

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 31 32 19.16 – Geotextile Soil Stabilization.

1.2 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- .1 Owner to supply granular bedding and backfill material as follows:
 - .1 25mm and 40mm from Hwy 58 km 28 stockpile site.
- .2 Contractor to supply culverts required under this Contract:

1.3 MEASUREMENT AND PAYMENT

- .1 Measurement for **supply and install** of pipe culvert will be in metres, in place, for each size, type and class of pipe. Measurement of pipe culverts to include prefabricated sloped end sections.
- .2 No separate payment for:
 - .1 Any necessary dewatering prior to placing of bedding and construction maintenance and removal of any temporary bypass roads.
 - .2 Culvert excavation or additional sub-cut.
 - .3 Removal and disposal of existing culverts.
 - .4 Removal and disposal of existing culvert markers.
 - .5 Supply and install geotextile fabric in accordance with Section 31 32 19.16 – Geotextile Soil Stabilization
 - .6 Supply and Installation of new culvert markers.
 - .7 Repairing and removing damaged ends.
 - .8 Cutting existing culverts in preparation for extensions.
 - .9 Supply and installation of coating to repair culverts.
 - .10 Cutting new culverts to amend the length or performing field cuts for sloped end sections.
 - .11 Field cutting sloped end sections for all culverts to remain and ends to remain on culverts to be extended.
 - .12 Cleaning new and existing culverts.

Payment for Pipe Culverts will be under **Lump Sum Price Item 1 – Supply and Install Culvert.**

1.4 REFERENCES

- .1 ASTM International
 - .1 ASTM C117-[04], Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-[06], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698-[07e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³; (600 kN-m/m³)).
 - .4 ASTM D1248-[05], Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.
 - .5 ASTM F667-[06], Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.
- .3 CSA International
 - .1 CAN/CSA G401-[07], Corrugated Steel Pipe Products.
- .4 Government of Northwest Territories – Department of Transportation (GNWT-DOT).
 - .1 GNWT-DOT Specifications, Division 4 – Structures, Section 1 – Supply and Installation of Corrugated Steel Pipe Culverts [13 Dec 96]
 - .2 GNWT-DOT Specifications, Division 4 – Structures, Section 3 – Culvert Removal [13 Dec 96]
 - .3 GNWT-DOT, Standard Drawings SD-400 Series.

1.5 NORTHWEST TERRITORY - TRANSPORTATION STANDARD

- .1 Comply with GNWT-DOT Specifications, Division 4 – Structures, Section 1 – Supply and Installation of Corrugated Steel Pipe Culverts and Section 3 – Culvert Removal.
- .2 This section takes precedence over any contradictory statements made within any of the referenced GNWT-DOT Specifications sections.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Certification: to be marked on pipe.
- .3 Test and Evaluation Reports:
 - .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

Part 2 Products**2.1 CORRUGATED STEEL PIPE**

- .1 Corrugated steel pipe: to CAN/CSA-G401.
- .2 Corrugated steel pipe: helically corrugated and the ends recorrugated to provide annular corrugations for coupling purposes.
- .3 Minimum length of annular corrugated culvert ends 300 mm for culvert diameters 900 mm or less and 600 mm for culvert diameters greater than 900 mm.
- .4 Minimum wall thickness to be 2.8 mm.
- .5 Corrugations to be 68 mm x 13 mm.
- .6 Annular corrugated coupler band type not less than 0.60 metres wide and have a minimum of 3 bolts per coupler for culvert diameters of 800mm or greater.
- .7 Circular culverts
 - .1 Prefabricated sloped end sections supplied in accordance with GNWT-DOT Standard Drawings 'Standard Sloped End Sections'.
 - .2 Prefabricated end sections: 3:1 mitred end sections will be required.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe. Do not backfill until pipe grade and alignment checked and accepted by Departmental Representative.

3.2 PREPARATION

- .1 All work to be in accordance with the EPP, BMPs and the specifications.
- .2 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, and waterways according to requirements of sediment and erosion control plan, specific to site, or requirements of authorities having jurisdiction, whichever is more stringent.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Clean inlet and outlet areas, and along entire length of culverts free of branches and debris.
- .4 Beaver dams that are required to be removed to facilitate culvert or beaver deceiver installation shall be removed under the direction of the ESO.
 - .1 Beaver dams are to be removed in such a way as to release water slowly, in 20 cm increments.

3.3 INSTALLING CORRUGATED STEEL PIPES

- .1 Cofferdams
 - .1 Constructed of clean, non-erodible materials such as sand bags, aquadam-type installations, steel or wood walls, concrete blocks, clean rip-rap etc.
 - .2 Earthen fill material containing fine sediments will not be accepted unless, prior to its placement within the watercourse, it is fully contained using a non-erodible material that will prevent the release of sediment throughout installation, use and removal of the cofferdam.
 - .3 Cofferdams to be sealed appropriately to prevent leaking.
 - .4 Stream flows to be maintained during isolation to ensure upstream pooling does not occur.
- .2 Dewatering
 - .1 Contractor supplied Qualified Aquatic Environmental Specialist to perform fish salvage prior to dewatering each fish-bearing culvert.
 - .2 Pump intakes to be clean and dry before entering the National Park and to be fitted with appropriate fish screen.

- .3 Culvert Removal
 - .1 Remove culverts and dispose of sections to an approved location outside of the National Parks.
 - .2 Excavated material deemed unsuitable for use in backfill by Departmental Representative to be landscaped onto sideslopes or disposed of offsite.
 - .3 Accommodate traffic at all time during the removal of a culvert. Adequate control and traffic flow to be maintained.

- .4 Bedding
 - .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
 - .2 Place woven geotextile in accordance with Section 31 32 19.16 – Geotextile Soil Stabilization.
 - .3 Place approved granular material on bottom of excavation to specified depth or 300 mm minimum thickness and compact to 95% of corrected maximum dry density to ASTM D698 and dry to at least the optimum moisture content.
 - .4 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
 - .5 Place bedding in unfrozen condition.

- .5 Laying Corrugated Steel Pipe Culverts
 - .1 Begin pipe placing at downstream end.
 - .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
 - .3 Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points.
 - .4 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.

- .6 Joints
 - .1 Match corrugations or indentations of coupler with pipe sections before tightening.
 - .2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.
 - .3 Insert and tighten bolts.
 - .4 Repair spots where damage has occurred to spelter coating by applying two coats of asphalt paint approved in writing by Departmental Representative or two coats of zinc rich paint.

- .7 Backfilling
 - .1 Place granular backfill material around and over culverts as indicated or as directed by Departmental Representative in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
 - .1 Compact each layer to 98% corrected maximum dry density to ASTM D698 taking special care to obtain required density under haunches.

- .2 Utilize granular backfill material to backfill full depth of excavation in wet and/or frozen conditions.
- .2 Salvage excavated material and reuse for backfill material if approved by the Departmental Representative.
 - .1 The Contractor must be prepared to use granular material for the entire backfill envelope when working in wet and/or frozen conditions.
- .3 Protect installed culvert with compacted fill before heavy equipment is permitted to cross.
- .4 Remove and replace any culvert material damaged by Contractor's operations at no extra cost.
- .5 Place backfill in unfrozen condition.

3.4 CULVERT / STRUCTURE REMOVAL

- .1 Remove culverts and include dispose of sections to an approved location outside of the National Parks.
- .2 Accommodate traffic at all time during the removal of a culvert. Adequate control and traffic flow to be maintained.

3.5 CULVERT MARKERS

- .1 Supply and install new Ice Worm Advantage Culvert Savers or equivalent mounted culvert markers at each culvert end in accordance with the drawings.
- .2 Remove and dispose of existing culvert markers to an approved location outside of the National Parks.

END OF SECTION