SHAFFER POMEROY, LTD.
Consulting Engineers
909 S. Main Street Mansfield, OH 44907
3477 Commerce Pkwy Ste C Wooster, OH 44691
2550 Corporate Exchange Dr., Ste.10 Columbus, OH 43231

JOB EM-1744H HUR-13-2.47
SHEET NO. 1 OF 5
CALCULATED BY CJS DATE 2/20/19
CHECKED BY JSK DATE 2/27/19
SCALE

ESTIMATED QUANTITIES

ITEM 202E11000 - STRUCTURE REMOVED — LUMP ✓

ITEM 503E11100 - COFFERDAMS AND EXCAVATION BRACING — LUMP ✓

ITEM 503E21100 - UNCLASSIFIED EXCAVATION (SEE SHEET 5/5) — ~~116~~ 113 CY

INLET

$EL_{AVG.} = (1060.18 + 1061.78 + 1061.62 + 1060.63 + 1054.75 + 1058.97 + 1058.41 + 1055.10 + 1058.62 + 1057.97)/10$

$= 1058.\cancel{84}\ 87$

$V_{INLET} = (1058.\cancel{84}\ 87 - 1052.33)(229.29\ SF) + \left(\frac{11.6979' + 18.9479' + 12.4788' + 19.7\cancel{88}\ 55'}{2}\right)(1.5')(2.5')$ = 1469.75 + 117.90

$= \cancel{1495.88}\ 1587.65\ ft^3$

7'-0 + 6'-1 + 5'-10⅜ = 18'-11⅜

6'-1 + 7'-0 + 9'-1⅜ = 22'-2⅜"

$11.6979' + 1.5'\tan(55°/2) = 12.4788' \rightarrow 12'-5\frac{3}{4}"$

$18.9749' + 1.5'\tan(55°/2) = 19.7558"$

OUTLET

$EL_{AVG.} = (1058.94 + 1061.06 + 1060.70 + 1059.43 + 1055.77 + 1058.93 + 1056.77 + 1056.42 + 1058.23 + 1056.37)/10$

$= 1058.26$ ✓

$V_{OUTLET} = (1058.26 - 1052.04)(229.29\ SF) + \left(\frac{11.6979' + 18.9479' + 12.4788' + 19.7\cancel{88}\ 55'}{2}\right)(1.5')(2.5')$ = 1426.64 + 117.90

$= 1544.\cancel{03}\ 54\ ft^3$

$V_T = (\cancel{1495.88}\ 1587.65\ ft^3 + 1544.\cancel{03}\ 54\ ft^3)(1\ yd/3')^3 = \cancel{112.59}\ 116.01\ yd^3 \rightarrow \cancel{113}\ 116\ CY$

ITEM 509E10000 - EPOXY COATED REINFORCING STEEL — 4244 LB ✓

wt. = 4244 LB

SHAFFER POMEROY, LTD.
Consulting Engineers
909 S. Main Street Mansfield, OH 44907
3477 Commerce Pkwy Ste C Wooster, OH 44691
2550 Corporate Exchange Dr., Ste.10 Columbus, OH 43231

JOB EM-1744H HOR-13-2.47
SHEET NO. 2 OF 5
CALCULATED BY CJS DATE 2/20/19
CHECKED BY JSK DATE 2/28/19
SCALE

ITEM 511E46011 - CLASS QC1 CONCRETE, RETAINING/WINGWALL NOT INCLUDING FOOTING, AS PER PLAN — 12 CY ✓

WINGWALL LT.

$A_{Top} = 0.60\ ft^2$ AREA OF TOP OF WINGWALL @ BEND

$$V_C = \left[\left(\frac{1061.83 + 1060.58}{2}\right) - 1053.83\right](1')(13') + (1061.83 - 1053.83)(0.60\ ft^2)$$

$$= 100.68\ ft^3$$

WINGWALL RT.

$$V_C = \left[\left(\frac{1061.83 + 1059.33}{2}\right) - 1053.83\right](1')(6') = 40.50\ ft^3$$

HEADWALL

$$V_C = 1'(1')(14') = 14\ ft^3$$

$$V_T = 2(100.68\ ft^3 + 40.50\ ft^3 + 14\ ft^3)(1\ yd/3')^3 = 11.50\ CY \rightarrow 12\ CY \checkmark$$

ITEM 511E46510 - CLASS QC1 CONCRETE, FOOTING — ~~10~~ 35 CY

CUTOFF WALL

$$V_C = \left(\frac{11.6979' + 18.9479' + 12.4788' + 19.7~~88~~55'}{2}\right)(1.5')(2.5') = 117.~~85~~90\ ft^3$$

FOOTING

$$V_C = \left(\frac{11.6979' + 18.9479' + 14.9479' + 22.1979'}{2}\right)(6.25')(1.5') = 317.77\ ft^3 \checkmark$$

CLOSURE POUR

$$V_C = \left(\frac{14.1667' + 15.9167'}{2}\right)(2.5')(1') = 37.60\ ft^3 \checkmark$$

$$V_T = 2(117.~~85~~90\ ft^3 + 317.77\ ft^3 + 37.60\ ft^3)(1\ yd/3')^3 = ~~17.53~~35.06\ CY \rightarrow ~~18~~35\ CY$$

SHAFFER POMEROY, LTD.
Consulting Engineers
909 S. Main Street Mansfield, OH 44907
3477 Commerce Pkwy Ste C Wooster, OH 44691
2550 Corporate Exchange Dr., Ste.10 Columbus, OH 43231

JOB FM-1744H HUR-13-2.47
SHEET NO. 3 OF 5
CALCULATED BY CJS DATE 2/20/19
CHECKED BY JSK DATE 2/28/19
SCALE

ITEM 512E10100 - SEALING OF CONCRETE SURFACES (EPOXY-URETHANE) ~~35~~ 34.6 SY

BACK - ASSUME 6" OF SURFACE SEALED ALONG BACK

$A = (13.5268' + 20.7708')(0.5') = 17.15\ ft^2$ ✓

6'-1
7'-0
+ 7'-8¼
20'-9¼"

TOP $A_{TOP} = 0.60\ ft^2$ (TOP AREA @ BENTS)

$A = \left(\sqrt{(13')^2 + (1061.83 - 1060.58)^2} + 14' + \sqrt{(6')^2 + (1061.83 - 1059.33)^2}\right)(1') + 0.6\ ft^2$ (1.25', 2.5')

$= 34.16\ ft^2$ ✓

FRONT

$A = 2(1')(14') + 2(1')(5') + 2(1')^2 - 2\left[0.5(2')(1')\right] = 38.00\ ft^2$ ✓ (REDUCTION FOR RCP)

WINGWALL LT.

$A = \left[(1061.83 - 1054.83) - (2.0833'/2)\right](13') - (13')^2/4 - 13'(1.25')/2$ ($\frac{1}{2}(13')(1059.39 - 1055.89)$)

$= 27.08\ ft^2$ ~~ft^2~~ 46.45 ft^2

$A_{LT} = \left[\frac{1061.83 - 1054.83 - (2.0833'/2) + 1'}{2}\right]13.0833' = 45.52\ ft^2$

WINGWALL RT.

$A = \left[(1061.83 - 1054.83) - (2.0833'/2)\right](6') - (6')^2/4 - (6')(2.5')/2$

$= 19.25\ ft^2$

$A_{RT} = \left[\frac{1061.83 - 1054.83 - (2.0833'/2) + 0.5'}{2}\right]6' = 19.38\ ft^2$

WINGWALL ENDS

$A = 2\left[0.5' + (0.5'/2)\right](1') = 1.50\ ft^2$ ✓

$A_T = 2(17.15\ ft^2 + 34.16\ ft^2 + 38\ ft^2 + \sim\!\!27.68\ ft^2 + 45.52\ ft^2 + 19.25\ ft^2 + 1.50\ ft^2)(1yd/3')^2$

$= \sim\!\!30.48\ SY$ ~~34.6~~ $\rightarrow$ ~~35~~ 34.6 SY

ITEM 512E33000 - TYPE 2 WATERPROOFING 23~~6~~4 SY

$A_{SIDES} = 2[70' + 2(1')](7') = \sim\!\!1008.00\ ft^2$ 980

$A_{TOP} = 70'[14' + 2(1')] = 1120\ ft^2$ ✓

$A_T = (\sim\!\!1008\ ft^2 + 1120\ ft^2)(1yd/3')^2 = \sim\!\!230.44\ SY$ 233.3 $\rightarrow$ 23~~4~~ SY

SHAFFER POMEROY, LTD.
Consulting Engineers
909 S. Main Street Mansfield, OH 44907
3477 Commerce Pkwy Ste C Wooster, OH 44691
2550 Corporate Exchange Dr., Ste.10 Columbus, OH 43231

JOB EM-1744H HUR-13-2.47
SHEET NO. 4 OF 5
CALCULATED BY CJS DATE 2/21/19
CHECKED BY JSK DATE 2/28/19
SCALE

ITEM 518E21200 - PORous BACKFILL WITH GEOTEXTILE FABRIC 10 CY ✓

WINGWALL LT.

$$V = \left[\left(\frac{1061.83 + 1060.58}{2}\right) - 1.5' - 1056.24\right](13.5208' + 0.1875')(2') = 98.46\ ft^3$$

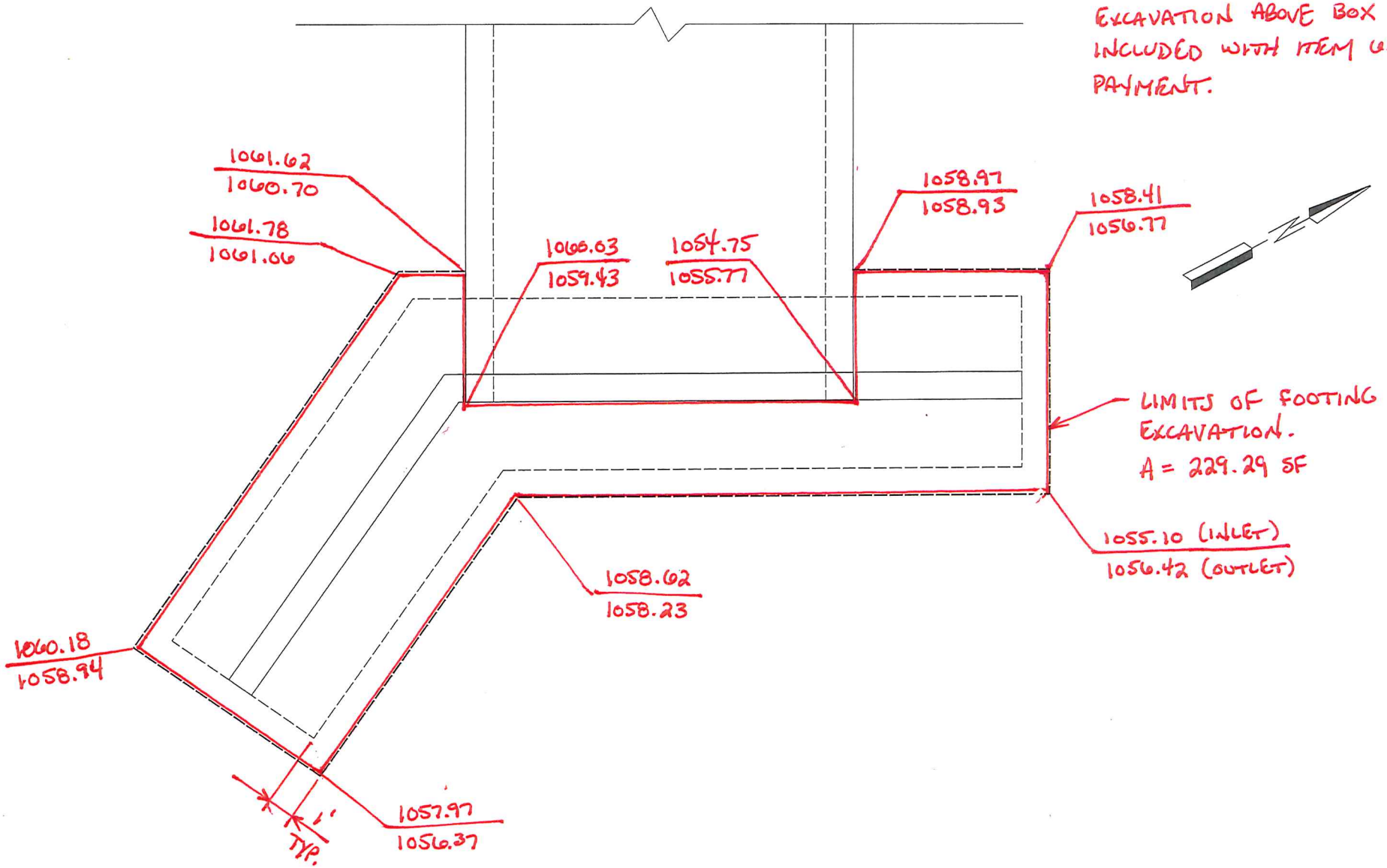
WINGWALL RT.

$$V = \left[\left(\frac{1061.83 + 1059.33}{2}\right) - 1.5' - 1056.37\right](6.0833')(2') = 32.97\ ft^3$$

$$V_T = 2(98.46\ ft^3 + 32.97\ ft^3)(1\text{yd}/3')^3 = 9.74\ CY \rightarrow 10\ CY$$

ITEM 611E97400 - CONDUIT, MISC.: 12"ø CONDUIT, TYPE A, 706.05 70 FT
(DESIGN EARTH COVER < 2 FEET)

L = 70'



PLAN

UNCLASSIFIED EXCAVATION