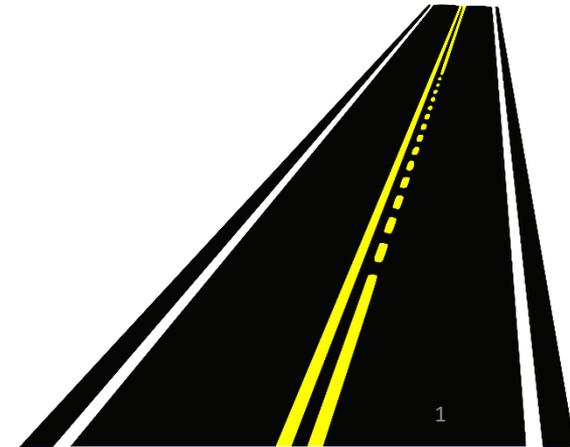
- 1.) **Attribute:** Nonspatial information about a geographic feature in a GIS, usually in a table and linked to the feature by a unique identifier. For example, attributes of a river might include its name, length, and sediment load at a gauging station.
- 2.) **Event:** A geographic location stored in tabular rather than spatial form. Even types include roadlog segments, reference points, and street lights.
- 3.) **Layer:** The visual representation of a geographic dataset in any digital map environment. Conceptually, a layer is a slice or stratum of the geographic reality in a particular area, and is more or less equivalent to a legend item on a paper map. On a road map, for example, roads, national parks, political boundaries, and rivers might be considered different layers.
- 4.) **Point:** A geometric element defined by a pair of x,y coordinates.
- 5.) **Polygon:** On a map, a closed shape defined by a connected sequence of x,y coordinate pairs, where the first and last coordinate pair are the same and all other pairs are unique.

- 6.) **Polyline:** a shape defined by one or more paths, in which a path is a series of connected segments. If a polyline has more than one path (a multipart polyline), the paths may either branch or be discontinuous.
- 7.) **Shape:** The characteristic appearance or visible form of a geographic object as represented on a map. A GIS uses points, line, and polygons to represent the shapes of geographic objects.
- 8.) **ShapeFile:** A vector data storage format for storing the location, shape, and attributes of geographic features. A shapefile is stored in a set of related files and contains one feature class.
- 9.) **Spatial:** Related to or existing within space.
- 10.) **Spatial Data:** Information about the locations and shapes of geographic features and the relationships between them, usually stored as coordinates and topology.

This glossary covers the GIS terms used in this help. The glossary definitions are provided from the ESRI Online GIS Dictionary. For more GIS term definitions you can find the ESRI Online GIS Dictionary here: <http://resources.arcgis.com/glossary/2/letters>.

# PAVEMENT MANAGEMENT SYSTEM (PMS) TRAINING

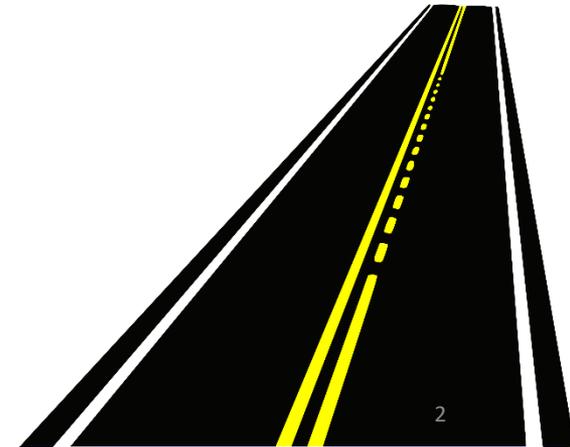
- Definition
- Levels of PMS
- Components
- Pavement Manager
- Database Updates
- Quality Control
- Technical User Groups
- Documentation



# What is a Pavement Management System?

PMS is a tool that can be used to make informed decisions about the Maintenance and Rehabilitation of a pavement network.

WAC 136-70-040 Requirement— Pavement Management System - Minimum Standards

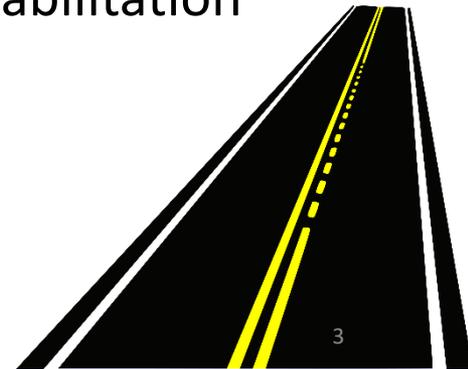


# Pavement Management System

Computer program for maintaining road surfaces by systematically analyzing pavement life cycles to:

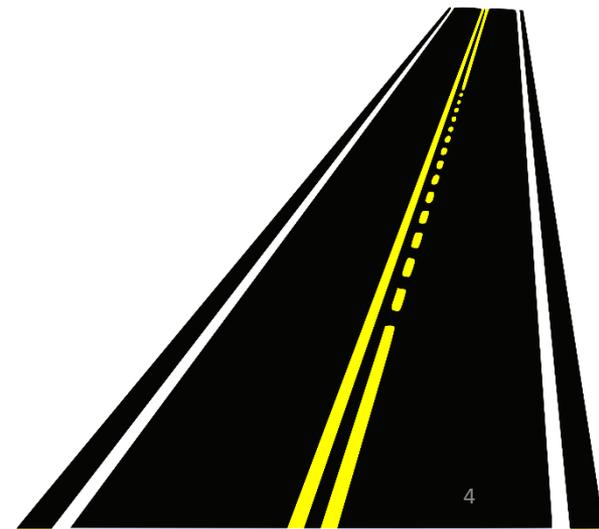
- Determine when to do pavement preservation
- What is the most cost effective rehabilitation method
- Develop pavement rehabilitation budget that will prevent major road deterioration.

Federal Function Class (FFC) data as well as Truck Route Classifications are used extensively as critical data elements in the road rehabilitation selection process.



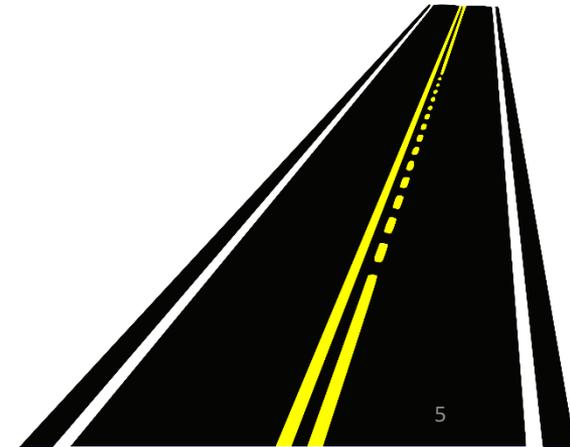
# Levels of Pavement Management

- Project Level: comes after network level, this level requires more detailed evaluation for a specific project. Such as cross-sections, topography and coring.
- Network Level: the evaluation of all pavement under the agency's jurisdiction.



# PMS Components

- Inventory Data
- Monitoring Data
- Database
- Data Analysis
- System Outputs
- Feedback

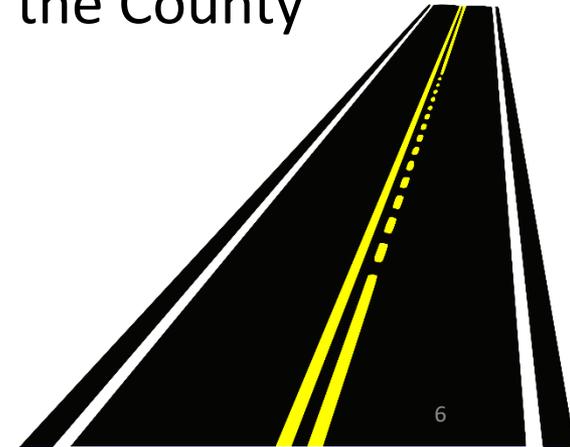


# What is a “Pavement Manager”?

This is the person that has the responsibility for:

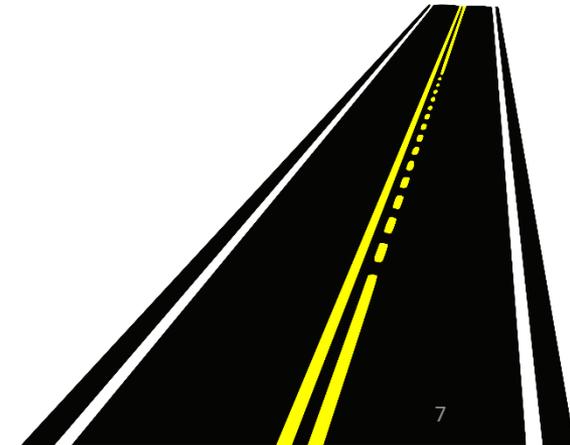
Collecting, Managing, Analyzing and Communicating all information pertaining to the County’s Pavement network to numerous people within county government (PW Director, County Engineer, Elected Officials, Road Log Manager/Administrator, Maintenance Staff and the Public)

This person is essential for reporting and submittal the annual Road Log updates and submittals to the County Road Administration Board.



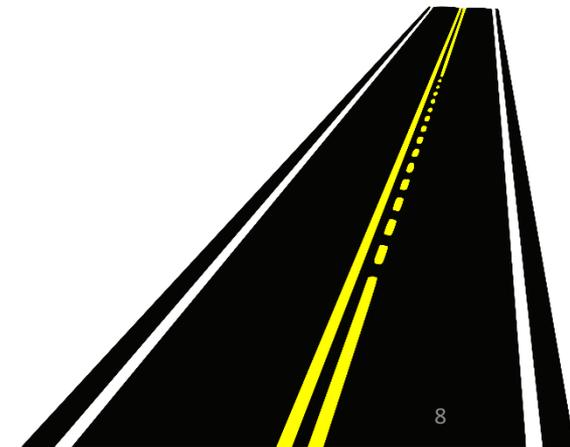
# PMS Database Updates

- Control Fields
- New Roads
- Road Re-alignment
- Road Deletions (Vacations, Road Closures)
- Maintenance History
- PSC Ratings
- Traffic Data Counts (aka ADT)
- Jurisdictional Change
- Pavement Type
- Width changes – shoulders & thru lanes etc.



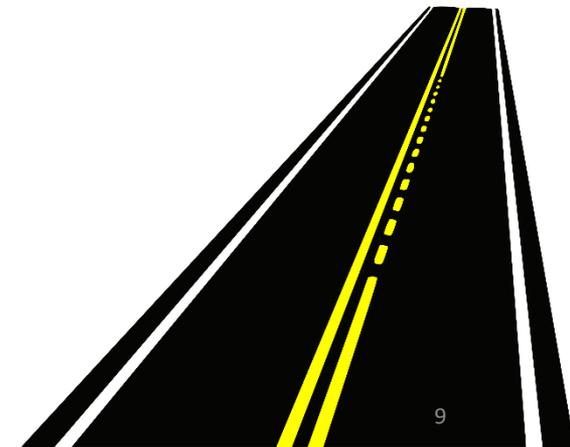
# Quality Control

- It is important to realize that the PMS is only as good as the data stored in the database.
- Visual Data Collection – Using the Pavement Surface Condition Rating Manual for guidance. Seven (7) Core defects.
- Quality Control - Data entry checking 10% minimum (self audit)
- Garbage in Garbage out!! (GIGO)



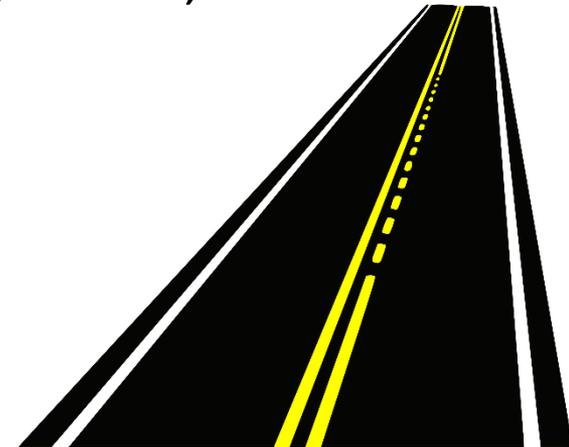
# Documentation

- Flow Chart – tracking the process.
- Written Instructions – step by step detailing your agencies' procedures when using the PMS software.
- Applications Guide – provides examples of ways to manipulate and analyze the data.



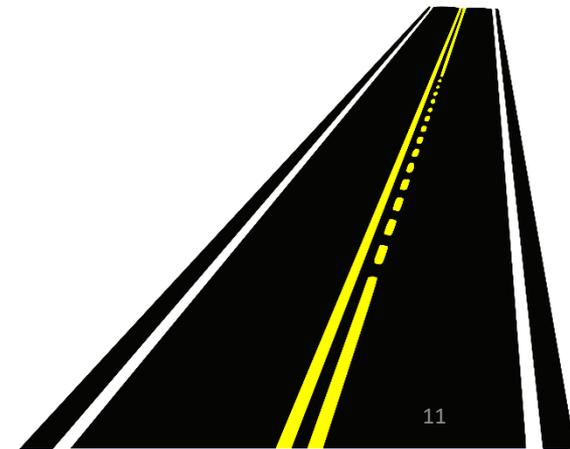
# Jump Start your PMS

- Have a meeting with Engineering, Maintenance and other vested staff
- Discuss expectations
- Select guidelines for extent of information to be included in the network inventory
- Data collected **MUST** serve a purpose
- System output requirements, spreadsheets, charts, maps, and “canned reports”



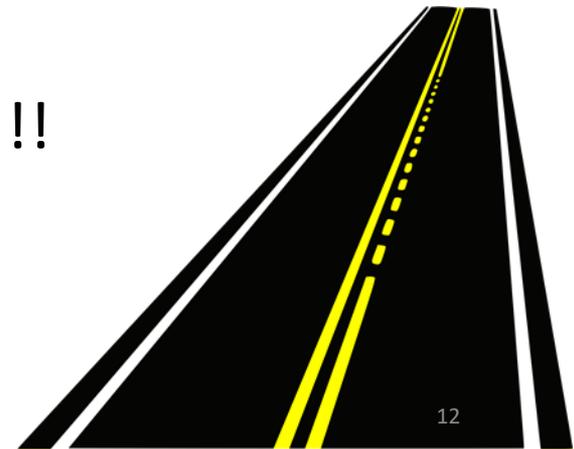
# Technical User Groups

- Engineering staff – project level information
- Maintenance staff – identify crack seal and other defects that need to be addressed before rehabilitation begins
- And of course the Pavement Manager



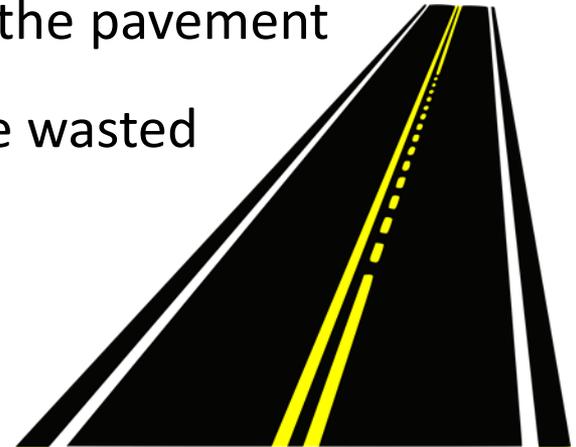
# Mobility PMS Data Requirements

- Updated Road Log Information
- Current (by WAC every 2 years) PSC ratings on Collectors and Arterials
- Updated Surface/Structural History Information
- ADT data (best-currently available)
- Good Data provides the Best Results!!!!



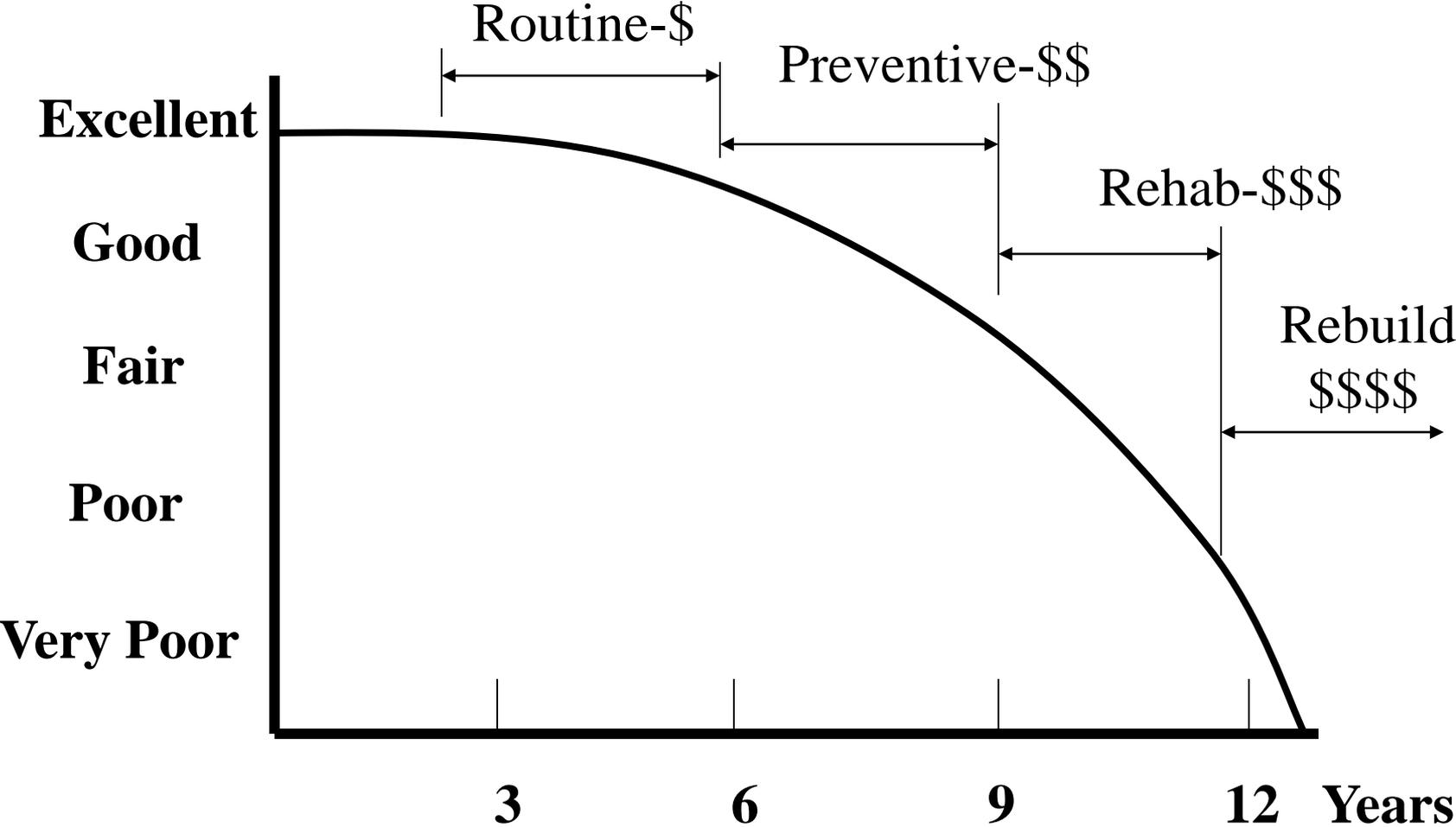
# PAVEMENT MANAGEMENT

- If a Reasonable Level of Service is Provided at the **Right** Time, **Right** Treatment and the **Right** Road.
- With an effective preventive maintenance program the long term costs will be lower versus delayed rehab/reconstruction costs.
- Maintains the roadway in a higher level of service for the public with overall reduced cost.
- Preventive maintenance must be applied before the pavement has deteriorated beyond preservation or it can be wasted money.

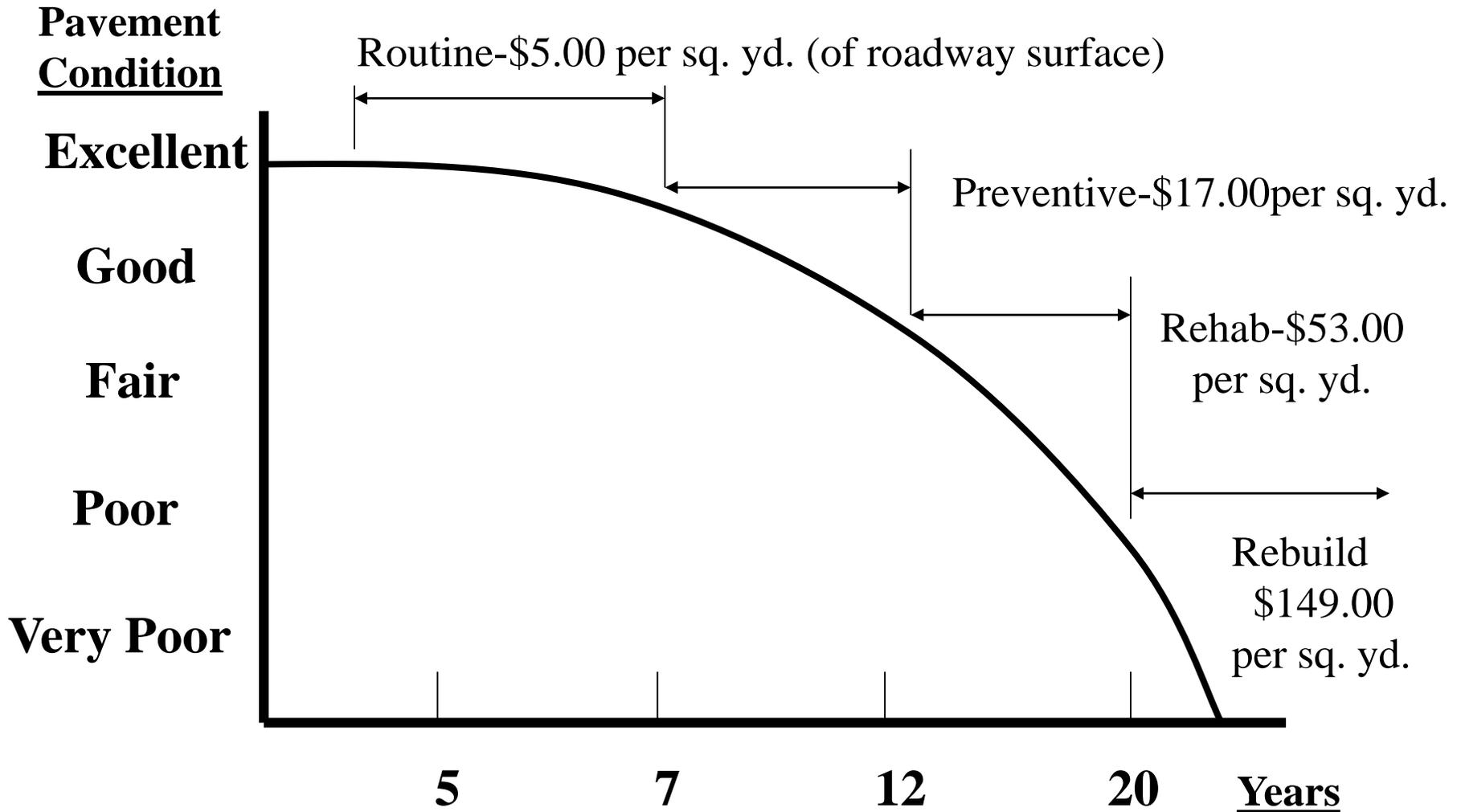


# Timing Of Treatments

## Typical Pavement Life Curve



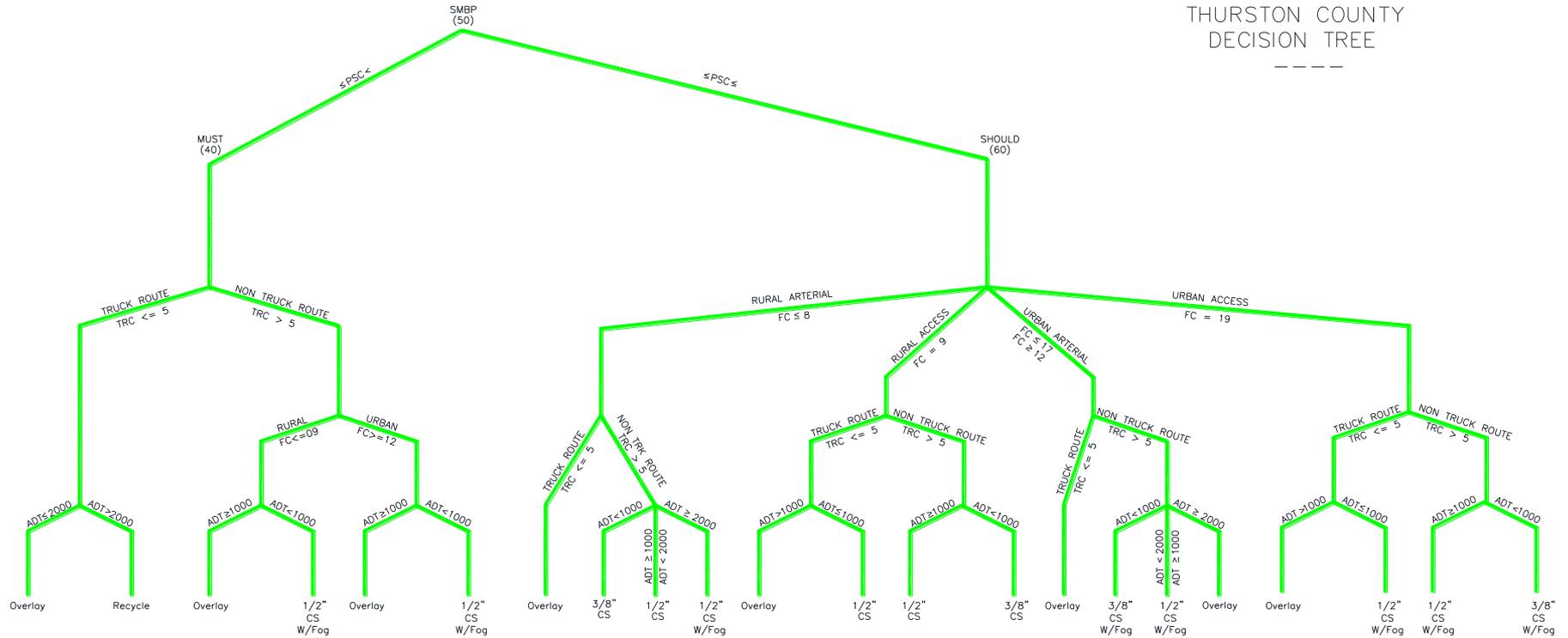
# Maintenance Treatment Cost Comparison



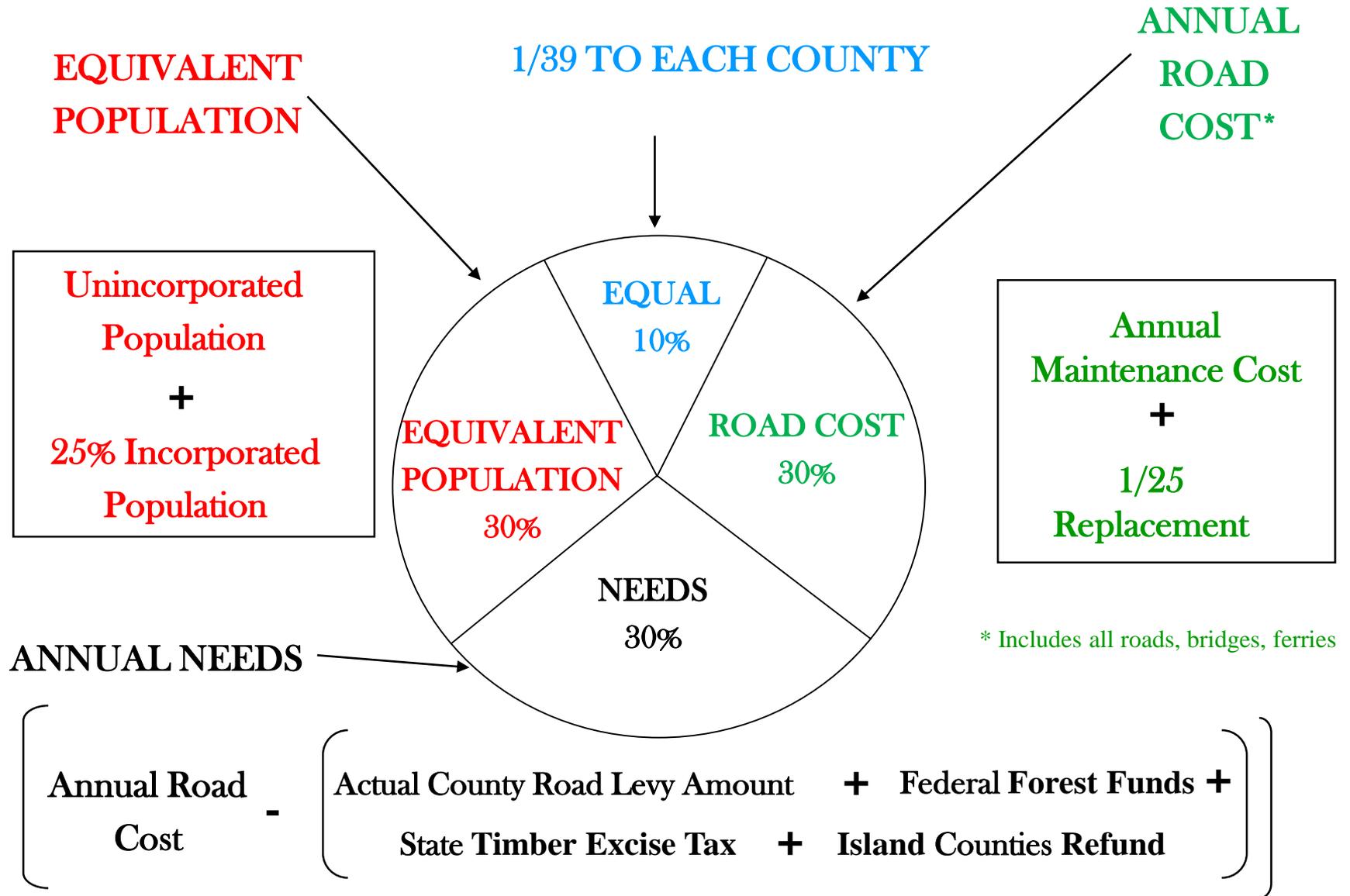
Based on 2013 Average County Costs

# Decision Tree

## THURSTON COUNTY DECISION TREE

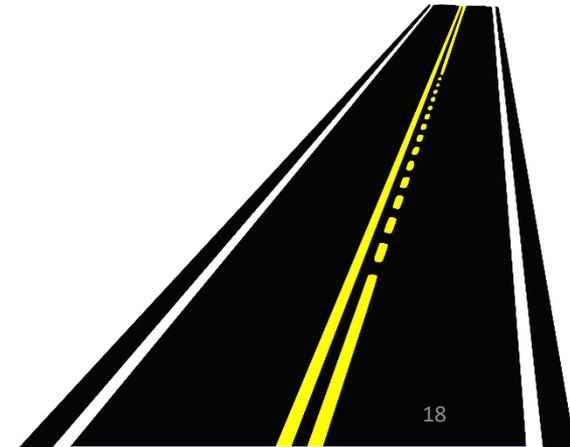


# County Gas Tax Distribution Formula (RCW 46.68.122-124)



# MOBILITY PMS

▶ Questions???



## Pavement Management System

Pavement Management System (PMS) is a methodology for maintaining road surfaces by systematically analyzing pavement life cycles and pavement ratings to determine timing of a pavement preservation, as well as the most cost effective pavement rehabilitation type. In addition, to develop pavement rehabilitation budgets that will prevent major road deterioration.

The roadway and pavement information is in the County Road Log, and updated annually as part of the Road Log **update process**. The Mobility PMS uses the road log information directly; counties using another PMS program have a routine to transfer the current road log information to their program. The next step in building your PMS is to design a Decision Tree that best fits your county needs and expectations of your road network. A Decision Tree is a set of "Rules" by which each road segment is evaluated. A Rehabilitation Type, Rehabilitation Date, and Rehabilitation Cost are then calculated for each road segment based on your Decision Tree (see page 24 for an example).

There are three levels of work on pavements:

- **Routine maintenance** (pothole repair, patching, crack sealing, etc), done on an as-needed basis
- **Preservation or rehabilitation** (installing a new wearing surface, a seal coat or overlay), done on a cyclic basis
- **Reconstruction** (remove and replace the pavement and base structure), done when the road has failed or needs widening or realigning.

There are three phases in the life of a pavement:

- When the pavement is in good or better condition and does not need a preservation (PSC above 60)
- When a pavement preservation is cost effective (PSC between 60 and 40)
- When the pavement is in such a poor condition that a pavement preservation is no longer cost effective (PSC less than 40), reconstruction is needed

The year the pavement reaches the **should** and **must** levels is critical. The **should** level is the PSC level where a rehabilitation **should** be considered. If the PSC is above the **should** level, there is still life available in the pavement, and rehabilitation is not yet cost effective. If PSC is **below** the **must** level, the pavement is in such a deteriorated condition that the road **should** be rebuilt and a surface rehabilitation will not be adequate to restore the road to its original condition. The **should** and **must** levels are selected by the user. Typically the **should** level is a PSC of 60 (representing a 40% drop in quality) and the **must** level is a PSC of 40.

By knowing when pavement preservation is cost effective, the county can spend their limited pavement preservation funds on the most cost-effective rehabilitations. By properly preserving their pavements, they reduce the need for and cost of routine pavement maintenance.

The results of the PMS program are not the final answer. The PMS results are but one of the items that must be considered during the engineering analysis of the proposed pavement preservation program. Each proposed project needs to be reviewed to make sure it is the right thing to do.

The PMS strategy applied in Mobility Pavement Management System consists of four major parts:

1. **Surface Conditions** – Recording visible distresses on the pavement surfaces, which are calculated into a Pavement Structural Condition (PSC) score. **Alligator Cracking** and **Patching** are the highest deductions with the top 4 core structural pavement defects are – **Transverse cracking, Longitudinal cracking, Alligator cracking, and patching**. At a minimum, counties are required to rate their Paved Arterial network (Arterial and Collector roads) every two years.
2. **Generate Project File** - Define a road system as a rational set of projects.
3. **When Analysis** - Formulate a Pavement Performance Curve to predict the PSC score for each project segment.
4. **What Analysis** - Define and apply a budget and strategy, comparing the results of multiple iterations to determine the best course of action.

### **Benefits**

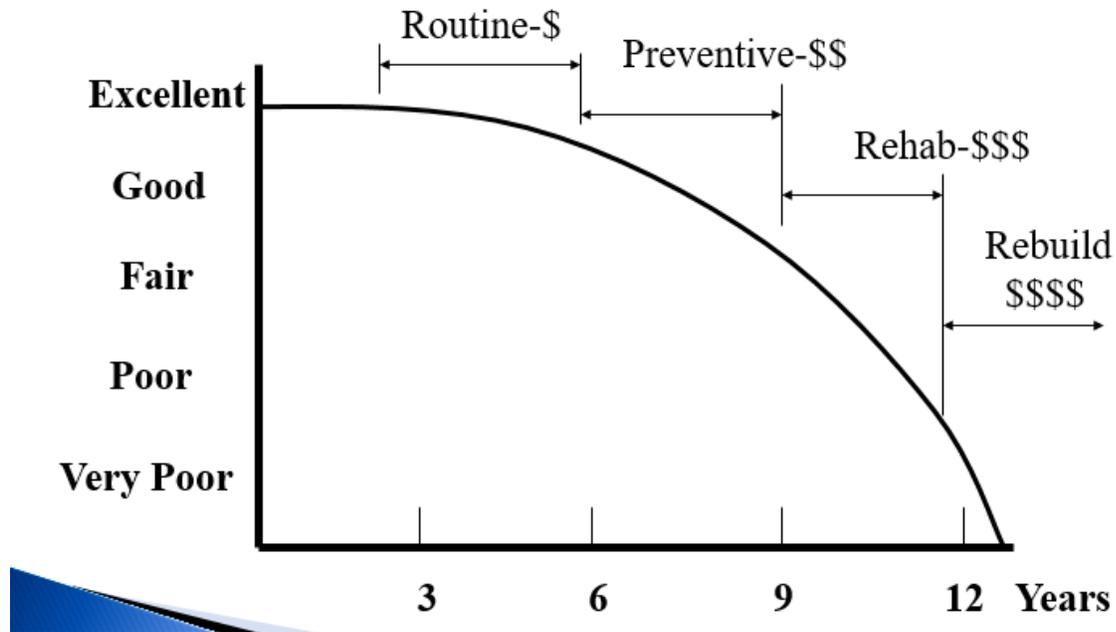
A benefit of a Pavement Management System is the determination of whether a preservation activity will or will not be cost effective. One of the reports (Below Must) provided by the PMS is a list of all roads in such a poor condition that a preservation activity will not be cost effective, and that these roads need to be reconstructed. These roads need an in-depth engineering analysis to determine what should be done to improve the road. If reconstruction is needed, funds must be located, such as RAP funds for rural arterials, TIB funds for urban arterials, state and federal funds.

The use of a PMS to determine if a preservation project is cost effective does not prevent the county from doing non-cost effective preservation projects. If it is determined that a preservation activity will be done, for whatever reason, that project will be done. The PMS provides an engineering reason for not doing the project, such that the pavement is in such poor condition that a pavement preservation will not last and is not cost effective.

- PMS allows you to: Select the appropriate roads (**Right Road**)
- Select the appropriate treatment (**Right Treatment**)
- Choose the correct timing (**Right Time**)
- Lowest cost treatment (with an effective preventive maintenance program the long term costs will be lower versus delayed rehabilitation/construction costs).
- Greatest life expectancy (Preventive maintenance must be applied before the pavement has deteriorated beyond preservation or it can be wasted money).

# Timing Of Treatments

## Typical Pavement Life Curve



Pavement life curve graph – costs increase significantly over 6-8 years and left alone pavements will typically deteriorate over time at increasing rate.

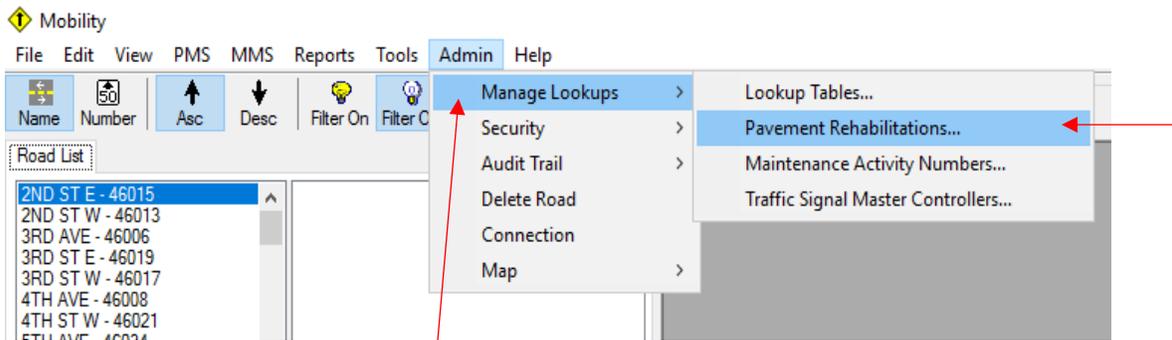


## Decision Tree Rules Exercise

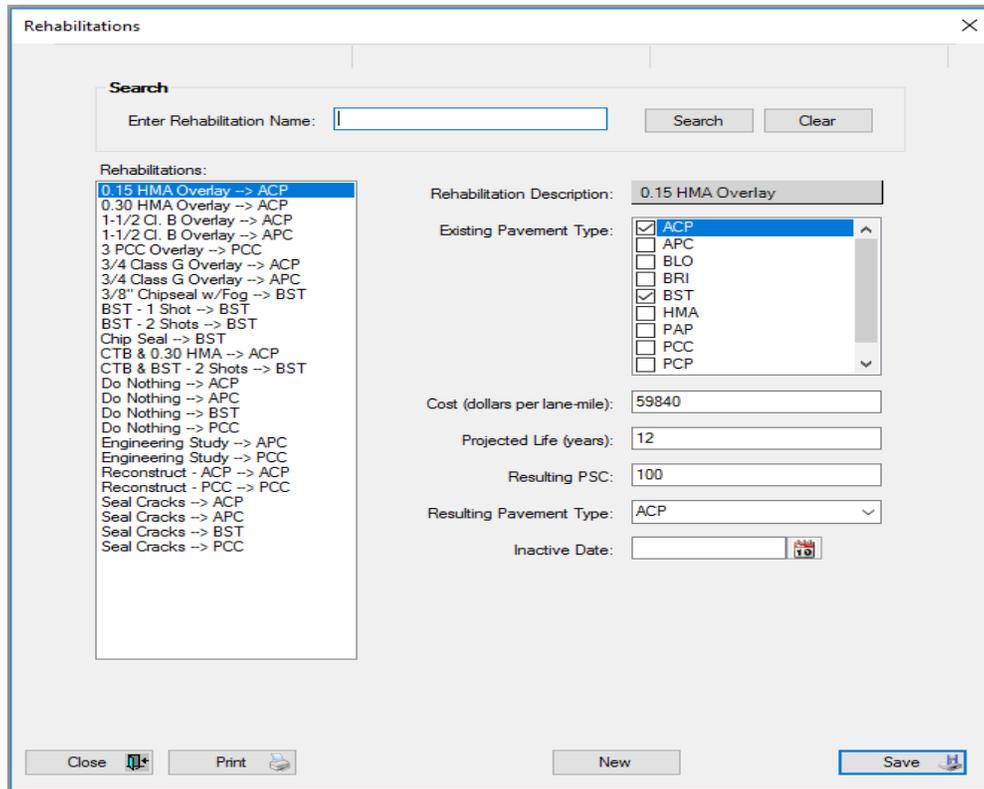
Prior to creating the Decision Tree Rules, I would encourage everyone involved with the Road Maintenance Preservation program to sit down to discuss how you will define the rehabilitation types, cost (dollars per lane-mile), projected life (years), and resulting PSC.

First, review and update the rehabilitation list. The rehabilitation list can be accessed from the menu “**Admin**” “**Pavement Rehabilitations**”. The rehabilitation list contains rehabilitations available to the MPMS decision trees. When defining rehabilitations, provide a “**Rehabilitation Description**”, “**Existing Pavement Type**” (what pavement types the rehabilitation can be used on), “**Cost (dollars per lane mile)**”, “**Projected Life (years)**”, the “**Resulting PSC**”, and the “**Resulting Pavement Type.**”

- 1.) Click on “**Admin**” on the upper menu bar then scroll down to “**Manage Lookups**”



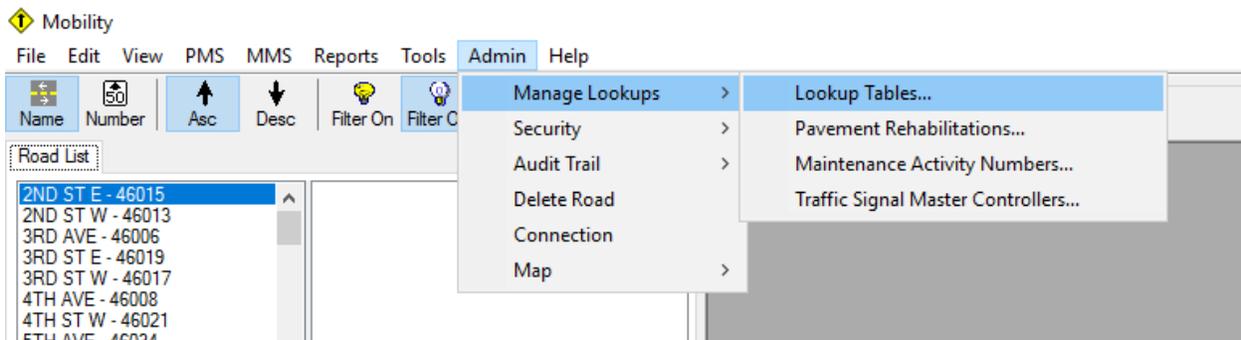
- 2.) Now click on “**Manage Lookups**”
- 3.) Click on “**Pavement Rehabilitations ...**”
- 4.) A dialog box will open for updating or creating new “**Pavement Rehabilitations**” (see following page)



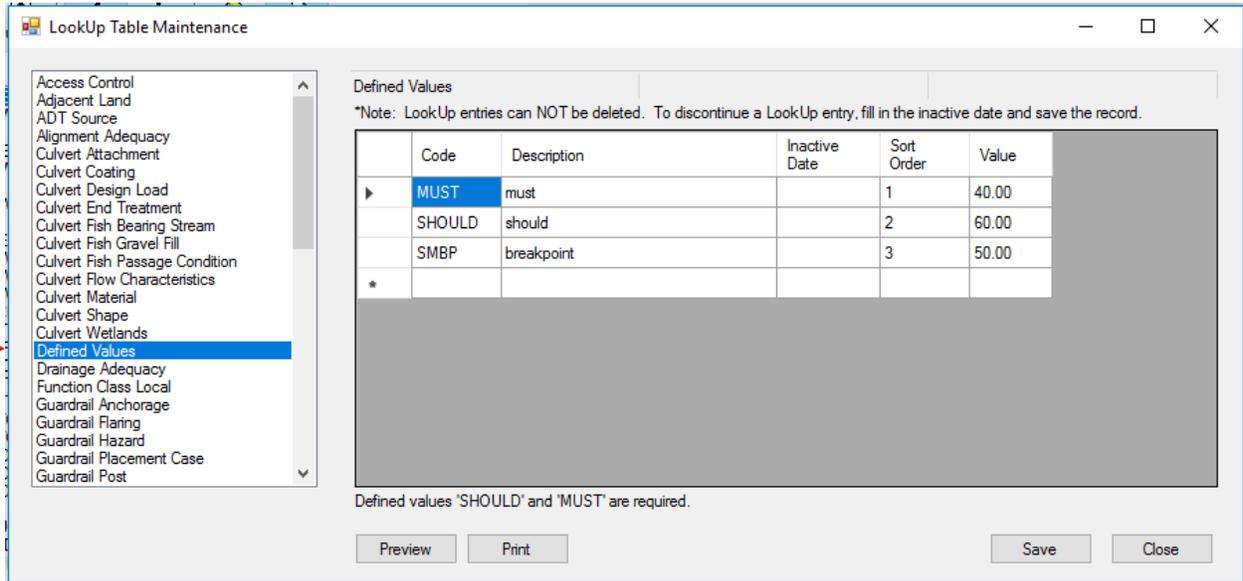
1.) In addition to collaborating on the Rehabilitation values, agencies should also work together on assigning values in the Defined Values lookup table. In this table, values for Should, Must and SMBP (Should Must Break Point) are defined. These values are critical in the What Analysis. No rehabilitations will be performed on projects with a PSC greater than the Should level, and no rehabilitations will be performed on projects with a PSC less than the Must level.

2.) Click on “**Admin**” on the upper menu bar then scroll down to “**Manage Lookups**”

3.) Now click on “**Lookup Tables**”



5.) In the Lookup Table Maintenance, click on “**Defined Values**” drop down box



Based on your own agency’s needs, values maybe modified. See below for examples –

<b><i>Code</i></b>	County A	County B	County C	County D	County E	County F
<b>Must</b>	<b>45</b>	<b>40</b>	<b>50</b>	<b>39</b>	<b>40</b>	<b>00</b>
<b>Should</b>	<b>71</b>	<b>70</b>	<b>70</b>	<b>81</b>	<b>75</b>	<b>65</b>
<b>SMBP</b>	<b>56</b>	<b>55</b>	<b>60</b>	<b>00</b>	<b>55</b>	<b>80</b>

## Data Entry

### Creating a New Decision Tree

- 1.) Click on “**PMS**” on the upper menu bar then scroll down to “**Decision Trees**”
- 2.) Click “**Edit decision trees**” *but do not edit the information on the screen!!!!*

Decision Tree Edit

Search

Decision Tree Name:  Search Clear

2017 Training  
Alternate 1  
Decision Tree No. 1  
Standard

Name: 2017 Training  
Description: PMS

Close Print New Delete Save

- 3.) Go to the bottom of the form and click “**New**”
- 4.) Now click on the “**Name**” box and type “**2017 Training**” now press the **tab key**
- 5.) In the **Description Box** type “**PMS**”
- 6.) Now drop down and click the “**Save**” button

This adds the “**2017 Training**” decision tree name to the list.

- 7.) Now click the **Close** button

### Creating New Decision Tree “Rules”

- 1.) Click on **“PMS”** on the upper menu bar then scroll down to **“Decision Trees”**
- 2.) Now click on **“Edit decision tree rule collections”**
- 3.) In the **“Select Decision Tree”** drop down box click on right side **down arrow** and select **“2017 Training”**

Decision Tree Rule Collections

Decision Trees

Select Decision Tree: 2017 Training

Rule Collections:

- ACP - 1-1/2 CLB Overlay
- ACP - ACP 3/8 Chip w/Fog
- ACP - BST 3/8" w/Fog
- APC - Chip Seal
- BST - BST 3/8" w/Fog
- PCC - Engineering Study

Pavement Type: ACP - Bituminous Concrete/Sheet Asphalt/Rock Asphalt

Rehabilitation: ACP - 1-1/2 CLB Overlay - \$48500 - ACP - 10

Rules Last Modified: 9/8/2017 1:26 PM Modified By: training21

Item	Operator	Value	BreakPoint
PSC	<		SMBP
*			

\* Rule collections with an asterisk use an inactive rehabilitation.

Choose reference category to view valid values: View Function Classes

Function Class Code:	Description:
00	Proposed or projected; private; non-county system road
01	Rural Interstate
02	Rural Major Arterial
05	Rural Other Freeways and Expressways
06	Rural Minor Arterial

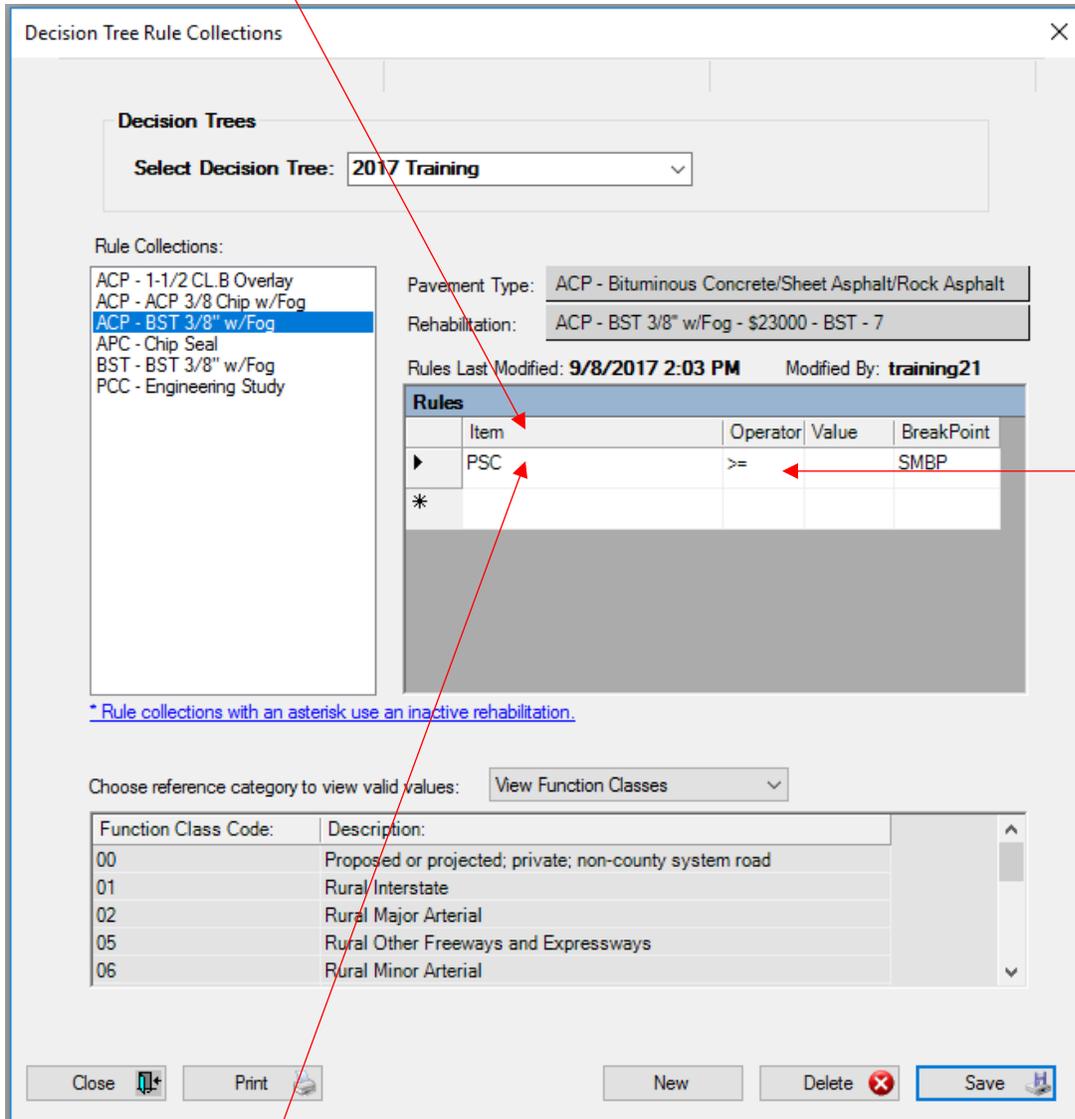
Close Print New Delete Save

- 4.) Now click the **“New”** button at the bottom of the form (even though the form is blank)
- 5.) In the **“Pavement Type”** box click on the **down arrow**
- 6.) Now click on **“ACP”** (bituminous concrete, sheet asphalt, rock asphalt)
- 7.) In the **“Rehabilitation”** box, click on the **down arrow**

### Decision Tree Rules Exercise continued

8.) Now click on the 7<sup>th</sup> rehab down: **ACP 3/8 CHIP with Fog - \$23,000 – BST – 7**

9.) Now click in **“Item”** box, now click on the **down arrow**.



10.) Click on **“PSC”**

11.) Click in **“Operator”** box, now click on the **down arrow**

- 12.) Click on greater than or = to (> =)
- 13.) Now click in the far right **“BreakPoint”** box, now click on **“SMBP”**.
- 14.) Now click the **“Save”** button on bottom of form.
- 15.) Now click the **“New”** button at the bottom of the form and enter the Data from Group #2 from the Training decision Tree 2017.
- 16.) In the **“Pavement Type”** box click on the **down arrow**
- 17.) Then click on **“ACP”** (bituminous concrete, sheet asphalt, rock asphalt)
- 18.) In the **“Rehab”** box, click on the **down arrow**
- 19.) Then click on the 9<sup>th</sup> rehab down: **1½” Cl. B Overlay - \$48,500 – ACP - 10**
- 20.) Now click in **“Item”** box, now click on the **down arrow**
- 21.) Click on **“PSC”**
- 22.) Click in **“Operator”** box, now click on the **down arrow**
- 23.) Click on less than (<)
- 24.) Now click in the far right **“BreakPoint”** box now click on **“SMBP”**

25.) Now click the “**Save**” button on the bottom of the form.

### Decision Tree Rules Exercise

26.) Now click the “**New**” button at the bottom of the form and enter both lines of Data from Group #3 from the Training Decision Tree 2017.

27.) In the “**Pavement Type**” box click on the **down arrow**

28.) Now click on “**BST**” (low type Bituminous Surface-Treatment Road)

29.) In the “**Rehab**” box, click on the **down arrow**

30.) Now click on the 7<sup>th</sup> rehab down: **BST – 3/8” Chip with Fog - \$12,000 –BST - 10**

31.) Now click in “**Item**” box, now click on the **down arrow**

32.) Click on “**Function Class Code**”

33.) Click in “**Operator**” box, now click on the **down arrow**

34.) Click on greater than or = to: (**>=**)

35.) Now click in the first “**Value**” box, now type the number “**02**” (see following page)

36.) Now click in the “Item” box in the Second Row, now click on the **down arrow**

Item	Operator	Value	BreakPoint
FunctionClassCode	>=	02	
FunctionClassCode	<=	19	

37.) Click on “Function Class Code”

38.) Click in “Operator” box, now click on the **down arrow**

39.) Click on the less than or equal to :(<=)

40.) Now click in the first “Value” box, now type the number “19”

41.) Now click the “Save” button on the bottom of the form.

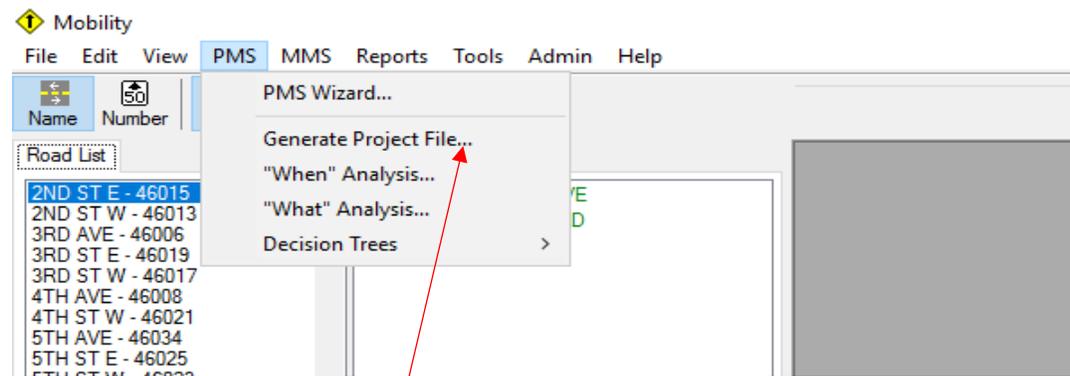
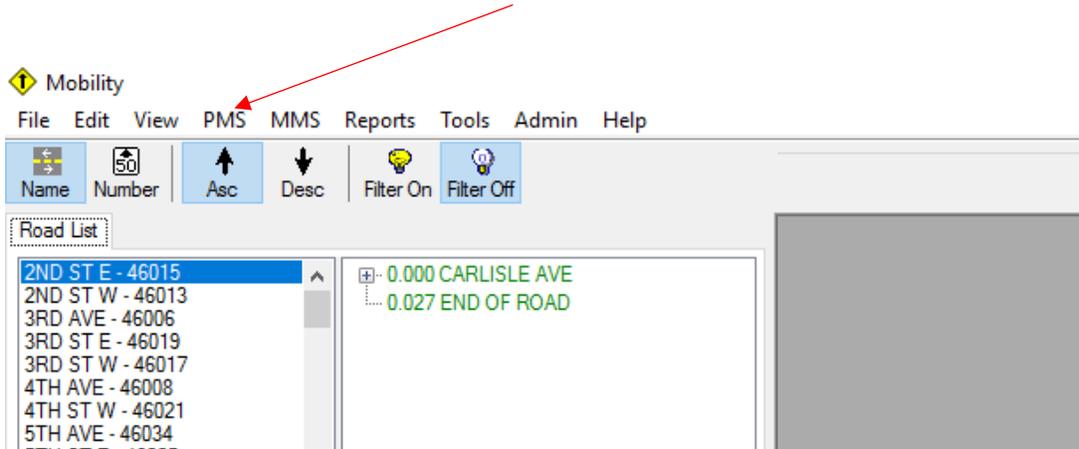
Now on your own enter data for group #4a (**both lines**) & #4b

42.) Be sure to start by clicking the “New” button.

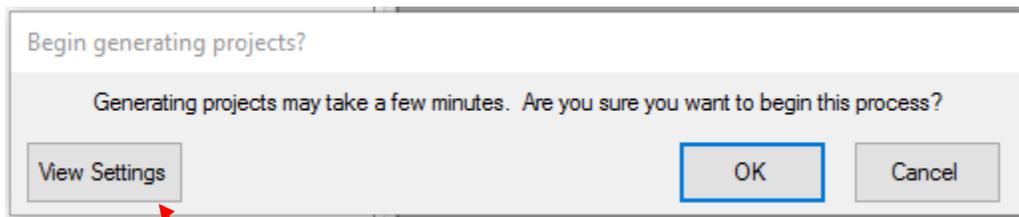
## Configuring Your PMS

### Generate Project File

- 1.) Go to the top menu bar and click on “PMS”

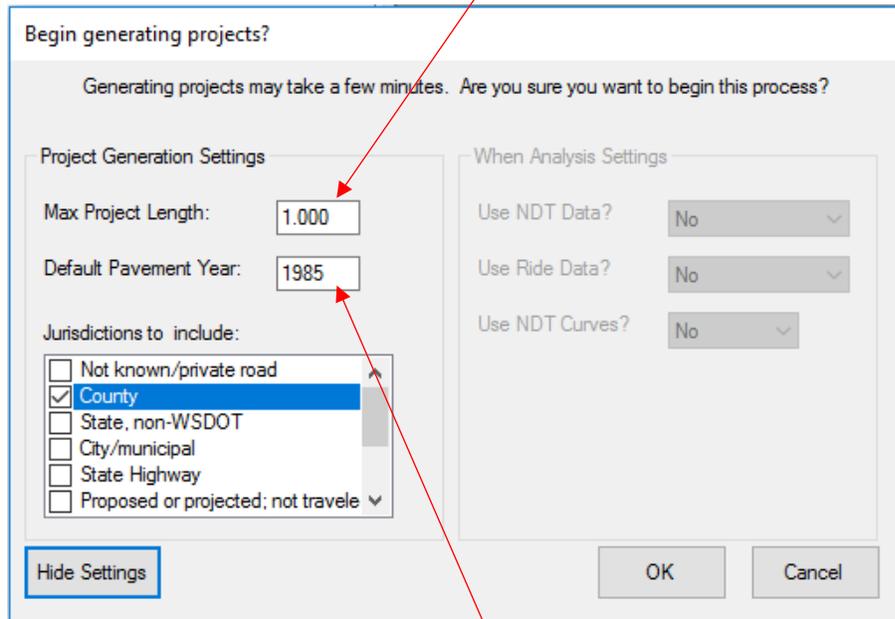


- 2.) Now click on “Generate Project File”



- 3.) Click on “View Settings” button, (under Project Generation Settings)

4.) Set “Max Project Length” to: **1.00** (miles)



5.) Set “Default Pavement Year” to: **1985**

6.) Under “Jurisdiction to include” check the “**County**” box, now remove check in the **County, non-County Road** box

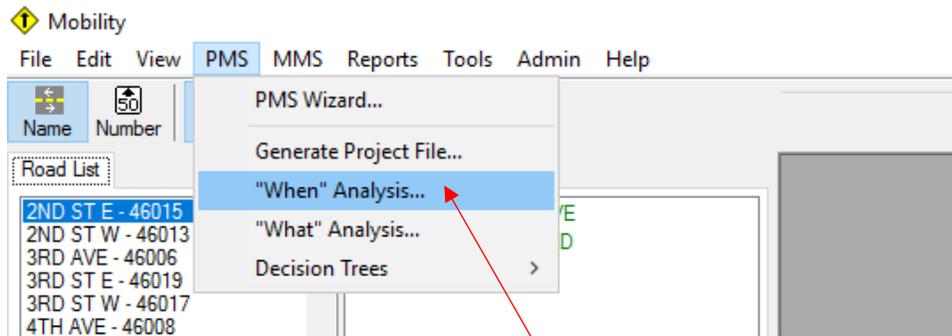
7.) Now click the “**OK**” button

Project Generation starts, look in the upper right corner of the screen

## Decision Tree Rules Exercise

### When Process:

- 1.) Go to the top menu bar and click on “PMS”
- 2.) Now click on “When” Analysis...

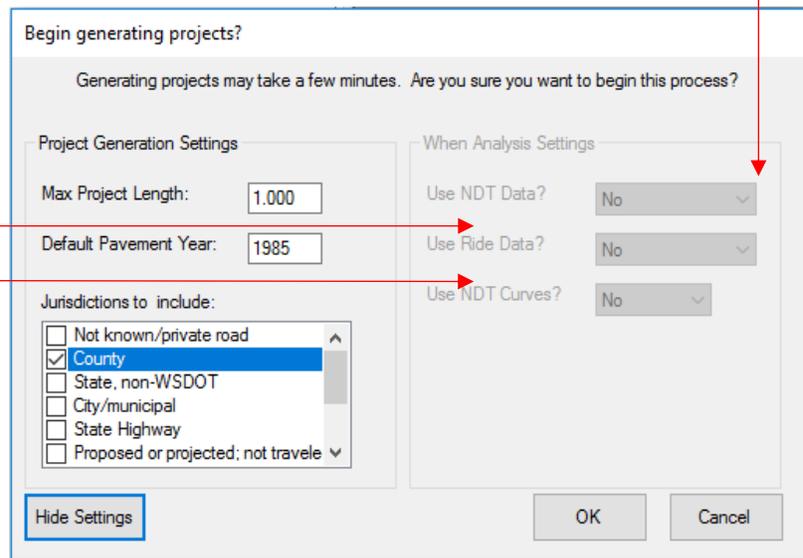


Use the following settings for the “When” Analysis... (Change if necessary)

Use ADT Data “No”

Use Ride Data “No”

Use NDT Curve Data “No”



- 3.) Now click the “OK” button

“Project Generation” starts (see upper right of menu bar for percentage complete)

Process – Option 1:

- 4.) Go to the top menu bar and click on “PMS”
- 5.) Now click on “What” analysis...

**Configure Analysis:**

**Configure Analysis**

Strategy

:Decision Tree: 2017 Training Use specified function class order? No

:Start Year: 2017

:Repair Order: Best First

Budget

Option 2

Option 1: Determine needed budget for ... 5 Years

Option 2: Determine network condition using specified budget, for ... 5 Years

Scheduled Maintenance of 0 Per Year

Available Funds of 1000000 Per Year

Total: \$1,000,000

Option 3: Determine network condition using specified budgets for six years.

:Year	2017	2018	2019	2020	2021	2022
:Scheduled Maint	0	50000	50000	50000	50000	50000
:Available Funds	1000000	500000	500000	500000	500000	500000
:Total	\$1,000,000	\$550,000	\$550,000	\$550,000	\$550,000	\$550,000

OK Cancel

- 6.) In Decision Tree box click on the “down arrow”
- 7.) Now select “2017 Training”
- 8.) In the “Start Year” box type in “2017”
- 9.) In the “Repair Order” box click on the “down arrow”
- 10.) Now select “Best First”

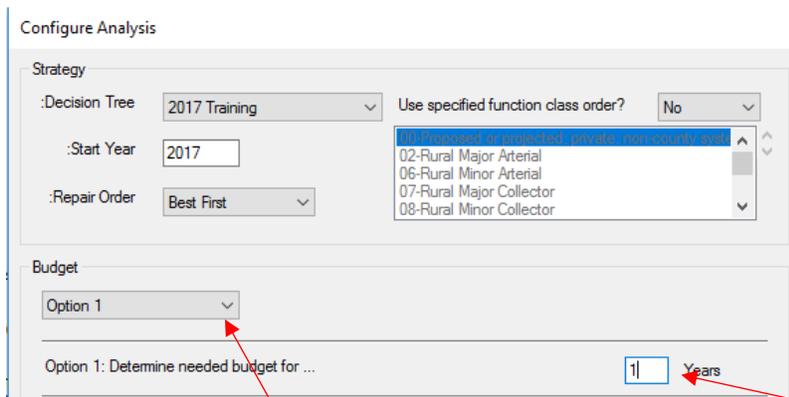
11.) In the “Use specified function class order?” box click on the “down arrow”

12.) Now select “No”

**Budget Box:**

13.) Under Budget click on the “down arrow”

14.) Now click on “Option 1” (below Option 1 is no longer grayed out)



15.) In the “Option 1: Determine needed budget for...” click to highlight, then type the number “1” (year)

16.) Now go to the bottom of the form and click the “OK” button

Now look at the upper right corner of the screen and see the process percentage count

Now the 1 Year Budget amount displays on the screen in a box.

**What Process – Option 2:**

17.) Go to the top menu bar and click on “PMS”

18.) Now click on “What” analysis...

19.) Under Budget click on the “down arrow” now click on “Option 2”

**Configure Analysis**

**Strategy**

:Decision Tree: 2017 Training Use specified function class order?: No

:Start Year: 2017

:Repair Order: Best First

02-Rural Major Arterial  
06-Rural Minor Arterial  
07-Rural Major Collector  
08-Rural Minor Collector

**Budget**

Option 2

Option 1: Determine needed budget for ... 1 Years

Option 2: Determine network condition using specified budget, for ... 5 Years

Scheduled Maintenance of 0 Per Year

Available Funds of 1000000 Per Year

Total: \$1,000,000

Option 3: Determine network condition using specified budgets for six years.

:Year	2017	2018	2019	2020	2021	2022
:Scheduled Maint	0	50000	50000	50000	50000	50000
:Available Funds	1000000	500000	500000	500000	500000	500000
:Total	\$1,000,000	\$550,000	\$550,000	\$550,000	\$550,000	\$550,000

OK Cancel

20.) Change Option 2: Determine network condition using specified budget for... “5 years”

21.) Scheduled Maintenance of: \$0 per year

22.) Available Funds of: \$1,000,000 per year

23.) Total should equal \$1,000,000

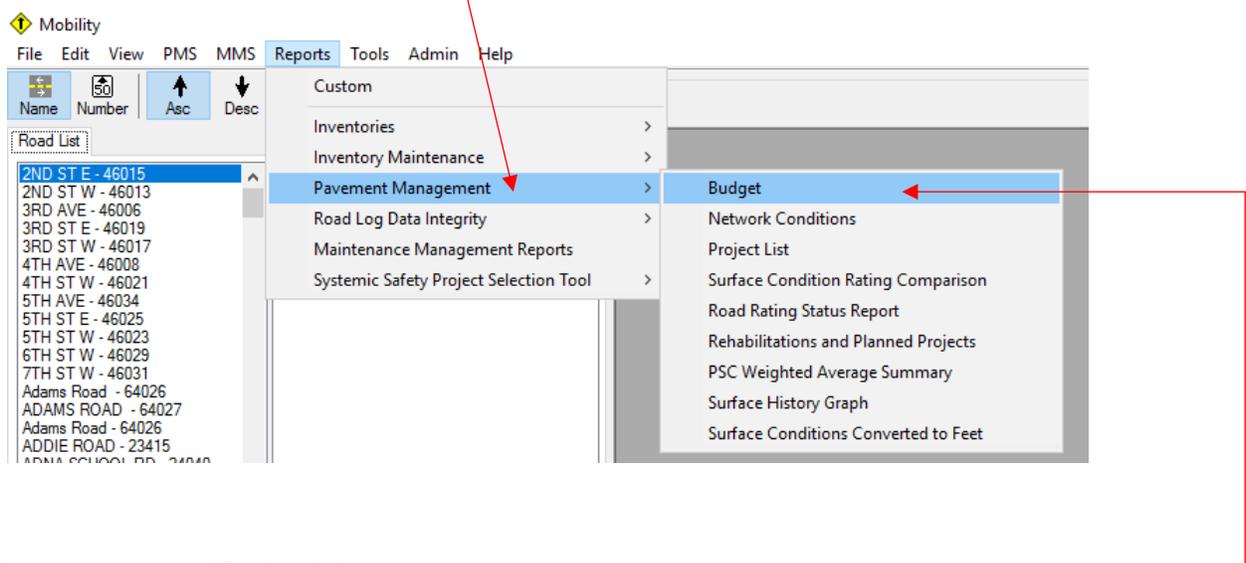
24.) Now click the “OK” button on the bottom of the form

Now look at the upper right corner of the screen and see the process percentage count.

**Pavement Management Reports:**

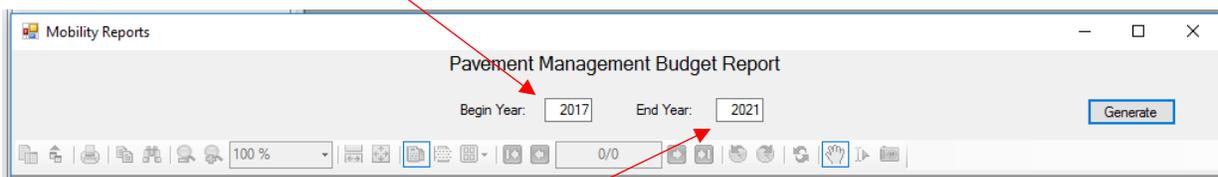
1.) Go to the top menu bar and click on “Reports”

2.) Click on “Pavement Management”



3.) Now click on “Budget”

4.) Change “Begin Year” to “2017” now hit the “tab” key



5.) Now change “End Year” to “2021”

6.) Now click on the “Generate” button (far right)

This canned report named **“Pavement Management Budget Report”** lists:

Rehab. years

Type of rehab.

Cost of rehab.

Total cost and total length of each rehabilitation type

7.) To close the report click on the **Red “X”** in the upper right hand corner

8.) Now go to the top menu bar and click on **“Reports”**

9.) Go to the bottom of the list and click on **“Pavement Management”**

10.) Now click on **“Project List”**

11.) Change **“Begin Year”** to **“2017”** then hit the **“tab”** key

12.) Now change **“End Year”** to **“2021”**

13.) Leave **“Project Type”** blank for now

14.) Now click on the **“Generate”** button (far right)

This canned report named **“Pavement Management Project List Report”** list roads by:

Rehab. Year

Rehab. Type

Road #

Road Name

BMP - EMP

Rehab. Cost by Type

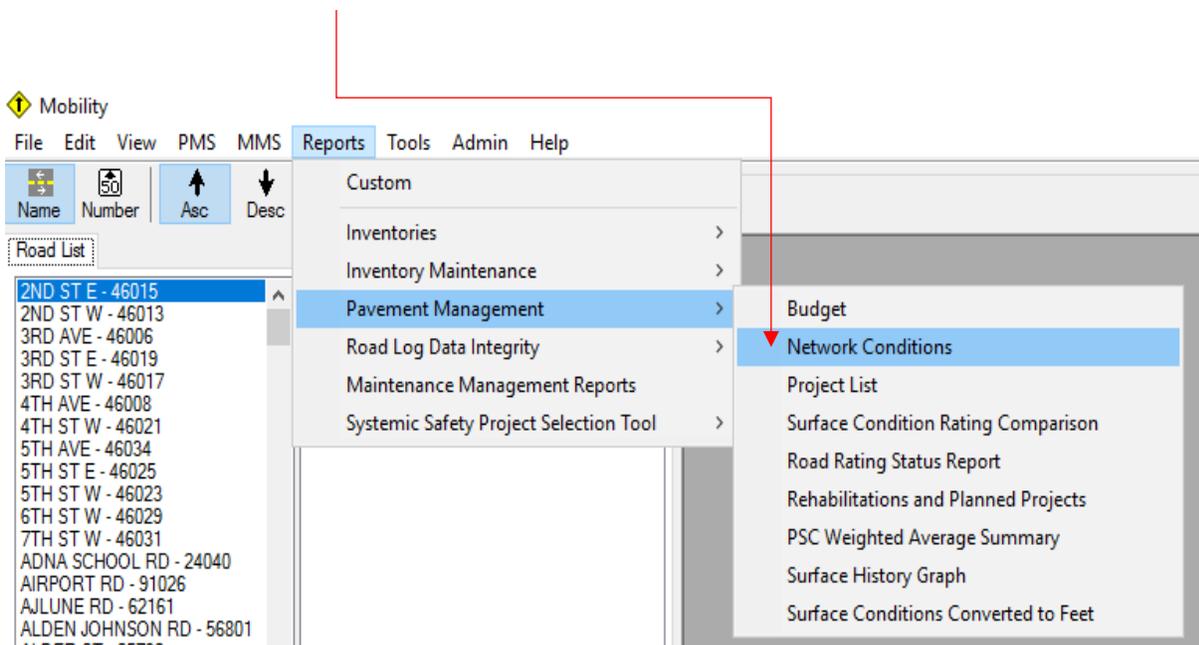
Total Cost of all Rehabs by Year

15.) To close the report click on the **Red “X”** in the upper right hand corner

16.) Now go to the top menu bar and click on **“Reports”**

17.) Click on **“Pavement Management”**

18.) Now click on **“Network Conditions”**



19.) Now click on the **“Generate”** button (far right)

## Mobility User Training

### Network Condition Report

9/13/2017

STRATEGY: Option 2, Best First, Analysis from 2017 to 2021

BUDGET: 2017 with Available Funds of \$1,000,000

SHOULD LEVEL: 60 MUST LEVEL: 40 SMBP: 50 Decision Tree: MC Sept 2017

Year	Pave Type	FFC	Avg PSC	PSC 0-19	PSC 20-39	PSC 40-59	PSC 60-79	PSC 80-100
<b>2017</b>								
	ACP	07	86	0.000	0.136	1.987	13.385	35.409
	ACP	08	78	0.000	0.000	0.210	4.838	5.159
	ACP	09	70	2.798	1.397	2.575	14.606	14.825
	ACP	16	83	0.000	0.073	0.000	3.002	3.551
	ACP	17	84	0.000	0.000	0.338	0.809	3.448
	ACP	18	69	0.000	0.000	0.000	2.510	0.000
	ACP	19	56	1.121	0.291	2.836	1.777	3.071
	<b>ACP</b>		<b>78</b>	<b>3.919</b>	<b>1.897</b>	<b>7.946</b>	<b>40.927</b>	<b>65.463</b>
	APC	07	79	0.000	0.000	0.832	0.384	3.550
	APC	16	40	0.000	1.559	0.952	0.000	0.049
	<b>APC</b>		<b>65</b>	<b>0.000</b>	<b>1.559</b>	<b>1.784</b>	<b>0.384</b>	<b>3.599</b>
	BST	07	84	0.000	0.000	1.155	22.768	73.401
	BST	08	85	0.417	0.999	0.187	5.484	93.801
	BST	09	73	9.167	52.988	72.834	138.975	367.256
	BST	16	90	0.000	0.000	0.000	0.129	2.619
	BST	17	73	0.000	0.000	0.298	1.575	1.034
	BST	18	79	0.000	0.000	0.000	0.000	0.455
	BST	19	64	1.297	5.486	2.354	5.897	11.403
	<b>BST</b>		<b>76</b>	<b>10.881</b>	<b>59.473</b>	<b>76.828</b>	<b>174.828</b>	<b>549.969</b>
	PCC	09	28	0.542	0.315	0.000	0.100	0.039
	PCC	16	77	0.000	0.000	0.000	0.000	0.039
	<b>PCC</b>		<b>30</b>	<b>0.542</b>	<b>0.315</b>	<b>0.000</b>	<b>0.100</b>	<b>0.078</b>
	<b>Total</b>		<b>76</b>	<b>15.342</b>	<b>63.244</b>	<b>86.558</b>	<b>216.239</b>	<b>619.109</b>

Page 1 - First year analysis Average PSC 76

### Network Condition Report

9/13/2017

STRATEGY: Option 2, Best First, Analysis from 2017 to 2021

BUDGET: 2021 with Available Funds of \$1,000,000

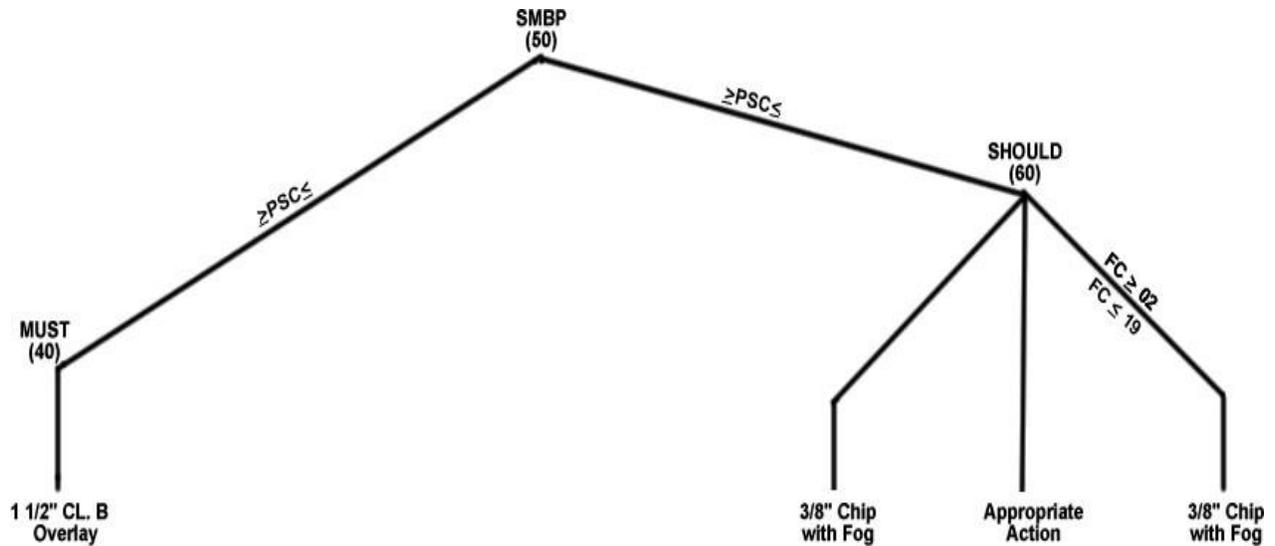
SHOULD LEVEL: 60 MUST LEVEL: 40 SMBP: 50 Decision Tree: MC Sept 2017

Year	Pave Type	FFC	Avg PSC	PSC 0-19	PSC 20-39	PSC 40-59	PSC 60-79	PSC 80-100
<b>2021</b>								
	ACP	07	71	1.433	1.941	15.302	7.863	24.378
	ACP	08	55	0.890	1.017	3.288	4.392	0.620
	ACP	09	48	7.481	2.749	12.411	5.233	8.327
	ACP	16	80	0.243	0.000	0.802	1.300	4.281
	ACP	17	68	0.338	0.809	0.000	1.360	2.088
	ACP	18	54	0.000	1.510	0.000	0.000	1.000
	ACP	19	35	3.843	1.415	1.128	0.920	1.790
	<b>ACP</b>		<b>60</b>	<b>14.228</b>	<b>9.441</b>	<b>32.931</b>	<b>21.068</b>	<b>42.484</b>
	APC	07	60	0.000	1.063	1.512	1.153	1.038
	APC	16	13	1.559	0.952	0.000	0.000	0.049
	<b>APC</b>		<b>44</b>	<b>1.559</b>	<b>2.015</b>	<b>1.512</b>	<b>1.153</b>	<b>1.087</b>
	BST	07	64	0.000	1.155	37.177	44.215	14.777
	BST	08	65	1.293	0.310	40.667	41.627	16.991
	BST	09	52	119.283	41.490	133.764	263.512	83.171
	BST	16	60	0.000	0.000	0.569	2.056	0.123
	BST	17	64	0.000	0.298	1.334	0.029	1.246
	BST	18	53	0.000	0.000	0.455	0.000	0.000
	BST	19	40	8.984	1.520	4.638	9.450	1.845
	<b>BST</b>		<b>54</b>	<b>129.560</b>	<b>44.773</b>	<b>218.604</b>	<b>360.889</b>	<b>118.153</b>
	PCC	09	25	0.542	0.315	0.000	0.000	0.139
	PCC	16	77	0.000	0.000	0.000	0.000	0.039
	<b>PCC</b>		<b>27</b>	<b>0.542</b>	<b>0.315</b>	<b>0.000</b>	<b>0.000</b>	<b>0.178</b>
	<b>Total</b>		<b>55</b>	<b>145.889</b>	<b>56.544</b>	<b>253.047</b>	<b>383.110</b>	<b>161.902</b>

Page 5 – 5 year analysis – Average PSC 55

See page 6 for graph

**2017 TRAINING  
DECISION TREE**



**Training Decision Tree**

Decision Tree	Group #	Surface Type	Rehabilitation	Item	Operator	Value	Break Point
Training	1	ACP	3/8 Chip W/Fog	PSC	>=		SMBP
Training	2	ACP	1-1/2 Cl B Overlay	PSC	<		SMBP
Training	3	BST	3/8 Chip W/Fog	FC	>=	02	
Training	3	BST	3/8 Chip W/Fog	FC	<=	19	
Training	4	APC	3/8 Chip W/Fog	FC	>=	02	
Training	4	APC	3/8 Chip W/Fog	FC	<=	19	
Training	5	PCC	Engineer Study	PSC	<=		SHOULD