

The pavement condition survey will be divided into two formats: the current NCDOT pavement condition survey manual and the LTPP pavement condition survey manual. In the following, brief descriptions of various distresses included in the two surveys are summarized.

### **NCDOT Pavement Condition Survey (Asphalt Pavement)**

(Note: Refer to the NCDOT Asphalt Pavement Survey Manual for the severity of each distress and other details.)

#### **Surface Distress**

| Focus Area       | Data Elements                         | Explanation   | Desire to Collect |
|------------------|---------------------------------------|---|-------------------|
| Surface Distress | Alligator Cracking (Fatigue Cracking) | Includes edge cracking. Report the percentage of the section exhibiting each of the four severity levels.                           |                   |
|                  | Transverse cracking                   | Includes block cracking and reflective cracking. Determine the overall rating of the section using severity and % of each severity. |                   |
|                  | Raveling                              | Only Bituminous Surface Treatment and slurry seals are rated for raveling. Determine the overall rating.                            |                   |
|                  | Oxidation                             | Only plant mix surfaces are rated for oxidation. Determine presence of oxidation.   |                   |
|                  | Bleeding                              | Determine % area of the section.  |                   |
|                  | Patching                              | Determine % area of the section.  |                   |

#### **Pavement Profile**

| Focus Area       | Data Elements            | Explanation   | Desire to Collect |
|------------------|--------------------------|---|-------------------|
| Pavement Profile | Ride Quality (Roughness) | Determine the overall rating from % of the section that is uneven and bumpy and difficulty of maintaining operating speed safely. |                   |
|                  | Rutting                  | Determine presence of rutting and depth to nearest ¼ inch.  |                   |

**Skid Characteristics**

| Focus Area      | Data Elements | Explanation   | Desire to Collect |
|-----------------|---------------|---|-------------------|
| Skid            | Texture       | Determine directly or from high speed profilometer. |                   |
| Characteristics | Friction      | Determine friction number.                          |                   |

## NCDOT Pavement Condition Survey (Concrete Pavement)

(Note: Refer to the NCDOT Concrete Pavement Survey Manual for the severity of each distress and other details.)

### Surface Distress (General)

| Focus Area                 | Data Elements      |   | Explanation                    | Desire to Collect |
|----------------------------|--------------------|---|--------------------------------|-------------------|
| Surface Distress (General) | Shoulder Condition | Paved Shoulder (Plant mix, slurry or BST) | Determine shoulder type.       |                   |
|                            |                    | Paved Shoulder (Concrete)                 |                                |                   |
|                            |                    | Unpaved Shoulder                          |                                |                   |
|                            |                    | Drop-off                                  | Presence of drop-off           |                   |
|                            |                    | Lane-Joint Seal (Asphalt)                 | Determine lane-joint seal type |                   |
|                            |                    | Lane-Joint Seal (Concrete)                |                                |                   |
|                            | Surface Wear       | Percent of area                           |                                |                   |
|                            | Pumping            | Number of joints or areas                 |                                |                   |

### Surface Distress (JCP)

| Focus Area                    | Data Elements         |   | Explanation                                | Desire to Collect |
|-------------------------------|-----------------------|---|--|-------------------|
| Surface Distress (JCP)        | Patches               | Asphalt                                 | Number of slabs patched                    |                   |
|                               |                       | Concrete                                |  |                   |
|                               | Longitudinal Cracking |   | Number of slabs with longitudinal cracking |                   |
|                               | Transverse Cracking   |   | Number of slabs with transverse cracks     |                   |
|                               | Corner Break          |   | Number of slabs with corner breaks         |                   |
|                               | Spalling              |   | Number of slabs with spalls                |                   |
|                               | Joint Seal Damage     |   | Number of joints with joint seal damage    |                   |
| Faulting of Transverse Joints |                       | Average of faulting (inches) in section |  |                   |

**Surface Distress (CRCP)**

| Focus Area              | Data Elements         |          | Explanation                              | Desire to Collect |
|-------------------------|-----------------------|----------|--|-------------------|
| Surface Distress (CRCP) | Patches               | Concrete | Number of concrete patches in section    |                   |
|                         |                       | Asphalt  | Number of asphalt patches in section     |                   |
|                         | Longitudinal Cracking |          | Length of longitudinal cracks in section |                   |
|                         | Transverse Cracking   |          | Number of transverse cracks in section   |                   |
|                         | Punchouts             |          | Number of punchouts in section           |                   |
|                         | Narrow Cracks         |          | Number of narrow cracks in section       |                   |
|                         | 'Y' Cracks            |          | Number of "Y" cracks in section          |                   |

**Pavement Profile (General)**

| Focus Area       | Data Elements | Explanation   | Desire to Collect |
|------------------|---------------|---|-------------------|
| Pavement Profile | Ride Quality  | Determine the overall rating from % of the section that is uneven and bumpy and difficulty of maintaining operating speed safely. |                   |

**Skid Characteristics (General)**

| Focus Area           | Data Elements | Explanation   | Desire to Collect |
|----------------------|---------------|---|-------------------|
| Skid Characteristics | Texture       | Determine directly or from high speed profilometer. |                   |
|                      | Friction      | Determine friction number.                          |                   |

## LTPP Pavement Condition Survey (Asphalt Pavement)

(Note: Refer to the LTPP Asphalt Pavement Survey Manual for the severity of each distress and other details.)

### Surface Distress

| Focus Area       | Data Elements                         | Explanation  | Desire to Collect |
|------------------|---------------------------------------|--|-------------------|
| Surface Distress | Alligator Cracking (Fatigue Cracking) | Record square feet of affected area at each severity level. If different severity levels existing within an area cannot be distinguished, rate the entire area at the highest severity present.  |                   |
|                  | Transverse Cracking                   | Record number and length of transverse cracks at each severity level. Rate the entire transverse crack at the highest severity level present for at least 10% of the total length of the crack. Length recorded is the total length of the crack and is assigned to the highest severity level present for at least 10% of the total length of the crack. Also record length in feet of transverse cracks with sealant in good condition at each severity level. |                   |
|                  | Raveling                              | Record square feet of attested surface area at each severity level.  |                   |
|                  | Bleeding                              | Record square feet of surface area at each severity level.   |                   |
|                  | Patching                              | Record number of patches and square feet of affected surface area at each severity level.  |                   |
|                  | Block Cracking                        | Record square feet of affected area at each severity level.  |                   |
|                  | Edge Cracking                         | Record length in feet of pavement edge affected at each severity level.  |                   |
|                  | Longitudinal Cracking                 | <p><b>Wheel path longitudinal cracking:</b> Record the length in feet of longitudinal cracking within the defined wheel paths at each severity level. Record the length in feet of longitudinal cracking with sealant in good condition at each severity level.</p>  |                   |

**Non-wheel path longitudinal cracking:** Record the length in feet of longitudinal cracking not located in the defined wheel path at each severity level. Record the

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|--|------------------------------|--|--|
|  |                              | length in feet of longitudinal cracking with sealant in good condition at each severity level.   |  |
|  | Reflection Cracking at Joint | <p><b>Transverse reflection cracking:</b> Record the number of transverse reflection cracks at each severity level. Record length in feet of transverse reflection cracks, assigned to the severity level of the crack. Record length in feet of transverse cracks with sealant in good condition at each severity level.</p> <p><b>Longitudinal reflection cracking:</b> Record length in feet of longitudinal reflection cracking at each severity level. Record the length in feet of longitudinal reflection cracking with sealant in good condition at each severity level.</p> |  |
|  | Potholes                     | Record number of potholes and square feet of affected area at each severity level.   |  |
|  | Shoving                      | Record number of occurrences and square feet of affected surface area.   |  |
|  | Polished Aggregate           | Record square feet of affected surface area.   |  |
|  | Lane-to-Shoulder Drop-off    | Record inches to the nearest 0.04 in., at intervals of 50ft along the lane-to shoulder joint. If the traveled surface is lower than the shoulder, record as a negative value.  |  |
|  | Water Bleeding and Pumping   | Record the number of occurrences of water bleeding and pumping and the length in feet of affected pavement.  |  |

### Pavement Profile

| Focus Area       | Data Elements | Explanation  | Desire to Collect |
|------------------|---------------|--|-------------------|
| Pavement Profile | Roughness     | Report the IRI value of the section.                                       |                   |
|                  | Rutting       | Record maximum rut depth in inches at 50-ft intervals for each wheel path. |                   |

## LTPP Pavement Condition Survey (Concrete Pavement)

(Note: Refer to the LTPP Concrete Pavement Survey Manual for the severity of each distress and other details.)

### Surface Distress (JCP)

| Focus Area             | Data Elements                  | Explanation  | Desire to Collect   |
|------------------------|--------------------------------|--|---|
| Surface Distress (JCP) | Drop-off                       | Measure at the longitudinal construction joint between the lane edge and the shoulder. Record to the nearest millimeter at 50 feet intervals along the lane-to-shoulder joint. If the traveled surface is lower than the shoulder, record as a negative value.   |   |
|                        | Patches                        | Record number of patches and square meters of affected surface area at each severity level, recorded separately by material type—rigid versus flexible. For slab replacement, rate each slab as a separate patch and continue to rate joints.  |   |
|                        | Longitudinal Cracking          | Record length in meters of longitudinal cracking at each severity level. Also record length in meters of longitudinal cracking with sealant in good condition at each severity level.  |   |
|                        | Transverse Cracking            | Record number and length of transverse cracks at each severity level. Length recorded, in meters, is the total length of the crack and is assigned to the highest severity level present for at least 10 percent of the total length of the crack. Also record the length, in meters, of transverse cracking at each severity level with sealant in good condition. The length recorded, in meters, is the total length of the well-sealed crack and is assigned to the severity level of the crack. Record only when the sealant is in good condition for at least 90 percent of the length of the crack. |   |
|                        | Corner Cracking (Corner Break) | Record number of corner breaks at each severity level.   |   |
|                        | Spalling                       | Longitudinal Joint   | Record length in meters of longitudinal joint affected at each severity level. Only record spalls that have a length of 0.328 feet or more. |

|                                  |                  |   |  |
|----------------------------------|------------------|---|--|
|                                  | Transverse Joint | Record number of affected transverse joints at each severity level. Rate the entire transverse joint at the highest severity level present for at least 10 percent of the total length of the spalling. Record length in meters of the spalled portion of the joint at the assigned severity level for the joint.   |  |
| Lane-Joint Seal Damage           | Transverse       | Indicate whether the transverse joints have been sealed (Yes-record number of sealed transverse joints at each severity level. No-apparent damage is considered to be low severity.)  |  |
|                                  | Longitudinal     | Record number of longitudinal joints that are sealed. Record total length of sealed longitudinal joints with joint seal damage as described in the manual.  |  |
| Joint Seal Damage                | Longitudinal     | Record number of longitudinal joints that are sealed. Record length of sealed longitudinal joints with joint seal damage as described in the manual. Individual occurrences are recorded only when at least 3.281 feet in length.   |  |
|                                  | Transverse       | Indicate whether the transverse joints have been sealed (yes or no). If yes, record number of sealed transverse joints at each severity level.  |  |
| Faulting of Transverse Joints    |                  | Record in millimeters, to the nearest millimeter: 0.984 feet and 2.461 feet from the outside slab edge (approximately the outer wheel path). For a widened lane, the wheel path location will be 2.461 feet from the outside lane edge stripe. At each location, three measurements are made, but only the approximate average of the readings is recorded. |  |
| Durability Cracking (D-Cracking) |                  | Record number of slabs with "D" cracking and square meters of area affected at each severity level. The slab and affected area severity rating is based on the highest severity level present for at least 10 percent of the area affected.   |  |
| Map Cracking                     |                  | Record the number of occurrences and the square meters of affected area.  |  |
| Scaling                          |                  | Record the number of occurrences and the square meters of affected area.  |  |
| Polished Aggregate               |                  | Record square meters of affected surface area.  |  |
| Blow up                          |                  | Record the number of blowups.   |  |
| Lane-to-Shoulder Separation      |                  | Record to the nearest millimeter at intervals of 50 feet along the lane-to-shoulder joint. Indicate whether the joint is well-sealed (yes or no) at each location.  |  |
| Transverse Construction          |                  | Record number of construction joints at each severity level.  |  |

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|--|-------------------------------|--|--|
|  | Joint Deterioration           |  |  |
|  | Surface Wear (Water Bleeding) | Record the number of occurrences of water bleeding and pumping and the length in meters of affected pavement with a minimum length of 3.28 feet. |  |
|  | Pumping                       | Record the number of occurrences of water bleeding and pumping and the length in meters of affected pavement with a minimum length of 3.28 feet. |  |

### Surface Distress (CRCP)

| Focus Area              | Data Elements                         | Explanation   | Desire to Collect |
|-------------------------|---------------------------------------|---|-------------------|
| Surface Distress (CRCP) | Drop-off                              | Measure at the longitudinal construction joint between the lane edge and the shoulder. Record to the nearest millimeter at 50 feet intervals along the lane-to-shoulder joint. If the traveled surface is lower than the shoulder, record as a negative value.  |                   |
|                         | Lane-Joint Seal Damage (Longitudinal) | Record number of longitudinal joints that are sealed. Record total length of sealed longitudinal joints with joint seal damage as described in the manual.  |                   |
|                         | Patches                               | Record number of patches and square meters of affected surface area at each severity level, recorded separately by material type—rigid versus flexible. Note: Panel replacement shall be rated as a patch. Any sawn joints shall be considered construction joints and rated separately.  |                   |
|                         | Longitudinal Cracking                 | Record length in meters of longitudinal cracking at each severity level. Also record length in meters of longitudinal cracking with sealant in good condition at each severity level.   |                   |
|                         | Transverse Cracking                   | Record separately the number and length in meters of transverse cracking at each severity level. The sum of all the individual crack lengths shall be recorded. Then record the total number of transverse cracks within the survey section.  |                   |
|                         | Punchouts                             | Record number of punchouts at each severity level. The cracks which outline the punchout are also recorded under “Longitudinal Cracking” (CRCP 2) and “Transverse Cracking” (CRCP 3). Punchouts that have been repaired by completely removing all broken pieces and replacing them with patching material (rigid or flexible) should be rated as a patch. If the boundaries of the punchout are visible, then also rate as a high severity punchout. |                   |
|                         | Durability Cracking (D-Cracking)      | Record number of slabs with “D” cracking and square meters of area affected at each severity level. The slab and affected area severity rating is based on the highest severity level present for at least 10 percent of the area affected.   |                   |
|                         | Map Cracking                          | Record the number of occurrences and the square meters of affected area.  |                   |

|  |   |  |  |
|--|---|--|--|
|  | Scaling                                     | Record the number of occurrences and the square meters of affected area.   |  |
|  | Polished Aggregate                          | Record square meters of affected surface area.   |  |
|  | Blow up                                     | Record the number of blowups.  |  |
|  | Lane-to-Shoulder Separation                 | Record to the nearest millimeter at intervals of 50 feet along the lane-to-shoulder joint. Indicate whether the joint is well-sealed (yes or no) at each location.   |  |
|  | Lane-to-Shoulder Drop Off                   | Measure at the longitudinal construction joint between the lane edge and the shoulder. Record in millimeters to the nearest millimeter at 50 feet intervals along the lane-to-shoulder joint. If the traveled surface is lower than the shoulder, record as a negative (-) value.                          |  |
|  | Transverse Construction Joint Deterioration | Record number of construction joints at each severity level.   |  |
|  | Spalling of Longitudinal Joint              | Record length in meters of longitudinal joint spalling at each severity level. Only record spalls having a length of 0.328 feet or more. Spalls that have been repaired by completely removing all broken pieces and replacing them with patching material (rigid or flexible) should be rated as a patch. |  |
|  | Surface Wear (Water Bleeding)               | Record the number of occurrences of water bleeding and pumping and the length in meters of affected pavement with a minimum length of 3.28 feet.   |  |
|  | Pumping                                     | Record the number of occurrences of water bleeding and pumping and the length in meters of affected pavement with a minimum length of 3.28 feet.   |  |

### Pavement Profile

| Focus Area       | Data Elements | Explanation                          | Desire to Collect |
|------------------|---------------|--------------------------------------|-------------------|
| Pavement Profile | Roughness     | Report the IRI value of the section. |                   |