Solutions for Congested Corridors Program (SCCP) Performance Metrics Instructions by Measure Area

1. This document is intended to provide additional background and information for each Measure Area that an applicant is expected to complete for the table located in Appendix II of the project nomination.
2. The following standardized terminology has been developed:
   Project benefits = Outputs + Outcomes
   Outputs = actual physical infrastructure improvements (i.e. miles of bike lanes, # of transit stations)
   Outcomes = non-physical improvements (i.e. congestion reduction, air quality improvement)
   Measure = the outcome that is being measured (i.e. safety, air quality)
   Metric = how the outcome is being measured (i.e. air quality improvement = reduced greenhouse gas emissions)
3. Project benefits are expected to be provided for the scope of the project as defined in the application and as projected for the "Build" scenario versus the "No Build" scenario over a 20-year horizon (with no other alternatives consideration required). If a horizon other than 20 years is utilized, it must be identified and justified in the table. Provide current conditions where applicable and explain current conditions as part of project purpose and need.
4. These metrics measure estimated project benefits based on what data available at the time of application.
5. For each measure area applicants must specify the horizon year, methodology, assumptions, and data source(s) used and any data gaps or challenges should also be noted.
6. Modeled and observed data may be used. Modeled data used must be calibrated per federal standards.
7. Project types include: Local Road, Highway, Transit Rail, Transit Bus, and Active Transportation or any combination thereof. Benefits are reported for the project as a whole.
8. A few tools have been identified in the table below, including the Regional Travel Demand Model, Sub-Regional or Project-Level Models. Applicants are encouraged to use tools that are industry standard to the extent possible, but when there is a need to use an alternate tool, applicants should explain their choice of model and underlying assumptions.
9. Each application should include analysis utilizing the most recent version of Caltrans' Life Cycle Benefit Cost Analysis (Cal-B/C) Model to document that the expected benefits of the project justify its costs. If another model is more applicable it may be used; the alternative model must be identified and justified in the table.
10. For the Air Quality analysis portion of the application, Cal-B/C, the SB 1 Intermodal Tool, or the SB 1 Other Projects Tool must be used. The most recent version of Cal-B/C, the SB 1 Intermodal and Other Projects Tools can be accessed here: https://dot.ca.gov/programs/transportation-planning/economics-data-management/transportation-economics
11. The intent of these metrics is not to require a RTDM run for every project. It is anticipated that project applicants will utilize existing analyses (i.e. project level modeling conducted for the environmental analysis) and use that information coupled with additional off model tools or other calculations to estimate the project benefits for the application process.

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
Congestion Reduction	Project Area, Corridor, County, or Regionwide VMT per capita **and** total VMT	All	• Regional Travel Demand Model (RTDM) or other appropriate tool.
	Person Hours of Travel Time Saved	Local Road, Highway, Transit Rail, Transit Bus	• Cal-B/C Tools available using RTDM inputs and/or engineering estimates for environmental analysis: https://dot.ca.gov/programs/transportation-planning/economics-data-management/transportation-economics
	Daily Vehicle Hours of Delay[1]	Highway	• Only required for National and State Highway System Projects • Federal Metric: https://www.fhwa.dot.gov/tpm/guidance/ https://www.fhwa.dot.gov/tpm/guidance/hif18040.pdf and 23 CFR 490.711
	Percent Change in Non-Single Occupancy Vehicle Travel (optional)	Local Road, Highway	• Federal Metric: https://www.fhwa.dot.gov/tpm/guidance/ https://www.fhwa.dot.gov/tpm/guidance/hif18040.pdf and 23 CFR 490.713
	Per Capita and Total Person Hours of Delay per Year (optional)	Local Road, Highway	• Federal Metric: https://www.fhwa.dot.gov/tpm/guidance/ https://www.fhwa.dot.gov/tpm/guidance/hif18040.pdf and 23 CFR 490.711

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
Throughput	Peak Period Person Throughout by Applicable Mode (optional)	Local Road, Highway, Transit Rail, Transit Bus	• Possible methodologies include RTDM outputs, off-model calculations, or engineering estimates from environmental analysis • Peak period will be defined by the applicant and must be consistent with state or federal peak-period definitions as applicable.
	Passengers per Vehicle Service Hour (optional)	Transit Rail, Transit Bus	• See *Caltrans Triennial Performance Audit Guidebook* [LINK pending] for more information
	Bicyclist/Pedestrian Screen Line Counts (optional)	Active Transportation	• See *OB 19-02 Interim ATP Count Guidance* for pre-application counts: https://dot.ca.gov/-/media/dot-media/programs/local-assistance/documents/ob/2019/ob19-02-attachment.pdf

[1] Caltrans defines delay as the difference between travel time at 35 MPH and actual travel time for state highways, with delay calculated as the difference between actual travel time and travel time at 35 MPH for vehicles on the roadway segment in question. Caltrans Performance Measurement System (PeMS) provides data on Annual Vehicle Hours of Delay (VHD) at 35 MPH. The Federal peak hour excessive delay (PHED) metric is calculated as a product of Average Vehicle Occupancy and Excessive Delay, thus Daily Vehicle Hours of Delay is built into PHED. We suggest including PHED only or both PHED and Daily VHD.

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
System Reliability	Peak Period Travel Time Reliability Index	Highway	• Only required for National and State Highway System Projects • Federal Metric: https://www.fhwa.dot.gov/tpm/guidance/ and https://www.fhwa.dot.gov/tpm/guidance/hif18040.pdf and 23 CFR 490.611 [Reliable = LOTTR < 1.50 threshold] • Peak Period defined in federal law as: four total time periods weekdays (Monday to Friday) 6-10am; 10am-4pm; 4-8pm and weekends 6am—8pm.
	Transit Service On-Time Performance	Transit Rail, Transit Bus	• Change in percentage of "on-time performance" (i.e. 0 minutes early or no more than 3-5 minutes late) • General Transit Feed Specification (GTFS) data can be used to track on time performance

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
Safety	Number of Fatalities	Local Road, Highway	• Required for **all** National and State Highway System Projects, local road projects (only if data is available), • Federal Metric: https://www.fhwa.dot.gov/tpm/guidance/ https://www.fhwa.dot.gov/tpm/guidance/safety_performance.pdf also AASHTO Highway Safety Manual Methodology • Projected for the life of the improvement, up to 20 years • See safety calculations documentation on p. 6 for more information
	Rate of Fatalities per 100 Million VMT	Local Road, Highway	
	Number of Serious Injuries	Local Road, Highway	
	Number of Serious Injuries per 100 Million VMT	Local Road, Highway	
	Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries	Local Road, Highway, Active Transportation	
	Number or Rate of Property Damage Only and Non-Serious Injury Collisions (optional)	Local Road, Highway	• Utilizing the Statewide Integrated Traffic Records System (SWITRS) Database
	Accident Cost Savings (optional)	Local Road, Highway	• Cal-B/C Tools Available using RTDM inputs: https://dot.ca.gov/programs/transportation-planning/economics-data-management/transportation-economics
	Other Narrative (optional)	Transit Bus, Transit Rail	• First-mile/last-mile, station/stop, and vehicle safety improvements; safety benefits of mode shift to transit.

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
Economic Development and Job Creation	Jobs Created (Direct and Indirect)	All	• Federal Multiplier (RIMS II-type) based on Project Cost • Caltrans uses 11 jobs per $1 million invested in 2018 Executive Fact Book
	Other Narrative (optional)	All	• Narrative explanation of the quality of jobs, local training and hires, etc. • California Air Resources Board jobs modeling methodology: https://ww2.arb.ca.gov/resources/documents/cci-methodologies

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
Air Quality & Greenhouse Gas Emissions	Particulate Matter (PM 2.5 PM 10)	All	• Cal-B/C Tools Available using RTDM inputs for project area: https://dot.ca.gov/programs/transportation-planning/economics-data-management/transportation-economics • Provide a summary of Cal-B/C inputs
	Carbon Dioxide (CO_2)		
	Volatile Organic Compounds (VOC)		
	Sulphur Dioxides (SO_x)		
	Carbon Monoxide (CO)		
	Nitrogen Oxides (NO_x)		

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
Cost Effectiveness	Cost Benefit Ratio	All	• Cal-B/C Tools Available using RTDM inputs: https://dot.ca.gov/programs/transportation-planning/economics-data-management/transportation-economics • Provide a summary of Cal-B/C inputs

Measure	Indicator/Metric	Project Type	Horizon, Methodology, and Data Notes
Efficient Land Use	See Land Use Efficiency Supplement	All	• Insert LINK to Land Use Efficiency Supplement

Measure	Metric	Project Type	Horizon, Methodology, and Data Notes
Accessibility	Number of Jobs Accessible by Mode and Access to Key Destinations by Mode	All	• Within mode-appropriate travel shed-distance: # of Jobs within: ¼ mile of transit stop, ½ mile by walking, 3 miles by biking • Rural areas without transit could consider: # of Jobs within: 8 miles (20-minute auto trip @ 25 mph), 13 miles (30-minute auto trip @ 25 mph), or 19 miles (45-minute auto trip @ 25 mph) • Other Destinations (i.e. school, healthcare services, grocery store) within ¼ mile of transit stop, ½ mile by walking, 3 miles by biking • Local Employment Dynamics Information available from the US Census: https://lehd.ces.census.gov/doc/LEDonepager.pdf • GIS Mapping is a tool (small projects) and Urban Footprint and RTDM are tools (larger projects)
	% of Population Defined as Low Income or Disadvantaged within ½ mile of rail station, ferry terminal, or high-frequency bus stop	Transit Bus, Transit Rail	• "Low Income or Disadvantaged": will be defined per 2020 SCCP Guidelines Attachment I Section E. • Accessibility benefits for disadvantaged populations are to be projected for current conditions and upon opening of the project, any projection beyond that is up to the applicant and should be clearly noted • High-Frequency = 15-minute headways (urban) and 20-30-minute headways (suburban)
	Other Narrative (optional)	All	• Affordability and Travel Cost Savings from mode shift: https://ww2.arb.ca.gov/resources/documents/cci-methodologies

Safety Calculations Documentation:

Table 1 – Safety Performance Measures and Data Sources

Safety Performance Measures	Safety Performance Measure Description	Data	Data Source
Number of Fatalities	The total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year	Fatalities	Final FARS and FARS ARF
		Target	HSIP Annual Report
Rate of Fatalities	The ratio of the total number of fatalities to the number of VMT (expressed in 100 million VMT)	Fatalities	Final FARS and FARS ARF
		VMT	VM-2 Table in Highway Statistics Series
		Target	HSIP Annual Report
Number of Serious Injuries	The total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year	Serious injuries	HSIP Annual Report
		Target	HSIP Annual Report
Rate of Serious Injuries	The ratio of the total number of serious injuries to the number of VMT (expressed in 100 million VMT)	Serious injuries	HSIP Annual Report
		VMT	VM-2 Table in Highway Statistics Series
		Target	HSIP Annual Report
Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries	The total number of fatalities with the FARS person attribute codes: (5) Pedestrian, (6) Bicyclist, (7) Other Cyclist, (8) Person on Personal Conveyances and the total number of serious injuries where the injured person is, or equivalent to, a pedestrian (2.2.36) or a pedalcyclist (2.2.39) as defined in the American National Standards Institute (ANSI) D16.1-2007.	Non-motorized fatalities	Final FARS and FARS ARF
		Non-motorized serious injuries	HSIP Annual Report
		Target	HSIP Annual Report

Safety Documentation Continued:

2.1 Number of Fatalities

Number of Fatalities Measure $_{PY}$ =

$$\frac{\{\text{Fatalities}_{PY-4} + \text{Fatalities}_{PY-3} + \text{Fatalities}_{PY-2} + \text{Fatalities}_{PY-1} + \text{Fatalities}_{PY}\}}{5}$$

Where,

Number of Fatalities Measure $_{PY}$ = Calculated fatality measure for the PY *(rounded to the nearest tenth decimal place)*

Fatalities $_{PY}$ = Annual number of fatalities metric *(whole number)*

2.2 Rate of Fatalities

Rate of Fatalities Measure $_{PY}$ =

$$\frac{\left\{\left(\frac{\text{Fatalities}_{PY-4}}{\text{Total VMT}_{PY-4}}\right) + \left(\frac{\text{Fatalities}_{PY-3}}{\text{Total VMT}_{PY-3}}\right) + \left(\frac{\text{Fatalities}_{PY-2}}{\text{Total VMT}_{PY-2}}\right) + \left(\frac{\text{Fatalities}_{PY-1}}{\text{Total VMT}_{PY-1}}\right) + \left(\frac{\text{Fatalities}_{PY}}{\text{Total VMT}_{PY}}\right)\right\}}{5}$$

Where,

Rate of Fatalities Measure $_{PY}$ = Calculated fatality rate measure for the PY *(rounded to the nearest thousandth decimal place)*

Fatalities $_{PY}$ = Annual number of fatalities metric *(whole number)*

Total VMT $_{PY}$ = Annual VMT per 100 million metric *(calculated per 100 million and rounded to the nearest hundredth decimal place)*

$\frac{\text{Fatalities}_{PY}}{\text{Total VMT}_{PY}}$ = Annual fatality rate metric *(rounded to the nearest hundredth decimal place)*

Number of Serious Injuries Measure $_{PY}$ =

$$\frac{\{\text{Serious Injuries}_{PY-4} + \text{Serious Injuries}_{PY-3} + \text{Serious Injuries}_{PY-2} + \text{Serious Injuries}_{PY-1} + \text{Serious Injuries}_{PY}\}}{5}$$

Where,

Number of Serious Injuries Measure $_{PY}$ = Calculated serious injury measure for the PY *(rounded to the nearest tenth decimal place)*

Serious Injuries $_{PY}$ = Annual number of serious injuries metric *(whole number)*

2.4 Rate of Serious Injuries

Rate of Serious Injuries Measure $_{PY}$ =

$$\frac{\left\{\left(\frac{\text{Serious Injuries}_{PY-4}}{\text{Total VMT}_{PY-4}}\right) + \left(\frac{\text{Serious Injuries}_{PY-3}}{\text{Total VMT}_{PY-3}}\right) + \left(\frac{\text{Serious Injuries}_{PY-2}}{\text{Total VMT}_{PY-2}}\right) + \left(\frac{\text{Serious Injuries}_{PY-1}}{\text{Total VMT}_{PY-1}}\right) + \left(\frac{\text{Serious Injuries}_{PY}}{\text{Total VMT}_{PY}}\right)\right\}}{5}$$

Where,

Rate of Serious Injuries Measure$_{PY}$ = Calculated serious injury rate measure for the PY *(rounded to the nearest thousandth decimal place)*

Serious Injuries $_{PY}$ = Annual number of serious injury metric *(whole number)*

Total VMT $_{PY}$ = Annual VMT (per 100 million) metric *(calculated per 100 million and rounded to the nearest hundredth decimal place)*

$\frac{\text{Serious Injuries}_{PY}}{\text{Total VMT}_{PY}}$ = Annual serious injury rate metric *(rounded to the nearest hundredth decimal place)*

2.5 Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries

Number of Non-Motorized Measure $_{PY}$ =

$$\frac{\{\text{Non-Motorized}_{PY-4} + \text{Non-Motorized}_{PY-3} + \text{Non-Motorized}_{PY-2} + \text{Non-Motorized}_{PY-1} + \text{Non-Motorized}_{PY}\}}{5}$$

Where,

Number of Non-Motorized Measure $_{PY}$ = Calculated number of non-motorized fatalities and number of serious injury measure for the PY *(rounded to the nearest tenth decimal place)*

Non-Motorized $_{PY}$ = Combined annual number of non-motorized fatalities and non-motorized serious injuries metric *(whole number)*