



LOCATION & OWNERSHIP MAP  
BAY TOWNSHIP

SCALE IN FEET  
660 330 0 660

**LEGEND**

PROPOSED IMPROVEMENT  
 HIGHWAYS  
 PROPERTY LINE  
 WATERSHED  
 SECTION CENTER  
 ACRES IN WATERSHED  
 ACRES OWNED  
 SECTION CORNER  
 STREAM LARGE  
 DITCH 4' DEEP & OVER  
 DITCH LESS THAN 4'

**BENCH MARK DESCRIPTION**

BM-1 STA. 0+44 TOP OF SPIKE IN E. SIDE OF TELEPHONE POLE W. SIDE OF MULCAHY RD 80' S. OF DITCH  
M.S.L. ELEV. 579.27

BM-2 TOP OF SPIKE IN S. SIDE OF 42" ASH TREE N. SIDE OF DITCH STA. 10+40  
M.S.L. ELEV. 577.89

BM-3 TOP OF BELL ON W. END OF CONCRETE 10" CULVERT FOR FARM DRIVE STA. 22+36  
M.S.L. ELEV. 576.73

BM-4 TOP OF BELL ON S. END OF CONCRETE 12" CULVERT FOR DRIVE STA. 34+08  
M.S.L. ELEV. 576.42

BM-5 TOP OF N. END OF 18" C.M.P. FARM DRIVE CULVERT STA. 44+70  
M.S.L. ELEV. 574.10

**SUPPORTING DATA**

DRAINAGE AREA ----- 154 ACRES  
 DESIGN COEFFICIENT --- Q<sub>c</sub> CURVE  
 LAND USE --- GENERAL FARMING  
 SOIL TYPE --- TOLEDO, FULTON  
 LAND SLOPE --- 0-2%  
 TYPE DRAINAGE --- SURFACE

**SPECIFICATIONS**

I. EXCAVATION  
 A. Bottom Width: The bottom width shall be THREE (3) feet between sta. 0+00 and sta. 44+70  
 B. Bank Slopes: The ditch bank slopes are to be constructed to at least SIX (6) feet between sta. 44+70 and sta. 52+00  
 C. Alignment: The centerline of the improvement shall be approximately the centerline of the existing ditch unless otherwise indicated on the plan.  
 D. Total excavation: The total excavation consists of 22.84 cubic yards of earth over 6,634 linear feet of ditch.  
 E. Excess Yardage: No extra compensation will be paid for such excavation in excess of yards herein estimated. This estimate was made from cross-sections of the proposed ditch. The contractor should view the proposed work to his own satisfaction.

II. CLEARING  
 All trees and/or brush which would interfere with the excavation operation must be cleared from the ditch right-of-way ahead of the construction operations. Stumps on the berm should be removed or cut as low as cutting tools permit. Cleared debris should be disposed of by burning or removed from the right-of-way.

III. BERM WIDTHS  
 Unless otherwise noted the berms will have the following minimum widths: four (4) feet wide for ditches up to four (4) foot depth; six (6) feet wide for four to six foot depth; and ten (10) foot wide for ditches over six feet in depth.

IV. SPILL BANKS  
 Excavated material should be deposited and spread along the field side of the ditch, as determined, except where used for levees, and in overflow areas with timber or brush cover. Slope of the spoil after spreading should be at least 3:1 on the channel side and at least 4:1 on the field side. The height of the spoil should not exceed one foot above average ground level. Openings shall be provided for surface water to enter the ditch.

V. TILE OUTLETS  
 Landowners shall protect their tile outlets with a section of continuous rigid pipe and flap-gates or grid to exclude rodents. For details of construction see your Soil Conservation Technician.

VI. SURFACE WATER OUTLETS  
 Whenever a lateral or a surface ditch enters the main ditch at a higher elevation protection from erosion should be provided by drop structures, pipe drops, other suitable structure or grassed waterway. For assistance on outlets see your Soil Conservation Technician.

VII. DITCH BANK SEEDING  
 The ditch banks will be seeded, immediately after each day's work, to tall fescue (Kentucky 31 or Alta) at the rate of 25 lbs. per acre. A minimum of 500 lbs. of 10-10-10 fertilizer or equivalent will be applied. 1.7 acres of ditch bank seeding will be required.

VIII. CULVERTS  
 Existing culverts will be cleaned and the inverts (flow line) lowered to correspond to the proposed ditch grade as indicated on the plan.

- STA. 0+44 CLEANED
- STA. 7+62 REPLACE WITH 15" R/C OR EQUIVALENT
- STA. 22+21 REMOVE
- STA. 27+18 CLEANED
- STA. 34+08 REMOVE
- STA. 44+54 CLEANED
- MULCAHY DITCH
- STA. 0+00 CLEANED FOR Q<sub>b</sub> OR 4" RUN OFF 30" R/C OR EQUIVALENT
- STA. 11+34 CLEANED 30" R/C OR EQUIVALENT

**HYDRAULIC CALCULATION**

MULCAHY DITCH CHANNEL FLOW  $V = 1.486 R^{2/3} S^{1/2}$   
 MAXIMUM VELOCITY  $N = 5$  FPS

REACH	STA. TO STA.	0+00	22+36	27+38	44+70
11+34	0+00				
16+34	11+18				
99	100				
115	115				
104	104				
00014	0004				
0118	0200				
974	975				
999	604				
11/2	11/2				
3'	2'				
2.8	2.2				
20.16	13.86				
.57	.83				
DRAINAGE AREA AC.		59	5	40	55
Q <sub>c</sub> FLOW C.F.S.		7	1	5	7
N		.04	.04	.04	.04
SLOPE-S FT. FT.		.0010	.0013	.0009	.0005
S 1/2		.0316	.0361	.0300	.0224
Q/S 1/2 = KD		221	27	166	312
KD VALUE USED		239	39	171	319
SIDE SLOPE		2:1	2:1	2:1	2:1
BOTTOM WIDTH FT.		3'	3'	3'	6'
DEPTH FT.		1.3	.5	1.1	1.5
AREA SQ. FT.		7.29	2.02	5.59	8.52
VELOCITY Q/A FPS.		.96	.49	.89	.82

$$H = \frac{V^2}{2g} (1 + KE + KPL)$$

**HEADLOSS IN CULVERTS**

MULCAHY DITCH	STATION	0+44	7+62	27+18	44+54
99	100				
115	115				
24"	24"				
C.M.P.	R/C				
.025	.013				
16'	40'				
3.14	3.14				
.046	.012				
.736	.48				
.50	.50				
3.66	3.66				
.47	.41				
DRAINAGE AREA AC.		59	30	5	40
Q <sub>c</sub> FLOW C.F.S.		7	3.8	.63	5.
DIAMETER IN.		24"	15"	10"	18"
TYPE		R/C	R/C	R/C	C.M.P.
N		.013	.013	.013	.025
LENGTH FT.		44	16'	20'	16'
X. SEC. AREA SQ. FT.		3.14	1.23	.545	1.77
KP		.012	.023	.040	.067
KPL		.528	.368	.80	1.07
KE		.50	.50	.50	.50
VELOCITY FPS.		22	15	12	2.8
HEADLOSS FT.		.15	.28	.05	.31

**CONSTRUCTION DATA**

STATION	GRADE %	BOTTOM WIDTH	SIDE SLOPE	CUBIC YARDS	AVERAGE DEPTH
0+44	0.10	3'	2:1	842	2.6'
27+18	0.13	3'	2:1	403	2.4
44+54	0.09	3'	2:1	494	3.0
52+00	0.05	6'	2:1	161	2.0
PORTION OF MULCAHY DITCH				1,900	
				384	
				2,284	

THIS DITCH PLAN HAS BEEN APPROVED BY  
*John D. Pappas*  
 OTTAWA COUNTY ENGINEER 11/13/68 DATE

SURVEYED - 3-28-68 D. SOMMER  
 E. CAMPBELL  
 D. OFFER

LOCATION - S.W. 1/4 OF S.E. 1/4 AND E. 1/2 OF S.W. 1/4 OF SECTION 8 T. 6 N. R. 16 E. BAY TWP. OTTAWA COUNTY OHIO.

REFERENCE - FIELD NOTES ON FILE IN OTTAWA SOIL & WATER CONSERVATION OFFICE 149 CHURCH STREET OAK HARBOR OHIO.

ENGINEERING JOB CLASS II

DITCH IMPROVEMENT PLAN  
 HOPFINGER DITCH GROUP #33  
 BAY TOWNSHIP  
 OTTAWA COUNTY, OHIO.

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

Date 3/68  
 Designed Donald Offer 3/68  
 Drawn Donald Offer 3/68  
 Title Civil Engng  
 Checked \_\_\_\_\_  
 Sheet \_\_\_\_\_  
 Drawing No. 34-01-83-68-4