

Administration and Inspection Activities for Buried Corrugated Steel Structures with Span Greater than 3.0 m

(As Specified in OPSS 960)

960.01 SCOPE

This CAIS covers the construction administration and inspection requirements for the construction of Buried Corrugated Steel Structures with Span greater than 3.0 m as specified in OPSS 960, April 2026.

960.02 REFERENCES

The references listed in OPSS 960 shall apply to this CAIS, in addition to the following standards, specifications, forms, or publications.

Construction Administration and Inspection Specifications (CAIS):

CAIS 209	Embankment Over Swamps
CAIS 404	Support Systems
CAIS 501	Compacting
CAIS 517	Dewatering and Temporary Flow Passage Systems
CAIS 539	Temporary Protection Systems
CAIS 902	Excavating and Backfilling - Structures
CAIS 904	Concrete Structures
CAIS 905	Steel Reinforcement for Concrete
CAIS 1004	Aggregates - Miscellaneous
CAIS 1010	Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
CAIS 1205	Clay Seal
CAIS 1350	Concrete - Materials and Production
CAIS 1355	Precast Concrete - Materials and Production
CAIS 1440	Steel Reinforcement for Concrete
CAIS 1805	Corrugated Steel Structural Plate
CAIS 1860	Geotextiles
CAIS 1863	Geomembranes

960.03 DEFINITIONS

For the purpose of this CAIS, the definitions shall be as specified in OPSS 960.

960.04 DESIGN AND SUBMISSION REQUIREMENTS

960.04.01 Design Requirement

960.04.01.01 Corrugated Steel Structures

Administrative Activities:

1	M	Check that the design of the structure is according to CSA S6, the Structural Manual, and is as specified in the Contract Documents.	-
2	M	Check that the design of joint treatment is as specified in the Contract Documents and satisfies the requirements of CSA S6.	-
3	M	When the geometry, corrugation profile, coating system, or final plate thickness are not specified in the Contract Documents, Check that the Contractor has designed these parameters in accordance with the requirements of the Contract Documents.	-

960.04.02 Submission Requirements

960.04.02.01 Working Drawings

Administrative Activities:

1	M	Check that the Working Drawings and supporting documents are submitted at least 14 Days prior to fabrication of the corrugated steel structural plates, and contain the information listed as required in OPSS 960 and the Contract Documents. If other authorities are involved in the approval of the design or construction of the structure, the submission of Working Drawings and supporting documents shall be at least 35 Days prior to the fabrication of the corrugated steel structural plate elements.	-
2	-	Check that the Working Drawings bear the seal and signature of an Engineer verifying that they are consistent with the Contract Documents. For elements designed by the Contractor shall be sealed by a design Engineer and a design-checking Engineer.	-
4	-	After reviewing the Working Drawings and supporting documentation, submit with comments, to the MTO Contract Services Administrator (CSA) and MTO Regional Structural Section within 2 Business Days of receipt.	-
5	-	Ensure a final copy of all Contractor submissions is kept at the Working Area at all times.	-
6	-	Ensure a final copy of the submissions is sent to MTO Regional Structural Section.	-
7	M	Review and provide a written response of acceptability within 10 Business Days for any design proposals that are submitted.	-

960.04.02.02 Manufacturer’s Representative

Administrative Activities:

1	-	Receive the name(s) of the manufacturer’s representative at least 14 Days prior to the commencement of fabrication of the corrugated steel structural plates.	-
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960.05 MATERIALS

960.05.01 Appurtenances

Administrative Activities:

1	-	Check that appurtenances, coatings, and all associated hardware required for installation are as specified in OPSS 960.	-
2	-	Check that the coating of steel appurtenances is as specified in OPSS 960.05.01.	-
3	-	Check that cast-in-place concrete used for appurtenances, if applicable, is according to OPSS 1350. For concrete materials and production, additional administrative and inspection tasks shall be according to CAIS 1350.	-
4	-	Check that precast concrete used for appurtenances, if applicable, is according to the OPSS 1355. Additional administrative and inspection tasks shall be according to CAIS 1355.	-
5	-	Check that steel reinforcement for concrete, if applicable, is according to OPSS 1440. For steel reinforcement for concrete, additional administrative and inspection tasks shall be according to CAIS 1440.	-

960.05.02 Bedding Material

Administrative Activities:

1	-	Check that bedding material is as specified in the Contract Documents and according to OPSS 1010. For bedding materials, additional administrative and inspection tasks shall be according to CAIS 1010.	-
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960.05.03 Clay Seal

Administrative Activities:

1	-	Check that the clay seal, if specified by the Contract Documents, is as specified in OPSS 1205. For clay seal, additional inspection and administrative activities shall be as specified in CAIS 1205.	-
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960.05.04 Corrugated Steel Structural Plate

Administrative Activities:

1	-	Check the corrugated steel structural plate material is as specified in OPSS 1805. For corrugated steel structural plate, additional administrative and inspection activities shall be as specified in CAIS 1805.	-
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960.05.05 Engineered Fill

Administrative Activities:

1	-	Check that engineered fill is as specified in the Contract Documents and according to OPSS 1010. For engineered fill, additional administrative and inspection activities shall be as specified in CAIS 1010.	-
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960.05.06 Geomembrane

Administration Activities:

1	-	Check that geomembrane is as specified in OPSS 960.	-
2	-	Check that geomembrane is as specified in OPSS 1863. For geomembrane, additional administrative and inspection activities shall be according to CAIS 1863.	-

960.05.07 Geotextile

Administrative Activities:

1	-	Check that geotextile is as specified in the Contract Documents. For geotextile, additional administrative and inspection activities shall be as specified in CAIS 1860.	-
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960.05.08 Granular

Administrative Activities:

1	-	Check that granular material is according to OPSS 1010 and the requirements of the corrugated steel structural plate manufacturer and as specified in the Contract Documents. When specified by the Contract Documents, Check that clear stone is according to OPSS 1004. For granular, additional administrative and inspection activities shall be as specified in CAIS 1010 and CAIS 1004.	-
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960.05.09 Hardware

Administrative Activities:

1	-	Check that hardware is as specified in CSA G401, and satisfies the requirements of the Working Drawings. For hardware, additional administrative and inspection activities shall be as specified in CAIS 1805.	-
2	-	Check that bolt holes are sized according to the requirements of CSA G401 and satisfy the requirements of the Working Drawings.	

960.06 EQUIPMENT

Administrative Activities:

1	-	Check that the heavy equipment is as specified in OPSS 960.	-
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Inspection Activities:

1	SSI	Check that the use of heavy equipment adheres to the location requirements of OPSS 960.	100%
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960.07 CONSTRUCTION

960.07.01 Manufacturer Representative

Administrative Activities:

1	-	Receive written notice from the Contractor of a visit to the Working Area by the manufacturer's representative at least 2 Business Days prior to each visit.	-
2	-	Check that the manufacturer's representative is present at the Working Area during the operations described in OPSS 960.07.01.	-

960.07.02 Storage

Inspection Activities:

1	-	Check that storage of the elements is according to OPSS 1805. For the storage of elements, additional administrative and inspection activities shall be according to CAIS 1805.	100%
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960.07.03 Delivery

Inspection Activities:

1	-	Check that delivery of elements is according to OPSS 1805. For the delivery of elements, additional administrative and inspection activities shall be according to CAIS 1805.	50%
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960.07.04 Foundations - General

Inspection Activities:

1	SSI	Check that placement of the buried corrugated steel structure on bedding is as specified in the Contract Documents.	100%
2	SSI	Check that unsuitable material at the foundation base are removed and replaced with suitable compacted material as specified in the Contract Documents.	100%
3	-	Check that the founding soil on which the footing, working slab, or granular pad is to rest shall be protected and preserved from construction operations and environmental conditions including, but not limited to, rain, wind, and snow to avoid disturbance and degradation.	-
4	-	Check that receiving members and foundations, when specified in the Contract Documents, are square, on span, and on grade to facilitate assembly.	100%
5	-	Check that the elevations of the bottom of the footing, working slab, or granular pad are as specified in Contract Documents.	100%

960.07.05 Appurtenances

Inspection Activities:

1	-	Check that concrete used for appurtenances is constructed according to OPSS 904 and OPSS 1355 as specified in the Contract Documents. For cast-in-place concrete appurtenances, additional administrative or inspection activities shall be according to CAIS 904 and CAIS 1355.	50%
2	-	Check that the construction of steel reinforcement complies with the requirements of OPSS 905 and the Contract Documents. For steel reinforcement, additional administrative or inspection activities shall be according to CAIS 905.	50%
3	-	Check that steel used for appurtenances is constructed as specified in Contract Documents.	50%

960.07.06 Support Systems

Inspection Activities:

1	-	Check that support systems are constructed as specified in OPSS 404. For support systems, additional administrative and inspections tasks shall be according to CAIS 404.	-
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960.07.07 Temporary Protection Systems

Inspection Activities:

1	-	Check that temporary protection systems are constructed as specified in OPSS 539. For temporary protections systems, additional administrative and inspection tasks shall be according to CAIS 539.	-
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960.07.08 Dewatering

Inspection Activities:

1	-	Check that dewatering is as specified in OPSS 517. For dewatering, additional administrative and inspection activities shall be according to CAIS 517.	-
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960.07.09 Excavation

Inspection Activities:

1	-	Check that excavation for the installation of the structure is as specified in OPSS 902 and the Contract Documents, including frost tapers and structure end treatments. Additional administrative and inspection tasks shall be according to CAIS 902.	50%
2	-	Check swamp excavation, if specified by the Contract Documents, is as specified in OPSS 209 and the Contract Documents. For swamp excavation, additional administrative and inspection tasks shall be according to CAIS 209.	50%

960.07.10**Inspection after Excavation and Prior to Bedding**

Administration Activities:

1	M SSI	Receive and Review the MTO Form PH-CC-701, Request to Proceed upon completion of the excavation within a construction stage, as specified in the Contract Documents, and before placement of bedding. If required by the construction staging, Receive and Review the MTO Form PH-CC-701 for each construction stage.	-
2	M SSI	Ensure the MTO Form PH-CC-702, Notice to Proceed, is completed and provided to the Contractor before the next operation begins.	-

960.07.11**Bedding**

Inspection Activities:

1	-	Check bedding placement is as specified in the Contract Documents and is compacted according to OPSS 501. For compaction, additional administrative and inspection activities shall be according to CAIS 501.	50%
2	-	Check that bedding is placed in uncompacted, uniform layers not exceeding 200 mm in thickness.	50%
3	-	Check that, in accordance with CSA S6, for closed structures, a 200 mm thickness of the bedding layer for shallow corrugations or 300 mm for deep corrugations, measured from the outside edge of the corrugation, that is in direct contact with the invert of the structure is left uncompacted.	100%
4	-	Check that bedding provides uniform support under the full width and length by the structure.	100%
5	-	Check that ice and snow are removed from the area where bedding is to be placed and bedding is not placed on or against frozen ground. Check that deicing chemicals are not used.	100%
6	-	Ensure Bedding and subgrade material are adequately protected from disturbance during construction, such as from construction equipment or environmental factors, including but not limited to rain, wind, and snow.	50%

960.07.12 Inspection Prior to Installation of the Corrugated Steel Structural Plates

960.07.12.01 Inspection after Bedding and Prior to Installation of the Corrugated Steel Structural Plates

Administration Activities:

1	M	Receive and Review MTO Form PH-CC-701, Request to Proceed, after placement of bedding within a construction stage, to limits as specified in Contract Documents, and before installation of structure. If required by the construction staging, Receive and Review the MTO Form PH-CC-701 for each construction stage.	-
2	M	Ensure the MTO Form PH-CC-702, Notice to Proceed, is completed and provided to the Contractor before the next operation begins.	-

960.07.12.02 Inspection of the Corrugated Steel Structural Plates Prior to Installation

Inspection Activities:

1	M SSI	Prior to the assembly and installation of the corrugated steel structural plates, Check that the corrugated steel structural plates are as specified in the Contract Documents, including the satisfactory completion of any repairs.	100%
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Administration Activities:

1	M	Receive and Review MTO Form PH-CC-701, Request to Proceed, after placement of bedding within a construction stage, to limits as specified in Contract Documents, and before installation of structure. If required by the construction staging, Receive and Review the MTO Form PH-CC-701 for each construction stage.	-
2	M	Ensure the MTO Form PH-CC-702, Notice to Proceed, is completed and provided to the Contractor before the next operation begins.	-

960.07.13 Assembly and Installation of Buried Corrugated Steel Structure

Inspection Activities:

1	SSI	Check that assembly and erection of the structure is as specified in the Working Drawings and supporting documentation and satisfies the requirements the Contract Documents.	100%
2	SSI	Check connection of corrugated steel structural plates along seams is according to the Working Drawings and OPSS 960.	100%
3	SSI	If an alternative method of connecting structural plates along seams is noted and proposed on the Working Drawings, Receive and Review proposal.	100%

4	SSI	Check that installation, stabilization and lifting of elements is conducted in a manner to ensure that elements are not overstressed, unstable, or unsafe at any time.	100%
5	SSI	Check that elements are not rolled or dragged over hard obstructions (gravel or rock) or damaged while being assembled and installed.	100%
6	SSI	Check that the seams between structural plates are tightened when plates are hung, unless held in shape by cables, struts, or backfill.	100%
7	SSI	Check that reinforcing ribs, if specified in the Contract Documents, are attached prior to backfilling operations.	100%
8	SSI	Randomly select 5% of the installed bolts and witness testing by the Contractor of these bolts as specified in OPSS 960 to ensure proper tightening and installation. Bolts shall be tightened in accordance with ASTM A807/A807M to a torque between 200 and 340 Nm.	100%
9	-	Check that the total length of the structure is as specified by the Contract Drawings.	-
10	SSI	Check that temporary bracing, when required by the Working Drawings and supporting documentation, is installed for a sufficient period of time to protect workers and maintain the shape of the structure during erection. When used, temporary bracing shall not be removed until backfill is placed to an elevation that provides the necessary support, according to the Working Drawings and supporting documentation.	50%
11	SSI	Check that longitudinal and transverse alignment is maintained throughout assembly and installation operations. If struts or cables are used to maintain the structure shape during assembly or backfilling, they shall be removed before they restrict the downward movement of the crown of the structure, according to the Working Drawings and supporting documentation.	50%
12	SSI	Check that installation and assembly of the structure satisfies the tolerances for elevations, alignment, geometry, and camber as specified by OPSS 960, the Working Drawings and supporting documents, and the Contract Documents. If the Working Drawings and supporting documentation require a more stringent dimensional tolerance than the Contract Documents, the more stringent dimensional tolerance shall govern.	50%
13	-	Check that the Contractor records the span and rise of the structure along the length of the structure after the torquing of bolts.	25%

Administration Activities:

1	-	Receive the notice of installation date at least 3 Days prior to the commencement of installation.	-
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960.07.14 Joints Between Elements

Inspection Activities:

1	SSI	Check that the field joints between successive corrugated steel structural plates form a continuous line free from appreciable irregularities in the flow line of the watercourse.	100%
2	SSI	Check that field joints between successive corrugated steel structural plates are constructed according to the manufacturer's requirements and as specified in the Contract Documents.	100%
3	SSI	Check that the interface between the structure and appurtenances are constructed according to the manufacturer's requirements and as specified in the Contract Documents.	100%

960.07.15 Inspection after the Installation of the Structure and Prior to Backfilling

Administrative Activities:

1	M	<p>Receive and Review the following after installation of all elements of a structure within a construction stage and prior to backfilling:</p> <ul style="list-style-type: none"> a) MTO Form PH-CC-701, Request to Proceed; b) MTO Form PH-CC-822, Certificate of Conformance from the manufacturer's representative; c) The recorded span and rise of the structure after the torquing of bolts; d) Variations from the Contract Documents and Working Drawings; and e) The adherence to the required tolerances. <p>If required by the construction staging, Receive and Review the MTO Form PH-CC-701 for each construction stage.</p>	-
2	M	Ensure the MTO Form PH-CC-702, Notice to Proceed, is completed before starting the next operation.	-

960.07.16 Backfilling

960.07.16.01 General

Inspection Activities:

1	-	Check that all backfill placement and compaction procedures are according to OPSS 902, the Working Drawings and supporting documentation and as specified by the Contract Documents. Additional administrative and inspection activities shall be according to CAIS 902.	100%
2	SSI	Check that structural components are monitored regularly by the Contractor during backfilling operations for evidence of cusping, crimping, or localized deformations.	100%

3	SSI	Check that the upward or downward crown deflection of the structure does not exceed the limits specified in OPSS 960.07.18.01, unless otherwise specified by the design Engineer.	100%
4	SSI	Verify that, if the dimensional tolerances of the Contract Documents are exceeded, backfilling operations should be halted.	100%

Administrative Activities:

1	SSI	If dimensional tolerances of the Contract Documents are exceeded during backfilling operations, Receive and Review the MTO Form PH-CC-701 from the Contractor. Notify the MTO CSA and MTO Regional Structural Section.	-
2	SSI	Prepare and issue a MTO Form PH-CC-702, Notice to Proceed to resume backfilling operations, upon approval from the MTO Regional Structural Section.	-

960.07.16.02 Engineered Backfill Zone

Inspection Activities:

1	SSI	Check backfilling around the structure is according to the requirements of OPSS 960 and the manufacturer's specifications.	100%
2	SSI	Check that backfill against the sides of the structure is not placed by truck end-dumping or dozer placement.	100%
3	SSI	Check that material is never dumped on top of the structure.	100%
4	SSI	Check that backfill is placed on either side of the structure and spread in layers according to OPSS 960.07.16.02.	100%
5	SSI	Check that backfilling around the structure proceeds evenly on both sides of the structure, with the differential in surface elevation of the backfill material on each side of the structure and individual components not exceeding the thickness of two compacted lifts.	100%
6	SSI	Check that backfill is placed without any damage to the structure or movement of the structure beyond the acceptable tolerances specified in the Contract Documents.	100%

960.07.16.03 Light Equipment Compaction Zone

Inspection Activities:

1	SSI	Check that heavy equipment is not within the light equipment compaction zone as defined in OPSS 960.07.16.03.	100%
2	SSI	Check that initial covering of the top of the structure is performed in the presence of the Contract Administrator.	100%

3	SSI	Check that backfill within the light equipment compaction zone is placed according to the requirements of OPSS 960 and each layer compacted according to OPSS 501.	100%
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960.07.16.04 Backfill Beyond Engineered Backfill Zone

Inspection Activities:

1	-	Check that backfilling beyond the engineered fill zone is completed as specified in OPSS 960.07.16.04.	100%
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960.07.17 Geomembrane

Inspection Activities:

1	-	Check that the installation of the geomembrane is as specified in Contract Documents, OPSS 960, and satisfies the requirements of the geomembrane manufacturer.	25%
2	-	Check that the geotextile, as specified in the Contract Documents, is placed immediately above and below the geomembrane.	100%
3	-	Check that the geomembrane is placed such that positive drainage away from the structure is present.	100%
4	-	Check that the geomembrane is wrapped in an opaque protective covering and, when the cover is removed prior to installation, the geomembrane is not exposed to direct sunlight for more than 72 hours.	25%
5	-	Check that the surface on which the geomembrane is placed within the backfill provides sufficient support to the geomembrane and is prepared to remove protrusions in accordance with OPSS 960.07.17.	50%
6	-	Check that the no field welding of seams is completed, unless it is to repair an area from which a QA sample was taken.	100%
7	-	Check that no vehicular traffic travels on the geomembrane prior to backfilling to a depth specified by the manufacturer.	100%
8	-	Additional inspection tasks shall be according to CAIS 1863.	-

Administrative Activities:

1	-	Additional administrative tasks shall be according to CAIS 1863.	-
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960.07.18 Clay Seal

Administrative Activities:

1	-	Check that clay seals are constructed as specified in the Contract Documents and OPSS 1205. For clay seals, additional administrative and inspection tasks shall be according to CAIS 1205.	-
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960.07.19 Markings

Inspection Activities:

1	-	Check that markings on each structure are as specified in OPSS 1805. Additional administrative and inspection tasks shall be according to CAIS 1805.	-
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960.07.20 Inspection after Completion of Backfilling

Administration Activities:

1	-	Receive and Check the MTO Form PH-CC-701 Request to Proceed from the Contractor upon completion of backfill for each construction stage. If required by the construction staging, Receive and Review the MTO Form PH-CC-701 for each construction stage.	-
2	-	Ensure the MTO Form PH-CC-702, Notice to Proceed, is completed and provided to the Contractor before the next operation begins.	-

960.07.21 Management of Excess Material

Administration Activities:

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

960.08.01 Acceptance

Inspection Activities:

1	-	Confirm acceptance of the buried corrugated steel structural is according to OPSS 960.08.01.	
1	-	Conduct visual inspection deemed necessary to assess the effectiveness of surface finish and repairs.	100%

2	-	Check the acceptance of the structure against the Contract Documents, OPSS 960.08, and OPSS 1805. Acceptance should also include the satisfactory completion of any repairs.	100%
3	-	Additional inspection activities are as specified in CAIS 1805.	-

Administrative Activities:

1	-	Additional inspection activities are as specified in CAIS 1805.	-
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960.08.02 Acceptance of Installation Tolerances

Inspection Activities:

1	SSI	Check the measurements of the structure prior to, during, and after any backfilling operations to confirm compliance with installation tolerances.	100%
2	SSI	Inspect the elements for defects or deficiencies as specified in OPSS 1805. Additional inspection activities shall be as specified in CAIS 1805.	100%

Administrative Activities:

1	-	Check that quality assurance and acceptance of precast concrete culverts is as specified in OPSS 960.	-
2	-	Check that quality assurance and acceptance is as specified in OPSS 960 and OPSS 1805. Additional administration activities shall be as specified in CAIS 1805.	-
3	-	Notify MTO's Quality Assurance Section if the buried corrugated steel structure fails to meet the acceptance requirements. Provide written notification to the Contractor, after consultation with MTO, for rejectable work.	-

960.08.03 Field Inspection

Inspection Activities:

1	SSI	Inspect the corrugated steel structural plates prior to assembly and installation and prior to and after backfilling to determine if there are any defects or deficiencies as specified in OPSS 960. Notify MTO's Quality Assurance Section and Structural Section of any defects or deficiencies.	100%
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Administrative Activities:

1	-	Receive and Review the Contractor's Repair Proposal for any defects or deficiencies.	-
2	-	Additional inspection activities are as specified in CAIS 1805.	-

960.08.04 Acceptance of Bolts & Nuts

Inspection Activities:

1	-	Observe the Contractor's testing of bolts and nuts as specified in the Contract Documents and check for conformance with as specified in the Contract Documents.	100%
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Administration Activities:

1	-	Verify that the torque is checked as required by the manufacturer's installation procedures and as specified in the Contract Documents.	-
2	-	Document the results of the testing of bolts and nuts.	-

960.08.05 Acceptance of Geomembrane

Inspection Activities:

1	-	Check that there are no tears, perforations, defects, or leakage in the impervious geomembrane.	100%
2	-	Sampling and testing of the geomembrane shall be as per CAIS 1863. Additional inspection activities are as specified in CAIS 1863. If the requirements of OPSS 1863 and the manufacturer's specifications are not satisfied, the geomembrane shall be rejected.	100%

960.09 MEASUREMENT FOR PAYMENT

Administrative Activities:

1	-	Measurement for payment shall be as specified in OPSS 960.09.	-
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960.10 BASIS OF PAYMENT

Administrative Activities:

1	-	Basis of payment shall be as specified in OPSS 960.10.	-
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WARRANT: Always with OPSS 960, Construction Specification for Buried Corrugated Steel Structures with Span Greater than 3.0 m