APPENDIX C

Los Inspection Manual
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1.0 Inspection Program Process

1.1 Introduction

This manual defines the inspection program and criteria for thirteen Maintenance categories.

1.2 Data Collection

The Level of Service (LOS) Survey is a visual inspection, of certain roadway assets, conducted by a walk-through based on criteria defined in this manual. Two teams, consisting of two collectors, are assigned to inspect six Districts’ state maintained highways. The inspections consist of 160 0.10 mile random sections in each Subdistrict. The random segments will be identified by route number and GPS coordinates. The inspections should start at given latitude and longitude location and cover 0.10 mile as described in section 1.3. These locations will be provided by the LOS supervisor and shown on the map interface of the inspection software.

1.3 Highway

1.3.1 Divided highways – A LOS inspection will be conducted in both highway directions.

1.3.2 Two-lane highways – A LOS inspection will be conducted in both highway directions.

1.4 Survey Policy During Snow and Ice Operations

A LOS inspection will not be conducted on a route until the pavement is clear. The LOS inspection team will communicate with the supervisor, to establish a course of action until the pavement is clear.

1.5 How INDOT Uses LOS Data

The LOS data provides the information necessary to generate the Organizational Performance Index (OPI). The District OPI is a scoring system index by which system conditions are compared to INDOT goals. Additionally, the LOS data will be used by the District Highway Operations to develop their work plan.
## 2.0 LOS Recordable Conditions

### 2.1 Summary of Recordable Deficiencies

#### 2.1.1 Shoulders

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop-off or build-up exceeding +/- 2 inches for 15 linear feet on paved shoulders less than 4 feet wide</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

#### 2.1.2 Paved Shoulder Cracking

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsealed cracks on more than 25% of the shoulder.</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

#### 2.1.3 Small Culvert Obstruction

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 25% of culvert obstructed</td>
<td>Each culvert in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

#### 2.1.4 Underdrain Obstruction

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 10% of outlets are closed. Rodent screens are missing. Marking of drain not rated.</td>
<td>Each underdrain in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

#### 2.1.5 Ditch Obstruction

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% or more of ditch filled with debris or standing water 1 inch in depth or greater that covers 6 feet or more. Standing water after a rain is still a deficiency.</td>
<td>1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

#### 2.1.6 Pavement Deterioration

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid pavement – more than 25% of transverse and longitudinal joint material does not appear to keep water out</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>Unsealed cracks on more than 25% of roadway Greater than hairline and exceeding 4 feet.</td>
<td>1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>
### 2.1.7 Pavement Failure

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement blow-up exceeding 2 inches</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>Pothole exceeding 1 inch in depth</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>Rigid pavement spalls – defect exceeding 1 square foot in area and 1.5 inches deep</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>Edge raveling exceeding 50 feet in length</td>
<td>1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

### 2.1.8 Bridge Category

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 plugged drain</td>
<td>Each</td>
</tr>
<tr>
<td>Expansion joint with rubber seal missing or pulled out to a vertical offset exceeding 1.5 inches</td>
<td>Each</td>
</tr>
<tr>
<td>1 square foot of delaminated, spalled, or cracked deck</td>
<td>Each</td>
</tr>
<tr>
<td>Sand or debris around bearings</td>
<td>Each</td>
</tr>
</tbody>
</table>

### 2.1.9 Guardrail

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than one rail panel damaged more than 75%</td>
<td></td>
</tr>
<tr>
<td>Spacer block – rotting or missing block-out</td>
<td>Every 3 continuous block-outs</td>
</tr>
<tr>
<td>Two or more consecutive posts missing or rotten</td>
<td></td>
</tr>
</tbody>
</table>

### 2.1.10 Cable Barrier

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable sagging more than 1/3 of post height</td>
<td>1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>More than 1 post knocked down</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

### 2.1.11 Crash Attenuator

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damaged or missing</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

### 2.1.12 Sign

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damaged or faded sign, cannot be clearly read</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>Missing sign, excluding 3-button “no passing zone” indicator post</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>Sign is older than policy age (currently 18 years) (older stickers no year punched)</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
<tr>
<td>Missing or damaged mile markers or reference posts</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>
2.1.13 **Pavement Marking**

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess of 150 linear feet missing</td>
<td>1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

2.1.14 **Special Marking**

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>A total of one half of all markings are missing 50% of the marking on main line or at signalized approaches, stop bars, or cross walks (no stop bars on county road approaches unless at signal)</td>
<td>Each in 1/10 mile (528 feet) segment</td>
</tr>
</tbody>
</table>

2.1.15 **Maintenance Work Plan Analysis**

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PM activities will be evaluated comparing the planned versus the actual.</td>
<td>Score assigned to individual PM activities, and then scores are averaged for Sub and District scores,</td>
</tr>
</tbody>
</table>

2.1.16 **Traffic Work Plan Analysis**

<table>
<thead>
<tr>
<th>Deficiency Description</th>
<th>Deficiency Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PM activities will be evaluated comparing the planned versus the actual.</td>
<td>Score assigned to individual PM activities, and then scores are averaged for Sub and District scores,</td>
</tr>
</tbody>
</table>

2.2 **Description of Recordable Deficiencies**

2.2.1 **Deficiency Type: Shoulders**

Deficiency Description: Drop-off or build-up from the paved surface exceeding +/- 2 inches in depth and 15 linear feet in length on paved shoulders less than 4 feet wide.
2.2.2 Deficiency Type: **Shoulder Cracking**

Deficiency Description: Unsealed cracks on more than 25% of the shoulder.

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2.2.3 Deficiency Type: **Small Culvert Obstruction**

Deficiency Description: Culvert more than 25% obstructed. One deficiency will be recorded for each culvert.

Inspection Limits: INDOT right-of-way excluding ramps
2.2.4 Deficiency Type: **Underdrain Obstruction**

Deficiency Description: More than 10% of outlets are closed and/or unsuitably marked. Rodent screens are missing or torn.

Inspection Limits: INDOT right-of-way excluding ramps.

Plugged underdrain, missing rodent screen

Missing rodent screen

Plugged underdrain
2.2.5 Deficiency Type: **Ditch Obstruction**

Deficiency Description: 50% or more of a ditch is filled with debris or there is standing water 1 inch in depth or greater that covers 6 feet or more.

Note: Cattails will not be recorded as a deficiency.
Inspection Limits: INDOT right-of-way excluding ramps.

![Debris obstructing 50% of ditch cross-section](image)

![Standing water](image)

![Good Ditch Line](image)
2.2.6 Deficiency Type: **Pavement Deterioration**

Deficiency Description: More than 25% of the roadway has unsealed cracks.
**Rigid Pavement** – 25% of transverse and longitudinal joint material does not appear to keep water out.

2.2.7 Deficiency Type: **Pavement Failure**

***Any of the following four criteria causes the pavement to be deficient.

Deficiency Description: **Pavement blow-up** exceeding 2 inches. One deficiency will be recorded for each blow-up.

**Pothole** – exceeding 1 inch in depth.
**Rigid Pavement Spalls** – defect exceeding 1 square foot in area and 1.5 inches deep

**Edge Raveling** – exceeds 50 feet in length.
2.2.8 Deficiency Type: **Bridge Category**

***Any of the following four criteria causes the Bridge to be deficient.

**Drains** – 1 plugged drain

**Expansion Joint** – rubber seal missing or pulled out to a vertical offset exceeding 1.5 inches
**Deck Patching** – 1 square foot of delaminated, spalled, or cracked deck patching

**Bearings** – sand or debris around bearing

### 2.2.9 Deficiency Type: **Guardrail**

***Any of the following three criteria causes the guardrail to be deficient.

**Guardrail** – More than one rail panel is damaged more than 75%

Crushed rail panel
Double sided rail: Two rail deficiencies

Note: Post deficiencies exist beyond the two damaged rail panels.

**Spacer Block** – rotting or missing block-out. Every 3 continuous block-outs.

**Posts** – two or more consecutive posts missing or rotten

Missing posts

Post rot exceeding 50% of cross-section
2.2.10 Deficiency Type: **Cable Barrier**

Deficiency Description: Cable sagging more than 1/3 of post height or more than one post knocked down.
2.2.11 Deficiency Type: **Crash Attenuator**

Deficiency Description: Crash attenuator is damaged or missing.
2.2.12 Deficiency Type: **Sign**

- Sign is damaged or faded (it cannot be clearly read).
- Sign is missing, excluding 3 button “no passing zone” indicator post.
- Sign is older than policy age (currently 18 years).

**Inspection Limit:** All INDOT signs excluding TODS, LOGO, utility marker, and ramp signs.

Multiple element sign: No deficiencies were recorded. A total of 5 multiple element signs were inspected. WEST 22 with the left turn arrow represents one of the multiple element signs. If all 5 of the multiple element signs were significantly faded or could not be clearly read then a deficiency would be recorded.
Sign significantly faded

Damaged sign

Missing sign

Sign older than policy age
2.2.13 Deficiency Type: **Pavement Marking**

Deficiency Description: Excess of 150 feet missing in the segment.

Pavement center line covered in excess of 150 linear feet

Pavement edge line covered in excess of 150 linear feet
2.2.14 Deficiency Type: **Special Marking**

Deficiency Description: A total of one half of all markings are missing 50% of the marking on main line or at signalized approaches, stop bars, or crosswalks.

More than 50% missing/faded

More than 50% missing/faded