SUBJECT DESC.: FRA-104-5.63 STRUCTURE ESTIMATED QUANTITIES

Project ID Number: 97727 JOB NUMBER:

DESIGNED BY: DLC DATE: 6/1/21 CHECKED BY: APM DATE: 6/1/21

STRUCTURE ESTIMATED QUANTITIES

Item ID	Total	Units	Description
202E11203		**LS**	**PORTION OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN**

per "Procedure for Construction Budget Estimating", May 2013
remove existing deck, $25/ sf (349 ft x 36.5 ft) = $318000

Remove substructure concrete, $200/ cy
ex. Backwall, 2(1.75 ft x 44 ft x 5.5 ft) = 847 cf
ex. Wingwall safety curb area, 1.7 ft X 5.2 ft + 1.5 ft x 1 ft = 10.34 sf
2 (25.91 ft+ 20.2 ft)10.34 sf = 953.55 cf
ex. Wingwall 2 [(1.5 ft x 5.25 ft x 19.83) + (5.27 ft x27.83 x 1.5ft)] = 752.31 cf
ex. Wingwall 2 [(1.5 ft x 5.5 ft x 14.92) + (5.31 ft x22.92 x 1.5ft)] = 611.30 cf
118 cy ($200/cy) = $24000

Remove 4 intermediate crossframes:
L3x3x5/16, 6.10 lb/ft (2x8.5' + 7.5')x4 = 598 Lb
Remove end dam:
L8x4x1, 37.4 Lb/ft(42.23 FT)x2 = 3159 Lb
Remove 8 end crossframes:
L4x4x5/16, 8.20 Lb/ Ft(18.12 ft)x8 =1189 Lb
Remove support angle:
L7x4x3/4, 26.2 Lb/ FT(42.23 ft)x2 = 2213 Lb
Remove 24 3/8" attach plates'
16"x10"x0.375'x24x0.284 lb/ in^3 =409 Lb
Remove 10 R-100 rocker bearings:
10x 250 lb = 2500 Lb
Total Steel removal cost, $250/Ton(10068 lb/2000 lb/Ton) = $1260

Total LS removal cost = $345,000

202E22900	**186**	**SY**	**APPROACH SLAB REMOVED**

2 (25 FT x 33.4 FT) = 1670 SF

202E23500	**1331**	**SY**	**WEARING COURSE REMOVED**

399.06 FT (30 FT) = 11971.80 SF

503E21300		**LS**	**UNCLASSIFIED EXCAVATION**

PER CMS 503.9C, 1 ft. Outside outer edge of footing, footing or wall elevation to top of exist ground

Excavation for proposed straight wingwalls

SW Wingwall plan area, (6.75 ft. +2 ft) x (8.82 ft +2ft) = 94.68 sf Prop. Ftg. Bot. elev. = 713.01

SW Wingwall average ex. ground elevation, (721.01 + 719.36+ 717.85+ 718.76)/4 = 719.15

SW Wingwall excavation volume, (7219.95-713.01) 94.68 = 517.43 cf

SE Wingwall plan area, (6.75 ft. +2 ft) x (10.94 ft +2ft) = 113.23 sf Prop. Ftg. Bot. elev. = 713.01

SE Wingwall average ex. ground elevation, (720.71 + 724.42+ 719.87+ 717.18)/4 = 720.55

SE Wingwall excavation volume, (720.55-713.01) 113.23 = 853.19 cf

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STRUCTURE ESTIMATED QUANTITIES (Cont.)

Item ID	Total	Units	Description
503E21300		LS	UNCLASSIFIED EXCAVATION (cont.)

S backwall plan area, 2.5 ft x (44.92 ft) =112.30 sf Prop.bott porous backfill el = 718.34

S Backwall average ex. ground elevation, (727.24 + 727.02+ 727.07+ 726.90 + 726.90)/5 - 1.25 ft = 725.77

S Backwall excavation volume, (725.77-718.34) 112.3 = 834.39 cf

NW Wingwall plan area, (6.75 ft. +2 ft) x (10.41 ft +2ft) = 108.59 sf Prop. Ftg. Bot. elev. = 713.01

NW Wingwall average ex. ground elevation, (718.74 + 717.98+ 719.93+ 722.24)/4 = 719.72

NW Wingwall excavation volume, (719.72-713.01) 108.59 = 728.64 cf

NE Wingwall plan area, (6.75 ft. +2 ft) x (9.77 ft +2ft) = 102.99 sf Prop. Ftg. Bot. elev. = 713.01

NE Wingwall average ex. ground elevation, (724.42 + 720.76+ 717.48+ 718.5)/4 = 720.29

NE Wingwall excavation volume, (720.29-713.01) 102.99 = 749.77 cf

N backwall plan area, 2.5 ft x (44.54 ft) = 111.35 sf

N Backwall average ex. ground elevation, (726.85 + 726.93+ 727.07+ 727.02 + 727.63)/5 - 1.25 ft = 725.85

N Backwall excavation volume, (725.85-718.34) 111.35 = 836.24 cf

Excavation for access to existing turnback wingwalls

SW ex. Wingwall plan area, (1.83 ft. + 2 ft) (19.21 ft +2 ft) = 81.23 sf Prop saw cut el= 720.73

SW ex. Wingwall average ground elevation, (727.51 + 721.15 + 727.37 + 727.72)/4 = 725.94

SW ex. Wingwall excavation volume, (81.23 sf)(725.94-720.73) = 423.21 cf

SE ex. Wingwall plan area, (1.83 ft. + 2 ft) (20.41 ft. +2 ft) = 85.83 sf Prop saw cut el= 720.53

SE ex. Wingwall average ground elevation, (727.43 + 726.74 + 726.76 + 722.09)/4 = 725.76

SE ex. Wingwall excavation volume, (85.83 sf)(725.76-720.53) = 449.00 cf

NE ex. Wingwall plan area, (1.83 ft. + 2 ft) (20.17 ft. +2 ft.) = 84.91 sf Prop saw cut el= 720.76

NE ex. Wingwall average ground elevation, (726.71 + 725.53 + 722.07 + 726.78)/4 = 725.27

NE ex. Wingwall excavation volume, (84.91 sf)(725.76-720.76) = 424.55 cf

NW ex. Wingwall plan area, (1.83 ft. + 2 ft) (15.52 ft. + 2 ft)= 64.12 sf Prop saw cut el= 720.56

NW ex. Wingwall average ground elevation, (727.32 + 727.40 + 727.03 + 724.26)/4 = 726.50

NW ex. Wingwall excavation volume, (64.12 sf)(724.26-720.56) = 237.24 cf

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Item ID	Total	Units	Description
503E21300		**LS**	**UNCLASSIFIED EXCAVATION (cont.)**

Total SW excavation = 1362.34 cf Total NW excavation = 1384.00 cf

Total SE excavation = 1719.39 cf Total NE excavation = 1590.44 cf

Grand total unclassified excavation =6056.17 cf = 225 cy $30/ cy = $6750, use $10,000

509E10001 1E+05 LB EPOXY COATED REINFORCING STEEL, AS PER PLAN

SUPERSTRUCTURE = 91149 LB

Railing, = 16183 LB Piers = 4448 LB

Abutment, = 3434 LB Total = 1E+05 LBS

510E10001 322 EA DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT, AS PER PLA

(24+20) x2 [abut] + 39 x 2 x 3 [pier] = 322

511E21522 426 CY CLASS QC2 CONCRETE WITH QC/QA SUPERSTRUCTURE

Deck, 8.5 in(36 ft x 349.06 ft) = 8901.03 cf

haunches, [4x3.5in(9 in)) + 5(2.33in (14 in))] 341.02 ft = 684.65 cf

overhangs, [2.14 ft (3.5 in) + 2.72 ft (3.5 in)] 341.02 ft = 483.40 cf

Integral backwalls, 3.75 ft (4.25 ft) x (44.50 ft +44.58 ft) = 1419.71 cf

511E33501 2 EACH SEMI-INTEGRAL DIAPHRAGM GUIDE, AS PER PLAN

conc. $685/cy (2'x3'x3.75')/27 = $ 290 2" PEJF $9.40/sf(30 sf) = $280
reinf $0.86 / lb,(235 lb) =$200 Welded Studs, $3.60 (16) = $60
dowel holes, $17 (26) = $440 Steel Plates, $1.60/lb (24"x8"x2")0.28 lb/in^3 = $170
Total cost each = $1440

511E34450 75 CY CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET)

2.90 SF (2)(349.06 FT) = 2024.55 CF

511E45710 40 CY CLASS QC1 CONCRETE, ABUTMENT

Footing, 2.25 ft x 6.75 ft (7.92 ft +4.92 ft + 8.13 ft + 4.38ft) = 385.00 cf

se wingwall, 1.75 [8.17 ft (8.47 ft + 11.58)/2 + 1.64 ft (11.58 ft)] = 176.57 cf

sw wingwall, 1.75 ft[6.83 ft (11.81 ft + 8.81 ft)/2 + 1.64 ft (11.81 ft)] = 157.12 cf

ne wingwall, 1.75 ft [7.00 ft (11.68 ft + 8.62 ft)/2 + 1.64 ft (11.68 ft)] = 157.86 cf

nw wingwall. 1.75 ft [7.67 ft (11.43 ft + 8.15 ft)/2 + 1.64 ft (11.43 ft)] = 164.21 cf

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STRUCTURE ESTIMATED QUANTITIES (Cont.)

Item ID	Total	Units	Description
512E10100	**1026**	**SY**	**SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)**

Integral backwalls, (44.58ft + 44.50 ft) 4.75 ft = 423.13 sf

se wingwall face, 10.92 ft (.50 ft + 5.46 ft)/2 = 32.45 sf

sw wingwall face, 8.54 ft (.50 ft + 4.27 ft)/2 = 21.11 sf

ne wingwall face, 8.5 ft (.50 ft + 4.25 ft)/2 = 20.19 sf

nw wingwall face, 10.44 ft (.50 ft + 5.22 ft)/2 = 29.89 sf

wingwall perimeter, 2.25 ft (10.44 ft +8.5 ft + 8.54 ft + 10.92 ft) = 86.40 sf

parapet- deck OH perimeter, 8.39 ft (349.06 ft)2 = 5857.23 sf

piers 1 & 3, 14*pi*3*4 + [37.75*3-PI*1.5^2*3] + [37.75*2+pi*3]*4.23 = 979.06 sf per pier

pier 2, 9.25*pi*3*4 + [37.75*3-PI*1.5^2*3] + [37.75*2+pi*3]*4.23 = 799.99 sf

513E20000	**2595**	**EA**	**WELDED STUD SHEAR CONNECTORS**

5 BEAMS, 3 ROWS, 173 STUD ROWS = 2595

514E00050	**28340**	**SF**	**SURFACE PREPERATION OF EXISTING STRUCTURAL STEEL**

10 Plate girders, 55.5 in x 14 in x 172.58 ft

10 x 172.58 ft[2(55.5 in) +3(14in)]/12 = 22003.95 sf

90-intermediate/ bearing stiffeners, 10 x 2 x 90(6"x52")/144 = 3900 sf

98-L3x3 intermediate cross frames, 98 X 1 ft.{ 7.5 ft +2[(7.5 ft)^2+ (4.33 ft)^2]^0.5} = 2432.40 sf

514E00056	**28340**	**SF**	**FIELD PAINTING OF EXISTING STRUCTURAL STEEL, PRIME COAT**

(see "SURFACE PREPERATION OF EXISTING STRUCTURAL STEEL" for calculation)

514E00060	**28340**	**SF**	**FIELD PAINTING OF EXISTING STRUCTURAL STEEL, INTERMEDIATE COAT**

(see "SURFACE PREPERATION OF EXISTING STRUCTURAL STEEL" for calculation)

514E00066	**28340**	**SF**	**FIELD PAINTING OF EXISTING STRUCTURAL STEEL, FINISH COAT**

(see "SURFACE PREPERATION OF EXISTING STRUCTURAL STEEL" for calculation)

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STRUCTURE ESTIMATED QUANTITIES (Cont.)

Item ID	Total	Units	Description
514E00504	**29**	**MNHR**	**GRINDING FINS, TEARS, SLIVERS ON EXISTING STRUCTURAL STEEL**

1 MIN/ FT BEAM LENGTH, 10 (172.58 FT) /(60 MIN/ HR) = 28.76 MNHR

514E10000	**17**	**EA**	**FINAL INSPECTION REPAIR**

I EA / 150 FT BEAM LENGTH + 5% CROSSFRAME ASSEMBLIES

10(176.58 FT)/ 150 = 12 98 x 0.05 = 5

516E13900	**40**	**SF**	**2" PREFORMED EXPANSION JOINT FILLER**

4 (1.75 FT x 5.5 FT) = 38.5 SF

516E14020	**113**	**FT**	**SEMI-INTEGRAL ABUTMENT EXPANSION JOINT SEAL**

2(44.92 FT) = 89.84 FT (2 x 5.75 FT)2 = 23 ft

516E44101	**10**	**EA**	**ELASTOMERIC BEARING WITH INTERNAL LAMINATES, AND LOAD PLATE (NEOPRENE), AS PER PLAN 13" x 12" x 2.5"**

ABUTMENTS = 5 (2) = 10

516E44100	**10**	**EA**	**ELASTOMERIC BEARING WITH INTERNAL LAMINATES, AND LOAD PLATE (NEOPRENE) 16" x 16" x 2.625"**

PIERS 1 & 3 = 5 (2) = 10

516E44100	**5**	**EA**	**ELASTOMERIC BEARING WITH INTERNAL LAMINATES, AND LOAD PLATE (NEOPRENE) 16.5" x 16.5" x 2.825"**

PIER 2 = 5

516E47001		**LS**	**JACKING AND TEMPORARY SUPPORT OF SUPERSTRUCTURE AS PER PLAN**

$1000/ JACKING POINT, 25 BEARINGS = $25,000

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STRUCTURE ESTIMATED QUANTITIES (Cont.)

Item ID	Total	Units	Description
518E21200	**80**	**CY**	**POROUS BACKFILL WITH GEOTEXTILE FABRIC**

Behind Integral backwalls, 2[2 FT (7.78 FT) (44.92 FT)] = 1397.91 cf

se wingwall, 2 ft [8.17 ft (8.47 ft + 11.58)/2 + 1.64 ft (11.58 ft)] = 201.79 cf

sw wingwall, 2 ft[6.83 ft (11.81 ft + 8.81 ft)/2 + 1.64 ft (11.81 ft)] = 179.57 cf

ne wingwall, 2 ft [7.00 ft (11.68 ft + 8.62 ft)/2 + 1.64 ft (11.68 ft)] = 180.41 cf

nw wingwall. 2 ft [7.67 ft (11.43 ft + 8.15 ft)/2 + 1.64 ft (11.43 ft)] = 187.67 cf

519E11101	**300**	**SF**	**PATCHING OF CONCRETE STRUCTURE, AS PER PLAN**

REAR ABUTMENT = 36 SF

FORWARD ABUTMENT = 45 SF

PIER 1 = 108 SF
PIER 2 = 3 SF
PIER 3 = 108 SF

526E25001	**195**	**SY**	**REINFORCED CONCRETE APPROACH SLABS (T=15"), AS PER PLAN**

2(25 FT)(34.97 FT) = 1748.5 SF

526E90010	**81**	**FT**	**TYPE A INSTALLATION**

2(40.39 FT) = 80.78 FT

607E39900	**694**	**FT**	**VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC**

2(346.65 FT) = 693.29 FT

846E00120	**34**	**CF**	**POLYMER MODIFIED ASPHALT JOINT SYSTEM**

2(40.39 FT) x0.25 ft x 1.67 ft = 33.72 cf

511E43210	**15**	**CY**	**CLASS QC1 CONCRETE, PIER**

Average fill height 1.12 ft
Volume = 1.12*(3 piers)*(PI*1.5^2+37.75*3) = 404.27 cft = 14.97 cyd