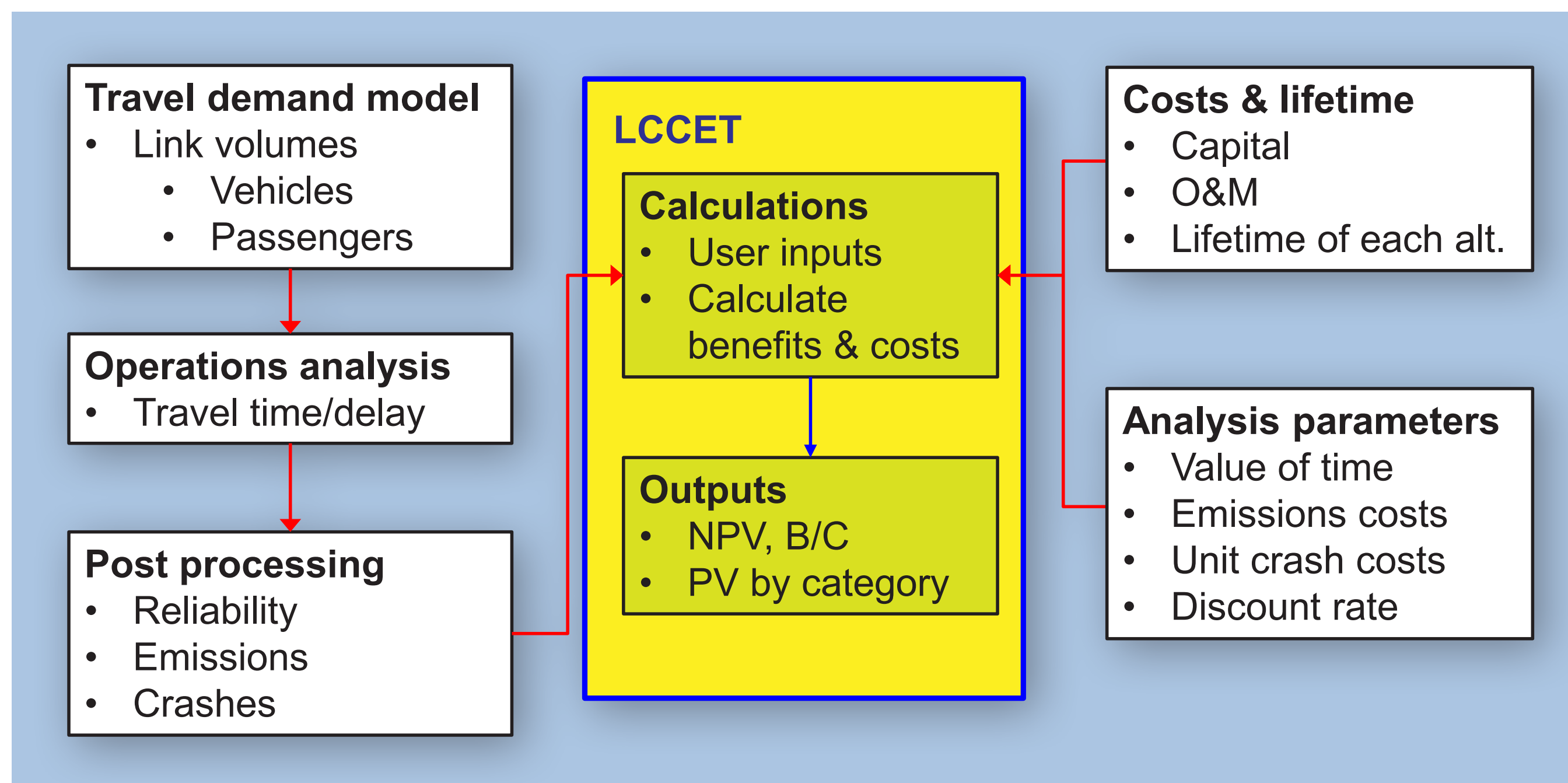


The Life-Cycle Cost Evaluation Tool (LCCET) is a spreadsheet based tool that can:

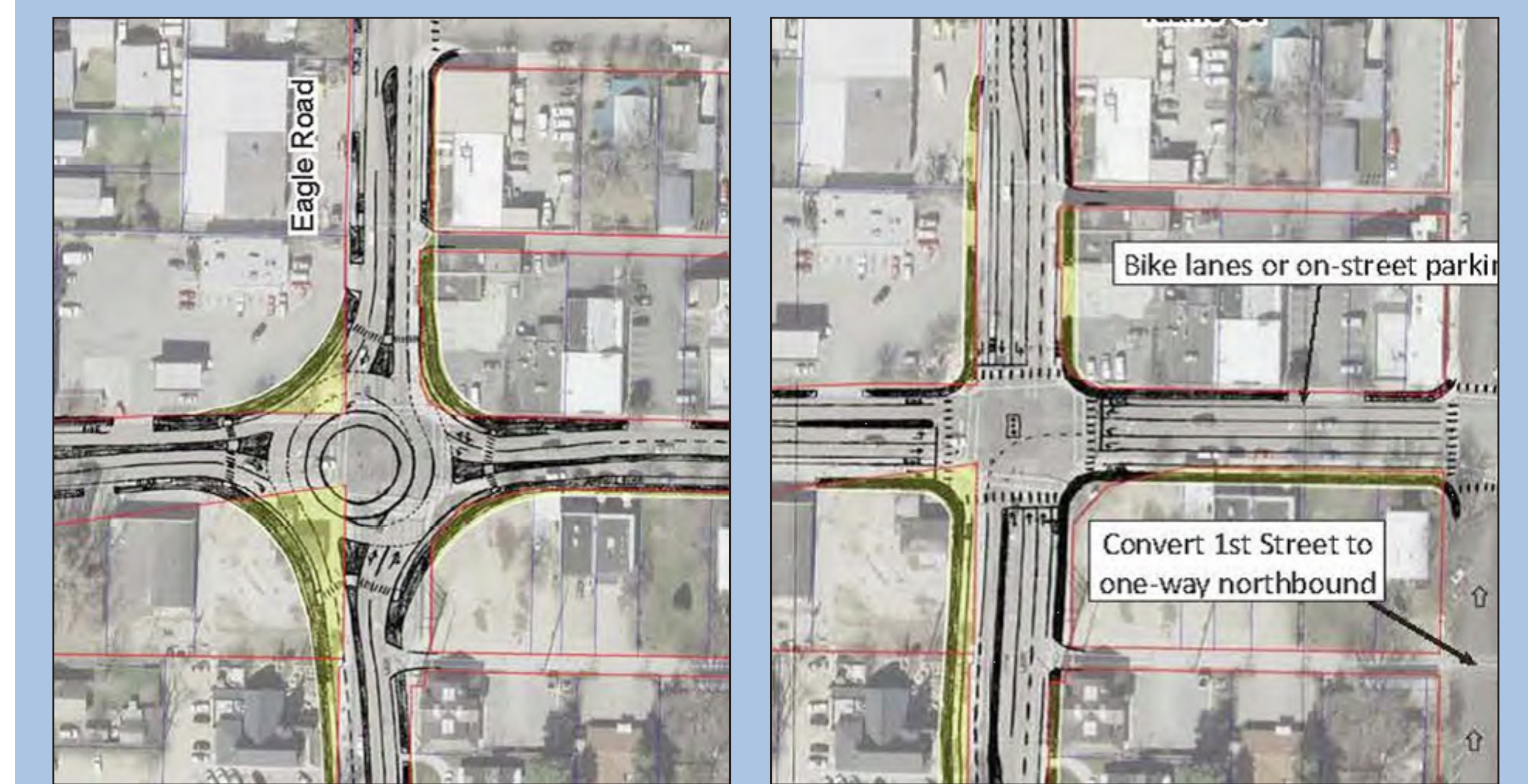
- Help practitioners **estimate the life-cycle costs and benefits of infrastructure projects**
- Consider a **wide range of intersection configurations**, including traffic signals, roundabouts, and innovative designs, such as median u-turns.
- Account for **local cost parameters** for construction, operations, and social factors



### The LCCET and B/C analysis provides:

- Consistent framework for comparing outcomes
- Dollar values to monetize outcomes
- Outcomes based on market values
- Present value of project costs over entire project lifetime
- Comparison of outcomes over time by discounting future costs
- Results that are understandable to decision-makers and the general public

### Example Application: Roundabout vs Signal



Alternative 1:  
Multilane Roundabout

Alternative 2:  
Enhance Signalized Intersection

Description:		Roundabout Alternative					
A summary of the net present value for this alternative is shown to the right in column 7.		Begin planning & construction					
<b>Planning &amp; construction period</b>		2014	First year of planning & construction				
Opening year		2014	Travel time/delay and demand forecasts for the opening year must be provided.				
Interim year 1			Travel time/delay and demand forecasts for up to three years between the opening year and the end year may be provided.				
Interim year 2							
Interim year 3							
End year		2035	Travel time/delay and demand forecasts for the end (horizon) year must be provided.				
<b>Worksheet setup</b>		Setup Worksheet					
		Once you have entered begin planning & construction, opening, and end years, click this button to set up the worksheet. You may enter other inputs at any time.					
<b>Planning &amp; construction costs</b>		Units	2014	2016	2017	2018	Notes
Planning, design		Dollars	\$ 622,819				
Survey		Dollars					
Right of way		Dollars	\$ 881,000				
Equipment, signs		Dollars					
Utilities		Dollars					
Construction		Dollars	\$ 3,111,000				
Landscaping		Dollars					
(Other planning & construction costs)		Dollars					
(Other planning & construction costs)		Dollars					
(Other planning & construction costs)		Dollars					
(Other planning & construction costs)		Dollars					
(Other planning & construction costs)		Dollars					
(Other planning & construction costs)		Dollars					
(Other planning & construction costs)		Dollars					
<b>Operations &amp; maintenance costs</b>		Units	Begin year	Period (years)	Cost	Notes	
Power		Dollars	2014	1	\$ 4,000		
Inspection		Dollars					
Repaving		Dollars					
Signing, striping		Dollars					
Signal timing		Dollars					
Landscaping		Dollars					
(Other O&M costs)		Dollars					
(Other O&M costs)		Dollars					
(Other O&M costs)		Dollars					
(Other O&M costs)		Dollars					
(Other O&M costs)		Dollars					
(Other O&M costs)		Dollars					
<b>Demand &amp; Travel Time (Delay)</b>		Average travel time / delay	Opening year	Interim year(s)	End year		
		Time Period	2014		2035		
Average vehicle travel time or delay		AM peak	seconds/veh	5.0		11.0	
		PM peak	seconds/veh	30.0		49.0	
		Weekend peak	seconds/veh	28.0		45.0	
Standard deviation of vehicle travel time or delay		AM peak	seconds/veh	0.0		0.0	
		PM peak	seconds/veh	0.0		0.0	
		Weekend peak	seconds/veh	0.0		0.0	
Average bicycle travel time or delay		All time periods	seconds/bike	0.0		0.0	
Average pedestrian travel time or delay		All time periods	seconds/ped	0.0		0.0	
<b>Safety</b>		Crash type	Units				
Fatality crashes		crashes/year	0.0			0.0	
Injury crashes		crashes/year	1.0			1.0	
Property damage only crashes		crashes/year	7.0			11.0	
Fatality, injury, PDO							
<b>Emissions</b>		Type	Units				
Greenhouse gases - Federal method (Exec. Order 12866)		CO2 equivalent	metric tons/year				
		CO	metric tons/year				
		NOx	metric tons/year				
		HC	metric tons/year				
		PM 2.5	metric tons/year				

### LCCET Costs Considered

- Planning and Preliminary Engineering
- Construction and Right-of-way
- Ongoing operations and maintenance
- User and societal costs (delay, safety, etc.)
- Other costs significant to local jurisdiction

### LCCET Potential Applications

- Analysis of alternative designs for a single intersection or set of intersections
- Programming, prioritizing, funding decisions across a large area
- Alternatives evaluations for corridors and subareas
- Signal retiming study along corridor
- Intersection maintenance, replacement, upgrade

Alternative:		Base Case	Roundabout	Enhanced Signal
<b>Base Analysis Year</b>			2014	
<b>Future Analysis Year</b>			2035	
<b>Average Daily (veh/d)</b>	<b>Annual Traffic</b>	<b>Base</b>	38,000	
		<b>Future</b>	67,000	
<b>Total Volume (veh/h)</b>	<b>Entering (Base)</b>	<b>AM</b>	1,553	
		<b>PM</b>	2,117	
		<b>Midday</b>	2,164	
<b>Total Volume (veh/h)</b>	<b>Entering (Future)</b>	<b>AM</b>	2,671	
		<b>PM</b>	3,535	
		<b>Midday</b>	3,484	
<b>Annual Trucks</b>	<b>Base</b>	2%		
	<b>Future</b>	4%		
<b>Transit/Bicycles/Pedestrians</b>		Not considered		
<b>Delay (Base) (s/veh)</b>	<b>AM</b>	25	5	25
	<b>PM</b>	27	30	27
	<b>Midday</b>	26	28	26
<b>Delay (Future) (s/veh)</b>	<b>AM</b>	43	11	77
	<b>PM</b>	93	49	77
	<b>Midday</b>	93	45	72
<b>Base Year Safety Performance</b>	<b>PDO Crashes</b>	5	7	5
	<b>Injury Crashes</b>	2	1	2
	<b>Fatal Crashes</b>	0	0	0
<b>Future Year Safety Performance</b>	<b>PDO Crashes</b>	10	11	9
	<b>Injury Crashes</b>	4	1	4
	<b>Fatal Crashes</b>	0	0	0
<b>Planning/Engineering Costs</b>		\$0	\$622,819	\$687,714
<b>Right-of-Way Costs</b>		\$0	\$811,000	\$474,554
<b>Construction Costs</b>		\$0	\$3,111,000	\$3,438,572
<b>Net Present Value</b>		<b>\$131,724,932</b>	<b>\$76,412,191</b>	<b>\$131,099,984</b>
<b>Benefits/Costs</b>		n/a	<b>13.03</b>	<b>1.14</b>