APR 14 1994

Neuhoff Farms, Inc.
1706 Woodwind Dr.
Greenville, NC 27858
(919) 756-2421

# Animal Waste Management Plan & Facility Design

**Contract Grower** DONALD SMITH

**Farm Description** 4 (880) FEEDER-TO-FINISH

**Farm Location** JONES COUNTY

**Designed by:**
**Weston's Landscaping**
**237 Al Taylor Rd.**
**Richlands, NC 28574**
**324-3044**

**Kevin Weston - Owner**

Operator: DONALD SMITH

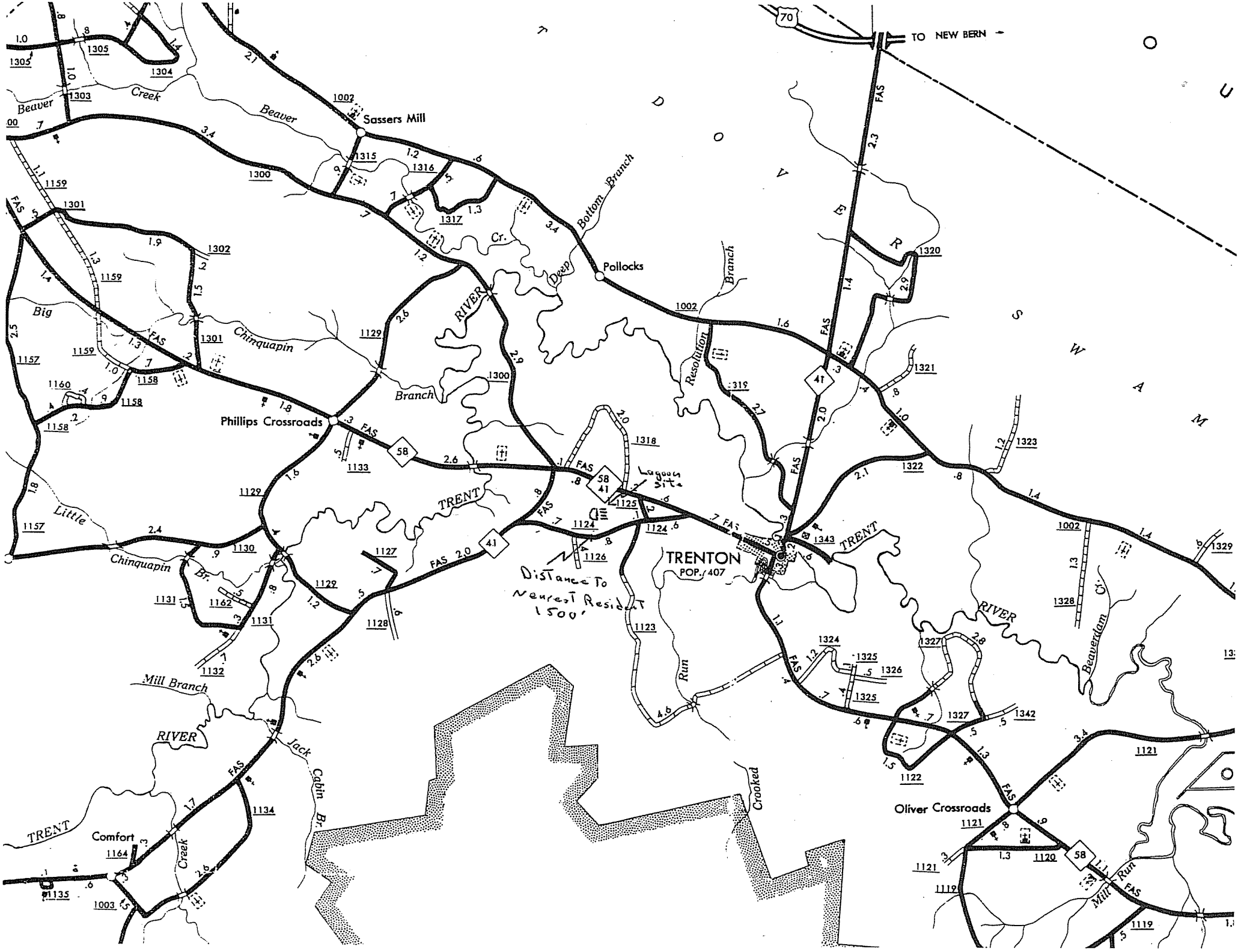
Please review the attached plan and specifications carefully. Retain this copy for your use and records. It is important that everyone; you, your Contractor, and Soil Conservation Service personnel, understand what is expected so that final construction meets plan and specifications.

The actual amount of material required for pads and dike may vary from the estimates. The design will attempt to balance cuts and fills as close as possible. If additional material is required after construction is complete on lagoon, the contractor and owner will negotiate on the price and location of the borrow area.

| | |
|---|---|
| Design Requirement: | 710404 cu.ft. = 26311 cu.yds. |
| Estimate of Excavation: | 527337 cu.ft. = 19531 cu.yds. |
| Estimate of Pad & Dike: | 443232 cu.ft. = 16416 cu.yds. |
| Estimate of Compacted Clay Backfill: | _____ cu.ft. = _____ cu.yds. |
| Cut:Fill Ratio: | 1.2 : 1 |
| Job Class: | IV |

Additional Notes: No evidence of cultural resources observed on site.
Cuts + Fill not Figured or certified By SCS

OK
C.K. by [signature] DC 4/26/94


TO NEW BERN
Sassers Mill
Pollocks
Phillips Crossroads
TRENTON
POP. 407
Oliver Crossroads
Comfort
Beaver Creek
Big Chinquapin Branch
Little Chinquapin Br.
Mill Branch
Jack Cabin Br.
Deep Bottom Branch
Resolution Branch
Crooked Run
Beaverdam Cr.
Mill Run
TRENT RIVER
Lagoon Site
Distance To Nearest Resident 1500'
FAS
58
41
70

SCS-ENG-538
Rev. 5-70

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

# SOIL INVESTIGATION TO DETERMINE SUITABILITY OF PROPOSED POND SITE

FARMER'S NAME Donald Smith — DISTRICT Jones
DATE 2-24-94 — COUNTY Jones
S. C. S. PHOTO SHEET NO. — WORK UNIT

**WATERSHED AREA MEASUREMENTS**

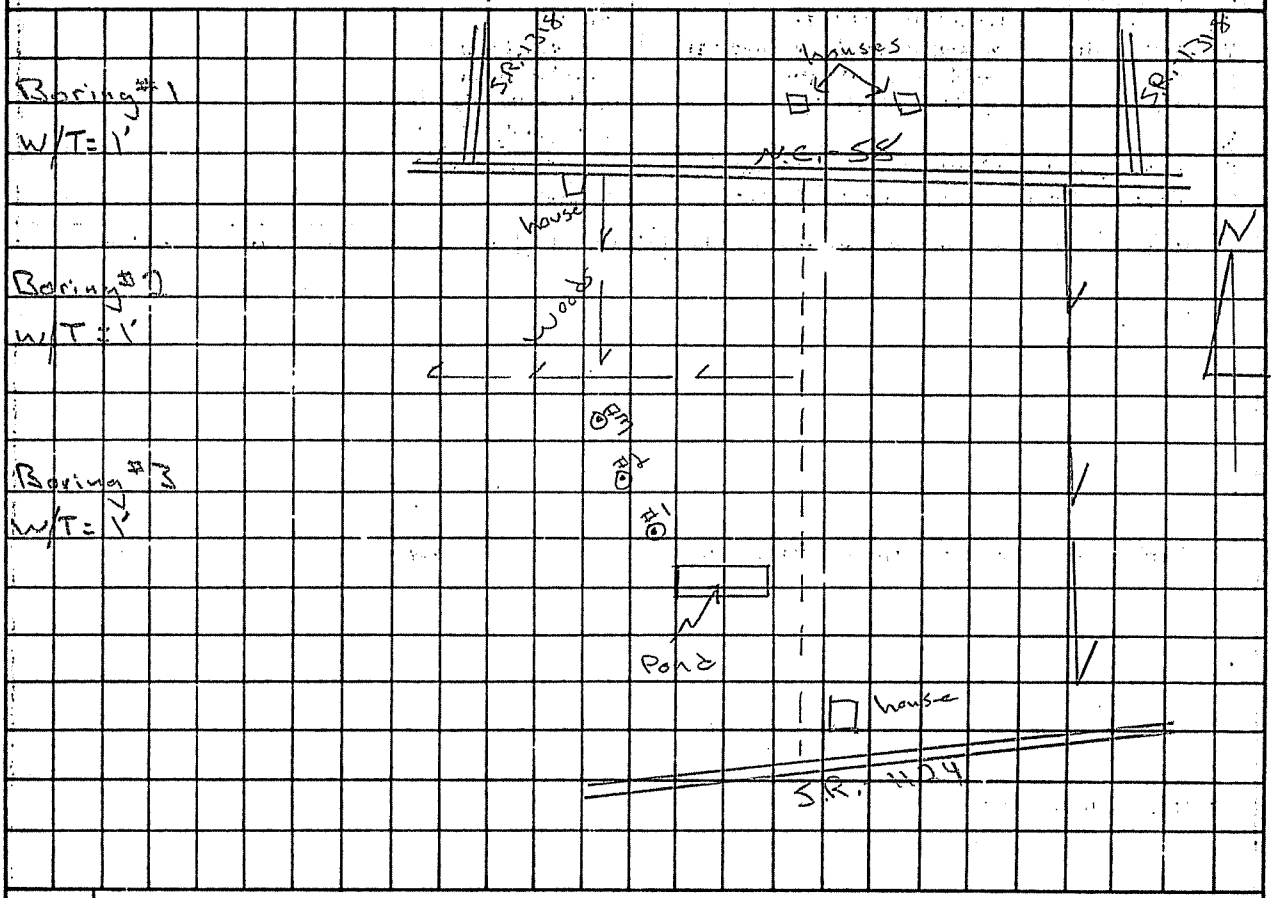
CROPLAND ____ ACRES PASTURE ____ ACRES
WOODLAND ____ ACRES TOTAL ____ ACRES

POND CLASS

4. 880 ± Feeder To Finish

WORK UNIT CONSERVATIONIST

**SKETCH OF PROPOSED POND SHOWING WHERE BORINGS WERE MADE** (Approx. scale 1" = ____ feet)
*Locate reference point on center line of dam and identify on sketch.*




**BORING NUMBER AND PROFILE**

SHOW DEPTH SCALE

*Make and list dam-site and spillway borings first - then ponded area and borrow pit borings - separate with vertical red line. (Continued on back where necessary) Show water table elevations on dam-site borings.*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | SM | | | | SM | | | | SM | | | | | | | | | | | | | | |
| 1-2 | SC | CL | | | SC | CL | | | SC | CL | | | | | | | | | | | | | |
| 2-3 | SC | CL | | | SC | CL | | | SC | CL | | | | | | | | | | | | | |
| 3-4 | CL | | | | CL | | | | CL | | | | | | | | | | | | | | |
| 4-5 | CL | | | | CL | | | | CL | | | | | | | | | | | | | | |
| 5-6 | CL | | | | CL | | | | CL | | | | | | | | | | | | | | |
| 6-7 | CL | | | | CL | | | | CL | | | | | | | | | | | | | | |
| 7-8 | CL | | | | CL | | | | CL | | | | | | | | | | | | | | |
| 8-9 | CL | | | | CL | | | | CL | | | | | | | | | | | | | | |
| 9-10 | CL | | | | SM | SC | | | SM | SC | | | | | | | | | | | | | |
| 10-11 | SM | | | | SM | SC | | | SM | SC | | | | | | | | | | | | | |

BORINGS MADE BY A. Metts, M. Harriett, R. Metts — SIGNATURE & TITLE Donald W. Metts SC

11

## TYPES OF MATERIAL ENCOUNTERED IN BORINGS
(Use one of systems below)

### UNIFIED CLASSIFICATION

GW - Well graded gravels; gravel, sand mix
GP - Poorly graded gravels
GM - Silty gravels; gravel-sand-silt mix
GC - Clayey gravels; gravel-sand-clay mix
SW - Well graded sands; sand-gravel mix
SP - Poorly graded sands
SM - Silty sand
SC - Clayey sands; sand-clay mixtures
ML - Silts; silty, v. fine sands; sandy or clayey silt
CL - Clays of low to medium plasticity
CH - Inorganic clays of high plasticity
MH - Elastic silts
OL - Organic silts and silty clays, low plasticity
OH - Organic clays, medium to high plasticity

### USDA CLASSIFICATION

g - gravel
s - sand
vfs - very fine sand
sl - sandy loam
fsl - fine sandy loam
l - loam
gl - gravelly loam
si - silt
sil - silt loam
cl - clay loam
sicl - silty clay loam
scl - sandy clay loam
sic - silty clay
c - clay

1. Suitable material for embankment is available ☑ Yes ☐ No *(Indicate where located on the sketch on reverse side)*

REMARKS: Site is suitable for lagoon. Need one foot cut off trench under dike.

2. Explain hazards requiring special attention in design *(Seepage, spring, rock etc.)*

GENERAL REMARKS:

| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Operator: DONALD SMITH  County: JONES  Date: 05/23/93

Distance to nearest residence (other than owner): 1400.0 feet

1. AVERAGE LIVE WEIGHT (ALW)

| | | | | |
|---|---|---|---|---|
| 0 sows (farrow to finish) | x | 1417 lbs. | = | 0 lbs |
| 0 sows (farrow to feeder) | x | 522 lbs. | = | 0 lbs |
| 3520 head (finishing only) | x | 135 lbs. | = | 475200 lbs |
| 0 sows (farrow to wean) | x | 433 lbs. | = | 0 lbs |
| 0 head (wean to feeder) | x | 30 lbs. | = | 0 lbs |
| Describe other : _____ | | | : | 0 |
| | | Total Average Live Weight | = | 475200 lbs |

2. MINIMUM REQUIRED TREATMENT VOLUME OF LAGOON

Volume = 475200 lbs. ALW x Treatment Volume(CF)/lb. ALW
Treatment Volume(CF)/lb. ALW = 1 CF/lb. ALW
Volume = 475200 cubic feet

3. STORAGE VOLUME FOR SLUDGE ACCUMULATION

Volume = 0.0 cubic feet

4. TOTAL DESIGNED VOLUME – *Rectangular dimensions used closely compare to actual lagoon size & volume.

| | |
|---|---|
| Inside top length (feet) | 357.0* |
| Inside top width (feet) | 266.4* |
| Top of dike elevation (feet) | 51.0 |
| Bottom of lagoon elevation (feet) | 40.0 |
| Freeboard (feet) | 1.0 |
| Side slopes (inside lagoon) | 3.0 : 1 |

Total design volume using prismoidal formula

| SS/END1 | SS/END2 | SS/SIDE1 | SS/SIDE2 | LENGTH | WIDTH | DEPTH |
|---|---|---|---|---|---|---|
| 3.0 | 3.0 | 3.0 | 3.0 | 351.0 | 260.4 | 10.0 |

AREA OF TOP
LENGTH * WIDTH =
351.0 260.4 91400 (AREA OF TOP)

AREA OF BOTTOM
LENGTH * WIDTH =
291.0 200.4 58316 (AREA OF BOTTOM)

AREA OF MIDSECTION
LENGTH * WIDTH * 4
321.0 230.4 295834 (AREA OF MIDSECTION * 4)

CU. FT. = [AREA TOP + (4*AREA MIDSECTION) + AREA BOTTOM] * DEPTH/6
91400.4 295833.6 58316.4 1.7

Total Designed Volume Available = 742584 CU. FT.

5. TEMPORARY STORAGE REQUIRED

DRAINAGE AREA:
Lagoon (top of dike)
Length * Width =
357.0 266.4 95104.8 square feet

Buildings (roof and lot water)

0.0 square feet Describe this area.

TOTAL DA 95104.8 square feet

Design temporary storage period to be 180 days.

5A. Volume of waste produced

Feces & urine production in gal./day per 135 lb. ALW 1.37

Volume = 475200 lbs. ALW/135 lbs. ALW * 1.37 gal/day 180 days
Volume = 868032 gals. or 116047.1 cubic feet

5B. Volume of wash water

This is the amount of fresh water used for washing floors or volume of fresh water used for a flush system. Flush systems that recirculate the lagoon water are accounted for in 5A.

Volume = 0.0 gallons/day * 180 days storage/7.48 gallons per CF

Volume = 0.0 cubic feet

5C. Volume of rainfall in excess of evaporation

Use period of time when rainfall exceeds evaporation by largest amount.

180 days excess rainfall = 7.0 inches

Volume = 7.0 in * DA / 12 inches per foot

Volume = 55477.8 cubic feet

5D. Volume of 25 year - 24 hour storm

Volume = 8.0 inches / 12 inches per foot * DA

Volume = 63403.2 cubic feet

TOTAL REQUIRED TEMPORARY STORAGE

| | | |
|---|---|---|
| 5A. | 116047 | cubic feet |
| 5B. | 0 | cubic feet |
| 5C. | 55478 | cubic feet |
| 5D. | 63403 | cubic feet |
| TOTAL | 234928 | cubic feet |

6. SUMMARY

| | | | |
|---|---|---|---|
| Temporary storage period | 180 | days | |
| Rainfall in excess of evaporation | 7.0 | inches | |
| 25 year - 24 hour rainfall | 8.0 | inches | |
| Freeboard | 1.0 | feet | |
| Side slopes | 3.0 | : 1 | |
| Inside top length | 357.0 | feet | |
| Inside top width | 266.4 | feet | |
| Top of dike elevation | 51.0 | feet | |
| Bottom of lagoon elevation | 40.0 | feet | |
| Total required volume | 710128 | cu. ft. | * |
| Actual design volume | 742584 | cu. ft. | * |
| Seasonal high watertable elevation (SHWT) | 46.7 | feet | |
| Stop pumping elev. | 47.2 | feet | * |
| Must be > or = to the SHWT elev. | 46.7 | feet | |
| Must be > or = to min. req. treatment el. | 46.0 | feet | |
| Required minimum treatment volume | 475200 | cu. ft. | |
| Volume at stop pumping elevation | 500780 | cu. ft. | |
| Start pumping elev. | 49.3 | feet | * |
| Must be at bottom of freeboard & 25 yr. rainfall | | | |
| Actual volume less 25 yr.- 24 hr. rainfall | 679181 | cu. ft. | |
| Volume at start pumping elevation | 679498 | cu. ft. | |
| Required volume to be pumped | 171525 | cu. ft. | * |
| Actual volume planned to be pumped | 178719 | cu. ft. | * |
| Min. thickness of soil liner when required | 1.6 | feet | |

7. DESIGNED BY: APPROVED BY: *W. Allen Turnage

DATE: DATE: 5-23-94

NOTE: SEE ATTACHED WASTE UTILIZATION PLAN

COMMENTS: * Design is approved on condition a Favorable site evaluation is made and completed form added to design pl.

# OPERATION AND MAINTENANCE PLAN

This lagoon is designed for waste treatment (permanent storage) and 180 days of temporary storage. The time required for the planned fluid level (permanent and temporary storage) to be reached may vary due to site conditions, weather, flushing operations, and the amount of fresh water added to the system.

The designed temporary storage consists of 180 days storage for: (1) waste from animals and (2) excess rainfall after evaporation. Also included is storage for the 25 year - 24 hour storm for the location. The volume of waste generated from a given number of animals will be fairly constant throughout the year and from year to year, but excess rainfall will vary from year to year. The 25 year rainfall will not be a factor to consider in an annual pumping cycle, but this storage volume must always be available.

A maximum elevation is determined in each design to begin pumping and this is usually the outlet invert of pipe(s) from building(s). If the outlet pipe is not installed at the elevation to begin pumping, a permanent marker must be installed at this elevation to indicate when pumping should begin. An elevation must be established to stop pumping to maintain lagoon treatment depth.
Pumping can be started or stopped at any time between these two elevations for operating convenience as site conditions permit, such as weather, soils, crop, and equipment in order to apply waste without runoff or leaching.

Land application of waste water is recognized as an acceptable method of disposal. Methods of application include solid set, center pivot, guns, and traveling gun irrigation. Care should be taken when applying waste to prevent damage to crops.

The following items are to be carried out:

1. It is strongly recommended that the treatment lagoon be pre-charged to 1/2 its capacity to prevent excessive odors during start-up. Pre-charging reduces the concentration of the initial waste entering the lagoon thereby reducing odors. Solids should be covered with effluent at all times. When precharging is complete, flush buildings with recycled lagoon liquid. Fresh water should not be used for flushing after initial filling.

2. The attached waste utilization plan shall be followed. This plan recommends sampling and testing of waste (see attachment) before land application.

3. Begin temporary storage pump-out of the lagoon when fluid level reaches the elevation 49.3 as marked by permanent marker. Stop pump-out when the fluid level reaches elevation 47.2 . This temporary storage, less 25 yr- 24 hr storm, contains 171525 cubic feet or 1283006 gallons.

4. The recommended maximum amount to apply per irrigation is one (1) inch and the recommended maximum application rate is 0.3 inch per hour. Refer to the waste utilization plan for further details.

5. Keep vegetation on the embankment and areas adjacent to the lagoon mowed annually. Vegetation should be fertilized as needed to maintain a vigorous stand.

6. Repair any eroded areas or areas damaged by rodents and establish in vegetation.

7. All surface runoff is to be diverted from the lagoon to stable outlets.

8. Keep a minimum of 25 feet of grass vegetated buffer around waste utilization fields adjacent to perennial streams. Waste will not be applied in open ditches. Do not pump within 200 feet of a residence or within 100 feet of a well. Waste shall be applied in a manner not to reach other property and public right-of-ways.

9. The Clean Water Act of 1977 prohibits the discharge of pollutants into waters of the United States. The Department of Environment, Health, and Natural Resources, Division of Environmental Management, has the responsibility for enforcing this law.

COMPUTATION SHEET
SCS–ENG–523 Rev. 8–69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Design - Check

| STATE | | PROJECT | | |
|---|---|---|---|---|
| BY E.T. | DATE 5-23-94 | CHECKED BY | DATE | JOB NO. |
| SUBJECT DONALD SMITH - WASTE TREATMENT LAGOON | | | | SHEET ____ OF ____ |

# LAGOON Volume & Surface Area Computation

Top of Dike - 51.0 - Bottom 40.0

Section (1)

50' X 160' @ elev. 51.0 = 8000 $FT^2$ Surface Area

@ elev. 45.0 - 32' X 124 X 10 = 39,680 $FT^3$ storage Volume

Section (2) 240' X 260' @ elev. 51.0 = 62,400 $FT^2$ Surface Area

@ elev. 45.0 - 204' X 260 X 10 = 530,400 $FT^3$ Storage Volume

Section (3)

190' X 130 @ elev. 51.0 = 24,700 $FT^2$ Surface Area

@ elev. 45.0 154' X 112 X 10 = 172,480 $FT^3$ Storage

Total surface Area - 95100 sq. ft.

Total designed Volume - 742,560 cubic ft

PERMANENT STORAGE NEEED :

3520 HOGS X 135 lbs. X 1 cu FT/lb. = 475200

TEMPORARY STORAGE NEEDED :

① 475200 X 0.00136 X 180 DAYS = 116329

② RAIN - EVAPORATION

7 $\frac{IN.}{YR.}$ X $\frac{1FT.}{12IN.}$ X 95100 $FT^2$ = 55475

③ 25 YR / 24 HR STORM

8 $\frac{IN.}{YR.}$ X $\frac{1FT.}{12IN.}$ X 95100 $FT^2$ = 63400

TOTAL STORAGE NEEDED : 710404 CU. FT.

PERMANENT STORAGE AVAILABLE :
(ELEV. 40.0' TO 47.0')

AT = AVG 50 X 136 = 6800
AM = " 50 X 115 X 4 = 23000
AB = " 50 X 94 = 4700
34500 X 7/6 = 40250

AT = AVG 130 X 166 = 21580
AM = " 130 X 145 X 4 = 75400
AB = " 130 X 124 = 16120
113100 X 7/6 = 131950

AT = AVG 236 X 216 = 50976
AM = " 215 X 195 X 4 = 167700
AB = " 194 X 174 = 33756
252432 X 7/6 = 294504

TOTAL PERMANENT STORAGE AVAILABLE : 466704 CU. FT.

* Approved on condition a favorable site evaluation is made & Form added to design.
BF.

TEMPORARY STORAGE AVAILABLE :
(ELEV. 47.0' TO 50.0')

AT = AVG. 50 X 154 = 7700
AM = " 50 X 145 X 4 = 29000
AB = " 50 X 136 = 6800
43500 X 3/6 = 21750

AT = AVG. 130 X 184 = 23920
AM = " 130 X 175 X 4 = 91000
AB = " 130 X 166 = 21580
136500 X 3/6 = 68250

AT = AVG. 254 X 234 = 59436
AM = " 245 X 225 X 4 = 220500
AB = " 236 X 216 = 50976
330912 X 3/6 = 165456

TOTAL TEMPORARY STORAGE AVAILABLE : 255456 CU. FT.

TOTAL STORAGE AVAILABLE : 722160 CU. FT.

MIN. REQUIRED TREATMENT VOLUME : 475200 CU. FT.
AT ELEV. 47.2 (END PUMPING) VOLUME IS : 482652 CU. FT.
TOTAL DESIGN VOLUME LESS 25YR/24 HR STORM : 658760 CU FT.
AT ELEV. 49.3 (START PUMPING) VOLUME IS : 659399 CU. FT.

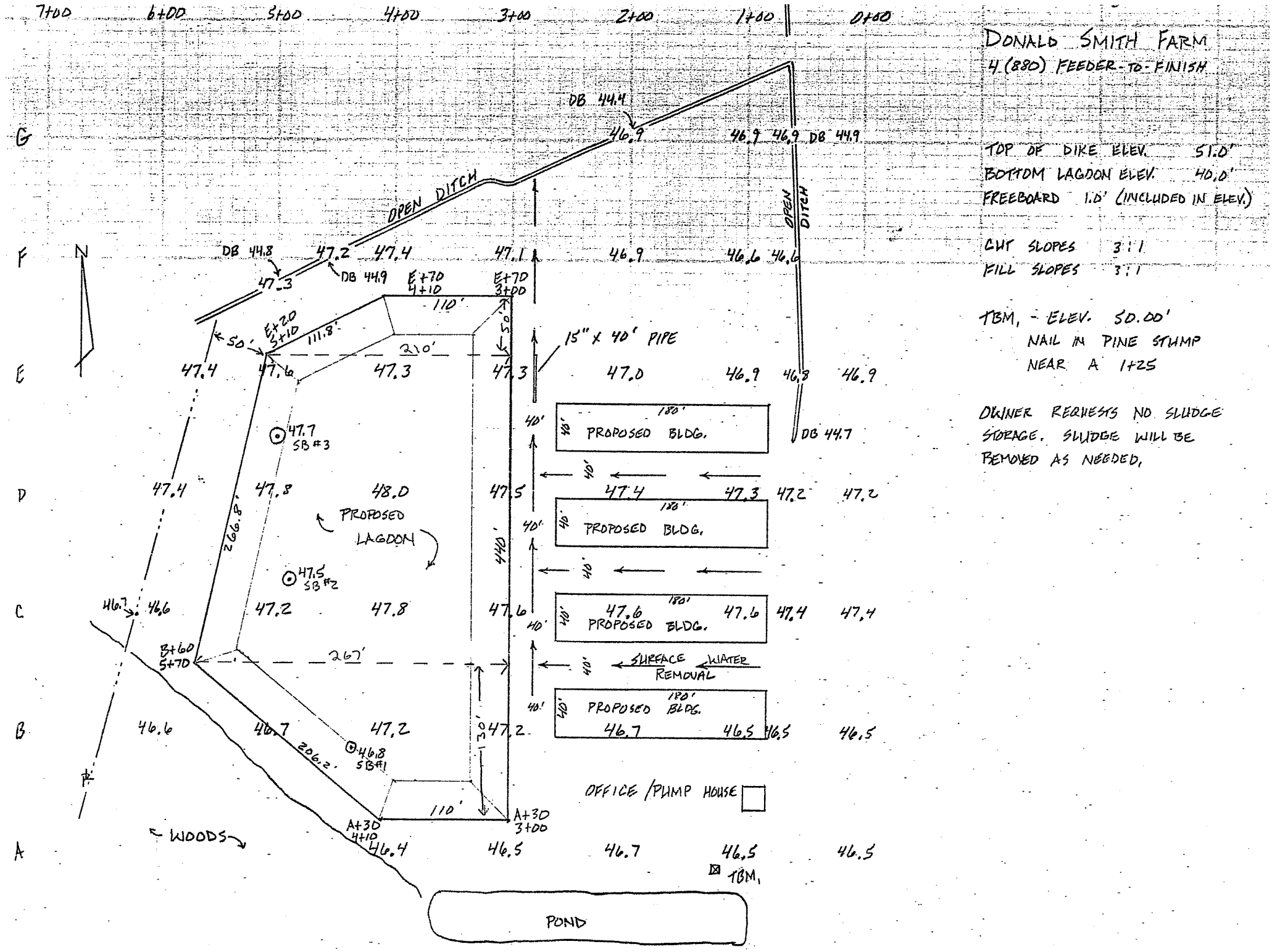
SEASONAL HIGH WATER TABLE ELEV. 46.7'

OWNER REQUESTS NO SLUDGE STORAGE
SLUDGE WILL BE REMOVED AS NEEDED.

DESIGNED BY :
Kevin Weston
4/94

APPROVED BY :
* W. Elton Zumwalt

C.K. OK by Andrew V. Motts DC




DONALD SMITH FARM
4 (880) FEEDER-TO-FINISH

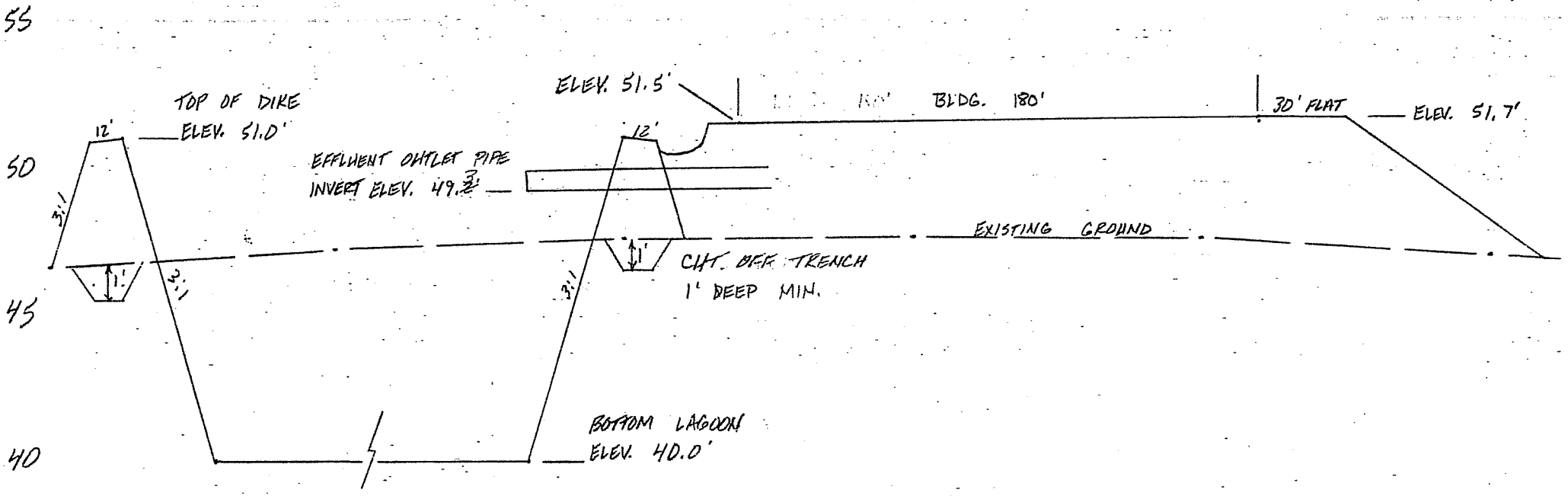
TOP OF DIKE ELEV. 51.0'
BOTTOM LAGOON ELEV. 40.0'
FREEBOARD 1.0' (INCLUDED IN ELEV.)

CUT SLOPES 3:1
FILL SLOPES 3:1

TBM, - ELEV. 50.00'
NAIL IN PINE STUMP
NEAR A 1+25

OWNER REQUESTS NO SLUDGE STORAGE. SLUDGE WILL BE REMOVED AS NEEDED.

# TYPICAL CROSS-SECTION



## OPERATION AND MAINTENANCE

This lagoon is designed for waste treatment with minimum odor control. The time required for the planned fluid level to be reached may vary due to soil conditions, flushing operations, and the amount of fresh water added to the system.

Land application of waste water is recognized as an acceptable method of disposal. Methods of application include solid set, center pivot, guns, and traveling gun irrigation. Care should be taken when applying waste to prevent runoff from the field or damage to crops.

The following items are to be carried out:

1. It is strongly recommended that the treatment lagoon be pre-charged to 1/2 its capacity to prevent excessive odors during start-up. Pre-charging reduces the concentration of the initial waste entering the lagoon thereby reducing odors. Solids should be covered with effluent at all times.

2. The attached waste utilization plan shall be followed. This plan recommends sampling and testing of waste (see Attachment B) before land application.

3. Begin pump-out of the lagoon when fluid level reaches elevation 49.3 as marked by permanent markers. Stop pump-out when the fluid level reaches elevation 47.2 or before fluid depth is less than 6 feet deep (this prevents the loss of favorable bacteria).

4. The recommended maximum amount to apply per irrigation is one (1) inch and the recommended maximum application rate is 0.4 inch per hour.

5. Keep vegetation on the embankment and areas adjacent to the lagoon mowed annually. Vegetation should be fertilized as needed to maintain a vigorous stand.

6. Repair any eroded areas or areas damaged by rodents and establish in vegetation.

7. All surface runoff is to be diverted from the lagoon to stable outlets.

8. The Clean Water Act of 1977 prohibits the discharge of pollutants into waters of the United States. The Department of Environment, Health, and Natural Resources, Division of Environmental Management, has the responsibility for enforcing this law.

# SPECIFICATIONS FOR CONSTRUCTION OF WASTE TREATMENT LAGOONS

## Clearing:

All trees and brush shall be removed from the construction area before any excavating or fill is started. Stumps will be removed within the area of the foundation of the embankment and fill areas and all excavated areas. All stumps and roots exceeding one (1) inch in diameter shall be removed to a minimum depth of one (1) foot. Satisfactory disposition will be made of all debris. The foundation area shall be loosened thoroughly before placement of embankment material.

## Cut-off Trench:

A cut-off trench (when specified) shall be installed as shown in the plans. NEEDED. (1.0' MIN. DEPTH)

## Construction:

Construction of excavated and earthfill areas shall be performed to the neat lines and grades as planned. Deviations from this will require prior approval of the SCS. Earthfill shall not be placed in standing water and reasonable compaction of the fills shall be performed by the construction equipment or sheeps-foot roller during placement. The embankment of the lagoon shall be installed using the more impervious materials. Construction of fill heights shall include ten (10) percent for settlement. To protect against seepage, when areas of unsuitable material are encountered, they will need to be excavated a minimum of one (1) foot below grade and backfilled and compacted with a suitable material (ie-CL,SC,CH). Refer to the soils investigation information in the plans for special considerations. Precautions should be taken during construction to prevent excessive erosion and sedimentation.

## Vegetation:

All exposed embankment and other bare constructed areas shall be seeded to the planned type of vegetation as soon as possible after construction.

## SEEDING RECOMMENDATIONS

AREA TO BE SEEDED: ~~5~~ 2.0 ACRES

USE THE SEED MIXTURE INDICATED:

_____LBS. FESCUE GRASS @ 60 LBS./ACRE
(BEST SUITED ON CLAYEY OR WET SOIL CONDITIONS)
SEEDING DATES: SEPTEMBER 15 TO NOVEMBER 30

_____LBS. 'PENSACOLA' BAHIA GRASS @ 60 LBS./ACRE
(SEE FOOTNOTE NO. 1)
SEEDING DATES: MARCH 15 TO JUNE 30

~~12~~ 16 LBS. HULLED BERMUDA GRASS @ 8 LBS./AC.
(SUITED FOR MOST SOIL CONDITIONS)
SEEDING DATES: APRIL 1 TO JULY 31

_____LBS. RYE GRAIN @ 30 LBS./ACRE (NURSERY FOR FESCUE)

_____LBS. RYE GRASS @ 40 LBS./ACRE (TEMPORARY VEGETATION)
SEEDING DATES: DECEMBER 1 TO MARCH 30

_____LBS. _____

APPLY THE FOLLOWING:

2000 ~~1000~~ LBS. OF 10-10-10 FERTILIZER (1000 LBS./ACRE)

4 3 TONS OF DOLOMITIC LIME (2 TONS/ACRE)

200 ~~100~~ BALES OF SMALL GRAIN STRAW (100 BALES/ACRE)

ALL SURFACE DRAINS SHOULD BE INSTALLED PRIOR TO SEEDING. SHAPE ALL DISTURBED AREA IMMEDIATELY AFTER EARTH MOVING IS COMPLETED. APPLY LIME AND FERTILIZER THEN DISK TO PREPARE A 3 TO 4 INCH SMOOTH SEEDBED. APPLY SEED AND FIRM SEEDBED WITH A CULTIPACKER OR SIMILAR EQUIPMENT. APPLY MULCH AND SECURE WITH A MULCH ANCHORING TOOL OR NETTING.

1. PENSACOLA BAHIAGRASS IS SLOWER TO ESTABLISH THAN COMMON BERMUDA GRASS. WHEN USING BAHIA, IT IS RECOMMENDED THAT 8 LBS./ACRE OF COMMON BERMUDA BE INCLUDED TO PROVIDE COVER UNTIL BAHIAGRASS IS ESTABLISHED.

U. S. Department of Agriculture
Soil Conservation Service

NC-ENG-34
September 1980
File Code: 210

# HAZARD CLASSIFICATION DATA SHEET FOR DAMS

Landowner Donald Smith County Jones

Community or Group No._____ Conservation Plan No._____

Estimated Depth of Water to Top of Dam 38' Ft. Length of Flood Pool 440' Ft.

Date of Field Hazard Investigation 2/24/94.

Evaluation by reach of flood plain downstream to the point of estimated minor effect from sudden dam failure.

| Reach | Length | Width | Slope | Land Use | Kind of Improvements | Est. Elev. Improvements Above Flood Plain | Est. Elevation of Breach Floodwater Above Flood Plain |
|---|---|---|---|---|---|---|---|
| | Ft. | Ft. | % | | | Ft. | Ft. |
| 1 | 1200 | 1000 | 0.1 | Cropland | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |

Describe potential for loss of life and damage to existing or probable future downstream improvements from a sudden breach Their is no potential for loss of life or damage to Structural property Down Stream. 1400' to Nearest Road (SR1121), 1400' to Nearest Residence Located on upper end of Crooked Run.

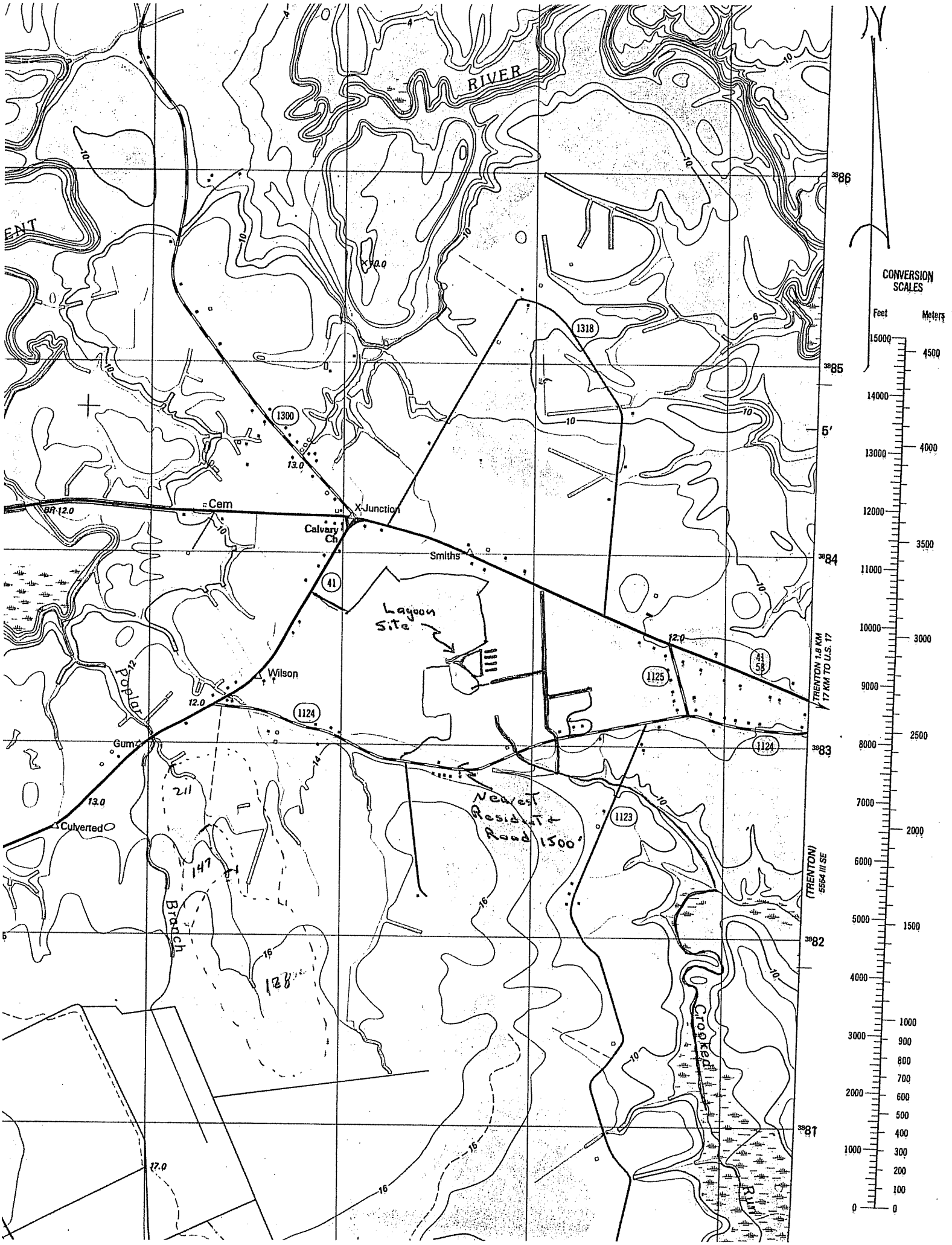
Hazard Classification of Dam (a), b, c) (see NEM-Part 520.21)_____

Dam Classification (I, II, III, (IV), V)_____

By [signature] PC Date 2/24/94
(name) (title)

Concurred By W. Elliott Turnage CEJ Date 5-23-94
(name) (title)

NOTE: 1. Instructions on reverse side.
2. Attach additional sheets as needed.



RIVER
ENT
Cem
X-Junction
Calvary Ch
Smiths
Wilson
Gum
Culverted
Poplar
Branch
Crooked
Run
Lagoon Site
Nearest Resident & Road 1500'
1300
1318
41
1124
1125
1123
41 58
BR 12.0
13.0
12.0
17.0
10.0
211
147
128
TRENTON 1.8 KM
17 KM TO U.S. 17
(TRENTON)
5554 III SE
5'
CONVERSION SCALES
Feet
Meters

# Brock Equipment Co.

**PO Box 100**
**BAILEY, N.C. 27807**
**Phone (919) 235-4111**
**Fax (919) 235-4112**


This irrigation system was designed for Donald Smith by Shane Ward of Brock Equipment Co.

A scaled drawing, required calculations, and required specifications on pipe and equipment are included.

All ditches in spray fields must be converted to grassey waterways in order for this design to be certified.

The following buffers were maintained on this farm:

25 feet from ditch
25 feet from property lines
50 feet from surface water and perennial streams
100 feet from well
200 feet from residence

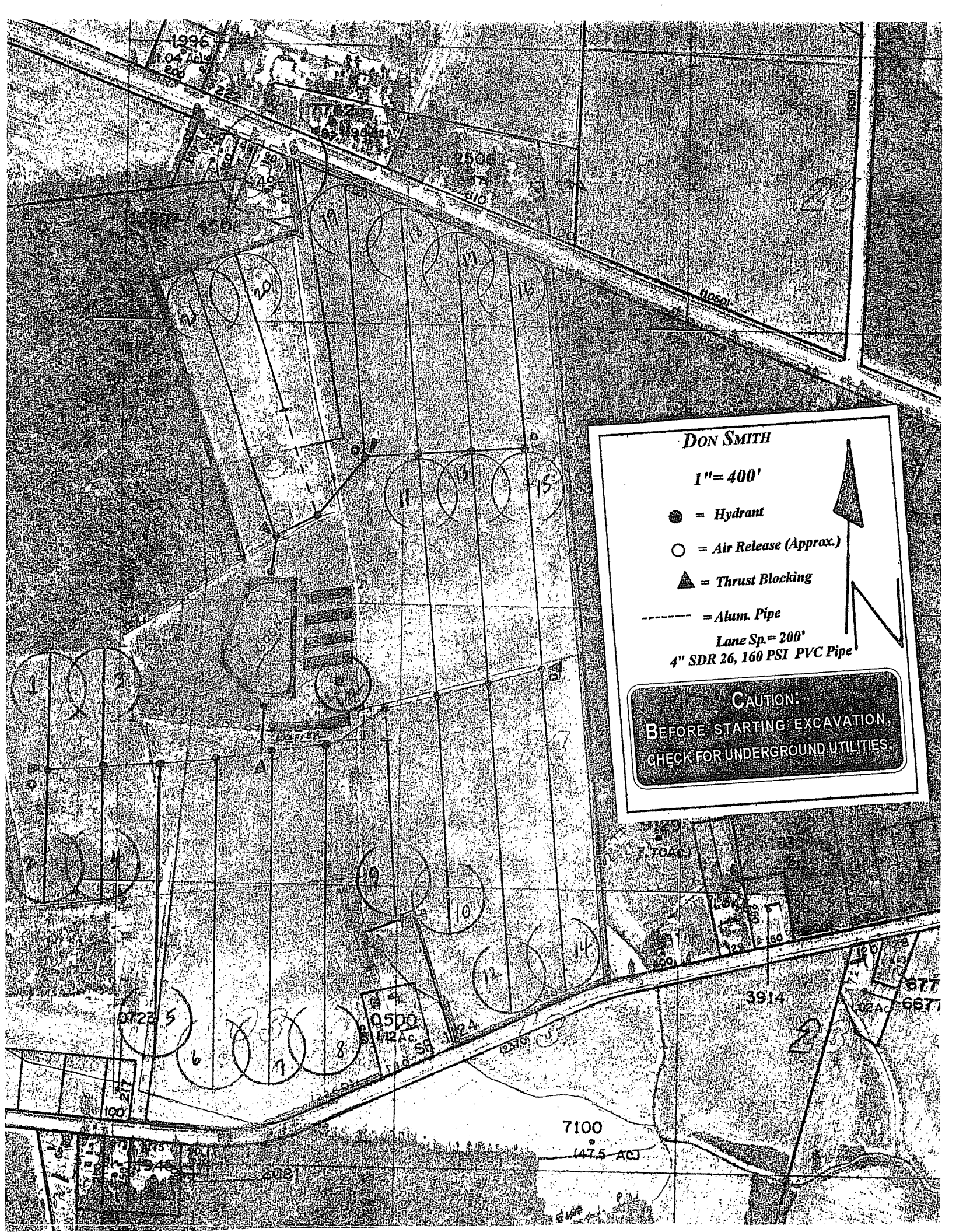
All comments and recommendations are appreciated.

Thank you,

Shane Ward

**Lee Brock, *Technical Specialist***

3-10-99


DON SMITH
1"= 400'
= Hydrant
= Air Release (Approx.)
= Thrust Blocking
= Alum. Pipe
Lane Sp.= 200'
4" SDR 26, 160 PSI PVC Pipe
CAUTION:
BEFORE STARTING EXCAVATION,
CHECK FOR UNDERGROUND UTILITIES.
1996
7100
(47.5 AC)
3914
0500
2081

## *Traveling Irrigation Gun Settings*

| Hydrant Number | Length of Pull | Effective Width | Acres Covered |
|---|---|---|---|
| 1 | 290 | 210.25 | 1.91 |
| 2 | 335 | 210.25 | 2.13 |
| 3 | 295 | 210.25 | 1.93 |
| 4 | 340 | 200 | 2.04 |
| 5 | 910 | 210.25 | 5.33 |
| 6 | 1,050 | 200 | 5.70 |
| 7 | 1,050 | 200 | 5.70 |
| 8 | 1,050 | 210.25 | 5.58 |
| 9 | 485 | 210.25 | 2.85 |
| 10 | 715 | 200 | 3.76 |
| 11 | 715 | 200 | 3.76 |
| 12 | 1,050 | 200 | 5.30 |
| 13 | 685 | 200 | 3.63 |
| 14 | 1,010 | 210.25 | 5.38 |
| 15 | 650 | 210.25 | 3.65 |
| 16 | 575 | 210.25 | 3.72 |
| 17 | 660 | 200 | 3.91 |
| 18 | 750 | 200 | 4.32 |
| 19 | 850 | 210.25 | 5.04 |
| 20 | 450 | 210.25 | 3.11 |
| 21 | 865 | 210.25 | 4.69 |
| **Total:** | | | **83.44** |

## *Traveling Irrigation Gun Settings*

Travel speed = 1.75 fpm or 21 ipm

Application rate = .30 iph

Lane spacing = 200'

Wetted diameter = 245'

Gun make and size = Nelson 100

Ring size = .81"

Operating pressure at gun = 60 psi

Operating pressure at reel = 87 psi

Operating pressure at pump = 97 psi

Arc pattern = 330°

Flow rate of sprinkler = 110 gpm

Pump power requirement (bhp) = 12

Total acres covered (effective) =83.44

Traveler make and model = Cadman 2625 XL

Hose length = 1,050'

Hose diameter (ID) = 2.625"

Speed compensation = mechanical

## *FIELD SPECIFICATIONS*

The lowest maximum application rate (inches per hour) = **.30**

The lowest maximum application amount (inches per irrigation cycle) = **1.0**

Amount of Nitrogen produced per year for application = **8,096 lbs.**

**This plan effectively wets **83.44** acres.

T- 780: Fields #1,4,6 = 24.59
x 112.5
**2,766 lbs.**

Field # 2 = 28.03
x 175
**4,905 lbs.**

Field #7 = 17.29
x 200
**3,458 lbs.**

Field # 9 = 13.53
x 168.75
**2,283 lbs.**

2,766
4,905
3,458
+2,283
**13,412 lbs.**

*13,412*
*- 8,096*
***+5,316 lbs.***

***This information was provided by the waste utilization plan.***

# TRAVELING IRRIGATION SYSTEM CALCULATIONS

## TRAVELING IRRIGATION GUN APPLICATION RATE

I = ((96.3*q)/(3.14*(.09*r)^2))*360/w

where,

I = approximate actual application rate (iph)
q = discharge (gpm)
r = wetted radius (ft)
w = portion of circle receiving water (degrees)

| | | |
|---|---|---|
| IF q = | 110.00 | gpm |
| r = | 122.50 | ft |
| and w = | 330.00 | degrees |

then I = 0.30 iph

**Application Rate = 0.30 inches per hour**

## TRAVELING IRRIGATION GUN APPLICATION AMOUNT

d = (1.605*q)/(I*s)

where,

d = gross application (in)
q = sprinkler discharge (gpm)
I = travel lane spacing (ft)
s = travel speed (fpm)

| | | |
|---|---|---|
| IF q = | 110.00 | gpm |
| I = | 200.00 | ft |
| and s = | 1.75 | fpm |

then d = 0.50 in

**Total Application Amount = 0.50 inches**

## VELOCITY IN A PIPELINE

v = [0.408*q]/d^2

where,

v = velocity of water (fps)
q = flowrate (gpm)
d = inside diameter of pipe (in)

| | | |
|---|---|---|
| IF q = | 110.00 | gpm |
| and d = | 4.00 | in |

then v = 2.81 fps

**Velocity of Water = 2.81 feet per second**

Don Smith / 4" SDR 26, 160 PSI PVC

# *FRICTION LOSS*
## *IN SUPPLY LINE AND/OR TRAVELER HOSE*

FRICTION LOSS IN SUPPLY LINE

FL = [(0.2083*(100/c)^1.852)*[(Q^1.852)/(D^4.8656)]*(L/100)]*.433

where,

FL = friction loss in supply line (psi)
c = roughness coefficient
Q = flowrate (gpm)
D = inside diameter of pipe or hose (in)
L = length of supply line or hose (ft)

| | | |
|---|---|---|
| IF c = | 150 | |
| Q = | 110 | gpm |
| D = | 4 | in |
| and L = | 1250 | ft |

then FL = 3.78 psi

**Friction Loss in Supply Line = 3.78 psi**

FRICTION LOSS IN TRAVELLER HOSE *(if solid set ... enter 0 for gpm )*

FL = [(0.2083*(100/c)^1.852)*[(Q^1.852)/(D^4.8656)]*(L/100)]*.433

where,

FL = friction loss in traveler hose (psi)
c = roughness coefficient
Q = flowrate (gpm)
D = inside diameter of pipe or hose (in)
L = length of supply line or hose (ft)

| | | |
|---|---|---|
| IF c = | 150 | |
| Q = | 110 | gpm |
| D = | 2.625 | in |
| and L = | 1050 | ft |

then FL = 24.64 psi

**Friction Loss in Traveller Hose = 24.64 psi**

# TOTAL DYNAMIC HEAD

| | psi | feet |
|---|---|---|
| Elevation dif. from water to CL of pump- | 1.732 | 4 |
| Elevation of nozzle- | 2.165 | 5 |
| Elevation dif. between CL of pump and high point in field- | 4.33 | 10 |
| Sprinkler discharge pressure- | 60 | 138.6 |
| FL in pump suction assembly- | 2 | 4.62 |
| FL in pump discharge assembly- | 2 | 4.62 |
| FL in traveller hose** - | 24.64 | 56.91 |
| FL in supply line** - | 3.78 | 8.73 |
| TDH- | 100.64 | 232.48 |

BRAKE HORSEPOWER

BHP = [Q*TDH]/[3960*Ep]

where,

BHP = power required to drive the pump (hp)

Q = flow rate (gpm)

TDH = total head the pump operates against (ft)

Ep = pump efficiency (decimal form)

| | | |
|---|---|---|
| IF Q = | 110 | gpm |
| TDH = | 232.48 | ft |
| and Ep = | 0.55 | |

then BHP = 12 hp

**Brake Horsepower = 12 horsepower**

** Friction Losses calculated on previous page

Don Smith / 4" SDR 26, 160 PSI PVC Pipe

# *NPSHA Calculations*

**NPSHA** = $P_a$-$H_s$-$H_f$-$P_{vpa}$

= 14.3-6.33-2-.36

**NPSHA** = 5.61 psi or 13 feet

Where:

$P_a$ = Atmospheric Pressure

$H_s$ = Suction Head

$H_f$ = Friction Head

$P_{vpa}$ = Vapor Pressure

# *Lane Spacing*

***200 is 81.6% of 245***

***245(.8163)= 199.9935***

***LS =200'***

***Acreage of start/stop end for existing hard hose traveler systems:**

**Interior Start = .48** **Interior Stop = .40**

**Exterior Start = .51** **Exterior Stop = .43**

# Irrigation System Operation

## Traveler

Start-up:

1. Tow machine to field.
2. Connect supply hose to field hydrant and traveler.
3. Open hydrant.
4. Start pump and run at idle until water is coming out of gun.
5. Slowly increase throttle to the desired pressure.
6. Start traveler engine, engage reel, and set at the desired speed.

Shut-down:

1. Slowly decrease throttle on pump and shut off.
2. Shut off engine on reel.
3. Shut hydrant off.
4. Disconnect supply hose.

Winterization:

1. Remove suction assembly.
2. Remove discharge hose and supply hose.
3. Remove drain plug on the bottom of pump.
4. Remove cap on bottom of gun cart.
5. Blow reel out with air compressor.
6. Check antifreeze in engine.

# BIG GUN® PERFORMANCE TABLES U.S. UNITS

## 100 SERIES BIG GUNS — 24° TRAJECTORY**

### 100 T TAPER BORE NOZZLES

| PSI | Nozzle .5" GPM | DIA. | Nozzle .55" GPM | DIA. | Nozzle 6" GPM | DIA. | Nozzle .65" GPM | DIA. | Nozzle .7" GPM | DIA | Nozzle .75" GPM | DIA. | Nozzle .8" GPM | DIA | Nozzle .85" GPM | DIA. | Nozzle .9" GPM | DIA. | Nozzle 1.0" GPM | DIA. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 47 | 195' | 57 | 202' | 66 | 213' | 78 | 224' | 91 | 230' | 105 | 240' | 119 | 250' | 134 | 258' | 150 | 266' | 186 | 282' |
| 50 | 50 | 205' | 64 | 215' | 74 | 225' | 87 | 235' | 100 | 245' | 115 | 256' | 130 | 265' | 150 | 273' | 165 | 280' | 204 | 300' |
| 60 | 55 | 215' | 69 | 227' | 81 | 236' | 96 | 250' | 110 | 260' | 126 | 270' | 143 | 280' | 164 | 288' | 181 | 295' | 224 | 316' |
| 70 | 60 | 225' | 75 | 238' | 88 | 250' | 103 | 263' | 120 | 275' | 136 | 283' | 155 | 295' | 177 | 302' | 197 | 310' | 243 | 338' |
| 80 | 64 | 235' | 79 | 248' | 94 | 260' | 110 | 273' | 128 | 285' | 146 | 295' | 165 | 305' | 189 | 314' | 210 | 322' | 260 | 352' |
| 90 | 68 | 245' | 83 | 258' | 100 | 270' | 117 | 283' | 135 | 295' | 155 | 306' | 175 | 315' | 201 | 326' | 223 | 335' | 274 | 362' |
| 100 | 72 | 255' | 87 | 268' | 106 | 280' | 123 | 293' | 143 | 305' | 163 | 316' | 185 | 325' | 212 | 338' | 235 | 345' | 288 | 376' |
| 110 | 76 | 265' | 92 | 278' | 111 | 290' | 129 | 303' | 150 | 315' | 171 | 324' | 195 | 335' | 222 | 344' | 247 | 355' | 304 | 380' |

*Available only with F100 & SR100.

### 100 R RING NOZZLES

| PSI | .71 RING GPM | DIA | .77 RING GPM | DIA | .81 RING GPM | DIA | .86 RING GPM | DIA | .89 RING GPM | DIA | .93 RING GPM | DIA | .96 RING GPM | DIA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 40 | 66 | 208 | 78 | 212 | 91 | 215 | 103 | 224 | 118 | 235 | 134 | 238 | 152 | 242 |
| 50 | 74 | 220 | 88 | 225 | 100 | 230 | 115 | 240 | 129 | 250 | 150 | 255 | 167 | 260 |
| 60 | 81 | 235 | 96 | 240 | 110 | 245 | 125 | 260 | 141 | 270 | 164 | 275 | 183 | 280 |
| 70 | 88 | 245 | 104 | 250 | 118 | 260 | 135 | 275 | 152 | 290 | 177 | 295 | 198 | 300 |
| 80 | 94 | 255 | 111 | 265 | 127 | 275 | 145 | 285 | 163 | 300 | 189 | 305 | 211 | 315 |
| 90 | 99 | 265 | 117 | 276 | 134 | 285 | 154 | 295 | 173 | 310 | 201 | 315 | 224 | 325 |
| 100 | 105 | 270 | 124 | 280 | 142 | 295 | 162 | 305 | 182 | 320 | 212 | 325 | 236 | 335 |
| 110 | 110 | 275 | 130 | 290 | 149 | 305 | 170 | 315 | 191 | 325 | 222 | 335 | 248 | 345 |

### 100 DN DIFFUSER NOZZLES

| 0.5 DN GPM | DIA | 0.6 DN GPM | DIA | 0.7 DN GPM | DIA | 0.8 GPM |
|---|---|---|---|---|---|---|
| — | — | — | — | — | — | — |
| 45 | 154 | 66 | 168 | 91 | 182 | 118 |
| 50 | 165 | 74 | 176 | 100 | 190 | 130 |
| — | — | — | — | 110 | 200 | 143 |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |

**The diameter of throw is approximately 3% less for the 21° trajectory angle, 6% less for 18°.

## 150 SERIES BIG GUNS — 24° TRAJECTORY**

### 150 T TAPER BORE NOZZLES

| PSI | Nozzle .7" GPM | DIA | Nozzle .8" GPM | DIA | Nozzle 9" GPM | DIA | Nozzle 1.0" GPM | DIA | Nozzle 1.1" GPM | DIA | Nozzle 1.2" GPM | DIA | Nozzle 1.3" GPM | DIA. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 100 | 250' | 130 | 270' | 165 | 290' | 205 | 310' | 255 | 330' | 300 | 345' | 350 | 360' |
| 60 | 110 | 265' | 143 | 285' | 182 | 305' | 225 | 325' | 275 | 345' | 330 | 365' | 385 | 380' |
| 70 | 120 | 280' | 155 | 300' | 197 | 320' | 245 | 340' | 295 | 360' | 355 | 380' | 415 | 395' |
| 80 | 128 | 290' | 165 | 310' | 210 | 335' | 260 | 355' | 315 | 375' | 380 | 395' | 445 | 410' |
| 90 | 135 | 300' | 175 | 320' | 223 | 345' | 275 | 365' | 335 | 390' | 405 | 410' | 475 | 425' |
| 100 | 143 | 310' | 185 | 330' | 235 | 355' | 290 | 375' | 355 | 400' | 425 | 420' | 500 | 440' |
| 110 | 150 | 320' | 195 | 340' | 247 | 368' | 305 | 385' | 370 | 410' | 445 | 430' | 525 | 450' |
| 120 | 157 | 330' | 204 | 350' | 258 | 375' | 320 | 395' | 385 | 420' | 465 | 440' | 545 | 460' |

### 150 R RING NOZZLES

| PSI | Ring .86" GPM | DIA | Ring .97" GPM | DIA. | Ring 1.08" GPM | DIA. | Ring 1.18" GPM | DIA. | Ring 1.26" GPM | DIA | Ring 1.34" GPM | DIA. | Ring 1.41" GPM | DIA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 100 | 245' | 130 | 265' | 165 | 285' | 205 | 300' | 255 | 320' | 300 | 335' | 350 | 350' |
| 60 | 110 | 260' | 143 | 280' | 182 | 300' | 225 | 315' | 275 | 335' | 330 | 350' | 385 | 365' |
| 70 | 120 | 270' | 155 | 290' | 197 | 310' | 245 | 330' | 295 | 350' | 355 | 365' | 415 | 380' |
| 80 | 128 | 280' | 165 | 300' | 210 | 320' | 260 | 340' | 315 | 360' | 380 | 380' | 445 | 395' |
| 90 | 135 | 290' | 175 | 310' | 223 | 330' | 275 | 350' | 335 | 370' | 405 | 390' | 475 | 405' |
| 100 | 143 | 300' | 185 | 320' | 235 | 340' | 290 | 360' | 355 | 380' | 425 | 400' | 500 | 415' |
| 110 | 150 | 310' | 195 | 330' | 247 | 350' | 305 | 370' | 370 | 390' | 445 | 410' | 525 | 425' |
| 120 | 157 | 315' | 204 | 335' | 258 | 360' | 320 | 380' | 385 | 400' | 465 | 420' | 545 | 435' |

**The diameter of throw is approximately 3% less for the 21° trajectory angle

## 200 SERIES BIG GUNS — 27° TRAJECTORY**

### 200 T TAPER BORE NOZZLES

| PSI | Nozzle 1.05" GPM | DIA | Nozzle 1.1" GPM | DIA | Nozzle 1.2" GPM | DIA | Nozzle 1.3" GPM | DIA | Nozzle 1.4" GPM | DIA | Nozzle 1.5" GPM | DIA. | Nozzle 1.6" GPM | DIA | Nozzle 1.75" GPM | DIA. | Nozzle 1.9" GPM | DIA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 250 | 345' | 285 | 355' | 330 | 375' | 385 | 380' | 445 | 410' | 515 | 430' | 585 | 445' | 695 | 470' | 825 | 505' |
| 70 | 270 | 360' | 310 | 380' | 355 | 395' | 415 | 410' | 480 | 430' | 555 | 450' | 630 | 465' | 755 | 495' | 890 | 515' |
| 80 | 290 | 375' | 330 | 395' | 380 | 410' | 445 | 430' | 515 | 450' | 590 | 470' | 675 | 485' | 805 | 515' | 950 | 535' |
| 90 | 310 | 390' | 350 | 410' | 405 | 425' | 475 | 445' | 545 | 465' | 625 | 485' | 715 | 505' | 855 | 535' | 1005 | 555' |
| 100 | 325 | 400' | 370 | 420' | 425 | 440' | 500 | 460' | 575 | 480' | 660 | 500' | 755 | 520' | 900 | 550' | 1060 | 575' |
| 110 | 340 | 410' | 390 | 430' | 445 | 450' | 525 | 470' | 605 | 495' | 695 | 515' | 790 | 535' | 945 | 565' | 1110 | 590' |
| 120 | 355 | 420' | 405 | 440' | 465 | 460' | 545 | 480' | 630 | 505' | 725 | 530' | 825 | 550' | 985 | 580' | 1160 | 605' |
| 130 | 370 | 425' | 425 | 445' | 485 | 465' | 565 | 485' | 655 | 515' | 755 | 540' | 860 | 560' | 1025 | 590' | 1210 | 620' |

### 200 R RING NOZZLES

| PSI | 1 1/4" Ring (1.29" actual) GPM | DIA. | 1 3/8" Ring (1.46" actual) GPM | DIA. | 1 1/2" Ring (1.56" actual) GPM | DIA. | 1 5/8" Ring (1.66" actual) GPM | DIA. | 1 3/4" Ring (1.74" actual) GPM | DIA. | 1 7/8" Ring (1.83" actual) GPM | DIA. | 2" Ring (1.93" actual) GPM | DIA. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 230 | 325' | 300 | 355' | 350 | 370' | 410 | 390' | 470 | 405' | 535 | 420' | 640 | 445' |
| 60 | 250 | 340' | 330 | 370' | 385 | 390' | 445 | 410' | 515 | 425' | 585 | 440' | 695 | 455' |
| 70 | 270 | 355' | 355 | 385' | 415 | 405' | 480 | 425' | 555 | 440' | 630 | 455' | 755 | 470' |
| 80 | 290 | 370' | 380 | 400' | 445 | 420' | 515 | 440' | 590 | 455' | 675 | 470' | 805 | 490' |
| 90 | 310 | 380' | 405 | 415' | 475 | 435' | 545 | 455' | 625 | 470' | 715 | 485' | 855 | 505' |
| 100 | 325 | 390' | 425 | 425' | 500 | 445' | 575 | 465' | 660 | 480' | 755 | 500' | 900 | 520' |
| 110 | 340 | 400' | 445 | 435' | 525 | 455' | 605 | 475' | 695 | 490' | 790 | 510' | 945 | 535' |
| 120 | 355 | 410' | 465 | 445' | 545 | 465' | 630 | 485' | 725 | 500' | 825 | 520' | 985 | 545' |
| 130 | 370 | 415' | 485 | 450' | 565 | 470' | 655 | 490' | 755 | 505' | 860 | 525' | 1025 | 550' |

**The diameter of throw is approximately 2% less for the 24° trajectory angle, 5% less for the 21° trajectory angle.

The BIG GUN® performance data has been obtained under ideal test conditions and may be adversely affected by wind, poor hydraulic entrance conditions or other factors. Nelson Irrigation Corporation makes no representation regarding droplet condition, uniformity, or application rate.

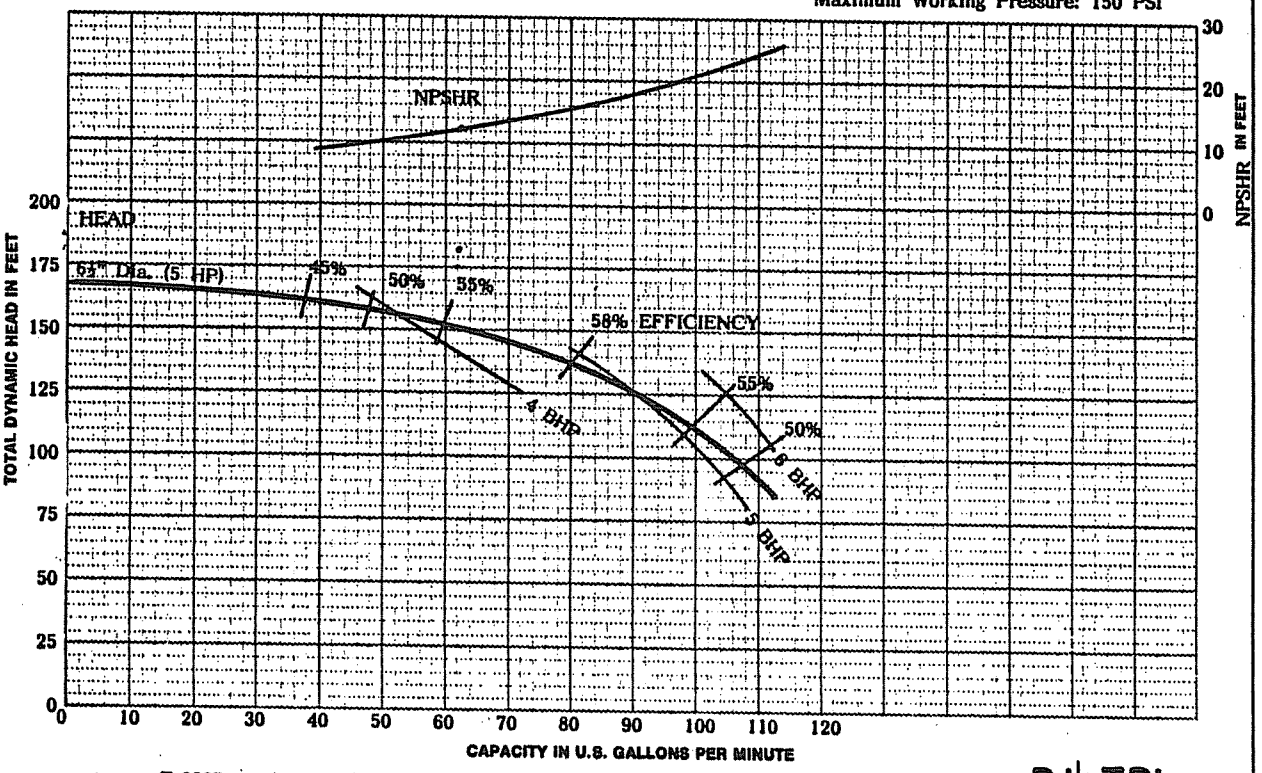
BERKELEY PUMPS

# TYPE "B" RATING CURVES
## MOTOR DRIVE

| | |
|---|---|
| CURVE | 4075 |
| DATE | 1-2-86 |
| PAGE | 1.02 |
| SUPERSEDES | |
| All previously issued | |
| 4075 Curves | |

Case: Material C.I. Patt. No. L01018 Mach. No. L01018
Impeller: Material C.I. Patt. No. S07367 Mach. No. S07367 Dia. 6¼ Full

Nominal R.P.M. 3600
Based on Fresh Water @ 80° F.
Maximum Working Pressure: 150 PSI

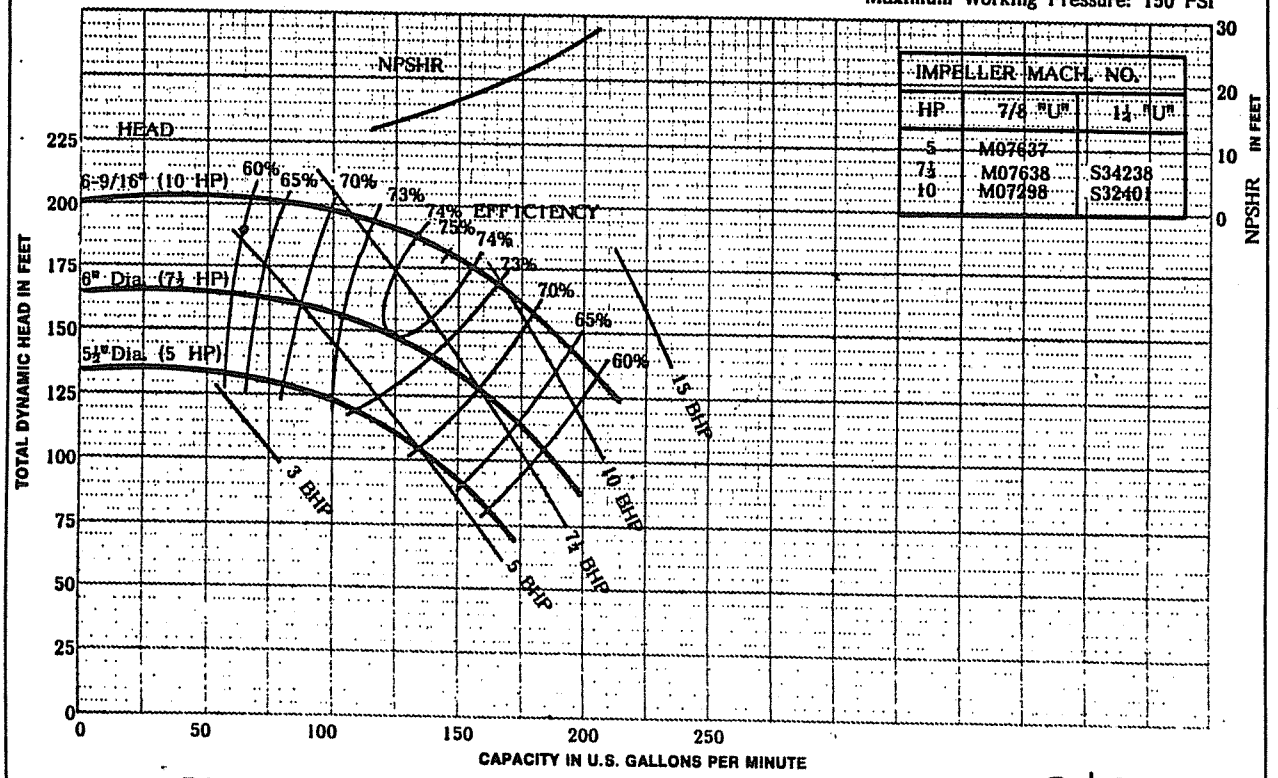



C-5035 Based on T-3207 Supersedes C-5035 Dated 3-1-72 Date 7-30-85 MODEL B 1½TPL

Case: Material C.I. Patt. No. L01018 Mach. No. L01018
Impeller: Material C.I. Patt. No. M07298 (7/8U) S32401 (1½ U) Mach. No. See below Dia. 6-9/16"

Nominal R.P.M. 3600
Based on Fresh Water @ 80° F.
Maximum Working Pressure: 150 PSI

| IMPELLER MACH. NO. | | |
|---|---|---|
| HP | 7/8 "U" | 1½ "U" |
| 5 | M07637 | |
| 7½ | M07638 | S34238 |
| 10 | M07298 | S32401 |




C-8888 Based on T-3957, -1, -2 Supersedes C-8888 Dated 12-7-83 Date 7-30-85 MODEL B 1½TPM

# THRUST BLOCKING

4"
DEAD END AND TEE = (200 X 16.2) / 1200 = 2.7
90 ELBOW = (200 X 23.0) / 1200 = 3.8

6"
DEAD END AND TEE = (200 X 34.8) / 1200 = 5.8
90 ELBOW = (200 X 49.2) / 1200 = 8.2

Handling and Installation of PVC Plastic Pipe

Temperature has a major effect on PVC plastic pipe. As temperatures approach freezing, the flexibility and impact resistance of PVC plastic pipe is greatly reduced. At low temperatures when joining solvent weld pipe, a longer time is required for the glue to set. Generally solvent weld pipe should not be joined at temperatures below 40°F. At high temperatures pipe becomes more flexible and set-up time for the glue is greatly reduced.

When pipe is stacked, it should not be placed in piles more than five feet high. Occasionally out-of-round pipe will result from stacking. In warm weather, once the weight is removed, it will rapidly assume a round shape. In cold weather, several hours may be required for the pipe to return to the original shape.

Sunlight can have an effect on the pipe, especially in colors other than white. It may warp and exhibit a snaking effect. When left in the sunlight for long periods, the color may fade and the pipe will harden at the surface causing a loss of impact strength. Discolored pipe should be handled carefully during installation. If pipe is to be stored outside for long periods of time, it should be covered with a cover of opaque material, not plastic, and air should be able to circulate under the cover.

Gaskets should be stored away from excessive heat and solvents. Some pipe comes from the manufacturer with the gaskets installed. If the pipe is not to be installed immediately, the gaskets should be removed and stored.

When installing gasket pipe there are several simple steps to follow that will ensure leak-free joints. The gasket or ring groove should be cleaned of foreign materials. The gasket should be properly installed. Ample lubricant should be placed on the male pipe end, the pipe aligned and the male end inserted into the female end. Some pressure will be required to force the male end to the correct depth. There will be a reference point to indicate the required penetration depth. If penetration is not deep enough the joint may leak; and if penetration is too deep, there is not adequate room for pipe expansion. Once the joint is made, the pipe being installed should be rotated to ensure that the gasket is not pinched. Gasket pipe may be connected in the trench or on the ground beside the trench and then lowered into the trench. If the latter is done, check each joint to ensure that penetration is correct. If it is necessary to cut pipe, either a PVC pipe cutter or a miter box with a carpenter's fine-toothed handsaw should be used. For gasket pipe, it will be necessary to bevel the pipe, usually at an 8° angle, accomplished with a special rasp or file. For solvent weld pipe, burrs chips and filings should be removed from the outside and inside of the pipe and it is preferable to slightly bevel the outside circumference.

Fittings for gasket pipe may be plastic or steel. The trend in the industry today is to use epoxy coated steel fittings. These are manufactured by several companies (McDowell, Pierce, Davis, etc.) and can

The ratio of air-release valve diameter to pipe diameter for valves intended to release air when filling the pipe should not be less than 0.1. However, small-diameter valves may be used to limit water hammer pressures by controlling air release where control of filling velocities is questionable. Equivalent valve outlet diameter of less than 0.1 are permitted for continuously acting air release valves. Adequate vacuum relief must be provided.

Air-release valves or combination air valves shall be used as needed to permit air to escape from the pipeline while the line is at working pressure. Small orifices of these types shall be sized according to the working pressure and venting requirements recommended by the valve manufacturer.

Manufacturers of air vales marketed for use under this standard shall provide dimensional data, which shall be the basis for selection and acceptance of these valves.

**Drainage.** Provision shall be made for completely draining the pipeline if a hazard is imposed by freezing temperatures, drainage is recommended by the manufacturer of the pipe, or drainage of the line is specified for the job. If provisions for drainage are required drainage outlets shall be located at all low places in the line. These outlets may drain into dry wells or to points of lower elevation. If drainage cannot be provided by gravity, provisions shall be made to empty the line by pumping or by other means.

**Flushing.** If provisions are needed for flushing the line free of sediment or other foreign material, a suitable valve shall be installed at the distal end of the pipeline.

**Thrust control.** Abrupt changes in pipeline grade, horizontal alignment, or reduction in pipe size normally require an anchor or thrust blocks to absorb any axial thrust of the pipeline. Thrust control may also be needed at the end of the pipeline and at in-line control valves.

Thrust blocks and anchors must be large enough to withstand the forces tending to move the pipe, including those of momentum and pressure as well as forces due to expansion and contraction.

The pipe manufacturer's recommendations for thrust control shall be followed. In absence of the pipe manufacturer's requirements, the following formula must be used in designing thrust blocks:

$$A = \frac{98\,HD^2}{B} \sin\frac{a}{2}$$

Where:

$A$ = Area of thrust block required in $ft^2$
$H$ = Maximum working pressure in ft
$D$ = Inside diameter of pipe in ft
$B$ = Allowable passive pressure of the soil in $lb/ft^2$
$a$ = Deflection angle of pipe bend

Area of thrust blocks for dead ends and tees shall be 0.7 times the area of block required for a 90-deflection angle of pipe bend.

If adequate soil tests are not available, the passive soil pressure may be estimated from Table 1.

**Materials.** All materials shall meet or exceed the minimum requirements indicated in "Specifications for Materials."

## Plans and specifications

Plans and specifications for constructing high-pressure underground plastic pipeline shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purposes.

Table 1.—Allowable soil bearing pressure

| Natural soil material | Depth of cover to center of thrust block | | | |
|---|---|---|---|---|
| | 2 ft | 3 ft | 4 ft | 5 ft |
| | $lb/ft^2$ | | | |
| Sound bedrock | 8,000 | 10,000 | 10,000 | 10,000 |
| Dense sand and gravel mixture (assumed $\theta = 40°$) | 1,200 | 1,800 | 2,400 | 3,000 |
| Dense fine to coarse sand (assumed $\theta = 35°$) | 800 | 1,200 | 1,650 | 2,100 |
| Silt and clay mixture (assumed $\theta = 25°$) | 500 | 700 | 950 | 1,200 |
| Soft clay and organic soils (assumed $\theta = 10°$) | 200 | 300 | 400 | 500 |

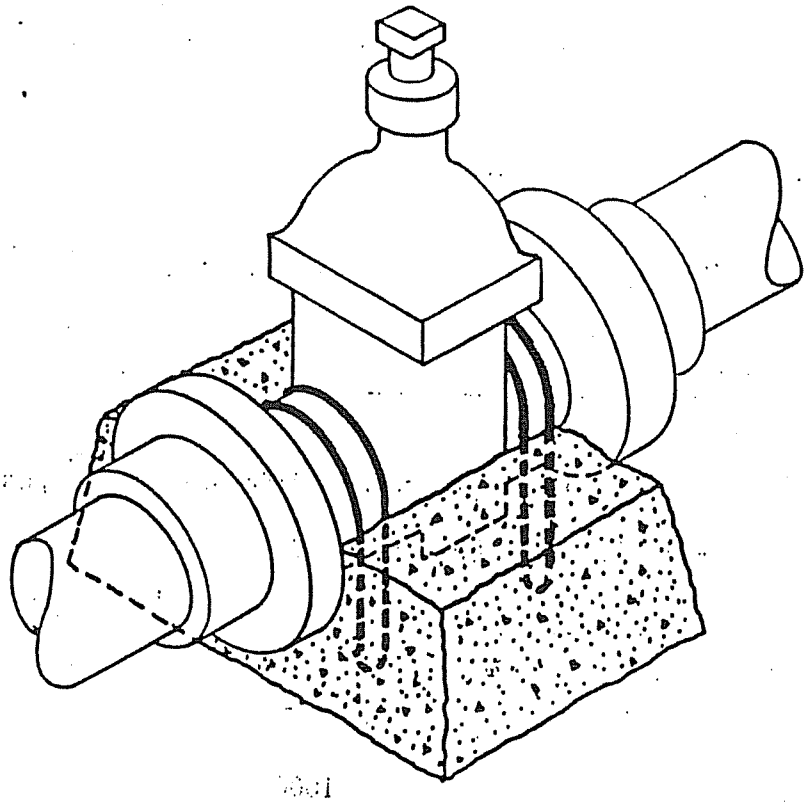


Figure 2. Anchorage blocks for in-line valves.

Table 1 is the forces encountered at end plugs. to calculate forces encountered at bends, tees and wyes, multiply the figure in Table 1 by the factors given in Table 2.

Table 1. Thrust W at End Plugs

| Pipe Diameter (inches) | Thrust in lbs. for test pressure in psi | | | |
|---|---|---|---|---|
| | 100 PSI | 150 PSI | 200 PSI | 250 PSI |
| 1½ | 295 | 440 | 590 | 740 |
| 2 | 455 | 680 | 910 | 1140 |
| 2½ | 660 | 990 | 1320 | 1650 |
| 3 | 985 | 1480 | 1970 | 2460 |
| 4 | 1820 | 2720 | 3630 | 4540 |
| 6 | 3740 | 5600 | 7460 | 9350 |
| 8 | 6490 | 9740 | 13,000 | 16,200 |
| 10 | 10,650 | 16,000 | 21,300 | 26,600 |
| 12 | 15,150 | 22,700 | 30,200 | 37,800 |
| 14 | 20,600 | 30,800 | 41,100 | 51,400 |
| 16 | 26,600 | 39,800 | 53,100 | 66,400 |

# DIAMOND PLASTICS CORPORATION

## IPS IRRIGATION PIPE

ASTM D2241

| Stock Plant | Nominal Size | Weight Per 100 ft. | Outside Diameter | Wall Thickness | Inside Diameter | Pieces Per Bundle | Feet Per Bundle | Feet Per* Truckload |
|---|---|---|---|---|---|---|---|---|
| | | | **SDR - 41** | **100 PSI** | | | | |
| LM | 4" | 104.40 | 4.500 | .110 | 4.280 | 63 | 1,260 | 20,160 |
| M | 6" | 222.60 | 6.625 | .162 | 6.301 | 28/32 | 560/640 | 8,400 |
| M | 8" | 373.30 | 8.625 | .210 | 8.205 | 15/10 | 300/200 | 4,840 |
| M | 10" | 558.00 | 10.750 | .262 | 10.226 | 12 | 240 | 3,420 |
| M | 12" | 819.30 | 12.750 | .311 | 12.128 | 6/8 | 120/160 | 2,100 |
| | | | **SDR - 32.5** | **125 PSI** | | | | |
| M | 4" | 127.70 | 4.500 | .138 | 4.224 | 63 | 1,260 | 20,160 |
| M | 6" | 275.80 | 6.625 | .204 | 6.217 | 28/32 | 560/640 | 8,400 |
| M | 8" | 467.90 | 8.625 | .265 | 8.095 | 15/10 | 300/200 | 4,840 |
| M | 10" | 729.20 | 10.750 | .331 | 10.088 | 12 | 240 | 3,420 |
| M | 12" | 1,026.00 | 12.750 | .392 | 11.966 | 6/8 | 120/160 | 2,100 |
| | | | **SDR - 26** | **160 PSI** | | | | |
| M | 2" | 44.70 | 2.375 | .091 | 2.193 | 204 | 4,080 | 65,280 |
| M | 3" | 96.10 | 3.500 | .135 | 3.230 | 88 | 1,760 | 28,160 |
| M | 4" | 158.80 | 4.500 | .173 | 4.154 | 63 | 1,260 | 20,160 |
| M | 6" | 342.00 | 6.625 | .255 | 6.115 | 28/32 | 560/640 | 8,400 |
| M | 8" | 581.50 | 8.625 | .332 | 7.961 | 15/10 | 300/200 | 4,840 |
| M | 10" | 902.70 | 10.750 | .413 | 9.924 | 12 | 240 | 3,420 |
| M | 12" | 1,272.30 | 12.750 | .490 | 11.770 | 6/8 | 120/160 | 2,100 |
| | | | **SDR - 21** | **200 PSI** | | | | |
| M | 2" | 54.90 | 2.375 | .113 | 2.149 | 204 | 4,080 | 65,280 |
| M | 3" | 117.80 | 3.500 | .167 | 3.166 | 88 | 1,760 | 28,160 |
| M | 4" | 192.70 | 4.500 | .214 | 4.072 | 63 | 1,260 | 20,160 |
| M | 6" | 419.80 | 6.625 | .316 | 5.993 | 28/32 | 560/640 | 8,400 |
| M | 8" | 711.40 | 8.625 | .410 | 7.805 | 15/10 | 300/200 | 4,840 |
| M | 10" | 1,106.30 | 10.750 | .511 | 9.728 | 12 | 240 | 3,420 |
| M | 12" | 1,558.70 | 12.750 | .606 | 11.538 | 6/8 | 120/160 | 2,100 |

Prices are subject to a firm policy of "Price in effect at time of shipment on regular purchase."
Possession of this page of a price list does not constitute an offer to sell.
*Freight regulations &/or equipment may reduce maximum footage per truckload.
All prices F.O.B. manufacturing location.
L = normal stock item at Lubbock, Texas
M = normal stock item at Macon, Georgia

Joints Per Quart of Lubricant
(Furnished)

| | |
|---|---|
| 4" | 85 |
| 6" | 60 |
| 8" | 45 |
| 10" | 35 |
| 12" | 25 |
| 15" | 15 |
| 18" | 12 |
| 21" | 10 |
| 24" | 8 |
| 27" | 5 |

Additional Lubricant

| | |
|---|---|
| 12 Qt. per case | $6.00/qt. |
| 4 Gal. per case | $15.00/gal. |

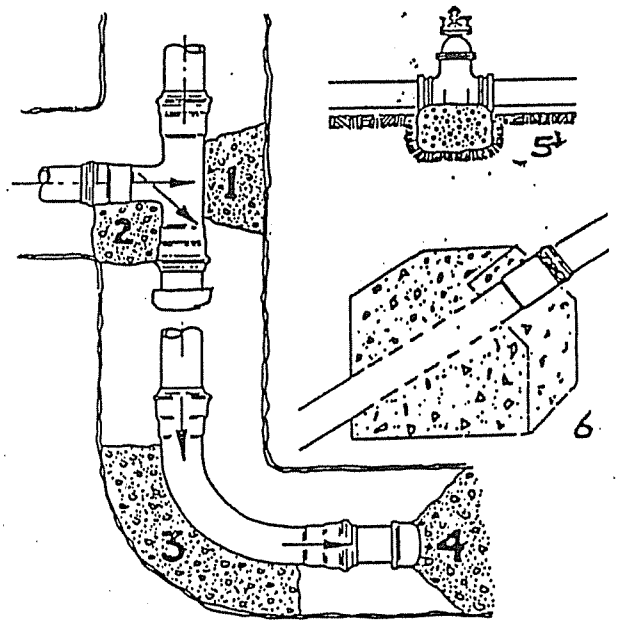



Figure No. 4

## THRUST BLOCKS

1. Tees
1 & 2. Plugged End of Tee
3. 90° Elbow
4. End Caps or Plugs
5. Valve
6. Steep Incline

# General Installation Recommendations: FOR GASKET PIPE

## nstallation

:xcavation, Laying, Testing, and Back-lling Instructions are usually provided y the Engineer in charge of the project. leference may also be made to Ameri-an Society for Testing and Materials tandard, ASTM D-2774 "Recommended ractice for Underground Installation of hermoplastic Pressure Piping."

## :xcavation

The trench bottom shall be stable, ontinuous, relatively smooth, and free rocks or other objects detrimental to ie pipe. It shall provide continuous ipport for the pipe, and bell holes shall e provided for the bell and spigot joints, ilves, and other system components iat might act as a fulcrum. When made rough a rock cut, at least 4" of com-acted satisfactory bedding material iall be provided.

The trench depth shall place the pipe-ie at least 6" below the lowest recorded ost depth, and shall place the pipeline epth at least 30" below grade.

The trench width at the top of the pipe iall be as narrow as practical to allow lequate room for joining the pipe and allow proper compaction of the sidefill. inimum trench width is normally con-dered 12" plus the pipe O.D.

Pipelines shall be cased, bridged, or herwise protected at locations where ey will be subject to heavy surface ads due to shallow burial. Casing shall so be used in spanning creeks and illies, extending 8 ft. on either side of e creek or gully.

## oinling

The pipe shall be jointed in the trench, above ground, in accordance with the inting Instructions.

It is important that the gasket be clean id properly seated, the spigot end well ibricated, and the bell and spigot ends gned correctly in both planes.

If jointing is done above ground, care ould be taken when lowering pipe into e trench that the depth of the joint entry mains correct. Check that the depth entry mark on the spigot ends is flush ih the face of the bell. Jointing of 6" d large pipe is usually done in the trench.

AT NO TIME should a back-hoe or illar device be used to assemble pipe.

## Thrust Blocking

As with other push-fit rubber gasketed joints, the pipe will not take end thrust without restraints. Thrust blocks are usually required at dead ends and wherever the line changes direction of 30 degrees or more.

1. Thrust blocks shall be placed so that the bearing surface is in direct line with the major force created by the pipe or fitting. Concrete having a compressive strength of 2000 psi is the recommended blocking material, and may be poured between the simplest of forms and the undisturbed earth bearing surfaces.
2. Thrust blocking size may be calculated as follows:

a) Multiply the pressure level desired for testing by the value shown in the table for thrust on fittings:

## Thrust In Pounds

| Pipe Size | 90 Elbow | 45 Elbow | 22½ Bend | Dead End or Tee |
|---|---|---|---|---|
| 6" | 48.74 | 26.38 | 13.45 | 38.10 |
| 8" | 82.61 | 44.72 | 22.80 | 61.18 |
| 10" | 128.84 | 69.47 | 35.42 | 95.05 |
| 12" | 180.54 | 77.23 | 49.82 | 133.70 |

b) Determine the bearing strength of the soil from the following table:

| BEARING STRENGTH OF SOILS | |
|---|---|
| SOIL | lb. per Sq. Ft. |
| Muck, peat, etc. | 0 |
| Soft clay | 1,000 |
| Sand | 2,000 |
| Sand and gravel | 3,000 |
| Sand and gravel cemented with clay | 4,000 |
| Hard shale | 10,000 |

c) Divide the total thrust on the fitting (step a) by the bearing strength of the soil (step b). The result is the square feet of area needed on the face of the thrust block.

d) Thrust blocks should haunch the pipe or fitting, not encase it.

## Backfilling

1. Place select backfill and compact under the haunch, along the sides of, and over the top of the pipe to a compacted depth of at least 6". This backfill shall be soils that allow good compaction and placed in 6" layers, well compacted. It shall be free of rocks, frozen clods, or other hard objects.
2. The final backfill may then be made in the usual manner, but care should be taken not to dump large rocks or heavy objects on the initial backfill and pipeline.
3. If the joints and fittings must be left exposed while under test, backfill to within one foot of each side of the joint or fitting to prevent deflection of the pipe while under test pressures.

## Testing

1. ALL AIR IN THE PIPELINE SHALL BE BLED OFF CAREFULLY WHILE FILLING THE LINE WITH WATER FOR TESTING. Entrapped air in the line can cause excessive test pressures, and create unnecessary problems. Air shall be bled off at the high spots in the line. Air removal may also be accomplished by pushing a foam plug through the line by incoming water pressure.
2. Test pressures may be 1½ times the designed operating pressure of the pipeline, but shall not exceed the maximum pressure rating of the pipe.
3. After pressure test and acceptance of testing, the uncovered joints and fittings shall be initially backfilled with well compacted soil, and then covered with final backfill.
4. Hydraulic pressure testing of the pipeline shall be carried out initially at intervals not exceeding 500 yards and thereafter at intervals not exceeding 1,000 yards.

## Radius Bends

Gradual change of direction may be achieved by deflecting or cocking RIEBER Joints a maximum of 3 degrees without affecting the hydraulic seal of the joint. Offsets are made only after the straight in-line assembly is made. Deflections at the joint and minimum curve radii (ft.) obtainable are listed below:

| Degree of Deflection at the Joint | 20 ft. lengths | |
|---|---|---|
| | Offset, inches | Radius, feet |
| 1 | 4.2" | 1,150' |
| 2 | 8.3" | 572' |
| 3 | 12.3" | 381' |

be fabricated in almost any configuration. Some epoxy coated fittings include stacks and hydrants as an integral part of the fitting. Occasionally it may be necessary to connect PVC plastic pipe to steel or CA pipe. This connection can be made with a coupling called a transition or repair coupling. In-line valves can be supplied with connections to gasket pipe.

Thrust blocking is required for gasket pipe. Most thrust blocks will be concrete. Manufacturers recommended thrust blocks at any change in direction greater than $10^{o}$. Figure 1 gives an example of different arrangements for thrust blocks.

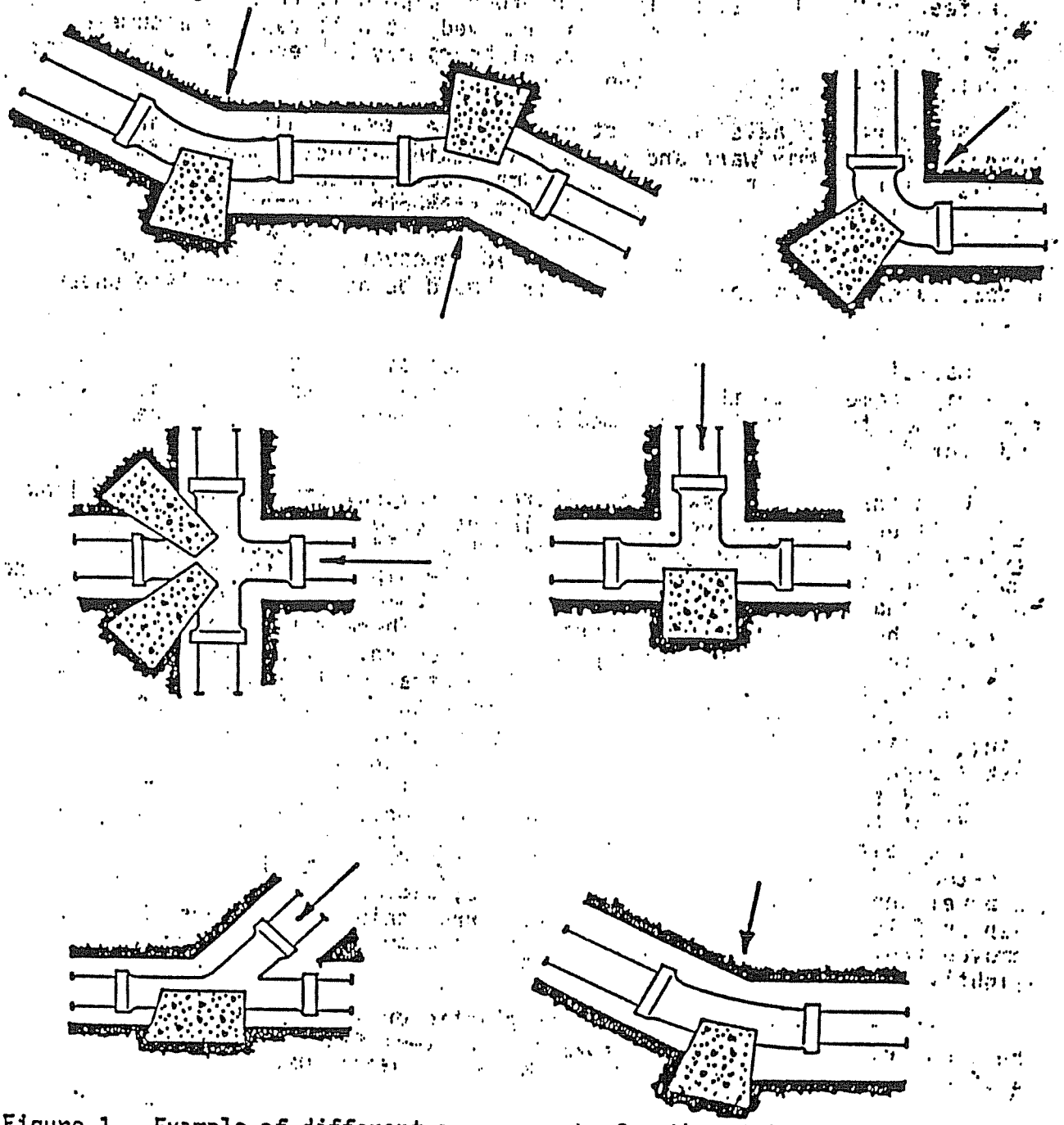


Figure 1. Example of different arrangements for thrust blocks.

# EMERGENCY ACTION PLAN

PHONE NUMBERS

DWQ 252-946-6481
EMERGENCY MANAGEMENT SYSTEM 252-448-1221
SWCD 252-448-2731 EXT. 3
NRCS 252-448-2731 EXT. 3

This plan will be implemented in the event that wastes from your operation are leaking, overflowing, or running off site. You should not wait until wastes reach surface waters or leave your property to consider that you have a problem. You should make every effort to ensure that this does not happen. This plan should be posted in an accessible location for all employees at the facility. The following are some action items you should take.

1. Stop the release of wastes. Depending on the situation, this may or may not be possible. Suggested responses to some possible problems are listed below.

   A. Lagoon overflow-possible solutions are:

      a. Add soil to berm to increase elevation of dam.
      b. Pump wastes to fields at an acceptable rate.
      c. Stop all flows to the lagoon immediately.
      d. Call a pumping contractor.
      e. Make sure no surface water is entering lagoon.

   B. Runoff from waste application field-actions include:

      a. Immediately stop waste application.
      b. Create a temporary diversion to contain waste.
      c. Incorporate waste to reduce runoff.
      d. Evaluate and eliminate the reason(s) that caused the runoff.
      e. Evaluate the application rates for the fields where runoff occurred.

   C. Leakage from the waste pipes and sprinklers-action include:

      a. Stop recycle pump.
      b. Stop irrigation pump.
      c. Close valves to eliminate further discharge.
      d. Repair all leaks prior to restarting pumps.

   D. Leakage from flush systems, houses, solid separators-action include:

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DEC 06 2012
Aquifer Protection Section

a. Stop recycle pump.
b. Stop irrigation pump.
c. Make sure no siphon occurs.
d. Stop all flows in the house, flush systems, or solid separators.
e. Repair all leaks prior to restarting pumps.

E. Leakage from base or sidewall of lagoon. Often this is seepage as opposed to

a. Dig a small sump or ditch away from the embankment to catch all seepage, put in a submersible pump, and pump back to the lagoon.
b. If holes are caused by burrowing animals, trap or remove animals and fill holes and compact with a clay type soil.
c. Have a professional evaluate the condition of the side walls and lagoon bottom as soon as possible.

2. Assess the extent of the spill and note any obvious damages.

a. Did the waste reach any surface waters?
b. Approximately how much was released and for what duration?
c. Any damage noted, such as employee injury, fish kills, or property damage?
d. Did the spill leave the property?
e. Does the spill have the potential to reach surface waters?
f. Could a future rain event cause the spill to reach surface waters?
g. Are potable water wells in danger (either on or off of the property)?
h. How much reached surface waters?

3. Contact appropriate agencies.

a. During normal business hours, call your DWQ (Division of Water Quality) regional office; Phone - - . After hours, emergency number: 919-733-3942. Your phone call should include: your name, facility, telephone number, the details of the incident from item 2 above, the exact location of the facility, the location or direction of movement of the spill, weather and wind conditions. The corrective measures that have been under taken, and the seriousness of the situation.
b. If spill leaves property or enters surface waters, call local EMS phone number - -
c. Instruct EMS to contact local Health Department.
d. Contact CES, phone number - - , local SWCD office phone number - - , and local NRCS office for advice/technical assistance phone number - - .

4. If none of the above works call 911 or the Sheriff's Department and explain your problem to them and ask that person to contact the proper agencies for you.

5. Contact the contractor of your choice to begin repair of problem to minimize off-site

damage.

a. Contractors Name: EDGAR E. MILLS
b. Contractors Address: 1365 SPANN RD. TRENTON NC. 28585
c. Contractors Phone: 252-448-5066

6. Contact the technical specialist who certified the lagoon (NRCS, Consulting Engineer, etc.

a. Name: Andrew W. Metts - NRCS
b. Phone: 252-637-2547 EXT. 3

7. Implement procedures as advised by DWQ and technical assistance agencies to rectify the damage, repair the system, and reassess the waste management plan to keep problems with release of wastes from happening again.

# Swine Farm Waste Management Odor Control Checklist

| Source | Cause | BMPs to Minimize Odor | Site Specific Practices |
|---|---|---|---|
| Farmstead | ● Swine Production | ☐ Vegetative or wooded buffers;<br>☐ Recommended best management practices;<br>☑ Good judgement and common sense | |
| Animal body surfaces | ● Dirty manure-covered animals | ☑ Dry floors | |
| Floor surfaces | ● Wet manure-covered floors | ☑ Slotted floors;<br>☑ Waterers located over slotted floors;<br>☐ Feeders at high end of solid floors;<br>☐ Scrape manure buildup from floors;<br>☐ Underfloor ventilation for drying | |
| Manure collection pits | ● Urine;<br>● Partial microbial decomposition | ☑ Frequent manure removal by flush, pit recharge, or scrape;<br>☐ Underfloor ventilation | |
| Ventilation exhaust fans | ● Volatile gases;<br>● Dust | ☑ Fan maintenance;<br>☑ Efficient air movement | |
| Indoor surfaces | ● Dust | ☑ Washdown between groups of animals;<br>☐ Feed additives;<br>☐ Feed covers;<br>☐ Feed delivery downspout extenders to feeder covers | |
| Flush tanks | ● Agitation of recycled lagoon liquid while tanks are filling | ☐ Flush tank covers;<br>☐ Extend fill to near bottom of tanks with anti-siphon vents | |
| Flush alleys | ● Agitation during wastewater conveyance | ☐ Underfloor flush with underfloor ventilation | |
| Pit recharge points | ● Agitation of recycled lagoon liquid while pits are filling | ☐ Extend recharge lines to near bottom of pits with anti-siphon vents | |
| Lift stations | ● Agitation during sump tank filling and drawdown | ☐ Sump tank covers | |
| Outside drain collection or junction boxes | ● Agitation during wastewater conveyance | ☐ Box covers | |

| Source | | Cause | | BMPs to Minimize Odor | Site Specific Practices |
|---|---|---|---|---|---|
| End of drainpipes at lagoon | ● | Agitation during wastewater conveyance | ☐ | Extend discharge point of pipes underneath lagoon liquid level | |
| Lagoon surfaces | ● | Volatile gas emission; | ☑ | Proper lagoon liquid capacity; | |
| | ● | Biological mixing; | ☑ | Correct lagoon startup procedures; | |
| | ● | Agitation | ☐ | Minimum surface area-to-volume ratio; | |
| | | | ☐ | Minimum agitation when pumping; | |
| | | | ☐ | Mechanical aeration; | |
| | | | ☐ | Proven biological additives | |
| Irrigation sprinkler nozzles | ● | High pressure agitation; | ☑ | Irrigate on dry days with little or no wind; | |
| | ● | Wind drift | ☐ | Minimum recommended operating pressure; | |
| | | | ☐ | Pump intake near lagoon liquid surface; | |
| | | | ☐ | Pump from second stage lagoon | |
| Storage tank or basin surface | ● | Partial microbial decomposition; | ☐ | Bottom or midlevel loading; | |
| | ● | Mixing while filling; | ☐ | Tank covers; | |
| | ● | Agitation when emptying | ☐ | Basin surface mats of solids; | |
| | | | ☐ | Proven biological additives or oxidants | |
| Settling basin surface | ● | Partial microbial decomposition; | ☐ | Extend drainpipe outlets underneath liquid level; | |
| | ● | Mixing while filling; | | | |
| | ● | Agitation when emptying | ☐ | Remove settled solids regularly | |
| Manure, slurry or sludge spreader outlets | ● | Agitation when spreading; | ☐ | Soil injection of slurry/sludges; | |
| | ● | Volatile gas emissions | ☐ | Wash residual manure from spreader after use; | |
| | | | ☐ | Proven biological additives or oxidants | |
| Uncovered manure, slurry or sludge on field surfaces | ● | Volatile gas emissions while drying | ☐ | Soil injection of slurry/sludges; | |
| | | | ☐ | Soil incorporation within 48 hrs.; | |
| | | | ☐ | Spread in thin uniform layers for rapid drying; | |
| | | | ☐ | Proven biological additives or oxidants | |
| Dead animals | ● | Carcass decomposition | ☑ | Proper disposition of carcasses | |
| Dead animal disposal pits | ● | Carcass decomposition | ☐ | Complete covering of carcasses in burial pits; | |
| | | | ☐ | Proper location/construction of disposal pits | |
| Incinerators | ● | Incomplete combustion | ☐ | Secondary stack burners | |

| Source | Cause | BMPs to Minimize Odor | Site Specific Practices |
|---|---|---|---|
| Standing water around facilities | ● Improper drainage;<br>● Microbial decomposition of organic matter | ☑ Grade and landscape such that water drains away from facilities | |
| Mud tracked onto public roads from farm access | ● Poorly maintained access roads | ☑ Farm access road maintenance | |

| Additional Information: | Available From: |
|---|---|
| Swine Manure Management; .0200 Rule/BMP Packet | NCSU, County Extension Center |
| Swine Production Farm Potential Odor Sources and Remedies; EBAE Fact Sheet | NCSU - BAE |
| Swine Production Facility Manure Management: Pit Recharge - Lagoon Treatment; EBAE 128-88 | NCSU - BAE |
| Swine Production Facility Manure Management: Underfloor Flush - Lagoon Treatment; EBAE 129-88 | NCSU - BAE |
| Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE 103-88 | NCSU - BAE |
| Calibration of Manure and Wastewater Application Equipment; EBAE Fact Sheet | NCSU - BAE |
| Controlling Odors from Swine Buildings; PIH-33 | NCSU - Swine Extension |
| Environmental Assurance Program: NPPC Manual | NC Pork Producers Assoc. |
| Options for Managing Odor; a report from the Swine Odor Task Force | NCSU - Agri Communications |
| Nuisance Concerns in Animal Manure Management: Odors and Flies; PRO107, 1995 Conference Proceedings | Florida Cooperative Extension |

# Insect Control Checklist for Animal Operations

| Source | | Cause | BMPs to Minimize Insects | Site Specific Practices |
|---|---|---|---|---|
| | | | **Liquid Systems** | |
| Flush Gutters | ● | Accumulation of Solids | ☑ Flush system is designed and operated sufficiently to remove accumulated solids from gutters as designed;<br>☐ Remove bridging of accumulated solids at discharge | |
| Lagoons and Pits | ● | Crusted Solids | ☑ Maintain lagoons, settling basins and pits where pest breeding is apparent to minimize the crusting of solids to a depth of no more than 6 - 8 inches over more than 30% of surface. | |
| Excessive Vegetative Growth | ● | Decaying vegetation | ☑ Maintain vegetative control along banks of lagoons and other impoundments to prevent accumulation of decaying vegetative matter along water's edge on impoundment's perimeter. | |
| | | | **Dry Systems** | |
| Feeders | ● | Feed Spillage | ☐ Design, operate and maintain feed systems (e.g., bunkers and troughs) to minimize the accumulation of decaying wastage.<br>☐ Clean up spillage on a routine basis (e.g., 7 - 10 day interval during summer; 15-30 day interval during winter). | |
| Feed Storage | ● | Accumulation of feed residues | ☐ Reduce moisture accumulation within and around immediate perimeter of feed storage areas by insuring drainage away from site and/or providing adequate containment (e.g., covered bin for brewer's grain and similar high moisture grain products).<br>☐ Inspect for and remove or break up accumulated solids in filter strips around feed storage as needed. | |
| Animal Holding Areas | ● | Accumulations of animal wastes and feed wastage | ☐ Eliminate low areas that trap moisture along fences and other locations where waste accumulates and disturbance by animals is minimal.<br>☐ Maintain fence rows and filter strips around animal holding areas to minimize accumulations of wastes (i.e. inspect for and remove or break up accumulated solids as needed. | |

| Source | Cause | BMPs to Minimize Insects | Site Specific Practices |
|---|---|---|---|
| Dry Manure Handling Systems | ● Accumulations of animal wastes | ❒ Remove spillage on a routine basis (e.g., 7-10 day interval during summer; 15-30 day interval during winter) where manure is loaded for land application or disposal.<br>❒ Provide fo adequate drainage around manure stockpiles.<br>❒ Inspect for an remove or break up accumulated wastes in filter strips around stockpiles and manure handling areas as needed. | |

For more information contact the Cooperative Extension Service, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613

## Mortality Management Methods

(check which method(s) are being implemented)

- ☐ Burial three feet beneath the surface of the ground within 24 hours after knowledge of the death. The burial must be at least 300 feet from any flowing stream or public body of water.

- ☐ Rendering at a rendering plant licensed under G.S. 106-168.7.

- ☑ Complete incineration

- ☐ In the case of dead poultry only, placing in a disposal pit of a size and design approved by the Department of Agriculture.

- ☐ Any method which in the professional opinion of the State Veterinarian would make possible the salvage of part of a dead animal's value without endangering human or animal health. (Written approval of the State Veterinarian must be attached)

December 18, 1996

# Waters Agricultural Laboratories, Inc.

P.O. Box 382 257 Newton Hwy
Camilla, GA 31730
(229) 336-7216 FAX (229) 336-7967


KEITH MILLS
1365 SPANN RD
TRENTON, NC 28585

## Soil Analysis Report
## NCDA Index

**Grower:** KEITH MILLS
**Field ID:**

**Account#:** 1365
**Received:** 10/17/2012
**Processed:** 10/20/2012

| Lab Number | Sample ID | P-I | K-I | Mg% | Ca% | Water pH | AC | S-I | B-lbs/a | Zn-I | Mn-I | Fe-lbs/a | Cu-I | CEC | OM% | Soil Class |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 815713QC | 1 | 7 | 10 | 4.3 | 8.3 | 4.5 | 2.4 | 70 | 0.2 | 9 | 3 | 72 | 15 | 5.6 | 0.63 | MIN |
| 815714QC | 2 | 3 | 10 | 4.0 | 6.7 | 4.5 | 3.6 | 117 | 0.2 | 5 | 9 | 56 | 13 | 8.1 | 0.98 | MIN |
| 815715QC | 3 | 4 | 9 | 4.8 | 8.1 | 4.5 | 2.6 | 91 | 0.3 | 4 | 6 | 75 | 8 | 6.0 | 0.92 | MIN |
| 815716QC | 4 | 2 | 14 | 3.6 | 6.6 | 4.5 | 4 | 102 | 0.3 | 5 | 9 | 56 | 12 | 9.0 | 0.8 | MIN |
| 815717QC | 5 | 4 | 12 | 3.1 | 6.2 | 4.5 | 3.8 | 51 | 0.3 | 10 | 12 | 70 | 19 | 8.4 | 0.74 | MIN |
| 815718QC | 6 | 3 | 11 | 3.3 | 6.9 | 4.4 | 3.2 | 50 | 0.4 | 10 | 15 | 65 | 12 | 7.2 | 0.54 | MIN |
| 815719QC | 7 | 2 | 15 | 5.0 | 8.8 | 4.5 | 2.8 | 87 | 0.5 | 5 | 15 | 68 | 16 | 6.6 | 0.66 | MIN |
| 815720QC | 8 | 2 | 15 | 4.7 | 8.7 | 4.5 | 3.2 | 92 | 0.4 | 6 | 3 | 76 | 36 | 7.5 | 0.69 | MIN |
| 815721QC | 9 | 2 | 13 | 17.4 | 35.3 | 4.6 | 0.4 | 97 | 0.4 | 6 | 12 | 81 | 25 | 1.8 | 1.11 | MIN |
| 815722QC | 10 | 2 | 12 | 16.3 | 34.0 | 4.5 | 0.4 | 92 | 0.5 | 7 | 15 | 70 | 30 | 1.7 | 0.94 | MIN |
| 815723QC | 11 | 2 | 16 | 5.3 | 10.3 | 4.5 | 2.6 | 107 | 0.6 | 7 | 12 | 77 | 21 | 6.3 | 0.99 | MIN |
| 815724QC | 12 | 3 | 16 | 3.9 | 8.0 | 4.5 | 3.6 | 103 | 0.6 | 43 | 6 | 64 | 19 | 8.3 | 0.88 | MIN |
| 815725QC | 13 | 4 | 15 | 15.8 | 36.8 | 4.5 | 0.4 | 52 | 0.5 | 11 | 3 | 75 | 33 | 1.8 | 0.93 | MIN |
| 815726QC | 14 | 2 | 15 | 3.9 | 7.1 | 4.6 | 3.4 | 123 | 0.5 | 5 | 12 | 69 | 17 | 7.7 | 1.05 | MIN |
| 815727QC | 15 | 2 | 12 | 4.7 | 8.5 | 4.5 | 2.4 | 73 | 0.4 | 4 | 15 | 69 | 13 | 5.6 | 1.02 | MIN |
| 815728QC | 16 | 3 | 14 | 3.7 | 7.3 | 4.5 | 3.8 | 113 | 0.5 | 5 | 12 | 64 | 17 | 8.6 | 1.07 | MIN |
| 815729QC | 17 | 2 | 13 | 3.4 | 6.1 | 4.4 | 3.8 | 98 | 0.4 | 5 | 15 | 67 | 18 | 8.5 | 0.89 | MIN |
| 815730QC | 18 | 2 | 13 | 3.3 | 6.5 | 4.6 | 3.8 | 120 | 0.4 | 5 | 12 | 57 | 15 | 8.5 | 0.93 | MIN |
| 815731QC | 19 | 3 | 14 | 4.7 | 9.3 | 4.6 | 2.6 | 65 | 0.3 | 7 | 3 | 63 | 18 | 6.1 | 1 | MIN |

L=Low M=Medium A=Adequate H=High VH=Very High

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 815732QC | 20 | 2 | 16 | 3.8 | 7.5 | 4.5 | 3.8 | 97 | 0.3 | 7 | 6 | 68 | 27 | 8.7 | 0.92 | MIN |
| 815733QC | 21 | 5 | 14 | 3.9 | 10.0 | 4.6 | 2.8 | 118 | 0.3 | 7 | 12 | 71 | 14 | 6.6 | 0.97 | MIN |

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| 815717QC | 5 | 4 | 12 | 3.1 | 6.2 | 4.5 | 3.8 | 51 | 0.3 | 10 | 12 | 70 | 19 | 8.4 | 0.74 | MIN |
| 815718QC | 6 | 3 | 11 | 3.3 | 6.9 | 4.4 | 3.2 | 50 | 0.4 | 10 | 15 | 65 | 12 | 7.2 | 0.54 | MIN |
| 815719QC | 7 | 2 | 15 | 5.0 | 8.8 | 4.5 | 2.8 | 87 | 0.5 | 5 | 15 | 68 | 16 | 6.6 | 0.66 | MIN |
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