PAVEMENT TYPE DETERMINATION PROCESS

OVERVIEW
The Region Pavement Management Engineer will determine the pavement type at the project level with assistance from the Asset/Pavement Management Group and the Region Project Managers. Pavement type determination will consist of four steps:

1. Corridor Determination
2. Pavement Design Analysis with Project Specific Constraints
3. Life Cycle Analysis (LCCA)
4. Engineering Analysis

I. Corridor Determination

The first step is to determine if specific corridors will be rigid or flexible pavement and conform to the corridor designations. The Asset Management group champions this process by working closely with region pavement managers and central materials to select pavement types for UDOT. Base this selection on an overall CORRIDOR analysis including life-cycle, maintenance consistency, and geographic constraints. Apply a general Life Cycle Cost Analysis (LCCA) that includes initial construction, rehabilitation, user costs, and maintenance. Develop maps and documents that will be published for use in pavement design. Pavement type will remain unchanged once determined by corridor unless a safety issue or minimal (temporary) performance period requirement (preservation-type) is presented. Not all pavements and corridors will be identified as one or the other. These will continue on in the process. Summaries of the criteria and corridors are listed in section VI and VII.

II. Project Specific Constraints

The second step is to identify project-specific constraints that will define one specific pavement type over another. These items can drive a need that may not show up in a LCCA. Typical items are listed below and should remain minimal. A Region can develop a staged construction plan showing interim projects that will help meet an applicable corridor pavement strategy if it determines that a specific pavement type is not feasible. The following are situations that can fall under this procedure.

1. Historical Materials Performance Issues
   a. Stripping-susceptible aggregates
   b. Settlement problems – the region can place an asphalt road until settlement is removed if concrete is determined to be the final pavement type.
2. Performance Period Required
3. Utility Construction Issues
4. Research Scope within project
5. Existing Surface – the region can use overlay principles and change pavement types when the life of the pavement is exhausted.
III. Life Cycle Comparison – Alternate Bid Determination

Pavements that do not fall into a defined corridor or have specific constraints that prevent one type or the other will be addressed through a project specific LCCA in the Department’s design process. Details of the Department’s LCCA process are listed in sections VIII, IX, and X.

User costs will need to be determined from an acceptable delay program with rates based upon UDOT calculations. A simplified version that includes direct delay of travelers based on speed reduction through the work zone is most appropriate because it is defendable. The majority of full-blown user cost analyses are very time consuming and results can vary significantly to the point where they no longer make sense.

Results that show greater than 15 percent benefit in LCCA will be used to determine pavement type. This type will be carried through the design process and bid in the normal approach.

Results that show a 15 percent or less benefit in LCCA will facilitate the use of an alternate bid process. One rigid design and one flexible design will be carried through design and into the bid process. This will require duplicate summary sheets, typical sections, quantity determinations, etc. The time and cost for duplication will vary based on project size. A typical interstate rehab on I-80 came to about four weeks and $5,000. Typical projects that fall into this category are thick and thin overlays, major reconstruction, and new construction. Others will be dependent on project specific issues addressed in section II.

IV. Pavement Concept Modifications

Pavement type is considered a defined concept within a project scope as determined by the above process. Changes to this concept or pavement type need to be brought through a similar process to a typical design exception. Minimize changes to the pavement type due to scope modifications or need for additional funds. The long-term ramifications to the overall state system are large and need to be addressed by the UDOT Deputy Director.

V. Miscellaneous Items to Address

1. Apply the process retroactively to any projects that are still in the scope.
2. Adopt the process as a Department program/procedure with Technical Committee approval.
3. Set up Commission Approved Amounts to allow for either pavement type when appropriate. PCC is about 30 percent more as a pavement line item. Communicate this information to PMs.
4. Modify dTIMS runs to allow pavement type flexibility. Asset Management Group is aware of this and will address when they can.
5. Leave escalators for binder out of the project or add escalators for Portland cement. True comparison and low-bid results cannot be accomplished without these items and this will be the biggest contention at the industry level. Try both methods for the first several alternate bids to see what happens.

VI. Corridor Criteria for Determining Pavement Type
1. Corridor Criteria (Entire State – See VII for individual region)
   a. Truck Volumes
   b. Traffic Counts
   c. Truck Speeds
   d. Consistency – Maintenance and Pavement
   e. Life Cycle Costs – User Impacts Costs and Maintenance Impacts
   f. Subgrade Conditions
   g. Construction Materials
   h. Climate data – Canyon Areas where concrete will not be used (safety)
   i. Context Sensitive Solution
2. Concrete roads, high truck traffic, and ADT – See VII for individual roads.
   a. Most interstates through the Wasatch Front
   b. Most major collectors
   a. Local roads – mainly cars
   b. Rural roads

I. VII. Region Pavement Type Corridor Designations

Region 1
1. Criteria used to determine Pavement Type
   a. Truck volumes: ≥ 3000 AADTT
   b. Truck speeds: Slow moving trucks industrial areas
   c. User cost impacts: areas where it is most critical to get in get out and stay out
   d. Maintenance Impacts
   e. Canyon Areas
   f. Context Sensitive Solution: areas where colored concrete and heat effects could be beneficial i.e. down towns
   g. Subgrade Conditions
2. Road Considerations
   a. Concrete: Designated Concrete Corridors – Region 1
      I-84 except for Weber Canyon
      I-15
      SR-26
      SR-204
SR-68
SR-39 From SR-126 to SR-203
SR-104
US-89 Davis and Weber County
US-91 From SR-165 to 2500 North
1000 West Cache County
b. Asphalt: Designated HMA Corridors
I-84 Weber canyon MP 87.6 to MP 94.8
US-89 Logan Canyon
US-91 Brigham and Wellsville canyons
SR-167 Trappers Loop
SR-226 Snowbasin Road
SR-158 Powder Mountain Road
SR-39 Ogden Canyon and Monti Cristo
SR-243 Beaver Mountain Road
SR-66 Morgan to East Canyon
SR-67 Big Mountain
c. Other roadway will be determined on a project-by-project bases.

**Region 2**

1. Criteria used by Region 2
   a. Truck Volumes
   b. Traffic Counts
   c. Consistency
   d. User Cost Impacts
   e. Subgrade Conditions
   f. Construction Materials

2. Road Considerations
   a. Concrete – Designated PCC Corridors
      I-15
      I-80 Grantsville to to Wyoming Line
      SR-68 SR-201 to Bangerter Highway
      I-84 Echo to Morgan County Line
      SR-201
      Bangerter HWY
      I-215
      5600 West 201 to I-80
      Mt. View Corridor
      US 40
   b. Asphalt - Designated HMA Corridors
      US-89
      I-80 Wendover to Grantsville and Silver Creek to Echo – Lower Trucks and ADT
      SR-36
      SR-171
      SR – 186 47th South
SR-210
SR-209
SR……..32,35,36,48,58,65,71,73,86,89,112,138,140,150,151,152,
171,172,173,181,184,186,190,196,199,202,209,210,224,248,266,2
69,270,280,282,302

c. Other

Region 3

1. Criteria used in Region 3
   a. Truck Volumes
   b. Traffic Counts
   c. Truck speeds: Slow moving trucks industrial areas
   d. Subgrade Conditions
   e. Canyon Areas
   f. Consistency
   g. User Cost Impacts
   h. Maintenance Impacts (business areas that will be affected by future
      maintenance)

2. Road Considerations
   a. Concrete Designated PCC Corridors
      I-15 – Spanish Fork to Utah/SL Co. Line
      SR-40 From Summit/Wasatch Co. Line to Heber
      SR-52
      SR-73 from I-15 to US-89
      SR-75
      SR-77
      US-89 – University Ave to I-15 Lehi
      SR-145
      SR-180
      US-189 – 1-15 to SR-52
      SR-265
   b. Asphalt Designated HMA Corridors
      All other routes

Region 4

General

The following determinations were made by the Region 4 Engineering Team.
The purpose is to identify preferred pavement types for select routes within
Region 4. Potential deterrents and justifications are also identified. Roadways
and roadway segments not identified are suitable candidates for either flexible or
rigid pavement types.
**Interstates**

*I-15*  Flexible pavement due to unstable sub grade.
- **MP 59-68**
- **MP 138-144**

*I-70*  Flexible pavement due to unstable sub grades, lack of suitable pcc aggregates, canyons, steep grades, high elevations with snow removal issues.
- **MP 47-231.67**

**NHS**

*US-6*  Flexible pavement due to unstable sub grades, lack of suitable pcc aggregates, canyons, steep grades, high elevations with snow removal issues.
- **MP 202-300**

*US-9*  Flexible pavement due to unstable sub grades, high elevations with snow removal issues, remote.
- **MP 47.77 - 57.07**

*US-50*  Flexible pavement with unstable sub grade.
- **MP 60-75**
  - Preference: Flexible
  - Why: Unstable sub-grade

*US-89*  Flexible pavement due to unstable sub grades, lack of suitable pcc aggregates, remote.
- **MP 0-226**

*US-191*  Flexible pavement due to unstable sub grades.
- **MP 26-37**
- **MP 128-157**

**State**

*SR-10*  Flexible pavement due to unstable sub grades.
- **ALL**

*SR-12*  Flexible pavement due to high elevations and snow removal issues, canyons, steep grades, remote.
- **ALL**

*SR-24*  Flexible pavement due to high elevations and snow removal issues, canyons, steep grades, remote.
- **ALL**
SR-95 - ALL
Flexible pavement due to unstable sub grades, lack of suitable pcc aggregates, remote.
SR-163 - ALL
SR-261 - ALL
SR-262 - ALL
SR-276 - ALL

VIII. Life Cycle Cost Analysis Process

1. UDOT uses the Annualized Method for calculating Life Cycle Costs. The following equation is used:

\[ A = P \times \left[ \frac{I(1 + I)^n}{(1 + I)^{n-1}} \right] \]

A = Annulized Costs  
P = Present Worth or Current costs  
n = Number of years  
I = Interest Rate (Discount Rate)

\[ UCR = \left[ \frac{I(1 + I)^n}{(1 + I)^{n-1}} \right] \]

2. UDOT has recommended a four percent discount rate through simplifying the use of a variable rate based on economic values.

3. Current costs will consist of using the following portions and equations:

   a. Initial Construction Costs
      1) These items consist of either alternate bidding from contractors or by estimating construction costs through the Pavement Management Engineer.
      2) UDOT focuses on what items need to be considered when calculating initial construction costs

   b. Rehab Costs
      1) UDOT uses plans for every section (PFES) to control what treatments to use and when each treatment will take place. Each road section has different criteria based on type, traffic volume, and use.
2) UDOT is creating standard items to be included when determining the costs for each rehab project. This will allow PME’s to use similar rehab costs when determining projects throughout the state.

c. User Costs
1) The following criteria is the minimum when calculating user costs. Each PME can look at other models based on delay, alternate routes, etc.
2) Equation:

\[ UC = \left( \frac{AVT}{RS} - \frac{L}{IS} \right) \left( ADT \right) \left( PT \left( CP \right) \right) \]

Where:
UC = User Cost (total project costs)
AVT = Average Value of Time – Can be obtained from Engineer Central UDOT Traffic.
L = Project Length
RS = Reduced speed through construction zone
IS = Initial speed prior to construction zone
ADT = Average daily traffic in current year (only portion of ADT affected by the project)
PT = Percent of the traffic affected by the construction project.
CP = Construction period in days

d. UDOT calculates each project based on current unit bid pricing and will recalculate through the revised 08-1 design phases.
<table>
<thead>
<tr>
<th>Road Class</th>
<th>Treat ID</th>
<th>Description</th>
<th>Order</th>
<th>Year</th>
<th>Treat Type</th>
<th>Last Updated</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>CON_RHB_0</td>
<td>New pavement Structure</td>
<td>0</td>
<td>10</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>CON_SS_10</td>
<td>Joint Seal Grinding &amp; Joint Repair</td>
<td>10</td>
<td>10</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>CON_RHB_20</td>
<td>Rehabilitation</td>
<td>20</td>
<td>10</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>CON_SS_30</td>
<td>Joint Seal Grinding &amp; Joint Repair</td>
<td>30</td>
<td>10</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>CON_RHB_40</td>
<td>Rehabilitation</td>
<td>40</td>
<td>10</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>CON_SS_50</td>
<td>Joint Seal Grinding &amp; Joint Repair</td>
<td>50</td>
<td>10</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>GRAV</td>
<td>GRAV_RHB_0</td>
<td>New Add/Gravel</td>
<td>0</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>GRAV_RHB_1</td>
<td>Grade/Repair</td>
<td>1</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>GRAV_RHB_2</td>
<td>Grade/Repair</td>
<td>2</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>GRAV_RHB_3</td>
<td>Grade/Repair</td>
<td>3</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>GRAV_RHB_4</td>
<td>Grade/Repair</td>
<td>4</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>GRAV_RHB_5</td>
<td>Grade/Repair</td>
<td>5</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>HVIA</td>
<td>HVIA_RHB_0</td>
<td>New Pavement Structure</td>
<td>0</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_3</td>
<td>Surface Seal</td>
<td>3</td>
<td>1</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RJV_4</td>
<td>Surface Rejuvenation</td>
<td>4</td>
<td>3</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_7</td>
<td>Surface Seal</td>
<td>7</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RJV_10</td>
<td>Surface Rejuvenation</td>
<td>10</td>
<td>3</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_13</td>
<td>Surface Seal</td>
<td>13</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RHB_16</td>
<td>Structural Overlay</td>
<td>16</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_17</td>
<td>Surface Seal</td>
<td>17</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RJV_20</td>
<td>Surface Rejuvenation</td>
<td>20</td>
<td>3</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_23</td>
<td>Surface Seal</td>
<td>23</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RJV_26</td>
<td>Surface Rejuvenation</td>
<td>26</td>
<td>3</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_29</td>
<td>Surface Seal</td>
<td>29</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RHB_32</td>
<td>Structural Overlay</td>
<td>32</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_30</td>
<td>Surface Seal</td>
<td>33</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RJV_36</td>
<td>Surface Rejuvenation</td>
<td>36</td>
<td>3</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_39</td>
<td>Surface Seal</td>
<td>39</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_RJV_42</td>
<td>Surface Rejuvenation</td>
<td>42</td>
<td>3</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVIA_SS_45</td>
<td>Surface Seal</td>
<td>45</td>
<td>6</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>HVNIA</td>
<td>HVNA_RHB_6</td>
<td>New Pavement Structure</td>
<td>0</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_SS_1</td>
<td>Surface Seal</td>
<td>1</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_RJV_5</td>
<td>Surface Rejuvenation</td>
<td>5</td>
<td>4</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_SS_9</td>
<td>Surface Seal</td>
<td>9</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_RJV_13</td>
<td>Surface Rejuvenation</td>
<td>13</td>
<td>4</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_RHB_17</td>
<td>Structural Overlay</td>
<td>17</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_SS_16</td>
<td>Surface Seal</td>
<td>18</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_RJV_22</td>
<td>Surface Rejuvenation</td>
<td>22</td>
<td>4</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_SS_26</td>
<td>Surface Seal</td>
<td>26</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_RJV_30</td>
<td>Surface Rejuvenation</td>
<td>30</td>
<td>4</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_RHB_34</td>
<td>Structural Overlay</td>
<td>34</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_SS_38</td>
<td>Surface Seal</td>
<td>35</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_RJV_39</td>
<td>Surface Rejuvenation</td>
<td>39</td>
<td>4</td>
<td>RJV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>HVNA_SS_43</td>
<td>Surface Seal</td>
<td>43</td>
<td>7</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>LVIA_RHB_0</td>
<td>New Pavement Structure</td>
<td>0</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td></td>
<td>LVIA_SS_1</td>
<td>Surface Seal</td>
<td>1</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
</tbody>
</table>

Monday, June 04, 2007
<table>
<thead>
<tr>
<th>Road Class</th>
<th>Treat ID</th>
<th>Description</th>
<th>Order</th>
<th>Year</th>
<th>Treat Type</th>
<th>Last Updated</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVIA</td>
<td>RUV_4</td>
<td>Surface Rejuvenation</td>
<td>4</td>
<td>3</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_7</td>
<td>Surface Seal</td>
<td>7</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_10</td>
<td>Surface Rejuvenation</td>
<td>10</td>
<td>3</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_13</td>
<td>Surface Seal</td>
<td>13</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RHB_17</td>
<td>Structural Overlay</td>
<td>17</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_18</td>
<td>Surface Seal</td>
<td>18</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_21</td>
<td>Surface Rejuvenation</td>
<td>21</td>
<td>3</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_24</td>
<td>Surface Seal</td>
<td>24</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_27</td>
<td>Surface Rejuvenation</td>
<td>27</td>
<td>3</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_30</td>
<td>Surface Seal</td>
<td>30</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RHB_34</td>
<td>Structural Overlay</td>
<td>34</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_35</td>
<td>Surface Seal</td>
<td>35</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_38</td>
<td>Surface Rejuvenation</td>
<td>38</td>
<td>3</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_41</td>
<td>Surface Seal</td>
<td>41</td>
<td>3</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_44</td>
<td>Surface Rejuvenation</td>
<td>44</td>
<td>3</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_47</td>
<td>Surface Seal</td>
<td>47</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RHB_0</td>
<td>New Pavement Structure</td>
<td>0</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_1</td>
<td>Surface Seal</td>
<td>1</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_5</td>
<td>Surface Rejuvenation</td>
<td>5</td>
<td>4</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_9</td>
<td>Surface Seal</td>
<td>9</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_13</td>
<td>Surface Rejuvenation</td>
<td>13</td>
<td>4</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_17</td>
<td>Surface Seal</td>
<td>17</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RHB_21</td>
<td>Structural Overlay</td>
<td>21</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_22</td>
<td>Surface Seal</td>
<td>22</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_26</td>
<td>Surface Rejuvenation</td>
<td>26</td>
<td>4</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_30</td>
<td>Surface Seal</td>
<td>30</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_34</td>
<td>Surface Rejuvenation</td>
<td>34</td>
<td>4</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_38</td>
<td>Surface Seal</td>
<td>38</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RHB_42</td>
<td>Structural Overlay</td>
<td>42</td>
<td>1</td>
<td>RHB</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_43</td>
<td>Surface Seal</td>
<td>43</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_47</td>
<td>Surface Rejuvenation</td>
<td>47</td>
<td>4</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_51</td>
<td>Surface Seal</td>
<td>51</td>
<td>4</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>RUV_55</td>
<td>Surface Rejuvenation</td>
<td>55</td>
<td>4</td>
<td>RUV</td>
<td>12/30/1999</td>
</tr>
<tr>
<td>LVIA</td>
<td>SS_59</td>
<td>Surface Seal</td>
<td>59</td>
<td>6</td>
<td>SS</td>
<td>12/30/1999</td>
</tr>
</tbody>
</table>
X. Develop Pavement Design

2009 Design Network

13G Assess Existing Pavement Condition

Overview
Evaluate the existing pavement condition and compare the results of the evaluation to the existing conditions documented in the concept phase’s preliminary pavement design. If a concept pavement design is not available, evaluate the existing pavement conditions to assess the level of pavement design needed.

Deliverables
- Pavement Conditions Report

Distribution
- Project File
- Region Materials Engineer
- State Materials Engineer
- 13R

<table>
<thead>
<tr>
<th>Task</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain Preliminary Pavement Design</td>
<td>X</td>
</tr>
<tr>
<td>Conduct Field Review</td>
<td>X</td>
</tr>
<tr>
<td>Write Pavement Conditions Report</td>
<td>X</td>
</tr>
</tbody>
</table>

Obtain Preliminary Pavement Design

- Obtain preliminary pavement design from the Concept Report

Conduct Field Review

If the preliminary pavement design exists, do the following:

- Conduct a field review to determine the validity of the pavement conditions assumed in the preliminary pavement design. If the current pavement conditions are not consistent with those assumed in the preliminary pavement design, conduct a field review according to the instructions for a non-existent preliminary pavement design found below.

If the preliminary pavement design does not exist, do the following:

- Conduct a field review to determine the existing pavement conditions. This review will be used in developing the pavement design.
- Determine the condition of the existing pavement using detailed data sheets from the Statewide Pavement Survey. If needed, supplement the data by obtaining and testing no more than four cores per mile. Also, in exceptional cases, obtain and test soil samples but no more than four cores per mile.

**Write Pavement Conditions Report**

If the current pavement conditions match the pavement conditions assumed in the preliminary pavement design, do the following:

- Write a memo affirming the pavement conditions assumed in the preliminary pavement design.

If the current pavement conditions do not match the pavement conditions assumed in the preliminary pavement design or if the preliminary pavement design does not exist, do the following:

- Write a pavement conditions report assessing the current conditions of the pavement and assume the pavement conditions at the time of construction.
21G Confirm Pavement Design

Overview

Confirm the concept report pavement design remains applicable and update/create the pavement as needed.

Deliverables

- Confirmed Pavement Design

Distribution

- Project File
- Phase Leader
- Roadway

<table>
<thead>
<tr>
<th>Task</th>
<th>Activity Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region Pavement Management Engineer</td>
<td></td>
</tr>
<tr>
<td>Phase Leader</td>
<td></td>
</tr>
<tr>
<td>Review Concept Report</td>
<td>X</td>
</tr>
<tr>
<td>Conduct Field Visit</td>
<td>X</td>
</tr>
<tr>
<td>Determine Any Revisions/Write Modification</td>
<td>X</td>
</tr>
</tbody>
</table>

Review Concept Report

Obtain the Concept Report and review the pavement design for the following:

- Pavement scope
  - Testing strategy used
  - Proposed design life
  - Additional testing required from testing strategy
  - Potential material sources
- Testing
  - Core and trench for thickness and condition of existing pavement
  - Extraction/gradation on cores
  - Strength and stripping tests
  - Trench for sub-base and sub-grade samples
  - Concrete pavement evaluation
  - Falling Weight Deflectometer testing
- Centerline Soil Survey Report
  - California Bearing Ratio
  - Soil Classification-Plastic Limit
- Liquid Limit
- Plastic Index
- Soluble Salts
- Resistivity
- pH
- Identify and determine mode(s) of failure for the existing pavement
- Evaluate the need for underdrains and coordinate with the project Hydraulic Engineer
- Review pavement design options used
- Review engineering and economic analysis of options
- Verify the design is the best option
- Look at updated traffic data to verify that the pavement design remains applicable

Conduct Field Visit

Determine Any Revisions/Write Modification