MTC’s Local Street and Road Sustainability Efforts

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Metropolitan Transportation Commission
August 29, 2012
San Francisco Metro Region

- Population = 7.3 Mil
- Nine Counties
- 109 Jurisdictions
- 42,500 Lane-Miles
- 1,500 Miles of Highway
- 23 Transit Agencies
- Seven Toll Bridges
- One MPO: MTC
MTC’s Regional Local Street & Road Program

• 25 Years of Support for Local Streets & Roads
  – StreetSaver® Pavement Management Software
  – Training & Technical Support
  – Pavement Management Grant Program
  – Regional Analyses
  – Funding & Policy Advocacy
What is Sustainability?

One Definition:

“Meet present needs without compromising the ability of future generations to meet their needs”

– United Nations, 1987
MTC Sustainability Efforts for Local Streets & Roads

• Environmental
  – Promote preventive maintenance and “green” technologies to reduce GHG emissions

• Economic
  – Obtain sufficient resources to preserve the street and road infrastructure
  – Promote best management practices
Environmental Sustainability

• Recent Emphasis on Environmental Sustainability in Transportation
  – California SB 375
  – Sustainable Communities Strategies
  – Climate Initiatives

• MTC’s RSRP Works to Demonstrate How Proper Maintenance Aids Environmental Sustainability
  – Pavement Preservation
  – Technologies
Sustainable Maintenance Practices

- Preservation Strategies Limit GHG Emissions Associated with Rehab/Reconstruction
- Consistent Pavement Conditions Over Time
- Lower User Costs
- Preventive Maintenance has a 5:1 (minimum) Benefit/Cost Ratio
Sustainable Maintenance Practices

Effect of Deferred Maintenance on Green House Gas Emissions & Pavement Conditions

Total Lifecycle GHG emissions/lane mile = 212,100 lbs. of CO2e

Emissions Data Source: Jim Chehovits & Larry Galehouse; Energy Usage and Greenhouse Gas Emissions of Pavement Preservation Processes for Asphalt Concrete Pavement, 2010
Sustainable Maintenance Practices

Effect of Preventive Maintenance on Green House Gas Emissions & Pavement Conditions

Total Lifecycle GHG emissions / lane mile = 30,100 lbs. of CO2e

Emissions Data Source: Jim Chehovits & Larry Galehouse; Energy Usage and Greenhouse Gas Emissions of Pavement Preservation Processes for Asphalt Concrete Pavement; 2010
For a typical roadway, pavement preservation strategies can save 182,000 lbs. of GHG emissions per lane mile, as compared to reconstruction. This is equivalent to taking 15 cars off the road for one year.
Paving Can Be “Green”!

True sustainability means not only seeking new ideas, but searching for innovative alternatives to existing methods.
MTC’s Climate Initiative Program

• $2 Million Awarded to Cold in Place Recycling Demo

• Joint Napa/Sonoma County Project

• Estimated Cost Savings = 40%

• Estimated GHG Emissions Savings = 2,2 million lbs.
  
  – Equivalent to 184 cars off the road for one year
Estimated GHG Savings / Lane Mile with CIR

<table>
<thead>
<tr>
<th>GHG Emissions Savings:</th>
<th>GHG Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CO₂e lbs. / ton pavement</td>
</tr>
<tr>
<td>CIR¹</td>
<td>88</td>
</tr>
<tr>
<td>Passenger Car Equivalent²</td>
<td></td>
</tr>
</tbody>
</table>

1) Bilal, Julian; Chappat, Michael; Colas Group; *Sustainable Development: The Environmental Road of the Future*; 2003

2) [www.epa.gov/otaq/climate/420f05004.htm](http://www.epa.gov/otaq/climate/420f05004.htm)
On average, for every lane mile of roadway that CIR is used instead of traditional HMA, approximately 130,704 lbs of GHG emissions are saved, which is equivalent to taking 11 cars off the road for one year.
## Mileage Suitable for CIR Based on PCI & Estimated GHG Savings

<table>
<thead>
<tr>
<th>Roadway Condition Range*</th>
<th>% of Total BA LSR Mileage</th>
<th>Lane Mileage</th>
<th>Depth</th>
<th>Length</th>
<th>Width</th>
<th>Tons Asphalt</th>
<th>CO2e Savings / Ton**</th>
<th>Total CO2e Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI: 60-69</td>
<td>12%</td>
<td>5042</td>
<td>0.167</td>
<td>5280</td>
<td>15</td>
<td>4,991,857</td>
<td>88</td>
<td>439,283,434</td>
</tr>
<tr>
<td>PCI: 50-59</td>
<td>10%</td>
<td>4202</td>
<td>0.250</td>
<td>5280</td>
<td>15</td>
<td>6,239,822</td>
<td>88</td>
<td>549,104,292</td>
</tr>
<tr>
<td>PCI: 25-49</td>
<td>8%</td>
<td>3362</td>
<td>0.333</td>
<td>5280</td>
<td>15</td>
<td>6,655,810</td>
<td>88</td>
<td>585,711,245</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>12,606</td>
<td></td>
<td></td>
<td></td>
<td>17,887,488</td>
<td></td>
<td>1,574,098,970</td>
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</tbody>
</table>

**Annual Passenger Car Reduction Equivalent:** 129,819

*Source: MTC's 2009 Local Streets and Roads Regional Condition Summary
The GHG emissions savings potential if all candidate streets in the region were paved using CIR instead of traditional HMA is 1.6 billion lbs of CO2e, which would be equivalent to taking 129,843 cars off the road for one year.
The GHG emissions savings potential over the next five years if available funding was spent on treating appropriate roadways with CIR instead of HMA is 354 million lbs of CO2e, which would be equivalent to taking 29,172 cars off the road for one year.
Sustainable Maintenance Practices

• MTC Actively Promotes Other “Green” Paving Technologies:
  – Full Depth Reclamation
  – RAC

• Life Extension Value is Key
Economic Sustainability Efforts

- Economic Analyses
- Maximize Resources
- Advocacy
Local Street and Road 28-Year Maintenance Needs

- SF Bay Area’s Average PCI = 66
- Target = PCI of 75
- Corresponding Non-Pavement Target
- Total Needs = $44 B
- Available Revenue = $15 B
- Remaining Need = $30B
Economic Analyses

Pavement Life Cycle

- Very Good-Excellent
- Good
- Fair
- At Risk
- Poor
- Failed

YEARS

0 5 10 15 20

Time varies depending on traffic, climate, pavement design, etc.

66 Bay Area Average PCI

40% drop in quality

75% of pavement life

$1 for renovation here

40% drop in quality

12% of life

Will cost at least $5 here
# Economic Analyses

## 28-Year LSR Capital Needs (In Billions)

<table>
<thead>
<tr>
<th>County</th>
<th>Available Revenues</th>
<th>Pavement Needs</th>
<th>Non-Pavement Needs</th>
<th>Total Capital Needs</th>
<th>Total Remaining Capital Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alameda</td>
<td>$ 2,148</td>
<td>$ 3,715</td>
<td>$ 4,082</td>
<td>$ 7,798</td>
<td>$ 5,650</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>$ 2,915</td>
<td>$ 3,111</td>
<td>$ 2,674</td>
<td>$ 5,786</td>
<td>$ 2,871</td>
</tr>
<tr>
<td>Marin</td>
<td>$ 655</td>
<td>$ 865</td>
<td>$ 641</td>
<td>$ 1,506</td>
<td>$ 852</td>
</tr>
<tr>
<td>Napa</td>
<td>$ 219</td>
<td>$ 1,087</td>
<td>$ 429</td>
<td>$ 1,516</td>
<td>$ 1,297</td>
</tr>
<tr>
<td>San Francisco</td>
<td>$ 2,299</td>
<td>$ 2,416</td>
<td>$ 2,363</td>
<td>$ 4,778</td>
<td>$ 2,480</td>
</tr>
<tr>
<td>San Mateo</td>
<td>$ 1,440</td>
<td>$ 1,929</td>
<td>$ 1,984</td>
<td>$ 3,913</td>
<td>$ 2,473</td>
</tr>
<tr>
<td>Santa Clara</td>
<td>$ 3,374</td>
<td>$ 5,776</td>
<td>$ 5,118</td>
<td>$ 10,894</td>
<td>$ 7,520</td>
</tr>
<tr>
<td>Solano</td>
<td>$ 488</td>
<td>$ 1,906</td>
<td>$ 1,289</td>
<td>$ 3,195</td>
<td>$ 2,707</td>
</tr>
<tr>
<td>Sonoma</td>
<td>$ 994</td>
<td>$ 3,699</td>
<td>$ 1,319</td>
<td>$ 5,018</td>
<td>$ 4,023</td>
</tr>
<tr>
<td>REGION</td>
<td>$ 14,531</td>
<td>$ 24,504</td>
<td>$ 19,899</td>
<td>$ 44,404</td>
<td>$ 29,872</td>
</tr>
</tbody>
</table>
How Much Would We Need to Raise the Gas Tax?

- **Maintain** Existing Conditions
  - $0.00

- **Improve** Conditions ($0.35)
  - $0.18
  - $0.54
  - $0.76

- **Existing Federal Excise**
  - $0.89

- **Existing State Excise**
  - 13 cents
  - 22 cents
  - 35.3 cents
  - 18.4 cents
## Economic Analyses

<table>
<thead>
<tr>
<th></th>
<th>Existing Funding</th>
<th>Maintain Current Pavement Condition</th>
<th>Desirable Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Regional PCI* in 2035</td>
<td>45</td>
<td>66</td>
<td>75</td>
</tr>
<tr>
<td>Pavement Condition</td>
<td>Poor</td>
<td>At Risk</td>
<td>Good</td>
</tr>
<tr>
<td>Average Annual Expenditure</td>
<td>$351 million</td>
<td>$740 million</td>
<td>$975 million</td>
</tr>
<tr>
<td>Annual Expenditure/Lane Mile</td>
<td>$8,000</td>
<td>$17,000</td>
<td>$23,000</td>
</tr>
<tr>
<td>Increase over Existing Funding</td>
<td>0%</td>
<td>110%</td>
<td>177%</td>
</tr>
</tbody>
</table>
Impact of Analyses on Regional Funding Policy

Regional Investment in LSR Over Consecutive RTPs (Millions)

<table>
<thead>
<tr>
<th>Year</th>
<th>LS&amp;R Maintenance Shortfalls</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001 RTP</td>
<td>$143</td>
</tr>
<tr>
<td>T2030</td>
<td>$991</td>
</tr>
<tr>
<td>T2035</td>
<td>$7,500</td>
</tr>
<tr>
<td>Plan Bay Area</td>
<td>$10,000</td>
</tr>
</tbody>
</table>
Maximizing Resources

- LSR Funds Conditioned on Performance
  - PMS Certification
  - Projects Recommended by StreetSaver®
  - Performance Based Allocation Formula

- Analysis of Financing Options
  - To bond…or not to bond.
Financing Options

Pavement Condition & Deferred Maintenance w/without Sales Tax Measure

Year

Pavement Condition Index

(Millions)
Financing Options

Pavement Condition & Deferred Maintenance Scenarios
With/Without Sales Tax Measure

Year
Pavement Condition Index
(Millions)


61 68

$0 $200 $400 $600 $800 $1,000 $1,200 $1,400 $1,600 $1,800

61 29
# Bonding Success Stories

## El Cerrito’s Pavement Program and Conditions, 2006 vs. 2010

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-year PCI score</td>
<td>48 (Poor)</td>
<td>85 (Very Good)</td>
</tr>
<tr>
<td>PCI: 3-year moving average</td>
<td>53 (At Risk)</td>
<td>62 (Fair)</td>
</tr>
<tr>
<td>Maintenance backlog</td>
<td>$21.2 million</td>
<td>$500,000</td>
</tr>
<tr>
<td>Annual budget needed to maintain PCI</td>
<td>$1.3 million</td>
<td>$500,000</td>
</tr>
<tr>
<td>Annual average funding level</td>
<td>$250,000</td>
<td>$500,000</td>
</tr>
</tbody>
</table>
Advocacy – Communicating the Need

- The 2010 *Pothole Report*
- Annual Press Releases
- Statewide Needs Assessment
Questions?

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