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Bridge Quantity Calculations

ODOT District 12 Project

LAK-283-04.58

PID No. 110807

Lakeshore Boulevard SR-283 Bridge over
the Chagrin River Overflow Channel

City of Eastlake
Lake County, Ohio

March 11, 2024

CT PROJECT NO. 210060

ITEM 202 - E11203 ~ PORTIONS OF STRUCTURE REMOVED, OVER 20 FT SPAN, A.P.P ~ LS

EXIST. BRIDGE LENGTH = 50.0'

" " WIDTH = 39.5'

DECK AREA = 2015 SF

USE REMOVAL COST @ \$40/SF

$$\therefore \text{COST} = \$40/\text{SF} \times 2015 \text{ SF} = \$80,600$$

Say \$85,000

ITEM 202 - E23500 ~ WEARING COURSE REMOVED ~ SY

EXISTING PAVEMENT AREA = 30 FT X 51 FT = 1,530 SF

$$= \frac{1530 \text{ SF}}{9 \text{ SF/SY}} = 170 \text{ SY}$$

ITEM 503 ~ ^{E1101} COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN ~ LS

See General Notes Sheet 3/22 For Limits of Sheetings @ Bridge Ends

$$\text{LENGTH} = 2 \text{ ABUTMENT} \times 25 \text{ FT/ABUT} = 50 \text{ FT}$$

$$\text{HEIGHT} = 28 \text{ FT}$$

Use Cost @ \$50/SF

$$\therefore \text{COST} = 50 \text{ FT} \times 28 \text{ FT} \times \$50/\text{SF} = \$70,000$$

ITEM 503 ~ E21300 - UNCLASSIFIED EXCAVATION ~ LS

Ave. Depth of Excavation @ Abutments → BACK (8 FT); FRONT (1.5 FT)

Ave. Depth of Excavation @ Piers = 1.5 FT

Area of Abut. Excavation → BACK (162 SF); FRONT (66 SF)

Area of Pier Excavation → 82 SF

$$\text{Abut. Exc. Volume} = 2 \text{ Abutments} \left[\frac{(162 \text{ SF} \times 8 \text{ FT}) + (66 \text{ SF} \times 1.5 \text{ FT})}{27 \text{ CF/CY}} \right] = 104 \text{ CY}$$

$$\text{Piers Exc. Volume} = 2 \text{ Piers} \left(\frac{82 \text{ SF} \times 1.5 \text{ FT}}{27 \text{ CF/CY}} \right) = 10 \text{ CY}$$

$$\Sigma = 114 \text{ CY}$$

$$\text{Cost: } @ \$80/\text{CY}; \quad 114 \text{ CY} \times \$80/\text{CY} = \$9,120$$

Say \$10,000

ITEM 509 ~ E 10001 - EPOXY COATED REINFORCING STEEL, AS PER PLAN ~ LB	
Refer to Sheets 21 & 22 of 22. (REINFORCING SCHEDULE SHEETS)	
SUBSTRUCTURE	REAR ABUTMENT = 2554 LB
	FWD ABUTMENT = 2732 LB
	PIER NO. 1 = 2096 LB
	PIER NO. 2 = 2096 LB
SUPER. R.A. DIAPHRAGM = 2125 LB	SUPERSTRUCTURE = 32,544 LB
SUPER. F.A. DIAPHRAGM = 2125 LB	
SUPERSTRUCTURE (SLAB) = 25616 LB	
" (PARAPETS) = 2678 LB	
$\Sigma = 42,042$ LB	

ITEM 510 ~ E10000 - DOVEL HOLES WITH NONSHRINK, NONMETALLIC GROUT ~ EACH	
REAR ABUTMENT = 8 + 13 + 16 + 31 + 16 + 30 + 5 + 12 = 131 EACH	
FWD ABUTMENT = 8 + 13 + 16 + 30 + 16 + 31 + 9 + 15 = 138 EACH	
PIER NO. 1 = 1 + 2(14) + 2(13) + 1 = 56 EACH	
PIER NO. 2 = 1 + 2(14) + 2(13) + 1 = 56 EACH	
$\Sigma = 381$ EACH	

ITEM 511 ~ E 33412 - CLASS GC2 CONCRETE, SUPERSTRUCTURE ~ CY	
SLAB: DECK CROSS SECTION AREA = 45.7 SF	
F/F ABUTMENT LENGTH = 56.5 - 2(1.75) = 49.0'	
VOLUME = $\frac{45.7 \text{ SF} \times 49.0'}{27 \text{ CF/CY}} = 83 \text{ CY}$	
<u>ABUTMENT DIAPHRAGM & PIER CROWN</u>	
AREA = $2 \left[(144.5 \text{ SF}) \times (2.25') - (55 \text{ SF} \times 0.5') + (22.6 \text{ SF} \times 2.5') \right] = 708.25 \text{ CF}$	
VOLUME = $\frac{708.25 \text{ CF}}{27 \text{ CF/CY}} = 27 \text{ CY}$	
TOTAL = 83 CY + 27 CY = 110 CY	

ITEM 511 ~ E40510 - CLASS QC1, PIER ABOVE FOOTING ~ CY

AVERAGE DEPTHS → PIER #1 = 8.3'; PIER #2 = 8.5'

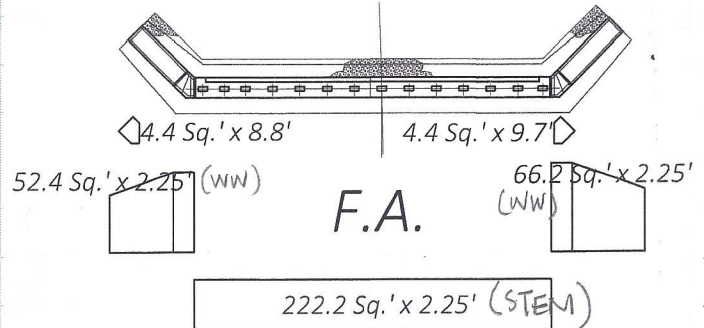
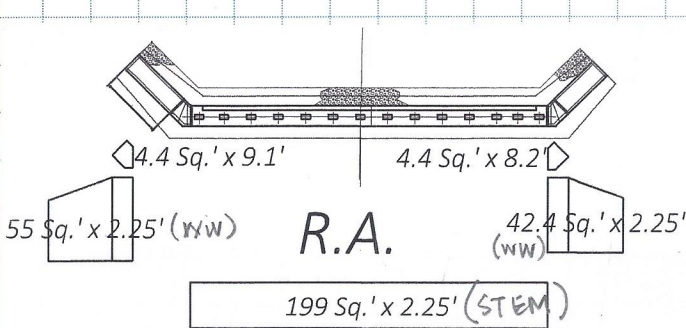
PLAN (TYP.) 93.7 SF

$$\text{PIER \#1 VOLUME} = \frac{93.7 \text{ SF} \times 8.3'}{27 \text{ SF/cy}} = 28.8 \text{ cy} \approx 29 \text{ cy}$$

$$\text{PIER \#2 VOLUME} = \frac{93.7 \text{ SF} \times 8.5'}{27 \text{ SF/cy}} = 29.5 \text{ cy} \approx 30 \text{ cy}$$

$$\Sigma = 59 \text{ cy}$$

ITEM 511 ~ E44110 - CLASS QC1 CONCRETE, ABUTMENT NOT INCLUDING FOOTING ~ CY



$$\text{R.A.: } \frac{4.4 \text{ SF} (9.1' + 8.2') + 2.25' (55.2 \text{ SF} + 42.4 \text{ SF}) + 199 \text{ SF} (2.25')}{27 \text{ SF/cy}} = 28 \text{ cy}$$

$$\text{F.A.: } \frac{4.4 \text{ SF} (8.8' + 9.7') + 2.25' (52.4 \text{ SF} + 66.2 \text{ SF}) + 222.2 \text{ SF} (2.25')}{27 \text{ SF/cy}} \approx 32 \text{ cy}$$

$$\Sigma = 60 \text{ cy}$$

ITEM 512 ~ E10100 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE) ~ SY

R.A.	21 SF + 55 SF + 21 SF + 109 SF + 18 SF + 43 SF + 19 SF	= 376 SF / 9 SF/SY	= 42 SY
F.A.	21 SF + 53 SF + 20 SF + 223 SF + 23 SF + 63 SF + 23 SF	= 426 SF / 9 SF/SY	= 48 SY
PIER #1	99' (8.3')	= 822 SF / 9 SF/SY	= 92 SY
PIER #2	99' (8.5')	= 842 SF / 9 SF/SY	= 94 SY
SUPER (DECK)	2 SIDES (7.167') (53.5')	= 767 SF / 9 SF/SY	= 86 SY
			$\Sigma = 362 \text{ SY}$

ITEM 512 ~ E10300 - SEALING CONCRETE BARGE DECKS WITH HMWV RESIN ~ SY

LOCATION: DECK along Phase Construction Joints (2 required)

$$\text{AREA} = 2 \times 2\text{FT} \times 53.5\text{FT} = 23.7\text{sy}$$

9sf/sy

Say 30sy

ITEM 512 ~ E33000 - TYPE 2 WATERPROOFING ~ SY

12

$$\text{R.A. @ C.J.} = 12\text{sf} + 19\text{sf} = 31\text{sf}$$

$$\text{@ WW} = (10' \times 3') + (9' \times 3') = 57\text{sf}$$

$$\frac{88\text{sf}}{9\text{sf/sy}} = 10\text{sy} \text{ Say } 15\text{sy}$$

$$\text{FA @ C.J.} = 12\text{sf} + 21\text{sf} = 33\text{sf}$$

$$\text{@ WW} = (10' \times 3') + (11' \times 3') = 63\text{sf}$$

$$\frac{96\text{sf}}{9\text{sf/sy}} = 11\text{sy} \text{ Say } 15\text{sy}$$

$$\underline{\underline{\Sigma 30\text{sy}}}$$

ITEM 516 ~ E13900 - 2" PREFORMED EXPANSION JOINT FILLER ~ SF

AVERAGE HEIGHT ~ 4 FT

$$\text{REAR ABUTMENT} = \frac{2(4' \times 2.25')}{9\text{sf/sy}} \approx 5.0\text{sy}$$

$$\text{FORWARD ABUTMENT} = \frac{2(4' \times 2.25')}{9\text{sf/sy}} \approx 5.0\text{sy}$$

$$\underline{\underline{\Sigma 10.0\text{sy}}}$$

ITEM 516 ~ E14014 - INTEGRAL ABUTMENT EXPANSION JOINT SEAL ~ FT

$$\text{REAR ABUTMENT} = \underset{\text{HORIZ.}}{42'} + 2 \underset{\text{VERTICAL}}{(5.5')} = 53'$$

$$\text{FORWARD ABUTMENT} = \underset{\text{HORIZ.}}{42'} + 2 \underset{\text{VERTICAL}}{(5.5')} = 53\text{FT}$$

$$\text{TOTAL} = 53' + 53' = \underline{\underline{106\text{FT}}}$$

ITEM 516 ~ E14014 - ELASTOMERIC BEARING WITH INTERNAL LAMINATES ONLY (NEOPRENE), AS PER PLAN, 1/4" x 7" x 14" ~ EACH

$$\text{REAR ABUTMENT} \sim 14 \text{ EA.}$$

$$\text{FWD. ABUTMENT} \sim 14 \text{ EA.}$$

$$\underline{\underline{\Sigma 28 \text{ EA}}}$$

