**4R CONCEPTUAL STUDY REPORT**

**For Resurfacing, Restoration, Rehabilitation or Reconstruction of Interstate or Freeway Roadways**

Freeway (Non-Interstate)  Interstate

**PART I**

**1. Project Information**

|  |  |  |  |
| --- | --- | --- | --- |
| A. Job Number |  | F. Construction Year |  |
| B. County |  | G. Begin Continuous Log Mile |  |
| C. Route |  | H. End Continuous Log Mile |  |
| D. Direction (s) |  | I. Total Project Length |  |
| E. Travelway ID(s) |  | J. Functional Classification |  |

K. Project Location Description (attach location sketch):

L. District Rehabilitation Proposal (If Developed):

**2. Traffic Data**

A. Construction Year (     ) ADT:

1. Design 20-Year (     ) ADT:

1. Growth Rate:

D. % Trucks:

1. Truck Classifications:

|  |  |  |  |
| --- | --- | --- | --- |
| Truck Classification | % | Truck Classification | % |
| Class 4 |  | Class 9 |  |
| Class 5 |  | Class 10 |  |
| Class 6 |  | Class 11 |  |
| Class 7 |  | Class 12 |  |
| Class 8 |  | Class 13 |  |

F. Operational (Posted) Speed:

**3. Existing Pavement Data**

1. Attach typical sections showing thickness of existing and proposed pavement and shoulder structure.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Existing Pavement |  | HMA / PCCP |  | PCCP |  | HMA | Total Thickness |  |
| Existing Shoulders |  | Paved |  | Agg. |  | Earth | Total Paved Thickness |  |

B. Give the history of the existing pavement to include the type, thickness, date of original construction and any subsequent pavement rehabilitation, such as resurfacing.

|  |  |  |  |
| --- | --- | --- | --- |
| **Pavement** | **Year** | **Matl. Type** | **Thickness (in)** |
| Original Pavement |  |  |  |
| 1st Rehabilitation |  |  |  |
| 2nd Rehabilitation |  |  |  |
| 3rd Rehabilitation |  |  |  |
| Additional Overlays |  |  |  |

C. Attach the latest ARAN data.

D. Summarize the type, extent or severity level, and if known, the cause of the pavement distress.

**Preliminary Pavement Evaluation** - The Distress Identification Manual (DIM) for the Long-Term Pavement Performance Program (LTPP), FHWA-RD-03-031, is the nationally recognized guide for evaluating the type, severity, and extent of pavement distresses.

The district is encouraged to use the DIM in order to provide the pavement engineer an initial assessment of the pavement condition. The following tables can be used to record visual distresses, if the district elects to develop the rehabilitation proposal.

|  |  |
| --- | --- |
| **VISUAL ASSESSMENT FOR HMA OR HMA OVERLAY PAVEMENTS** | |
| **Distress Type** | **Severity Rating**  **None - Low – Moderate - Severe** |
| **Cracking** |  |
| Fatigue Cracking |  |
| Block Cracking |  |
| Edge Cracking |  |
| Longitudinal Cracking |  |
| Reflective Cracking at Joints |  |
| Transverse Cracking |  |
| **Patching and Potholes** |  |
| Patch Deterioration |  |
| Potholes |  |
| **Surface Deformation** |  |
| Rutting |  |
| Shoving |  |
| **Surface Defects** |  |
| Bleeding |  |
| Polished Aggregate |  |
| Raveling |  |
| **Miscellaneous Distresses** |  |
| Lane-to-Shoulder Dropoff |  |
| Water Bleeding and Pumping |  |
| Other - |  |

|  |  |
| --- | --- |
| **VISUAL ASSESSMENT PCC PAVEMENTS** | |
| **Distress Type** | **Severity Rating**  **None - Low – Moderate - Severe** |
| **Cracking** |  |
| Corner Breaks |  |
| Durability “D” Cracking) |  |
| Longitudinal Cracking |  |
| Transverse Cracking |  |
| **Joint Deficiencies** |  |
| Spalling of Transverse Joints |  |
| Spalling of Longitudinal Joints |  |
| **Surface Defects** |  |
| Map Cracking |  |
| Scaling |  |
| Polished Aggregate |  |
| Popouts |  |
| **Miscellaneous Distresses** |  |
| Blowups |  |
| Faulting of Transverse Joints and Cracks |  |
| Lane-to-Shoulder Dropoff |  |
| Lane-to-Shoulder Separation |  |
| Patch/Patch Deterioration |  |
| Water Bleeding and Pumping |  |

E. Indicate any restrictions to adding thickness to the existing roadway.

1. Attach a straight-line profile of the existing pavement for each direction of roadway.

G. Attach a sketch of existing lanes, additional lanes proposed under the project, and additional lanes programmed in the future.

* 1. **Pavement Coring and Submittal**

Cores should be taken for all rehabilitation projects in order to identify the extent of the pavement deterioration and to implement the most appropriate pavement rehabilitation treatment. Coring may be omitted if all of the following apply:

1. District only has funding for a short-term treatment such as a single lift overlay; regardless of current pavement conditions.
2. No coldmilling or recycling will be conducted.
3. Short-term improvements are acceptable.

The pavement engineer shall be consulted on the number of cores, type of cores, and if additional testing is needed. The district shall not dispose of pavement cores before consultation with the pavement engineer.

**5. Design Parameters for Pavement Type Selection** **for Reconstruction**

**(This section may be omitted if reconstruction is not being considered)**

1. Number of Lanes in Each Direction:
2. Widened Travelway: Yes No
3. Design Lane Width (ft):
4. Adjoining Pavement Thickness (in):
5. Depth of Water Table Below Existing or Proposed Surface Elevation (ft):
6. Attach Soils Report or Complete the Following Soils Data
   1. Soil Classification:
   2. Atterberg Limits:
   3. Gradation:
      1. % Passing #200
      2. % Passing #4
7. Base Material Type: 4” Aggregate Base 18” Rock Base 4” Agg./4” Perm. Base
   1. Gradation
      1. % Passing #200
      2. % Passing #4
8. If bypass is to be installed, give service of bypass (yrs):

**PART II**

**6. Geometric Data**

A. Identify geometrics of adjoining sections compared to project location.

B. List roadside obstacles within the horizontal clearance limits (clear zone).

**7. Accident Data, Safety Enhancements and Access Management.**

A. Project accident rate:

B. Statewide accident rate for highways of same functional classification:

C. Attach data pertaining to the number, location, type and severity of accidents. (5 year accident by log mile)

D. Indicate predominant type of accident and locations.

E. Identify any locations within or adjacent to the project limits which are on the “High Severity Location Lists” in the TMS database

F. Is there a relationship between the accident rate and any design exception requested?       Explain.

G. Describe the measures being taken to enhance safety on this project.

1. Does this section of highway meet current access management criteria? If not, can safety be enhanced by upgrading some or all of the access to the highway to criteria in the MoDOT Access Management Guidelines?
2. Are bicycle/pedestrian facilities to be provided on the project? Explain.

**8. Conceptual Cost Data ($1,000's)**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Right of Way** | **Construction** | **Total** |
| **Current Estimate** |  |  |  |
|  |  |  |  |

|  |  |
| --- | --- |
| Approved by: |  |
|  | , P.E. |
|  | District Engineer |
|  |  |
|  |  |