



Dayton Office

## ENGINEERING REPORT

TO: Contech Engineered Solutions, LLC.  
9025 Centre Pointe Drive, Suite 400  
West Chester, OH 45069

DATE: April 16, 2021

NO: 23999D-1-0421-05

ATTN: Mr. Zach Moore, P.E.  
Project Engineer

Re: Preliminary Design of Reinforced Concrete Headwalls for a Seven Barrel Skewed BridgeCor Box (615299); South County Road 1232, Midland, Texas; CBC Report No. 23999D-1-0421-05

We are pleased to submit our report for the above referenced project. The purpose of this report is to provide a preliminary design of the reinforced concrete headwalls for a seven barrel skewed BridgeCor box. Each BridgeCor box is reported to have a span of 34'-1" and a rise of 9'-11 7/8". Others are responsible for all other aspects of the design of this structure, and the only responsibility of CBC Engineers is the preliminary design of concrete headwalls for the proposed structure.

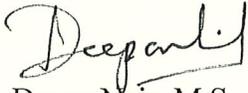
The maximum height of the concrete headwalls for the BridgeCor box has been considered to be approximately 12.5 feet above the top of the footings in the preliminary design. The length of the headwalls is approximately 341.0 ft. The required geometry of the headwalls must be verified prior to final design. Control joints will need to be placed between portions of the headwalls as shown on the attached preliminary drawings. The headwalls at both ends of the structure have been preliminarily designed as per AASHTO LRFD design methodology to carry the lateral soil pressure resulting from the backfill around the structure (an approximate level backfill with a minimum friction angle of 36 degrees and a maximum unit weight of 130 pcf), lateral live load pressure from the HL-93 live load surcharge, and also the loads from the skew-cut end of the BridgeCor barrels. No impact loading or unbalanced hydrostatic loading has been considered. It has been preliminarily determined that the headwalls need to be 24 inches thick at the top of the wall and 48 inches thick at the bottom of the wall. The headwalls will bear on the arch footings (to be designed) as shown on the preliminary drawings.

The preliminary total volume of concrete for the two concrete headwalls as shown on the attached drawing is approximately 360 cubic yards. The preliminary weight of steel reinforcement is estimated to be approximately 600 lbs./cy of reinforced concrete. The preliminary drawing is attached in Appendix A.

It is emphasized that a final design has not been performed and the information presented herein is preliminary and is subject to change once a final design is completed. The information presented herein should in no way be used for construction or applied to a different structure.

Respectfully submitted,

CBC Engineers & Associates, Ltd.



Deepa Nair, M.S., P.E.  
Project Engineer



Mitchell T. Hardert, P.E.  
Chief Engineer

DN/MTH/leh

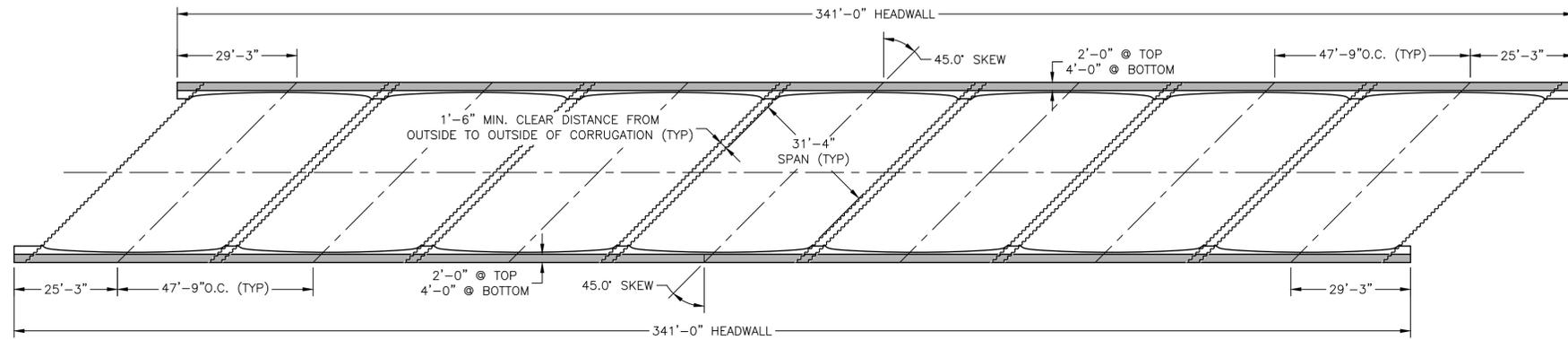
cc: Client (zach.moore@contechllc.com)

cc: Darrell Sanders (darrell.sanders@contechllc.com)

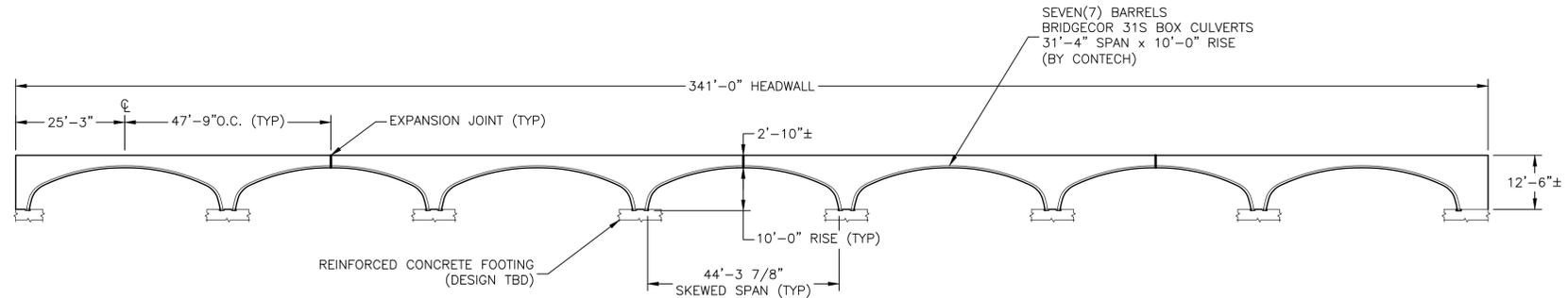
cc: Melinda Fugate (melinda.fugate@contechllc.com)

1-File

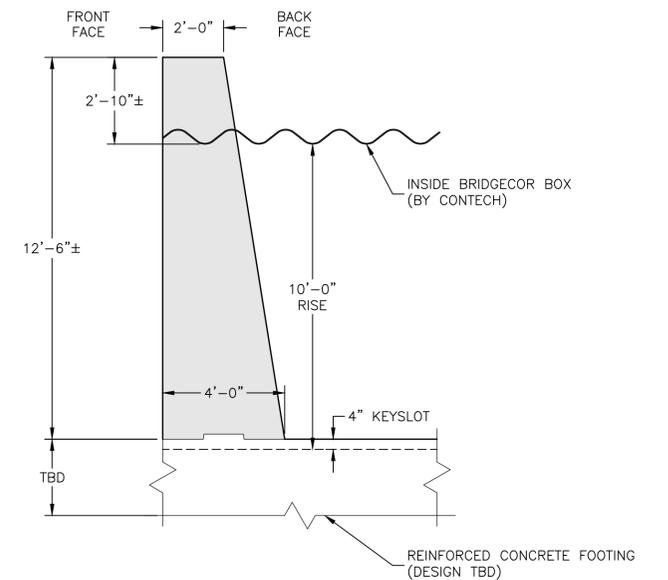
**APPENDIX A**  
**PRELIMINARY DETAILS**



**PLAN VIEW**



**TYPICAL HEADWALL ELEVATION VIEW**



**TYPICAL HEADWALL SECTION VIEW**



**ESTIMATED QUANTITIES:**

(TOTAL FOR TWO HEADWALLS)  
 CONCRETE = 360 cu.yd.  
 REINFORCING STEEL = 600 lbs./cu.yd.

**PRELIMINARY DESIGN**

- NOT FOR CONSTRUCTION - SUBJECT TO CHANGE -

<b>PRELIMINARY HEADWALL DETAILS</b>			
Drawn By DJH	Date 4/13/2021	CONTECH ENGINEERED SOLUTIONS, LLC PRELIMINARY Design of Concrete Headwalls for a Seven Barrel Skewed BridgeCor Box (615299); South County Road 1232, Midland, Texas	
Approved By	Date	Project No. CBC-23999	Rev. -
Scale GRAPHIC	Sheet 1 OF 1		