

**INDEX TO STRUCTURE ESTIMATED QUANTITY CALCULATIONS**  
**BRIDGE NO. CUY-43-0607 OVER HAWTHORNE CREEK**

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**INDEX TO STRUCTURE ESTIMATED QUANTITY CALCULATIONS**  
**BRIDGE NO. CUY-43-0607 OVER HAWTHORNE CREEK**

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PROJECT CUY-43-6.04 PROJ. NO. 18-091 PG. 1 OF 25

COMP. BY BDH DATE 1-7-21 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT B.N. CUY-43-06.07 OVER HANTHORNE CR.

STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

PHASE 1 A REMOVAL

SIDEWALK (RIGHT)

$$\text{CONCRETE} = \frac{1}{2} (0.79' + 1.00') (5.00') (66.80') \left(\frac{1}{27}\right) = 11.1 \text{ CY}$$

TOTAL PHASE 1A REMOVAL (CONCRETE)

$$\text{SUPERSTRUCTURE} = 11.1 \text{ CY} = 11.1 \text{ CY}$$



STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

PHASE 1B REMOVAL

REAR ABUTMENT WINGWALL (LEFT)

FOOTING (CONCRETE)

$$\left[ \frac{1}{2}(1.50' + 1.67')(3.625') + (1.67')(0.75') \right. \\ \left. + (2.00')(1.00') + \left( \frac{1}{2} \right)(1.50')(2.00')(3.625') \right] \\ \times 18.00' \text{ LONG} \times \frac{1}{27} = 9.6 \text{ CY}$$

WALL (CONCRETE)

$$\left[ (1.75') \left( \frac{1}{2} \right) (3.25' + 13.33') \text{ AVG. HT. (18.00' LONG)} \right. \\ \left. + (1.25') \left( \frac{1}{2} \right) (12.33' + 2.00') \text{ AVG. HT. (18.00' LONG)} \right] \times \frac{1}{27} = 15.6 \text{ CY}$$

R.A. WINGWALL (CONCRETE) = 25.2 CY

WALL (MASONRY)

$$(0.75') \left( \frac{1}{2} \right) (12.33' + 2.00') \text{ AVG. HT. (18.00' LONG)} \times \frac{1}{27} = 3.6 \text{ CY}$$

R.A. WINGWALL (MASONRY) = 3.6 CY

REAR ABUTMENT WALL (CONCRETE)

$$(2.25')(8.80')(4.00' + 25.66') \text{ FOOTING TO COPING} \times \frac{1}{27} = 21.8 \text{ CY}$$

$$(3.00')(3' \text{ AVG. HT.})(25.66') \text{ COPING TO SEAT} \times \frac{1}{27} = 8.6 \text{ CY}$$

$$(1.25')(2.50')(25.66') \text{ BACKWALL} \times \frac{1}{27} = 3.0 \text{ CY}$$

R.A. WALL (CONCRETE) = 33.4 CY

REAR ABUTMENT FOOTING (CONCRETE)

ASSUME LEFT IN PLACE

PHASE 1B R.A. (CONCRETE) SUBTOTAL

$$25.2 \text{ CY} + 33.4 \text{ CY} = 58.6 \text{ CY}$$

PHASE 1B R.A. (MASONRY) SUBTOTAL

$$3.6 \text{ CY} = 3.6 \text{ CY}$$



STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, APP

PHASE 1B REMOVAL (CONT'D)

FORWARD ABUTMENT WINGWALL (LEFT)

FOOTING (CONCRETE)

$$\left[ \frac{1}{2}(1.50' + 1.67')(3.625') + (1.67')(0.75') \right. \\ \left. + (2.00')(1.00') + \frac{1}{2}(1.50')(2.00')(3.625') \right] \\ \times 13.375' \text{ LONG} \times \frac{1}{27} = 7.2 \text{ CY}$$

WALL (CONCRETE)

$$\left[ (1.75') \left( \frac{1}{2} \right) (3.00' + 3.875') \text{ AVG. HT. } (2.625') \right. \\ \left. + (1.75') \left( \frac{1}{2} \right) (6.00' + 13.92') \text{ AVG. HT. } (13.375') \right. \\ \left. + (1.25') \left( \frac{1}{2} \right) (10.76' + 1.09') \text{ AVG. HT. } (16.00') \right] \times \frac{1}{27} = 13.6 \text{ CY}$$

F.A. WINGWALL (CONCRETE) = 20.8 CY

WALL (MASONRY)

$$(0.75') \left( \frac{1}{2} \right) (10.76' + 1.09') \text{ AVG. HT. } (16.00') \times \frac{1}{27} = 2.6 \text{ CY}$$

FORWARD ABUTMENT WALL (CONCRETE)

$$(2.25')(7.87')(6.625' + 24.92') \text{ FOOTING TO COPING} \times \frac{1}{27} = 20.7 \text{ CY}$$

$$(3.00')(3' \text{ AVG. HT.})(24.92') \text{ COPING TO SEAT} \times \frac{1}{27} = 8.3 \text{ CY}$$

$$(1.25')(2.50')(24.92') \text{ BACKWALL} \times \frac{1}{27} = 2.9 \text{ CY}$$

F.A. WALL (CONCRETE) = 31.9 CY

FORWARD ABUTMENT FOOTING (CONCRETE)

ASSUME LEFT IN PLACE

PHASE 1B F.A. (CONCRETE) SUBTOTAL

$$20.8 \text{ CY} + 31.9 \text{ CY} = 52.7 \text{ CY}$$

PHASE 1B F.A. (MASONRY) SUBTOTAL

$$2.6 \text{ CY} = 2.6 \text{ CY}$$

STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

PHASE 1B REMOVAL (CONT'D)

RAILING (LEFT)

CONCRETE:  $(1.00') \times (4.50') \times (66.80') \times (\frac{1}{27}) = 11.1 \text{ CY}$

MASONRY:  $(0.50') \times (4.50') \times (66.80') \times (\frac{1}{27}) = 5.6 \text{ CY}$

SIDEWALK (LEFT)

CONCRETE:  $(1.92' \text{ AVG TH}) \times (5.00') \times (66.80') \times (\frac{1}{27}) = 23.8 \text{ CY}$

SLAB & BEAMS

CONCRETE:  $(28.3 \text{ SQ FT CAD AREA}) \times (30.7') \times (\frac{1}{27}) = 32.2 \text{ CY}$

DIAPHRAGM:  $(1.17') \times (1.625') \times (3.625') \times (4) \times (\frac{1}{27}) = 1.0 \text{ CY}$

CONCRETE = 33.2 CY

MASONRY:  $(\frac{1}{2}) \times (1.75' + 2.00') \times (0.75') \times (30.7') \times (\frac{1}{27}) = 0.9 \text{ CY}$

PHASE 1B SUPERSTRUCTURE (CONCRETE) SUBTOTAL

$11.1 \text{ CY} + 23.8 \text{ CY} + 33.2 \text{ CY} = 68.1 \text{ CY}$

PHASE 1B SUPERSTRUCTURE (MASONRY) SUBTOTAL

$5.6 \text{ CY} + 0.9 \text{ CY} = 6.5 \text{ CY}$

TOTAL PHASE 1B REMOVAL (CONCRETE)

ABUTMENTS:  $58.6 \text{ CY} + 52.7 \text{ CY} = 111.3 \text{ CY}$

SUPERSTRUCTURE:  $68.1 \text{ CY}$

179.4 CY

TOTAL PHASE 1B REMOVAL (MASONRY)

ABUTMENTS:  $3.6 \text{ CY} + 2.6 \text{ CY} = 6.2 \text{ CY}$

SUPERSTRUCTURE:  $6.5 \text{ CY}$

12.7 CY



STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

PHASE 2 REMOVAL

REAR ABUTMENT

WALL (CONCRETE)

$(2.25')(8.80')(10.785')(\frac{1}{27})$  FOOTING TO COPING = 8.0 CY

$(3.00')(3' \text{ Avg. Ht.})(10.785')(\frac{1}{27})$  COPING TO SEAT = 3.6 CY

$(1.25')(2.50')(10.785')(\frac{1}{27})$  BACKWALL = 1.2 CY

R. A. CONCRETE = 12.8 CY

FORWARD ABUTMENT

WALL (CONCRETE)

$(2.25')(7.87')(12.00')(\frac{1}{27})$  FOOTING TO COPING = 7.9 CY

$(3.00')(3' \text{ Avg. Ht.})(12.00')(\frac{1}{27})$  COPING TO SEAT = 4.0 CY

$(1.25')(2.50')(12.00')(\frac{1}{27})$  BACKWALL = 1.4 CY

F. A. CONCRETE = 13.3 CY

SLAB & BEAMS

CONCRETE :  $(17.1 \text{ SQFT CAD AREA})(30.7')(\frac{1}{27})$  = 19.4 CY

DIAPHRAGM:  $(1.17')(1.625')(3.625')(2)(\frac{1}{27})$  = 0.5 CY

SUPERSTRUCTURE = 19.9 CY

TOTAL PHASE 2 REMOVAL (CONCRETE)

ABUTMENTS : 12.8 CY + 13.3 CY = 26.1 CY

SUPERSTRUCTURE: 19.9 CY = 19.9 CY

46.0 CY

STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

PHASE 3 REMOVAL

REAR ABUTMENT WINGWALL (RIGHT)

SIMILAR TO F.A. WINGWALL LEFT. USE F.A. W/W QUANTITIES

FOOTING (CONCRETE) = 7.2 CY  
WALL (CONCRETE) = 13.6 CY  
R.A. WINGWALL (CONCRETE) = 20.8 CY

WALL (MASONRY) = 2.6 CY

REAR ABUTMENT WALL (CONCRETE)

(2.25')(8.80')(6.625' + 20.8')(1/27) FOOTING TO COPING = 20.1 CY  
(3.00')(3' AVG. HT.)(20.8')(1/27) COPING TO SEAT = 6.9 CY  
(1.25')(2.50')(20.8')(1/27) BACKWALL = 2.4 CY

R.A. WALL (CONCRETE) = 29.4 CY

REAR ABUTMENT FOOTING (CONCRETE)

ASSUME LEFT IN PLACE

PHASE 3 R.A. (CONCRETE) SUBTOTAL

20.8 CY + 29.4 CY = 50.2 CY

PHASE 3 R.A. (MASONRY) SUBTOTAL

2.6 CY = 2.6 CY



STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

PHASE 3 REMOVAL (CONT'D)

FORWARD ABUTMENT WINGWALL (RIGHT)

SIMILAR TO R.A. WINGWALL LEFT. USE R.A. WW QUANTITIES

FOOTING (CONCRETE) = 9.6 CY  
 WALL (CONCRETE) = 15.6 CY  
 F.A. WINGWALL (CONCRETE) = 25.2 CY

WALL (MASONRY) = 3.6 CY  
 F.A. WINGWALL (MASONRY) = 3.6 CY

FORWARD ABUTMENT WALL (CONCRETE)

(2.25')(7.87')(4.00' + 20.13')(1/27) FOOTING TO COPING = 15.8 CY  
 (3.00')(3' AVG. HT.)(20.13')(1/27) COPING TO SEAT = 6.7 CY  
 (1.25')(2.50')(20.13')(1/27) BACKWALL = 2.3 CY

F.A. WALL (CONCRETE) = 24.8 CY

FORWARD ABUTMENT FOOTING (CONCRETE)

ASSUME LEFT IN PLACE

PHASE 3 F.A. (CONCRETE) SUBTOTAL  
 25.2 CY + 24.8 CY = 50.0 CY

PHASE 3 F.A. (MASONRY) SUBTOTAL  
 3.6 CY = 3.6 CY

STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

PHASE 3 REMOVAL (CONT'D)

RAILING (RIGHT) USE RAILING (LEFT) QUANTITY

CONCRETE : 11.1 cy = 11.1 cy

MASONRY : 5.6 cy = 5.6 cy

SLAB & BEAMS

CONCRETE : (23.0 SQ FT CAD AREA) (30.7') (1/27) = 26.2 cy

DIAPHRAGM : (1.17') (1.625') (3.625') (3 1/2) (1/27) = 0.9 cy

MASONRY : (1/2) (1.75' + 2.00') (0.75') (30.7') (1/27) = 0.9 cy

PHASE 3 SUPERSTRUCTURE (CONCRETE) SUBTOTAL

11.1 cy + 27.1 cy = 38.2 cy

PHASE 3 SUPERSTRUCTURE (MASONRY) SUBTOTAL

5.6 cy + 0.9 cy = 6.5 cy

TOTAL PHASE 3 REMOVAL (CONCRETE)

ABUTMENTS : 50.2 cy + 50.0 cy = 100.2 cy

SUPERSTRUCTURE : 38.2 cy = 38.2 cy

138.4 cy

TOTAL PHASE 3 REMOVAL (MASONRY)

ABUTMENTS : 2.6 cy + 3.6 cy = 6.2 cy

SUPERSTRUCTURE : 6.5 cy = 6.5 cy

12.7 cy



STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-11003 STRUCTURE REMOVED, OVER 20 FOOT SPAN, A.P.P.

SUMMARY OF REMOVALS & TOTALS

PHASE	REAR ABUT. (CONCRETE)	FORWARD ABUT. (CONCRETE)	TOTAL ABUTMENTS (CONCRETE)	SUPER (CONCRETE)	TOTAL (CONCRETE)
1A	-	-	-	11 CY	11 CY
1B	59 CY	53 CY	112 CY	68 CY	180 CY
2	13 CY	13 CY	26 CY	20 CY	46 CY
3	50 CY	50 CY	100 CY	38 CY	138 CY
<b>TOTAL</b>	<b>122 CY</b>	<b>116 CY</b>	<b>238 CY</b>	<b>137 CY</b>	<b>375 CY</b>

PHASE	REAR ABUT. (MASONRY)	FORWARD ABUTMENT (MASONRY)			
1A	-	-	-	-	-
1B	4 CY	3 CY	7 CY	7 CY	14 CY
2	-	-	-	-	-
3	3 CY	4 CY	7 CY	7 CY	14 CY
<b>TOTAL</b>	<b>7 CY</b>	<b>7 CY</b>	<b>14 CY</b>	<b>14 CY</b>	<b>28 CY</b>

LUMP SUM

STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 202-22900 APPROACH SLAB REMOVED

PHASE 1B:  $(20.083')(17.500')(\frac{1}{4})(2 \text{ ENDS}) = 77.8 \text{ SY} \approx 78 \text{ SY}$   
 PHASE 2:  $(20.083')(10.000')(\frac{1}{4})(2 \text{ ENDS}) = 44.6 \text{ SY} \approx 45 \text{ SY}$   
 PHASE 3:  $(20.083')(13.500')(\frac{1}{4})(2 \text{ ENDS}) = 60.2 \text{ SY} \approx 60 \text{ SY}$

183 SY

ITEM 202-23500 WEARING COURSE REMOVED

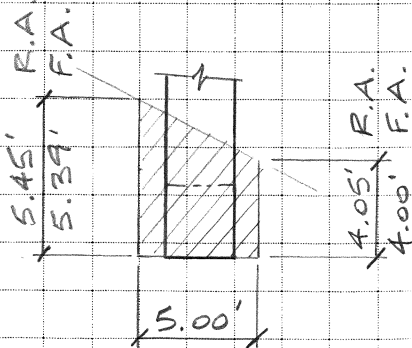
PHASE 1B:  $(69.45')(17.00')(\frac{1}{4}) = 131.2 \text{ SY} \approx 131 \text{ SY}$   
 PHASE 2:  $(69.45')(10.00')(\frac{1}{4}) = 77.2 \text{ SY} \approx 77 \text{ SY}$   
 PHASE 3:  $(69.45')(13.00')(\frac{1}{4}) = 100.3 \text{ SY} \approx 100 \text{ SY}$

308 SY

ITEM 503-11101 COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN

LUMP SUM

ITEM 503-21100 UNCLASSIFIED EXCAVATION



PHASE 1B

REAR ABUTMENT

$\frac{1}{2}(4.05' + 5.45')(5.00')(36' \text{ LONG})(\frac{1}{27})$   
 $= 31.7 \text{ CY}$

FORWARD ABUTMENT

$\frac{1}{2}(4.00' + 5.39')(5.00')(36' \text{ LONG})(\frac{1}{27})$   
 $= 31.3 \text{ CY}$

TOTAL PHASE 1B

$31.7 \text{ CY} + 31.3 \text{ CY} = 63 \text{ CY}$



STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 503-21100 UNCLASSIFIED EXCAVATION

PHASE 2

REAR ABUTMENT

$$\frac{1}{2}(4.05' + 5.45')(5.00')(10.78' \text{ LONG})\left(\frac{1}{27}\right) = 9.5 \text{ CY}$$

FORWARD ABUTMENT

$$\frac{1}{2}(4.00' + 5.39')(5.00')(10.78' \text{ LONG})\left(\frac{1}{27}\right) = 9.4 \text{ CY}$$

$$\text{TOTAL PHASE 2} = 9.5 \text{ CY} + 9.4 \text{ CY} = 18.9 \text{ CY} \approx 19 \text{ CY}$$

PHASE 3

REAR ABUTMENT

$$\frac{1}{2}(4.05' + 5.45')(5.00')(32.64' \text{ LONG})\left(\frac{1}{27}\right) = 28.7 \text{ CY}$$

FORWARD ABUTMENT

$$\frac{1}{2}(4.00' + 5.39')(5.00')(32.64' \text{ LONG})\left(\frac{1}{27}\right) = 28.4 \text{ CY}$$

$$\text{TOTAL PHASE 3} = 28.7 \text{ CY} + 28.4 \text{ CY} = 57.1 \text{ CY} \approx 57 \text{ CY}$$

$$\text{TOTAL} = 63 \text{ CY} + 19 \text{ CY} + 57 \text{ CY} = \boxed{139 \text{ CY}}$$

ITEM 505-11100 PILE DRIVING EQUIPMENT MOBILIZATION

LUMP SUM

ITEM 507-00501 12" CAST-IN-PLACE REINFORCED CONCRETE PILES,  
DRIVEN, AS PER PLAN

PHASE 1B

$$\text{REAR ABUTMENT: } 5 \text{ PILES} \times 45' \text{ EST. LENGTH} = 225 \text{ FT}$$

$$\text{FORWARD ABUTMENT: } 5 \text{ PILES} \times 40' \text{ EST. LENGTH} = 200 \text{ FT}$$

$$\text{TOTAL PHASE 1B} = 225 \text{ FT} + 200 \text{ FT} = 425 \text{ FT}$$

STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 507-00501 12" CAST-IN-PLACE REINFORCED CONCRETE PILES,  
DRIVEN, AS PER PLAN

PHASE 2

REAR ABUTMENT: 2 PILES x 45' EST. LENGTH = 90 FT

FORWARD ABUTMENT: 2 PILES x 40' EST. LENGTH = 80 FT

TOTAL PHASE 2 = 90 FT + 80 FT = 170 FT

PHASE 3

REAR ABUTMENT: 5 PILES x 45' EST. LENGTH = 225 FT

FORWARD ABUTMENT: 5 PILES x 40' EST. LENGTH = 200 FT

TOTAL PHASE 3 = 225 FT + 200 FT = 425 FT

TOTAL = 425 FT + 170 FT + 425 FT = 1020 FT

ITEM 507-00551 12" CAST-IN-PLACE REINFORCED CONCRETE PILES,  
FURNISHED, AS PER PLAN

PHASE 1B

REAR ABUTMENT: 5 PILES x 50' ORDER LENGTH = 250 FT

FORWARD ABUTMENT: 5 PILES x 45' ORDER LENGTH = 225 FT

TOTAL PHASE 1B = 250 FT + 225 FT = 475 FT

PHASE 2

REAR ABUTMENT: 2 PILES x 50' ORDER LENGTH = 100 FT

FORWARD ABUTMENT: 2 PILES x 45' ORDER LENGTH = 90 FT

TOTAL PHASE 2 = 100 FT + 90 FT = 190 FT



STRUCTURE ESTIMATED QUANTITIES

SFN: 1803396

ITEM 507-00551 12" CAST-IN-PLACE REINFORCED CONCRETE PILES,  
FURNISHED, AS PER PLAN

PHASE 3

REAR ABUTMENT : 5 PILES x 50' ORDER LENGTH = 250 FT

FORWARD ABUTMENT : 5 PILES x 45' ORDER LENGTH = 225 FT

TOTAL PHASE 3 = 250 FT + 225 FT = 475 FT

TOTAL = 475 FT + 190 FT + 475 FT = 1140 FT

ITEM 509-10000 EPOXY COATED REINFORCING STEEL

REAR AND FORWARD ABUTMENT

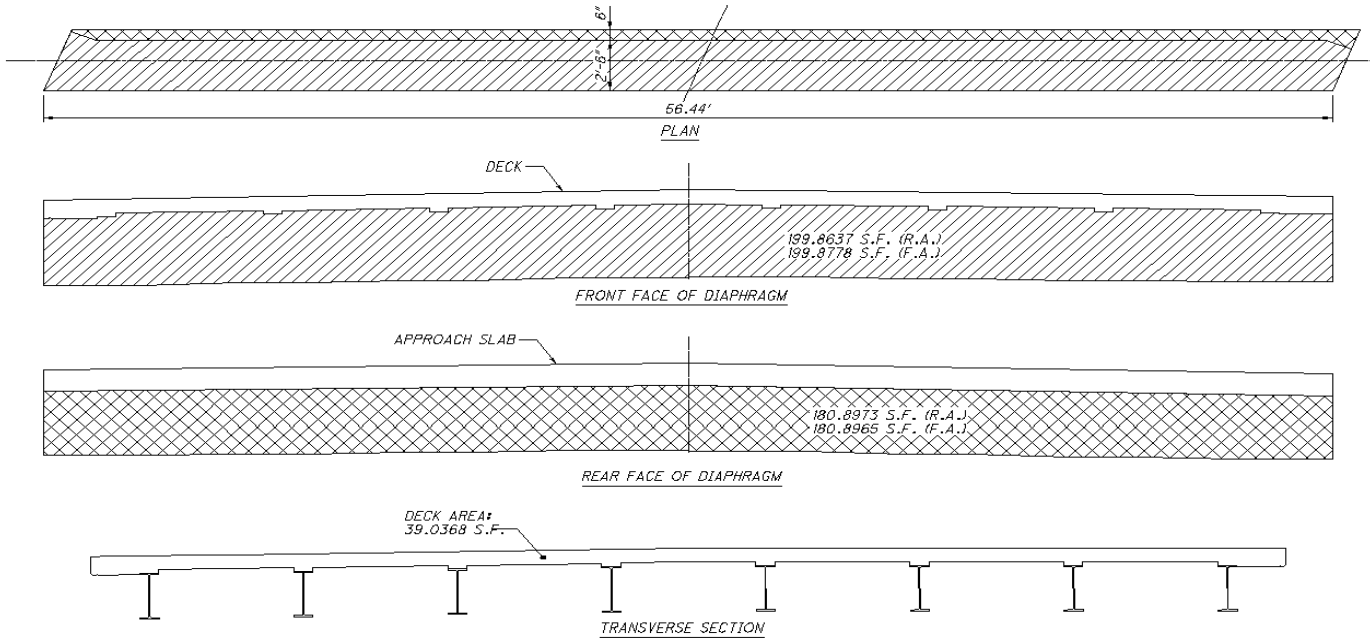
CARRIED FROM PLANSHEET 33/35 = 17234 LB

SLAB

CARRIED FROM PLAN SHEET 35/35 = 16579 LB

TOTAL = 33813 LB

ITEM 511 21523 CLASS QC2 CONCRETE WITH QC/QA, SUPERSTRUCTURE, AS PER PLAN  
 (AREAS BY CADD)  
 SUPERSTRUCTURE:



**DIAPHRAGM AREA UNDER DECK:**

R.A.:	$((199.8637 \times 2.50) \times 1/27 =$	18.51 C.Y.
F.A.:	$((199.8778 \times 2.50) \times 1/27 =$	18.51 C.Y.

**DIAPHRAGM AREA UNDER APPROACH SLABS:**

R.A.:	$(180.8973 \times 0.50) \times 1/27 =$	3.35 C.Y.
F.A.:	$(180.8965 \times 0.50) \times 1/27 =$	3.35 C.Y.

**DEDUCT FOR 1" P.E.J.F.**

$((56.44 \times .83) \times .083) \times 1/27 =$	0.14 C.Y.
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**DEDUCT FOR 1/2" P.E.J.F.**

$((56.44 \times .83) \times .042) \times 1/27 =$	0.07 C.Y.
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<b>TOTAL DIAPHRAGMS:</b>	<b>43.51 C.Y.</b>
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**DECK AREA:**

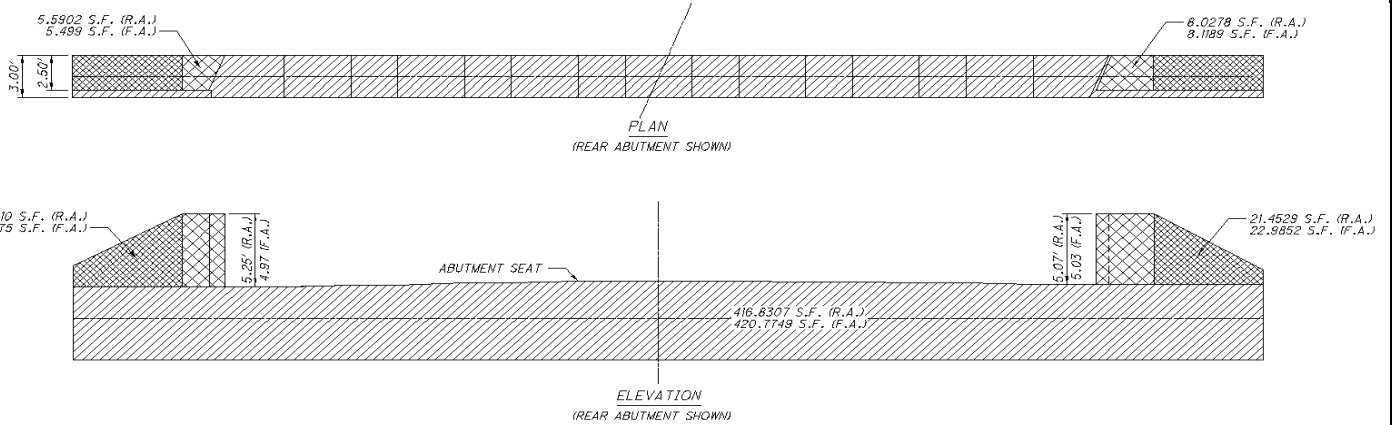
$(39.0368 \times 57.16) \times 1/27 =$	82.64 C.Y.
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<b>TOTAL SUPERSTRUCTURE:</b>	<b>126.15 C.Y.</b>
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USE 127 C.Y.



ITEM 511 43512 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT INCLUDING FOOTING  
(AREAS BY CADD)



ABUTMENT (BELOW ABUTMENT SEAT)

(R.A.) $(416.8307 \times 3.0) \times 1/27 =$	46.31	C.Y.
(F.A.) $(420.779 \times 3.0) \times 1/27 =$	46.75	C.Y.

LEFT WALL (LEVEL PORTION)

(R.A.) $(8.0278 \times 5.06) \times 1/27 =$	1.50	C.Y.
(F.A.) $(5.4990 \times 4.97) \times 1/27 =$	1.01	C.Y.

LEFT WALL (SLOPED PORTION)

(R.A.) $(21.4529 \times 2.50) \times 1/27 =$	1.99	C.Y.
(F.A.) $(23.3975 \times 2.50) \times 1/27 =$	2.17	C.Y.

RIGHT WALL (LEVEL PORTION)

(R.A.) $(5.5902 \times 5.25) \times 1/27 =$	1.09	C.Y.
(F.A.) $(8.1189 \times 5.03) \times 1/27 =$	1.51	C.Y.

RIGHT WALL (SLOPED PORTION)

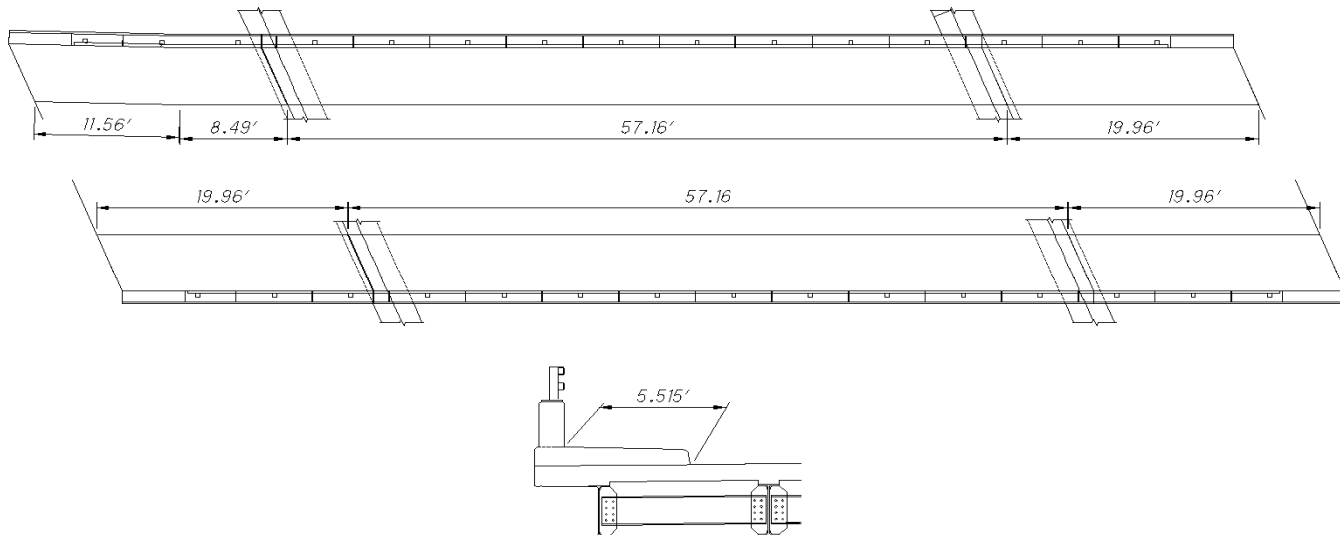
(R.A.) $(23.6310 \times 2.50) \times 1/27 =$	2.19	C.Y.
(F.A.) $(22.9852 \times 2.50) \times 1/27 =$	2.13	C.Y.

**TOTAL SUBSTRUCTURE: 106.65 C.Y.**

USE 

107	C.Y.
-----	------

ITEM 512 10050 SEALING OF CONCRETE SURFACES (NON-EPOXY)



**SUPERSTRUCTURE:**

$((57.16 \times 5.515) \times 2) \times 1/9 = 70.0528 \text{ S.F.}$

USE 71 S.F.

**GENERAL:**

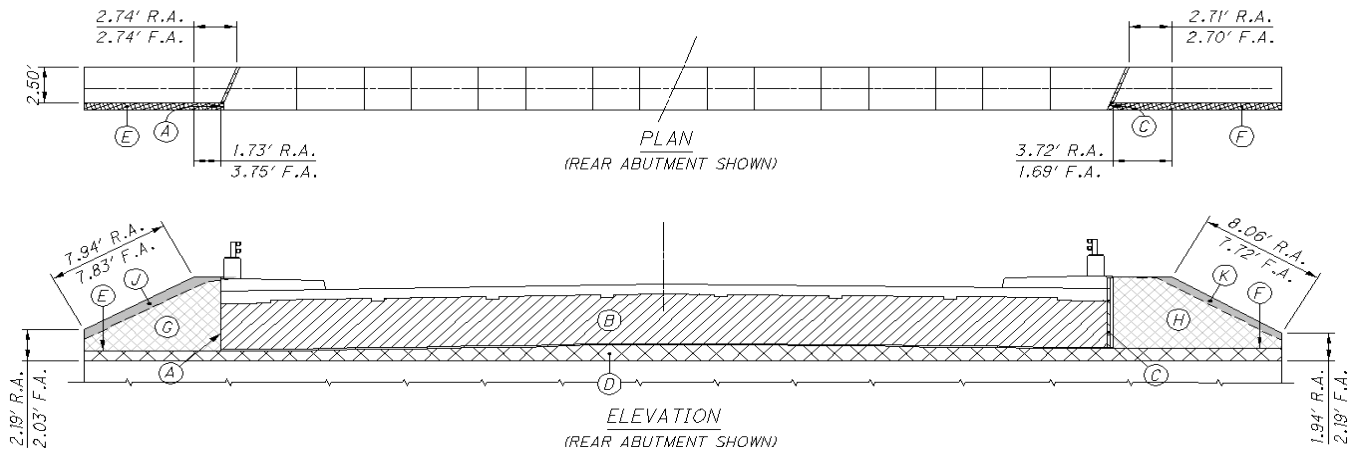
$((11.56 + 8.49 + (19.96 \times 3)) \times 5.515) \times 1/9 = 48.9793 \text{ S.F.}$

USE 49 S.F.

TOTAL 120 S.F.



ITEM 512 10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)  
 (AREAS CALCULATED BY CADD EXCLUDING TOP & END OF WALLS)



REAR ABUTMENT		FORWARD ABUTMENT	
DIAPHRAGM:	WALL - LEFT	DIAPHRAGM:	WALL - LEFT
A 1.71 S.F.	H 40.27 S.F.	A 1.69 S.F.	H 31.82 S.F.
B 195.14 S.F.	K 4.40 S.F.	B 194.56 S.F.	K 4.30 S.F.
C 1.83 S.F.		C 1.82 S.F.	
ABUTMENT:	WALL - RIGHT	ABUTMENT:	WALL - RIGHT
D 69.13 S.F.	G 32.70 S.F.	D 46.02 S.F.	G 41.87 S.F.
E 4.46 S.F.	J 5.97 S.F.	E 5.52 S.F.	J 4.55 S.F.
F 5.50 S.F.		F 4.44 S.F.	

**ABUTMENTS:**

(R.A.)  $(69.13 + 4.46 + 5.50) \times 1/9 = 8.79$  S.Y.  
 (F.A.)  $(46.02 + 5.52 + 4.44) \times 1/9 = 6.22$  S.Y.

**WALLS - LEFT:**

(R.A.)  $(((3.72 + 2.71) \times 1/2) + 8.06 + 1.94) \times 2.50 = 33.04$  S.F.  
 $(33.04 + 40.27 + 4.40) \times 1/9 = 8.63$  S.Y.  
 (F.A.)  $(((1.69 + 2.70) \times 1/2) + 7.72 + 2.19) \times 2.50 = 30.26$  S.F.  
 $(30.26 + 31.82 + 4.30) \times 1/9 = 7.38$  S.Y.

**WALLS - RIGHT:**

(R.A.)  $(((1.73 + 2.74) \times 1/2) + 7.94 + 2.19) \times 2.50 = 30.91$  S.F.  
 $(30.91 + 32.70 + 5.97) \times 1/9 = 7.73$  S.Y.  
 (F.A.)  $(((3.75 + 2.74) \times 1/2) + 7.83 + 2.03) \times 2.50 = 32.76$  S.F.  
 $(32.76 + 41.87 + 4.55) \times 1/9 = 8.80$  S.Y.

**TOTAL ABUTMENT 47.55 S.Y.**

USE 48 S.Y.

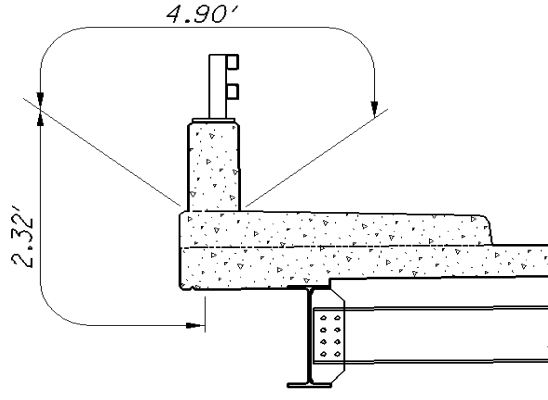
**SUPERSTRUCTURE:**

**DIAPHRAGMS:**

(R.A.)  $(1.71 + 195.14 + 1.83) \times 1/9 = 22.08$  S.Y.  
 (F.A.)  $(1.69 + 194.56 + 1.82) \times 1/9 = 22.01$  S.Y.  
 -----  
 44.08 S.Y.

(CONTINUED)

ITEM 512 10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)  
 (SUPERSTRUCTURE CONTINUED)



DIAPHRAGMS (CARRIED FROM SHEET 17) 44.08 S.Y.

RAILING ON DECK:

$((4.90 \times 57.16) \times 2) \times 1/9 = 62.24 \text{ S.Y.}$

DECK OVERHANG AT FASCIA:

$((2.32 \times 51.76) \times 2) \times 1/9 = 26.69 \text{ S.Y.}$

**TOTAL SUPERSTRUCTURE 133.01 S.Y.**

USE 133 S.Y.

GENERAL - RAILING ON APPROACH SLABS:

$((4.90 \times 20) \times 4) \times 1/9 = 43.56 \text{ S.Y.}$

USE 44 S.Y.

TOTAL ABUTMENT (CARRIED FROM SHEET 17): 48 S.Y.

TOTAL SUPERSTRUCTURE: 133 S.Y.

GENERAL: 44 S.Y.

**TOTAL 225 S.Y.**

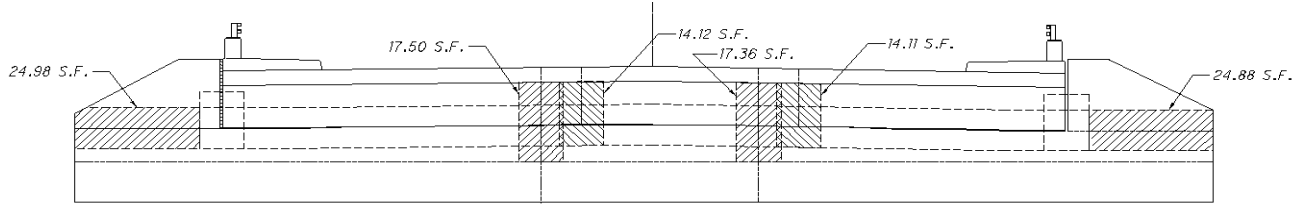
225 S.Y.

ITEM 512 10300 SEALING OF CONCRETE BRIDGE DECKS WITH HMWM RESIN

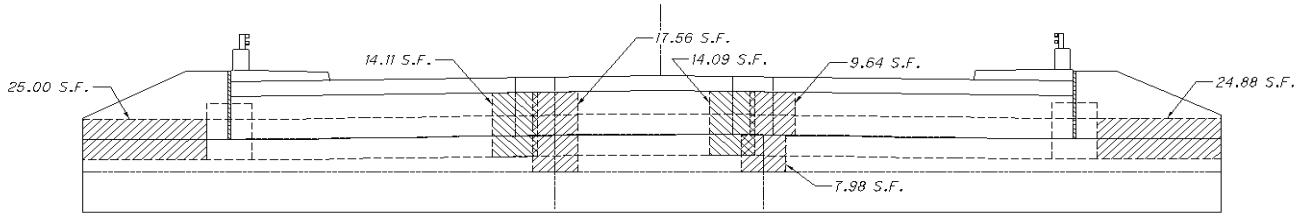
$((4.5 \times 57.16) \times 2) \times 1/9 = 57.16 \text{ S.Y.}$

USE 58 S.Y.

ITEM 512 33000 TYPE 2 WATERPROOFING  
 (AREAS CALCULATED BY CADD)



REAR ABUTMENT  
 (REAR FACE)



FORWARD ABUTMENT  
 (REAR FACE)

(R.A.):  $(24.98 + 17.50 + 14.12 + 17.36 + 14.11 + 24.88) \times 1/9 = 12.55 \text{ S.Y.}$

(F.A.):  $(25.00 + 14.11 + 17.56 + 14.09 + 9.64 + 7.98 + 24.88) \times 1/9 = 12.58 \text{ S.Y.}$

TOTAL 25.13 S.Y.

USE 26 S.Y.



ITEM 51310220 STRUCTURAL STEEL MEMBERS, LEVEL 1

BEAMS:

<u>C.L. R.A. TO C.L. F.A. + 13"</u>	<u>LENGTH</u>	<u>NUMBER</u>	
W30x108	56.083	8	
		108 x (56.083 x 8) =	48455.712 LB.
			BEAM TOTAL: 48455.71 LB.

CROSS FRAME CONNECTION PLATES:

50 PL's x (25 1/2" x 11 1/2" x 3/8") @ (490/1728) LB/IN<sup>3</sup> = 1559.1634 LB.

DEDUCT FOR CLIPS:

2 x (1/2 x (1" x 2 1/2" x 3/8")) = 0.9375 PER PLATE  
 0.9375 x 50 PLATES @ (490/1728) LB/IN<sup>3</sup> = DEDUCT 13.2921 LB.

2 x (1/2 x (6.75" x 6.75" x 3/8")) = 17.0859 PER PLATE  
 17.086 x 50 PLATES @ (490/1728) LB/IN<sup>3</sup> = DEDUCT 242.2485 LB.

600 ~ 1" DIA. BOLTS WITH NUT AND 2 WASHERS:

[12 x ((148 + (11.3 x 2)) x 1/100)] x 50 PLATES = 1,023.6000 LB.  
 CONNECTION PLATE TOTAL: 2327.22 LB.

INTERMEDIATE BOLTED CROSSFRAMES:

25 ~ C15x33.9  
 CHANNEL LENGTH: 6'-7"

(25 x (33.9 x 6.5833)) = 5579.3468 LB.  
 CROSS FRAME CHANNEL TOTAL: 5579.35 LB.

BEAM TOTAL	48455.71 LB.	
CONNECTION PLATE TOTAL	2327.22 LB.	
CROSS FRAME ANGLE TOTAL	5579.35 LB.	
<hr/>		
TOTAL	56362.28 LB.	
	USE	<span style="border: 1px solid black; padding: 2px;">56,363 LB.</span>

ITEM 513 20000 WELDED STUD SHEAR CONNECTORS

96 ROWS SPACED ALONG BEAM x 3 PER ROW = 288 STUDS PER BEAM  
 288 STUDS x 8 BEAMS = 2304 EACH

ITEM 514 00800 FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT

56,363 LB.

ITEM 514 00850 FIELD PAINTING STRUCTURAL STEEL, FINISH COAT

56,363 LB.

ITEM 514 10000 FINAL INSPECTION REPAIR

(8 BEAMS x 56.083'L) x 1/150 = 2.99  
 [25 CHANNEL CROSS FRAMES x 6.5833' L] x .05 = 8.23  
 TOTAL = 11.22

USE 12 EACH

ITEM 516 10010 ARMORLESS PREFORMED JOINT SEAL

(R.A.) 56.75 FT.  
 (F.A.) 56.27 FT.  
 113.02 FT.

USE 114 FT.

ITEM 516 13200 1/2" PREFORMED EXPANSION JOINT FILLER

REAR FACE OF ABUTMENTS:

(56.44'L x .833'W) x 2 = 94.03 S.F.

SIDEWALKS:

[(1.17 + 5.39) x (.823 + .667) x 1/2] x 4 = 19.55 S.F.

TOTAL 113.58 S.F.

USE 114 S.F.

ITEM 516 13600 1" PREFORMED EXPANSION JOINT FILLER

FRONT FACE OF ABUTMENTS:

(56'.24'L x .833'W) x 2 = 93.70 S.F.

USE 94 S.F.

ITEM 516 13900 2" PREFORMED EXPANSION JOINT FILLER

END OF DIAPHRAGM AT WALLS:

(R.A.) (5.25 + 5.07) x 2.70 = 27.86 S.F.

(F.A.) (4.97 + 5.03) x 2.70 = 27.00 S.F.

TOTAL 54.86 S.F.

USE 55 S.F.

ESTIMATED QUANTITIES SFN: 1803396

ITEM 516 14014 INTEGRAL ABUTMENT EXPANSION JOINT SEAL

(REAR ABUTMENT)

NEOPRENE ALONG BEAM SEAT: 59.62 FT  
NEOPRENE @ DIAPHRAGM GUIDE (LEFT): 4.14 FT  
NEOPRENE @ DIAPHRAGM GUIDE (RIGHT): 4.12 FT

(FORWARD ABUTMENT)

NEOPRENE ALONG BEAM SEAT: 59.62 FT  
NEOPRENE @ DIAPHRAGM GUIDE (LEFT): 4.16 FT  
NEOPRENE @ DIAPHRAGM GUIDE (RIGHT): 4.15 FT

TOTAL 135.81 FT

USE 136 FT.

ITEM 516-44101 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE

(NEOPRENE), AS PER PLAN, 2 1/16" x 10" x 1'-0" W/1 1/2" x 11" x 1'-1" LOAD PLATE

REAR ABUTMENT: 8  
FORWARD ABUTMENT: 8

16 EACH

ITEM 517-75120 RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING)

57.16 + 57.16 = 114.32 FT.

USE 115 FT.

ITEM 517-75121 RAILING (CONCRETE PARAPET WITH TWIN STEEL TUBE RAILING), AS PER PLAN

LEFT SIDE: 13.66 + 6.45 + 20.00 = 40.11 FT.

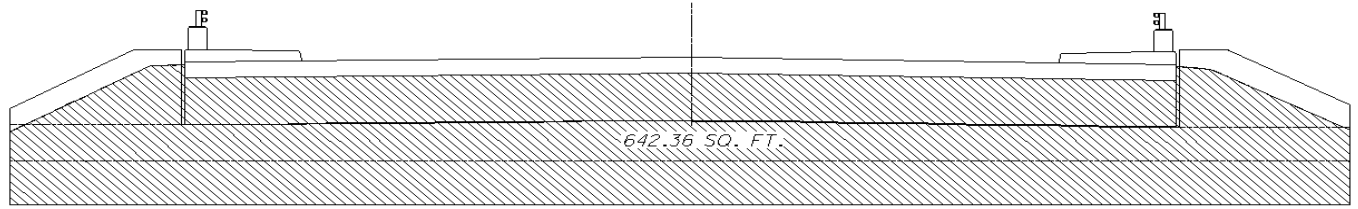
RIGHT SIDE: 20.00 + 20.00 = 40.00 FT.

TOTAL 80.11 FT.

USE 81 FT.



ITEM 518 21200 POROUS BACKFILL WITH GEOTEXTILE FABRIC

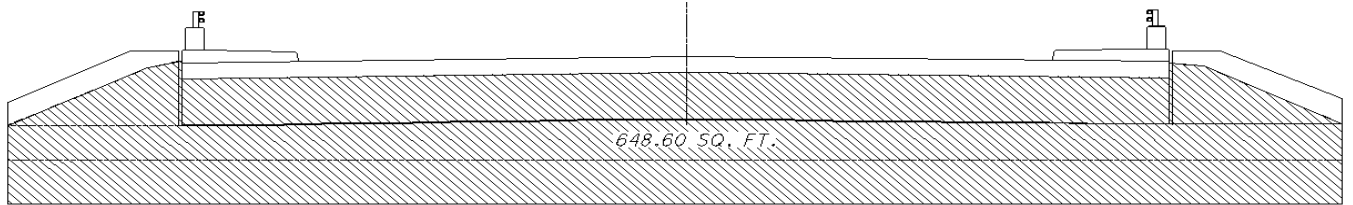


REAR ABUTMENT  
 (REAR FACE)

POROUS BACKFILL @ REAR ABUTMENT:

$$642.36 \text{ SQ. FT.} \times 2.0' \text{ THK} = 1284.72 \text{ C.F.}$$

$$1284.72 \text{ C.F.} \times 1/27 = 47.58 \text{ C.Y.}$$



FORWARD ABUTMENT  
 (REAR FACE)

POROUS BACKFILL @ REAR ABUTMENT:

$$648.60 \text{ SQ. FT.} \times 2.0' \text{ THK} = 1297.20 \text{ C.F.}$$

$$1297.20 \text{ C.F.} \times 1/27 = 48.04 \text{ C.Y.}$$

$$47.58 + 48.04 = 95.63 \text{ C.Y.}$$

USE 96 C.Y.

ITEM 518 40000 6" PERFORATED CORRUGATED PLASTIC PIPE

REAR ABUTMENT: 78.25 FT.

FORWARD ABUTMENT: 78.25 FT.

TOTAL 156.50 FT.

USE 157 FT.

ITEM 518 40010 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS

REAR ABUTMENT: 12 x 2 = 24.00 FT.

FORWARD ABUTMENT: 12 x 2 = 24.00 FT.

TOTAL 48.00 FT.

USE 48 FT.

ITEM 523 20000 DYNAMIC LOAD TESTING

2 EA.

ITEM 523 15001 REINFORCED CONCRETE APPROACH SLABS (T=13"), AS PER PLAN

REAR ABUTMENT:

$[(54.30 + 53.93) \times 1/2] \times 14.04 + [53.93 \times 5.96] = 1081.20 \text{ S.F.}$

FORWARD ABUTMENT:

$53.93 \times 20 = 1078.60 \text{ S.F.}$

TOTAL 2159.80 S.F.

$2159.80 \times 1/9 = 239.977 \text{ S.Y.}$

USE 240 S.Y.

ITEM 526 90030 TYPE C INSTALLATION

REAR ABUTMENT:

56.75 FT.

FORWARD ABUTMENT:

56.27 FT.

TOTAL 113.02 FT.

USE 114 FT.

**ENGINEERING ASSOCIATES, INC.  
CONSULTING ENGINEERS**

1935 EAGLE PASS - WOOSTER, OHIO 44691  
TELEPHONE: (330) 345-6556  
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PROJECT: CUY-43-6.04 PROJ. NO.: 18091 PG.: 25 OF 25

COMP. BY: \_\_\_\_\_ DATE: \_\_\_\_\_ CHKD. BY: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: BRIDGE NO. CUY-43-0607 OVER HAWTHORNE CREEK

ESTIMATED QUANTITIES SFN: 1803396

NOT USED