CAMBRIDGE SYSTEMATICS

Think Forward

Visualization and Network Editing in TransCAD

presented to

Caltrans District 7

presented by

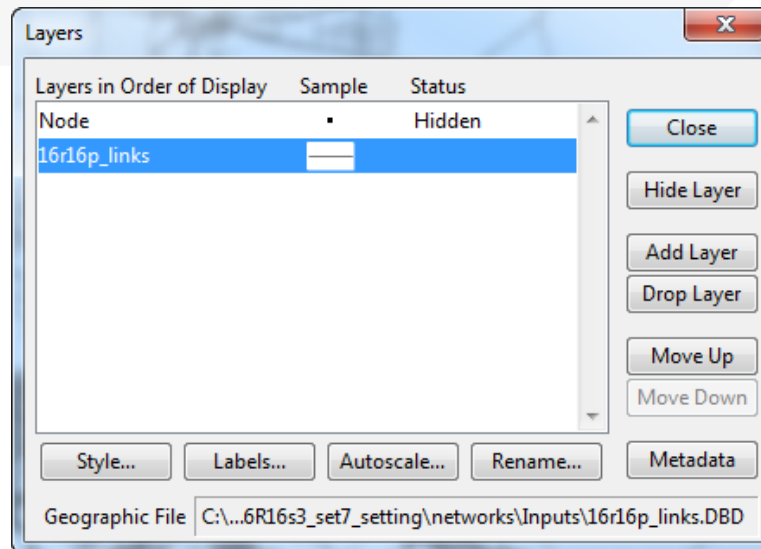*Cambridge Systematics, Inc.*

Chao Wang

February 23rd 2018
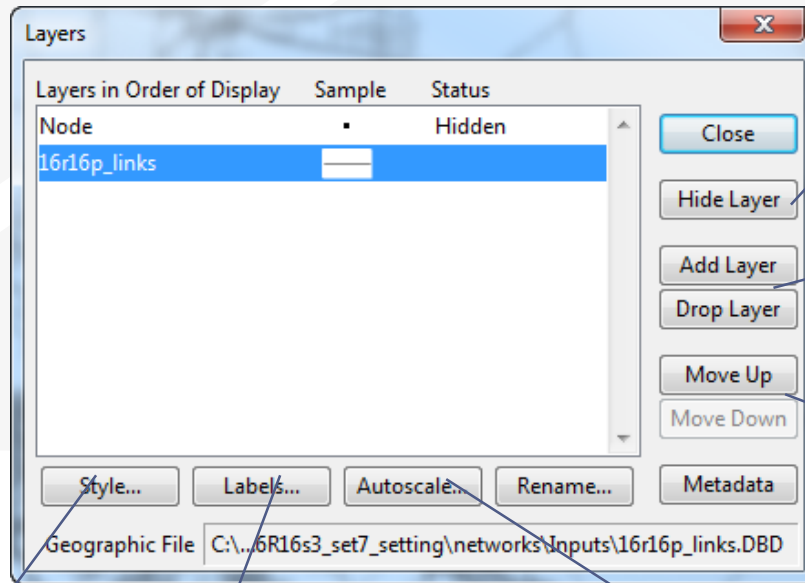
Map Basics: Visualizing

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Working with Layers

- Start by opening a map **or** a geographic (dbd) layer file
  - » Opening a layer will create a new map and add the layer
  - » Opening a map will load all saved layers, settings, etc.

- Access layers with the layers dialog box ( )

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Working with Layers

- **The Layers Dialog ( )**

Hide/show a layer

Add/Drop layers

Re-order layers

Change a layer style

Add/edit labels

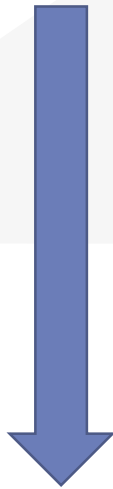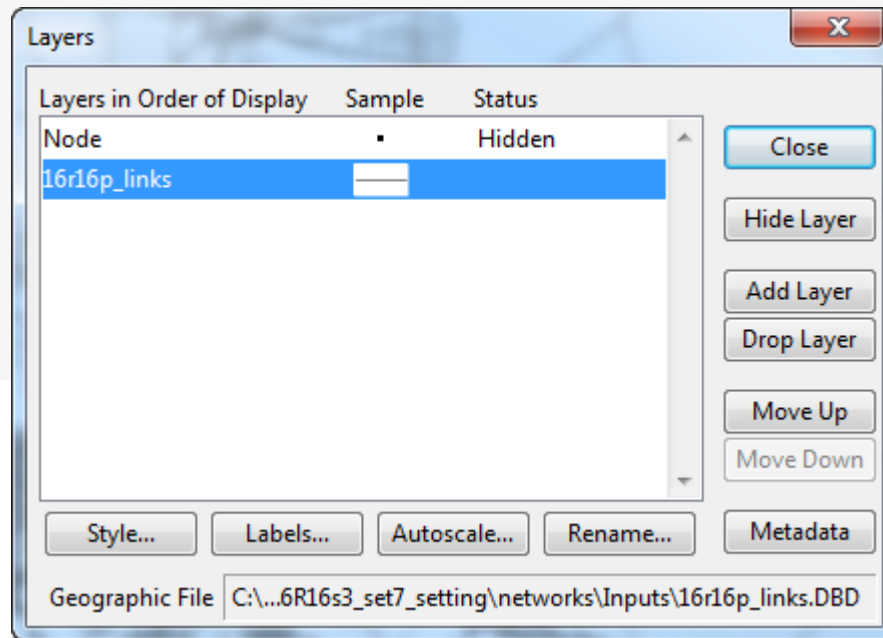Automatically show/hide layers as certain scales

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Working with Layers

- **Layers are drawn from TOP to BOTTOM**

Top layer
(drawn first)

Bottom layer
(drawn last)

Layers

Layers in Order of Display	Sample	Status
Node	.	Hidden
16r16p_links		

Close

Hide Layer

Add Layer

Drop Layer

Move Up

Move Down

Style...   Labels...   Autoscale...   Rename...   Metadata

Geographic File C:\...6R16s3_set7_setting\networks\Inputs\16r16p_links.DBD
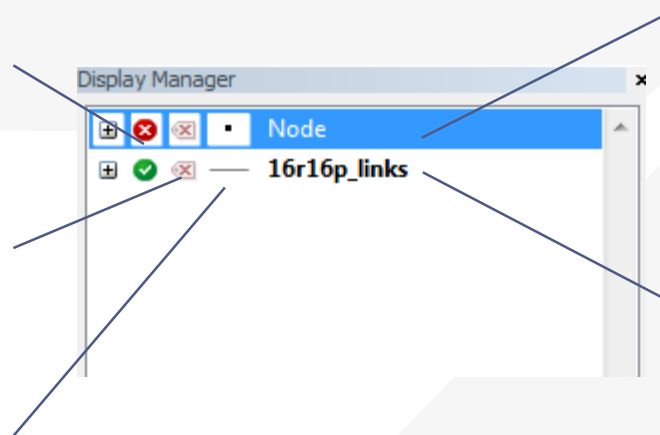
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Display Manager

➤ Activate from Map → Display Manager

➤ Quick access to layers, settings, etc.

» Right-click for more settings, including *make working layer*

Hide/show a layer

Node layer is **NOT** active

Add/edit labels

Display Manager

Node

16r16p_links

Change a layer style

Bold text: links layer is active

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Color Theme

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Creating Maps

➤ Create a new map by opening a Geographic File (*.dbd)

➤ Add more layers if desired

»   then **Add Layer**

➤ Choose the active layer

» Use the dropdown selector
» Or use the display manager

➤ Change the "default" styles for the layers

»   then **Style...** , or , or use the display manager

➤ Hide or show layers

»   or the display manager

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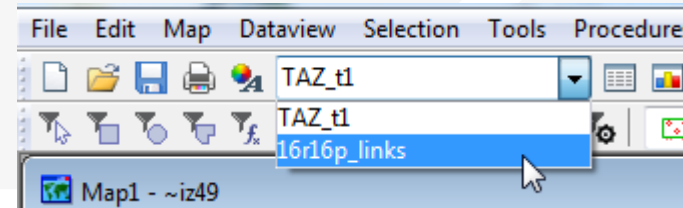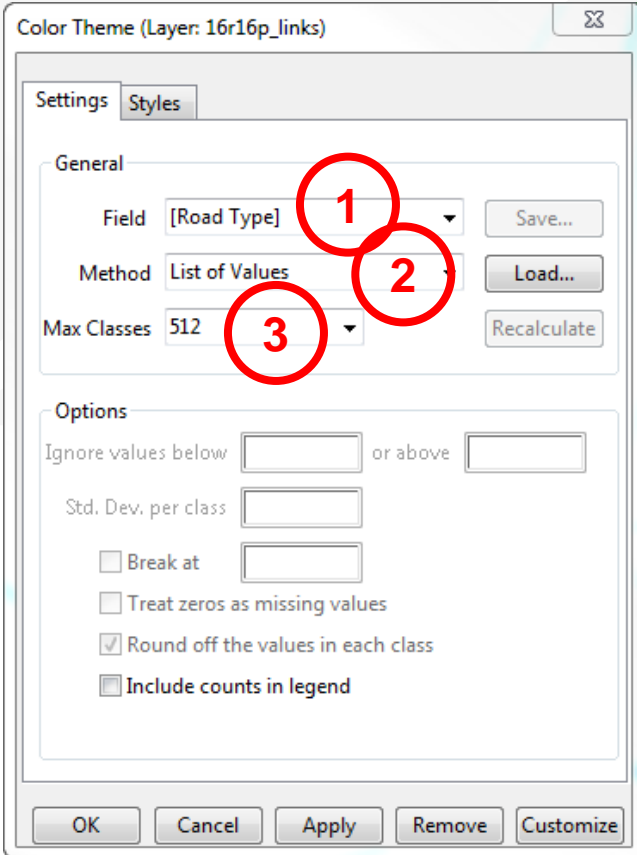
Color and Pattern Themes

- Set feature colors and styles based on attributes
  - » Color Themes ( ) are often used to display facility type on a roadway network
  - » Pattern Themes (Map → Pattern Theme…) is sometimes used to display number of lanes on a roadway network

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Color and Pattern Themes

The Settings Tab

1. Choose a field to represent

2. Choose a method to create categories and number of classes

* Use the Load and Save buttons to store and recall settings

   » *This is a huge time-saver!*

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Color and Pattern Themes

The Styles Tab
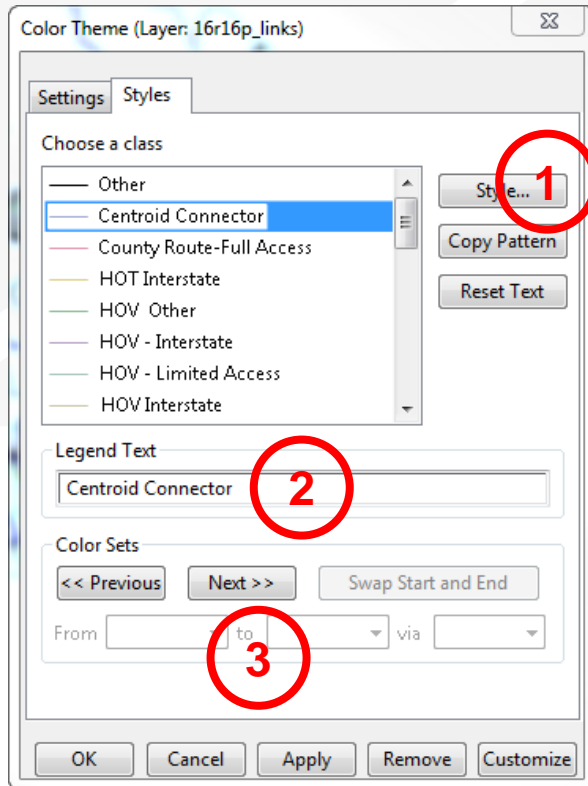
1. Choose a style for each class

2. Select a legend text for each class

3. Choose from pre-defined color settings if desired

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Functional Class

	Primary Facility Type		Secondary Facility Type
1	Freeways	10	Freeway
2	HOV	20	HOV 2
		21	HOV 3+
		22	HOV - HOV Connector
3	Expressway / Parkway	30	Undivided
		31	Divided, Interrupted
		32	Divided, Uninterrupted
4	Principal Arterial	20	Undivided
		41	Divided
		42	Continuous Left Turn
5	Minor Arterial	50	Undivided
		51	Divided
		52	Continuous Left Turn
6	Major Col lector	60	Undivided
		61	Divided
		62	Continuous Left Turn

	Primary Facility Type		Secondary Facility Type
7	Minor Collector	70	Undivided
		71	Divided
		72	Continuous Left Turn
		73	Posted Speed 25
		74	Posted Speed 15
8	Ramps	80	Freeway to Freeway Connector
		81	Freeway to arterial
		82	Arterial to freeway
		83	Ramp Distributor
		84	Ramp from Arterial to HOV
		85	Ramp from HOV to Arterial
		86	Collector distributor
		87	Shared HOV Ramps to MF
		88	Truck only
9	Trucks	90	Truck only
100		100	Centroid Connector - Tier 1
200		200	Centroid Connector - Tier 2

Source: SCAG Model
Documentation, Appendix A

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Functional Class

➤ Two Digit FT Codes

  » Contained in AB_Facility_Type and BA_Facility_Type

  » Difficult to use for map editing setup (too many details)

➤ One Digit FT Codes

  » Not stored on the network

  » Can be computed

TransCAD Formulas.txt

```
MAP_FT:
-------
if (AB_Facility_Type = 100 or BA_Facility_Type = 100) then 100 else
if (AB_Facility_Type = 200 or BA_Facility_Type = 200) then 200 else
if (AB_Facility_Type = 999 or BA_Facility_Type = 999) then 999 else
if (AB_Facility_Type > 0) then s2i(left(string(AB_Facility_Type), 1))
else s2i(left(string(BA_Facility_Type), 1))
```

Note: We will discuss formulas in more detail in a later section

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Practice 1: Create a color theme for line layer using IFC field

1. Open the SCAG Network File (16R16pl_links.dbd)
   - ✓ File→Open, then in the file type dropdown next to 'File name:' select Geographic File(*.cdf,.*dbd) option
   - ✓ Browse to the location/folder where the geographic file is located and select the 'abmload.dbd' and click 'Open' button

2. Add the MAP_FT Formula Field
   - ✓ Dataview→Formula Fields
   - ✓ Open TransCAD Formuals.txt in notepad, then copy the MAP_FT formula
   - ✓ Paste the formula and name the formula MAP_FT
   - ✓ Click OK

3. On the top ribbon, click   it is called 'color theme map wizard'

4. It opens up a dialog box with two tabs. In the first tab 'Settings' tab:
   - ✓ Select the MAP_FT from the 'Field' drop down options
   - ✓ Select the 'List of Values' from the 'Method' drop down options
   - ✓ Max. Classes: Use the default value (512)

5. Go to the 'Styles' tab
   - ✓ Observe the default styles
   - ✓ Optional: Set a preferred style for each facility type (we will use a shortcu

6. Go back to the Settings tab, click the Load button.
   - ✓ Choose From Settings File
   - ✓ Browse to and select SCAG Training\Settings.stg
   - ✓ Choose MAP_FT and click OK
   - ✓ Click OK again to complete the color theme dialog box

7. Save the settings (optional, method 1) **Skip this step in training.**
   - ✓ Tools → Geographic Utilties → Geographic file
   - ✓ Click Save Settings

1. Save the settings (optional, method 2) **Use this method in training.**
   14
   - ✓ File –Save As

Formula (Dataview: 16r16p_links)
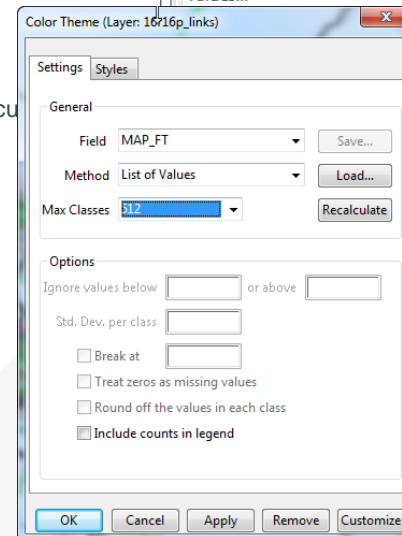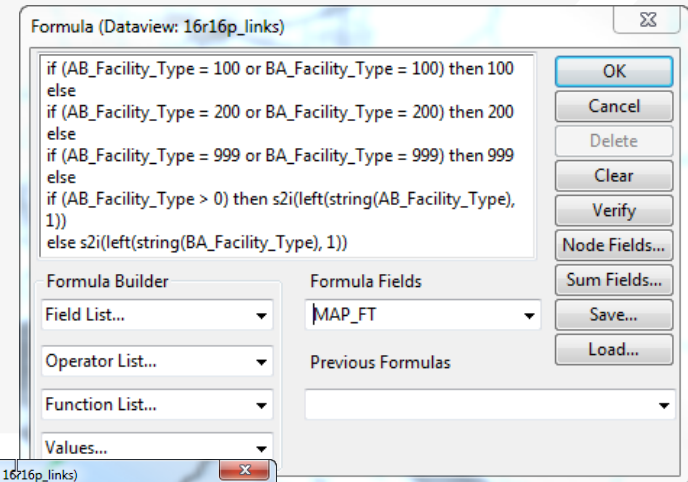
```
if (AB_Facility_Type = 100 or BA_Facility_Type = 100) then 100
else
if (AB_Facility_Type = 200 or BA_Facility_Type = 200) then 200
else
if (AB_Facility_Type = 999 or BA_Facility_Type = 999) then 999
else
if (AB_Facility_Type > 0) then s2i(left(string(AB_Facility_Type),
1))
else s2i(left(string(BA_Facility_Type), 1))
```

OK · Cancel · Delete · Clear · Verify · Node Fields... · Sum Fields... · Save... · Load...

Formula Builder
- Field List...
- Operator List...
- Function List...
- Values...

Formula Fields — MAP_FT

Previous Formulas

Color Theme (Layer: 16r16p_links)

Settings | Styles

General
- Field: MAP_FT — Save...
- Method: List of Values — Load...
- Max Classes: 512 — Recalculate

Options
- Ignore values below [ ] or above [ ]
- Std. Dev. per class [ ]
- ☐ Break at [ ]
- ☐ Treat zeros as missing values
- ☐ Round off the values in each class
- ☐ Include counts in legend

OK · Cancel · Apply · Remove · Customize

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Data Preparation for AQ Analysis

presented to

Caltrans District 7

presented by

Cambridge Systematics, Inc.

Chao Wang
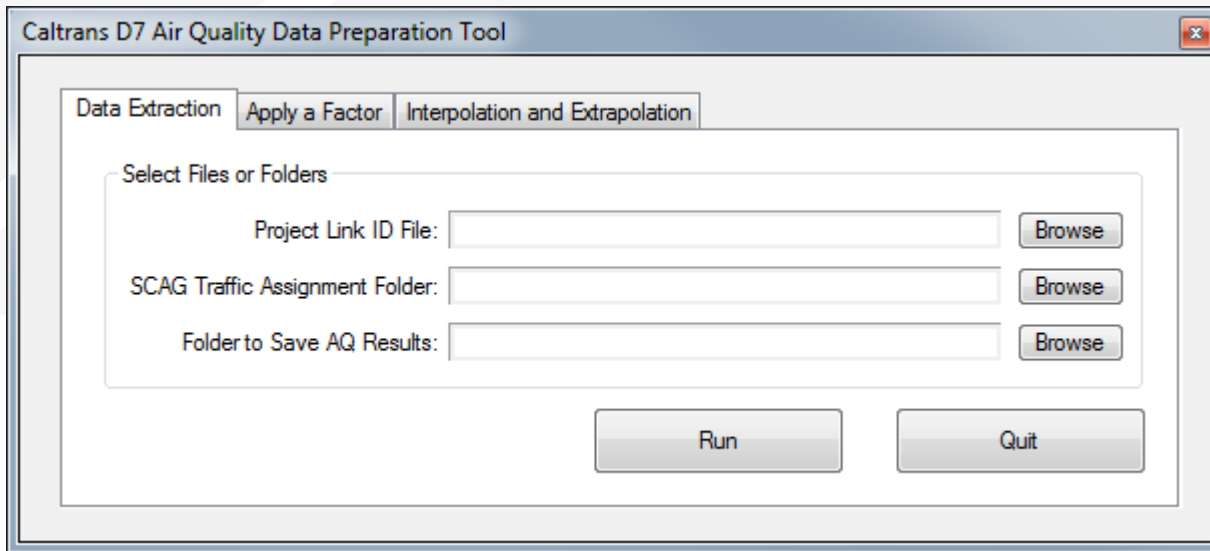
February 23rd 2018

Extract and Interpolate Data

Customized Tool to Prepare Data

➤ Caltrans D7 Air Quality Data Preparation Tool

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Flow Chart

Data Extraction
for the Air
Quality Analysis

Prepare Input Files
(Project links and associated information)

Convert Excel
files to Bin files

Extract Traffic Assignment Results
(Using the GISDK script)

Copy CSV files to
Excel template files

Formatted AQ Data to be transferred to
the AQ Analysis Staff

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Input

➤ The input file contains

  » Project link number

  » TransCAD link ID

  » Topological direction

  » Link length

  » Route number

  » Facility type

  » Post Mile etc.

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What Links should be included for an AQ Analysis

➤ Project links

➤ Links connected to project links
 » Usually include links that are within one intersection of the project links

➤ Optional: Links on alternative routes
  » A project might introduce more traffic on project links due to higher capacities or free flow speeds, therefore leading to more Vehicle Miles Traveled (VMT) and possibly more emission.
  » However, this project should have reduced traffic on alternative routes, and then less emission on alternative routes.
  » In this situation, it is better to include links on alternative routes in the AQ analysis.

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What Links should be included for an AQ Analysis

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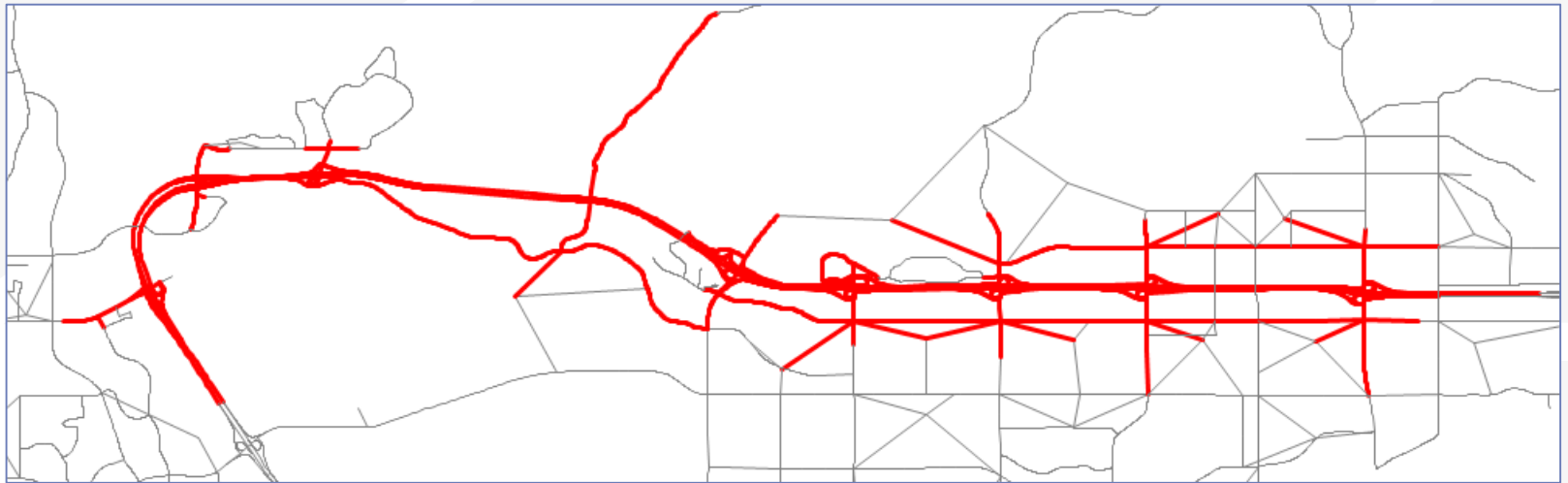
Output

CSV Files

» Two or four freeway csv files, one for each direction

» One ramp csv file

» One arterial csv file

Copy to the Excel Template File

» Copy values only

Exercise 2: Run the AQ Tool

➤ Install the AQ Tool (TransCAD Add-ins)

➤ Run the tool

➤ Examine the results

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Exercise 2-1: Install the AQ Tool

➤ Step 1: In TransCAD, click Tools → Setup Add-Ins

➤ Step 2: In the Setup Add-ins window

» Click the button "Add"

» For Settings → Type, select "Dialog Box"

» For Settings → Description, enter a description of the tool

» For Settings → Name, enter "Air Quality Data Extraction" (must be exactly the same, case sensitive, no quotation marks)

» Click the "Browse" button to specify the UI Database, which is "d7_airquality_dataextraction.dbd" in the folder of "\D7_AQ_Tool".

» Click the "OK" button to close the window.
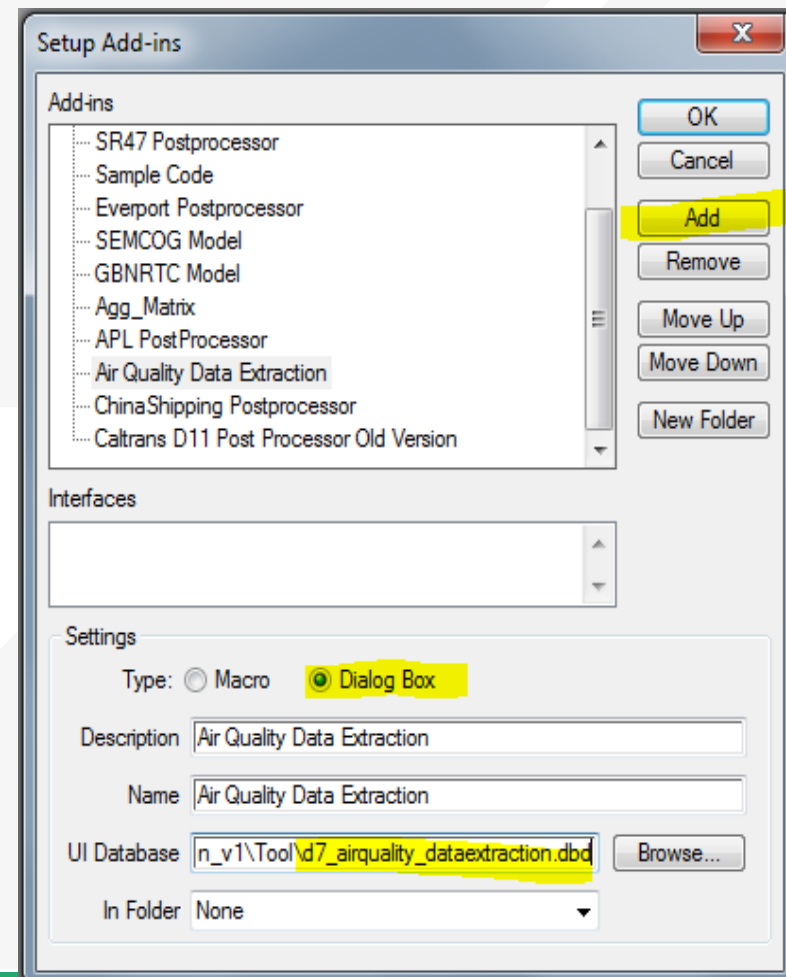
Exercise 2-2: Run Data Extraction

➤ Step 3: Select the tool from Tools → Add-Ins

➤ Step 4: On the "Data Extraction" tab, specify the inputs and output folder, and click "Run" to run the data extraction

» Project Link ID file is "\SR-118_AQ_Input\Project_List_SR-118_04062017.bin"

» SCAG Traffic Assignment Folder is "\SCAG_Model_Run\2016Build_Alt2_Pha1\Assign_Output\"

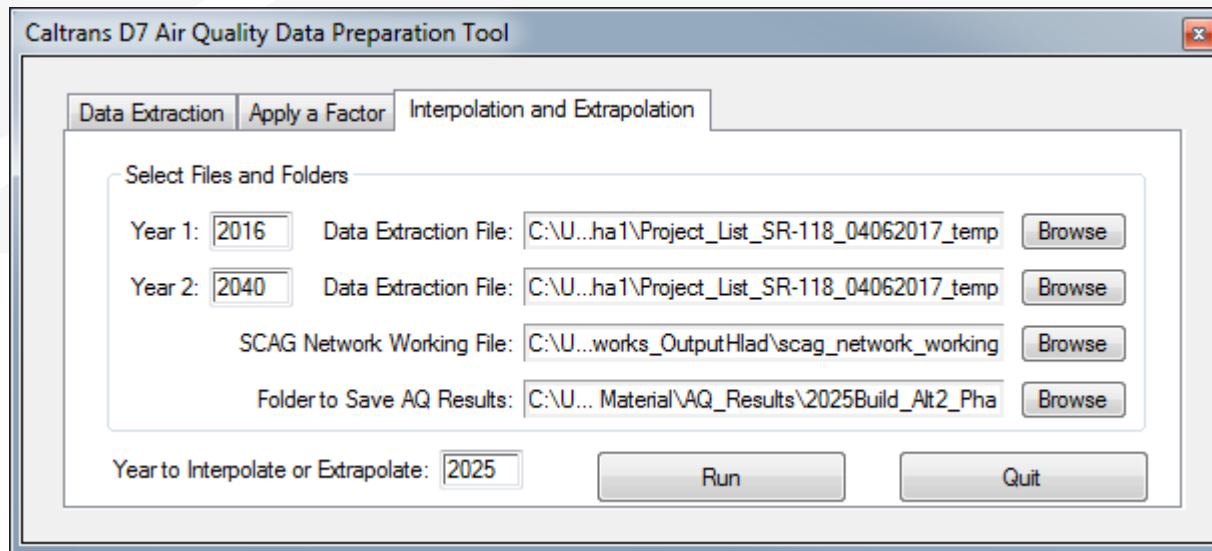» Folder to Save AQ Results is "\AQ_Results\2016Build_Alt2_Pha1\"

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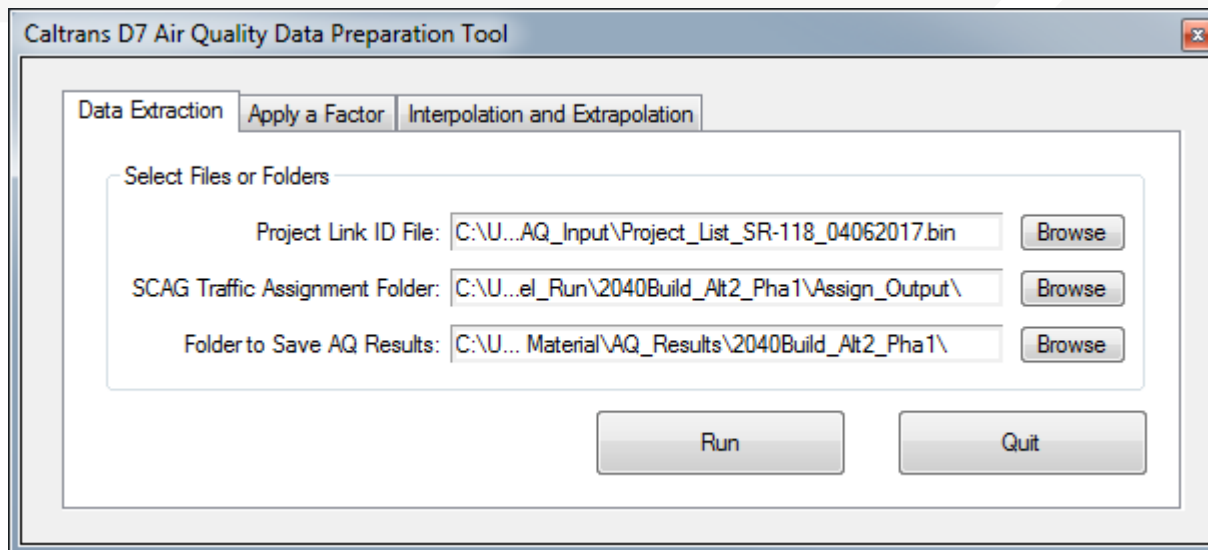
Exercise 2-3: Run Data Extraction

➤ Step 5: Repeat Step 4 for 2040Build_Alt2_Pha1

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Exercise 2-4: Run Data Interpolation

➤ Step 6: Interpolate the results for 2025Build_Alt2_Pha1 based on

» 2016Build_Alt2_Pha1

» 2040Build_Alt2_Pha1

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Exercise 3: Create the Final Output

➤ Copy the results to the template

➤ Check the results

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Exercise 3: Create the Final Output

➤ **Step 1: Make a copy of the template and rename it**

 » The template file is \SR-118_AQ_Input\SR-118 Air Quality Template v2.xlsx

➤ **Step 2: Open the csv files* in Excel and copy <u>values</u> to the corresponding spreadsheet in the Excel file from Step 1**

 » E.g. copy the content (without the first row) in "Project_List_SR-118_04062017_Route118_East.csv" to the spreadsheet of "Freeways East" in the Excel file from Step 1

 » When copy from the CSV file, use the following tips to select the content faster

 ▪ Click on Cell A2 (first column second row to leave out the title row), then use Ctrl + Shift + → (pressing three keys together) on the keyboard to select all columns, then use Ctrl + Shift + ↓ to select all rows from Row 2.

 » When paste to the Excel file, paste values only to preserve the format in the Excel file. To do that, right click the cell where you want to paste in Excel and choose 📋123 in the popup window.

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