The Mannik & Smith Group
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Job Number: 117649
Calc'd By: BMC 4/22/25
Checked By: RJS 12/17/25

ESTIMATED QUANTITIES
CUY-43-04.80

Units and Definitions

$\gamma_{conc} := 150pcf$ $\quad dollars := 1$ $\quad \gamma_{steel} := 490pcf$ $\quad cy := yd^3$ $\quad pcy := \frac{lbf}{cy}$ $\quad sy := yd^2$

Legend:

INPUTS **IMPORTANT VALUES** **FINAL VALUE** **NEEDS UPDATED**

ITEM 202E11203 - PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN — LS

ITEM 503E11101 - COFFERDAMNS AND EXCAVATION BRACING, AS PER PLAN — LS

ITEM 503E21100 - UNCLASSIFIED EXCAVATION — CY

$A_{Exc.RA} := 37.5ft^2$ $\quad L_{Exc.RA} := 87.56ft$

$A_{Exc.FA} := 37.5ft^2$ $\quad L_{Exc.FA} := 88.005ft$

$V_{.Exc.Channel} := 4652.16ft^3$

$V_{Excavation} := \left(A_{Exc.RA} \cdot L_{Exc.RA} + A_{Exc.FA} \cdot L_{Exc.FA} + V_{Exc.Channel}\right) \cdot 1.15$ $\quad V_{Excavation} = 478.56 \cdot yd^3$

$Total_{Excavation} := Ceil\left(V_{Excavation}, 100yd^3\right)$ $\quad Total_{Excavation} = 500 \cdot yd^3$

ITEM 511E46010 - CLASS QC1 CONCRETE, RETAINING/WINGWALL NOT INCLUDING FOOTING — CY

$A_{1.WW.1} := 16.50ft^2$

$A_{2.WW.1} := 85.75ft^2$

$W_{1.WW.1} := 1.167ft$

$W_{2.WW.1} := 1.33ft$

$A_{1.WW.2} := 16.50ft^2$

$A_{2.WW.2} := 71.678ft^2$

$W_{1.WW.2} := 1.167ft$

$W_{2.WW.2} := 1.33ft$

$A_{1.WW.3} := 16.50ft^2$

$A_{2.WW.3} := 77.10ft^2$

$W_{1.WW.3} := 1.167ft$

$W_{2.WW.3} := 1.33ft$

$A_{1.WW.4} := 16.50ft^2$

$A_{2.WW.4} := 86.98ft^2$

$W_{1.WW.4} := 1.167ft$

$W_{2.WW.4} := 1.33ft$

$V_{Wingwall.1} := A_{1.WW.1} \cdot W_{1.WW.1} + A_{2.WW.1} \cdot W_{2.WW.1}$ $V_{Wingwall.1} = 133.30 \cdot ft^3$

$V_{Wingwall.2} := A_{1.WW.2} \cdot W_{1.WW.2} + A_{2.WW.2} \cdot W_{2.WW.2}$ $V_{Wingwall.2} = 114.59 \cdot ft^3$

$V_{Wingwall.3} := A_{1.WW.3} \cdot W_{1.WW.3} + A_{2.WW.3} \cdot W_{2.WW.3}$ $V_{Wingwall.3} = 121.80 \cdot ft^3$

$V_{Wingwall.4} := A_{1.WW.4} \cdot W_{1.WW.4} + A_{2.WW.4} \cdot W_{2.WW.4}$ $V_{Wingwall.4} = 134.94 \cdot ft^3$

$Total_{Wingwall} := Ceil\left(V_{Wingwall.1} + V_{Wingwall.2} + V_{Wingwall.3} + V_{Wingwall.4}, yd^3\right)$ $Total_{Wingwall} = 19 \cdot yd^3$

ITEM 511E51510 - CLASS QC2 CONCRETE, SIDEWALK — CY

$A_{Sidewalk} := 13.89ft^2$

$L_{Sidewalk} := 34.76ft$

$Total_{511.Sidewalk} := Ceil(A_{Sidewalk} \cdot L_{Sidewalk}, cy)$ $Total_{511.Sidewalk} = 18.00 \cdot yd^3$

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

Abutment Sealing *(Areas Measured from CSUB.dgn Basemap)*

Wingwalls:

$A_{Wing.Section.View} := 6.80ft^2$

$A_{WW1.Side} := 74.91ft^2$

$A_{WW2.Side} := 60.123ft^2$

$A_{WW1.Top} := 13.86ft^2$

$A_{WW2.Top} := 12.77ft^2$

Wingwalls:

$A_{WW3.Side} := 63.44ft^2$

$A_{WW4.Side} := 81.94ft^2$

$A_{WW3.Top} := 15.57ft^2$

$A_{WW4.Top} := 17.10ft^2$

$A_{WW.1} := 2A_{Wing.Section.View} + 2 \cdot A_{WW1.Side} + A_{WW1.Top}$

$A_{WW.2} := 2A_{Wing.Section.View} + 2 \cdot A_{WW2.Side} + A_{WW2.Top}$

$A_{WW.3} := 2A_{Wing.Section.View} + 2 \cdot A_{WW3.Side} + A_{WW3.Top}$

$A_{WW.4} := 2A_{Wing.Section.View} + 2 \cdot A_{WW4.Side} + A_{WW4.Top}$

$Total_{WW.Seal} := Ceil(A_{WW.1} + A_{WW.2} + A_{WW.3} + A_{WW.4}, yd^2)$ $Total_{WW.Seal} = 75.00 \cdot yd^2$

Superstructure Sealing

$P_{Barrier.Super.Seal} := 10.083ft$ *Perimeter of Sealing around Barrier*

$L_{Barrier} := 34.763ft$ Length of Barrier

$Total_{Super.Seal} := Ceil\left[\left(P_{Barrier.Super.Seal}\right)\cdot L_{Barrier}, yd^2\right]$ $Total_{Super.Seal} = 39.00\cdot yd^2$

Total Epoxy Sealing

$Total_{512.Epoxy} := \left(Total_{WW.Seal} + Total_{Super.Seal}\right)$ $Total_{512.Epoxy} = 114.00\cdot yd^2$

ITEM 512E33000 - TYPE 2 WATERPROOFING SY

$L_{Type2.} := 60ft$

$H_{Type2} := 8.25ft$

$W_{Footing.Type.2} := 1ft$

$H_{Type2.Extended.1ft} := 1ft$

$Total_{Type2} := Ceil\left(L_{Type2.}\cdot H_{Type2} + L_{Type2.}\cdot H_{Type2.Extended.1ft} + W_{Footing.Type.2}\cdot L_{Type2.}, sy\right)$ $Total_{Type2} = 69.00\cdot yd^2$

ITEM 512E33010 - TYPE 3 WATERPROOFING SY

$A_{Deck} := 2085.76ft^2$

$A_{Extended.1ft} := 129.42ft^2$

$Total_{Type3} := Ceil\left(A_{Deck} + A_{Extended.1ft}, ft^2\right)$ $Total_{Type3} = 246.22\cdot yd^2$

ITEM 516E13600 - 1" PREFORMED EXPANSION JOINT FILLER SF

$h_{1in.PEJF.Edge} := 8.25ft$ Height of PEJF at Joint between Conduit and Wingwall

$w_{1in.PEJF.Edge} := 1.42ft$ Width of PEJF at Joint between Conduit and Wingwall

$A_{1in.PEJF.TOP} := 0.6ft^2$ Area of PEJF at Joint between Walk and Wingwal

$Total_{516.Joint.Fill.1in} := Ceil\left(4\cdot h_{1in.PEJF.Edge}\cdot w_{1in.PEJF.Edge} + 4\cdot A_{1in.PEJF.TOP}, ft^2\right)$ $Total_{516.Joint.Fill.1in} = 50.00\cdot ft^2$

ITEM 517E74501 - RAILING, CONCRETE, AS PER PLAN — FT

$L_{Railing} := 34.763ft$

$A_{Railing} := 4.66ft^2$

$Total_{Conc.Railing} := 2L_{Railing}$ $\quad Total_{Conc.Railing} = 69.53 \cdot ft$

ITEM 509E10000 - EPOXY COATED STEEL REINFORCEMENT — LB

$Weight_{Sidewalk.Railing.Rebar} := 6399lb$

$Weight_{Wingwall.Rebar} := 1813lb$

$Total_{wt.Rebar} := Weight_{Sidewalk.Railing.Rebar} + Weight_{Wingwall.Rebar}$ $\quad Total_{wt.Rebar} = 8212.00\,lb$

ITEM 509E20001 - CONCRETE REINFORCEMENT, REPLACEMENT OF EXISTING CONCRETE REINFORCEMENT, AS PER PLAN — LB

ITEM 530E13000 - SPECIAL - FORM LINER — CY

$H_{Railing} := 3.5ft$

$Total_{Form.Liner} := Ceil\left(4L_{Railing} \cdot H_{Railing}, ft^2\right)$ $\quad Total_{Form.Liner} = 487.00 \cdot ft^2$

ITEM 518E21200 - POROUS BACKFILL WITH GEOTEXTILE FABRIC — CY

$A_{Porous.Fill.WW} := 15ft^2$ Face Area of Porous Backfill

$w_{Porous.Fill.WW.1} := 12.39ft$

$w_{Porous.Fill.WW.2} := 12.47ft$

$w_{Porous.Fill.WW.3} := 13.01ft$

$w_{Porous.Fill.WW.4} := 12.54ft$

$Total_{518.Backfill} := Ceil\left[\left(w_{Porous.Fill.WW.1} + w_{Porous.Fill.WW.2} + w_{Porous.Fill.WW.3} + w_{Porous.Fill.WW.4}\right) \cdot A_{Porous.Fill.WW}, yd^3\right]$

$Total_{518.Backfill} = 29.00 \cdot yd^3$

ITEM 518E40000 - PERFORATED CORREGATED PLASTIC PIPE FT

$Total_{518.PCPP} := Ceil\left[\left(w_{Porous.Fill.WW.1} + w_{Porous.Fill.WW.2} + w_{Porous.Fill.WW.3} + w_{Porous.Fill.WW.4}\right), ft\right]$

$Total_{518.PCPP} = 51.00 \cdot ft$

ITEM 518E400100 - NON-PERFORATED CORREGATED PLASTIC PIPE FT

$L_{to.Wall} := 2.5ft$

$n_{holes} := 5$

$Total_{518.NonPCPP} := Ceil\left[\left(L_{to.Wall} \cdot n_{holes}\right), ft\right]$

$Total_{518.NonPCPP} = 13.00 \cdot ft$

ITEM 601E32201 - ROCK CHANNEL PROTECTION, TYPE C WITH FILTER, AS PER PLAN CY

$A_{RA.RCP} := 579.07ft^2$ *Plan Area of RCP at Rear Abutment from Profile View*

$A_{FA.RCP} := 593.53ft^2$ *Plan Area of RCP at Fwd. Abutment from Profile View*

$t_{RCP} := 2.00ft$ *Thickness of Slope Protection*

$Adjustment := \frac{\sqrt{1^2 + 2^2}}{2}$ $Adjustment = 1.12$

$V_{RA.RCP} := Adjustment \cdot A_{RA.RCP} \cdot t_{RCP}$ $V_{RA.RCP} = 47.96 \cdot yd^3$

$V_{FA.RCP} := Adjustment \cdot A_{FA.RCP} \cdot t_{RCP}$ $V_{FA.RCP} = 49.15 \cdot yd^3$

$Total_{601.RCP} := Ceil\left(V_{RA.RCP} + V_{FA.RCP}, yd^3\right)$ $Total_{601.RCP} = 98.00 \cdot yd^3$

ITEM 611E70001 - CONDUIT, TYPE A, PRECAST REINFORCED CONCRETE THREE SIDED FLAT TOP CULVERT, AS PER PLAN (30'-0" X 7'-0" RISE) FT

$L_{Prop.Culv} := 60ft$

$L_{Total.Culv} := Ceil\left(L_{Prop.Culv}, ft\right)$ $L_{Total.Culv} = 60.00\,ft$