

# Local Streets and Roads Projection Process

## Need

### Pavement

1. Key in Unit Treatment Costs reported by each jurisdiction via the LS&R Needs/Revenue survey. There will be separate costs for arterials / collectors and residential roadways. Jurisdiction cost information should be grouped into the nine counties.  
*(Exhibit A – Survey table for reporting unit treatment costs)*
2. Determine the county average treatment costs by condition category, for both of the functional class categories. To determine the county averages, first take a straight average over each condition category. Then eliminate any of the individual jurisdiction costs for each condition category, that falls within + or – one standard deviation from the average. Take another average of the remaining costs for the county. This will be the “adjusted average”, and the values used in the decision trees.  
*(Exhibit B – Unit Treatment Cost Spreadsheet)*
3. For each of the nine counties, insert the adjusted average treatment costs into the standard “best practices” decision tree. Each of the 140 branches of the decision tree must have a new cost inserted. The construction of the nine county decision trees can be easily constructed by using the filter tool in the Excel spreadsheet that was created specifically for this purpose. The new decision trees can be copy/pasted or imported into the appropriate PMP databases prior to calculation of the Unconstrained Needs.  
*(Exhibits C & D – Standard “Best Practices” Decision Tree and Decision Tree Construction Spreadsheet with Filter Tool)*
4. Run the unconstrained needs in the calculations module of the PMP software for each jurisdiction. The updated, standard decisions trees should be inserted into each jurisdiction’s database prior to running of the needs calculations (see step 3). The needs calculation should be run for 20 years if using version 7.5, or for 25-years, if using Streetsaver v.8™. Interest and inflation should be set to 0%.
  - If using version 7.5, when the needs calculation is complete, export the “Projected PCI / Cost Summary” report in .RTF format, to the desktop file titled “Needs Total.rtf”. Export the same report with the selection criteria inserted for **functional class = arterials**, to the desktop file titled “Needs A.rtf”. Export the same report again with the selection criteria inserted for **functional class = collectors**, to the desktop file titled “Needs C.rtf”. Open the Excel file, “Needs.xls” that was created for parsing the information into required data for the pavement needs projections. Run the macro that is incorporated into the spreadsheet and when the macro is completed, print the results page. This sheet will contain all of the information that is required for the pavement needs projection. This process is required to convert the 20-year need information into 25-year need information.
  - If using Streetsaver v. 8™, simply run the needs calculations, and print out the “Projected PCI / Cost Summary” reports for total need, arterial need (selection criteria is “FC = arterial”) and collector need (“FC = collector”).

*(Exhibits E & F—“Needs.xls” macro spreadsheet and sample “Needs.rtf” files)*

5. Calculate the proportion of combined arterial & collector need to total need, for each jurisdiction. The arterial and collector need is considered the “MTS Need”. The proportion information will be needed in order to segment the *Non-Pavement* need into MTS and Non-MTS Need.
6. Prepare jurisdiction Pavement Need figures in spreadsheet form, segmented by arterial and collector need (MTS vs. Non-MTS). Sum the jurisdictional figures at the county level.

### *Non-Pavement*

*For the Non-Pavement need estimates, each jurisdiction’s pavement need was divided by a ratio, developed and used for the 2005 RTP need projections. The ratio used differed depending on whether the jurisdiction was considered “urban” or “rural” based upon their population densities. The ratio for “urban” jurisdictions was 1.12, and the ratio for “rural” jurisdictions was 1.70. These ratios were developed by determining average pavement to non-pavement cost ratios from jurisdictions reporting their non-pavement need estimates via a survey done in 2002.*

*MTC is currently working with a consulting firm that specializes in asset management, in order to develop a method for estimating Non-Pavement need in a more accurate manner.*

7. Divide each jurisdiction’s pavement need, by the appropriate non-pavement factor in order to get the Non-Pavement need estimate for each jurisdiction—urban jurisdictions: ratio = 1.12; rural jurisdictions: ratio = 1.70.  
*(Exhibit G—Urban vs. Rural designation spreadsheet)*
8. Multiply the Non-Pavement Need by the percent arterial and collector Pavement need figures (as calculated in Step 5) in order to segment the Non-Pavement Need estimates into “MTS” vs. “Non-MTS” Non-Pavement Need.
9. Prepare jurisdiction Non-Pavement Need figures in spreadsheet form, segmented by arterial and collector need (MTS vs. Non-MTS). Sum the jurisdictional figures at the county level.

## Revenue

1. Key in budget information for each jurisdiction from the LS&R Needs/Revenue surveys. Information is segregated by maintenance category—Pavement, Non-Pavement, Operations, Other—and by *source*—Gas Tax, Sales Tax Measure, Other Local.  
*(Exhibit I—Sample Budget portion of LS&R survey)*
2. Use the submitted survey information pertaining to the five year budget to calculate the average annual revenue available for each category of the LS&R budget—Pavement, Non-pavement, and Operations / Other—by jurisdiction.  
*(Exhibit I—Annual Revenue Breakdown spreadsheet)*
3. For each of the nine counties and their jurisdiction, determine the county average percent split of total LS&R revenues, between each of the categories, for the survey responders. Example—Pavement = 30%, Non-pave = 30%, Operations / Other = 40%.<sup>1</sup>  
*(Exhibit J—County Average Calculations spreadsheet)*
4. For each of the nine counties and their jurisdictions, calculate the average “Dollars per Center Line Mile” budgeted for each of the LS&R categories, among the survey responders.<sup>2</sup>  
*(Exhibit J—County Average Calculations spreadsheet)*
5. For each of the nine counties and their jurisdictions, calculate the average county percent split among revenue sources (i.e., sales tax, gas tax, and other local) that make up the LS&R budgets.<sup>3</sup>  
*(Exhibit K—Jurisdiction Growth Rate spreadsheet)*
6. Utilize county average information on category % splits and Dollars /Center Line Mile, to estimate the revenue information for survey non-responders and survey partial-responders.  
*(Exhibit J—County Average Calculations spreadsheet)*
7. Utilize the county average information on revenue source % splits to calculate the weighted growth rate for the county and its jurisdictions by inserting the percentages for each revenue source into the formula below:  
$$\text{Growth Rate} = (\% \text{ of GT} \times -1.42\%) + (\% \text{ of ST} \times 2.61\%) + (\% \text{ of OL} \times 1.98\%)$$

GT = gas tax; ST = sales tax; OL = other local funds
8. Insert the average annual revenue, percentage splits, and growth rates into the 25-year projection spreadsheet template  
*(Exhibit L—Revenue Projection Spreadsheet)*

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<sup>1</sup> When determining county average figures, eliminate outliers by removing any jurisdiction’s figures that fall outside + or – one standard deviation from the average. Calculate an “adjusted average” from the remaining figures for use in the projections.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

9. Examine sales tax assumptions embedded in the revenue projection spreadsheet formulas for accuracy.
10. Ensure the local bridge match deduction assumptions in the revenue projection spreadsheet are still correct.
11. Adjust Proposition 42 figures to reflect most current estimates from Programming & Allocations.
12. Copy total 25-year pavement and non-pavement revenue estimates from the revenue projection spreadsheet into the 25-year “Needs” spreadsheet.
13. Where Revenue is greater than Need (a surplus exists), make Revenue equal to the Need to eliminate any negative / surplus figures for Shortfall.<sup>4</sup>
14. Segment the Pavement and Non-Pavement revenue estimates by arterial & collector revenue (MTS vs. Non-MTS) by applying the same proportion of arterial and collector “Need” to Total Need to the revenue estimates. Sum the jurisdictional figures at the county level.

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<sup>4</sup> The justification for doing this is that a surplus would not exist after 25 years. Surpluses on an annual basis would be re-directed to another use. Also, surpluses would not be transferred from one jurisdiction to another therefore surpluses should not be allowed to lower the overall county and regional Shortfall figures.

## Allocation

The Local Streets & Roads Committee developed and agreed to an allocation model that will be used in future regional LS&R funding cycles will consist of the following formula:

- 7% of the regional pot of funding to be taken “off the top” and allocated based upon performance
- The allocation of the remaining funds would be based equally on the factors of population, lane mileage, and arterial and collector shortfall (one third each)
- Performance would be scored on a 5-range scale that only awards points to those jurisdictions that have a preventive maintenance performance score above the 25<sup>th</sup> percentile. The performance score would then be multiplied by a weighting factor that consists of each jurisdiction’s total percent share of the other three factors—population, lane mileage, and arterial & collector shortfall.

Therefore, the regional pot of funding would be allocated: 31% on population, 31% on lane mileage, 31% on arterial & collector shortfall, and 7% on performance

The following is the step-by-step process for determining the allocation shares by jurisdiction, using the new model:

1. Determine Population Statistics: The latest population figures can be obtained from the California Dept. of Finance’s Demographic Unit. Population data can be downloaded from: [www.dof.ca.gov/HTML/DEMOGRAP/E-1text.htm](http://www.dof.ca.gov/HTML/DEMOGRAP/E-1text.htm).
2. Determine Lane Mileage Figures: Information on lane mileage is located in each individual jurisdiction’s Pavement Management System database and is assumed to be accurate since it is information provided by the jurisdiction itself. Information is extracted from the latest Pavement Management database on hand at MTC, for each of the jurisdictions. Lane mileage data is recorded during the process of calculating the Pavement Needs in order to reduce time spent accessing each of the databases. For jurisdictions that do not utilize MTC’s Pavement Management System, the regional average ratio of lane mileage to centerline mileage is calculated and applied to the jurisdiction’s centerline mileage (obtained from Caltrans) in order to estimate the jurisdiction’s lane mileage.
3. Obtain Arterial & Collector Shortfall Calculations: The shortfall figures used in the allocation figure consist of the arterial and collector shortfall for both Pavement and Non-Pavement. . The Pavement Need that exists on the arterial and collector routes within a jurisdiction is derived from the Pavement Management System databases. The ratio of arterial and collector Need to Total Pavement Need, is applied to the Total Non-Pavement Need, in order to estimate the portion of Non-Pavement Need that exists on or along arterial and collector routes. This ratio is also applied to the Pavement and Non-Pavement *shortfalls* in order to calculate the arterial and collector shortfall figures to be used in the allocation model.

4. Score Performance: The performance measure to be used in the allocation model is based upon the ratio of the actual preventative maintenance expenditure, to the expenditure amount recommended for each jurisdiction by MTC's Pavement Management System software. Actual preventative maintenance expenditure is determined from the responses provided by each jurisdiction on the "LS&R Needs & Revenue" survey.<sup>5</sup> Jurisdictions were asked on the survey to estimate the dollar amount spent on preventive maintenance over two fiscal years. The average of those two years is calculated and serves as the jurisdiction's "actual" preventive maintenance expenditure<sup>6</sup>. The "recommended" preventive maintenance expenditure is determined by taking the percentage of budget recommended to be spent on preventive maintenance from each jurisdiction's Pavement Management System, and applying that percentage to the jurisdiction's estimated annual revenue for pavement maintenance.

The ratios of actual vs. recommended preventive maintenance expenditures are then scored according to a five-range scale. The five-range scale awards points only for scores that fall at or above the 25<sup>th</sup> percentile.

<b>5-Range Scale</b>	
<b>% Range</b>	<b>Points</b>
0-19%	0
20-40%	1
41 - 60%	2
61-80%	3
81-99%	4
100%+	5

As a final step, the performance measure scores are weighted by each jurisdiction's share of the other three formula factors (population, lane mileage, and arterial & collector shortfall—see Step 5 below).

5. Calculate % Shares of Each Factor—Each jurisdiction competes for its share of funding among the entire region. For example, the total population in the region is 7,009,840. The population of the City of Alameda is estimated at 74,100. Therefore, Alameda's population % share is equal to 1.06%. The same calculation is conducted for each of the factors in the allocation model, for each jurisdiction.

6. Weight Factors—The individual shares of each of the factors must be weighted according to the allocation formula—31% Population, 31% Mileage, 31% A&C Shortfall, and 7% Performance. For example, the City of Alameda's total share of funding would be:

#### **City of Alameda**

Factor:	Population	Lane Mileage	A&C Shortfall	Performance
Percent Share	1.06%	.74%	.71%	.49%

**Total Share: = (.31 x .0106) + (.31 x .0074) + (.31 x .0071) + (.07 x .0049) = .0081147 or .81%**

<sup>5</sup> Jurisdictions that did not provide preventive maintenance expenditure information on the survey did not receive any funds from the performance measure share of the allocation model.

<sup>6</sup> The LS&R Committee recommended that the survey be the sole source for determining actual preventive maintenance expenditure for the 3<sup>rd</sup> Cycle of STP programming. Future allocations may utilize information extracted directly from each jurisdiction's Pavement Management System, to determine actual preventive maintenance expenditures.

7. Apply Total Share to Funding Pot—The total % share for each jurisdiction is multiplied against the amount of funding to be allocated. In the 2<sup>nd</sup> and 3<sup>rd</sup> Cycles, the amount was estimated to be \$57 million. Therefore, the City of Alameda's share of the funding would be:

$$.0081147 * \$57,000,000 = @\$463,000$$

8. Sum allocation shares at the county level.