DESIGN PROCEDURE FOR DRAINAGE FIELD DITCH (607)

Steps

1. Determine layout for drainage system.

2. Determine drainage area for each ditch or reach of ditch from USGS maps, aerial photos, and/or field surveys.

3. Select drainage curve (A,B,C, or D) according to degree of drainage desired.

4. Determine required discharge for each reach from EFM, Chap. 14, p 14-89, Exh. 14-2, or Indiana Drainage Guide, p 29, Fig. 11, using selected drainage curve.

5. Determine grade for each ditch or reach using profiles from field surveys.

6. Select channel dimensions from Table IN-14-6, and/or Indiana Drainage Guide, Tables 15 to 18. Use n = 0.04 for channels with grassed slopes and bare earth bottoms, n = 0.25 for earthen channels, and "C" retardance for grassed channels.

7. Check available capacity (cfs) against required discharge (cfs).

8. Check velocity of each reach, allowable velocity for earth channels will be from 2.0 fps for silt loam or sandy loam soils to 3.0 fps for heavy clay loam soils. A grassed channel may have a velocity up to 5.0 fps.

9. Complete data sheets for plan. Use IN-ENGR-33 and IN-ENGR-19 if needed for additional profiles.

10. Check all work for omissions and errors.

Example Design

Drainage Field Ditches

(607)

Steps

1. Layout system from field topo or field observations.

2. Drainage Area: Ditch #1 Reach 1 = 40 acres
   Reach 2 = 20 acres
   Ditch #2 Reach 1 = 12 acres

3. Select drainage curve: "B" for very good to excellent drainage.

4. Required Discharge: Ditch #1 Reach 1 = 12 cfs
   Reach 2 = 7 cfs
   Ditch #2 Reach 1 = 5 cfs

5. Channel Grades: Ditch #1 Reach 1 = 0.30%
   Reach 2 = 0.15%
   Ditch #2 Reach 1 = 0.10%

6. Assume bare earth channel (n = 0.025); Side Slopes 8:1
   Reference: Table IN-14-6.

   Ditch #1 Reach 1, b = 10', d = 0.5'
   Reach 2, b = 8', d = 0.5'
   Ditch #2 Reach 1, b = 8', d = 0.5'

   NOTE: From profiles, depths of constructed channels will vary from 0.6' min. to 1.3 max.

7. Available Capacity - cfs. Reference: Table IN-14-6

   Ditch #1 Reach 1 q = 12 cfs
   Reach 2 q = 7 cfs
   Ditch #2 Reach 1 q = 6 cfs

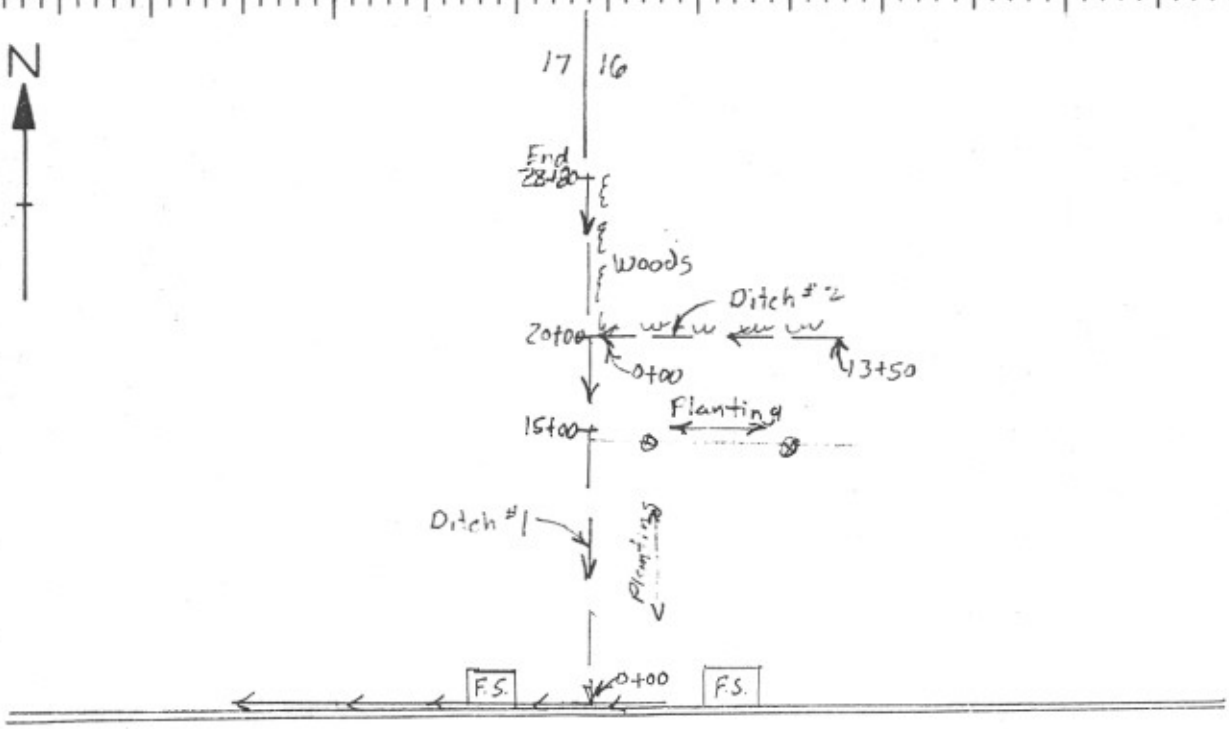
8. Velocity check - fps. Reference: Table IN-14-6
   (n = 0.025)

   Ditch #1 Reach 1 V = 1.7 fps
   Reach 2 V = 1.2 fps
   Ditch #2 Reach 1 V = 1.0 fps

9. Complete data sheets for the plan - IN-ENG -33; if needed for additional profiles, IN-ENG -19.

10. Check all work for omissions and errors.

11. Get required reviews and approvals of plan.
    Reference: NEM Part 501, Subpart A.



LOCATION PLAN

Scale: 1 inch= 100 feet

LEGEND

Road
Farm Boundary
Permanent Fence
Existing Drain Line
Proposed Drain Line
New Drain Installed
Existing Deep Ditch
Proposed Deep Ditch
Existing Shallow Ditch
Proposed Shallow Ditch

DESIGN DETAILS

Line	Stations	Drain area acres	Drain curve	Grade %	Velocity n=0.025 ft./sec.	Ditch dimensions Depth feet	Top feet	Bottom feet	Side slope	Capacity Req'd c.f.s.	Avail c.f.s.
#1	0+00-15+00	40	B	0.30	1.7	0.5	--	10	8:1	12	12
	15+00-28+80	20	B	0.15	1.2	0.5	--	8	8:1	7	7
#2	0+00-13+50	12	B	0.10	1.0	0.5	--	8	8:1	5	6

Quantities:
4,230 L.F. Surface Drainage

SURFACE DRAINAGE PLAN

NAME Chris Geyman

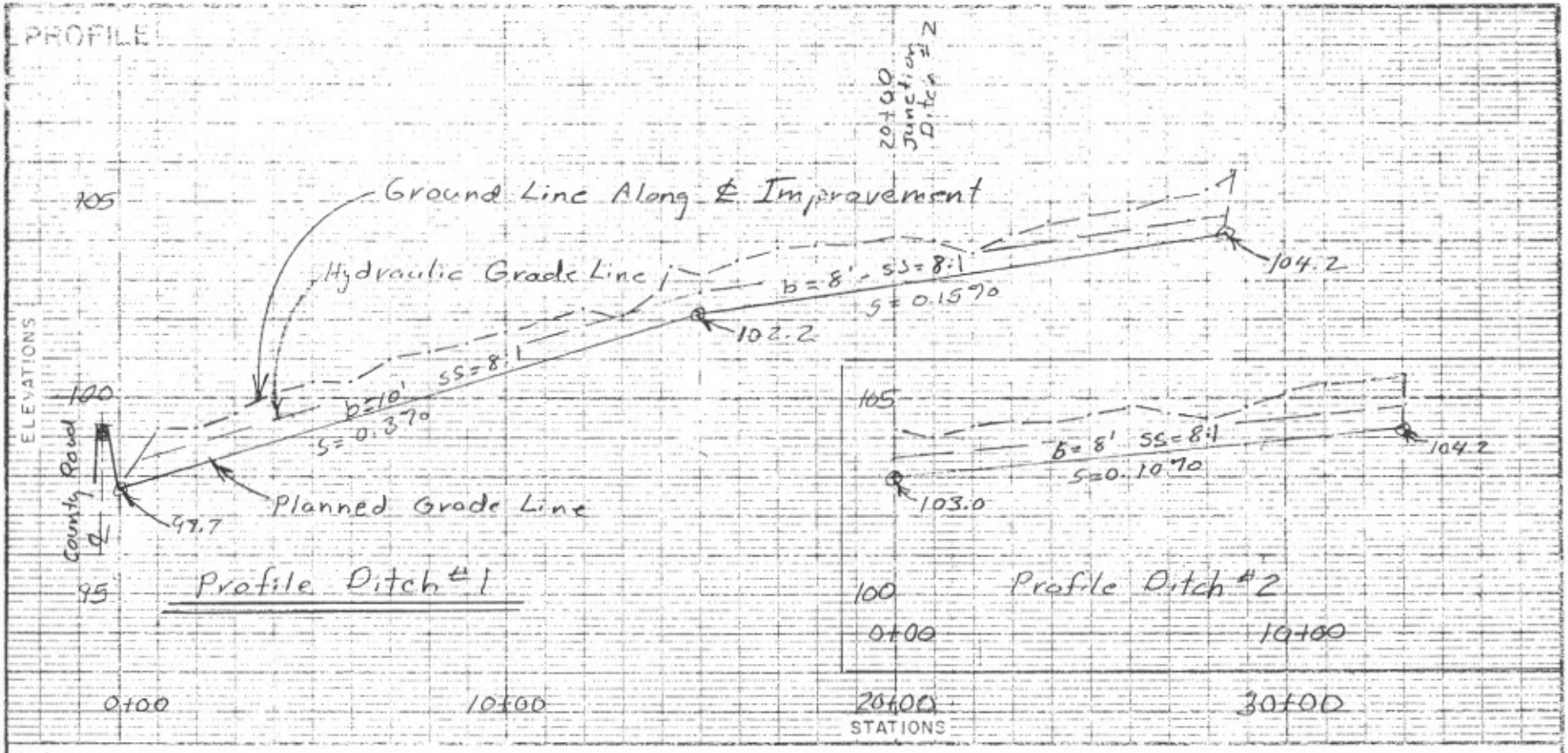
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed R. Dunn Date 12-7
Drawn R. Dunn
Checked R. Dunn
Reviewed

Approved by /s/ Robt. E. Dunn
Title AE 12-2-77
Title
Sheet No. 1 of 1
Drawing No.

IN-ENG-33 (1) 2 Rev. 6-81

PROFILE



QUANTITIES

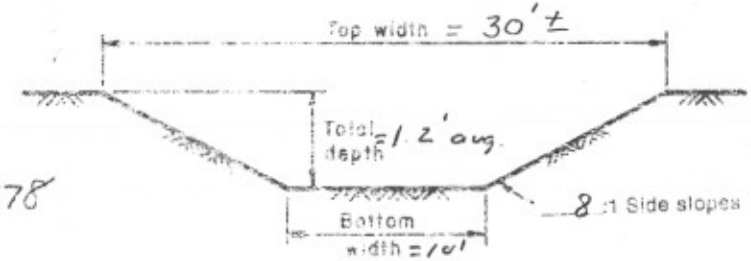
TOTAL LENGTH DITCHES CONSTRUCTED 4150 LIN. FT.

AREA BENEFITTED 100 ACRES

I CERTIFY THAT THIS JOB MEETS ALL THE REQUIREMENTS OF THE INDIANA STANDARDS AND SPECIFICATIONS FOR DRAINAGE FIELD DITCH (CODE 607) ~~OR DRAINAGE MAIN OR LATERAL (CODE 608)~~ AND THE PLANS AS DESIGNED.

CHECKED BY: Allen Checks DATE: May 19, 1978

REMARKS:



TYPICAL CROSS SECTION