

## **Administration and Inspection Activities for Concrete Pavement and Concrete Base**

(As Specified in OPSS 350 and SSP 350S02)

### **350.01 SCOPE**

This CAIS covers the construction administration and inspection requirements for Concrete Pavement and Concrete Base as specified in OPSS 350, July 2023 and SSP 350S02, October 2024.

### **350.02 REFERENCES**

This CAIS refers to the following standards, specifications, or publications:

#### **Ontario Provincial Standard Specifications, Construction:**

OPSS 350	Concrete Pavement and Concrete Base
OPSS 366	Repairing Concrete Pavement and Concrete Base
OPSS 369	Sealing or Resealing of Joints and Cracks in Concrete Pavement and Concrete Base
OPSS 904	Concrete Structures
OPSS 919	Formwork and Falsework
OPSS 929	Abrasive Blast Cleaning - Concrete Construction

#### **Ontario Provincial Standard Specifications, Materials:**

OPSS 1302	Water
OPSS 1306	Burlap
OPSS 1308	Joint Filler in Concrete
OPSS 1315	White Pigmented Curing Compounds for Concrete
OPSS 1350	Concrete - Materials and Production
OPSS 1440	Steel Reinforcement for Concrete
OPSS 1441	Load Transfer Assemblies
OPSS 1442	Epoxy Coated Steel Reinforcement for Concrete

#### **Construction Administration and Inspection Specifications (CAIS):**

CAIS 366	Repairing Concrete Pavement and Concrete Base
CAIS 369	Sealing and Resealing of Joints and Cracks in Concrete Pavement and Concrete Base
CAIS 904	Concrete Structures
CAIS 919	Formwork and Falsework
CAIS 929	Abrasive Blast Cleaning - Concrete Construction
CAIS 1302	Water
CAIS 1350	Concrete - Materials and Production
CAIS 1440	Steel Reinforcement for Concrete
CAIS 1442	Epoxy Coated Steel Reinforcement for Concrete

**MTO Forms:**

- PH-CC-433-A Concrete Mix Submission Form A
- PH-CC-885 Concrete Referee Testing Request Form

**350.03 DEFINITIONS**

For the purpose of this CAIS, the definitions shall be as specified in OPSS 350.

**350.04 DESIGN AND SUBMISSION REQUIREMENTS**

**350.04.01 Design Requirements**

**350.04.01.01 Concrete Mix Designs**

**350.04.02 Submission Requirements**

**350.04.02.01 Concrete Mix Design**

Administrative Activities:

1	M	Check that concrete mix design submissions are as specified in OPSS 1350. Additional administrative and inspection activities shall be according to CAIS 1350.	-
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**350.04.02.02 Curing Compound**

Administrative Activities:

1	M	Check that curing compound submissions are as specified in OPSS 904. Additional administrative and inspection activities shall be according to CAIS 904.	-
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**350.04.02.03 Temperature Control Plans**

**350.04.02.03.01 Cold Weather**

Administrative Activities:

1	M	Receive a temperature control plan at least 7 Days prior to concrete paving operations that required curing during cold weather..	-
2	M	Check and Review that the temperature control plan is as specified in OPSS 904. Additional administration and inspection activities shall be according to CAIS 904.	-

**350.04.02.03.02 Hot Weather**

Administrative Activities:

1	M	Receive a description of the methods to be used to control the temperatures of the concrete and underlying base at least 7 Days prior to placement of concrete subject to hot weather.	-
2	M	Check and Review that the submitted description covers all the materials and equipment required to control the temperature of concrete and underlying base within the specified temperature.	-

#### **350.04.02.04 Temperature Records**

Administrative Activities:

1	-	Check that the temperature records for concrete paving operations that require curing during cold weather is received and check that temperature records are as specified in OPSS 904. Additional administration and inspection activities shall be according to CAIS 904.	-
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#### **350.04.02.05 Effluent Management**

Administrative Activities:

1	-	At least 14 Days prior to commencement of the effluent producing work, receive a written agreement from the operator of the receiving site or property owner selected to accept the effluent.	-
2	-	At the completion of the work, receive a copy of a release signed by the same receiving site operator or property owner.	-
3	-	Receive a copy of the Contractor's Environmental Compliance Approval for a Waste Management System prior to the commencement of the effluent producing work.	-

### **350.05 MATERIALS**

#### **350.05.01 Bond Breaker**

Inspection Activities:

1	-	Check that the dowel bars and load transfer devices (when applicable) are coated with a bond breaker both by checking the tag on the dowel bar bundles and by visually checking the surface of the dowel bars and load transfer devices, except for dowel bars which are installed into existing concrete.	100%
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Administrative Activities:

1	-	Check that the bond breaker is as specified.	-
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**350.05.02 Burlap**

Inspection Activities:

1	-	Check that the burlap is as specified in OPSS 1306.	10%
2	-	Check that the burlaps have no tears or holes.	10%

**350.05.03 Concrete**

Administrative Activities:

1	-	Review the concrete mix design requirement as specified in OPSS 1350. Check that the maximum proportion by mass of the total cementing material for slag does not exceed 30%, as specified in OPSS 350.	-
2	-	Check that the concrete mix design has a specified 28-Day compressive strength of 35 MPa.	-
3	-	Check that concrete and concrete materials are as specified and CAIS 1350. Additional administrative and inspection activities shall be according to CAIS 1350.	-

**350.05.04 Curing Compound**

Administrative Activities:

1	-	Check that the curing compound is as specified in OPSS 1315.	-
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**350.05.05 Epoxy Adhesives**

Administrative Activities:

1	-	Check that the epoxy adhesive is of the type approved for horizontal dowel applications and mixed in the nozzle (cartridge).	-
2	-	Check that the epoxy adhesive is from the ministry's DSM list.	-

**350.05.06 Expansion Joint Filler**

Administrative Activities:

1	-	Check that the expansion joint filler is as specified in OPSS 1308.	-
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**350.05.07 Forms**

Administrative Activities:

1	-	Check that the forms are as specified in OPSS 919. Additional administrative and inspection activities shall be according to CAIS 919.	-
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**350.05.08 Moisture Vapour Barrier**

Administrative Activities:

1	-	Check that the moisture vapour barrier is as specified.	-
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**350.05.09 Proprietary Patching Materials**

Administrative Activities:

1	-	Check that the proprietary patching materials are suitable for the application and are from the Owner's list of proprietary patching materials (i.e., Ministry's List of Concrete Patching Materials).	-
2	-	Verify the suitability of the proprietary patching material with regional Quality Assurance Office.	-

**350.05.10 Tie Bars, Dowel Bars and Load Transfer Devices**

Administrative Activities:

1	-	Check that tie bars and dowel bars are as specified in OPSS 1440. Additional administrative and inspection activities shall be according to CAIS 1440.	-
2	-	Check that tie bars and dowel bars are epoxy coated as specified in OPSS 1442. Additional administrative and inspection activities shall be according to CAIS 1442.	-
3	-	Check that load transfer devices are as specified in OPSS 1441 and the Contract Documents.	-

**350.05.11 Water**

Administrative Activities:

1	-	Check that the water is as specified in OPSS 1302. Additional administrative and inspection activities shall be according to CAIS 1302.	-
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**350.06 EQUIPMENT**

**350.06.01 Air Compressor**

Inspection Activities:

1	-	Check that the air compressor is as specified.	10%
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**350.06.02 Batching Plant and Delivery Equipment**

Inspection Activities:

1	-	Check that the delivery equipment is as specified in OPSS 1350. Additional administrative and inspection activities shall be according to CAIS 1350.	10%
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Administrative Activities:

1	-	Check that the batching plant is as specified in OPSS 1350. Additional administrative and inspection activities shall be according to CAIS 1350.	-
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**350.06.03 Diamond Grinder**

Inspection Activities:

1	-	When a diamond grinder is used, check that the diamond grinder is as specified.	10%
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**350.06.04 Effluent Collection Systems**

Inspection Activities:

1	-	Check that the effluent collection systems are as specified.	10%
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**350.06.05 Gang Drill**

Inspection Activities:

1	-	Check that the gang drill is as specified.	10%
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**350.06.06 Grooving Machines**

Inspection Activities:

1	-	Check that the grooving machine is as specified.	10%
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**350.06.07 Hand Finishing Equipment**

Inspection Activities:

1	-	Check that the hand finishing equipment are as specified.	10%
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**350.06.08 Sawcutting Equipment**

Inspection Activities:

1	-	Check that the saw cutting equipment is as specified.	10%
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**350.06.09 Slip-Form Paving Equipment with Automatic Dowel Bar Inserter (DBI)**

Inspection Activities:

1	-	When an automatic dowel bar inserter is used, check that slip-form paving equipment is as specified.	10%
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**350.06.10 Straight Edge**

Inspection Activities:

1	-	Check that the straight edge is as specified.	10%
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**350.06.11 Thermocouples and Dataloggers**

Inspection Activities:

1	-	Check that the thermocouples and associated instrumentation are as specified.	10%
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**350.07 CONSTRUCTION**

**350.07.01 General**

Inspection Activities:

1	-	Check that concrete pavement and concrete base are constructed true to grade, cross-section and to the dimensions specified in the Contract Documents at a minimum of 3 random locations per subplot.	100%
2	-	Check that the concrete pavement or concrete base are protected from damage to the surface.	100%
3	-	Check that traffic, other than foot traffic and rubber-tired sawing equipment, is not permitted on the concrete until it has attained a compressive strength of 20 MPa.	100%
4	-	Check that construction of shoulders is as specified in the Contract Documents.	100%

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Administrative Activities:

1	-	Seven Days prior to the commencement of the concrete paving operation, Check that the intent to place concrete pavement in writing is received.	-
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**350.07.02 Production of Concrete**

Inspection Activities:

1	-	Check that production of concrete is as specified in General, Temperature Control, Mixing Time and Mixing Rate, and Delivery subsections of OPSS 1350. Additional administrative and inspection activities shall be according to CAIS 1350.	100%
2	-	Check that when concrete is delivered by means of non-agitating equipment, discharge is completed within 30 minutes after introduction of water to the cement and aggregates.	100%

**350.07.03 Placing of Concrete**

**350.07.03.01 General**

Inspection Activities:

1	-	Check that immediately ahead of concrete placing operations, the underlying materials is wetted by means of a uniform spray of water sufficient to wet the underlying materials thoroughly without leaving standing water.	100%
2	-	Check that concrete is transported, placed, and consolidated as specified.	100%
3	-	Record the time and location of interruptions in placing concrete greater than 20 minutes and measures taken for protecting the concrete.	100%

Administrative Activities:

1	-	When there is an interruption in placing concrete greater than 20 minutes, Check that an immediate notification from the Contractor and a proposal for remedial action is received. Notify the Contractor if the proposal is approved.	-
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**350.07.03.02 Concrete Placing Restrictions**

Inspection Activities:

1	-	Check that no concrete is placed until all curing material and, in cold weather, all cold weather protection material, has been delivered to the site.	100%
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2	-	Check that concrete work does not proceed when there is a restriction as specified.	100%
3	-	Check that the temperature of the underlying materials and the forms (if used) are as specified.	25%

#### **350.07.04 Consolidation**

Inspection Activities:

1	-	Check that for slip-form pavers, the concrete is consolidated as specified.	25%
2	-	Check that for fixed-form placement, the concrete is consolidated as specified.	25%

#### **350.07.05 Finishing**

Inspection Activities:

1	-	Check that finishing is as specified.	100%
2	-	Check that no water or other materials are applied to the concrete surface or the finishing tools to aid in the finishing.	100%

#### **350.07.06 Initial Texturing of Concrete Pavement or Concrete Base Surface**

Inspection Activities:

1	-	Check that immediately after finishing and before the application of curing, the plastic surface of the concrete receives an initial texturing .	100%
2	-	Check that the burlap condition is as specified.	50%
3	-	Check that the initial texturing is created in the longitudinal direction and is uniform, as specified.	100%
4	-	Check that water is not added to the concrete surface.	100%

#### **350.07.07 Curing**

Inspection Activities:

1	-	For slip-form placement, check that curing is applied immediately after initial texturing of the concrete surface and within 15 minutes of concrete being formed by the paver.  For slip-form placement, Record time between concrete being formed by the paver and application of curing compound a minimum of 10 times per Day's placement.	100%
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2	-	For fixed-form placement, check that curing is applied immediately after initial texturing of the concrete surface.	100%
		For fixed-form placement, Record time between concrete receiving initial texture and application of curing compound a minimum of 5 times per Day's placement.	
3	-	Check that the curing period is appropriate for the weather and type of curing applied as specified.	100%
4	-	Check that the curing method is used as specified and according to the applicable clause in OPSS 904. Additional administrative and inspection activities shall be according to CAIS 904.	100%
5	-	When curing compound is used, check that it is not applied to joint faces against which joint sealing compound will be placed or to concrete surfaces to which concrete or mortar is to be bonded as specified.	100%
6	-	Check that curing compound used on the surface of a concrete base is removed completely prior to the application of tack coat and overlaying with asphalt pavement by means of abrasive blasting as specified in OPSS 929 and it does not result in any damage to the concrete surface. Additional administrative and inspection activities shall be according to CAIS 929.	100%
7	-	Check that the removal process of curing compound meets all environmental constraints as specified in the Contract Documents.	100%

### 350.07.08 Cold Weather Protection

#### 350.07.08.01 General

Inspection Activities:

1	-	Check that during cold weather, the temperature of the concrete is monitored and controlled for a minimum period of 7 Days and the monitoring is commenced at the start of the concrete placing operation as specified.	100%
2	-	Check that the concrete temperature does not fall below 15 °C for the first 3 Days of curing and then 10 °C for the following 4 Days.	100%
3	-	Check that for cold weather conditions, concrete is protected according to the Concrete Subject to Cold Weather clause in OPSS 904.. Additional administration and inspection activities shall be according to CAIS 904.	100%
4	-	Check that the cold weather condition is monitored, and the protection system is modified as required.	100%

5	-	If the cold weather protection is removed for sawcutting of joints, check that no concrete is left unprotected or exposed for more than the specified limits.	100%
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### 350.07.08.02 Monitoring and Control of Temperature

Inspection Activities:

1	-	During cold weather, for each Day's placement of concrete, select a minimum of four locations near the concrete surface, equally distributed throughout the placed concrete, for thermocouple or sensors to be installed.	100%
2	-	Check that the thermocouples were installed as specified.	100%
3	-	Check at least one additional thermocouple or sensor is installed to measure ambient air temperature above the surface of the concrete and outside of the specified cold weather protection.	100%
	-	Check the number of installed thermocouple or sensor and the monitoring started as specified.	100%
5	-	Verify the temperature readings at random intervals.	25%

### 350.07.08.03 Submission of Temperature Records

Administrative Activities:

1	-	At the end of each Day during the temperature monitoring period, the datalogger temperature records and a record of any actions taken to maintain control of temperature is received.	-
2	-	At the end of the temperature monitoring period, check that the complete temperature record for all thermocouples or sensors is received.	-
3	-	Review the records if they met the requirements of temperature during the temperature monitoring period. The regional Quality Assurance Office can be contacted for assistance interpreting the data.	-

### 350.07.09 Joints

#### 350.07.09.01 General

Inspection Activities:

1	-	Check that joints are of the type and at the locations specified in the Contract Documents.	100%
2	-	Check that tie bars are used for longitudinal joints and dowel bars are used for transverse joints, according to the Contract Documents.	100%
3	-	Check that the transverse joint in new pavement is located at the same locations and continuous with transverse joints in the existing adjacent pavements.	100%

**350.07.09.02 Longitudinal and Transverse Joints**

Inspection Activities:

1	-	Check that reservoir cut is not done and backer rod is not used for the joints.	25%
2	-	For concrete pavement, check that the dimensions of the longitudinal and transverse joints are full depth joint filling without reservoir cut as specified	25%
3	-	For concrete base, check that the dimension of the joint is as specified in the Contract Documents.	25%

**350.07.09.03 Construction Joints**

Inspection Activities:

1	-	Check that transverse construction joints are constructed at the end of each Day's production or when an interruption greater than 20 minutes occurs in the concrete paving operation.	100%
2	-	Check that the construction joints is located at a transverse joint or an expansion joint location.	100%

**350.07.09.04 Tie Bars and Dowel Bars****350.07.09.04.01 General**

Inspection Activities:

1	-	Prior to placement of concrete or the installation of tie bars or dowel bars, check that if any bars are loose, broken, cracked or damaged.	100%
2	-	Check that all loose, broken, cracked or damaged bars are removed and replaced as specified.	100%

**350.07.09.04.02 Protection of Tie Bars and Dowel Bars**

Inspection Activities:

1	-	Check if the tie bars and dowel bars are stored and protected as specified.	100%
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**350.07.09.04.03 Repair of Tie Bars and Dowel Bars**

Inspection Activities:

1	-	Check that tie bars are repaired or replaced as specified	100%
2	-	Check that the repairs to damaged epoxy coating are completed as specified and OPSS 1442.	100%

		Additional administration and inspection activities shall be according to CAIS 1442.	
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#### **350.07.09.04.04 Installation of Tie Bars in Plastic Concrete**

Inspection Activities:

1	-	Check that tie bars at longitudinal joints are installed according to the Contract Documents.	100%
2	-	Check that tie bars are not manually inserted into the plastic concrete.	100%
3	-	Check that the tie bars are installed within the tolerance of $\pm 15$ from the specified depth and are not placed within 600 mm of a transverse joint.	100%

#### **350.07.09.04.05 Installation of Dowel Bars in Plastic Concrete**

Inspection Activities:

1	-	Check that dowel bars at transverse joints are installed according to the Contract Documents.	100%
2	-	Record the locations where the dowel bars were installed using a DBI or by means of load transfer devices for calculating the lot size.	100%
3	-	When load transfer devices are used, verify that: <ul style="list-style-type: none"> <li>• they are placed securely using stakes as specified</li> <li>• they are placed a minimum of 100 m in advance of the concrete placing operations</li> <li>• the spacer wire is cut as specified</li> </ul>	100%
4	-	Check that the dowel bars are installed within the tolerance specified.	100%
5	-	Check that the location of the centre of the dowel bars are precisely marked to permit joint forming or cutting operations directly over the centre of the dowel bars.	100%

#### **350.07.09.04.06 Installation of Tie Bars and Dowel Bars in Hardened Concrete**

Inspection Activities:

1	-	Check that tie bars and dowel bars are installed in hardened concrete at the locations and within the tolerances specified in Clauses Installation of Tie Bars in Plastic Concrete and Installation of Dowel Bars in Plastic Concrete.	25%
2	-	Check that tie bars and dowel bars are installed in hardened concrete by drilling holes using a gang drill as specified.	25%
3	-	Check that for concrete that is less than seven Days of age, prior to drilling, cylinders are prepared as specified to demonstrate that the concrete has reached a minimum compressive strength of 20 MPa.	25%

4	-	Check that the drill holes meet the diameter and dimension tolerance, and are cleaned as specified prior to tie bar or dowel bar installation.	25%
5	-	Check that epoxy adhesive is injected into the back of the cleaned holes and the tie or the dowel bar are installed with grout retention disks attached and encased with epoxy adhesive for the full depth of the hole as specified.	25%
6	-	After curing of the epoxy adhesive, pull a minimum of 10 bars to ensure proper application of epoxy adhesive.	25%
7	-	Check that holes that have been started but not completed are cleaned and filled with a proprietary patching material from the Owner's list of acceptable concrete patching materials.	100%
8	--	Check that bond breaker is applied to the free end of dowel bars and the exposed vertical concrete face along the transverse joint immediately before placing concrete.	100%

### 350.07.09.05 Sawcutting, Cleaning and Sealing of Joints in Concrete Pavement

Inspection Activities:

1	-	Check that sawcutting, dimensions, cleaning, and sealing of joint operations are carried out as specified in OPSS 350, Contract Documents and OPSS 369. Additional administration and inspection activities shall be according to CAIS 369.	25%
2	-	Receive a 4-litre sample of the hot poured rubberized joint sealing compound from the heating and mixing kettle at the beginning, middle and the end of the process of joint sealing compound installation for each calendar year for testing by the Owner, and delivered to the designated laboratory.	100%
3	-	Notify the Contractor if more frequent hot poured rubberized joint sealing sampling is required.	-

Administrative Activities:

1	-	Check that a proposal for temporarily sealing joints (if applicable) is received. Review the proposal and notify the Contractor of acceptance or rejection of the proposal.	-
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### 350.07.09.06 Sawcutting and Cleaning of Joints in Concrete Base

Inspection Activities:

1	-	Check that sawcutting, dimensions, and cleaning of joint operations are carried out as specified in OPSS 350, Contract Documents, and OPSS 369. Additional administration and inspection activities shall be according to CAIS 369.	25%
2	-	Check that concrete base joints are not sealed.	100%

**350.07.10 Optional Diamond Grinding to Improve Surface Tolerance and Smoothness**

Inspection Activities:

1	-	Check that the optional diamond grinding proceeds according to the submitted proposal only after the written permission is received.	100%
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Administrative Activities:

1	-	When optional diamond grinding is selected by the Contractor, check that a written proposal is received at least 5 business days prior to commencing the diamond grinding.	-
2	-	Review the proposal according to Repairs subsection and check that the sublots, stations limits, and the length of each location are listed.	-
3	-	Issue a Permission to Proceed in writing if the proposal meets the requirements as specified.	-

**350.07.11 Final Texturing of Concrete Pavement Surface**

**350.07.11.01 Trial Section**

Inspection Activities:

1	-	Select the location of a 500 metre single lane trial section.	100%
2	M	For the trial section, check that the final texturing meets the requirements as specified at a minimum of 10 random locations and any areas of concern.	100%
3	M	If the trial section does not meet the requirements, select another trial section and check the final texturing until the requirements is met.	100%

Administrative Activities:

1	-	Issue Permission to Proceed with the grooving texture on the Contract when it has been demonstrated that the trial section meets the requirements as specified.	-
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**350.07.11.02 Final Texturing of Concrete Pavement**

Inspection Activities:

1	-	Check that concrete pavement receives a final texturing by longitudinal grooving as specified. Check that concrete base does not receive final texturing.	100%
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2	-	Check that final texturing is done after the curing period and, if applicable, after completion of the cold weather protection period. Check that prior to final texturing, all concrete repairs are completed according to the Contract Documents.	100%
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Administrative Activities:

1	-	Receive written notification from the Contractor if any of the defects or conditions listed in Clause Acceptance of Concrete Surface Texturing are present in the work. The notification shall include the extent of the defects and an explanation of the cause.	-
2	-	Receive a proposal for the remedial work for any defects and conditions listed in Clause Acceptance of Concrete Surface Texture.	-
3	-	Review and notify the Contractor for acceptance or rejection of the proposal.	-

**350.07.12 Surface Tolerance**

Inspection Activities:

1	-	Check that the surface of concrete meets the surface tolerance requirement as specified.	25%
2	-	If required, check that diamond grinding is carried out as specified in Clause Surface Tolerance and Surface Smoothness Deficiencies Clause to ensure that concrete surface meets the surface tolerance requirements as specified.	25%
3	-	Check the surface of the concrete is join flush with adjacent concrete pavement or concrete base.	25%

**350.07.13 Material Sampling and Testing**

Inspection Activities:

1	-	Check that the sampling requirements for aggregates are carried out as specified in OPSS 1350.	10%
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**350.07.13.01 Sampling of Water, Admixtures, Limestone Filler and Cementing Materials**

Inspection Activities:

1	-	Check that sampling of water, admixtures, limestone filler (if applicable) and cementing materials are carried out as specified in OPSS 1350. Additional administration activities shall be according to CAIS 1350.	10%
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**350.07.13.02 Sampling and Testing of Plastic Concrete**

Inspection Activities:

1	-	Check that sampling, testing, acceptance, adjustments, visual acceptance, and submission of results for plastic concrete are as specified in OPSS 1350, with the exception that after satisfactory control has been established, testing shall be carried out on one load of concrete in every five loads, randomly selected. Additional inspection activities shall be according to CAIS 1350.	100%
2	-	Check that satisfactory control of plastic concrete is established each day as specified.	100%

**350.07.13.03            Sampling for Acceptance Testing of Thickness, 28-Day Compressive Strength, Air Void System Parameters, Rapid Chloride Permeability and Acceptance of Joint Sealing**

**350.07.13.03.01        General**

Inspection Activities:

1	-	Check that lot and subplot size and number of cores per subplot are as specified.	100%
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Administrative Activities:

1	-	After sealing operations are completed, check with the regional Quality Assurance Office whether additional coring, up to 2 cores per subplot, at joint locations is required to evaluate the acceptability of the joint cleaning and sealing.	-
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**350.07.13.03.02        Coring**

Inspection Activities:

1	-	Select 2 random adjacent panels for coring within each subplot and Witness core samples being obtained for acceptance testing as specified.	100%
2	-	When the concrete is 7 to 10 Days, select a random location from within the subplot for removal of 5 core samples from the concrete pavement or concrete base for acceptance testing of 28-Day compressive strength, air void system parameters and rapid chloride permeability. Witness that the 3 cores for acceptance testing of 28-Day compressive strength are removed from a single panel of concrete pavement or concrete base at the random location.  Witness that the cores for air void system parameters and rapid chloride permeability are taken from a panel of concrete pavement or concrete base adjacent to the panel from which the cores for compressive strength testing were taken.	100%

3	-	After completion of any repairs and final texturing, select another random location from within each subplot for removal of a single core for measurement of thickness.	100%
4	-	When requested by the Owner, select up to 2 core locations per subplot, at joint locations to evaluate the acceptability of the joint cleaning and sealing. Additional inspection activities shall be according to CAIS 369.	100%
5	-	Check that cores are marked, bagged and tagged as specified.	100%
6	-	Upon removal of the core samples, immediately take possession of the cores and deliver them to the designated laboratory for testing.	100%
7	-	Check that core holes are filled as specified in OPSS 1350.	100%

**350.07.14 Preparation for Measurement of Position and Alignment of Dowel Bars**

**350.07.14.01 Joint Cut-Out Procedure**

Inspection Activities:

1	-	Select the transverse joint to be evaluated and check that the joint cut-out is carried out by the Contractor as specified. Confirm the measurement of dowel position and alignment using the magnetic pulse induction (MPI) device is completed for the joint before the joint cut-out operations.	100%
2	M	Measure and evaluate the position and alignment of the dowel bars at the joint as specified.	100%
3	-	After the selected joint has been measured and evaluated, Check that the joint is removed and replaced with a full depth concrete repair, 2 m in length, as specified in OPSS 366.. Additional administrative and inspection activities shall be according to CAIS 366.	100%
4	-	Within the full depth concrete repair area, measure and record the depth of the exposed tie bars.	100%

**350.07.14.02****Preparation for Measurement of Position and Alignment of Dowel Bars**

Inspection Activities:

1	-	Check that the lot size, measurement and acceptance of position and alignment of dowel bars using MPI device are as specified.	100%
2	-	Check that the area to be measured are free of loose stone, debris and obstructions.	100%
3	-	After the measurements by the MPI device are completed and prior to the commencement of any corrective work, Check that all areas to be repaired are marked on the concrete surface.	100%

Administrative Activities:

1	-	Check that a written notification is received from the Contractor when the concrete pavement or concrete base is ready for measurement of position and alignment of dowel bars.	-
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**350.07.15****Preparation for Surface Smoothness Measurement**

Inspection Activities:

1	M	Check that areas to be measured are clearly marked out as specified as specified.	100%
2	-	If reflectors are used for measurements, Check that requirements as specified.	50%
3	-	When necessary, check that traffic protection during measurement is in accordance with MTO OTM Book 7.	100%
4	M	Review the measurement result and identify and direct the Contractor to mark the areas to be repaired due to rejectable sublots or incidents of localized roughness or both prior to the commencement of any corrective work.	100%

Administrative Activities:

1	-	Check that a written notification is received from the Contractor when the concrete pavement or concrete base is ready for surface smoothness acceptance testing.	-
2	-	Check that final texturing has been completed prior to surface smoothness acceptance test.	-

**350.07.16 Repairs**

**350.07.16.01 Surface Tolerance and Surface Smoothness Deficiencies**

Inspection Activities:

1	-	When Owner’s acceptance testing of surface smoothness and surface tolerance indicates that there are deficiencies, check that diamond grinding is used as the corrective method.	100%
2	-	Check that diamond grinding is performed as specified .	100%
3	-	Check that all the repaired sublots are identified in the Contractor’s proposal.	100%
4	-	When repaired areas do not meet the specified texturing requirement, verify that re-texturing is performed as specified.	100%

Administrative Activities:

1	-	When diamond grinding repair is required, Receive and Review a written repair proposal at least 5 Business Days prior to the start of repairs as specified.	-
2	M	Issue the permission to proceed if the repair proposal is as specified	-

**350.07.16.02 Crack Repairs**

Inspection Activities:

1	-	When approved by the Owner, check the remedial works is completed according to the proposal.	100%
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Administrative Activities:

1	-	When cracks are found in the concrete pavement or concrete base, check that a proposal for remedial works is received.	-
2	-	Review the proposal for remedial works which shall include the location of the crack(s), their length(s) and depth(s) and any relevant information. Notify and provide the submitted documentation to the Quality Assurance Office (QAO).	-
3	-	Notify the Contractor for acceptance or rejection of the proposal. No repair work is proceeded until approval.	-

**350.07.17 Management of Effluent**

**350.07.17.01 General**

Inspection Activities:

1	-	Check that effluent are captured and managed according to the Contract Documents.	100%
2	-	Check that the Contractor's Environmental Compliance Approval (ECA) for a Waste Management System and the receiver's ECA for a Waste Disposal Site are valid for the items specified.	-

Administrative Activities:

1	-	Check that the carrier has one of the certificates of approvals as specified.	-
2	-	Receive a notification a minimum of 2 weeks prior to the first shipment and a minimum of 24 hours' notice prior to each subsequent shipment requiring the manifest.	-
3	-	Receive and Complete a Regulation 347 Form 1 manifest for "Part A"	-

**350.07.17.02 Environmental Compliance Approval**

Administrative Activities:

1	-	Check that Contractor's ECA for a waste management system and the receiver's ECA for a waste disposal site are valid as specified.	-
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**350.07.18 Management of Excess Material**

Inspection Activities:

1	-	Check that the excess material is managed as specified.	100%
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**350.08 QUALITY ASSURANCE**

**350.08.01 Acceptance of Concrete Pavement and Concrete Base**

Inspection Activities:

1	-	Check that if any concrete pavement or concrete base are unacceptable or rejectable.	100%
2	-	Notify the Contractor for the unacceptable or rejectable works.	100%
1	-	Check that unacceptable lots and sublots are removed and replaced as specified.	100%

Administrative Activities:

1	-	Check that the concrete pavement and concrete base are acceptable as specified.	-
2	-	Contact Regional Quality Assurance Office for any specialized testing.	-
3	-	Check that the pavement or concrete base that has been replaced are evaluated for acceptance on the same basis as the original lots and sublots.	-

**350.08.02 Field Inspection**

Inspection Activities:

1	M	Check the work during production and reject all or a portion of the work based on the presence of one or more of the defects specified.	100%
2	-	After sealing operations are complete, check any cores taken at joint locations to evaluate the acceptability of the joint cleaning and sealing. Document the location of the cores, the visual examination and prepare a report that includes photographs of the cores.	100%

**350.08.03 Acceptance of 28-Day Compressive Strength, Air Void System Parameters, Rapid Chloride Permeability and Thickness**

**350.08.03.01 General**

Inspection Activities:

1	-	<p>Check that acceptance of 28-Day compressive strength, air void system parameters, rapid chloride permeability and thickness are based on cores removed from hardened concrete.</p> <ul style="list-style-type: none"> <li>• Acceptance of 28-Day compressive strength and thickness is on a lot basis.</li> <li>• Acceptance of air void system parameters and rapid chloride permeability is on a subplot basis.</li> </ul>	-
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**350.08.03.02 Lot Size**

Inspection Activities:

1	-	Check that a total of 6 cores are removed from each subplot.	100%
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Administrative Activities:

1	-	Determine the lot and subplot size as specified.	-
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**350.08.03.03 Acceptance Testing**

**350.08.03.03.01 28-Day Compressive Strength Testing**

Administrative Activities:

1	-	Check that the 28-Day compressive strength is performed according to LS-410, with the exception that determination of concrete pavement thickness is not required.	-
2	-	Determine the 28-Day compressive strength of a subplot by taking the average of the set of three cores for the subplot, rounded to one decimal place.	-

**350.08.03.03.02 Air Void System in Hardened Concrete**

Administrative Activities:

1	-	Check that one half of one core representing the subplot is tested for air void system parameters according to LS-432 and the other half is retained for audit purposes by the owner.	-
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**350.08.03.03.03 Rapid Chloride Permeability**

Administrative Activities:

1	-	Check that the rapid chloride permeability test is performed according to LS-433 and the test is performed when the concrete is 28 to 32 Days of age.	-
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**350.08.03.03.04 Thickness Testing**

Administrative Activities:

1	-	Check that the concrete pavement or concrete base thickness for each subplot is determined according to LS-450.	-
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**350.08.03.04 Basis of Acceptance**

**350.08.03.04.01 28-Day Compressive Strength**

Administrative Activities:

1	-	Review and check that all Quality Assurance results for 28-Day compressive strength meet the requirements as specified.	-
2	-	Determine acceptance and rejection and price adjustment (if applicable) of the subplot as specified.	-

**350.08.03.04.02 Air Void System in Hardened Concrete**

Administrative Activities:

1	-	Review and Check that all Quality Assurance results for hardened air content and spacing factor meet the requirements as specified.	-
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2	-	Determine acceptance and rejection and price adjustment (if applicable) of the subplot as specified.	-
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**350.08.03.04.03 Rapid Chloride Permeability**

Administrative Activities:

1	-	Review and Check that all Quality Assurance results for rapid chloride permeability meet the requirements as specified.	-
2	-	Determine acceptance and rejection and price adjustment (if applicable) of the subplot as specified.	-

**350.08.03.04.04 Thickness**

Administrative Activities:

1	-	Review and Check that all Quality Assurance results for thickness meet the requirements as specified.	-
2	-	Determine acceptance and rejection and price adjustment (if applicable) of the lot as specified.	-

**350.08.03.05 Referee Testing**

**350.08.03.05.01 General**

Administrative Activities:

1	-	Check that referee testing for a subplot is invoked by the Contractor within 3 Business Days of receiving the test results.	-
2	-	Review the Contractor's request to invoke Referee Testing (including the original test results to verify they do not meet the specified Quality Assurance acceptance requirements).	-
3	-	Complete the Referee Request Form (PH-CC-885) and submit it to the appropriate Quality Assurance Officer (QAO).	-
4	-	Notify the Referee laboratory that they have been selected as the Referee laboratory and let them know the quantity of samples and type of testing required.	-
5	-	If the laboratory cannot complete Referee Testing in a reasonable timeframe, inform the QAO, who will provide another referee laboratory from the EMO referee roster.	-
6	-	Submit a copy of the completed Referee Request Form provided by EMO to the referee laboratory by email.	-
7	-	For referee testing of air void system parameters or thickness, Contact the Area Quality Assurance laboratory and notify them to ship the referee samples immediately to the referee laboratory.	-

8	-	Track the delivery of the samples to ensure they arrive at the referee laboratory.	-
9	-	If cores are required for referee testing, coordinate the core removal and determine the locations for core removal and notify the Contractor.	-
10	-	Once the schedule for referee testing has been finalized, provide the Contractor and QAO with the details of the referee laboratory, dates and times at least 3 Business Days in advance of the date and time of Referee Testing.	-
11	-	Confirm that the Contractor will be witnessing the Referee Test (maximum of 2 people). Note that if the date provided by the referee laboratory meets the minimum of 3 Business Days prior to the intended date of performing the test. The date is non-negotiable by the Contractor unless a change is formally requested by the MTO.	-
12	-	Once testing is complete, Receive and Review the test results from the Referee Laboratory.	-
13	-	Request clarification from the Referee Laboratory if required, otherwise, Submit the results to the Contractor. Also Submit the Referee results together with a cover letter to the applicable QAO.	-
14	-	Forward the referee test results to the Contractor as they become available.	-

#### **350.08.03.05.02 28-Day Compressive Strength**

Administrative Activities:

1	-	Within 24 hours of the Contractor invoking referee testing, witness that a new set of three cores are removed by the Contractor.	-
2	-	Check that cores for referee testing for each disputed subplot are taken at a location no more than 1 m from the location that each of the disputed acceptance cores were removed from.	-
3	-	Check that the core size and core extraction are as specified.	-
4	-	Check that the core holes are filled as specified in OPSS 1350.	-
5	-	Determine and whether referee result confirms the test acceptance test result or not. Revise the payment adjustment calculations as specified (if applicable).	-

#### **350.08.03.05.03 Air Void System in Hardened Concrete**

Administrative Activities:

1	-	Check that the referee testing for air voids is carried out on the same half of the core sample that was tested for acceptance.	-
2	-	Discard the acceptance test result and replace it with the referee test result. Determine acceptance and rejection as specified.	-

**350.08.03.05.04 Rapid Chloride Permeability**

Inspection Activities:

1	-	Within 24 hours of invoking the referee testing, Check that a new core is removed by the Contractor.	-
2	-	Check that cores for referee testing for each disputed subplot are taken at a location no more than 1 m from the location that each of the disputed acceptance cores were removed from.	-
3	-	Check that the core size and core extraction are as specified.	-
4	-	Check that the core holes are filled as specified in OPSS 1350. Additional administrative and inspection activities shall be according to CAIS 1350.	-
5	-	Determine acceptance and rejection as specified and whether referee result confirms the test acceptance test result or not.	-

**350.08.03.05.05 Thickness**

Administration Activities:

1	-	Check that referee testing of thickness for a subplot is done on the same core that was used for acceptance testing of thickness.	-
2	-	Determine acceptance and rejection as specified and whether referee result confirms the test acceptance test result or not.	-

**350.08.04 Acceptance of Position and Alignment of Dowel Bars**

**350.08.04.01 General**

Administrative Activities:

1	-	Check that a written notification that the pavement or concrete base is ready for acceptance testing is received and reviewed.	-
2	-	Check that the pavement or base is free of loose stone, debris, and obstructions.	-
3	-	Arrange for acceptance testing after the above two activities are completed and Provide the Contractor with a 48 hours' notice of when the dowel position and alignment measurements will begin.	-

**350.08.04.02 Lot Size**

Administrative Activities:

1	-	Determine the lot and subplot size as specified.	-
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**350.08.04.03 Measurement and Acceptance**

Administrative Activities:

1	-	Upon receiving the Contractor's written notice that the concrete pavement or concrete base is ready for measurements by the Owner for position and alignment of dowel bars, coordinate with the Owner to retain the services of a testing service provider, to measure the position and alignment of dowel bars according to the Contract Documents.	-
2	-	Calculate the Percent Within Limits for the criteria of dowel bar position and alignment and the payment factor.	-
3	-	Check that the dowel bar position and alignment for the lot is acceptable as specified.	-
4	-	Check that all areas to be repaired, after the measurements by the MPI device, are marked on the concrete surface prior to the commencement of any corrective work.	-

**350.08.04.04 Referee Testing**

**350.08.04.04.01 General**

Administrative Activities:

1	-	Check that referee testing for a subplot is invoked by the Contractor within 3 Business Days of receiving the test results.	-
2	-	Review the Contractor's request to invoke Referee Testing (including the original test results to verify they do not meet the specified Quality Assurance acceptance requirements).	-
3	-	Complete the Referee Request Form (PH-CC-885) and Submit to the appropriate Quality Assurance Officer (QAO).	-
4	-	Coordinate with the Owner to retain the services of a testing service provider, to measure the position and alignment of dowel bars according to the Contract Documents.	-
5	-	Once the schedule for referee testing has been finalized, provide the Contractor and QAO with the details, dates and times at least 3 Business Days in advance of the date and time of Referee Testing.	-
6	-	Confirm that the Contractor will be witnessing the Referee Test (maximum of 2 people).	-
7	-	Once testing is complete, Receive and Review the test results.	-
8	-	Forward the referee test results to the Contractor as they become available.	-

**350.08.04.04.02 Referee Testing Cost**

Administrative Activities:

1	-	Determine who is responsible for the referee testing cost.	-
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**350.08.05 Acceptance of Concrete Surface Texturing**

Inspection Activities:

1	-	Select, inspect, and measure grooving areas for acceptance as specified.	10%
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Administrative Activities:

1	-	Determine acceptance and rejection as specified.	-
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**350.08.06 Acceptance of Surface Smoothness**

**350.08.06.01 General**

Administrative Activities:

1	-	Arrange for acceptance testing of the lot by the Owner after: a) Final texturing has been completed, and b) Written notification that the concrete pavement or concrete base is ready for acceptance testing is received, and c) The pavement or concrete base is checked to be free of loose stone, debris, and obstructions.	-
2	-	Provide the Contractor with a 48 hours' notice of when the surface smoothness measurements will begin.	-
3	-	Check that if the weather conditions is suitable for testing, according to the equipment manufacturer's recommendations, the testing shall be suspended and resumed only when the conditions are acceptable.	-
4	-	Forward the test results to the Contractor as they become available.	-

**350.08.06.02 Lot Size**

Administrative Activities:

1	-	Determine the lot and subplot size as specified.	-
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**350.08.06.03 Measurement and Acceptance of Surface Smoothness**

Inspection activities:

1	-	After the measurements are analyzed, check that all areas to be repaired due to rejectable sublots or incidents of localized roughness or both, are marked on the concrete surface prior to the commencement of any corrective work.	100%
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Administrative Activities:

1	-	Check that smoothness measurement of the surface of the concrete pavement or concrete base, and incidents of localized roughness are measured as specified in LS-296, using an inertial profiler.	-
2	-	Ensure smoothness measurements are done using an approved inertial profiler and operator.	-
3	-	Check that the subplot's smoothness is acceptable as specified .	-
4	-	Calculate the Percent Within Limits for smoothness and the payment factor.	-
5	-	Calculate payment adjustment for incident(s) of localized roughness.	-
6	-	Determine areas that need to be repaired as specified.	-

**350.08.06.04 Referee Testing**

**350.08.06.04.01 General**

Administrative Activities:

1	-	Check that referee testing for a subplot is invoked by the Contractor within 5 Business Days of receiving the test results.	-
2	-	Review the Contractor's request to invoke Referee Testing (including the original test results to verify they do not meet the specified Quality Assurance acceptance requirements).	-
3	-	Complete the Referee Request Form (PH-CC-885) and Submit to the appropriate Quality Assurance Officer (QAO).	-
4	-	Coordinate with the Owner to retain the services of a testing service provider, based on the applicable referee roster.	-
5	-	Check that all sublots that are requested for referee testing are re-measured, as specified in LS-296 within 21 Business Days of receiving the written request for referee testing.	-
6	-	Once testing is complete, Receive and Review the test results.	-
7	-	Forward the referee test results to the Contractor as they become available.	-

**350.08.06.04.02 Referee Testing Cost**

Administrative Activities:

1	-	Determine who is responsible for the referee testing cost.	-
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**350.08.07 Acceptance of Repairs**

**350.08.07.01 General**

Inspection Activities:

1	-	Check repaired areas to ensure the requirements as specified..	100%
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**350.08.07.02 Acceptance of Repair of Surface Tolerance and Surface Smoothness Deficiencies**

Inspection Activities:

1	-	Check that sublots repaired by diamond grinding to correct deficiencies or as chosen by the Contractor, or areas that have been removed and replaced, are re-measured for surface smoothness.	100%
2	-	Check that a repaired subplot is acceptable as specified	100%
3	-	Check that grooving in areas that have been diamond ground after final texturing are re-evaluated for acceptance as specified.	100%

Administrative Activities:

1	-	Receive a written notification from the Contractor when the repaired sublots are ready for acceptance re-measurement by the Owner.	-
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**350.08.08 Scaling Warranty**

**350.08.08.01 General**

Inspection Activities:

1	-	Inspect and assess the severity of scaling of the concrete pavement, if any, according to Figures 1 to 6.	100%
2	-	Check that areas of medium and severe scaling are removed and replaced.	100%

Administrative Activities:

1	-	For light scaling greater than 20% of the component, receive and review a repair proposal. Notify the Contractor if the repair proposal is acceptable.	-
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**350.08.08.02 Warranty Period**

Administrative Activities:

1	-	Determine the end of warranty period as specified.	-
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**350.08.08.03 Distress Survey**

Inspection Activities:

1	-	Carry out a survey at any time during the warranty period if required.	100%
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Administrative Activities:

1	-	At least 60 days prior to the end of the warranty, submit the survey results to the Contractor.	-
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**350.09 MEASUREMENT FOR PAYMENT**

Administrative Activities:

1	-	Measurement for payment shall be as specified.	-
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**350.10 BASIS OF PAYMENT**

Administrative Activities:

1	-	Basis of payment shall be as specified.	-
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WARRANT: Always with OPSS 350, Construction Specification for Concrete Pavement and Concrete Base.