



RICHLAND ENGINEERING LIMITED

29 North Park Street, Mansfield, Ohio 44902
419/524-0074 • FAX 419/524-1812

CALCULATION SHEET

JOB NO. D12 GROUPS SHEET NO. 1 OF 3

SUBJECT CUY-71-0579 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dlt DATE 6/2020

REVISED BY _____ DATE _____

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

LUMP

ITEM 512 - SEALING OF CONC. SURFACES (NON-EPOXY)

DECK $1265 \text{ S.Y. (S.B.)} + 1140 \text{ S.Y. (N.B.)} = \underline{2405 \text{ S.Y.}}$

2405 S.Y.

ITEM 512 - SEALING OF CONC. SURFACES (EPOXY - URETHANE), AS PER PLAN

ABUTS = $106 \text{ FT}^2 \text{ (R.A.)} + 99 \text{ FT}^2 \text{ (F.A.)} = 205.0 \text{ FT}^2 \div 9 = 22.78 = \underline{23 \text{ S.Y.}}$

PIERS = $2433 \text{ FT}^2 \text{ (PIER 1)} + 2396 \text{ FT}^2 \text{ (PIER 2)} = 4829.0 \text{ FT}^2 \div 9 = 536.56 = \underline{537 \text{ S.Y.}}$

PARAPETS = $1650 \text{ FT}^2 \text{ (OUTSIDE)} + 2953 \text{ (MEDIAN)} = 4603.0 \text{ FT}^2 \div 9 = 511.45 = \underline{512 \text{ S.Y.}}$

TOTAL SEALING = 1072 S.Y.

1072 S.Y.

ITEM 512 - REMOVAL OF EXISTING COATINGS FROM CONC. SURFACES, AS PER PLAN

ABUTS = $(106.0 \text{ FT}^2 - 54.0 \text{ FT}^2 \text{ R.A.}) + (99.0 \text{ FT}^2 - 51.0 \text{ FT}^2 \text{ F.A.}) = 100 \text{ FT}^2 \div 9 = 11.11 = \underline{12 \text{ S.Y.}}$

PIERS = $(2433 \text{ FT}^2 - 25.0 \text{ FT}^2 \text{ PIER 1}) + (2396.0 \text{ FT}^2 - 62.0 \text{ FT}^2 \text{ PIER 2}) = 4742.0 \text{ FT}^2 \div 9 = 526.88 = \underline{527 \text{ S.Y.}}$

TOTAL REMOVAL = 539 S.Y.

539 S.Y.

ITEM 513 - STRUCTURAL STEEL FOR REHABILITATION (BOTTOM FLANGE RETROFITS)

PL $(0.0625' \times 1.0' \times 3.0') + 2(0.0625' \times 0.375' \times 3.0') + (0.0417' \times 1.0' \times 1.5') = 0.3907 \text{ FT}^3 \times 60 \text{ LOCATIONS} = 23.4405 \text{ FT}^3 \times 490 \#/\text{CF} = \underline{11,485.85 \#}$

BOLTS $20 \text{ BOLTS} \times 60 \text{ LOCATIONS} = 1200/100 \times 116.7 \# = \underline{1400.4 \#}$

TOTAL = 12,886.25 = 12,887 \#

12,887 LB



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CALCULATION SHEET

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 SUBJECT CVY-71-0579 QTY'S
 CALCULATED BY JLS DATE 6/2020
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 REVISED BY _____ DATE _____

ITEM 514 - SURFACE PREPARATION OF EXISTING STRUCTURAL STEEL

LUMP

ITEM 514 - FIELD PAINTING OF EXISTING STRUCTURAL STEEL, PRIME COAT

LUMP

ITEM 514 - FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT

LUMP

ITEM 514 - FIELD PAINTING STRUCTURAL STEEL, FINISH COAT, AS PER PLAN

LUMP

ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

ONE WRAP = $(1 \times 3.0' \times 2) + 1.0' = 19.85'$ LONG

2 COLUMNS APPROX 12' TALL = 7 WRAPS PER COLUMN

$19.85' \times 2.0' \times 7 \times 2 \text{ COLUMNS} = 555.80 = \underline{\underline{556 \text{ S.F.}}}$

556 S.F.

ITEM 519 - PATCHING CONC. STRUCTURE, AS PER PLAN

R.A. NORTHBOUND = 39.25 FT²
 R.A. SOUTHBOUND = 14.50 FT²
 F.A. SOUTHBOUND = 29.50 FT²
 F.A. NORTHBOUND = 21.50 FT² } TOTAL ABUTS = 104.75 FT² = 105 S.F.

PIER 1 = 25.0 FT²
 PIER 2 = 61.25 FT² } TOTAL PIERS = 86.25 FT² = 87 S.F.

284 S.F.

PARAPETS = $80 \text{ FT}^2 + 12 \text{ FT}^2 = \underline{92 \text{ S.F.}}$

TOTAL PATCHING = $105 + 87 + 92 = \underline{\underline{284 \text{ S.F.}}}$



CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 3 OF 3

SUBJECT CV4-71-0579 QTY'S

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CALCULATED BY JLS DATE 6/2020

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ITEM 844- CONC. PATCHING WITH GALVANIC ANODE PROTECTION, AS PER PLAN

$$\text{PIER 1} = 2' \times 3' = 6 \text{ FT}^2$$

$$\text{PIER 2} = 3' \times 1' = 3 \text{ FT}^2$$

$$\left. \begin{array}{l} \text{PIER 1} = 2' \times 3' = 6 \text{ FT}^2 \\ \text{PIER 2} = 3' \times 1' = 3 \text{ FT}^2 \end{array} \right\} \text{TOTAL} = \underline{\underline{9 \text{ S.F.}}}$$

9 S.F.



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 1 OF 3

SUBJECT CWY-71-0856 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY _____ DATE _____

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

LUMP

ITEM 512-SEALING OF CONCRETE SURFACES (EPOXY-URETHANE), AS PER PLAN

R.A. = 15.0 FT²
F.A. = 30 FT² } TOTAL ABUTS = 45 FT² ÷ 9 = 5 S.Y.

PIER 1 = 2(4' x 4.6') = 36.8 FT²
PIER 2 = 3.5' x 4.7' = 16.45 FT² } TOTAL PIERS = 53.25 FT² ÷ 9 = 5.92 = 6 S.Y.

MEDIAN PARAPETS = 1250 FT²
OUTSIDE PARAPETS = 1325 FT² } TOTAL = 2575 FT² ÷ 9 = 286.11 = 287 S.Y.

TOTAL SEALING = 5 + 6 + 287 = 298 S.Y.

298 S.Y.

ITEM 512-REMOVAL OF EXISTING COATINGS FROM CONC. SURFACES, AS PER PLAN

R.A. = 15.0 FT² - 8.0 FT² = 7.0 FT²
F.A. = 30.0 FT² - 11.0 FT² = 19.0 FT² } TOTAL ABUTS = 26.0 FT² ÷ 9 = 2.89 = 3 S.Y.

PIERS = 54 FT² - 31.0 FT² = 23 FT² ÷ 9 = 2.56 = 3 S.Y.

TOTAL REMOVAL = 6 S.Y.

6 S.Y.

ITEM 513-STRUCTURAL STEEL FOR REHABILITATION (BOTTOM FLANGE RETROFITS)

PL (0.0521' x 0.875' x 2.4167') + 2(0.0521' x 0.3333' x 2.4167') + (0.0365' x 0.875' x 1.2083') =
0.2327 FT² x 76 LOCATIONS x 490# / CF = 8665.49#

BOLTS 16 BOLTS x 76 LOCATIONS = 1216 / 100 x 116.7# = 1419.07#

TOTAL = 10,084.56 = 10,085#

10,085 LB.



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SUBJECT CUY-71-0856 QTY'S.

CALCULATED BY JLS DATE 6/2020

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REVISED BY JLS  DATE 12/2020

ITEM 513 - REPLACEMENT OF DETERIORATED END CROSSFRAMES, AS PER PLAN

$\angle 4 \times 4 \times 5/16$ LENGTH = 7.78' (BOTT.) & 3.90' (DIAG.)

REAR ABUTMENT END CROSSFRAME REPAIRS

NB (2 BOTT. \times 7.78') + (4 DIAG. \times 3.90') = 31.16' \times 8.2#/FT = 255.51#

SB (1 BOTT. \times 7.78') + (2 DIAG. \times 3.90') = 15.58' \times 8.2#/FT = 127.76#



FORWARD ABUTMENT END CROSSFRAME REPAIRS

SB (1 BOTT. \times 7.78') + (2 DIAG. \times 3.90') = 15.58' \times 8.2#/FT. = 127.76#

NB SAME AS SB = 127.76#

639 LB

TOTAL = 638.79 = 639 LB

ITEM 514 - SURFACE PREPARATION OF EXISTING STRUCTURAL STEEL

LUMP

ITEM 514 - FIELD PAINTING OF EXSTING STRUCTURAL STEEL, PRIME COAT

LUMP

ITEM 514 - FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT

LUMP

ITEM 514 - FIELD PAINTING STRUCTURAL STEEL, FINISH COAT, AS PER PLAN

LUMP



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SUBJECT CUY-71-0856 QTY'S

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ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

ONE WRAP = $(\pi \times 3.0' \times 2) + 1.0' = 19.85'$ LONG

2 COLUMNS APPROX 12.67' TALL = 7 WRAPS PER COLUMN

$19.85' \times 2.0' \times 7 \times 2$ COLUMNS = 555.80 FT²

PIER 2 END CAP = $(\frac{\pi \times 3.0'}{2} + 6.0')$ $3.39' \times 2 =$ 72.63 FT²

TOTAL = $628.43 =$ 629 S.F.

629 S.F.

ITEM 519 - PATCHING CONCRETE STRUCTURE, AS PER PLAN

R.A. = 8.0 FT²
F.A. = 11.0 FT² } TOTAL ABUTS = 19 S.F.

PIERS = 31 S.F.

PARAPETS = 43 S.F.

TOTAL = $19 + 31 + 43 =$ 93 S.F.

93 S.F.

ITEM 844 - CONC. PATCHING WITH GALVANIC ANODE PROTECTION, AS PER PLAN

PIER COLS = $(1.0' \times 6.0') + (2.0' \times 3.0') + (1.0' \times 1.0' \text{ CAP}) =$ 13 S.F.

13 S.F.

ITEM 516 - ELASTOMERIC BEARING w/ INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)

(2.190" x 8" x 12" WITH 2 7/8" OR 2 1/2" LOAD PLATE WITH SHIMS), AS PER PLAN

19 BEAM LINES x 2 ABUTMENTS = 38 EACH

38 EACH

ITEM 516 - JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN

LUMP



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 1 OF 1

SUBJECT CV4-71-1007 QTY'S.

CALCULATED BY JLS DATE 6/2020

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ITEM 516 - RESET BEARING, AS PER PLAN

ABUTS = 4 BRGS X 2 ABUTS = 8 EACH

PIERS = 1 FOR PIER 1 & 1 FOR PIER 3 = 2 EACH

TOTAL = 10 EACH

10 EACH

ITEM 516 - JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN

LUMP



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 1 OF 3

SUBJECT CV4-271-0972 & 0974 QTY

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY _____ DATE _____

ITEM 202-VANDAL PROTECTION FENCE REMOVED

INTERIOR FENCE = $428.83' \times 2 \text{ BRIDGES} = 857.67' = \underline{\underline{858 \text{ FT.}}}$

858 FT.

ITEM 512-SEALING OF CONC. SURFACES (NON-EPOXY)

WESTBOUND = 13,820 FT²

EASTBOUND = 13,820 FT²

TOTAL = $27,640 \text{ FT}^2 \div 9 = 3071.11 = \underline{\underline{3072 \text{ S.Y.}}}$

3072 S.Y.

ITEM 512-SEALING OF CONC. SURFACES (EPOXY-URETHANE), AS PER PLAN

PIER CAPS FOR PIERS 1, 2, 4 & 5 = $406 \text{ S.F.} \times 8 \text{ CAPS} = 3248 \text{ FT}^2$

PIER COLUMNS = (1) PIER 4 W.B. & (2) PIER 4 E.B. =

$3.0' \text{ DIA.} \times 14.75' \text{ HIGH} \times 3 \text{ COLUMNS} =$

$14.25' \times 3.0' \times 14.75' \times 3 = 417.05 = 417 \text{ FT}^2$

TOTAL PIER SEALING = $3665 \text{ FT}^2 \div 9 = 407.23 = \underline{\underline{408 \text{ S.Y.}}}$

408 S.Y.

ITEM 512-REMOVAL OF EXISTING COATINGS FROM CONC. SURFACES, AS PER PLAN

PIER CAP QTY FROM EPOXY-URETHANE SEALING = 3248 FT²

MINUS AREAS OF CONC. PATCHING = 77 FT²

TOTAL CAPS = $3248 - 77 = \underline{\underline{3171 \text{ FT}^2}}$

+ 3 PIER COLUMNS FROM EPOXY-URETHANE SEALING = 417 FT²

TOTAL = $3171 \text{ FT}^2 + 417 \text{ FT}^2 = 3588 \text{ FT}^2 \div 9 = 398.67 = \underline{\underline{399 \text{ S.Y.}}}$

399 S.Y.

ITEM 516-RESET BEARING, AS PER PLAN

1 EACH AT REAR ABUT, BEAM LINES 1 & 2 = 2 EACH

2 EACH



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SUBJECT W4-271-0972 & 0974 QTY'S

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CHECKED BY dhf DATE 6/2020

REVISED BY _____ DATE _____

ITEM 516 - JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN

LUMP

ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

PIER 1 = $(173.0' \times 2) + 1.0' = (19.85' \text{ LONG} \times 9 \text{ WRAPS} \times 2.0' \times 6) + (19.85' \times 0.58' \times 6) = 2212.88 \text{ FT}^2$

PIER 2 = $(19.85' \times 8 \text{ WRAPS} \times 2.0' \times 6) + (19.85' \times 1.5' \times 6) = 2084.25 \text{ FT}^2$

PIER 4 = $19.85' \times 8 \text{ WRAPS} \times 2.0' \times 3 = 952.80 \text{ FT}^2$

PIER 5 = $(19.85' \times 7 \text{ WRAPS} \times 2.0' \times 6) + (19.85' \times 1.17' \times 6) = 1806.75 \text{ FT}^2$

TOTAL = $7056.68 = \underline{\underline{7057 \text{ S.F.}}}$

7057 S.F.

ITEM 519 - PATCHING CONCRETE STRUCTURE, AS PER PLAN

PIERS TOTAL = 77 FT²

77 S.F.

ITEM SPECIAL - STRUCTURES, BOTTOM OF DECK SPALL REMOVAL

@ BEAM HAUNCHES = $(0.75' \text{ HAUNCH} \times 2 \text{ SIDES}) (10 \text{ BEAM LINES}) 274.0' \text{ PER BEAM} =$

4110 FT²

4110 S.F.

ITEM 607 - VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC, AS PER PLAN

$426.83' \times 2 \text{ INTERIOR PARAPETS} = 853.67 = \underline{\underline{854 \text{ FT.}}}$

854 FT.



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SUBJECT CWY-271-0972 & 0974 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dh+ DATE 6/2020

REVISED BY _____ DATE _____

ITEM B44 - CONC. PATCHING W/ GALVANIC ANODE PROTECTION, AS PER PLAN

AVG. COLUMN HEIGHT = 15.0' (PIERS 1 & 2) AND 12.0' (PIERS 4 & 5)

$$\text{PIER 1} = (\pi 3.0' \times 17.08' \times 0.25) 3 + (\pi 3.0' \times 17.08' \times 0.10) + (\pi 3.0' \times 17.08' \times 0.40) + (\pi 3.0' \times 17.08' \times 0.20) = \underline{233.41 \text{ FT}^2}$$

$$\text{PIER 2} = (\pi 3.0' \times 16.17' \times 0.20) 2 + (\pi 3.0' \times 16.17' \times 0.25) + (\pi 3.0' \times 16.17' \times 0.30) + (\pi 3.0' \times 16.17' \times 0.10) 2 = \underline{175.26 \text{ FT}^2}$$

$$\text{PIER 4} = (\pi 3.0' \times 14.75' \times 0.30) + (\pi 3.0' \times 14.75' \times 0.10) + (\pi 3.0' \times 14.75' \times 0.20) = \underline{83.41 \text{ FT}^2}$$

$$\text{PIER 5} = (\pi 3.0' \times 14.0' \times 0.20) 2 + (\pi 3.0' \times 14.0' \times 0.5) + (\pi 3.0' \times 14.0' \times 0.25) + (\pi 3.0' \times 14.0' \times 0.40) + (\pi 3.0' \times 14.0' \times 0.30) = \underline{244.10 \text{ FT}^2}$$

$$\text{TOTAL} = 736.18 = \underline{\underline{737 \text{ S.F.}}}$$

737 S.F.



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 1 OF 2

SUBJECT COY-480-0126 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY _____ DATE _____

ITEM 512-SEALING OF CONC. SURFACES (EPOXY-URETHANE), AS PER PLAN

NORTH ABUTMENT = $26 \text{ FT}^2 \div 9 = 2.89 = \underline{3 \text{ S.Y.}}$

PIER CAPS = $(19.50 \text{ FT}^2 \times 2) + (1.5' \times 3.0')^2 + (3.162' \times 3.0')^2 =$
 $66.972 \text{ FT}^2 \times 3 \text{ PIERS} = 200.92 \text{ FT}^2 \div 9 = 22.32 = \underline{23 \text{ S.Y.}}$

TOTAL = 26 S.Y.

26 S.Y.

ITEM 512-REMOVAL OF EXIST. COATINGS FROM CONC. SURFACES, AS PER PLAN

NORTH ABUTMENT = SEALED AREA (3 S.Y.) - PATCHED AREA ($16 \text{ FT}^2 \div 9$) =
 $1.11 = \underline{2 \text{ S.Y.}}$

PIER CAPS = SEALED AREA (23 S.Y.)

TOTAL REMOVAL = $2 + 23 = \underline{25 \text{ S.Y.}}$

25 S.Y.

ITEM 516-STRUCTURAL JOINT OR JOINT SEALER, MISC.: ADDING DIAMOND PLATE

COVER TO JOINT

2 EACH

EXP. JT. @ EACH ABUT. = 2 EACH

ITEM 518-SCUPPER, MISC.: CORING AND INSTALLING PVC DOWNSPOUT

SOUTH ABUT. = 2 EACH }
NORTH ABUT. = 4 EACH } TOTAL = 6 EACH

6 EACH



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SUBJECT CVY-480-0126 QTY'S

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ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

ONE WRAP = $(143.0' \times 2) + 1.0' = 19.85'$ LONG

P1 = $(19.85' \times 2.0' \times 6 \text{ WRAPS}) + (19.85' \times 1.0') = 258.05 \text{ FT}^2$

P2 = $(19.85' \times 2.0' \times 6 \text{ WRAPS}) + (19.85' \times 1.17') = 261.42 \text{ FT}^2$

P3 = $(19.85' \times 2.0' \times 5 \text{ WRAPS}) + (19.85' \times 1.167') = 231.65 \text{ FT}^2$

752 S.F.

TOTAL = $751.12 = \underline{\underline{752 \text{ S.F.}}}$

ITEM 519 - PATCHING CONC. STRUCTURE, AS PER PLAN

NORTH ABUT. = 16 S.F.

16 S.F.

ITEM SPECIAL - STRUCTURES, BOTTOM OF DECK SPALL REMOVAL

NORTH ABUTMENT RAMP = 44 S.F.

44 S.F.

ITEM 607 - FENCE, MISC.: REPAIR DAMAGED FENCE ON NORTH ABUTMENT LANDING

1 EACH

ITEM 844 - CONC. PATCHING w/GALVANIC ANODE PROTECTION, AS PER PLAN

PIER 1 = 48 FT²

PIER 2 = 18 FT²

PIER 3 = 40 FT²

} TOTAL = 106 S.F.

106 S.F.



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 1 OF 2

SUBJECT CVY-480-0177 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY _____ DATE _____

ITEM 202 - WALK REMOVED

$$\left. \begin{aligned} \text{SOUTH RAMP} &= 25.0' \times 8.0' = 200.0 \text{ FT}^2 \\ \text{NORTH RAMP} &= 40.0' \times 8.0' = 320.0 \text{ FT}^2 \end{aligned} \right\} \text{TOTAL} = 520 \text{ S.F.}$$

520 S.F.

ITEM 202 - VANDAL PROTECTION FENCE REMOVED

$$(288.0' \times 2) + 11.0' = 587.0 \text{ FT.}$$

587 FT

ITEM 304 - AGGREGATE BASE

$$\begin{aligned} \text{SOUTH RAMP} &= 25.0' \times 7.58' \times 0.75' = 142.13 \text{ FT}^3 \\ \text{NORTH RAMP} &= 40.0' \times 7.58' \times 1.0' = 303.20 \text{ FT}^3 \\ \text{TOTAL} &= 445.33 \text{ FT}^3 \div 27 = 16.49 = \underline{17 \text{ C.Y.}} \end{aligned}$$

17 C.Y.

ITEM 512 - SEALING OF CONC. SURFACES (EPOXY-URETHANE), AS PER PLAN

$$\begin{aligned} \text{PIER CAPS} &= (9.0' \times 2.5' \times 2) - (3.0' \times 1.0' \times 2) + (1.5' \times 3.0' \times 2) + (3.16' \times 3.0' \times 2) = \\ & 66.96 \text{ FT}^2 \times 3 \text{ CAPS} = 200.88 \text{ FT}^2 \div 9 = 22.32 = \underline{23 \text{ S.Y.}} \end{aligned}$$

$$\text{DECK SLAB REPAIR} = 4.5' \times 0.92' = 4.14 \text{ FT}^2 \div 9 = 0.46 = \underline{1 \text{ S.Y.}}$$

24 S.Y.

$$\text{TOTAL} = \underline{24 \text{ S.Y.}}$$

ITEM 512 - REMOVAL OF EXIST. COATINGS FROM CONC. SURFACES, AS PER PLAN

$$\text{PIER CAPS} = \underline{23 \text{ S.Y.}}$$

23 S.Y.



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ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

$$1 \text{ WRAP} = (\pi \times 3.0' \times 2) + 1.0' = 19.85' \text{ LONG}$$

$$\text{PIER 1} = 19.85' \times 2.0' \times 7 \text{ WRAPS} = 277.90 \text{ FT}^2$$

$$\text{PIER 2} = (19.85' \times 2.0' \times 8 \text{ WRAPS}) + (19.85' \times 0.33') = 324.15 \text{ FT}^2$$

$$\text{PIER 3} = (19.85' \times 2.0' \times 7 \text{ WRAPS}) + (19.85' \times 0.42') = 286.24 \text{ FT}^2$$

889 S.F.

$$\text{TOTAL} = 888.29 = \underline{\underline{889 \text{ S.F.}}}$$

ITEM 519 - PATCHING CONCRETE STRUCTURE, AS PER PLAN

$$\text{DECK EDGE} = 4.0' \times 0.92' = 3.68 = \underline{\underline{4.0 \text{ S.F.}}}$$

4 S.F.

ITEM 607 - VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC, AS PER PLAN

$$(287.5' \times 2) + 11.0' = \underline{\underline{586 \text{ FT.}}}$$

586 FT

ITEM 608 - 5" CONCRETE WALK

$$\text{SOUTH RAMP} = 25.0' \times 8.0' = 200 \text{ FT}^2$$

$$\text{NORTH RAMP} = 40.0' \times 8.0' = 320 \text{ FT}^2$$

$$\text{TOTAL} = \underline{\underline{520 \text{ S.F.}}}$$

520 S.F.

ITEM 844 - CONC. PATCHING W/ GALVANIC ANODE PROTECTION, AS PER PLAN

$$\text{PIER 1} = 10' \times 3' = 30 \text{ FT}^2$$

$$\text{PIER 2} = 4' \times 4' = 16 \text{ FT}^2$$

$$\text{PIER 3} = 1' \times 2' = 2 \text{ FT}^2 \Delta$$

48 S.F.

$$\text{TOTAL} = \underline{\underline{48 \text{ SF}}}$$



RICHLAND ENGINEERING LIMITED

29 North Park Street, Mansfield, Ohio 44902
419/524-0074 • FAX 419/524-1812

CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 1 OF 4

SUBJECT CVY-480-0501 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY _____ DATE _____

ITEM 201 - TREE REMOVED, 18", AS PER PLAN

1 EACH

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

LUMP

ITEM 509 - EPOXY COATED REINFORCING STEEL

F.A. BACKWALL = 355 LB.

355 LB

ITEM 510 - DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT

F.A. REPAIR $(19 + 10) \times 2 + 1 = \underline{59 \text{ EACH}}$

59 EACH

ITEM 511 - CLASS QCI CONCRETE, ABUTMENT (BACKWALL REPAIR)

$$(29.75' \text{ AVG.} \times 1.75' \times 1.58') - (30.6' \times 0.67' \times 0.23') = 77.54 \text{ FT}^3 \div 27 = 2.87 = \underline{3 \text{ C.Y.}}$$

3 C.Y.

ITEM 512 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE), AS PER PLAN

$$\text{R.A.} = 21.0 + 45.0 + 7.0 + 8.0 + 13.0 = 94 \text{ FT}^2$$

$$\text{F.A.} = 90.75' + 65.25' + 10.5' + 24.0' + 33.25' + 14.375' = 238.125 \text{ FT}^2$$

$$\text{TOTAL ABUTS} = 332.13 \text{ FT}^2 \div 9 = 36.90 = \underline{37 \text{ S.Y.}}$$

OUTSIDE PARAPET - VERT. HEIGHT OF SEALING = 3.67'

$$\text{W.B. PARAPET} = 520.5' \times 3.67' = 1910.24 \text{ FT}^2$$

$$\text{E.B. PARAPET} = 495.36' \times 3.67' = 1817.97 \text{ FT}^2$$

INSIDE PARAPET - VERT. HEIGHT OF SEALING = 4.91'

$$\text{E.B. PARAPET} = 464.25' \times 4.91' = 2279.47 \text{ FT}^2$$

$$\text{W.B. PARAPET} = 464.25' \times 4.91' = 2279.47 \text{ FT}^2$$

$$\text{TOTAL PARAPETS} = 8287.15 \text{ FT}^2 \div 9 = 920.79 = \underline{921 \text{ S.Y.}}$$

958 S.Y.

$$\text{TOTAL SEALING} = \underline{958 \text{ S.Y.}}$$



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 2 OF 4

SUBJECT WY-480-0501 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY _____ DATE _____

ITEM 512-REMOVAL OF EXIST. COATINGS FROM CONC. SURFACES, AS PER PLAN

R.A. $94.0 \text{ FT}^2 - (10 + 22.5 + 2.5 + 3 + 4.5) = 51.5 \text{ FT}^2$

F.A. $246.0 \text{ FT}^2 - (55.5 + 40.5 + 5 + 12 + 18 + 8) = 107 \text{ FT}^2$

TOTAL ABUTS = $158.5 \text{ FT}^2 \div 9 = 17.61 = \underline{18 \text{ S.Y.}}$

OUTSIDE PARAPETS

W.B. = $1910.24 \text{ FT}^2 - 169.0 \text{ FT}^2 \text{ (PATCHED AREA)} = 1741.24 \text{ FT}^2$

E.B. = $1817.97 \text{ FT}^2 - 68.0 \text{ FT}^2 \text{ (PATCHED AREA)} = 1749.97 \text{ FT}^2$

INSIDE PARAPET

E.B. = $2279.47 \text{ FT}^2 - 40 \text{ FT}^2 \text{ (PATCHED AREA)} - (18.0' \times 4.91') - (1.25' \times 2.0') = 2148.59 \text{ FT}^2$

W.B. = $2279.47 \text{ FT}^2 - 27.38 \text{ FT}^2 \text{ (PATCHED AREA)} - (18.0' \times 4.91') - (1.25' \times 2.0') = 2161.21 \text{ FT}^2$

TOTAL PARAPETS = $7801.01 \text{ FT}^2 \div 9 = 866.78 = \underline{867 \text{ S.Y.}}$

885 S.Y.

TOTAL REMOVAL = 885 S.Y.

ITEM 513-STRUCTURAL STEEL, MISC.: PENCIL ABRASIVE BLASTING, GRINDING,

AND NDT

W.B. LANES = 7 LOCATIONS }
E.B. LANES = 6 LOCATIONS } 13 EACH

13 EACH

ITEM 513-STRUCTURAL STEEL, MISC.: DRILLING STRUCTURAL STEEL, GRINDING,

AND NDT

W.B. LANES = 7 LOCATIONS }
E.B. LANES = 6 LOCATIONS } 13 EACH X 2 HOLES = 26 EACH

26 EACH



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 3 OF 4

SUBJECT CVY-480-0501 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY JLS DATE 12/2020

ITEM 516 - PREFORMED ELASTOMERIC COMPRESSION JOINT SEAL, AS PER PLAN

$$\left. \begin{aligned} \text{R.A.} &= 7.0' + 7.0' + 7.0' + 7.25' = 28.25' \\ \text{F.A.} &= 7.0' + 7.0' + 7.0' + 7.25' = 28.25' \end{aligned} \right\} 56.5 = \underline{\underline{57 \text{ FT.}}}$$

57 FT.

ITEM 516 - RESET BEARING, AS PER PLAN

R.A. = 3 LOCATIONS

F.A. = 7 LOCATIONS

▲ CONTINGENCY = 10 LOCATIONS

20 EACH

20 EACH

ITEM 516 - JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE, AS PER PLAN

LUMP

ITEM 517 - RAILING, CONCRETE (QC2), REPLACEMENT OF DAMAGED SECTIONS

$$\left. \begin{aligned} \text{W.B. MEDIAN} &= 18.0' + 1.25' = 19.25' \\ \text{E.B. MEDIAN} &= 18.0' + 1.25' = 19.25' \end{aligned} \right\} 38.5 = \underline{\underline{39 \text{ FT.}}}$$

39 FT.

ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

ONE WRAP = $(\pi \times 3.0' \times 2) + 1.0' = 19.85'$ LONG

$$\text{PIER 2} = (19.85' \times 5 \text{ WRAPS} \times 2.0') + (19.85' \times 1.58') + \left[\left(\frac{\pi \times 3.0}{2} + 6.0' \right)^2 \right] 2 = 272.71 \text{ FT}^2$$

$$\left(\frac{\pi \times 3.0}{2} + 6.0' \right)^2 + \left(\frac{\pi \times 3.0}{2} + 6.0' \right) 1.67' = 39.31 \text{ FT}^2$$

$$(19.85' \times 5 \text{ WRAPS} \times 2.0') + (19.85' \times 0.83') + \left(\frac{\pi \times 3.0}{2} + 6.0' \right) 2.0' +$$

$$\left(\frac{\pi \times 3.0}{2} + 6.0' \right) 1.67' = 254.29 \text{ FT}^2$$

$$\text{TOTAL PIER 2} = \underline{\underline{566.31 \text{ FT}^2}}$$

868 S.F.

$$\text{PIER 3} = (19.85' \times 7 \text{ WRAPS} \times 2.0') + (19.85' \times 1.17') = \underline{\underline{301.12 \text{ FT}^2}}$$

$$\text{TOTAL} = 867.43 = \underline{\underline{868 \text{ S.F.}}}$$



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CALCULATION SHEET

JOB NO. D12 GROUP 5 SHEET NO. 4 OF 4

SUBJECT CV4-480-0501 QTY'S

CALCULATED BY JLS DATE 6/2020

CHECKED BY dht DATE 6/2020

REVISED BY _____ DATE _____

ITEM 519 - PATCHING CONCRETE BRIDGE DECK OVERLAY W/MICRO-SILICA

MODIFIED CONCRETE, PER SS 847

@ FOR ABUT

WESTBOUND = $(1' \times 6') + (1' \times 4') + 15 \text{ FT}^2 = 25 \text{ FT}^2$

EASTBOUND = $(1' \times 8') + (1' \times 20') = 28 \text{ FT}^2$

TOTAL = $53 \text{ FT}^2 \div 9 = 5.89 = \underline{\underline{6 \text{ S.Y.}}}$

6 S.Y.

ITEM 519 - PATCHING CONCRETE STRUCTURE, AS PER PLAN

R.A. = $10 \text{ FT}^2 + 22.5 \text{ FT}^2 + 2.5 \text{ FT}^2 + 3 \text{ FT}^2 + 4.5 \text{ FT}^2 = 42.5 \text{ FT}^2$

F.A. = $55.5 \text{ FT}^2 + 40.5 \text{ FT}^2 + 5 \text{ FT}^2 + 12 \text{ FT}^2 + 18 \text{ FT}^2 + 8 \text{ FT}^2 = 139 \text{ FT}^2$

TOTAL ABUTS = $181.5 = \underline{\underline{182 \text{ S.F.}}}$

OUTSIDE PARAPETS = 245.25 FT^2

MEDIAN PARAPETS = 67.375 FT^2

TOTAL PARAPETS = $312.63 = \underline{\underline{313 \text{ S.F.}}}$

495 S.F.

TOTAL PATCHING = 495 S.F.

ITEM 844 - CONC. PATCHING W/GALVANIC ANODE PROTECTION, AS PER PLAN

PIER 2 - $(1' \times 4') + (1' \times 5') + (3' \times 2') + (2' \times 1') = \underline{\underline{17 \text{ FT}^2}}$

PIER 3 - $2' \times 5' = \underline{\underline{10 \text{ FT}^2}}$

TOTAL = 27 S.F.

27 S.F.