Equations for RSP level 2 Infrastructure Form:

Equation 1:

$$N_1 / N_0 = (V_1 / V_0)^{\alpha}$$

Where:

N_0 = number of crashes on the roadway before

N_1 = number of crashes on the roadway after

= average operating speed of a roadway before

$\bar{v}_1$ = average operating speed of a roadway after

α =4 for fatal crashes

α =3 for fatal & serious injury crashes

α =2 for all injury crashes

Equation 2:

$$N_{expected} = w \times N_{predicted} + (1 - w) \times N_{observed}$$

Where

$N_{expected}$ = expected average crashes frequency for the study period.

$N_{predicted}$ = predicted average crash frequency predicted using a SPF for the study period under the given conditions.

w = weighted adjustment to be placed on the SPF prediction.

$N_{observed}$ = observed crash frequency at the site over the study period.

$$w = \frac{1}{1 + k \times (\sum_{\substack{all\ study \\ years}} N_{Predicted})}$$

Where

k = overdispersion parameter from the associated SPF.

Equation 3:

Incremental BCR = $(PV_{benefits\ 2} - PV_{benefits\ 1}) / (PV_{costs\ 2} - PV_{costs\ 1})$

Where

$PV_{benefits\ 1}$ = Present value of benefits for lower-cost project

$PV_{benefits\ 2}$ = Present value of benefits for higher-cost project

$PV_{costs\ 1}$ = Present value of cost for lower-cost project

$PV_{costs\ 2}$ = Present value of cost for higher-cost project

Equation 4:

Std. error of estimate = $\sqrt{[\Sigma (Y_{actual} - Y_{pred})^2 / N]}$

Where:

N = number of comparisons

Equation 5:

Std. error = $s / \sqrt{n}$

where:

s = standard deviation of the population

n = size of sample

Equation 6:

Variance = $S^2 = [\Sigma (x_i - x_{mean})^2] / (n-1)$

where

n = number of observations

Σ = summation sign

x_i = the ith value in the sample

x_{mean} = the arithmetic mean of the sample

Equation 7:

SE = $s / \sqrt{n}$

where:

S = standard deviation of the population

n = size of sample

Equation 8:

$$CI\ (y\%) = AMF_x \pm SE_x \times MSE$$

Where

CI (y%) = the confidence interval for which it is y-percent probable that the true value of the CMF is within the interval

CMF_x = Crash Modification Factor for condition x

SE_x= Standard Error of the CMF_x

MSE = Multiple of Standard Error

Equation 9:

$SE = \sqrt{(S_a^2/n_a) + (S_b^2/n_b)}$

where:

SE= standard error of the difference between the means of two samples

S_a = the standard deviation of sample A

S_b = the standard deviation of sample B