

CALCULATIONS

FHWA REGION	STATE	PROJECT
5	OHIO	

18
114

CALC: PCB 12-83
CHK: ROB 12-83

LAKE COUNTY
LAK-20-6.65

SHEET 28	ITEM 301 BITUMINOUS AGGREGATE BASE = 8.15 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 1.63 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 185.8 S.Y.	
	ITEM 608 4" CONCRETE WALK = 5632 S.F.	
	ITEM 609 CURB TYPE 7 = 47 L.F.	
SHEET 29	ITEM 301 BITUMINOUS AGGREGATE BASE = 11.88 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 2.37 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 36.0 S.Y.	
	ITEM 608 4" CONCRETE WALK = 5920 S.F.	
SHEET 30	ITEM 301 BITUMINOUS AGGREGATE BASE = 6.23 C.Y.	
	ITEM 304 AGGREGATE BASE = 18.24 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 1.24 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 68.4 S.Y.	
	ITEM 608 4" CONCRETE WALK = 3638 S.F.	
	ITEM 608 CURB RAMP TYPE 2 = 2 EA.	
	ITEM 609 CURB, TYPE 7 = 125 L.F.	
SHEET 31	ITEM 301 BITUMINOUS AGGREGATE BASE = 34.45 C.Y.	
	ITEM 304 AGGREGATE BASE = 26.57 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 6.89 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 114.7 S.Y.	
	ITEM 608 4" CONCRETE WALK = 5103.0 S.F.	
SHEET 32	ITEM 301 BITUMINOUS AGGREGATE BASE = 16.89 C.Y.	
	ITEM 304 AGGREGATE BASE = 5.19 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 3.38 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 184.9 S.Y.	
	ITEM 608 4" CONCRETE WALK = 3560.4 S.F.	
	ITEM 608 CURB RAMP TYPE 1 = 4 EA.	
SHEET 33	ITEM 301 BITUMINOUS AGGREGATE BASE = 17.11 C.Y.	
	ITEM 304 AGGREGATE BASE = 16.11 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 3.42 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 206.2 S.Y.	
	ITEM 608 4" CONCRETE WALK = 4283.1 S.F.	
SHEET 34	ITEM 301 BITUMINOUS AGGREGATE BASE = 0.62 C.Y.	
	ITEM 304 AGGREGATE BASE = 11.48 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 0.12 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 260.5 S.Y.	
	ITEM 608 4" CONCRETE WALK = 3198 S.F.	
	ITEM 608 CURB RAMP, TYPE 2 = 25 S.F.	
	ITEM 609 CURB, TYPE 7 = 53 L.F.	
SHEET 35	ITEM 301 BITUMINOUS AGGREGATE BASE = 24.99 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 4.99 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 220.3 S.Y.	
	ITEM 608 4" CONCRETE WALK = 3070 S.F.	
	ITEM 608 CURB RAMP, TYPE 2 = 25 S.F.	
	ITEM 609 CURB, TYPE 7 = 35 L.F.	
SHEET 36	ITEM 301 BITUMINOUS AGGREGATE BASE = 5.38 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 1.08 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 96.9 S.Y.	
	ITEM 608 4" CONCRETE WALK = 3630 S.F.	
	ITEM 608 CURB RAMP, TYPE 2 = 1 EA.	
	ITEM 608 CURB RAMP, TYPE 2 = 25 S.F.	
	ITEM 609 CURB, TYPE 7 = 376 L.F.	

SHEET 37	ITEM 301 BITUMINOUS AGGREGATE BASE = 17.64 C.Y.	
	ITEM 304 AGGREGATE BASE = 8.02 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 3.53 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 145.7 S.Y.	
	ITEM 608 4" CONCRETE WALK = 2570 S.F.	
	ITEM 608 CURB RAMP, TYPE 2 = 25 S.F.	
	ITEM 609 CURB, TYPE 7 = 308 L.F.	
SHEET 38	ITEM 301 BITUMINOUS AGGREGATE BASE = 35.45 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 7.09 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 255.3 S.Y.	
	ITEM 608 4" CONCRETE WALK = 2186.5 S.F.	
	ITEM 608 CURB RAMP, TYPE 2 = 25 S.F.	
	ITEM 609 CURB, TYPE 7 = 171 L.F.	
SHEET 39	ITEM 301 BITUMINOUS AGGREGATE BASE = 25.76 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 5.14 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 662.13 S.Y.	
	ITEM 608 4" CONCRETE WALK = 3365.5 S.F.	
	ITEM 608 CURB RAMP, TYPE 2 = 2 EA.	
	ITEM 609 CURB, TYPE 7 = 302 L.F.	
SHEET 40	ITEM 301 BITUMINOUS AGGREGATE BASE = 53.23 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 10.64 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 204.3 S.Y.	
	ITEM 608 4" CONCRETE WALK = 3816 S.F.	
	ITEM 609 CURB, TYPE 7 = 17.5 L.F.	
SHEET 41	ITEM 301 BITUMINOUS AGGREGATE BASE = 4.88 C.Y.	
	ITEM 404 ASPHALT CONCRETE = 0.98 C.Y.	
	ITEM 452 8" PLAIN CONCRETE = 163.7 S.Y.	
	ITEM 608 4" CONCRETE WALK = 2640 S.F.	
	ITEM 609 CURB TYPE 7 = 40 L.F.	
SHEET 42	ITEM 452 8" PLAIN CONCRETE = 11.0 S.Y.	

PAVEMENT CALCULATIONS

PAVEMENT AREA MAINLINE U.S. 20	
STA. 44 + 40 TO STA. 72 + 50	
A = 48 x 2810 - 1/2 (160 x 4) 2	
STA. 72 + 50 TO STA. 81 + 88	
A = 1/2 (48 + 60) 480 + (60 x 206)	
38 (12) 1/2 + 60 x 252	
STA. 81 + 88 TO STA. 89 + 00	
A = (352 x 72) + 1/2 (72 + 60) 100 + (260 x 60)	
STA. 89 + 00 TO STA. 95 + 00 (FULL DEPTH)	
A = (600 x 60)	
STA. 95 + 00 TO STA. 116 + 80	
A = (2180 x 60)	
STA. 116 + 80 TO STA. 118 + 00	
A = 1/2 (60 + 58) 60 + 60 (58)	
TOTAL	7,020 S.F.
	409,232 S.F.
EXISTING PAVEMENT AREA (U.S. 20)	
STA. 44 + 40 TO STA. 79 + 36	
A = (3496 x 40) + (80 x 2) 2	
STA. 79 + 36 TO STA. 81 + 88	
A = (44 x 252) + 12 (38) 1/2	
STA. 81 + 88 TO STA. 89 + 00	
A = 1/2 (54 + 40) 180 + (532 x 40)	
STA. 95 + 00 TO STA. 118 + 00	
A = (1700 x 40) + 1/2 (40 + 58) 600 - 2 (60 x 2)	
EX. PAV'T AREA TOTAL	140,160 S.F.
	11,316 S.F.
	29,740 S.F.
	97,160 S.F.
	278,376 S.F.

MIDLAND DR.	DEDUCT PAV'T. AREA = (4 x 128)	= -512 S.F.
	RETURN AREA = (59 x 24) + (52 x 57.5)	
	$\pi (52)^2 \frac{(95.5)}{360} + (52 \times 47.23) - \pi (52)^2 \frac{(84.5)}{360}$	= 2601.5 S.F.
S.R. 306	DEDUCT PAV'T. AREA = 1/2 (60 + 100) 16	= -1280 S.F.
	RETURN AREA RESURFACING	
	A = (38 x 64) + 1/2 (8 x 22)	
	+ 1/2 (11 x 23) - (2 x 21)	= 2604.5 S.F.
	RETURN AREA NEW PAV'T.	
	A = 1/2 (40 x 11) + 1/2 (17 + 7) 26 + 1/2 (20 x 6)	
	+ 1/2 (3 x 50) + 1/2 (1 + 13) 34 + 1/2 (32 x 11)	
	+ (2 x 21)	= 1123.0 S.F.
DARTMOOR RD.	RETURN AREA - NEW PAV'T.	
	A = (52 x 26) + 12 (26 + 23.4) 1/2 +	
	(52 x 104) - $\pi (52)^2 \frac{1}{2}$	= 2809.0 S.F.
STOCKBRIDGE RD.	RETURN AREA - NEW PAV'T.	
	A = (67.65 x 19) + (52 x 39.11) - $\pi (52)^2 \frac{(76.94)}{360} + (52 \times 67.65)$	= 2589.4 S.F.
	- $\pi (52)^2 \frac{(103.06/360)}$	
MIDDLESEX RD.	RETURN AREA - NEW PAV'T.	
	A = (52 x 19) + (52 x 104) - 1/2 (52)^2 π	= 2148.6 S.F.
BRENTWOOD DR.	DEDUCT PAV'T. AREA = 1/2 (92 + 51) 16	= -1144.0 S.F.
	RETURN AREA RESURFACING	
	A = (19 x 54) + 1/2 (40 x 21) - [1/2 (2 x 13) + (2 x 9) + 1/2 (2 x 15)]	= 1400.0 S.F.
	RETURN AREA - NEW PAV'T.	
	A = 1/2 (3 + 6) 42 + 1/2 (3 x 14) + 1/2 (19 x 5.5) + 1/2 (34 x 13)	
	+ 1/2 (14 x 36) + 1/2 (2 x 15) + 1/2 (2 x 13) + (2 x 9)	= 781.3 S.F.
ITEM 404 ASPHALT CONCRETE		
U.S. 20 MAINLINE	V = 409,232 x 0.1042 + 27	= 1579.33 C.Y.
	V = FOR LEVELING EX. PAV'T. (SEE SH. 72)	= 266.71 C.Y.
SIDE ROAD INTERSECTIONS		
MIDLAND DR.	V = [2601.5 + 1/4 (20 + 5) 24] 0.1042 + 27	= 10.62 C.Y.
S.R. 306	V = [2604.5 x 0.1042 + (1123.0 x 0.1042)] + 27	= 14.39 C.Y.
DARTMOOR	V = [2809 + 1/4 (10) (23.4 + 22.5)] 0.1042 + 27	= 11.28 C.Y.
STOCKBRIDGE	V = [2589.4 + (5 x 19) 1/2] 0.1042 + 27	= 10.18 C.Y.
MIDDLESEX	V = [2148.6 x 0.1042 + (10 x 19) 1/2 x 0.1042] + 27	= 8.66 C.Y.
BRENTWOOD	V = [1400 x 0.1042 + (10 x 19) $\frac{1042}{2}$ + 781.3 x 0.1042] + 27	= 8.78 C.Y.
FEATHER AREA AT BEGIN & END PROJECT	V = (40 x 8.0 x 0.1042 x 0.5) + 27	= 0.62 C.Y.
	V = 1/2 [(38 x 10) + 1/2 (8 x 50)] 0.1042 + 27	= 1.12 C.Y.
SIDEROAD LEVELING	V = [(1400 + 2617) 0.1042 + 27] (234/1581)	= 2.30 C.Y.
TOTAL ITEM 404 ASPHALT CONCRETE TO GENERAL SUMMARY		1913.99 C.Y.
		1914 C.Y.
ITEM 402 ASPHALT CONCRETE		
U.S. 20 MAINLINE	V = [409,232 - (278,376 + 512 + 1280 + 1144)] 0.1458 + 27	= 690.76 C.Y.
	V = FOR LEVELING EX. PAV'T. (SEE SH. 72)	= 734.82 C.Y.
S.R. 306	V = 1123 x 0.1458 + 27	= 6.06 C.Y.
DARTMOOR RD.	V = 2809 x 0.1458 + 27	= 15.17 C.Y.

BRUNING 44-132 30495-1