

EXHIBIT NE-001**Example of 6-Part Design Folder**

- Part 1 NARRATIVE**
1. DESIGN REPORT
 2. CORRESPONDENCE
- Part 2 QUANTITIES**
1. SUMMARY OF QUANTITIES
 2. EARTHFILL QUANTITIES
 3. EXCAVATION QUANTITIES
 4. DRAINFILL QUANTITIES
 5. RIPRAP QUANTITIES
 6. PIPE LENGTHS
 7. SEEDING & FENCING
 8. OTHER
- Part 3 SURVEY NOTES/SKETCH LAYOUTS**
1. HARD COPY OF NOTES, SIGNED BY PARTY CHIEF
 2. SKETCHES OF OWNER'S OBJECTIVES
 3. SKETCHES OF SITE EVALUATION (PRELIM LAYOUT)
- Part 4 DRAIN ANALYSIS/LAYOUT**
- Part 5 HYDROLOGY/SEDIMENT/HYDRAULICS**
1. USGS MAP & ASCS PHOTOS OF DRAINAGE AREA
 2. WORKSHEET OF PLANIMETER READINGS/CALCULATIONS
 3. WORKSHEET OF LAND USE CALCULATIONS
 4. CN CALCULATIONS/OHIO PRINTOUT OF CN PROGRAM
 5. SEDIMENT WORKSHEETS
 6. HYDRAULIC CALCULATION WORKSHEETS
 7. OHIO PRINTOUT: WATERWAY HYDRAULICS
 8. NEBR TERRACE PRINTOUT (TERRACE DESIGN)
 9. MO-POND PRINTOUT (PR/EM SPILLWAY ROUTINGS)
- Part 6 GEOLOGY/SOIL MECHANICS**
1. GEOLOGIC CROSS SECTIONS
 2. GEOLOGISTS & SML REPORTS
 3. REQUESTS FOR SML TESTING

The above are major categories to be used on a complex job. All categories are not needed on all jobs. Simple structures would contain only the categories which apply.

EXHIBIT NE-002**DESIGN REPORT - Bobby Buildmore Structure - PL-46 -
Longlost County, Nebraska**

SUMMARY: This proposed structure is located on a small drainage which empties into the Winding River. The legal description is Section 33, T78N, R26W.

The owner requested assistance from the Longlost Field Office in October 1992. I looked at the site in November and again in January with the Field Engineer. The owner's objective is to provide some gully stabilization plus water conservation. There will also be recreational and wildlife benefits at the site and floodwater reduction downstream.

Two alternate prelim designs were given the owner, based on centerline cross section and storages estimated from the USGS quad map. He elected "plan B" even though it would require construction and storage permits from DWR.

Site was surveyed in April and a more refined cost estimate of \$24,000 was given the owner. Prelim design was discussed with owner at Longlost Field Office, and he elected to proceed. Final plans were drafted by the NRCS using Terramodel.

DESCRIPTION: Structure drains 276 acres (223 timber & pasture) with runoff curve number = 72. Required sediment storage is 6.8 acre-feet. Permanent pond storage = 52.5 ac. ft.

Design is according to Nebraska NRCS Standard 378, using a 10-year frequency storm (5.5") for the principal spillway and a 50-year storm (6.1") for the emergency spillway. Hydraulic design was done by a computer routing using the Missouri Pond program. A 30" diameter conduit was selected, and the emergency spillway is 32 feet wide. Effective height is 29.8 ft; total storage at emergency spillway elevation is 76.5-ac ft; job approval category is class IV.

Permanent pond will be 5.5 acres in size. It is given a class "a" hazard rating (low hazard) because of its rural setting with restricted access to the downstream area.

FOUNDATION/EMBANKMENT DESIGN: A site investigation was done by the state geologist and five backhoe test pits were dug. One test pit on centerline of fill revealed a 3-foot thick layer of cobbles and boulders carrying water. For this reason, a positive cutoff with the core trench is proposed. A foundation drain is also designed as a second line of defense and for seepage control along the pipe.

DRAWINGS/SPECIFICATIONS: Nebraska "NE" Construction Specifications will be used. Standard drawings which will be used as part of this plan include 5001-8, 15, 21, 22; 5003-11; 5005-1 for the Debris Rack, Pipe Support, Metal Pipe & Coupling Bands, Diaphragm for Metal Pipe, Drain Detail, Cathodic Protection.

CONSTRUCTION INSPECTION: Continuous inspection is needed during critical phases of construction, i.e., during core trench excavation, drain and CMP installation.

Designed by /s/ Civil Engineering Technician --- Jul 16, 1994

Approved by /s/ Field Engineer ----- Aug 2, 1994

EXHIBIT NE-003

DESIGN REPORT - Amos Leaking Structure
Cottonwood Co., NE

SUMMARY: This structure is located in Section 5, T33N, R43W, on a tributary of Keno Creek approximately 7 miles northwest of Decay. This dam will provide a small pool for livestock watering. There is no intent to provide irrigation storage.

The site was surveyed by the CET and assisted by the NRCS staff from the Decay Field Office.

A geological reconnaissance was completed in September 1994 by the NRCS State Geologist, and one soil sample was submitted to the Soil Mechanics Lab in Lincoln. The required sediment storage was calculated by the Sedimentation Geologist. Final design was completed and submitted to the State Conservation Engineer for review. His comments and recommended changes have been incorporated into the design.

DESCRIPTION: This structure is a class "a" hazard, class IV job approval authority because of the embankment height and principal spillway diameter. A construction permit from Nebraska Department of Water Resources is required.

Drainage area is 4700 acres, all rangeland. The pond is designed to hold an estimated 25 years accumulated sediment. The reservoir will detain a 24-hr, 5-yr. storm between principal spillway and emergency spillway and pass a 24-hr, 50-yr. storm through emergency spillway without overtopping the dam.

A 24-hr, 10-yr. storm was analyzed below the emergency spillway, but it resulted in an emergency spillway elevation that would not fit the physical features of the site.

Elevations and Storages:

<u>Feature</u>	<u>Elev</u>	<u>Storage</u>
Top of Dam	54.0	116.6 ac ft
Emerg Spwy (width=150')	50.0	72.5 ac ft
Pool (2.6 acres)	39.0	14.2 ac ft
25-year sediment storage		13.5 ac ft
Lowest ^C L elev	26.0	----
Lowest structural elev	20.0	----

BASIS FOR DESIGN: Design was in accordance with the criteria contained in NRCS Standard 378 (Ponds) dated March 1991.

LAYOUT: Controlling physical configuration at this site is the emergency spillway location. Pictures are included in the design folder to substantiate this statement.

HYDROLOGY: Hydrology was computed using the NRCS computer program, DAMS 2 (TR 48). Time of concentration was estimated using methods contained in NRCS Engineering Field Manual (EFM), Chapter 2. Runoff curve number was computed using preliminary soils maps obtained from the NRCS Soil Survey Office in Northwaste County. CN = 67.

HYDRAULIC DESIGN: Hydraulics were also done by DAMS 2. Three different conduit sizes were analyzed. Final principal spillway design is 36" CMP with 48" CMP riser. Emergency spillway elevation was set at 50.0 providing detention of the routed 24-hr, 5-yr storm. A routing of the 24Q₅₀ resulted in a 150-ft width at a flow depth of 2.1 ft.

FOUNDATIONS/EMBANKMENT DESIGN: Abutment shaping (1:1), foundation drainage, channel cleanout, and core trench excavation were all recommended in the geologic report and are incorporated into this design.

A site specific foundation drain is used at this site rather than the NRCS standard drawing. The drain material gradation is similar to gradation specified at Site 8A in Nearby Watershed, constructed in 1979 and has proven to be adequate over the years. Embankment design calls for 1.4 ft of settlement.

Borrow will come from the emergency spillway and is a good CL material. Pre-wetting is specified by our modification of Const Spec 21, Excavation. This condition can be waived at the pre-construction meeting if an early spring start is scheduled, and there is adequate ground moisture.

SPECIFICATIONS/CONSTRUCTION DRAWINGS: Nebraska PL-46 construction specs will be used. Also, standard Nebraska base drawings for principal spillway, riser, and fencing.

Asphalt coated pipe and cathodic protection will be specified for this job. Asphalt coating has been seldom used in the past several years, but there have been recent instances of structural failures which may trace back to "non-watertight" principal spillway conduits. Cathodic protection is specified as a precaution as the site location is on the fringe area of the "hot" soils.

CONSTRUCTION INSPECTION: Starting date for construction of this structure should coincide with early spring to take advantage of natural moisture in the borrow. Continuous construction inspection is required during installation of the drains, core trench, channel cleanout, abutment shaping, and conduit placement. After conduit backfill is completed, periodic inspection will be sufficient.

Close communication is needed between the owner, contractor, Field Office, and Field Engineer to establish a mutual starting date and provide adequate inspection. A pre-construction conference must be held to discuss the critical items needing inspection and the borrow moisture. The pre-construction meeting will include both the owner and contractor.

OPERATION AND MAINTENANCE: An O&M plan will be provided the owner as guidance for maintaining the structure. This O&M plan is a modified version of page M-378-1 of the design standard. It was modified by adding one paragraph about the cathodic protection test box.

DISTRIBUTION: A copy of this design report has been sent to the DC, the owner, the CET, Decay Field Office, and the State Conservation Engineer. A copy of this report should be attached to the plans when the owner applies for permits.

..... /ss/ Field Engineer, 12-19-94

..... Reviewed & concurred /s/SCE, 12/29/94

EXHIBIT NE-004

**DESIGN REPORT - Smellbad Farms Waste Treatment Lagoon
Aroma Co., NE**

SUMMARY: This project is located in NW1/4 of Section 7, T18N, R7W, in Aroma County, NE. It is a waste treatment facility for 2700 head of feeder pigs, designed in connection with two new confinement buildings and a third building which may be built later. Construction and operating permits are required from the Nebraska Department of Environmental Quality.

Owner requested assistance from the NRCS Field Office at Aroma. Site inspected by Ole Timer CET, myself from Generic City on Nov 3, 1994. He and Brick Bottoms, SCT, Aroma, completed a site survey.

DESIGN DESCRIPTION: Job requires class IV approval authority due to required volume. Permits are required from Department of Environmental Quality.

Design period is 180 days. Animal capacity is 2700 head of feeder pigs at average weight of 160 lbs (432 animal units) and manure production of 1.0 cu ft per animal unit (AU) per day. Sizing of the lagoon is based on 5.4 lbs/AU/day production and a lagoon loading rate of 4 lbs of VS per 1000 ft of water. An animal unit is considered to be 1000 lbs live weight.

Allowance was made for ten years of accumulated sludge buildup in the bottom, assuming total solids (TS) production of 6.34 lbs/AU/day. The design height is increased to account for the volume of a 24 hr-Q25 plus 1.0 ft freeboard.

The design has balanced cut, fill and storage with an estimated 125% excavation vs fill to allow for shrinkage due to compaction. BASIS FOR DESIGN: Design is according to criteria contained in NRCS Standard 359, dated 1987, and Animal Waste Management Field Handbook.

FOUNDATIONS/EMBANKMENT DESIGN: The site is located on Hastings silt-loam soil with a CL-CH classification. Seepage is not anticipated to be a problem. Soil borings were taken by Digger Giddings, Soil Scientist at Generic City. Three borings were made to a depth of 22 feet and no water table was encountered. Depth of lagoon is 13.0 feet (bottom = 86.0) with effective storage calculated at $d = 11.1$, allowing 0.9 ft for the Q25 storm and 1.0 ft of freeboard. Elevation of dike is 99.0 (maximum fill = 9.3 ft). Side slopes of 3:1 used on both sides, as this has proven satisfactory on other projects in Aroma County.

COST ESTIMATE: Quantities are listed on the plan for embankment, excavation and PVC pipe. Cost estimates should be completed by the Aroma Field Office staff using prevailing "average costs" for Aroma County.

CONSTRUCTION INSPECTION: Periodic inspection required during stripping, embankment placement and installation of PVC pipe. The local CET, Ole Timer, has adequate job approval authority. Job requirements should be reviewed with owner prior to construction.

OPERATION: For proper operation of the waste treatment system the water depth should be six feet prior to loading. Construction plan calls for steel post markers to be set in the side slopes of the embankment at two different water levels (97.1 & 96.3) which indicate the minimum and maximum operating levels. The owner should be advised.

/s/FIELD ENGINEER -----DEC 30, 1994

EXHIBIT NE-005

DESIGN REPORT - Overhill Farms Pipeline Project Wilderness Co., NE

SUMMARY: This project is located in Section 17, T12N, R37W, in Wilderness County, NE. Purpose of the project is to incorporate Overhill's cropland into the Flatland Irrigation District, thus receiving water from the district owned lateral, known as the Jackweed Lateral, west of the Overhill property. This necessitates crossing the Whitey Thomas property.

I. B. Taker, owner of Overhill Farms, requested assistance from the NRCS Field Office at Second Chance. I completed a preliminary survey on Jan 11, 1995, assisted by Walleye Fisher and Barb Whyre, both from Second Chance FO.

A preliminary site investigation was carried out on Jan 18, 1995. Present were J. B. Surge, manager of Flatland Irrigation District, both landowners, Fisher, Whyre, and myself.

PRELIMINARY OPTIONS: Two design alternatives were developed from the survey and presented to the group.

(OPTION ONE) -- Bring the supply line across the Thomas property and only irrigate the Overhill Farms cropland. Supply line would be 80 psi, 10" PVC pipe, 1900 ft long.

(OPTION TWO) -- Bring the supply line across the Thomas property and irrigate both the Thomas and Overhill cropland. Supply line would still be 80-psi PVC pipe, 1900 ft long; but it would be divided into three reaches, each with a different diameter. The first 650 ft of it would be 15" dia, followed by a 550 ft reach of 12" dia and the last 700 ft of 10" dia.

Preliminary drawings and cost estimates were discussed with this group. Option 1: \$12,300 and option 2: \$18,200.

Both landowners were interested but delayed a decision pending financial commitments. This was resolved, and the FO was notified by them on Feb 1st to proceed with Option No. 2.

FINAL DESIGN (OPTION NO. 2):

Thomas property --- Place two risers, both designed for 1.0 cfs outflow into an open lateral. Risers would be at 650 ft and 1200 ft from the supply canal. Since both may operate simultaneously, a 2-cfs supply pipe would be needed.

Overhill Farms --- Install a riser and surge valve at the property line, 1900 ft from the supply canal. This will allow distribution of 1400 ft through 8" gated pipe in one direction or 670 ft through 8" gated pipe in the other direction.

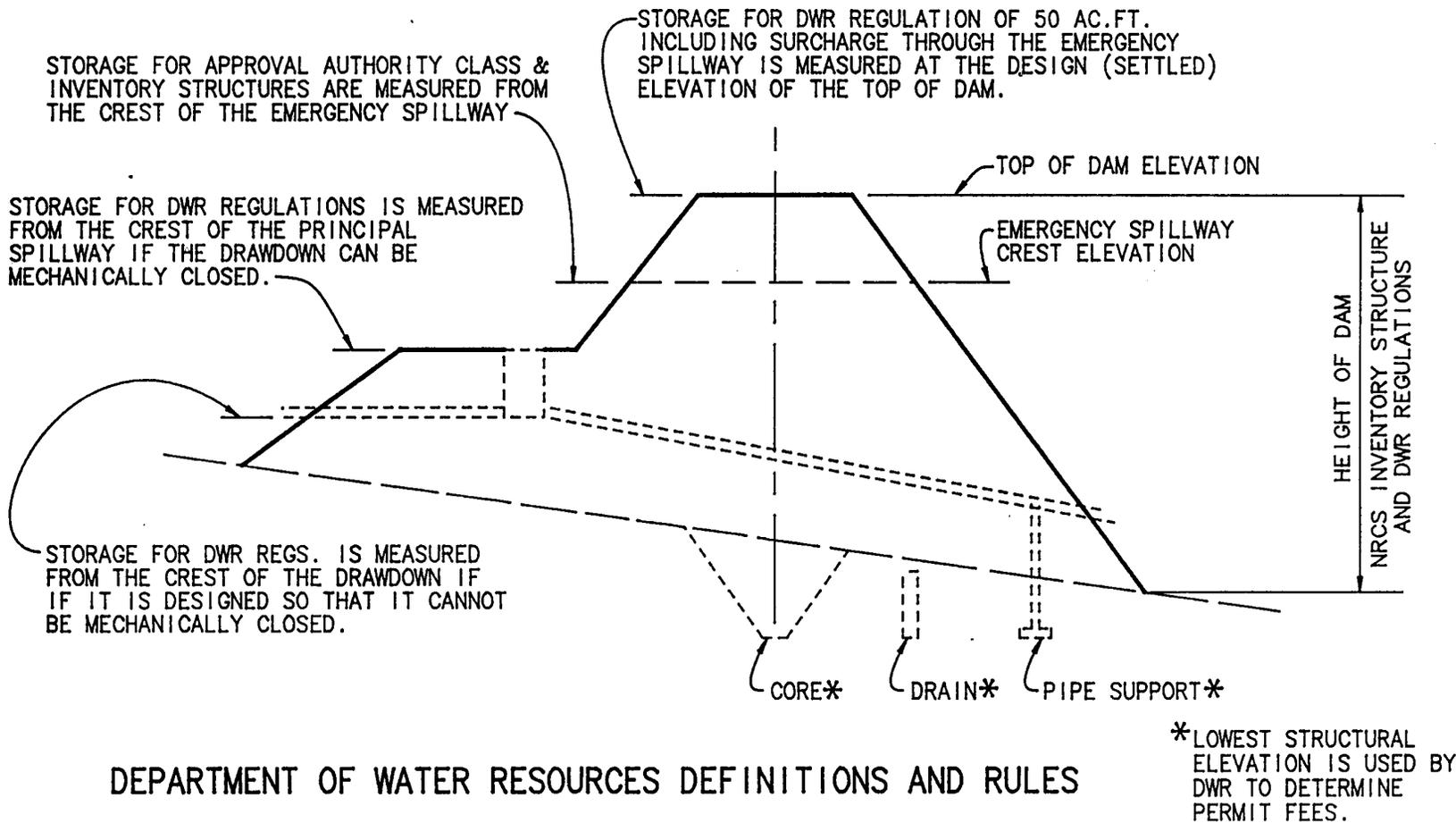
The 8" gated pipe has a capacity of 1.0 cfs. The owner of Overhill Farms wanted a system with 1.5 cfs capacity. Our preliminary calculations showed that this was possible, but it would require 10" gated pipe. Given this option, Mr. Taker opted for the 1.0 cfs system because they already own enough 8" gated pipe to do the job.

BASIS FOR DESIGN: Design is according to criteria contained in NRCS Standard 430EE, dated 1987. Calculations were verified using the North Dakota Pipeline computer program.

/s/C.E.T. ----- FEB 11, 1995

EXHIBIT NE-006
DIAGRAM OF DEPARTMENT OF WATER RESOURCES
DEFINITIONS AND RULES

(NE 5-



DEPARTMENT OF WATER RESOURCES DEFINITIONS AND RULES

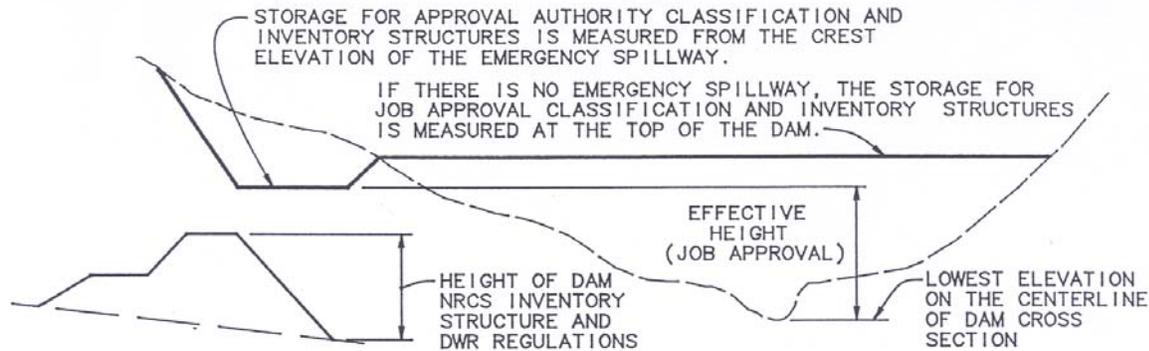
THE HEIGHT OF A DAM IS TO BE MEASURED FROM THE LOWEST ELEVATION ALONG THE DOWNSTREAM TOE OF THE DAM TO THE ELEVATION OF THE TOP OF THE DAM (REF. CHAPTER 8-002 DWR REGULATIONS ON SURFACE WATER).

THE STORAGE FOR, LOW HAZARD (CLASS A), DAMS LESS THAN TWENTY-FIVE FEET IN HEIGHT, WITH STORAGE LESS THAN 15 ACRE FEET, IS MEASURED BELOW THE CREST ELEVATION OF THE LOWEST OPEN OUTLET (REF. CHAPTER 46-257(2) DWR REGULATIONS ON SURFACE WATER).

REFER TO NEM501, PG. NE501(9) FOR DWR PERMIT REQUIREMENTS

*LOWEST STRUCTURAL ELEVATION IS USED BY DWR TO DETERMINE PERMIT FEES.

EXHIBIT NE-007
DIAGRAM OF NRCS DEFINITIONS AND
RULES FOR JOB APPROVAL AUTHORITY
AND INVENTORY STRUCTURES



NATURAL RESOURCES CONSERVATION SERVICE DEFINITIONS AND RULES

- I. There are two sets of height and storage definitions for dams that a field office might build. The first set of definitions is for job approval authority. The second set of definitions is for the NRCS dam safety inventory (commonly called inventory structures).

II. JOB APPROVAL AUTHORITY

- A. All field office employees have job approval limits in three separate categories identified as inventory/evaluation, design, and construction. (Ref. NEM 501.04)
- B. Definitions for assigning job approval.
1. The height of dam (called effective height) is measured from the lowest elevation in the cross section, taken along the centerline of the dam, to the elevation of the crest of the emergency spillway (Ref. Standard 378 of FOTV-IV).
 2. The storage is the volume in acre-feet in the reservoir below the elevation of the crest of the emergency spillway or the top of the dam if there is no emergency spillway (Ref. Standard 378 of FOTG-IV).
 3. If the product of the storage times the height is less than 3000 and the effective height of the dam is less than 35 feet, the dam is designed using the Standard 378 of the F.O.T.G. IV. (If one or the other of the values is exceeded, it must be designed under TR-60 criteria).

III. INVENTORY STRUCTURES

- A. Inventory structures are dams built with NRCS technical and/or financial assistance if they meet any of the following criteria:
1. All Class B & C hazard dams are inventory dams.
 2. All Class A hazard dams more than 6 feet high and with a storage capacity of 50 acre-feet or more.
 3. All Class A hazard dams more than 25 feet high and a storage capacity of more than 15 acre-feet.
- B. Measurements used for identifying inventory structures
1. The height of a dam is measured from the lowest elevation along the downstream toe of the dam to the elevation of the top of the dam.
 2. The storage is the acre-feet in the reservoir below the elevation of the crest of the emergency spillway or the top of the dam if there is no emergency spillway. (Ref. NEM 520.20)