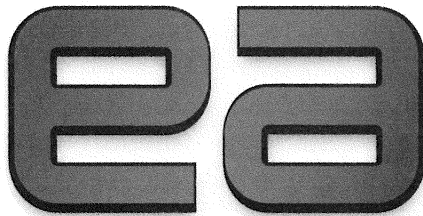


STRUCTURE ESTIMATED QUANTITY CALCULATIONS

**BRIDGE NO. RIC-30-1136
OVER BOWMAN STREET**

STRUCTURE FILE NO. 7001143

RIC-30-9.26



**PREPARED BY
ENGINEERING ASSOCIATES, INC.**

SEPTEMBER 2019

INDEX TO STRUCTURE ESTIMATED QUANTITY CALCULATIONS
BRIDGE NO. RIC-30-1135 OVER BOWMAN STREET

ITEM NO.	DESCRIPTION	SHEET
202-11203	PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN	1
202-22900	APPROACH SLAB REMOVED	1
202-23500	WEARING COURSE REMOVED	1
503-11100	COFFERDAMS AND EXCAVATION BRACING, AS PER PLAN	1
503-21100	UNCLASSIFIED EXCAVATION	2
504-11100	STEEL SHEET PILING LEFT IN PLACE, $S_x = 34.8 \text{ IN}^3 / \text{FT}$	3
505-11100	PILE DRIVING EQUIPMENT MOBILIZATION	3
507-00100	STEEL PILE HP10x42, FURNISHED	3
507-00150	STEEL PILE HP10x42, DRIVEN	3
509-10001	EPOXY COATED REINFORCING STEEL, AS PER PLAN	4
510-10000	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT	4
511-21523	CLASS QC2 CONCRETE WITH QC/QA, SUPERSTRUCTURE, AS PER PLAN	5
511-33500	SEMI-INTEGRAL DIAPHRAGM GUIDE	6
511-41012	CLASS QC1 CONCRETE WITH QC/QA, PIER ABOVE FOOTINGS	6-7
511-44112	CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING	8-9
511-46512	CLASS QC1 CONCRETE WITH QC/QA, FOOTING	10
512-10100	SEALING OF CONCRETE SURFACES (EPOXY URETHANE)	11-16
512-10300	SEALING CONCRETE BRIDGE DECKS WITH HMWM RESIN	17
511-33000	TYPE 2 WATERPROOFING	17
513-10260	STRUCTURAL STEEL MEMBERS, LEVEL 3, AISC CATEGORY Mbr	18-21
513-20000	WELDED STUD SHEAR CONNECTORS	22
514-10000	FINAL INSPECTION REPAIR	22
514-80010	SHOP PAINTING AND FIELD TOUCH-UP OF STRUCTURAL STEEL	22
516-10010	ARMORLESS PREFORMED JOINT SEAL	23

INDEX TO STRUCTURE ESTIMATED QUANTITY CALCULATIONS
BRIDGE NO. RIC-30-1135 OVER BOWMAN STREET

ITEM NO.	DESCRIPTION	SHEET
516-13600	1" PREFORMED EXPANSION JOINT FILLER	23
516-13900	2" PREFORMED EXPANSION JOINT FILLER	22-24
516-44101	ELASTOMERIC BEARING PAD WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN, 2 13/16" x 1'-2" x 1'-5" W/ t x 1'-3" x 1'-6" BEVELED LOAD PLATE	25
516-44101	ELASTOMERIC BEARING PAD WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN, 2 1/2" x 11" x 1'-0" W/ 1 5/8" x 1'-0" x 1'-1" BEVELED LOAD PLATE	25
518-21200	POROUS BACKFILL WITH GEOTEXTILE FABRIC	26
518-40001	6" PERFORATED CORRUGATED PLASTIC PIPE, AS PER PLAN	27
518-40010	6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	27
524-95434	DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK WITH QC/QA	27
524-95442	DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK WITH QC/QA	27
526-15001	REINFORCED CONCRETE APPROACH SLABS (T=13"), AS PER PLAN	28
526-90030	TYPE C INSTALLATION	28
601-21000	CONCRETE SLOPE PROTECTION	29
607-39900	SPECIAL – VANDAL PROTECTION FENCE – 6 FT STRAIGHT, COATED FABRIC	29

ITEM 202 12003 PORTIONS OF STRUCTURE REMOVED, OVER
20 FOOT SPAN, AS PER PLAN

LUMP SUM

ITEM 202 22900 APPROACH SLAB REMOVED

$20.0' L \times 58.00' w \times (2) \times 1/9 =$ 258 S.Y.

ITEM 202 23500 WEARING COURSE REMOVED

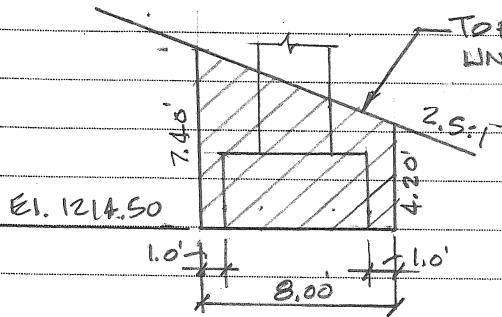
$20.0' L \times 58.00' w \times (2) \times 1/9 =$ 258 S.Y.

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

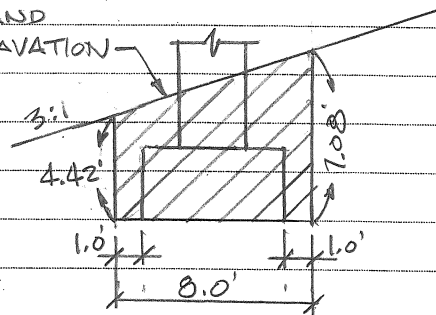
LUMP SUM

ITEM 503-21100 UNCLASSIFIED EXCAVATION

REAR ABUTMENT:



SECTION @ R. ABUTMENT



SECTION @ F. ABUTMENT

VOLUME AT REAR ABUTMENT:

$$\frac{7.40' + 4.20'}{2} \times 8.00' \times 114.75' \times \frac{1}{27} = 197.20 \text{ C.Y.}$$

VOLUME AT FORWARD ABUTMENT:

$$\frac{7.08' + 4.42'}{2} \times 8.00' \times 109.50' \times \frac{1}{27} = 186.56 \text{ C.Y.}$$

$$\sum 383.76 \text{ C.Y. USE } \underline{\underline{394 \text{ C.Y.}}}$$

ITEM 504-11100 STEEL SHEET PILING LEFT IN PLACE.

$$S_x = 34.8 \text{ IN}^3/\text{FT.}$$

$$32.0' \text{ H} \times 2.0' \text{ L} \times (3) \text{ LOCATIONS} \times (2) \text{ ABUTS} = \underline{3840 \text{ S.F.}}$$

ITEM 505-11100 PILE DRIVING EQUIPMENT MOBILIZATIONLUMP SUMITEM 507-00100 STEEL PILE HP10x42, FURNISHED

REAR ABUTMENT:

$$23 \text{ PILES} \times 50' \text{ ORDER LENGTH} = 1150 \text{ L.F.}$$

FWD. ABUTMENT,

$$23 \text{ PILES} \times 60' \text{ ORDER LENGTH} = \underline{1380 \text{ L.F.}}$$

$$\text{TOTAL} = \underline{2530 \text{ L.F.}}$$

ITEM 507-00150 STEEL PILE HP10x42, DRIVEN

REAR ABUTMENT:

$$23 \text{ PILES} \times 45' \text{ DRIVEN LENGTH} = 1035 \text{ L.F.}$$

FWD. ABUTMENT

$$23 \text{ PILES} \times 55' \text{ DRIVEN LENGTH} = \underline{1265 \text{ L.F.}}$$

$$\text{TOTAL} = \underline{2300 \text{ L.F.}}$$

ITEM 509-10001 EPOXY COATED REINFORCING STEEL, AS PER PLAN

REAR ABUTMENT

CARRIED FROM PLAN SHEET 49/56 11,570 LB.

FORWARD ABUTMENT + 1

CARRIED FROM PLAN SHEET 51/56 10,273 LB.

PIERS

CARRIED FROM PLAN SHEET 53/56 59,290 LB

SLAB

CARRIED FROM PLAN SHEET 54/56 146,678 LB.

APPROACH SLAB

(INCLUDED W/ APPROACH SLABS) -

TOTAL = 227,811 LB

ITEM 510-10000 DOWEL HOLES WITH NON-SHRINK, NON-METALLIC GROUT

12 HOLES (R. ABUT.) + 12 HOLES (F. ABUT.) = 24 EACH

ITEM 511-21523 CLASS Q02 CONCRETE WITH QC/QA,
SUPERSTRUCTURE, AS PER PLAN

DIAPHRAGMS: (Below Appr. Slab Seats)

$$(90.12' L \times 3.00' W \times 3.12' \text{ AVG "H" } \times (2 \text{ ABUTS.}) \times 1/27 = 62.48 \text{ C.Y.}$$

DECK SLAB OVER DIAPHRAGMS:

$$[(90.12' L \times 3.00' W \times 1.08' H) - (86.78' \times 0.50' \times 1.08')] \times (2 \text{ ABUTS.}) \times 1/27 = 18.16 \text{ C.Y.}$$

DECK SLAB BETWEEN FACES OF DIAPHRAGMS:

$$90.12' W \times 168.50' L \times 0.71' \text{ THK} \times 1/27 = 399.32 \text{ C.Y.}$$

HAUNCHES OVER BEAMS

$$12 \text{ HAUNCHES} \times 168.50' L \times 1.00' W \times 0.17' H \times 1/27 = 12.73 \text{ C.Y.}$$

ADDITIONAL SLAB "T" @ OUTSIDE FASCIAS:

$$2.61' W \times 168.50' L \times 0.22' H \times (2) \times 1/27 = 7.17 \text{ C.Y.}$$

ADDITIONAL SLAB "T" @ INSIDE FASCIAS:

$$2.41' W \times 168.50' L \times 0.22' H \times (2) \times 1/27 = 6.62 \text{ C.Y.}$$

MEDIAN BARRIER:

$$\left[\frac{(1.83' \times 4.75') - (0.91' \times 4.75')}{2} \right] \times 173.50' \times (2) \times 1/27 = 83.94 \text{ C.Y.}$$

OUTSIDE RAILINGS:

$$\frac{(0.83 + 1.50')}{2} \times 3.50' \times 146.42' \times (2) \times 1/27 = 44.22 \text{ C.Y.}$$

RAILING TRANSITIONS (SEE CALCS ON SHT OF .)

$$1.82 \text{ C.Y. / TRANSITION} \times (4 \text{ TRANSITIONS}) = 7.28 \text{ C.Y.}$$

ADDITIONAL SLAB VOLUME PLACE IN PH. 1A, REMOVED PH. 7

$$0.71' T \times 0.66' W \times 172.50' L \times 1/27 = 2.99 \text{ C.Y.}$$

$$\text{TOTAL} = 644.91 \text{ C.Y.}$$

$$\text{WSE: } 645 \text{ C.Y.}$$

ITEM 511-33500 SEMI-INTEGRAL DIAPHRAGM GUIDE

4 EACH

ITEM 511-41012 CLASS QCI CONCRETE WITH QC/QA,
PIER ABOVE FOOTINGS

PIER 1 COLUMNS:

TOP ELEV. - BOT. ELEV. = COL. HGT.

	{	1215.56	-	1200.00	=	15.56'
W.B.	{	1215.83	-	"	=	15.83'
	{	1216.10	-	"	=	16.10'
	{	1216.13	-	"	=	16.13'
E.B.	{	1215.91	-	"	=	15.91'
	{	1215.68	-	"	=	15.68'

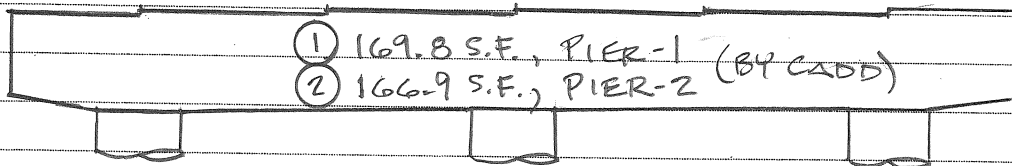
PIER-2 COLUMNS:

	{	1213.62	-	1200.00	=	13.62'
W.B.	{	1213.89	-	"	=	13.89'
	{	1214.16	-	"	=	14.16'
	{	1214.19	-	"	=	14.19'
E.B.	{	1213.97	-	"	=	13.97'
	{	1213.74	-	"	=	13.74'

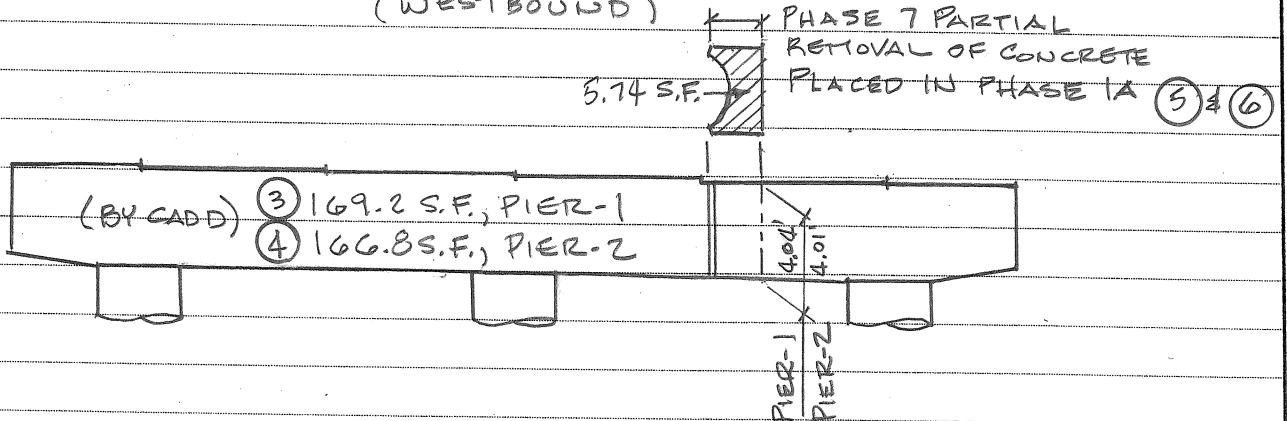
Σ 178.78'

COLUMN SUBTOTAL = $178.78' \times \pi \times 1.75^2 \times 1/27 = 63.70$ C.Y.

ITEM 511-41012 CLASS QC1 CONCRETE WITH QC/QA,
PIER ABOVE FOOTINGS



PIER CAP ELEVATION
(WESTBOUND)



PIER CAP ELEVATION
(EASTBOUND)

VOLUMES:

- ① 169.8 S.F. x 3.50' THK x 1/27 = 22.01 C.Y.
- ② 166.9 S.F. x 3.50' THK x 1/27 = 21.64 C.Y.
- ③ 166.9 S.F. x 3.50' THK x 1/27 = 21.64 C.Y.
- ④ 168.8 S.F. x 3.50' THK x 1/27 = 21.88 C.Y.
- ⑤ 5.74 S.F. x 4.04' H x 1/27 = 0.86 C.Y.
- ⑥ 5.74 S.F. x 4.01' H x 1/27 = 0.85 C.Y.

PIER CAP SUBTOTAL = 88.88 C.Y.

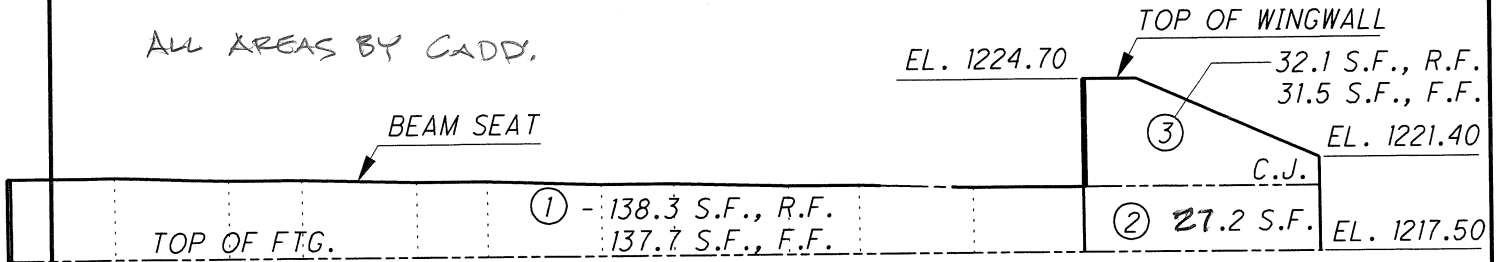
PIER TOTAL: 63.70 C.Y. + 88.88 C.Y. = 152.58 C.Y.

USE: 153 C.Y.

SPN: 7001148

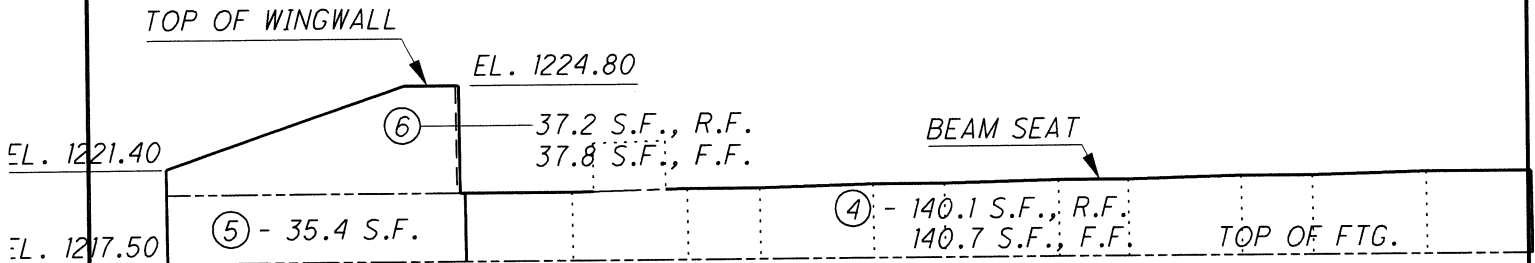
ITEM 511-44112 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT NOT INCLUDING FOOTING

ALL AREAS BY CADD.



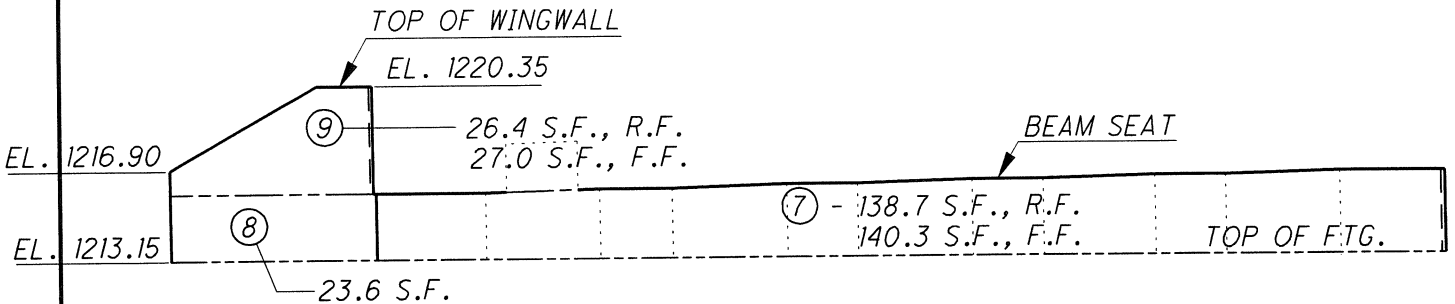
REAR ABUTMENT ELEVATION

(WESTBOUND STRUCTURE)



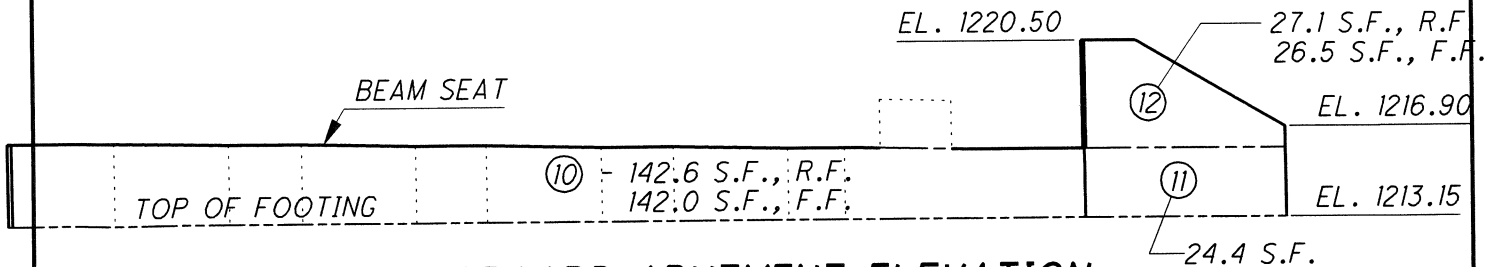
REAR ABUTMENT ELEVATION

(EASTBOUND STRUCTURE)



FORWARD ABUTMENT ELEVATION

(WESTBOUND STRUCTURE)



FORWARD ABUTMENT ELEVATION

(EASTBOUND STRUCTURE)

(CONTINUED)

ITEM 511-4412 CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT
NOT INCLUDING FOOTING

① $(138.3 + 138.7) \cdot \frac{1}{2} \times 3.00' \text{ THK} = 415.5 \text{ C.F.}$

② $27.2 \times 2.50' \text{ THK} = 68.0 \text{ ''}$

③ $(32.1 + 31.5) \cdot \frac{1}{2} \times 2.50' \text{ THK} = 79.5 \text{ ''}$

④ $(140.1 + 140.7) \cdot \frac{1}{2} \times 3.0' \text{ THK} = 421.2 \text{ ''}$

⑤ $35.4 \times 2.50' \text{ THK} = 88.5 \text{ ''}$

⑥ $(37.2 + 37.8) \cdot \frac{1}{2} \times 2.50' \text{ THK} = 93.8 \text{ ''}$

⑦ $(138.7 + 140.3) \cdot \frac{1}{2} \times 3.00' \text{ THK} = 418.5 \text{ ''}$

⑧ $23.6 \times 2.50' \text{ THK} = 59.0 \text{ ''}$

⑨ $(26.4 + 27.0) \cdot \frac{1}{2} \times 2.50' \text{ THK} = 66.8 \text{ ''}$

⑩ $(142.6 + 142.0) \cdot \frac{1}{2} \times 3.00' \text{ THK} = 426.9 \text{ ''}$

⑪ $24.4 \times 2.50' \text{ THK} = 61.0 \text{ ''}$

⑫ $(27.1 + 26.5) \cdot \frac{1}{2} \times 2.50' \text{ THK} = 67.0 \text{ ''}$

ADDITIONAL CONCRETE PLACED IN PHASE 1A

THEN REMOVED FOR PHASE 7:

REAR ABUT: $0.66' \times 2.95' \text{ H} \times 2.50' \text{ THK} = 4.9 \text{ ''}$

FWD ABUT: $0.66' \times 3.09' \text{ H} \times 2.50' \text{ THK} = 5.1 \text{ ''}$

$\Sigma 2275.57 \text{ S.F.}$

$\times 1/27$

84.28 USE: 85 C.Y.

ITEM 511-46512 CLASS QC1 CONCRETE WITH QC/QA, FOOTING

REAR ABUTMENT

$$(55.23' + 57.52' + 0.66'*) \times 3.00' H \times 6.00' W = 2041.4 \text{ C.Y.}$$

FORWARD ABUTMENT

$$(53.70' + 53.80' + 0.66'*) \times 3.00' H \times 6.00' W = 1946.9 \text{ C.Y.}$$

3988.3

* ADDITIONAL LENGTH OF FOOTING PLACED

$\times 1/27$

IN PHASE 1A THEN REMOVED AND

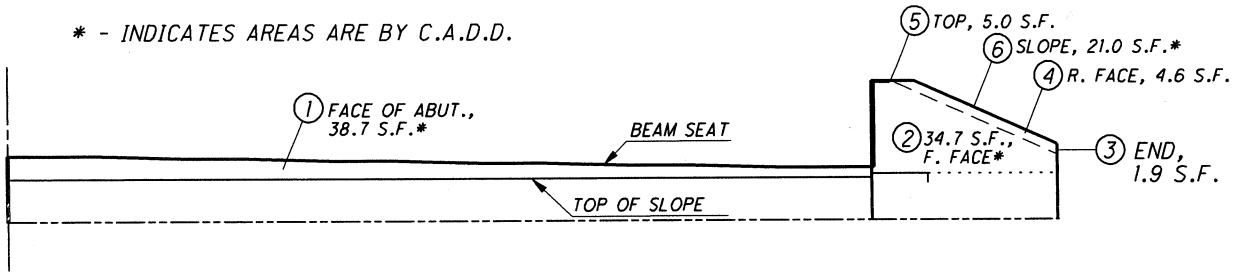
$$= 147.7 \text{ USE } \underline{\underline{148 \text{ C.Y.}}}$$

REPLACED IN PHASE 7

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

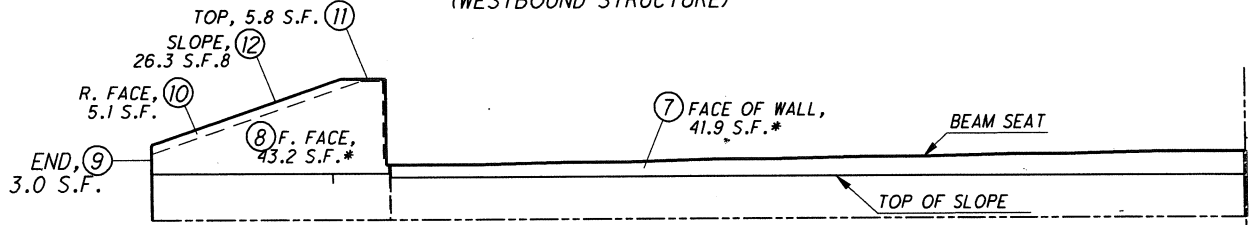
(ABUTMENTS)

* - INDICATES AREAS ARE BY C.A.D.D.



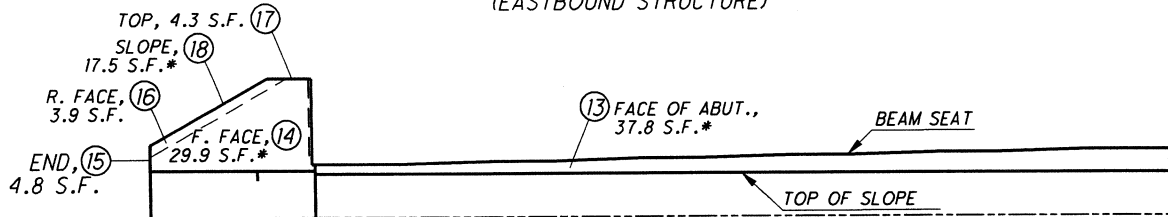
REAR ABUTMENT ELEVATION

(WESTBOUND STRUCTURE)



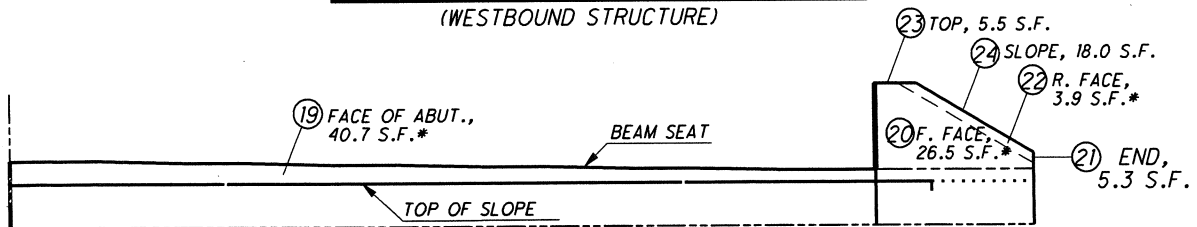
REAR ABUTMENT ELEVATION

(EASTBOUND STRUCTURE)



FORWARD ABUTMENT ELEVATION

(WESTBOUND STRUCTURE)



FORWARD ABUTMENT ELEVATION

(EASTBOUND STRUCTURE)

CONT'D.

STRUCTURE ESTIMATED QUANTITIES

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

REAR ABUTMENT:

1	38.7 S.F.
2	34.7
3	1.9
4	4.6
5	5.0
6	21.0
7	41.9
8	43.2
9	3.0
10	5.1
11	5.8
12	<u>26.3</u>

SUBTOTAL

231.2 S.F.

FORWARD ABUTMENT:

13	37.8 S.F.
14	29.9
15	4.8
16	3.9
17	4.3
18	17.5
19	40.7
20	26.5
21	5.3
22	3.9
23	5.5
24	<u>18.0</u>

SUB TOTAL =

198.2 S.F.

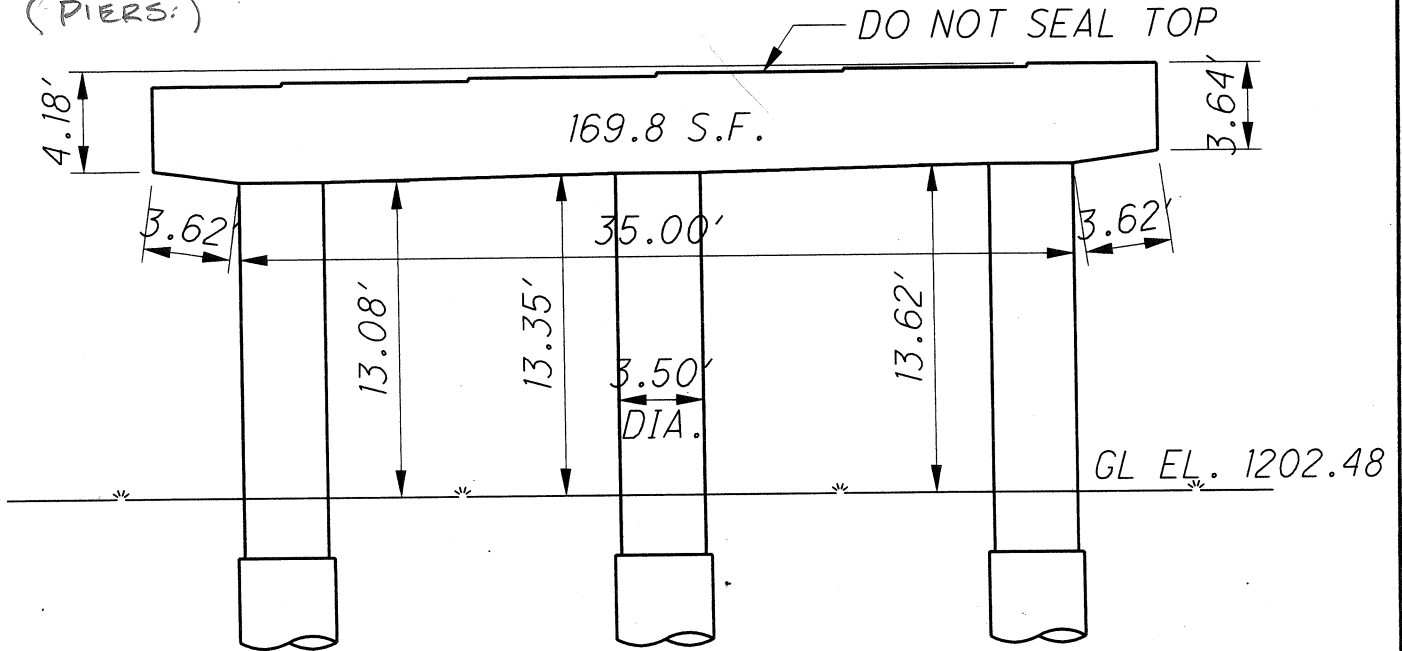
ABUTMENT TOTAL = $429.3 \text{ S.F.} \times 1/9 = 47.7 \text{ S.Y.}$

USE: 48 S.Y.

SFN: 7001143

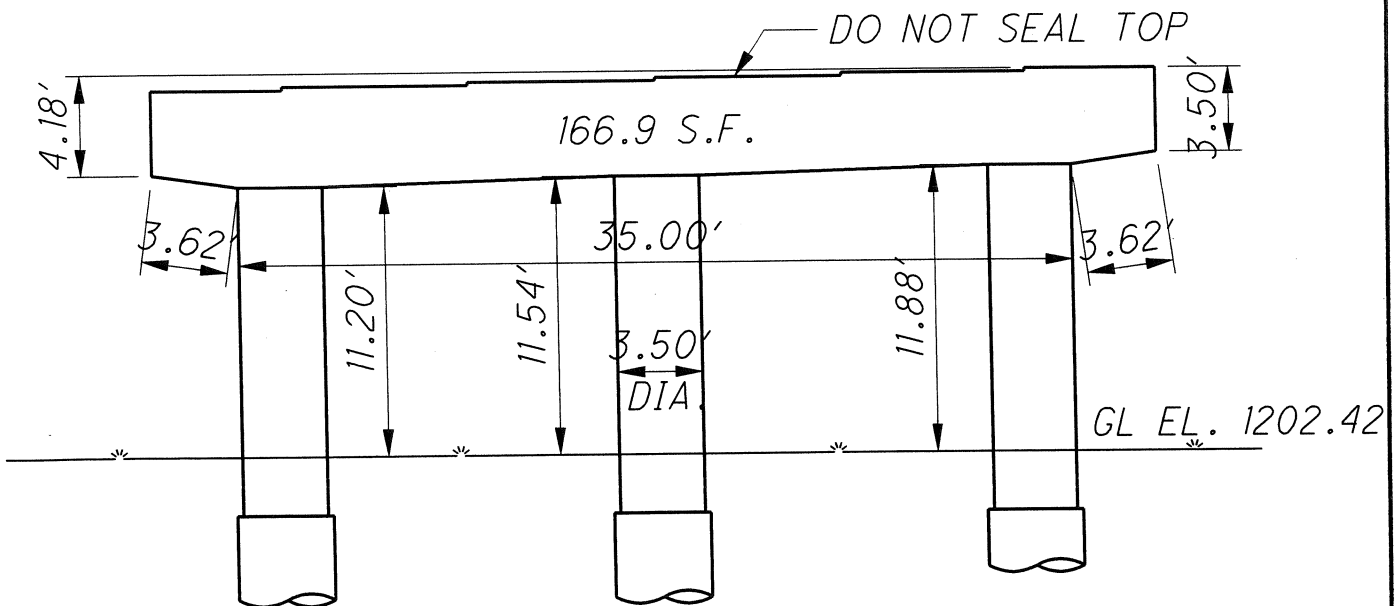
ITEM: S12-16100 SEALING OF CONCRETE SURFACES - (EPOXY-URETHANE)

(PIERS:)



PIER-1 ELEVATION

(WESTBOUND STRUCTURE)



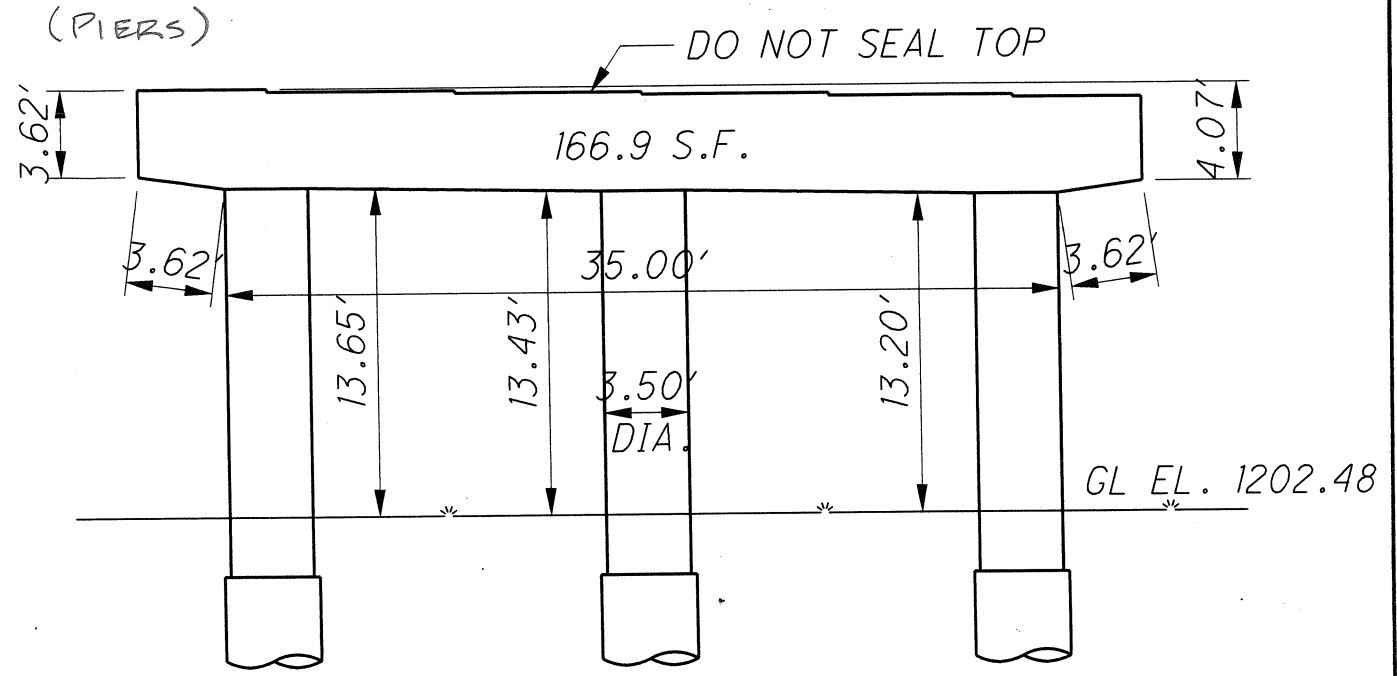
PIER-2 ELEVATION

(WESTBOUND STRUCTURE)

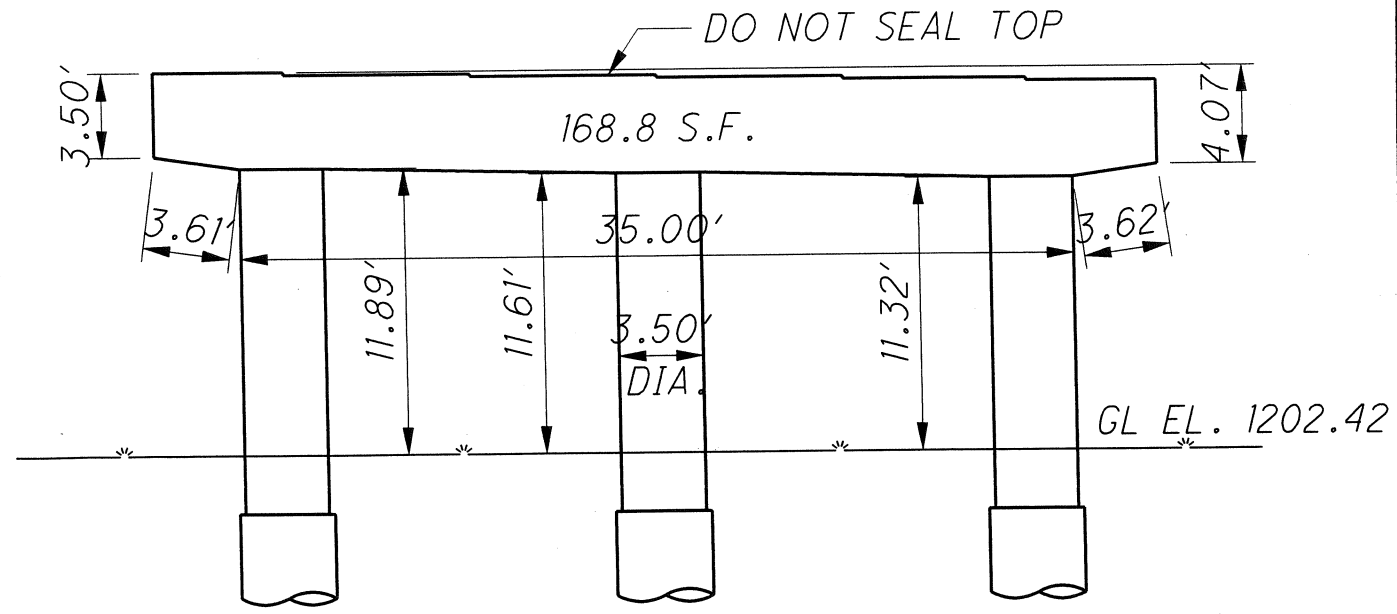
ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
 1935 EAGLE PASS - WOOSTER, OH 44691
 TELEPHONE: (330) 345-6556
 FAX: (330) 345-8077
 SFN: 7001143

PROJECT RIC-30-9.26 PROJ. NO. 15-074 PG. 14 OF 29
 COMP. BY RLE DATE 5-28-19 CHKD. BY TAC DATE 5/13/19
 SUBJECT BRIDGE NO. RIC-30-1135 OVER BOWMAN ST.
STRUCTURE ESTIMATED QUANTITIES

ITEM 511-10100 SEALING OF CONCRETE SURFACES - (EPOXY - URETHANE)



PIER-1 ELEVATION
 (EASTBOUND STRUCTURE)



PIER-2 ELEVATION
 (EASTBOUND STRUCTURE)

ITEM - S12-10100 SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)WESTBOUND PIERS 1 & 2

$$\text{SIDES OF CAPS: } (169.8 \text{ S.F.} + 166.2 \text{ S.F.}) \times (2 \text{ SIDES}) = 672.0 \text{ S.F.}$$

$$\text{ENDS OF CAPS: } (4.18 + 3.64 + 4.18 + 3.50') \times 3.50' \text{ WIDE} = 54.3 \text{ S.F.}$$

$$\text{BOT. OF CAPS: } (3.62 + 35.00 + 3.62') \times 3.50' \text{ WIDE} \times (2) = 295.7 \text{ S.F.}$$

$$\text{DEDUCT FOR COLUMNS: } \pi \times 1.75^2 \times 6 \text{ COL'S.} \quad \langle 57.7 \text{ S.F.} \rangle$$

PIER COLUMNS:

$$(13.08' + 13.35' + 13.62' + 11.20' + 11.54' + 11.88') \times (\pi \times 3.50') = 821.0 "$$

$$\text{SUB TOTAL} = 1785.3 \text{ S.F.}$$

EASTBOUND PIERS 1 & 2

$$\text{SIDES OF CAPS: } (166.9 \text{ S.F.} + 168.8 \text{ S.F.}) \times (2 \text{ SIDES}) = 671.0 \text{ S.F.}$$

$$\text{ENDS OF CAPS: } (3.62 + 4.07 + 3.50 + 4.07) \times 3.50' \text{ WIDE} = 53.4 \text{ S.F.}$$

$$\text{BOT. OF CAPS: } (3.62 + 35.00 + 3.62') \times 3.50' \text{ WIDE} \times (2) = 295.7 \text{ S.F.}$$

$$\text{DEDUCT FOR COLUMNS: } \pi \times 1.75^2 \times 6 \text{ COL'S.} \quad \langle 57.7 \text{ S.F.} \rangle$$

PIER COLUMNS:

$$(13.65' + 13.43' + 13.20' + 11.89' + 11.61' + 11.32') \times (\pi \times 3.50') = 829.8 \text{ S.F.}$$

$$\text{SUBTOTAL} = 1788.2 \text{ S.F.}$$

$$\text{TOTAL AREA} = (1785.3 + 1788.2) \times 1/9 = 397.1 \text{ S.Y.}$$

$$\text{USE: } \underline{\underline{397}} \text{ S.Y.}$$

STRUCTURE ESTIMATED QUANTITIES

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

SUPERSTRUCTURE:

FACE OF DIAPHRAGMS

$90.28' W \times 3.25' H (AVG) \times (2 \text{ ABUTS}) = 586.8 \text{ S.F.}$

HAUNCHES BETWEEN BEAMS

$1.07' \times 6.92' \times 10 \text{ HAUNCHES} \times (2 \text{ ABUTS}) = 148.1 \text{ S.F.}$

DECK OVERHALDS @ FASCIA:

$BOTTOM = 0.50' \times 168.50' \times (2 \text{ FASCIAS}) = 168.5 \text{ S.F.}$

$FACE = 0.93' \times 169.50' \times (2 \text{ FASCIAS}) = 315.3 \text{ S.F.}$

$TOP = 0.17' \times 175.51' \times (2 \text{ FASCIAS}) = 59.7 \text{ S.F.}$

PARAPETS:

$(3.50' + 0.83' + 3.56') \times 146.42' \times (2 \text{ PARAPETS}) = 2310.5 \text{ S.F.}$

PARAPET TRANSITIONS

$(2.67' + 2.67' + 1.50') \times 4.00' L \times (4) = 109.4 \text{ S.F.}$

$\frac{(2.67' + 3.50')}{2} + 1.50' \times 10.00' L \times (4) = 183.4 \text{ S.F.}$

MEDIAN BARRIERS

$(0.93' + 4.84') \times 173.50 \times (2) = 2002.2 \text{ S.F.}$

$\Sigma = 5884 \text{ S.F.}$

1/9

SUB TOTAL = 693.8 USE: 654 S.F.

GENERAL:

APPROACH SLAB BARRIER:

$((4.84' + 0.84') \times 22.10') \times 2 = 251.06 \text{ SF.}$

$251.06 \text{ S.F.} \times 2 \times 1/9 = 55.79 \text{ S.F.}$

USE: 56 S.F.

TOTAL: 48 S.Y. (ABUTS) + 397 S.Y. (PIERS) + 654 S.Y. (SUPERSTR) + 56 S.Y. (GEN'L)

= 1155 S.Y.

STRUCTURE ESTIMATED QUANTITIES

ITEM 512-10300 SEALING CONCRETE BRIDGE DECKS WITH HMWM RESIN

DECK SEALING:

5.33' WIDE W.B. CLOSURE X 173.50' L. X 1/9 = 102.75 S.Y.

5.25' WIDE E.B. CLOSURE X 173.50' L X 1/9 = 101.21 S.Y.

203.96 S.Y.

APPROACH SLAB SEALING

W.B. 2.00' W X 22.00' X (2) X 1/9 = 9.78 S.Y.

E.B. 2.00' W X 22.00' X (4) X 1/9 = 19.56 S.Y.

29.34 S.Y.

Σ 204 S.Y. + 29 S.Y. =

233 S.Y.

ITEM 512-33000 TYPE 2 WATERPROOFING

"H" BELOW "H" ABOVE
SEAT + SEAT =

REAR ABUTMENT E.B.

PHASE 7 JT = 2.99' + 3.24' = 6.23'

PHASE 6 JT = 3.07' + 3.21' = 6.27'

REAR ABUTMENT W.B.

PHASE 4 JT = 1.50' + 3.28' = 4.78'

PHASE 3 JT = 3.02' + 3.32' = 6.34'

FWD. ABUTMENT W.B.

PHASE 3 JT = 3.05' + 3.25' = 6.30'

PHASE 4 JT = 1.50' + 3.23' = 4.73'

FWD. ABUTMENT E.B.

PHASE 6 JT = 3.09' + 3.29' = 6.38'

PHASE 7 JT = 3.01' + 3.32' = 6.33'

Σ = 47.36'

∴ 47.36' X 3.00' WIDE X 1/9 = 15.8 S.Y.

USE: 16 S.Y.

STRUCTURE ESTIMATED QUANTITIES

ITEM 513-10260 STRUCTURAL STEEL MEMBERS, LEVEL 3,
AISC CATEGORY Mbr

BEAMS:

	FROM	TO	LENGTH	(No.)	WEIGHT
W30x132	± R.A - 6"	± SPL "1"	28.25'	12	44,748 LB
W30x173	± SPL "1"	± SPL "2"	34.00'	12	70,584 "
W30x148	± SPL "2"	± SPL "3"	48.00'	12	85,248 "
W30x173	± SPL "3"	± SPL "4"	34.00'	12	70,584 "
W30x132	± SPL "4"	± F.A + 6"	28.25'	12	44,748 "

DEDUCT FOR CLIPPED FLANGES ON W30x173

$1\frac{1}{16} \times 18\frac{1}{2} \times 4.50 \times \frac{490}{1728} \times 96 = \langle 2,407 \rangle$

SUB TOTAL = 313,504 LB

- BOLTED FIELD SPLICES 1 # 4

2 PL'S $9\frac{1}{16} \times 22\frac{1}{2} \times 26\frac{1}{2} \text{ @ } (\frac{490}{1728}) \text{ LB/IN}^3 = 190 \text{ LB}$

2 PL'S $\frac{1}{2} \times 10 \times 30 \text{ @ } (\frac{490}{1728}) \text{ LB/IN}^3 = 85$

4 PL'S $\frac{5}{8} \times 4 \times 30 \text{ @ } (\frac{490}{1728}) \text{ LB/IN}^3 = 85$

* 42 WEB BOLTS, $1\frac{1}{8} \phi \times 1\frac{3}{4} \text{ @ } 165.3\#/100 = 69$

* 32 FLANGE BOLTS $1\frac{1}{8} \phi \times 1\frac{3}{4} \text{ @ } 165.3\#/100 = 53$

$\Sigma = 482 \text{ LB}$

$482 \text{ LB/SPLICE} \times 24 \text{ SPLICES} = \underline{11,568 \text{ LB}}$

BOLTED FIELD SPLICES 2 # 3

2 PL'S $9\frac{1}{16} \times 22\frac{1}{2} \times 26\frac{1}{2} \text{ @ } (\frac{490}{1728}) \text{ LB/IN}^3 = 190$

2 PL'S $\frac{1}{2} \times 10 \times 37 \text{ @ } (\frac{490}{1728}) \text{ LB/IN}^3 = 105$

4 PL'S $\frac{5}{8} \times 4 \times 37 \text{ @ } (\frac{490}{1728}) \text{ LB/IN}^3 = 105$

4 PL'S $\frac{1}{8} \times 10 \times 18\frac{1}{2} \text{ @ } (\frac{490}{1728}) \text{ LB/IN}^3 = 24$

* 42 WEB BOLTS, $1\frac{1}{8} \phi \times 1\frac{3}{4} \text{ @ } 165.3\#/100 = 69$

* 40 FLANGE BOLTS, $1\frac{1}{8} \phi \times 1\frac{3}{4} \text{ @ } 165.3\#/100 = 66$

$\Sigma = 561 \text{ LB}$

$561 \text{ LB/SPLICE} \times 24 \text{ SPLICES} = \underline{13,464 \text{ LB}}$

* INCLUDES NOT # FLAT WASHER W/GRIP RANGE DEDUCTED

ITEM 513-10260 STRUCTURAL STEEL MEMBERS, LEVEL 3,
AISC CATEGORY Mbr

CONNECTION PLATES, TYPE B

AT W30x132 BEAMS:

$$PL \ 3/8" \times 6" \times 28\ 1/4" \times 490/1728 \times 38 = 685 \text{ LB}$$

$$CLIPS: \ 3/8" \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 76 = \langle 10 \text{ "} \rangle$$

$$3/8" \times 1\ 1/16" \times 1\ 1/16" \times 1/2 \times 490/1728 \times 76 = \langle 5 \text{ "} \rangle$$

AT W30x148 BEAMS:

$$PL \ 3/8" \times 6" \times 28\ 1/4" \times 490/1728 \times 38 = 685 \text{ LB}$$

$$CLIPS: \ 3/8" \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 76 = \langle 10 \text{ "} \rangle$$

$$3/8" \times 1\ 1/16" \times 1\ 1/16" \times 1/2 \times 490/1728 \times 76 = \langle 5 \text{ "} \rangle$$

AT W30x173 BEAMS:

$$PL \ 3/8" \times 6" \times 27\ 7/8" \times 490/1728 \times 114 = 2027 \text{ LB}$$

$$CLIPS: \ 3/8" \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 228 = \langle 30 \text{ "} \rangle$$

SUB-TOTAL 3337 LB

CONNECTION PLATES, TYPE C

AT EXIST. W36x150

$$PL \ 3/8 \times 7\ 3/4 \times 34" \times 490/1728 \times 6 = 168 \text{ LB}$$

$$CLIPS = 3/8 \times 2\ 1/16" \times 2\ 1/16" \times 1/2 \times 490/1728 \times 12 = \langle 3 \text{ "} \rangle$$

$$: \ 3/8 \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 12 = \langle 2 \text{ "} \rangle$$

AT EXIST. W36x170

$$PL \ 3/8 \times 7\ 3/4 \times 33\ 7/8" \times 490/1728 \times 4 = 112 \text{ LB}$$

$$CLIPS \ 3/8" \times 2\ 1/8" \times 2\ 1/8" \times 1/2 \times 490/1728 \times 8 = \langle 2 \text{ "} \rangle$$

$$3/8" \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 8 = \langle 1 \text{ "} \rangle$$

SUB-TOTAL 272 LB.

CONT'D.

STRUCTURE - ESTIMATED QUANTITIES

ITEM 513-10260 STRUCTURAL STEEL MEMBERS, LEVEL 3

AISC CATEGORY M6L

CONNECTION PLATES, TYPE C

AT W30 x 132 BEAMS

$\Phi \ 3/8 \times 7\ 3/4 \times 28\ 1/4 \times 490/1728 \times 2 = 47 \text{ LB}$

CLIPS: $3/8 \times 2\ 13/16 \times 2\ 13/16 \times 1/2 \times 490/1728 \times 4 = < 2 >$

$3/8 \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 4 = < 1 >$

AT W30 x 148 BEAMS

$\Phi \ 3/8" \times 7\ 3/4" \times 28\ 5/8" \times 490/1728 \times 6 = 142 \text{ LB}$

CLIPS: $3/8 \times 2\ 13/16 \times 2\ 13/16 \times 1/2 \times 490/1728 \times 12 = < 5 >$

$3/8 \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 12 = < 2 >$

AT W30 x 172 BEAMS

$\Phi \ 3/8 \times 7\ 3/4" \times 27\ 1/16" \times 490/1728 \times 2 = 46 \text{ LB}$

CLIPS: $3/8 \times 1" \times 2\ 1/2" \times 1/2 \times 490/1728 \times 4 = < 1 >$

SUB TOTAL = 224 LB

CROSSFRAME ANGLES L4 x 4 x 7/16 (TYP. B)

$(7.60' + 7.62' + 7.57') \times 11.3 \text{ LB/L.F.} \times 100 = 25,753 \text{ LB}$

CROSSFRAME ANGLES L4 x 4 x 7/16 (TYP. C)

$(4.50' + 4.50' + 4.35') \times 11.3 \text{ LB/L.F.} \times 10 = 1,509 \text{ LB}$

SUB-TOTAL = 27,262 LB

FILL PLATES AT TYPE B CROSSFRAMES:

$3/8" \times 5" \times 32" \times (490/1728) \text{ LB/CF} \times 100 = 1,701 \text{ LB}$

FILL PLATES AT TYPE C CROSSFRAMES:

$3/8 \times 5" \times 19" \times (490/1728) \text{ LB/CF} \times 10 = 101 \text{ LB}$

SUB-TOTAL = 1,802 LB

ITEM 513--10260 STRUCTURAL STEEL MEMBERS, LEVEL 3
AISC CATEGORY Mbr

BOLTS IN CONNECTION PLATES, TYPE B

* 600 BOLTS $5/8" \phi \times 1/4"$ @ 34.7# / 100 = 208 LB

* 130 BOLTS $7/8" \phi \times 1/2"$ @ 83.8# / 100 = 109 LB

SUB-TOTAL 317 LB

* INCLUDES NUT & FLAT WASHER w/GRIP RANGE DEDUCTED.

TOTAL = 371,750 LB

USE: 371,800 LB

ITEM 513-20000 WELDED STUD SHEAR CONNECTORS

7/8" ϕ x 6" STUDS:

241 STUDS/ROW x 3 ROWS/BEAM x 12 BEAMS = 8676 EACH

ITEM 514-10000 FINAL INSPECTION REPAIR

(12 BEAMS x 173.0' LONG) \div 150' = 13.80

100 CROSSFRAME ASSEMBLIES x 5% = 5.00

Σ = 18.80 USE: 19 EACH

ITEM 514-80011 SHOP PAINTING AND FIELD TOUCH-UP OF STRUCTURAL STEEL, AS PER PLAN

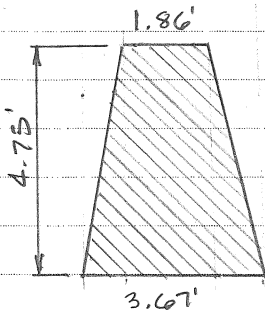
371,800 LB

ITEM 516-10010 ARMORLESS PREFORMED JOINT SEAL

87.95' L.F. x (2) APPROACH SLABS = 175.9'

USE: 176 L.F.

ITEM 516-13600 1" PREFORMED EXPANSION JOINT FILLER



BETWEEN MEDIAN BARRIER ON APPR. SLABS
AND SUPERSTRUCTURE,

$\frac{(1.86' + 3.67')}{2} \times 4.75' \times (2 \text{ LOCATIONS}) = \underline{26} \text{ S.F.}$

ITEM 516-13900 2" PREFORMED EXPANSION JOINT FILLER

SUPERSTRUCTURE.

BETWEEN R. ABUT. DIAPHRAGM AND W.B. WINGWALL

4.10' H x 2.50' W = 10.25 S.F.

BETWEEN R. ABUT. DIAPHRAGM AND E.B. WINGWALL

4.22' H x 2.50' W = 10.55 S.F.

BETWEEN F. ABUT. DIAPHRAGM AND E.B. WINGWALL

4.10' H x 2.50' W = 10.25 S.F.

BETWEEN F. ABUT. DIAPHRAGM AND W.B. WINGWALL

4.22' H x 2.50' W = 10.55 S.F.

BETWEEN R. ABUT. IA DIAPHRAGM AND EXIST. ABUT.

3.06' H x 3.02' W = 9.24 S.F.

BETWEEN F. ABUT. IA DIAPHRAGM AND EXIST. ABUT.

3.06' H x 3.02' W = 9.24 S.F.

SUB TOTAL = 60.08

USE: 60 S.F.

ITEM 516-13900 2" PREFORMED EXPANSION JOINT FILLER CONT'D.

APPROACH SLABS

FROM BOTTOM OF APPROACH SLAB TO TOP OF BARRIER
AND BRIDGE LIMIT TO END OF SLEEPER SLAB:

$6.10' \text{ HIGH} \times 22.10' \text{ LONG} \times (2 \text{ APRR SLABS}) = 225.4$

	SUB TOTAL =	<u>225 S.F.</u>
SUPERSTRUCTURE	SUB TOTAL =	<u>60 S.F.</u>
	TOTAL =	<u>285 S.F.</u>

STRUCTURE - ESTIMATED QUANTITIES

ITEM 516-14020 SEMI-INTEGRAL ABUTMENT EXPANSION JOINT SEAL

NEOPRENE SHEETING AT ABUTMENT EXPANSION JOINTS

VERTICAL JTS @ R. ABUT :

L-R (5.5' + 4.7' + 4.7' + 6.7' + 4.8' + 4.8' + 5.7') = 36.9 FT.

HORIZ. JOINT @ R. ABUT :

(90.5' + 1.5' + 1.5') = 93.5 FT.

VERTICAL JTS, @ F. ABUT.

L-R (5.5' + 4.7' + 4.7' + 6.8' + 4.8' + 4.8' + 5.6') = 36.9 FT.

HORIZ. JOINT @ F. ABUT.

(90.5' + 1.5' + 1.5') = 93.5 FT.

TOTAL = 260.8 FT.

USE: 261 FT.

ITEM 516-44101 ELASTOMERIC BEARING PAD WITH INTERNAL LAMINATES

AND LOAD PLATE (NEOPRENE), AS PER PLAN

2³/₁₆" x 1¹/₂" x 1¹/₂" W/ 1 x 1¹/₃" x 1¹/₆" BEVELED LOAD PLATE

PIER-1 : 12 EACH

PIER-2 : 12 EACH

Σ TOTAL = 24 EACH

ITEM 516-44101 ELASTOMERIC BEARING PAD WITH INTERNAL LAMINATES

AND LOAD PLATE (NEOPRENE), AS PER PLAN

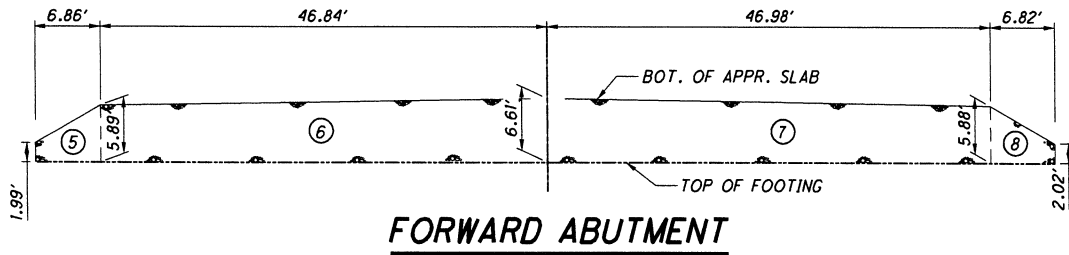
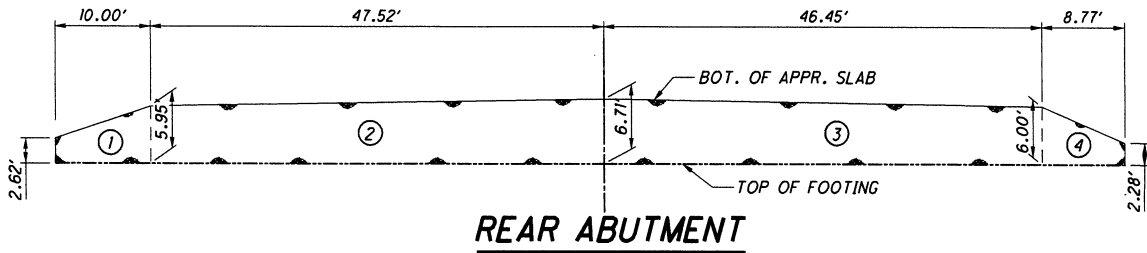
2¹/₂" x 11" x 1¹/₀" W/ 1⁵/₈" x 1¹/₀" x 1¹/₁" BEVELED LOAD PLATE

REAR ABUTMENT: 12 EACH

FWD. ABUTMENT: 12 EACH

Σ TOTAL = 24 EACH

ITEM 518-21200 POROUS BACKFILL WITH GEOTEXTILE FABRIC



REAR ABUTMENT:

- ① $(2.62' + 5.95') \frac{1}{2} \times 10.00' = 42.85 \text{ S.F.}$
- ② $(5.95' + 6.71') \frac{1}{2} \times 47.52' = 300.80 \text{ ''}$
- ③ $(6.71' + 6.00') \frac{1}{2} \times 46.45' = 295.19 \text{ ''}$
- ④ $(6.00' + 2.28') \frac{1}{2} \times 8.77' = 36.31 \text{ ''}$

FORWARD ABUTMENT:

- ⑤ $(1.99' + 5.89') \frac{1}{2} \times 6.86' = 27.03 \text{ S.F.}$
- ⑥ $(5.89' + 6.61') \frac{1}{2} \times 46.84' = 292.75 \text{ ''}$
- ⑦ $(6.61' + 5.88') \frac{1}{2} \times 46.98' = 293.39 \text{ ''}$
- ⑧ $(5.88' + 2.02') \frac{1}{2} \times 6.82' = 26.94 \text{ ''}$

$$\Sigma = 1315.26 \text{ S.F.} \times 2.0' \text{ THK} \times \frac{1}{27} = 97.43 \text{ C.Y.}$$

USE: 97 C.Y.

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1935 EAGLE PASS • WOOSTER, OH 44691
TELEPHONE: (330) 345-6556
FAX: (330) 345-8077
SFN: 7001143

PROJECT RIC-30-9.26 PROJ. NO. 15-074 PG. 27 OF 29
COMP. BY RLE DATE 5-28-19 CHKD. BY TAC DATE 5/13/19
SUBJECT BR. No. RIC-30-1135 OVER BOWMAN ST.
STRUCTURE - ESTIMATED QUANTITIES

ITEM S18-40001 6" PERFORATED CORRUGATED PLASTIC, AS PER PLAN

REAR ABUTMENT: $57.5' + 55.2' = 112.7 \text{ L.F.}$

FWD. ABUTMENT: $53.6' + 53.8' = 107.4 \text{ L.F.}$

TOTAL = 220.1 L.F. , USE: 220 FT.

ITEM S18-40010 6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS

REAR ABUTMENT: $8.0' + 6.0' = 14.0 \text{ L.F.}$

FWD. ABUTMENT: $4.0' + 4.0' = 8.0 \text{ L.F.}$

TOTAL = 22.0 L.F. USE: 22 FT.

ITEM S24-95434 DRILLED SHAFTS, 36" DIAMETER, INTO BEDROCK WITH QC/QA

PIER NO. 1: $6 \text{ SHAFTS} \times 7.0' \text{ LONG} = 42 \text{ L.F.}$

PIER NO. 2: $6 \text{ SHAFTS} \times 7.0' \text{ LONG} = 42 \text{ L.F.}$

TOTAL = 84 L.F. USE: 84 FT.

ITEM S24-95442 DRILLED SHAFTS, 42" DIAMETER, ABOVE BEDROCK WITH QC/QA

PIER NO. 1

$\text{EL. } 1200.00 - \text{EL. } 1171.6 = 28.4' \times 6 \text{ SHAFTS} = 170.4 \text{ FT.}$

PIER NO. 2

$\text{EL. } 1200.00 - \text{EL. } 1182.0 = 18.0' \times 6 \text{ SHAFTS} = 108.0 \text{ FT.}$

TOTAL = 278.4 FT.

USE: 278 FT.

ENGINEERING ASSOCIATES, INC.

CONSULTING ENGINEERS

1935 EAGLE PASS • WOOSTER, OH 44691

TELEPHONE: (330) 345-6556

FAX: (330) 345-8077

SFN: #7001143

PROJECT RIC-30-9.26 PROJ. NO. 15-074 PG. 28 OF 29

COMP. BY RLE DATE 5-28-19 CHKD. BY TAL DATE 5/13/19

SUBJECT BR. No. RIC-30-1135 OVER BOWMAN ST.

STRUCTURE - ESTIMATED QUANTITIES

ITEM 526-15001 REINFORCED CONCRETE APPROACH SLABS (13"),
AS PER PLAN

$$87.81' \text{ WIDE} \times 20.00' \text{ LONG} \times (2) \times 1/9 = 390.27 \text{ S.Y.}$$

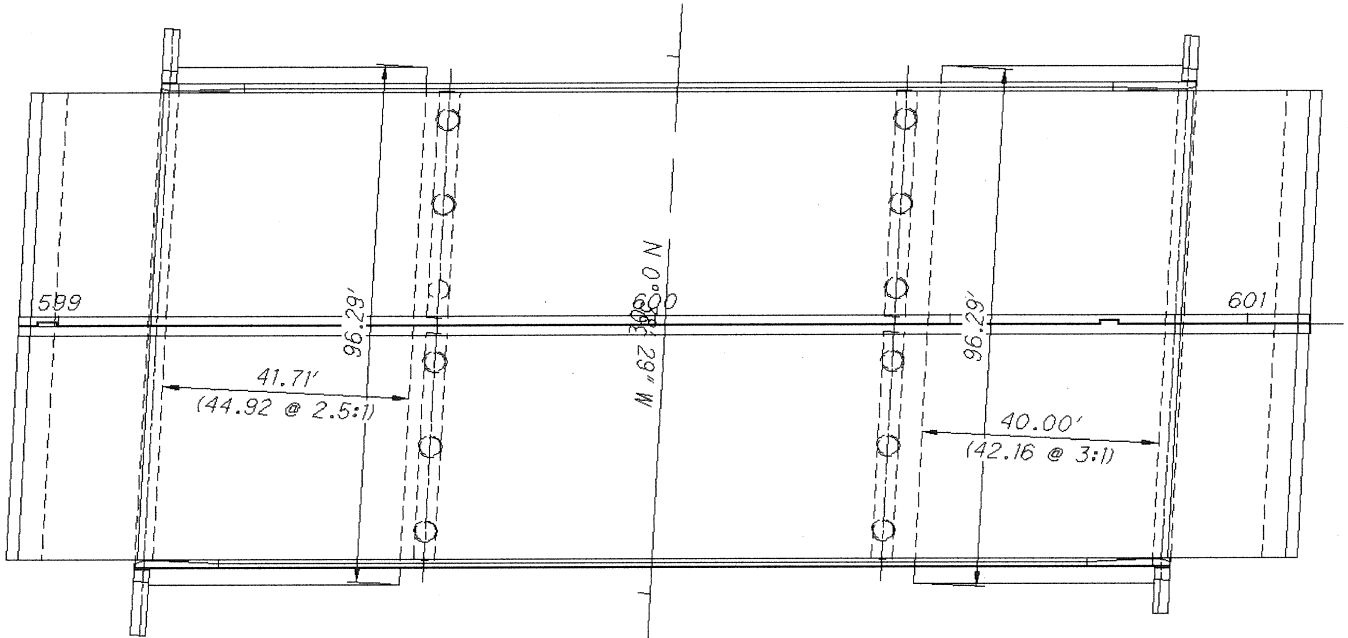
USE: 390 S.Y.

ITEM 526-90030 TYPE C INSTALLATION

$$87.95' \times (2) = 179.90$$

USE: 176 FT.

ITEM 601 21000 CONCRETE SLOPE PROTECTION



REAR ABUTMENT

$96.29 \times 44.92 = 4325.35$

$4325.35 \times 1/9 = 480.59 \text{ SY}$

FORWARD ABUTMENT

$96.29 \times 42.16 = 4059.586$

$4059.59 \times 1/9 = 451.07 \text{ SY}$

$480.59 + 451.07 = 931.66 \text{ SY}$

932 SY

ITEM 607 39900 VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC

$144.42' \text{ EACH PARAPET} \times 2 = 288.84 \text{ FT}$

289 FT

ITEM 513-20000 WELDED STUD SHEAR CONNECTORS

7/8" ϕ x 6" STUDS:

$$241 \text{ STUDS/ROW} \times 3 \text{ ROWS/BEAM} \times 12 \text{ BEAMS} = \underline{8676} \text{ EACH}$$

ITEM-514-00800 FIELD PAINTING STRUCTURAL STEEL,
INTERMEDIATE COAT, (IZEH)

W30x132 & W30x148 BEAMS

$$[(3 \times 0.875') + (2 \times 2.50')] \times 100.50' \times 12 = 9196 \text{ S.F.}$$

W30x173 BEAMS

$$[(3 \times 1.25') + (2 \times 2.50')] \times 64.00' \times 12 = 6720 \text{ S.F.}$$

CROSSFRAMES: 20% OF BEAM AREA:

$$(9196 \text{ S.F.} + 6720 \text{ S.F.}) \times 0.20' = 3,183 \text{ S.F.}$$

$$\text{TOTAL} = \underline{19,099 \text{ S.F.}}$$

ITEM 514-00066 FIELD PAINTING STRUCTURAL STEEL,
FINISH COAT, (IZEH)

$$\text{SAME AS INTERMEDIATE COAT:} \quad \underline{19,099 \text{ S.F.}}$$

ITEM 514-10000 FINAL INSPECTION REPAIR

$$(12 \text{ BEAMS} \times 173.0' \text{ LONG}) \div 150' = 13.80$$

$$100 \text{ CROSSFRAME ASSEMBLIES} \times 5\% = \underline{5.00}$$

$$\Sigma = 18.90 \quad \text{USE} \quad \underline{19} \text{ EACH}$$

ITEM 514-80011 SHOP PAINTING AND FIELD TOUCH-UP
OF STRUCTURAL STEEL AS PER PLAN

$$\underline{371,800 \text{ LB}}$$