### SECTION 502 – CONCRETE STRUCTURES

**DESCRIPTION**

NOTE TO SPEC WRITER: RCB projects should include consideration of limiting the project to pre-cast only based on project schedule limitations, traffic control considerations, trench width constraints resulting from existing utilities and pavement restoration costs. If a decision to exclude cast-in-place RCBs is made, it is strongly suggested that a memo to file and to the funding agency be drafted documenting that the above considerations reasonably appear to outweigh possible economic benefits from including cast-in-place as an option.

**502.01.01 GENERAL**

***ADD The following to this subsection:***

D. This work shall also include construction of headwalls, wingwalls, connection and transition/splitter structures, and pre-cast concrete box culverts. This shall include the construction of temporary head walls necessary to support the travel lanes and/or work adjacent to the excavation for the reinforced concrete box culvert and roadway.

E. Pre-cast reinforced concrete box culvert sections shall conform to Section 509 of the Uniform Standard Specifications.

F. The precast units scheduled for attachment to cast-in-place improvements shall be furnished with exposed No. 4 reinforcement steel on 12-inch spacings. The No. 4 reinforcement steel shall be cast a minimum of 18 inches into the pre-cast section and extended 18 inches into the cast-in-place improvements.

G. Reinforcing bars crossing construction joints shall be epoxy coated.

NOTE TO SPEC WRITER: Include H below only if you are specifying Pre-Cast RCB on your project

1. All reinforced box culverts shown on the plans between Sta. XXX to Sta. XXX shall be precast.

**CONSTRUCTION**

**502.03.09 CONCRETE DEPOSITED UNDER WATER**

***ADD The following to this subsection:***

G. If groundwater is encountered on this project, the Contractor will dewater the excavated area and subbase for the concrete structures improvements in such a manner that the concrete will not be placed in any standing water.

***ADD The following subsections TO this SECTION:***

**502.03.70 TEMPORARY HEAD WALL**

A. The Contractor may utilize the temporary head walls for support of the required travel lane(s) and/or work areas adjacent to open excavation. If the Contractor chooses to utilize temporary head walls, the Contractor shall provide theEngineerwith design plans and calculations for such head walls and/or supports. The design plans shall be in detail, showing all information as required by the Engineer, and shall bear the seal of a Nevada Registered Engineer.

**502.03.71 INSPECTION**

NOTE TO SPEC WRITER: Make sure video inspection is incidental to the RCB

Note to Spec Writer – Section 693 is to be used on all projects with new sewer and storm drain pipelines and structures, rehabilitated manholes, and rehabilitated sewer lines.

A. All RCB joints and lengths shall be 100 percent inspected. Inspection and Testing shall be performed by the Contractor during and after installation to ensure proper performance. Installation of bedding and backfill materials, as well as their placement and compaction, shall adhere to the requirements of this and other applicable sections. Errors in line and grade, as well as any improper assembly or backfill techniques, shall be corrected prior to placing significant backfill or trench fill. Joints shall be installed per manufacturer’s recommendations to prevent the infiltration of soil fines. Shallow cover installations shall be checked to ensure the minimum cover level is provided.

B. Internal Video Inspection. Internal video inspection shall be performed by the Contractor a minimum of 30 days after final backfill has been placed and prior to final acceptance by the Contracting Agency. The line shall be cleaned and inspected per Section 693 “Internal Inspection of Sewer and Storm Drain Facilities” in these Special Provisions. Cracks in RCBs that are less than 0.10 inch in width are generally considered non-structural flaws and need not be repaired. Cracks that are equal to or exceed 0.10 inch in width shall require an evaluation by a Nevada licensed Professional Engineer provided by the Contractor. The Contractor’s Engineer shall provide a recommendation regarding removal or repair subject to approval by the Contracting Agency. RCB joints and length that do not meet the specification shall be repaired or RCB replaced at the Contractor’s expense. All inspection results shall be submitted and approved by the Contracting Agency before final payment. Any replacement RCB shall also be subject to the same testing. All inspection and testing results shall be submitted to the Engineer for approval.

**METHOD OF MEASUREMENT**

**502.04.01 MEASUREMENT**

***ADD The following to this subsection:***

The quantity of SIZE Reinforced Concrete Box will be measured per linear foot along the centerline of the box.

The quantity of [FILL IN ITEM DESCRIPTION] will be measured per [UNIT].

No direct measurement shall be made for [FILL IN ITEM DESCRIPTION].

**BASIS OF PAYMENT**

**502.05.01 PAYMENT**

***ADD The following to this subsection:***

The accepted quantity of SIZE Reinforced Concrete Box will be paid for at the contract unit price of linear foot and shall include all materials, equipment and labor required including, but not limited to, removal of patches (temporary and permanent); temporary patches; permanent patches; all excavation; over-excavation and backfill; trench excavation; compaction and recompaction; dewatering; disposing of excess material; grading; scarification; shaping; shoring; subgrade preparation; bedding; drain backfill; drain rock; granular backfill; selected backfill; structural fill; trench backfill (granular, select or Controlled Low-Strength Material); Type II Aggregate Base; access ladders; backer rod; bolted/slotted lid with reinforced manhole collar; bolts; cast-in-place connections and/or transitions; concrete collars; concrete; contraction joints; curing compound; cutoff walls; dowels; epoxy dowels; epoxy; expansion joints; forming and curing concrete; gaskets; grout; joint filler; joint sealant; joint water proofing; manhole mounting; mortar; ready-mix flowable fill; reinforcing steel; removal of temporary steel piles; temporary closure wall (if applicable); temporary head walls; tools; potholing to determine the location of existing utilities; protection and restoration, if damaged, of all existing facilities and improvements required to remain in place including survey monuments, landscaping and irrigation systems, except where provided for elsewhere in these Special Provisions; support and protection of all utilities; delivery; handling; installation; placement; tie-in to existing concrete structures; tie-in to existing reinforced concrete box, internal video inspection; and all other items necessary to complete the work as shown on the Plans, as specified herein and as directed by the Engineer.

The accepted quantity of [FILL IN ITEM DESCRIPTION] will be paid for at the contract unit price of [UNIT] and shall include all materials, equipment and labor required including, but not limited to, [FILL IN] and all other items necessary to complete the work as shown on the Plans, as specified herein and as directed by the Engineer.

The accepted quantity of [FILL IN ITEM DESCRIPTION] will be paid for at the contract unit price of [UNIT] and shall conform to the requirements of subsection 502.05.01 of the Uniform Standard Specifications and shall include all materials, equipment, labor and disposal required to perform this work and all work as shown on the Plans, as specified herein and as directed by the Engineer. The above payment shall also include,

Unless otherwise provided in the Special Provisions, no payment will be made for [FILL IN ITEM DESCRIPTION] as such. The cost thereof shall be considered as included in the price bid for construction or installation of the items to which [FILL IN ITEM DESCRIPTION] is required.

Payment will be made under:

|  |  |  |
| --- | --- | --- |
| **ITEM NO.** | **ITEM DESCRIPTION** | **UOM** |
| 502.XXXX | SIZE REINFORCED CONCRETE BOX | LF |
| 502.XXXX | [CONCRETE STRUCTURE] | [UNIT] |

**END OF SECTION 502**