

STRUCTURE ESTIMATED QUANTITIES

Retaining Walls 4W5 and 4W6

From FRA-70-1373R/FRA-70-1373A to FRA-70-1390C

**FRA-70/71-12.68/14.86
PID No. 105523**

Franklin County, Ohio

Prepared For:

**The Ohio Department of Transportation
District 6**



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May 31, 2019

ESTIMATED QUANTITIES



GPD GROUP
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

Job FRA-70/71-12.0P/14.86 - WALL 4W5 1/4W6

Sheet No. 1 of _____

Calculated by DJC Date 2/11/19

Checked by RFV Date 2/21/19

ITEM 203 - EMBANKMENT

- CALCULATIONS PERFORMED LIKE ROADWAY CROSS-SECTIONS USING AVERAGE END AREAS & FILL VOLUMES

* = ESTIMATE BASED ON NO CROSS-SECTION AT THAT STATION

o = CADD MEASURED

<u>STATION</u>	<u>AREA (SF - CADD)</u>	<u>FILL VOLUME (CY)</u>
178+50	* 2400 ^{sq} '	
		4231.5 CY
179+00	2170 ^{sq} '	
		3731.5 CY
179+50	1860 ^{sq} '	
		2907.4 CY
180+00	1280 ^{sq} '	
		1703.7 CY
180+50	560 ^{sq} '	
		646.7 CY
181+00	160 ^{sq} '	
TOTAL =		13,240.8 CY
		↳ SAY <u>13,240 CY</u>

ITEM 203 - GRANULAR EMBANKMENT

- TO BE PLACED ON TOP OF THE CELLULAR CONCRETE FILL, CLASS III, WHICH WILL BE PLACED ON TOP OF THE CELLULAR CONCRETE FILL, CLASS II.

MINIMUM THICKNESS = 1'-0" ⇒ AVG. THICKNESS ≈ SAY 1'-6"

PLAN CADD AREA = 20,840^{sq}'

∴ VOLUME = 20,840^{sq}' × 1.50' ÷ 27 = 1157.8 CY ↳ SAY 1160 CY

ESTIMATED QUANTITIES



GPD GROUP
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

Job FRA-70/71-12.68/14.86 - WALL 4WS 1/4 W/L
 Sheet No. 2 of _____
 Calculated by DJC Date 2/11/19
 Checked by RFV Date 2/21/19

ITEM 203 - GRANULAR MATERIAL, TYPE C

• 1'-0" THICK UNDER PORTIONS OF THE EMBANKMENT - WIDTHS AT ALL CROSS-SECTIONS AS DESCRIBED BELOW

<u>STATION</u>	<u>WIDTH (FT.)</u>	<u>AREA (SF)</u>	<u>VOLUME (CY)</u>
176+86.55	147'	4236.0 ^{sq}	157 CY
177+16.55	115.4'	3826.7 ^{sq}	142 CY
177+50	113.4'	730.3 ^{sq}	27 CY
177+56.48	112.0'	4939.5 ^{sq}	183 CY
178+00	115.0'	5767.5 ^{sq}	214 CY
178+50	115.7'	4315.0 ^{sq}	160 CY
179+00	56.9'	2922.5 ^{sq}	108 CY
179+50	60.0'	2967.5 ^{sq}	110 CY
180+00	58.7'	2242.5 ^{sq}	83 CY
180+50	31.0'	1492.5 ^{sq}	55 CY
181+00	28.7'		
<u>TOTAL =</u>			<u>1239 CY</u>



ESTIMATED QUANTITIES

GPD GROUP
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

Job FRA-70/71-12.08/14.86 - WALK 4WS 1/4WL6
Sheet No. 3 of _____
Calculated by DTC Date 2/11/19
Checked by RFV Date 2/21/19

ITEM 509 - EPOXY COATED REINFORCING STEEL

TOTAL FROM SLEEPER SLAB 1/2 PARAPET REBAR - SEE REBAR LISTS

4WS = 30,646 LBS

4WL6 = 25,480 LBS.

TOTAL = 56,126 LBS.

ITEM 511 - CLASS QC2 CONCRETE, MISC: PARAPET INCLUDING SLEEPER SLAB, WITH QC/QA

AREA OF SLEEPER SLAB = $2.0' \times \left(\frac{20}{12}\right) + \frac{1}{2} \times 0.5' \times 0.75' + 0.5' \times 1.25' + 1.0' \times 5.5'$
 $+ \frac{1}{2} \times 5.5' \times 0.25' = 10.33 \text{ sq'}$

AREA OF PARAPET = $\left(\frac{10}{12}\right) \times 3.5' + \frac{1}{2} \times \left(\frac{8}{12}\right) \times (3.5') = 4.08 \bar{3} \text{ sq'}$

∴ TOTAL AREA = $10.33 + 4.08 \bar{3} = 14.4167 \text{ sq'}$

∴ TOTAL = $14.4167 \text{ sq'} \times \left[\overbrace{(4.44' + 357.4')}_{4WS} + \overbrace{304.93'}_{4WL6} \right] \div 27 = 356.02 \text{ CY}$

∴ TOTAL FOR ITEM = 356 CY

ITEM 511 - CLASS QC2 CONCRETE, MISC: LATERAL DISTRIBUTION SLAB, WITH QC/QA

• 6" THICK SLAB ON TOP OF THE GEOFAM BACKFILL

CARD AREA OF GEOFAM = 4298 sq'

∴ V = $4298 \text{ sq'} \times 0.5' \div 27 = 79.59 \text{ CY} \Rightarrow \text{SAY } \underline{80 \text{ CY}}$

ESTIMATED QUANTITIES



GPD GROUP
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Job FRA-70/71-12.68/14.86 - WALL 4W5 & 4W6
 Sheet No. 4 of _____
 Calculated by DJL Date 2/11/19
 Checked by RFV Date 2/21/19

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

PORTION OF WALL 4W5 IN FRONT OF ABUTMENT:

AREA FROM PROPOSED GRADE IN FRONT TO BOTTOM OF COPING, (CADD) = $2867.3 \text{ sq}'$
 COPING = $\left[0.25' + 2.0' + \left(\frac{10}{12}\right) + 0.5'\right] \times (41.69' + 63.17' + 26.89' + 25.13' + 8.6')$
 $= 592.4 \text{ sq}'$ ↓
VERTICAL
PART
 $\therefore \text{SUBTOTAL} = 2867.3 + 592.4 = \underline{3459.7 \text{ sq}'}$

PORTION OF WALL 4W5 ALONG SOUTH SIDE OF RAMP C5:

AREA FROM PROPOSED GRADE IN FRONT TO BOTTOM OF COPING, (CADD) = $13,238.3 \text{ sq}'$
 COPING = $\left[0.25' + 2.0' + \left(\frac{10}{12}\right)\right] \times (3.98' + 35.64') = 122.2 \text{ sq}'$ (WEST OF SLEEPER SLAB)
 COPING + PARAPET (SLEEPER SLAB PORTION):
 $A = \left[0.25' + 2.0' + \left(\frac{10}{12}\right) + \left(2'' + 42'' + 10'' + \sqrt{8^2 + 42^2}\right) \times \left(\frac{1}{12}\right)\right] \times 381.75'$
 $= 4255.1 \text{ sq}'$
 $\therefore \text{SUBTOTAL} = 13,238.3 + 122.2 + 4255.1 = \underline{17,615.6 \text{ sq}'}$

FACE $\frac{1}{2}$ COPING OF WALL 4W6:

AREA FROM TOP OF D-WALL IN FRONT TO BOTTOM OF COPING, (CADD) = $5247.6 \text{ sq}'$
 COPING (WEST OF SLEEPER SLAB) = $\left[0.25' + 2.0' + \left(\frac{10}{12}\right)\right] \times 19.0' = 58.6 \text{ sq}'$
 COPING + PARAPET (SLEEPER SLAB PORTION):
 $A = \left[0.25' + 2.0' + \left(\frac{10}{12}\right) + \left(2'' + 42'' + 10'' + \sqrt{8^2 + 42^2}\right) \times \left(\frac{1}{12}\right)\right] \times 305.2'$
 $= 3401.8 \text{ sq}'$
 $\therefore \text{SUBTOTAL} = 5247.6 + 58.6 + 3401.8 = \underline{8708.0 \text{ sq}'}$

$\therefore \text{TOTAL FOR ITEM} = (3459.7 \text{ sq}' + 17,615.6 \text{ sq}' + 8708.0 \text{ sq}') \div 9$
 $= 3309.3 \text{ SY}$
 $\rightarrow \text{SAY } \underline{\underline{3309 \text{ SY}}}$

ESTIMATED QUANTITIES



GPD GROUP
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Job FRA-70/71-12.68/14.86 - WALL 4WS $\frac{1}{2}$ 4W6
 Sheet No. 5 of _____
 Calculated by DJC Date 2/20/19
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ITEM 516 - $\frac{1}{2}$ " PREFORMED EXPANSION JOINT FILLER

- BETWEEN D-WALL $\frac{1}{2}$ FACING PANELS } BOTH WALL 4W6
- BETWEEN COPING $\frac{1}{2}$ SLEEPER SLAB }

$$A = \underbrace{3.5' \times 524.2'}_{\text{D-WALL}} + \underbrace{2.0' \times 305.2'}_{\text{COPING}} = 1745.1 \text{ sq}' \Rightarrow \text{SAY } \underline{\underline{1746 \text{ SF}}}$$

ITEM 516 - 2" PREFORMED EXPANSION JOINT FILLER

- BETWEEN COPING $\frac{1}{2}$ SLEEPER SLAB - WALL 4WS

$$A = 2.0' \times 381.75' = 763.5 \text{ sq}' \Rightarrow \text{SAY } \underline{\underline{764 \text{ SF}}}$$

ITEM 840 - MECHANICALLY STABILIZED EARTH WALL, AS PER PLAN

WALL 4WS

PORTION IN FRONT OF BRIDGE (CADD AREA) = 3,915.61 sq'
 PORTION ALONG RAMP CS (CADD AREA) = 16,231.76 sq'
 SUB-TOTAL = 20,147.37 sq'

WALL 4W6

$$\text{CADD AREA} = 6971.12 \text{ sq}' + 20,147.37 \text{ sq}' = 27,118.49 \text{ sq}'$$

$$\therefore \text{TOTAL FOR ITEM} = \underline{\underline{27,119 \text{ SF}}}$$

ITEM 840 - WALL EXCAVATION

- CALCULATIONS PERFORMED LIKE ROADWAY CROSS-SECTIONS USING AVG. END AREAS $\frac{1}{2}$ CUT SECTIONS

STATION	AREA (SF - CADD)	CUT VOLUME (CY)
176+86.55	762.4 sq'	1093.3
177+16.55	1205.6 sq'	1132.2
177+50.00	622.1 sq'	151.8
177+56.48	643.1 sq'	951.2
178+00.00	537.2 sq'	2174.2
178+50.00	1810.9 sq'	2041.1
179+00.00	393.5 sq'	958.1
179+50.00	641.2 sq'	1066.1
180+00.00	510.2 sq'	623.3
180+50.00	229.8 sq'	

TOTAL FOR ITEM
= 10,251 CY

TOTAL = 10,251.3 CY

ESTIMATED QUANTITIES



GPD GROUP
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Job FRA-70/71-12.68/14.86 - WALL 4WS & 4WL
 Sheet No. 6 of _____
 Calculated by DJC Date 2/21/19
 Checked by RFV Date 2/21/19

ITEM 840 - FOUNDATION PREPARATION

• SIMILAR TO EXCAVATION QTY CALCULATED ON PREVIOUS SHEET, USE CROSS-SECTIONS

STATION	FOUNDATION PREP WIDTH	AREA (SF)
176+86.55	167'	4230.0
177+16.55	115'	3813.3
177+50.00	113'	729.0
177+56.48	112'	4939.5
178+00.00	115'	5775.0
178+50.00	116'	4325.0
179+00.00	57'	2875.0
179+50.00	58'	2925.0
180+00.00	59'	2250.0
180+50.00	31'	

∴ TOTAL FOR ITEM
 = 31,861.8 / 9
 = 3540.2 SY
 SAY 3540 SY

TOTAL AREA = 31,861.8 sq ft

ITEM 840 - SELECT GRANULAR BACKFILL

• OCCURS IN THE CROSS-SECTIONS EAST OF THE GEOFOAM/CELLULAR CONCRETE FILL, CLASS II AREAS. THERE ARE 3 CROSS-SECTIONS CUT IN THIS AREA. TAKE AVERAGE AREA OF THESE 3 SECTIONS AND MULTIPLY BY AVG. LENGTH THE 1390C BRIDGE ABUTMENT. THEN ADD IN THE SGB THAT IS IN THE WEDGE BETWEEN THE 1390C ABUTMENT & WINGWALL

STA. 179+00 : AREA = 1658.8 sq ft
 STA. 179+50 : AREA = 1662.9 sq ft
 STA. 180+00 : AREA = 1681.8 sq ft

} AVG. = 1667.8 sq ft AND AVG. LENGTH ≈ 140'
 OF LATERAL LIMITS BTWN. 4WS & 4WL

∴ VOLUME = 1667.8 sq ft × 140' = 233,492 CF

WEDGE BETWEEN 1390C ABUTMENT & WINGWALL :

AVG. WALL HEIGHT ≈ 33.7' ∴ WIDTH OF SGB ≈ 0.70 × 33.7' + 2.0' = 25.6'
 and LENGTH OF WEDGE ≈ 100'

∴ VOLUME = (33.7' - 2.0') × 25.6' × 100' = 81,152 CF

∴ TOTAL FOR ITEM = [233,492 + 81,152] ÷ 27 = 11,653.5 CY ~ SAY 11,660 CY

ESTIMATED QUANTITIES



GPD GROUP
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Job FRA-70/71-12.08/14.86 - WALL 4W5 & 4W6
Sheet No. 7 of _____
Calculated by DJL Date 2/21/19
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ITEM 840 - 6" DRAINAGE PIPE, PERFORATED

• ONLY IN SGB AREAS AS SHOWN IN PLANS, NOT IN GEOFOAM OR CELLULAR CONCRETE AREAS

SEE LAYOUT IN PLAN \Rightarrow TOTAL LENGTH INCLUDING ALL LEGS & CONNECTIONS = 662.2

\therefore TOTAL FOR ITEM = SAY 680 FT.

ITEM 840 - 6" DRAINAGE PIPE, NON-PERFORATED

OUTLET TO THE MANHOLE OFF THE SOUTH SIDE OF RAMP C5, AT APPROX. RAMP C5 STATION 5084+30

$L = 45.2'$

\therefore TOTAL FOR ITEM = 50 FT.

ITEM 840 - CONCRETE COPING

\rightarrow VERTICAL

$4W5 = 41.69' + 63.17' + 10.6' + 26.9' + 25.1' + 3.98' + 54.2' + 221.4' + 139.8' = 588.84'$

$4W6 = 50.1' + 274.1' = 324.2'$

\therefore TOTAL FOR ITEM = $588.84' + 324.2' = 913.04' \sim$ SAY 915 FT.

ITEM 840 - AESTHETIC SURFACE TREATMENT

• WALL HEIGHT FROM BOTTOM OF COPING TO 1'-0" ABOVE THE TOP OF THE LEVELING PAD

$4W5$: AREA IN FRONT OF ABUTMENT = 3423.8 ft^2

AREA ALONG SOUTH SIDE OF RAMP C5 = $14,985.0 \text{ ft}^2$

$4W5$ TOTAL = $18,408.8 \text{ SF}$

$4W6$: AREA = 5998.8 SF

\therefore TOTAL FOR ITEM = $18,408.8 + 5998.8 = 24,407.4 \text{ SF}$

\rightarrow SAY 24,408 SF

ESTIMATED QUANTITIES



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Job FRA-70/71-12.68/14.86 - WALL 4W5 & 4W6
 Sheet No. 8 of _____
 Calculated by DJC Date 2/21/19
 Checked by RFV Date 2/21/19

ITEM 840 - ON-SITE ASSISTANCE

TOTAL = 5 DAYS (PER SUPPLEMENTAL SPEC. 840)

ITEM 840 - SGB INSPECTION AND COMPACTION TESTING

TOTAL = LUMP SUM

ITEM SPECIAL - 203E02000 - ENGINEERED FILL: EPS GEOFOAM FILL, ASTM D6877, TYPE 19

AREA \Rightarrow CADD MEASURED AT CROSS-SECTION \approx STA. 178+50 = 1380.3^{sq}
 AVG. LENGTH OF 8-SIDED SHAPE IN PLAN VIEW \approx 47'

\therefore TOTAL FOR ITEM = 1380.3^{sq} \times 47' \div 27 = 2402.7 CY \Rightarrow SAY 2403 CY

ITEM SPECIAL - 203E02000 - ENGINEERED FILL: LIGHTWEIGHT CELLULAR CONCRETE FILL, CLASS II CLASS II

STATION	CLASS II AREA (SF)	CLASS II VOLUME (CY)	CLASS III AREA (SF)	CLASS III VOLUME (CY)
176+86.55	4844.6		551.9	
		4861.7		579.2
177+16.55	3906.5		490.7	
		4840.4		577.6
177+50	3907.6		441.8	
		939.7		105.4
177+56.48	3922.9		436.8	
		6129.6		685.8
178+00	3682.8		414.2	
		6512.6		496.9
178+50	3350.8		122.4	

TOTAL = 23,284 CY CLASS II 2444.9 CLASS III

TOTAL FOR ITEM (CLASS II) = 23,290 CY

TOTAL FOR ITEM (CLASS III) = 2450 CY

ITEM SPECIAL - 203E65000 - SETTLEMENT PLATFORM

TOTAL = 4 EACH