Administration and Inspection Activities for Precast Concrete Bridge Elements and Systems

(As Specified in SSP 999S31OPSS 916)

1.0 SCOPE

This CAIS covers the construction administration and inspection requirements for the construction of precast concrete bridge elements (non-prestressed and systemsprestressed) as specified in SSP 999S31, May 2024.OPSS 916, November 2025.

2.0 REFERENCES

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

Ontario Provincial Standard Specifications, Construction:

OPSS 100 MTO General Conditions of Contract
OPSS 916 Precast Concrete Bridge Elements

Ontario Provincial Standard Specifications, Material:

OPSS 905 Steel Reinforcement for Concrete
OPSS 910 Stressing Systems for Post Tensioning
OPSS 919 Formwork and Falsework
OPSS 1213 Hot Applied Rubberized Asphalt Waterproofing Membrane
OPSS 1350 1355 Precast Concrete – Materials and Production
OPSS 1440 Steel Reinforcement for Concrete

MTO Standard Special Provisions:

SSP 199S64 General Requirements for Referee Testing
SSP 999S31 Requirements for Precast Concrete Bridge Elements and Systems

Construction Administration and Inspection Specifications (CAIS):

CAIS 905 1355 Precast Concrete Reinforcement
CAIS 1350 Concrete – Materials and Production

MTO FormsPublications:

PH-CC-701 Request to Proceed
PH-CC-702 Notice to Proceed
PH-CC-821 Manufacturer's Certificate of Conformance

~~3.0~~Structural Manual

916.03 DEFINITIONS

For the ~~purpose~~purposes of this CAIS, the definitions shall be as specified in ~~SSP 999S31~~OPSS 916.

~~4.0~~
916.04 DESIGN AND SUBMISSION REQUIREMENTS

~~4~~916.04.01 Design Requirements

~~4~~916.04.01.01 Precast Concrete Bridge Elements ~~and System~~

Administrative Activities:

1	-	Check that any design is ~~as per~~according to CSA~~-~~ S6 and the ~~MTO's~~MTO Structural Manual, Division 1 and the Contract Documents.	-

~~**4.01.02 Concrete Mix Design**~~

~~Administrative Activities:~~

~~1~~	~~-~~	~~Check that the concrete mix design meets the requirements of OPSS 1350 and the Contract Documents.~~	~~-~~

~~4~~
916.04.02 Submission Requirements

916.04.02.01 Working Drawings

916.04.02.01.~~03 Formwork and Falsework~~01 General

Administrative Activities:

1	-	~~Check that the formwork and falsework design meets the requirements of OPSS 919.~~Verify that one electronic copy in PDF format of the Working Drawings, including supporting documentation, are submitted and received at least 14 Days prior to commencement of fabrication of the elements, or 5 ways when other authorities are involved in the approval of the design or construction.	-
2	-	When other authorities are involved in the approval of the design or construction, verify that one additional copy of the Working Drawings and supporting documentation submission is provided for each authority.	-

~~4.02 Submission Requirements~~

~~4~~916.04.02.01~~ Working Drawings~~.02 Assembly Plan

~~Administrative Activities:~~

1	M	Check that the assembly plan Working Drawings and supporting documents ~~are submitted and~~ contain the information specified in ~~SSP 999S31~~OPSS 916.04.02.01.02 and the Contract Documents.	-
2	M	Verify that the assembly plan Working Drawings are sealed by an Engineer.	-
~~2~~3	~~M~~-	~~Verify that an electronic copy of all Working Drawings including supporting documents are submitted at least 7 Days prior to commencement of fabrication of the elements, or 5 weeks when other authorities are involved in the approval of the design or construction.~~After reviewing the Working Drawings and technical documentation submissions, submit with comments, to the Contractor, MTO Contract Services Administrator (CSA) and MTO Structural Section within 2 Business Days of receipt.	-
4	-	Ensure a final copy of all Contractor submissions is shared with inspection staff and available to perform on-site administration and inspection duties.	-
5	-	Ensure a final copy is sent to MTO Structural Section.	-

916.04.02.01.03 Precast Concrete Bridge Elements

Administrative Activities:

1	M	Check that the Working Drawings and supporting documents are submitted and contain the information specified in OPSS 916.04.02.02 and the Contract Documents.	-
2	M	Verify that the Working Drawings and supporting documents are submitted with the seal and signature of the design Engineer and the design-checking Engineer verifying that the drawings are consistent with the Contract Documents.	-
3	M	Check that the Working Drawings and supporting documents are submitted and contain the information listed in the Contract Documents.	-
4	~~M~~-	~~Receive and review the qualifications of the engineer responsible for the assembly plan at least 4 weeks prior to commencement of the work. Verify that the qualifications include a statement that the Engineer is familiar with the equipment the Contractor has available for assembly, and erection of the precast elements.~~After reviewing the Working Drawings and technical documentation submissions, submit with comments, to the Contractor, MTO CSA and MTO Structural within 2 Business Days of receipt.	-

5	~~M~~-	~~After reviewing the Contractor's submissions, submit with comments, to MTO CSA and MTO Regional Structural Section within 2 days of receipt.~~ Ensure a final copy of all Contractor submissions is shared with inspection staff and available to perform on ~~-~~site ~~for enforcement and ensure a final copy is sent to the MTO Regional Structural Section.~~ administration and inspection duties.	-
6	M	Ensure a final copy is sent to MTO Structural Section.	-

916.05 MATERIALS

Administrative Activities:

~~4.02.02 Welding~~

~~Administrative Activities:~~

~~1~~	~~M~~	~~If resistance welding is planned for fabrication of steel reinforcement cages receive proposal 7 Days prior to fabrication and check that it meets the requirements of the Contract.~~	~~-~~
~~2~~	~~M~~	~~After reviewing the contractors welding proposal, submit with comments to MTO CSA and MTO Regional Structural Section within 2 Days of receipt.~~	~~-~~

~~4.02.03 Concrete Mix Design~~

~~Administrative Activities:~~

~~1~~	~~M~~	~~Check that the concrete mix design submission contains the information required by the Contract Documents. Obtain Form A portion of the concrete mix design along with any supporting documentation at least 7 Days prior to placement of concrete and review it to determine that it meets the contract requirements. Check that all materials are from approved lists and meet the requirements of the Contract Documents.~~	~~-~~
~~2~~	~~M~~	~~Check that the MTO Quality Assurance Section has received Form B portion of the concrete mix design from the concrete supplier prior to placement of concrete.~~	~~-~~
~~3~~	~~-~~	~~Check if self-consolidating concrete is proposed to be used and notify MTO's Quality Assurance section for acceptance.~~	~~-~~

~~4.02.04 Precast Concrete Plant Certification~~

1	-	Check that precast concrete bridge elements are as specified in OPSS 1355 in its entirety. For precast concrete bridge elements, additional inspection and administrative activities shall be as specified in CAIS 1355.	-

916.06 EQUIPMENT – Not Used

916.07 CONSTRUCTION

916.07.01 Inspection of Bridge Elements Prior to Installation

Administrative Activities:

1	M	If any defects or deficiencies are present on the elements receive notification from the contractor.	-
~~1~~2	M	~~Receive precast plant's certificates with the concrete mix design submission.~~If no defects or deficiencies are present or have been repaired, receive the MTO form PH-CC-701, Request to Proceed from the Contractor, after delivery of the elements to site before installation.	-
~~2~~3	M	~~Verify that the precast and pre-stressed elements are fabricated at a precast plant certified according to SSP 999S31 Clause 4.02.05. If concrete will be supplied by a ready-mixed concrete supplier check that documentation has been submitted verifying that the plant is certified by RMCAO.~~Check the elements for defects and deficiencies, and that the repairs have been completed according to the Defects and Deficiencies clause of OPSS 1355.	-
4	M	If defects or deficiencies are found, Notify the Contractor of the type, size, and quantity and which element that they occur on.	-
5		Once the elements and any repairs are acceptable, issue MTO form PH-CC-702, Notice to Proceed, to the Contractor	-

~~4~~916.07.02~~.05 Control~~ Installation of ~~Concrete Temperature~~Bridge Elements

~~Administrative Activities:~~

~~1~~	~~M~~	~~Receive the concrete temperature control plan 7 Days prior to the commencement of fabrication of the precast element.~~	~~-~~
~~2~~	~~M~~	~~Check the temperature dataloggers prior to use on the contract, to verify thermocouple function, readings and that it can provide unalterable records during the recording period.~~	~~-~~
~~3~~	~~M~~	~~Provide written notification to the Contractor that the temperature monitoring and recording system is deemed acceptable to the MTO.~~	~~-~~

4.02.06 Manufacturer's Certificate of Conformance and Precast Report

Administrative Activities:

1	M	Receive MTO PH-CC-821 Contractor's Manufacturer's Certificate of Conformance, and precast report for each shipment of prestressed / precast elements at least 5 Business Days prior to shipping from the precast plant.	-
2	M	Receive MTO form PH-CC-701 Request to Proceed from the Contractor, before the delivery of the prestressed / precast element to the site.	-
3	M	Check that the submissions by the Contractor, including the Manufacturer's Certificate of Conformance, precast report and Request to Proceed meet the requirements of the Contract Documents.	-
4	M	Check that the prestressed / precast element is fabricated according to the Contract Documents, prior to delivery to the site.	-
5	M	Check that defects and deficiencies repairable by standard methods are repaired according to the Contract Documents.	-
6	M	Check that precast and prestressed elements with defects and deficiencies causing rejection according to the Contract Documents, are not included in the Work.	-
7	M	Issue MTO PH-CC-702 Notice to Proceed, in a timely manner, and prior to delivering the pre-stressed / precast elements to the site.	-

Administrative Activities: Activities related to coordination with MTO's Centralized Precast Retainer

1	M	Provide the following information to MTO Concrete Section's centralized retainer inspector: • Precast concrete plant's contact information for the centralized retainer to coordinate inspection. • Shop drawings of elements. • Contract specific specifications. • Change orders relating to manufacturing process, drawing, etc. • Production schedule. • Approved repair proposal.	-
2	-	Upload the inspection report from the centralized retainer to WBCMS for each Contract.	-
3	M	Review the inspection report and issues emails from the centralized retainer and act by providing details by INC element #, photos, descriptions of the issue on the non-conformances identified by the centralized retainer.	-

5.0 MATERIALS

Administrative Activities:

1	-	Check that concrete and all other materials are as specified in SSP 999S31 and the Contract Documents.	-
2	-	Check if self consolidating concrete is proposed to be used and notify MTO's Quality Assurance section for acceptance.	-
3	-	Verify the concrete sealers, if used, are from the Owner's list of acceptable sealers.	-
4	-	Check that elastomeric coatings, if used, are according to OPSS 1213.	-
5	-	Check that associated hardware and mechanical connectors, if used, are according to OPSS 905.	-
6	-	Check that the post-tensioning material, including grout, is according to OPSS 910.	-
7	-	Check that prestressing steel, if used, and steel reinforcement are according to OPSS 1440.	-
8	-	Verify proprietary patching materials are from the Owner's Proprietary Patching Materials list.	-

6.0 EQUIPMENT

Inspection Activities:

1	-	If used, check that chipping hammers meet the requirements of SSP 999S31.	25%
2		Check that the post-tensioning equipment is according to OPSS 910.	100%
3	-	Check that the temperature monitoring and recording system is as specified in SSP 999S31 Subsection 6.07.	100%
4	-	Check that all other equipment is according to SSP 999S31 Section 6.0.	100%

7.0 CONSTRUCTION

7.01 Fabrication

7.01.01 General

Inspection Activities:

1	-M	Check each element's identification number and casting date.Check that the installation of precast bridge elements is according to the Working Drawings, Assembly Plan, and the Contract Documents.	100%

2	M	Check that the lifting and placement of precast bridge elements ensures that they are not damaged, overstressed, unstable, or unsafe at any time.	100%
3	M	Check that precast bridge elements are not stacked temporarily on other bridge elements during installation unless permitted by the Contract Documents.	100%
4	M	Check that the Workings Drawings meeting the requirements of the Contract Documents are on site during installation of the precast bridge elements.	100%
5	M	Check that precast bridge elements with defects and deficiencies causing rejection according to the Contract Documents are not included in the Work.	100%
6	M	Check that the elements have been properly braced after the installation.	100%

~~Administrative Activities:~~

~~1~~	~~-~~	~~Receive Contractor's written notification a minimum of 7 Days prior to commencement of precast element fabrication.~~	~~-~~

~~7.01.02 Precast Plant Certification~~

~~Administrative Activities:~~

~~1~~	~~-~~	~~Check the compliance of the plant with the certification requirements as specified in SSP 999S31.~~	~~-~~

~~7.01.20 Material Sampling and Testing~~

~~Inspection Activities:~~

~~1~~	~~-~~	~~Sample steel reinforcement according to CAIS 905; water, admixtures and cementing materials according to CAIS 1350, when requested by the Owner.~~	~~100%~~
~~2~~	~~-~~	~~Witness sampling of cementing materials, limestone filler (if applicable), admixtures and water (when other than municipal drinking water is used) and check that sampling is as specified in OPSS 1350.07.05.02.~~	~~100%~~
~~3~~	~~M~~	~~Receive submission from the Contractor, a list of elements and their identification numbers within 24 hours of completion of a lot.~~	~~100%~~
~~4~~	~~M~~	~~After all the precast elements in the lot have been fabricated, randomly select one element from each lot for acceptance testing, and randomly select a location for core removal within that precast element. Advise the Contractor which element is to be cored and the coring location.~~	~~100%~~

5	M	Obtain from the Contractor the planned time and site of coring (job site or precast plant) for each lot (note: One precast element in each lot is to be cored at an age of 7 to 10 days, to remove 6 cores, for air void system, rapid chloride permeability and compressive strength testing respectively. Coring may take place at the job site or at the precast plant, wherever the precast element is at 7 to 10 days of age).	100%
6	M	Prior to coring, witness the detection of reinforcing steel by covermeter and Check that cores do not contain reinforcement or other embedded material. Check that cores are as specified.	100%
7	M	Witness the removal of cores when core removal is to take place on site. When coring is conducted at the precast plant, witness or have a representative witness the coring.	100%
8	M	Upon removal of the core samples, verify that cores are properly labelled and placed in the security bags provided by the MTO. Immediately take possession of the cores and deliver them to the designated laboratory for testing by the MTO.	100%

Administrative Activities:

1	-	If prestressing steel is used in the element check that the fabricator has demonstrated that the concrete strength has reached what was specified in the Contract Documents.	-
2	-	Check that the fabricator has demonstrated that the concrete strength has reached what was specified in the Working Drawings prior to stripping the formwork.	-
3	-	Check that the Contractor's concrete cover measurement on each element conforms to the requirements of SSP 999S31 in the Precast Report submitted.	-
4	-	Check that the Contractor's dimensional measurements on each girder conform to the requirements of SSP 999S31 in the Precast Report submitted.	-

7.03 Delivery

Administrative Activities:

1	-	Receive Contractor's written notification a minimum of 3 Business Days prior to delivery of the element.	-
2	-	Check the delivery is as specified in SSP 999S31 Subsection 7.03.	-

~~**7.04 Installation**~~

~~Inspection Activities:~~

~~1~~	~~M~~	~~Check that the Workings Drawings meeting the requirements of the Contract Documents are on site and are being followed during installation of the precast and pre-stressed elements.~~	~~100%~~
~~2~~	~~M~~	~~Check that precast and prestressed elements with defects and deficiencies causing rejection according to the Contract Documents, are not included in the Work.~~	~~100%~~
~~3~~	~~M~~	~~Check that precast and prestressed elements that required repair are repaired according to SSP 999S31 prior to installation.~~	~~100%~~
~~4~~	~~M~~	~~Check that the installation of the precast elements meets the requirements of the Contract Documents.~~	~~100%~~
~~5~~	~~M~~	~~Check that the elements have been properly braced after the installation.~~	~~100%~~

Administrative Activities:

1	-	Receive Contractor's written notification a minimum of 3 Business Days prior to the commencement of field installation operations.	-
~~2~~	~~-~~	~~If repairs are required prior to installation of the elements, receive MTO form PH-CC-701 Request to Proceed from the Contractor, prior to the installation of the elements that require repair.~~	~~-~~
~~3~~	~~-~~	~~Check that repairs have been completed according to SSP 999S31.~~	~~-~~
~~4~~	~~-~~	~~Issue MTO PH-CC-702 Notice to Proceed, in a timely manner, and prior to elements that required repair being installed.~~	~~-~~
~~5~~2	-	Receive and Check the Contractor's submission required under GC 7.02.07 regarding the certification by an Ontario Land Surveyor or Engineer for grade and layout of the component.	-
3	-	Review and provide a written approval regarding the Contractor's repair procedure within 10 Business Days, when applicable.	-
4	-	Check repair of defects is according to OPSS 1355 and CAIS 1355.	-
5	-	Review and provide a written response of acceptability within 10 Business Days for the Contractor's reported error preventing assembly and the proposed method of correction.	-
6	-	Review and provide comments on the Contractor's method of correction for assembly and fit to regional structural section regarding. Provide response to the Contractor within 5 days of receiving response from the regional structural section.	-

~~7.06~~ ~~Inspection after the~~ 916.07.03 Installation ~~of the Precast Elements~~Tolerances

~~Administrative~~ Inspection Activities:

1	M	~~Receive and check MTO PH-CC-701 Request to Proceed from the Contractor, after the installation of all elements for each structure within a construction stage.~~Check that installation tolerances specified in OPSS 916.07.03 are met.	~~-~~100%
~~2~~	~~M~~	~~Issue MTO PH-CC-702 Notice to Proceed, in a timely manner, and prior to the next operation.~~	~~-~~

~~7.07~~ ~~Repair of Defects and Deficiencies Repairable by Standard Methods~~ 916.07.04 Inspection after the Installation of the Elements

Administrative Activities:

~~1~~	~~-~~	~~Receive repair proposal from the Contractor when more than one of the defects or deficiencies listed in SSP 999S31 Table 2 is located in the same area in the element.~~	~~-~~
~~2~~	~~-~~	~~Check that the repair proposal is submitted in the precast report.~~	~~-~~
~~3~~1	~~-~~M	~~For defects and deficiencies that are not repairable by standard methods and that are not rejectable, provide a written response to the Contractor indicating whether the Engineer's assessment is deemed acceptable and if deemed unacceptable, the precast elements shall be rejected and replaced by the Contractor.~~Receive and Check a MTO form PH-CC-701, Request to Proceed from the Contractor, after the installation of each element type for each structure within a construction stage and prior to the cutting or removal of any temporary lifting, setting, or levelling devices, or casting of concrete or grouted joints.	-
~~4~~	~~-~~	~~Consult with MTO as necessary.~~	~~-~~
~~5~~2	~~-~~M	~~Provide a written response to the Contractor indicating whether the Engineer's assessment is deemed acceptable and if deemed unacceptable, the precast and pre-stressed elements shall be rejected and replaced by the Contractor.~~Issue a MTO form PH-CC-702, Notice to Proceed, in a timely manner, and prior to the next operation.	-

916.07.05 Field Cast Joints

Administrative Activities:

~~7.08~~

1	M	Check that field cast joints for bridge elements are as specified in OPSS 916.	-

916.07.06 Management of Excess Material

Administrative Activities:

~~Administrative Activities:~~

~~1~~	~~-~~	~~Check that management of excess material is done according to the Contract Documents.~~	~~-~~

~~8.0~~

1	~~-~~	Check that management of excess material is as specified in the Contract Documents.	~~-~~

916.08 QUALITY ASSURANCE

916.08.01 General

Inspection Activities:

~~1~~	~~M~~	~~After delivery and prior to installation, check for any surface defects not repaired adequately or dimensional measurements not appearing within tolerance.~~	~~100%~~
~~2~~	~~M~~	~~After deliver and prior to installation randomly select a minimum of two elements and check that precast elements and systems meet fabrication tolerances of Table 2 of SSP 999S31 and the Contract Documents. If the installation tolerances do not meet the Contract requirements inform the MTO immediately.~~	~~100%~~
~~3~~	~~M~~	~~If referee testing of compressive strength, air void system, or rapid chloride permeability is invoked, witness the removal of the core(s) for referee testing from the same precast element from which the disputed acceptance cores were obtained.~~	~~100%~~
~~4~~	~~M~~	~~After delivery and prior to installation, check that the referee core is properly labelled. Take possession of the core and deliver it to the referee laboratory designated by MTO.~~	~~100%~~
~~5~~	~~M~~	~~Conduct a visual inspection to assess surface finish and the acceptability of repairs.~~	~~100%~~
~~6~~	~~M~~	~~After delivery and prior to installation, randomly select a minimum of two precast elements from each lot for verification of concrete cover and dimensional measurements. If the concrete cover measurements of any of the precast elements measured does not meet the tolerances of the Contract Documents, inform MTO immediately.~~	~~100%~~
~~7~~	~~M~~	~~Check that core holes are repaired in accordance to the Contract Documents.~~	~~100%~~

~~8~~	~~M~~	~~After installation randomly select a minimum of two elements and check that precast elements and systems meet the installation tolerances of Table 3 of SSP 999S31 and the Contract Documents. If the installation tolerances do not meet the Contract requirements inform the MTO immediately.~~	~~100%~~
1	M	After delivery of precast bridge elements and prior to installation, Check for any surface defects not repaired as specified or dimensional measurements not within tolerance.	100%
2	M	For precast concrete bridge elements, Inspect the elements for defects or deficiencies as specified in OPSS 1355. Additional inspection activities shall be as specified in CAIS 1355.	100%

Administrative Activities:

1	-	Check that quality assurance and acceptance of concrete barrier is as specified in OPSS 916.	-
2	-	For precast concrete bridge elements, Check that quality assurance and acceptance is as specified in OPSS 1355. Check that precast concrete bridge elements meet the quality assurance requirement as specified in OPSS 1355, including acceptable 28-Day compressive strength, air void system parameters, and rapid chloride permeability. For precast concrete bridge elements, additional administrative activities shall be as specified in CAIS 1355.	-
3	-	Notify MTO's Quality Assurance Section for any precast concrete bridge elements that fails to meet the acceptance requirements. Provide written notification to the Contractor, after consultation with MTO, for rejectable work.	-

916.08.02 Acceptance of Installation Tolerances

Inspection Activities:

1	M	Check that installation tolerances are according to the requirements of the Contract Documents.	100%

Administrative Activities:

~~1~~	~~M~~	~~Obtain and review acceptance test results for compressive strength, air void system and rapid chloride permeability.~~	~~-~~
~~2~~	~~M~~	~~Obtain and review acceptance test results for water, admixtures and cementing materials.~~	~~-~~
~~3~~	~~M~~	~~If referee testing is invoked by the contractor, obtain and review results of referee testing according to the contract documents. The cost of referee testing shall be according to SSP 199S64. The party responsible for the cost of referee testing shall be according to SSP 999S31.~~	~~-~~

~~4~~	~~-~~	~~Check the lot size based on the production rate prior to commencing production as per SSP 999S31.~~	~~-~~
~~5~~	~~-~~	~~Identify which elements make up each lot (as defined in the Contract Documents).~~	~~-~~
~~6~~	~~-~~	~~Verify that elements with defects and deficiencies causing rejections as specified in SSP 999S31 Subsection 08.09 are rejected and replaced.~~	~~-~~

1	-	Receive written notification from Contractor when precast bridge elements are ready for verification measurements.	-
2	-	Receive and Review the Contractor's remediation proposal if an element fails to meet the tolerance requirements as specified in the Contract Documents	-
3	-	Provide Contractor's remediation proposal and Contract Administrator review and assessment of proposal to the MTO's Quality Assurance Section in a timely manner for approval.	-

916.08.02.03 Field Inspection

Inspection Activities:

1	M	Inspect the elements and the work for any defects and deficiencies. Notify MTO's Quality Assurance Section of any defects or deficiencies.	100%

916.10~~.0~~ BASIS OF PAYMENT

Administrative Activities:

1	-	Basis of payment shall be as specified in OPSS 916.10.	-

~~WARRANT: Always with SSP 999S31, Requirements for Precast Concrete Bridge Elements and Systems.~~