D. Inventory, Analysis and Alternatives

1. **Conservation Plan Map**
   - Milk barn, holding tank, feed storage
   - Livestock housing and corrals
   - Waste structures, lagoon(s), separator(s), solid storage, ditches, buried or surface pipelines, runoff containment, corral slopes, berms
   - Residences
   - Property lines, if appropriate; boundary lines of planning unit, field boundaries, land use and acres for each land unit, appropriate map symbols and legend
   - Wells and/or well heads
   - Monitoring wells
   - Surface waters, surface/subsurface drains (direction of flow)
   - Title block showing: "Conservation Plan Map", "Prepared with assistance from ___Name_____", Name of the conservation district, county and state, map scale, date prepared, North arrow
   - Include a larger scale map showing a 1-mile radius surrounding facility, including all wells
2. **Soil Maps**
3. **NM CNMP Inventory Sheet**, or equivalent to include:
   a. Name and location of facility
   b. Production information (see Section E), including number and species of animals, average weight, number of days in system, phases of production, manure volumes;
   consistency, location, and timing of the manure produced. The production estimates should include future expansion.
   c. Roof and/or Runoff Management
   d. Management of Dead Animals and Veterinary Wastes
   e. **Manure Collection, Storage, Treatment, and Transfer** (See Section E)
      - Collection - Identify method of collection, location of the collection points, scheduling of the collection, labor requirements, necessary equipment or structural facilities, and impact that collection has on the consistency of the waste. Report information on maintenance and cleaning of the milking parlor, including cow preparation for dairies.
      - Storage - The storage period should be determined by the utilization schedule; the waste management system should identify the storage period; the required storage volume; the type, estimated size, and location of the storage facility; and the impact of the storage on the consistency of the waste.
      - Treatment – include an analysis of the characteristics of the waste before treatment; a determination of the desired characteristics of the

waste following treatment; and the selection of the type, estimated size, location.

- Transfer – include an analysis of the consistency of the waste to be moved, method of transportation, distance between points, frequency and scheduling, and necessary equipment.

f. **Manure Utilization** – Describe how manure is and will be used, which may include as a source of energy, bedding, animal feed, mulch, organic matter, or plant nutrients.

(1) **Land Application** (also see Nutrient Management Jobsheet)

- A complete analysis of utilization through land application includes designing the distribution system and selecting necessary equipment.
- A nutrient management plan is to be developed to determine application rates and volumes; selecting the fields; scheduling applications; and sampling manure, soil, water, and plants.
- Individual field maps with marked setbacks, buffers, waterways
- A soil map with appropriate interpretations, such as land capability groupings, woodland suitability groups, pasture and hayland suitability groups, and other interpretive information regarding suitability for specific land uses.
- Site evaluation
- Crop rotation
- Crops and yields
- Nutrient uptake
- Expected seasonal application rate and time
- Estimated land area requirement
- Nutrient utilization worksheet
- Manure valuation summary
- Irrigation system (See IWM Jobsheet)– describe how cropland is irrigated, including liquid waste application. Set times, frequency of irrigation, available water holding capacity and crop management allowable depletion should be covered. Describe any changes to the irrigation system that may be necessary to address resource concerns.
- Grazing management (**Maintain a 3-in grazing height, about 1500 lbs/ac dry matter)**

(2) **Other Utilization of Manure** (See Practice 633 Jobsheet)

In addition to land application, explore additional ways that manure is being or could be utilized, including composting, methane generation, feed utilization.

g. Feeding information

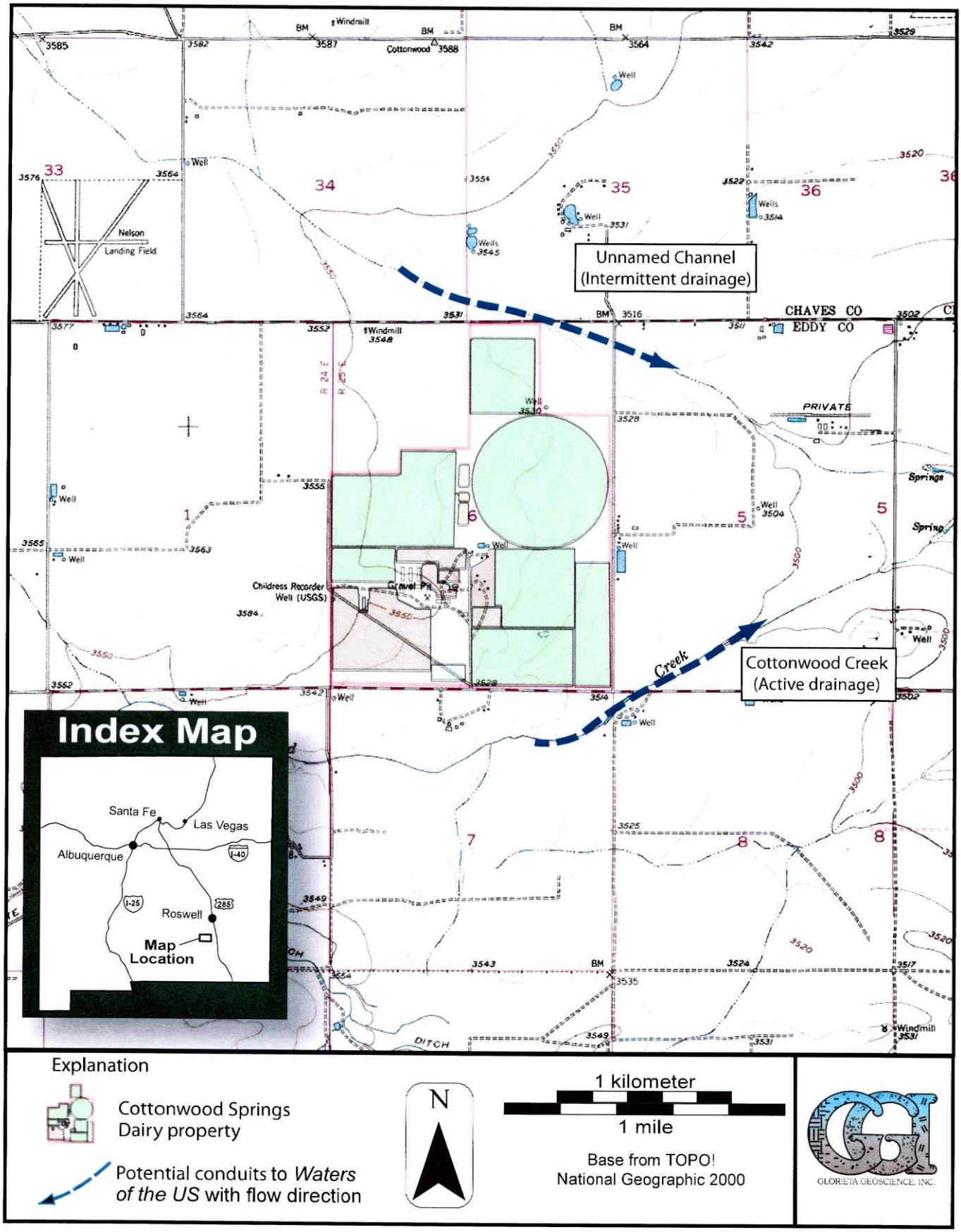
- Describe any measures that are or will be used to alter manure nutrient content through feed management such as phytase feeding, milk urea nitrogen testing.

h. Summary of Recommendations for Alternative Practices

4. **Other Inventory Worksheets**, e.g. Phosphorus Index, Soil Conditioning Index, Leaching Index

Cottonwood Springs Dairy LLC

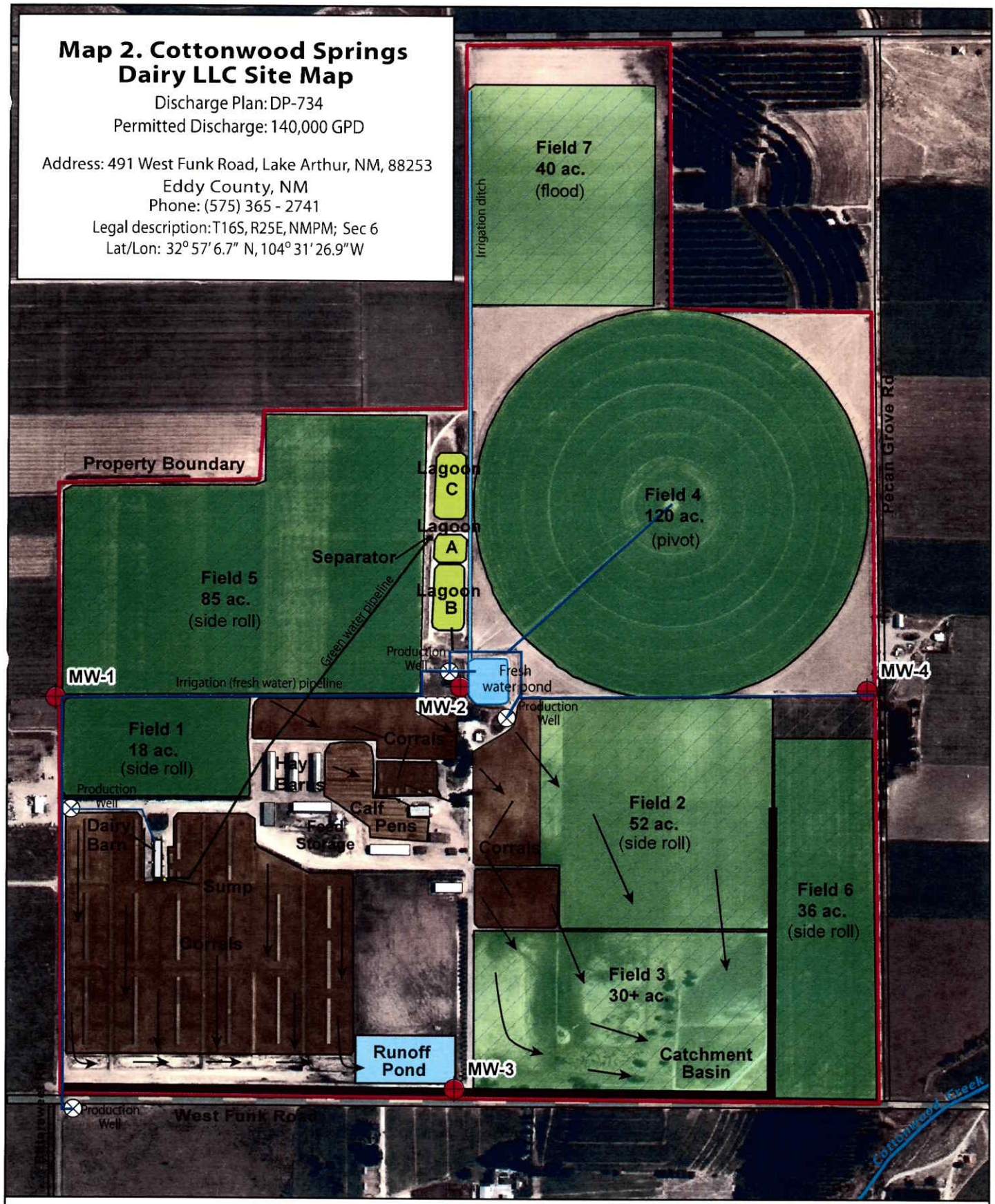
Map 1. Site Location Map Showing Potential Conduits to the Waters of the United States



Map 2. Cottonwood Springs Dairy LLC Site Map

Discharge Plan: DP-734
Permitted Discharge: 140,000 GPD

Address: 491 West Funk Road, Lake Arthur, NM, 88253
Eddy County, NM
Phone: (575) 365 - 2741
Legal description: T16S, R25E, NMPM; Sec 6
Lat/Lon: 32° 57' 6.7" N, 104° 31' 26.9" W



Monitoring well (MW)
Production well
Direction of surface flow
Six-foot earthen berm
Area enclosed by earthen berm
Irrigation pipeline
Irrigation ditch
Green water pipeline

0 0.125 0.25 0.5 Miles

N

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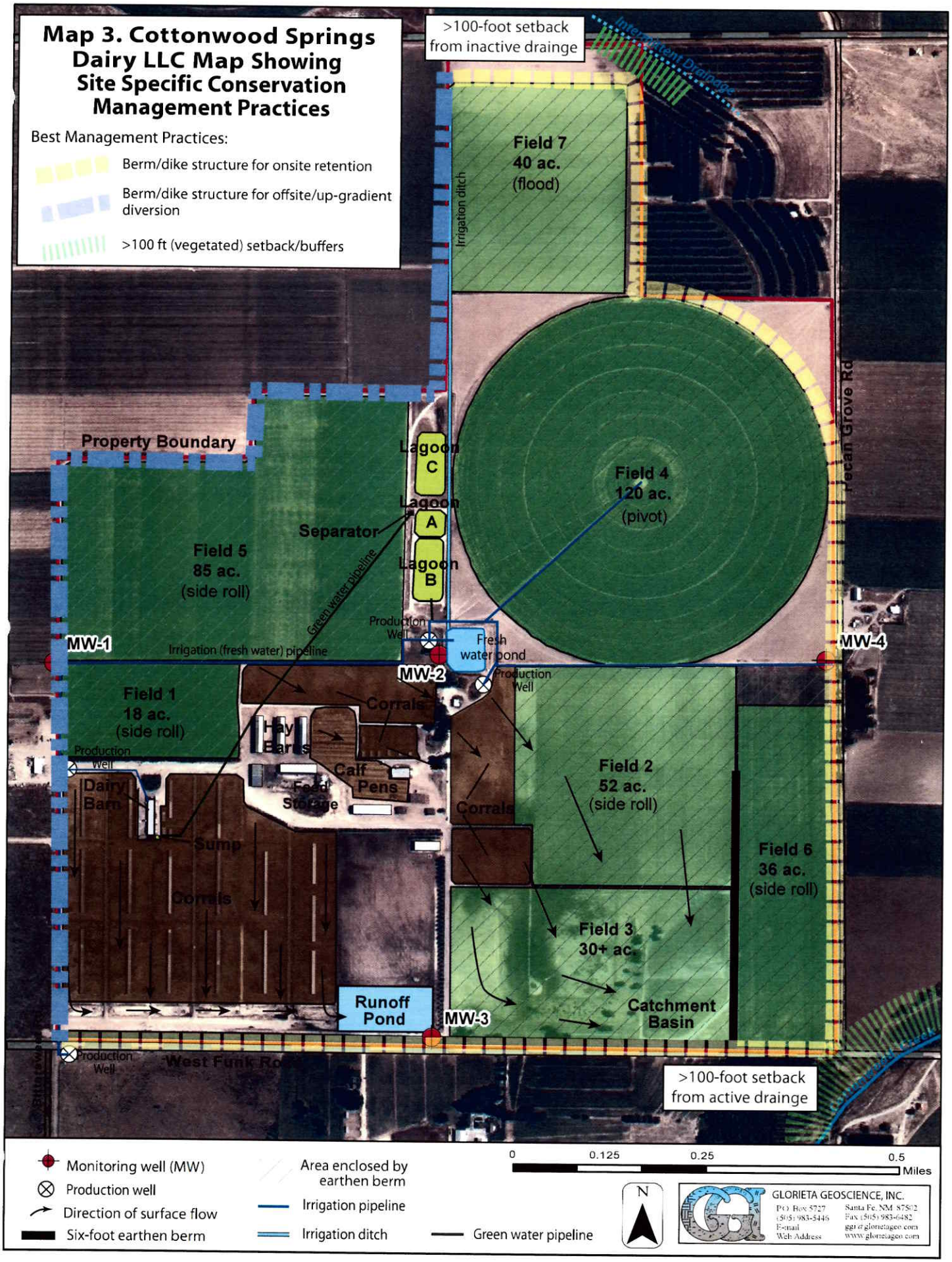
Map 3. Cottonwood Springs Dairy LLC Map Showing Site Specific Conservation Management Practices
Best Management Practices:
Berm/dike structure for onsite retention
Berm/dike structure for offsite/up-gradient diversion
>100 ft (vegetated) setback/buffers
>100-foot setback from inactive drainge
Intermittent Drainage
Field 7
40 ac.
(flood)
Irrigation ditch
Pecan Grove Rd
Property Boundary
Lagoon C
Lagoon A
Lagoon B
Separator
Field 4
120 ac.
(pivot)
Field 5
85 ac.
(side roll)
Green water pipeline
Production Well
Fresh water pond
MW-1
MW-2
MW-4
Irrigation (fresh water) pipeline
Field 1
18 ac.
(side roll)
Corrals
Hay Barns
Calf Pens
Feed Storage
Dairy Barn
Sump
Field 2
52 ac.
(side roll)
Field 6
36 ac.
(side roll)
Field 3
30+ ac.
Catchment Basin
Runoff Pond
MW-3
West Funk Rd
>100-foot setback from active drainge
Monitoring well (MW)
Production well
Direction of surface flow
Six-foot earthen berm
Area enclosed by earthen berm
Irrigation pipeline
Irrigation ditch
Green water pipeline
0
0.125
0.25
0.5
Miles
N
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Cottonwood Springs Dairy

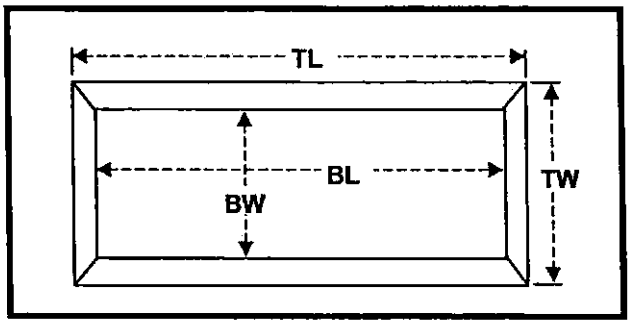
Green Water and Stormwater Capacity Requirements vs. Existing Storage Capacity

	Volume	Units	Reference Source
Required Green Water Capacity			
Permitted Volume	140,000	GPD	NMED Discharge Permit
Required 60-Day Storage Capacity	**33.4**	**Ac-ft**	NRCS Pond Sizing
Existing Green Water Lagoons Storage Capacity			
Lagoon B (with 2-ft freeboard)	12.36	Ac-ft	GGI Calculations based on AgServices Data
Lagoon C (with 2-ft freeboard)	32.98	Ac-ft	NRCS Engineering Design
Total Green Water Capacity	**45.34**	**Ac-ft**	

Required Stormwater Storage Capacity			
Production Area 1	21.1	Ac-ft	NRCS Hydrologic Data Sheet
Production Area 2	7	Ac-ft	NRCS Hydrologic Data Sheet
Total Required Stormwater Capacity	**28.1**	**Ac-ft**	
Existing Stormwater Capacity			
Runoff Pond	28.5	Ac-ft	Survey by Don Alam ACS
Runoff Catchment Basin	282	Ac-ft	NRCS Lot Runoff Pond Design
Total Existing Stormwater Capacity	**310.5**	**Ac-ft**	

Cottonwood Springs Dairy NMP - Lagoon B Volume Calulations

A. TOTAL CAPACITY



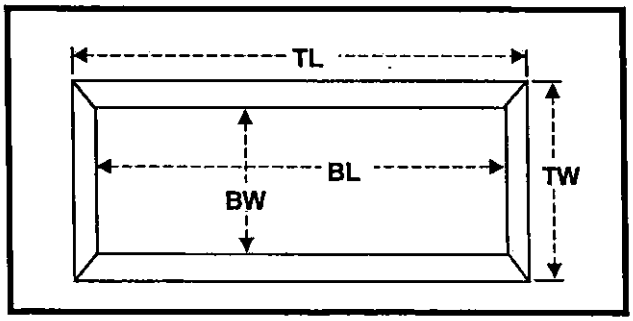
Given:

TL, Top Length:	430	feet
TW, Top Width:	200	feet
BL, Bottom Length:	357.4	feet
BW, Bottom Width:	140	feet
D, Depth:	10	feet

Calculations:

Top Area = TL x TW	86,000.0	square feet
Bottom Area = BL x BW	50,036.0	square feet
4x Mid Area = (TL + BL) x (TW x BW)	267,716.0	square feet
Sum of Areas = (Top + Bottom + 4x Mid Area)	403,752.0	square feet
Volume = (Depth) x (Sum of Areas) / 6	**672,920.0**	cubic feet with depth of 10 ft
	5,033,442	gallons
	15.45	acre-feet

B. LAGOON VOLUME WITH 2-FT FREEBOARD



Given:

TL, Top Length:	430	feet
TW, Top Width:	200	feet
BL, Bottom Length:	357.4	feet
BW, Bottom Width:	140	feet
D, Depth:	8	feet

Calculations:

Top Area = TL x TW	86,000.0	square feet
Bottom Area = BL x BW	50,036.0	square feet
4x Mid Area = (TL + BL) x (TW x BW)	267,716.0	square feet
Sum of Areas = (Top + Bottom + 4x Mid Area)	403,752.0	square feet
Volume = (Depth) x (Sum of Areas) / 6	**538,336.0**	cubic feet with depth of 8 ft
	4,026,753	gallons
	12.36	acre-feet

Greenwater lagoons
Storage calculations, Plans

NM-DAIRY PLANNING DATA SHEET

USDA Natural Resource Conservation Service Version 2.6 (5/8/06)

Dairy Name:	Cottonwood Springs Da	Dairy Manager:	Mr Philip Troost	Flush System used?	No
Location:	Artesia	Planner:	Reddy Ganta	Date:	11/30/09

DAIRY DATA (milking center and flush system)

Number of cows - Milking:	3,400	Dry: 423	1000 lbs units (AU) Milking
Average weight of cows:	1,400	lbs	4760
% waste from the milking center:	15%	percent (%), 15% is typical	
Wash water used in milking center:	41	gal/day/cow	This dairy is a large CAFO.
Number of months of storage needed:	4	Month Storage	
Flush water added:	0	Gal/Day	

Assumptions:
1. A 1000 lbs cow produces 80 lbs of manure daily.
2. 88% of manure is liquid.
3. 1 ton manure = 34 Cu Ft
4. 134.5 Cu. Yds.= 1 ac in.
5. 27150 gallons = 1 ac in.
6. 8.33 lbs. liquid = 1gal liquid

DAIRY DATA (Flush System)

Cow Type	Num. of Cows	Wt per Animal lbs/animal	% Time on system	Manure[1] lbs/day/1000lbs	Animal Units #xWt/1000	Manure/Day lbs/day
Number of milking cows:	3,400	0		80	0	0
Number of dry cows:	423	0		82	0	0
Number of heifers:	1,260			85	0	0
Number of other type cows:	1,905			85	0	0
Total:	6,988	head			Total:	0 lbs/day
Flush water used per cow:	0.0	gal/cow/day *(total gal per day/number of cows using the system)*				

[1] *Values from the AWMFH 4/92*

PROCESS WASTE CALCULATION

Milking Center Washwater (water storage needed/Mo)

Liquid Vol = milk center (gal/day/cow) x cows in system (# of cows) x days of storage (days) = Gal/Mo

Q= 41 gal/day/cow X 3400 cows X 30 days = **4,200,360 Gal./Mo**

(Gal/27150) OR = **154.7 ac. in.**

Milking Center Manure Production (liquid storage needed/Mo)

Liquid Vol = AU (#) X manure (lbs/day) X % liquid (88%) X % time (%) X 30 (days) = Lbs/Mo

Q = 4,760 AU X 80.0 lbs/day X 88% X 15% X 30 days = 1,507,968 Lbs/Mo.

Liquid storage needed = liquid (lbs/Mo) / 8.33 lbs/Gal = Gal/Mo

1,507,968 (lbs/Mo) / (8.33 lbs/gal) = **181,029 Gal/Mo**

(Gal/27150) OR = **6.7 ac. in./Mo**

Milking Center Manure Production (solid storage needed/Mo)

Solids Storage = 1000 lbs units X manure (lbs/day) X % solids (12%) X storage (30days) X barn time (%) = Lbs/Mo

Vol = 4760 AU X 80 lbs/day X 12% X 30 X 15% **205,632 Lbs/Mo**

(lbs/mo)/2000 lbs/ton) **102.8 tons/mo.** (cu. ft.) / (27 cu ft/cu yd) **131 cu. yds./Mo**

(tons/Mo) X 34.5 cu. ft./ton **3547 cu ft/mo.** (cu. yds.) / (134.5 cu yds/ac in) **0.98 ac. in./Mo**

Alley Flush Manure Production (liquid storage needed/Mo)

Liquid Vol = Manure weight (lbs/day) x percent liquid (0.88) x storage (30days) = Lbs/Mo

Q = 0 (lbs/day) X 88% X 30 days = 0 Lbs/Mo

Liquid Vol = (cow liquid (lbs) / 8.33 lbs/gal) + (added flush water X 30days) = gal. storage need

0 lbs/mo. / 8.33 lbs/gal + (0 gal/day X 30) = **0 Gal/Mo**

(gal/27150) OR = **0.0 ac. in./Mo**

Alley Flush Manure Production (solid storage needed/Mo)

Solid Vol = Manure weight (lbs/day) x percent solid (0.88) x storage (30days) = Lbs/Mo

Q = 0 (lbs/day) X 12% X 30 days = 0 Lbs/Mo

Liquid Vol = liquid (lbs) / 8.33 lbs/gal = gal. storage need

0 lbs/Mo / 8.33 lbs/ga = **0 Gal/Mo**

(lbs/mo)/2000 lbs/ton) **0.0 tons/mo.** (cu. ft.) / (27 cu ft/cu yd) **0 cu. yds./Mo**

(tons/mo) X 34.5 cu. ft./ton **0 cu ft/mo.** (cu. yds.) / (134.5 cu yds/ac in) **0.00 ac. in./Mo**

NM-POND VOLUME EVALUATION

USDA Natural Resources Conservation Service | Version 2.6 (5/8/06) | Date: 11/30/09

Dairy Name: Cottonwood Springs [**Dairy Manager:** Mr Philip Troost

Pond Name/Num.: Runoff Catchment **Planner:** Reddy Ganta

Pond Location (Climate): Eddy, ARTESIA 6 S NM0600

Type of Pond: 60-day Storage

Note: This page estimates the pond depth using cube shape with the given surface area of the pond.

Annual Lake Evap map: 71.0

Evaporation Surface Area: 5.0 Acres (See "NM-Evap" worksheet)

Month	Wash water ac in.	Manure Liquids ac in.	Rainfall inches	Pond Area Rainfall ac in.[1]	Total Inflow ac in.	Lake Evap. in.	Total Evap. ac in.[1]	Inflow - Evap. ac in.		Solids ac in.
JAN	154.7	6.7	0.36	1.80	163.2	2.8	14.2	149.0		0.98
FEB	154.7	6.7	0.46	2.30	163.7	3.6	17.8	145.9		0.98
MAR	154.7	6.7	0.33	1.65	163.0	5.7	28.4	134.6		0.98
APR	154.7	6.7	0.45	2.25	163.6	7.8	39.1	124.6		0.98
MAY	154.7	6.7	1.05	5.25	166.6	9.2	46.2	120.5		0.98
JUN	154.7	6.7	1.53	7.65	169.0	9.2	46.2	122.9		0.98
JUL	154.7	6.7	1.40	7.00	168.4	9.2	46.2	122.2		0.98
AUG	154.7	6.7	2.17	10.85	172.2	7.8	39.1	133.2		0.98
SEP	154.7	6.7	2.39	11.95	173.3	5.7	28.4	144.9		0.98
OCT	154.7	6.7	1.20	6.00	167.4	4.3	21.3	146.1		0.98
NOV	154.7	6.7	0.61	3.05	164.4	2.8	14.2	150.2		0.98
DEC	154.7	6.7	0.49	2.45	163.8	2.8	14.2	149.6		0.98
TOTALS		Rainfall (in):	12.4		Yearly Liquid Inflow (ac in):			1643.7	Yearly Solids(ac in):	11.7

[1] *Based on pond surface area.*

Total Yearly Volume Produced: 1655.4 ac in or **44,952,411** gallons

Required pond storage volume (liquid only): **25.0 ac ft Required 60 day storage.**

Cubic Pond Depth Est.	
60-day Storage (ft):	5.0
120-day Storage(ft):	NA

NM-POND SIZE DETERMINATION for Ponds with Field application

USDA Natural Resources Conservation Service — Version 2.6 (5/8/06) — Date: 11/30/2009

Dairy Name:	Cottonwood Springs Da	**Dairy Manager:**	Mr Philip Troost
Location:	Artesia	**Planner:**	Reddy Ganta
Pond Name/Num.:	Runoff Catchment	**Type of Pond:**	60-day Storage

Estimate Number of Years Before Cleaning Pond: 8 years

Pond designed for:
- Milk Center/Flush Volume ONLY and field application from pond ☑
- Milk Center/Flush AND Storm Lot Runoff with field application from pond ☐

SOLIDS SEPARATION *(adjustment to total storage requirements)*

Solids Produced (ac-in/yr from Pond Vol sheet): **11.7**

Type of Separators	% Reduced (default value)	% Adjust. (+/-)	Separation Value (%)	Storage Need (ac in)
Static Incline Screen (36 mesh)	15%	25%	19%	9.5
Total Volume of Solids:	9.5 ac in/yr		0.8 ac ft/yr	

POND STORAGE CAPACITY

Surface Area:	5.0 ac.
POND Volume (60 day Storage w/2 mo. Solids, or 120 day Storage w/4 mo. Solids):	25.1 ac. ft.
STORM Volume (25 year-24 hour Rainfall over Pond):	1.9 ac. ft.
STORM Volume (25 year-24 hrs Storm Runoff from Lot):	0 ac. ft.
Sludge Storage Volume (based on yrs before cleaning):	6.3 ac. ft.
Total Storage Required:	33.4 ac. ft.

WASTE WATER STORAGE REQUIREMENT

Required Freeboard Depth (ft)	2.0		
POND Length (at evaporation surface) (ft)	467	467	(ft) Estimated Length
SIDE SLOPE (inside) (ft:ft)	3.0 :1		GWQB requires ≥ 3:1
POND Width (at evaporation surface) (ft)	466	467	(ft) Estimated Width
POND Depth (for required storage) (ft)	5.1		Adjust POND Depth until pond vol balances.
POND Volume (for required storage) (ac-ft)	25.51		25.1 ac-ft = Required for Storage Vol.

The POND Vol. is OK or depth may be decreased.

Since evaporation from the pond surface varies with depth, the required or average "evaporation surface" is located halfway between the bottom and top of the waste water storage volume (Pond Volume).

STORAGE OF 25 year-24 hour STORM

SURFACE AREA (at top of required storage) (ac)	5.3	
STORM Length (at top of required storage) (ft)	482	
STORM Width (at top of required storage) (ft)	482	1.9 ac-ft = Required storage for 25 yr storm
STORM Depth (for storage of 25 yr storm) (ft)	0.4	**The STORM Vol. is OK or depth can be decreased.**
STORM Volume (for 25 yr storm storage) (ac-ft)	2.1	

STORAGE OF SLUDGE

SLUDGE AREA (bottom of required storage) (ac)	4.7	
SLUDGE Length (bottom of required storage) (ft)	451.7	
SLUDGE Width (bottom of required storage) (ft)	451.1	6.35 ac-ft = Required storage for sludge storage
SLUDGE Depth (for storage of sludge) (ft)	1.4	**The SLUDGE Vol. is OK or depth can be decreased.**
SLUDGE Volume (designed storage) (ac-ft)	6.4	

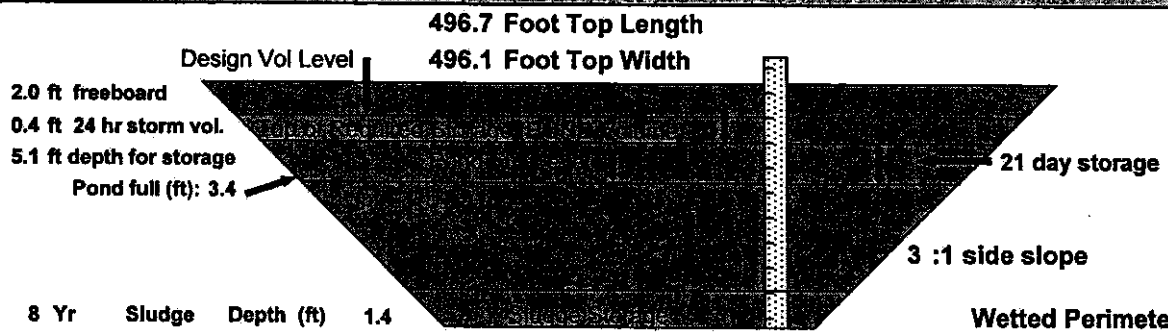
FINAL POND DIMENSIONS

TOTAL Pond Depth (ft)	8.9	Includes storage, runoff, freeboard and sludge.
TOTAL Pond Length (ft)	497	
TOTAL Pond Width (ft)	496	These quantities assumes a level existing ground surface.
TOTAL Surface Area (ac)	5.7	
TOTAL VOLUME (includes freeboard and sludge):	45.1 Ac Ft / 541.5 Ac In / 14,703,078 Gal / 1,965,801 Cu Ft / 72,807.5 Cu Yd	

DEPTH OF 21 DAY STORAGE WITHIN THE TOTAL STORAGE VOLUME

Required 21 Day Storage (ac-ft)	8.8	
Depth of 21-day storage (ft)	1.7	Increment 21-day depth until volumes balance.
Calculated 21-day Storage (ac-ft)	8.9	Depth is OK, or depth may be decreased.

Cross Section (not to scale)



Wetted Perimeter:
Length (ft.): 500
Width (ft.): 499

Pond Depth (Staff Gauge) - Volume Table

Depth	Ac Ft	Ac In	Gallons	Depth	Ac Ft	Ac In	Gallons
6.0	29.3	351.4	9,542,958				
5.5	26.7	320.0	8,690,195				
5.0	24.1	289.0	7,848,115				
4.5	21.5	258.4	7,016,649				
4.0	19.0	228.2	6,195,730				
3.5	16.5	198.3	5,385,291				
3.0	14.1	168.9	4,585,265				
2.5	11.6	139.8	3,795,583	8.5	42.9	514.4	13,969,354
2.0	9.3	111.1	3,016,180	8.0	40.1	481.0	13,062,172
1.5	6.9	82.7	2,246,988	7.5	37.3	448.0	12,166,009
1.0	4.6	54.8	1,487,938	7.0	34.6	415.4	11,280,797
0.5	2.3	27.2	738,965	6.5	31.9	383.2	10,406,469

Lining Area

Lining Area = 29,003 yds^2 OR 261,030 Ft^2

System Planning Notes (Explain pond arrangements or Waste flow characteristics)

NM-POND SIZE DETERMINATION for Ponds with Field application

USDA Natural Resources Conservation Service Version 2.6 (5/8/06) Date: 11/30/2009

Dairy Name:	Cottonwood Springs Da	**Dairy Manager:**	Mr Philip Troost
Location:	Artesia	**Planner:**	Reddy Ganta
Pond Name/Num.:	Runoff Catchment	**Type of Pond:**	60-day Storage

Estimate Number of Years Before Cleaning Pond: 8 years

Pond designed for:
- Milk Center/Flush Volume **ONLY** and field application from pond ☑
- Milk Center/Flush **AND** Storm Lot Runoff with field application from pond ☐

SOLIDS SEPARATION *(adjustment to total storage requirements)*

Solids Produced (ac in/yr from Pond Vol sheet): 11.7

Type of Separators	% Reduced (default value)	% Adjust. (+/-)	Separation Value (%)	Storage Need (ac in)
Static Incline Screen (36 mesh)	15%	25%	19%	9.5
Total Volume of Solids:	9.5	ac in/yr	0.8	ac ft/yr

POND STORAGE CAPACITY

Surface Area:	5.0 ac.
POND Volume (60 day Storage w/2 mo. Solids, or 120 day Storage w/4 mo. Solids):	25.1 ac. ft.
STORM Volume (25 year-24 hour Rainfall over Pond):	1.9 ac. ft.
STORM Volume (25 year-24 hrs Storm Runoff from Lot):	0 ac. ft.
Sludge Storage Volume (based on yrs before cleaning):	6.3 ac. ft.
Total Storage Required:	33.4 ac. ft.

WASTE WATER STORAGE REQUIREMENT

Required Freeboard Depth (ft)	2.0		
POND Length (at evaporation surface) (ft)	467	467	(ft) Estimated Length
SIDE SLOPE (inside) (ft:ft)	3.0 :1		GWQB requires ≥ 3:1
POND Width (at evaporation surface) (ft)	466	467	(ft) Estimated Width
POND Depth (for required storage) (ft)	5.1		Adjust POND Depth until pond vol balances.
POND Volume (for required storage) (ac-ft)	25.51		25.1 ac-ft = Required for Storage Vol.

The POND Vol. is OK or depth may be decreased.

Since evaporation from the pond surface varies with depth, the required or average "evaporation surface" is located halfway between the bottom and top of the waste water storage volume (Pond Volume).

STORAGE OF 25 year-24 hour STORM

SURFACE AREA (at top of required storage) (ac)	5.3
STORM Length (at top of required storage) (ft)	482
STORM Width (at top of required storage) (ft)	482
STORM Depth (for storage of 25 yr storm) (ft)	0.4
STORM Volume (for 25 yr storm storage) (ac-ft)	2.1

1.9 ac-ft = Required storage for 25 yr storm

The STORM Vol. is OK or depth can be decreased.

STORAGE OF SLUDGE

SLUDGE AREA (bottom of required storage) (ac)	4.7
SLUDGE Length (bottom of required storage) (ft)	451.7
SLUDGE Width (bottom of required storage) (ft)	451.1
SLUDGE Depth (for storage of sludge) (ft)	1.4
SLUDGE Volume (designed storage) (ac-ft)	6.4

6.35 ac-ft = Required storage for sludge storage

The SLUDGE Vol. is OK or depth can be decreased.

FINAL POND DIMENSIONS

TOTAL Pond Depth (ft)	8.9	Includes storage, runoff, freeboard and sludge.
TOTAL Pond Length (ft)	497	
TOTAL Pond Width (ft)	496	These quantities assumes a level existing ground surface.
TOTAL Surface Area (ac)	5.7	
TOTAL VOLUME (includes freeboard and sludge):	45.1 Ac Ft	541.5 Ac In
	14,703,078 Gal	1,965,801 Cu Ft
	72,807.5 Cu Yd	

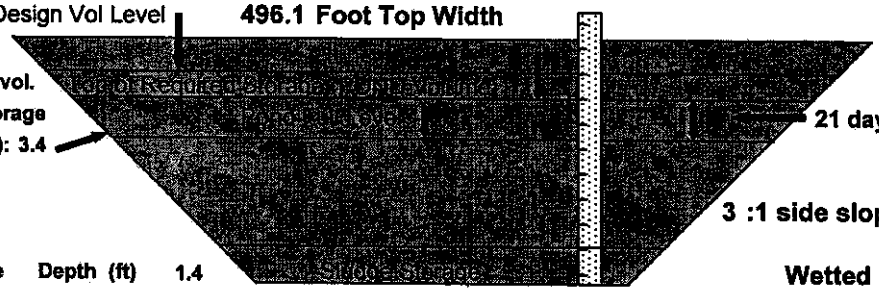
DEPTH OF 21 DAY STORAGE WITHIN THE TOTAL STORAGE VOLUME

Required 21 Day Storage (ac-ft)	8.8	
Depth of 21-day storage (ft)	1.7	Increment 21-day depth until volumes balance.
Calculated 21-day Storage (ac-ft)	8.9	Depth is OK, or depth may be decreased.

Cross Section (not to scale)

496.7 Foot Top Length

496.1 Foot Top Width



8 Yr Sludge Depth (ft) 1.4

8.9 ft Total depth needed

443.3 Foot Bottom Length

442.7 Foot Bottom Width

Wetted Perimeter:

Length (ft.): 500

Width (ft.): 499

Pond Depth (Staff Gauge) -- Volume Table

Depth	Ac Ft	Ac In	Gallons	Depth	Ac Ft	Ac In	Gallons
6.0	29.3	351.4	9,542,958				
5.5	26.7	320.0	8,690,195				
5.0	24.1	289.0	7,848,115				
4.5	21.5	258.4	7,016,649				
4.0	19.0	228.2	6,195,730				
3.5	16.5	198.3	5,385,291				
3.0	14.1	168.9	4,585,265				
2.5	11.6	139.8	3,795,583	8.5	42.9	514.4	13,969,354
2.0	9.3	111.1	3,016,180	8.0	40.1	481.0	13,062,172
1.5	6.9	82.7	2,246,988	7.5	37.3	448.0	12,166,009
1.0	4.6	54.8	1,487,938	7.0	34.6	415.4	11,280,797
0.5	2.3	27.2	738,965	6.5	31.9	383.2	10,406,469

Lining Area

Lining Area = 29,003 yds^2 OR 261,030 Ft^2

System Planning Notes (Explain pond arrangements or Waste flow characteristics)

Ag Services
1905 Old Dexter Highway
Roswell, NM 88203
(505) 623-9264 Fax (505) 622-7232

May 20, 2002

Phil Troost
Cottonwood Springs Dairy
491 W. Funk Road
Lake Arthur, NM 88253

Dear Mr. Troost,

Waste water ponds at Cottonwood Springs Dairy were built as; Large pond 200'x430'x10' deep, 15.8 acre foot capacity. Small pond 200'x200'x7' deep, 4.5 acre foot capacity, both were lined with 40 mil Smooth High-Density Polyethylene. Both were compacted to 90% minimum density (see attached report). Attached also is a layout of the ponds.

A new 25 horsepower Agpro pit pump was installed in the barn water pit Southeast of the milk barn. ump pumps the barn water effluent approximately 3000' at 350 GPM to an Agpro model Mark VI ator with a .040" screen. The solids are deposited on a concrete slab and the liquids go to a plastic lined ono.

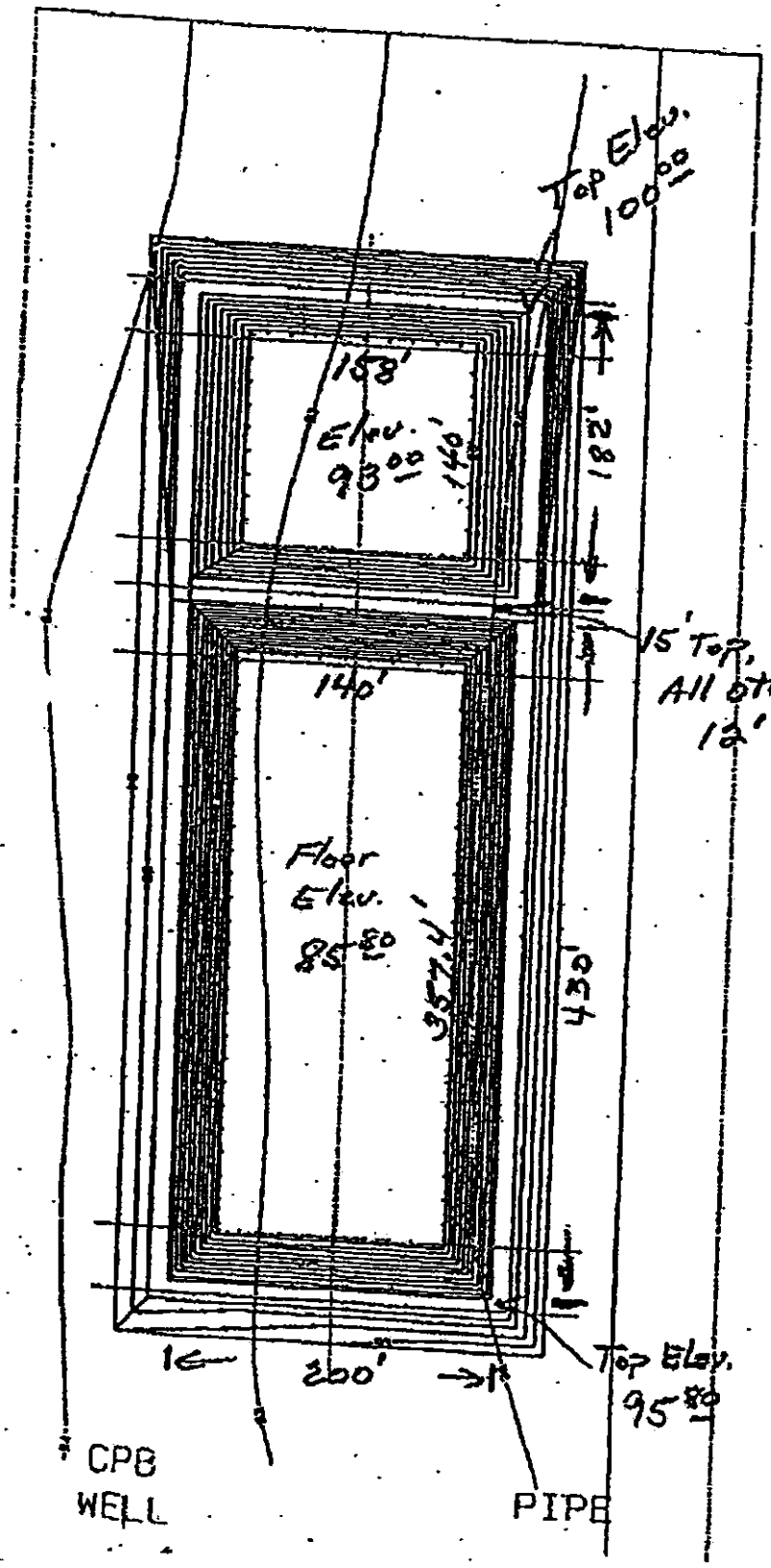
An Agpro model D600H30 floating 25hp pump pumps the effluent from the ponds to the center pivot for pplication to the farm land.

Sincerely,

David Pope

added
documentation
& calculations

wastewater



Cottonwood Springs

Scale 1" = 100'
All Slopes 3:1

Ag Services
1905 Old Dexter Highway
Roswell, NM 88203
(505) 623-9264 Fax (505) 622-7232

November 4, 2002

Glorietta Geoscience
Cathy Ratcliff

Mrs. Ratcliff,

Ag Services performed the lining of the Cottonwood Dairy lagoon using 40 mil HDPE liner material. The manufacturer's recommended seaming layout was followed, and all field testing complied with the manufacturer's specifications. Air gap pressure tests were performed on wedge welds, all tests were satisfactory. Vac box tests were performed on extrusion welds and batten strips, and all test results were satisfactory.

Enclosed is a copy of a letter from Agru America, our supplier for HDPE liner material, confirming that Ag Services is an approved installer of their products. If you have any questions please contact us.

Sincerely,

David Pope

David Pope

agru americas

October 25, 2002

To Whom It May Concern:

This is to confirm that AG Services is an approved installer of Agru America's HDPE and LLDPE geomembrane products.

P. W. Barker
Technical Director

10-25-02
Date

Executive Offices: 500 Garrison Road, Georgetown, S.C. 29440 • 843-546-0600 • 800-321-1373 • Fax 843-546-0516
Sales Office: 750 Rockmead, Suite 150, Kingwood, TX 77339 • 281-358-4741 • 800-373-2478 • Fax 281-358-5237
email: salesmkg@agruamerica.com

Smith Engineering Company
A Full-Service Engineering Company

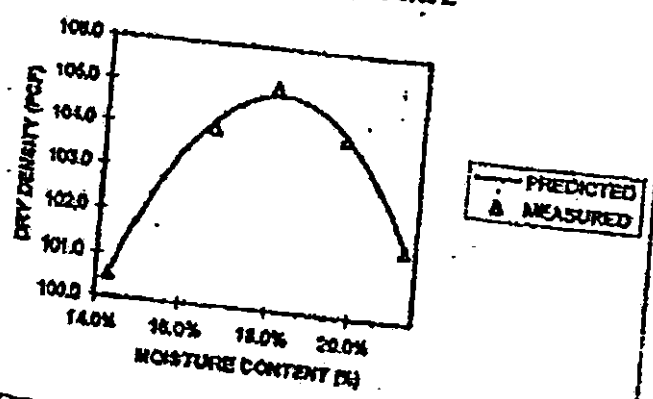
SOIL REPORT FORM

PROJECT COTTONWOOD SPRINGS LAGOON
CLIENT AG SERVICES
CONTRACTOR AG SERVICES
A SAMPLE OF NATURAL GROUND
LOCATION ON LOCATION

LAB NO. 302803
SAMPLE NO. J020484
SAMPLED BY CLIENT DATE 1/15/02
TESTED BY DLG/MD/FS DATE 1/18/02

TEST METHOD – ASTM D-698 A

MOISTURE-DENSITY CURVE



AGGREGATE SIEVE ANALYSIS
ASTM C136

SIEVE SIZE (U.S.B.S.)	CUMULATIVE % PASSING	SPECIFICATION LIMITS
2"	NT	
1 1/2"	NT	
1"	NT	
3/4"	NT	
1/2"	NT	
3/8"	NT	
No. 4	NT	
No. 10	NT	
No. 40	NT	
No. 80	NT	
No. 200	NT	

% GRAVEL	NT
% SAND	NT
% SILT AND CLAY	NT

MAX. DRY DENSITY 105.0 OPTIMUM MOISTURE 18.0%
CORRECTED FOR OVERSIZE FRACTION: (ASTM D4718)
MODIFIED M.D. NT MODIFIED O.M. NT

ATTERBERG LIMITS (ASTM D4318)
LIQUID LIMIT NT PLASTICITY INDEX NT

CLASSIFICATION (ASTM D2487)
UNIFIED CLASSIFICATION:

REMARKS:

COPIES TO: AG SERVICES

Thomas E. Dick P.E.
N.M. License No. 6136

REPORT OF MOISTURE FIELD DENSITY TESTS

Smith Engineering Company
A Full Service Engineering Company

PROJECT: Cottonwood Springs Lagoon

CLIENT: Ag Services

LAB NO: 302803

CONTRACTOR: Ag Services

TESTED BY: SAY

MATERIAL: Natural Ground

DATE TESTED: 1/18/02

TEST NUMBER	LOCATION OF TEST	PERCENT MOISTURE	DRY DENSITY LBS/CU FT	PERCENT PROCTOR	REQUIRED COMPACTION
1	Position 1, small tank	11.0	117.3	112%	90%
2	Postion 2, small tank	7.9	109.0	104%	90%
3	Postion 3, small tank	11.8	116.2	111%	90%
4	Portion 4, large tank	7.1	102.9	98%	90%
5	Postion 5, large tank	13.1	116.0	110%	90%
6	Postion 6, large tank	10.0	119.8	114%	90%
7	Postion 7, large tank	13.6	115.3	110%	90%
8	Postion 8, large tank	11.1	117.7	112%	90%
9	Pcsrion 2, large tank	11.3	110.4	105%	90%

REMARKS:

TEST METHOD: ASTM-D-2922, ts

OPTIMUM MOISTURE: 15.0

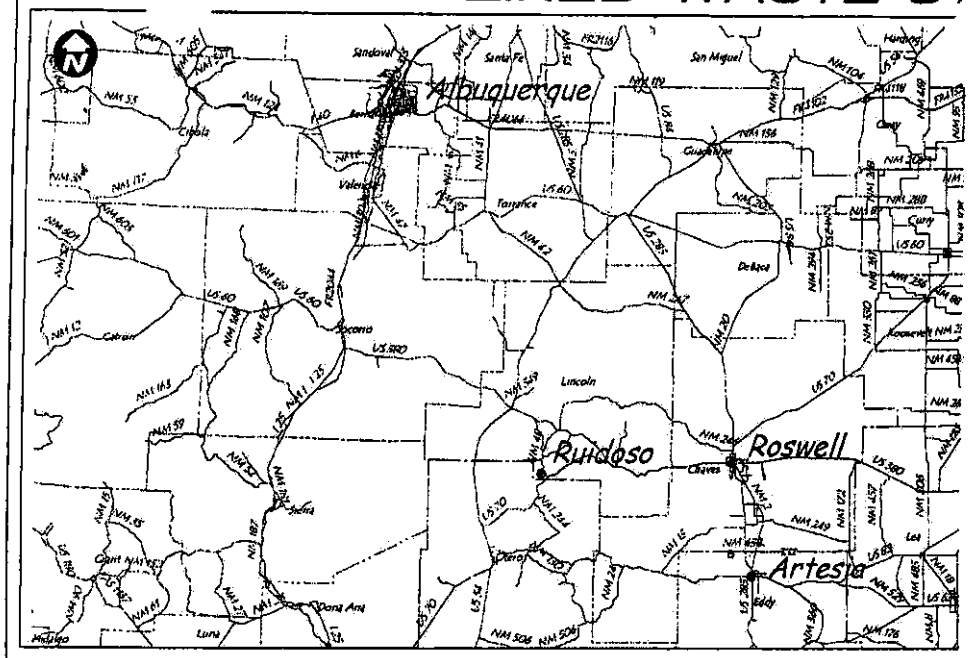
OPTIMUM DENSITY: 105.0

COPIES TO: Ag Services

THOMAS E. DICK
STATE OF NEW MEXICO
NO. 6135
REGISTERED PROFESSIONAL ENGINEER

THOMAS E. DICK, P.E.
N.M. LICENSE NO. 6135

LINED WASTE S, ORAGE FACILITY


Albuquerque
Sandoval
Santa Fe
San Miguel
Harding
Cibola
Valencia
Torrance
Guadalupe
Quay
Bernalillo
Bernalillo
Sandoval
Rio Arriba
Taos
Colfax
Union
McKinley
Cibola
Sierra
Socorro
Catron
Lincoln
Ruidoso
Roswell
Chaves
Artesia
Eddy
Lea
Otero
Dona Ana
Luna
Hidalgo
Grant
Roosevelt
Curry
Debaca
Harding
Guadalupe
Torrance
Valencia
Bernalillo
Sandoval
Santa Fe
San Miguel
Mora
Colfax
Union
Harding
Quay
Curry
Roosevelt
Lincoln
Otero
Eddy
Lea
Chaves
Dona Ana
Luna
Hidalgo
Grant
Sierra
Socorro
Catron
Cibola
Valencia
Torrance
Guadalupe
Bernalillo
Sandoval
Rio Arriba
Taos
Colfax
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Dona Ana
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Hidalgo
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Guadalupe
Torrance
Valencia
Bernalillo
Sandoval
Santa Fe
San Miguel
Mora
Colfax
Union
McKinley
Cibola
Sierra
Socorro
Catron
Lincoln
Otero
Eddy
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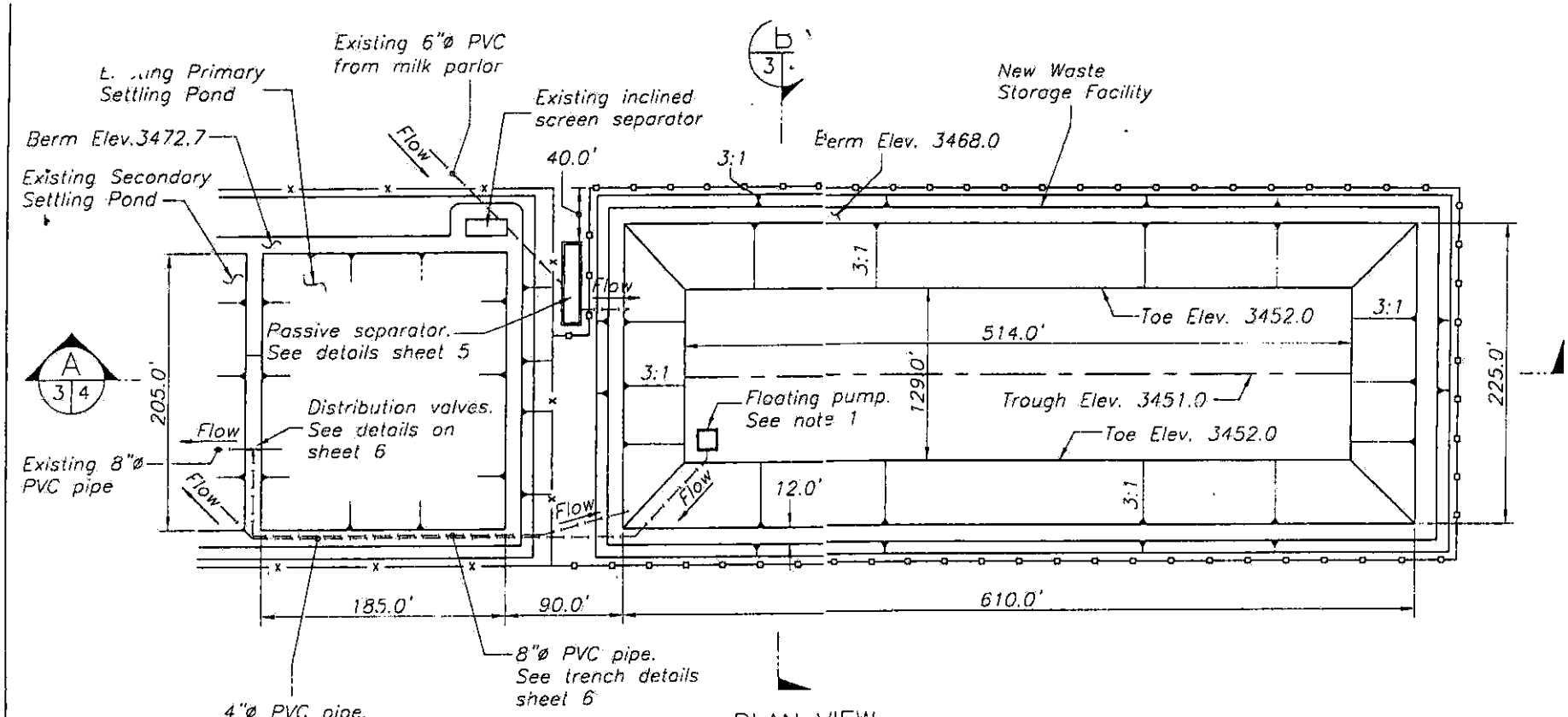
Valencia



PLAN VIEW

WASTE STORAGE FACILITY

0 80 160
Scale in Feet

LEGEND

—x— = Existing fence

—o— = New fence see details sheet 7

3:1 = Structure slope (TYP).

Notes:
1. Floating pump, 5HP, 200 GPM, TDH 40ft.
2. The outlet of the 4"ø PVC pipe will extend at lest 1 foot past the inside of the berm to outlet unto the liner of the settling pond.
3. The outlet of the 8"ø PVC pipes will extend at least 1 foot past the inside of the berm to outlet unto the liner of the new waste storage facility.
4. Pond will be lined in accordance with NRCS Conservation Practices 521A.
5. Appropiate warning signs must be installed on the fence surrounding the waste storage facility.

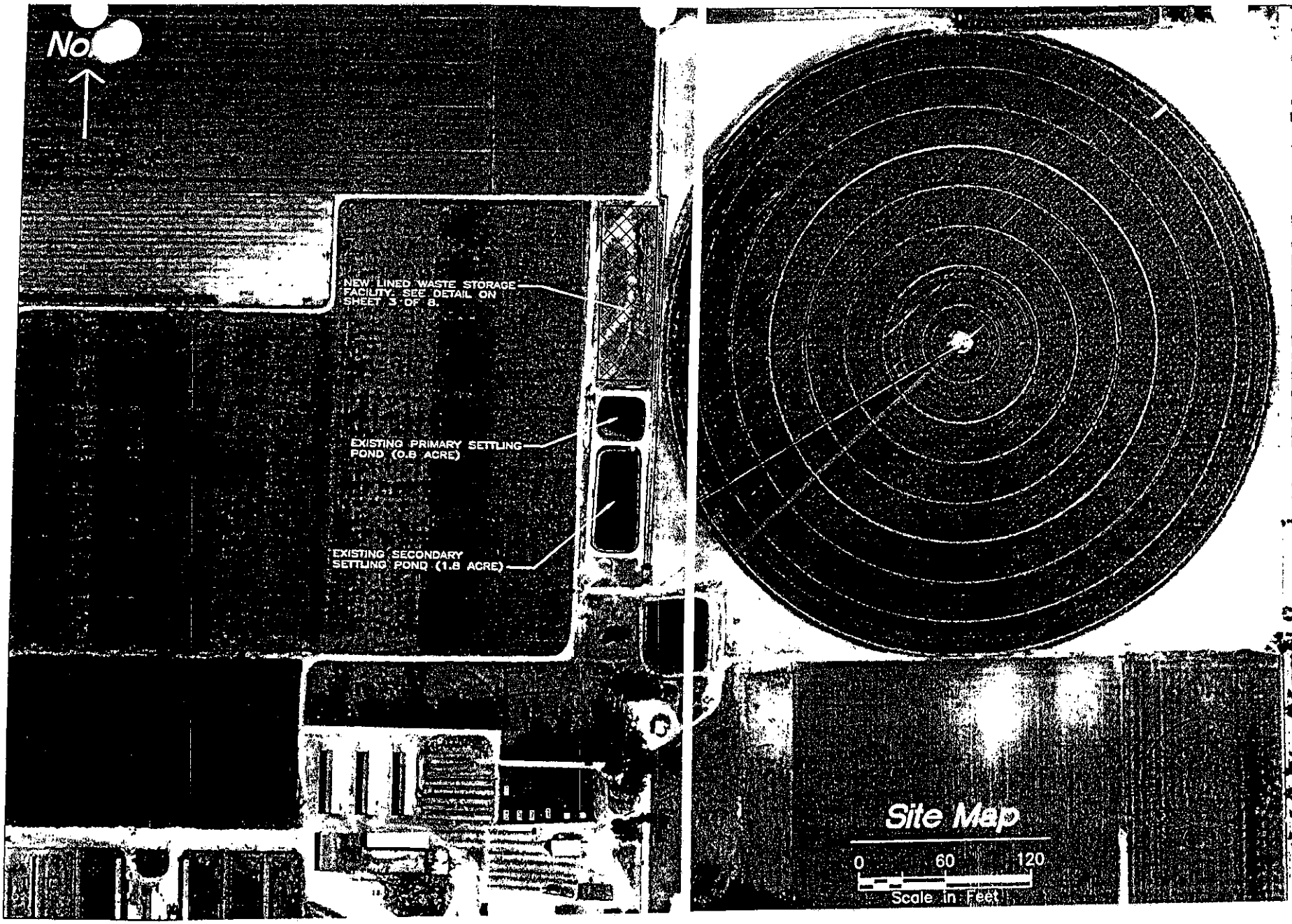
DAVID J. PACHECO
NEW MEXICO
10730
LICENSED PROFESSIONAL ENGINEER

Designed D. Fischer
Drawn E. Zuniga
Checked D. Fischer

PLAN VIEW & NOTES
WASTE STORAGE FACILITY
COTTONWOOD SPRING DAIRY

NRCS
Natural Resources Conservation Service

File Name sheet3of8.dwg
Drawing No. NM - [-1344
Sheet 3 of 8

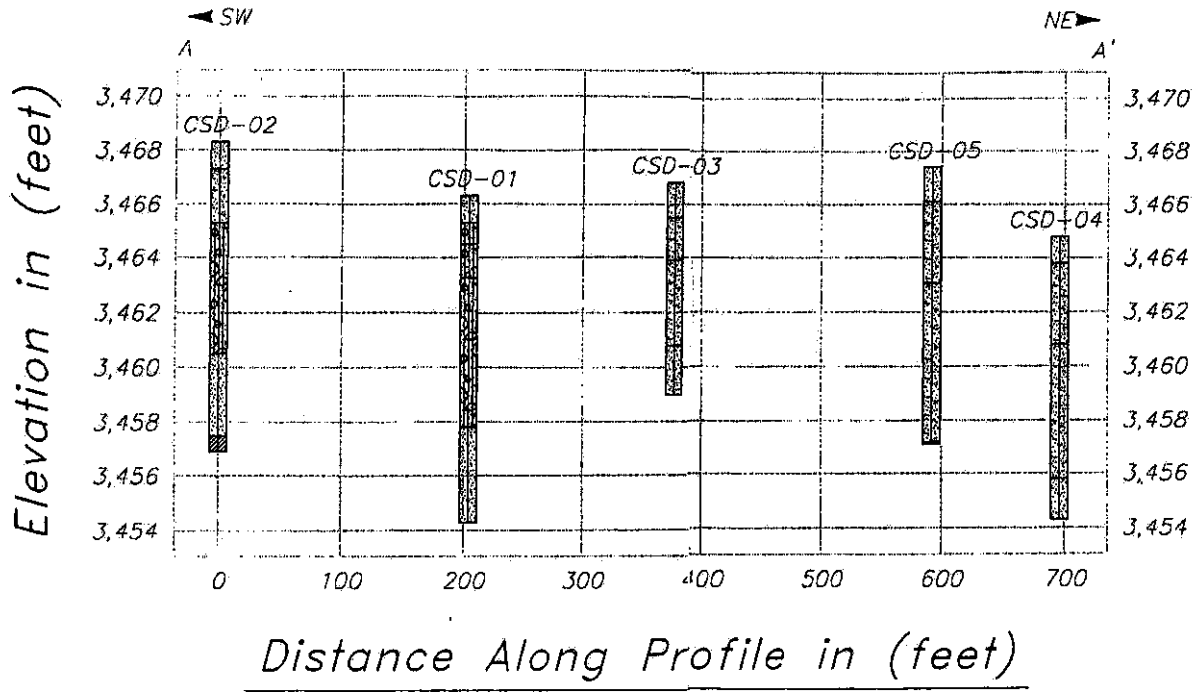


NRCS
Natural Resources Conservation Service

Designed
Drawn
Checked
Approved
Date

File Name
csdphose1.dwg

Drawing No.



N

0 100 200
Horiz. Scale in Feet

(Vertical Exaggeration: 21.5x)

LITHOLOGY GRAPHICS

- USCS Silty Sand
- USCS Low Plasticity Silty Clay
- USCS Silty Sand w/Gravel
- Calcareous material
- Calcium Carbonate Cemented Layer

CSD-01 — Borehole Number

Borehole Lithology — Well Construction

Water Level Reading at time of excavation.

Water Level Reading after excavation.

DAVID J. PACHECO
NEW MEXICO
10737
LICENSED PROFESSIONAL ENGINEER

GEOLOGIC X-SECTIONS
WASTE STORAGE FACILITY
COTTONWOOD SPRING DAIRY

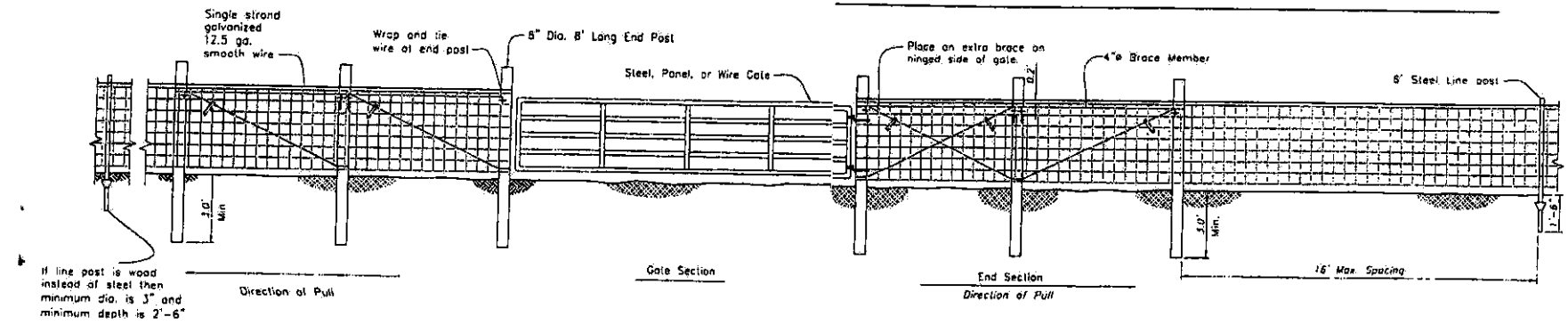
Eddy County, New Mexico

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

		Date
Designed	D. Fischer	
Drawn	E. Zunga	07-08
Checked	D. Fischer	07-08
Approved	D. Pacheco	07-08

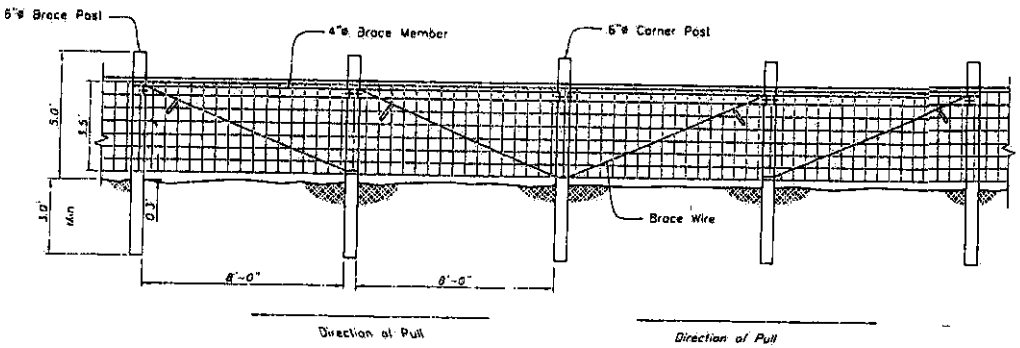
File Name: csdphase1.dwg

Drawing No.: NM-E-1344



GATE SECTION AND LINE FENCE SECTION

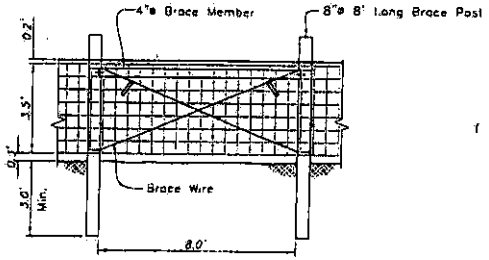
0 1 2 3 4 5
Scale in Feet



CORNER AND DIRECTION CHANGE BRACING

0 1 2 3 4 5
Scale in Feet

Corner assemblies shall be installed at all points where the fence alignment changes 15 degrees or more.



PULL POST ASSEMBLY

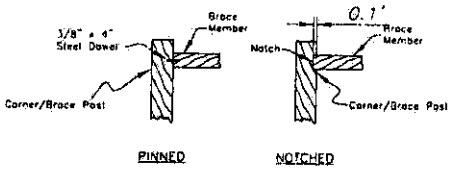
0 1 2 3 4 5
Scale in Feet

Pull post assembly shall be installed at the following locations:

a. In straight sections, at intervals not to exceed 660 feet.

b. At any point where the vertical angle described by two adjacent reaches of wire is upward and exceeds 10 degrees.

c. At the beginning and end of each curved fence section.



POST AND BRACE DETAIL

N.T.S.

NOTES:

1. Woven wire fabric shall be square open grid with nominal 6-inch spacing constructed with galvanized 12.5 gage or heavier wire. Top and bottom strands shall be 9 gage galvanized or heavier wire.
2. Fencing shall be placed on the side of the post opposite the pond to be protected.
3. Staples shall be 9 gauge or heavier with a minimum length of 1½".
4. No. 9 wire or heavier shall be used for bracing. Use 2 inch hardwood twist stick.
5. Corner, gate, and brace posts shall be pressure treated pine in accordance with ASTM D 1760. In the alternate, corner and brace posts may be 3-inch diameter (O.D.) steel posts weighing at least 7.58 pounds per foot. Steel posts shall be protected with rust-resistant paint or galvanized. Steel posts shall be set in concrete in a 12-inch diameter hole.
6. Steel line posts shall be new, painted or galvanized, "T" or "U" posts weighing at least 1.25 pounds per foot.
7. Use either the pin[illegible]

DAVID J. PACHECO
NEW MEXICO
10737
LICENSED PROFESSIONAL ENGINEER

		Date
Designed	D. Fischer	
Drawn	E. Zange	03-08
Checked	D. Fischer	07-08

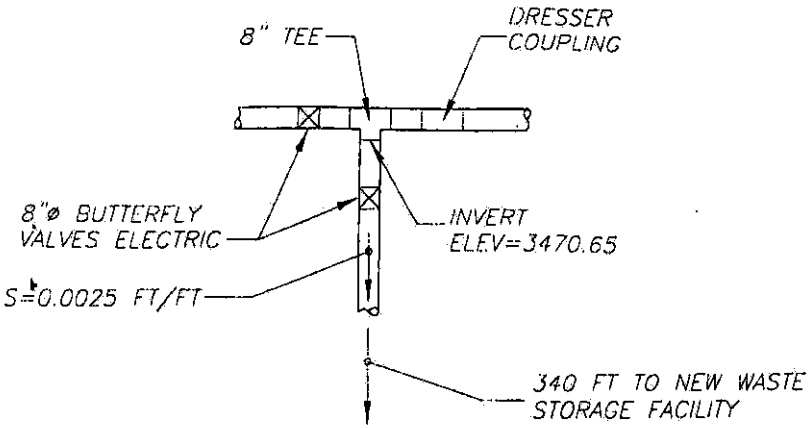
WOVEN WIRE FENCE DETAILS
WASTE STORAGE FACILITY
COTTONWOOD SPRING DAIRY

Eddy County

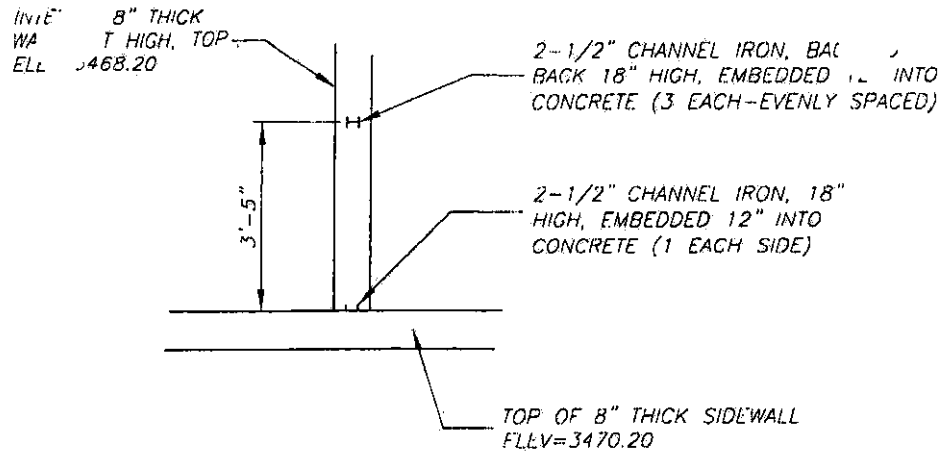
NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File Name
csdphase1.dwg

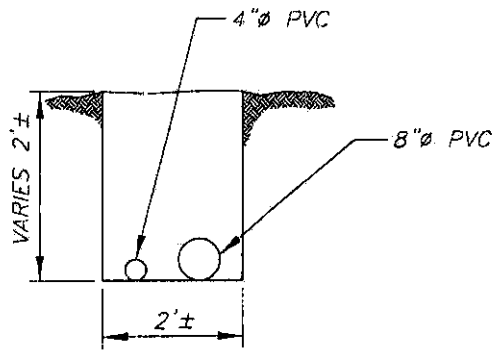
Drawing No.
NM - E - 1344



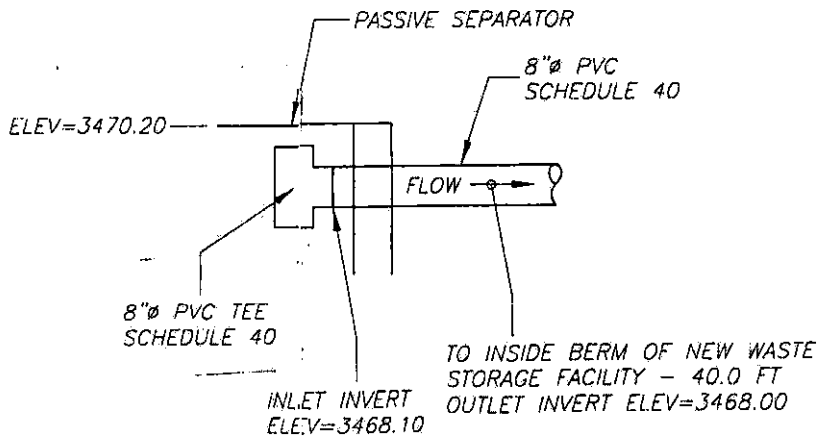
DISTRIBUTION VALVES



WEEPER WALL DETAIL



TRENCH DETAIL (TYP.) FOR 4" & 8" PVC



8"ø PVC OUTLET TO NEW WASTE STORAGE FACILITY

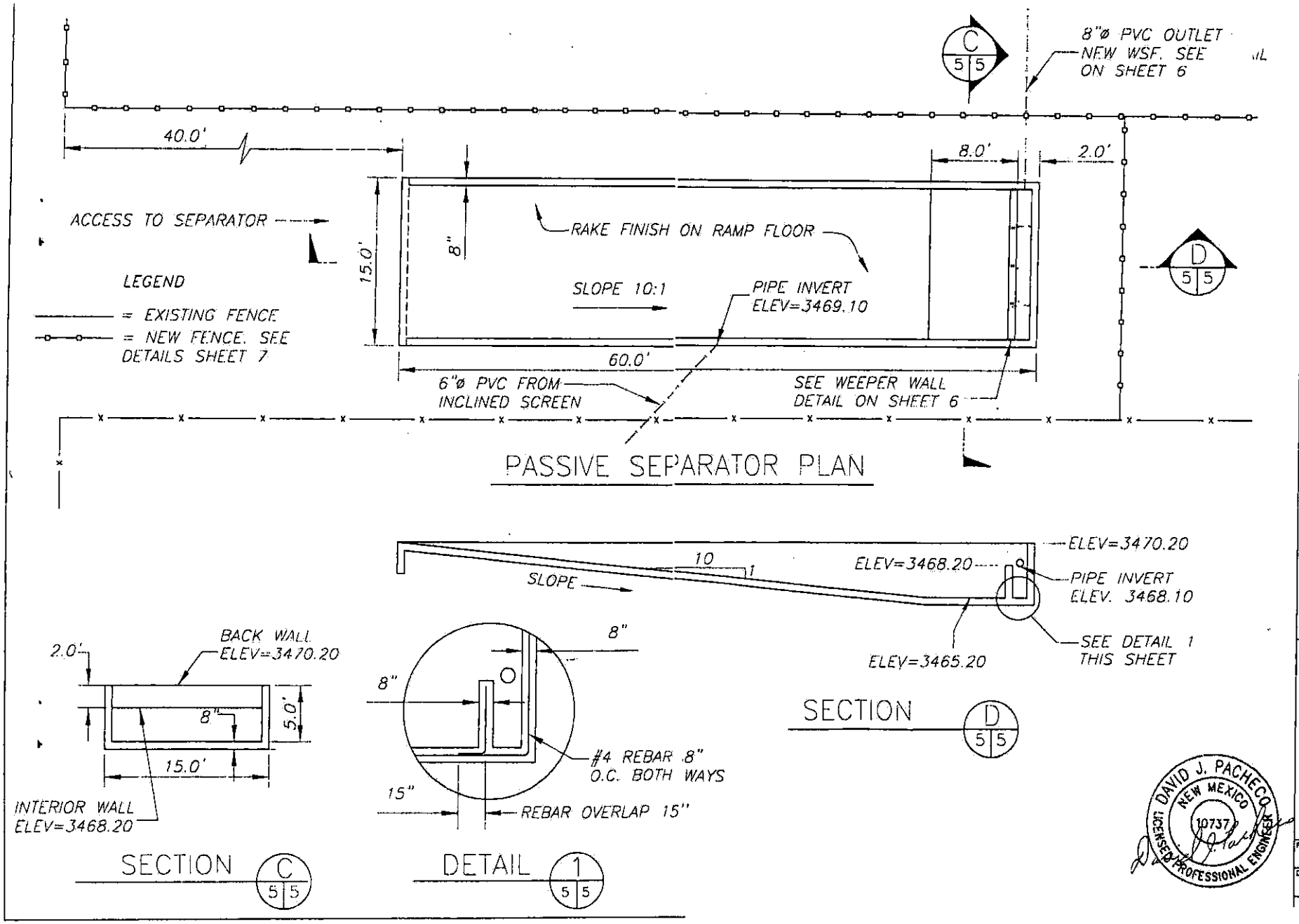
Date
Designed D. Pacheco 07-08
Drawn E. Jones 07-08
Checked D. Pacheco 07-08

PASSIVE SEPARATOR - DETAILS
WASTE STORAGE FACILITY
COTTONWOOD SPRING DAIRY

NRCS
Natural Resources Conservation Service

File Name
csdphase1.dwg

Drawing No.
NM - E - 1344



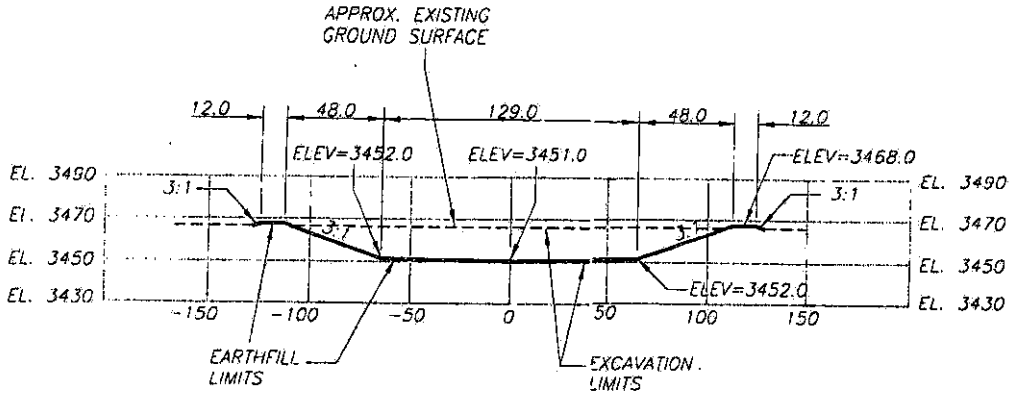
PASSIVE SEPARATOR - PLAN, SECTIONS, & DETAIL
WASTE STORAGE FACILITY
COTTONWOOD SPRING DAIRY

Designed D. Fischer
Drawn E. Zuniga
Checked D. Fischer

NRCS
Natural Resources Conservation Service

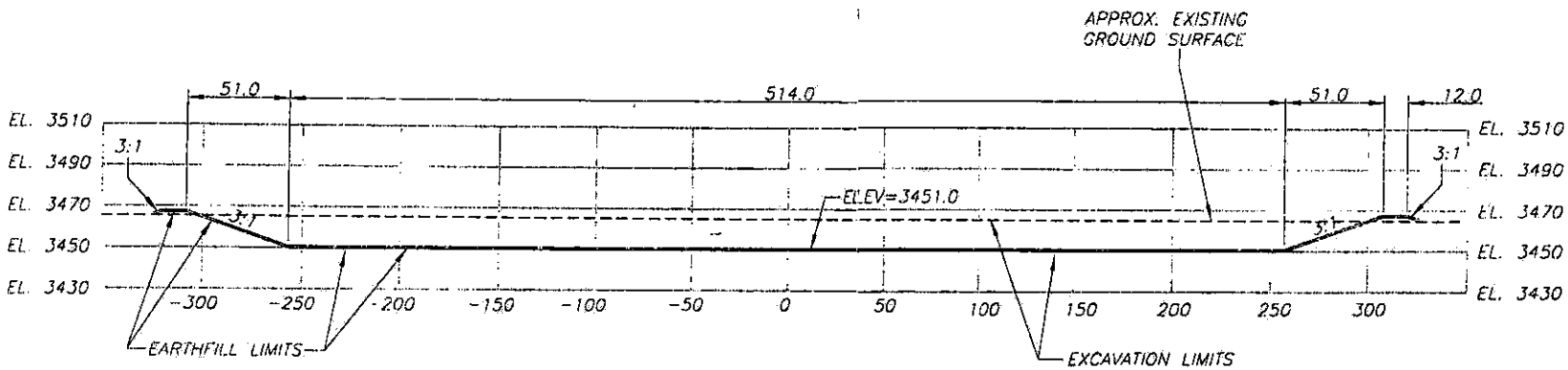
File Name
csdphase1.dwg

Drawing No.
NM - E - 1344



SECTION B 3|4

0 60 120
Scale in Feet



SECTION A 3|4

0 60 120
Scale in Feet

DAVID J. PACHECO
NEW MEXICO
10737
LICENSED PROFESSIONAL ENGINEER

Designed D. Fischer
Drawn E. Zunga
Checked D. Fischer
Date 07-08 07-08

CROSS-SECTIONS
WASTE STORAGE FACILITY
COTTONWOOD SPRING DAIRY

Eddie County

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File Name
csdphase1.dwg

Drawing No.
NM - E - 1344

Stormwater runoff ponds
Storage calculations, Plans

Ag Services
1905 Old Dexter Highway
Roswell, NM 88203
(505) 623-9264 Fax (505) 622-7232

May 20, 2002

Phil Troost
Cottonwood Springs Dairy
491 W. Funk Road
Lake Arthur, NM 88253

Dear Mr. Troost,

The rain water pond at Cottonwood Springs Dairy was constructed in 1991 at the same time the dairy was built. It was built to equal or exceed specifications furnished by Loney Ashcraft, USDA Soil Conservation Service.

Sincerely,

David Pope

David Pope

added documentation & calculations Storm water

U.S. Department of Agriculture
Natural Resources Conservation Service

NM-ENG-121 (modified for dairy runoff pond
Version 2.6 (5/8/06)

HYDROLOGY DATA SHEET for 25 yr 24 hr rainfall in NM

(Chapter 2 - Engineering Field Manual for Conservation Practices, NM 2/85 update, **modified for volume only**)

Planners are reminded that ALL clean water from the runoff area is to be DIVERTED out of the pond drainage area.

Dairy Name: Cottonwood Springs Da
Location: Artesia
Dairy Manager: Mr Philip Troost
Practice Name: 378 Pond
Pond Name/Num.: Runoff Pond SW
DATE: 11/30/09
Planner: Reddy Ganta
CHECKED BY: PG
Pond Location (Climate by County): Eddy, ARTESIA 6 S NM0600

Weighted Average Runoff Curve Number

Acres in WS	Soil Map Unit #	Soil Name	Soil Hydrologic Condition & Hyd. Soil Group	RCN[1]	RCN x Ac
84.4	All	All	Feedlot-Confined Animal Area, unpaved - All	90	7596
2.0	All	All	Impervious Areas-pavement, roofs, concrete alleys - All	95	190
	All	All	Feedlot-Confined Animal Area, unpaved - All	90	0

TOTAL DRAINAGE AREA (A) = 86.4 ac

WEIGHTED RUNOFF CURVE NUMBER = 90

CHANNEL-LOSS FACTOR (CLF):	1 (For dairies it is always 1)
RAINFALL, 24-HR:	4.0 in
DIRECT RUNOFF (Q):	2.9 in
NET RUNOFF (Q*CLF):	2.9 in
VOLUME OF RUNOFF (Qn*A/12):	**21.1 ac-ft**

[1] RCNs are based on the Chapter 2 of the Engineering Field Manual (updated for NM 2/85) and the TR-55 manual (6/86). Selected numbers are appropriate for NM dairy runoff pond estimates.

Briefly describe the dairy pond drainage hydrologic condition:

East Storm Runoff Pond

Designed, Surveyed, Staked & Crossections Shot 5/12-14th/2002 By Don Alem A.C.S.-

Orginally Structure 3517.5 Gives About 4-6 Ac.ft storage

Planned top of Dam & Dike 3522 Ele; Holding & Spillway Ele 3520

All Volumes Figured on Ele 3520. And Using N.R.C.S Artesia Field office End Area Program. Design t.w. 10-12ft/2:1 Slope

Sta 0+0 is S.E. Corner of Structure

① For fill 14 no Stations used. f.0 + 4.6' — to 2.2' by Spillway 85% of Shots needed fill. Using NRCS End Area Program Need. 4,600 cubic yds + 10% overfill = 5,060 cubic yds Compacted fill

Borrow Area should be within Ele 3520 on Pima Silt Loam Soils this would give 5060 Cubic Yds X 1.25 Factor (Cut/fill Ratio) = 6,325 cubic yards Cut/Borrow X 27 ft³ X 7.48 gal/cubic ft ÷ 325,850 gal/ac ft = 3.92 ac. More Storage Volume

② For Volum As Planned Using Existing Conditions ± Used 12 no. Crossections Running from Sta. west top Edge Planned to Ele Reading of 3520 Ave. Crossection Had 8 to 10 Shots, Plus 2 no Sta Equal 0 Volumes Giving 14 no. Sta. Using NRCS Artesia Field Office End Area Method. gave 45,983 Cubic yds X 27 cu ft/yd³ X 7.48 gal/cu ft ÷ 325,850 gal/ac ft = 28.5 Ac ft Storage with 2 ft free Bd.

③ total Storage Volume with 2 ft free Bd 3520 Holding

28.5 ac ft + 3.92 ac ft = 32.4 Ac.ft.

1.1 times more than Needed in 50 yr. Storm
1.28 " " " " in 25 yr Storm.

See Attached Map for Details

Department of Agriculture
Natural Resources Conservation Service

NM-ENG-121 (modified for dairy runoff pond
Version 2.6 (5/8/06)

HYDROLOGY DATA SHEET for 25 yr 24 hr rainfall in NM

(Chapter 2 - Engineering Field Manual for Conservation Practices, NM 2/85 update, **modified for volume only**)

Planners are reminded that ALL clean water from the runoff area is to be DIVERTED out of the pond drainage area.

Dairy Name: Cottonwood Springs Da
Location: Artesia
Dairy Manager: Mr Philip Troost
Practice Name: 378 Pond
Pond Name/Num.: Runoff Catchment
DATE: 11/30/09
Planner: Reddy Ganta
CHECKED BY: Tom Collins (USDANRCS)
Pond Location (Climate by County): Eddy, ARTESIA 6 S NM0600

Weighted Average Runoff Curve Number

Acres in WS	Soil Map Unit #	Soil Name	Soil Hydrologic Condition & Hyd. Soil Group	RCN[1]	RCN x Ac
28.8	All	All	Feedlot-Confined Animal Area, unpaved - All	90	2592
	All	All	Impervious Areas-pavement, roofs, concrete alleys - All	95	0

TOTAL DRAINAGE AREA (A) = 28.8 ac
WEIGHTED RUNOFF CURVE NUMBER = 90

CHANNEL-LOSS FACTOR (CLF):	1 (For dairies it is always 1)
RAINFALL, 24-HR:	4.0 in
DIRECT RUNOFF (Q):	2.9 in
NET RUNOFF (Q*CLF):	2.9 in
VOLUME OF RUNOFF (Qn*A/12):	**7.0 ac-ft**

[1] RCNs are based on the Chapter 2 of the Engineering Field Manual (updated for NM 2/85) and the TR-55 manual (6/86). Selected numbers are appropriate for NM dairy runoff pond estimates.

Briefly describe the dairy pond drainage hydrologic condition:

NM-POND SIZE EVALUATION OR LOT RUNOFF

SDA Natural Resources Conservation Service Version 2.3 (1/11/06) **Date:** 9/10/2006

Dairy Name:	Cottonwood Springs	**Dairy Manager:**	Mr Phil Troost
Location:	Artesia	**Planner:**	Reddy Ganta
Pond/Lagoon #:	RO	**Pond Type:**	Runoff Catchment area

Pond Storage Capacity

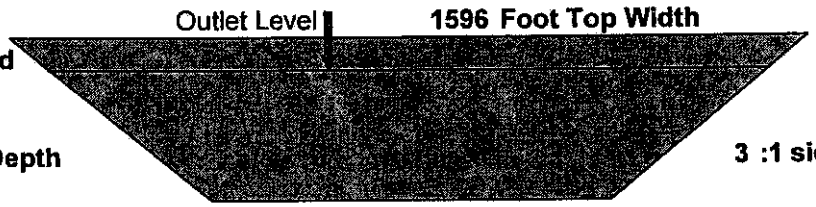
25 year-24 hrs Storm Runoff Volume Storage Requirement:	**21.1 ac. ft.**
25 year-24 hrs Storm Direct Rainfall Volume Storage Requirement:	**19.5 ac. ft.**
Total Design Volume Needed:	**40.6 ac. ft.**

POND DEPTH (high water line) (ft)	5	
FREEBOARD (above high water line) (ft)	2	
LENGTH (high water line) (ft)	1584	Pond size is OK.
WIDTH (high water line) (ft)	1584	
SIDE SLOPE (inside) (ft:ft)	3 :1	
SURFACE AREA (high water Line)	57.6	Acres

Total Designed Storage: 1,282.6 ac. ft. | 456084 cu. Yd.
1,539,120 ac. in. | ############# gal.

Note: *((area of high water line)+(area of the bottom)+(4 times the area of the mid section))*(depth)/6 = Vol (cu ft)*

Width cross section



1596 Foot Top Width

2 ft Freeboard

5 ft Storage Depth

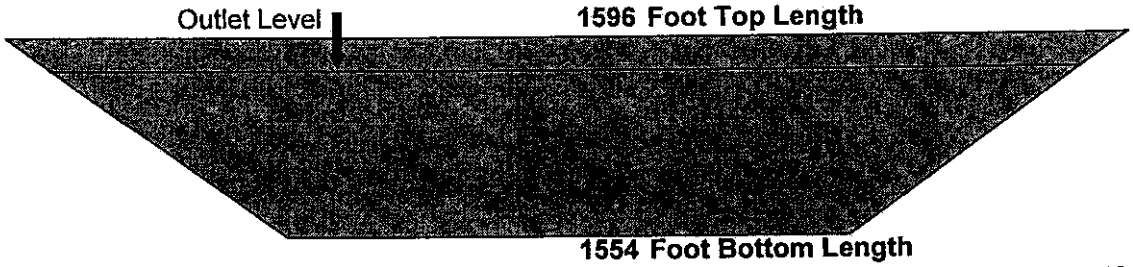
3 :1 side slope

7 ft Total depth needed

1554 Foot Bottom Width

Wetted Perimeter (ft): 1598

Length cross section



1596 Foot Top Length

1554 Foot Bottom Length

Wetted Perimeter (ft): 1598

Construction Quantities

Bottom Area =	**2414916 sq. ft.**	
Top Area =	**2547216 sq. ft.**	
Excavation Volume =	**643163 Cu. Yds.**	
Lining Area =	**2,592,976 ft^2**	**288108 yds^2**

Note: These quantities assumes a level existing ground surface.

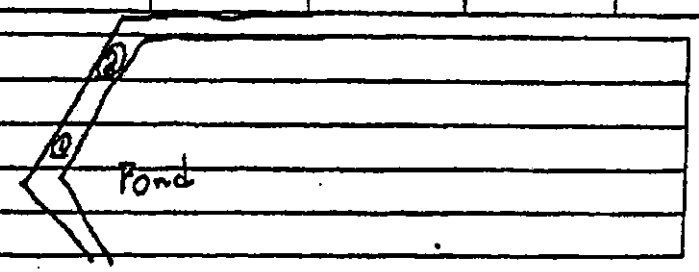
Quality Control Engineering, Inc.
1136 W. Hobbs Roswell, NM 88203
505-625-0005 Fax: 625-0555
2749 Florida Ave., Alamogordo, NM 88310
505-439-1285 Fax: 439-1283

TEST REPORT FOR IN-PLACE DENSITY
(ASTM D2922, D3017)

Project CWSD Project # _____ Date 10-7-02 Report # _____
Client _____ Subcontractor _____
Description of Work filler berms Time Onsite: From 11:15 to 11:50 Travel: _____ Tech. TM

Test Location	Elevation or Lift	Probe Depth (in.)	% Moisture	Wet Density lb/ft³	Dry Density lb/ft³	Max Den / Opt. Moist.	% Compaction	Minimum Specs
81' SW of East Corner of berm	1st	6"	13.7	118.1	103.8	112.0 / 14.8	93	90
75' NE of SE corner of berm	✓	✓	13.1	121.3	107.3	✓	96	✓
6' W of SE Corner	✓	✓	16.0	122.4	105.5	✓	94	✓

time on site 11:15



STANDARD COUNT: MOISTURE _____ DENSITY _____ _____
TEST EQUIPMENT: MAKE: TROXLER MODEL: _____ SERIAL # _____
DATE & SOURCE OF CALIBRATION _____ _____

CONTINUED..

Quality Contr ineering, Inc.
1136 W. Hobbs Roswell, NM 88203
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505-439-1285 Fax 505-439-1283

TEST REPORT FOR IN-PLACE DENSITY
(ASTM D2922, D3017)

Project Cottonwood Springs Dairy **Client** Cottonwood Springs Dairy **Project #**200R **Date** 11/21/02

Report# 4 **Description of Work** Backfill on Berm **Tech** MM Armstrong

Test Location	Elevation or Lift	Probe Depth (in)	% Moisture	Wet Density lb/cu ft	Dry Density lb/cu ft	Max. Den./Opt Moist.	% Compaction	Minimum Specs
84' N of N gate	Final	6"	9.8%	127.1	115.6	112.0/14.8	103%	90%
150' S of N end of berm	Final	6"	13.9%	128.5	112.8	112.0/14.8	101%	90%

Time 2.0 hr includes trip

Make: Troxler **Model:** 3430 **QCE#** 5

Quality Cont ngineering, Inc.
1136 W. Hobbs Roswell, NM 88203
505-625-0005 Fax: 625-0555
2749 Florida Ave., Alamogordo, NM 88310
505-439-1285 Fax: 439-1283

TEST REPORT FOR IN-PLACE DENSITY
(ASTM D2922, D3017)

Project CWSD Project # _____ Date 11-21-02 Report # _____
Client _____ Subcontractor _____
Description of Work Backfill on Burn Time Onsite: From 1:15 to _____ Travel: _____ Tech. MA

Test Location	Elevation or Lift	Probe Depth (in.)	% Moisture	Wet Density lb/ft³	Dry Density lb/ft³	Max Den / Opt. Moist.	% Compaction	Minimum Specs
84' North gate			9.8	127.1	115.6	112.0 / 14.8	103	90
150' S of N end of burn			13.9	128.5	112.8		101	

STANDARD COUNT: MOISTURE _____ DENSITY _____ _____
TEST EQUIPMENT: MAKE: TROXLER MODEL: _____ SERIAL # _____
DATE & SOURCE OF CALIBRATION _____ _____

CONTINUED . .

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505-439-1285 Fax: 439-1283

TEST REPORT FOR IN-PLACE DENSITY
(ASTM D2922, D3017)

Project CWSD Project # _____ Date 11-21-02 Report # _____

Client _____ Subcontractor _____

Description of Work Backfill on Burn Time Onsite: From 1:15 to _____ Travel: _____ Tech. MA

Test Location	Elevation or Lift	Probe Depth (in.)	% Moisture	Wet Density lb/ft³	Dry Density lb/ft³	Max Den / Opt. Moist.	% Compaction	Minimum Specs
84' N of gate			9.8	127.1	115.6	112.0 / 14.8	103	90
150' S of N end of burn			13.9	128.5	112.8		101	

STANDARD COUNT: MOISTURE _____ DENSITY _____ _____

TEST EQUIPMENT: MAKE: TROXLER MODEL: _____ SERIAL # _____

DATE & SOURCE OF CALIBRATION _____ _____

Pg. 1 of 1

CONTINUED..

Dorrow

Quality Control Engineering, Inc.
1136 W. Hobbs Roswell, NM 88203
505-625-0005 Fax: 625-0555
2749 Florida Ave., Alamogordo, NM 88310
505-439-1285 Fax: 439-1283

TEST REPORT FOR IN-PLACE DENSITY
(ASTM D2922, D3017)

Project Cottonwood Springs Dairy Project # _____ Date 10-11-02 Report # _____

Client Phil Trost Subcontractor _____

Description of Work E Runoff Water Containment Rd All E Subgrade Time Onsite: From _____ to _____ Travel: _____ Tech. ET

Test Location	Elevation or Lift	Probe Depth (in.)	% Moisture	Wet Density lb/ft³	Dry Density lb/ft³	Max Den / Opt. Moist.	% Compaction	Minimum Specs
300' from N. end Reference N. end Rd.	1 ft	6 in	12.0	124.2	110.9	112.0 / 14.8	99	90
100' N. of bend N. end Rd	2 ft	6	14.5	130.9	114.3		102	
Middle of 45° Bend	3 ft	6	10.4	114.5	103.7		93	
300' from W. end W. end of Rd. Center of E.I.H. Portion	Final @ 1½'	6	9.0	115.7	106.1		95	

STANDARD COUNT: MOISTURE 640 DENSITY 2400 _____

TEST EQUIPMENT: MAKE: TROXLER MODEL: 3430 SERIAL # 5

DATE & SOURCE OF CALIBRATION _____ _____

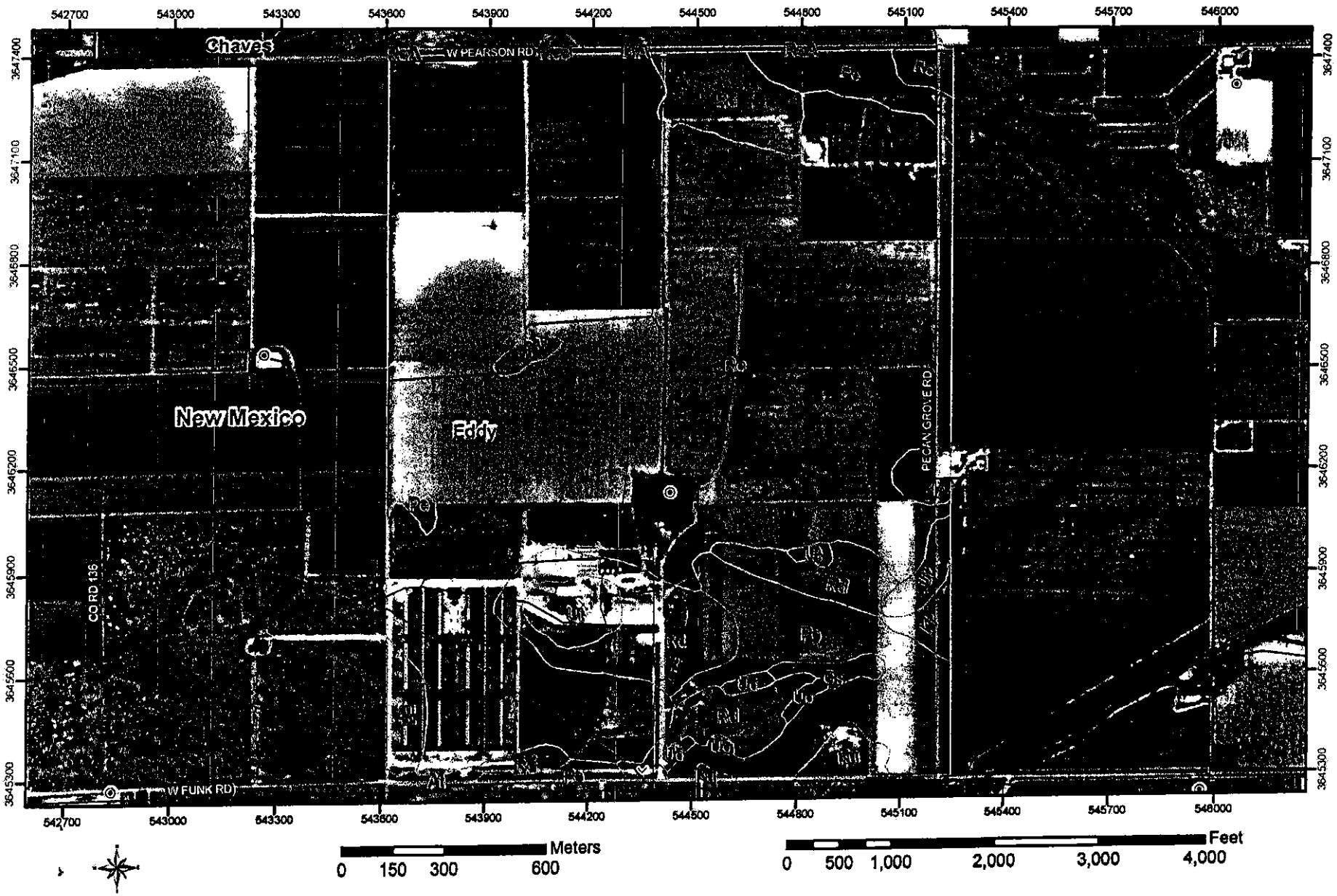
Pg. 1 of 1

CONTINUED..

E

OIL SURVEY OF CHAVES COUNTY, NEW MEXICO, S THERN PART; EDDY AREA, NEW MEXICO

Cottonwood SPrings Dairy



USDA Natural Resources Conservation Service

Web Soil Survey 1.1
National Cooperative Soil Survey

8/7/2006
Page 1 of 3

Soils Report
For Cottonwood Springs Dairy
By Don Alam – A.C.S.-Mgn. 5/14/2002

1.Background.

While District Conservationist for U.S.D.A. S.C.S. Artesia Field Office for over 25 yr.s; I did numerous soils & conservation planning on this farm.

In 1987, Pug Thigpen(previous owner) requested soil anlysis & conservation planning to change irrigated acres locations to better soils & to sprinkler irrigation.We did numerous soil borings &tests to determine soil deapths &to check accuracy of the Std. Eddy Co. Soil Survey.Two basic silt loam soils were chosen Reagan,&Pima (deep 6'+)

2.As District Conservationist I observed the Runoff Pond & Dairy being built at same time on Reagan & Pima soils. This was good due their being no chance of a hydrologic connection between them & water table(which is or was at 100'+ at that time.At that time I was showed planned pumping station to be able drain pond after a storm event.(to be used on cropland) I also figured out ponds storage from plans & noticed it was more than needed for 50yr.storm(16.4needed—at that time I estimated it at 25 ac./ft.)

3.From S.C.S. Hydrologly Studies for watershed purposes the water source for Cottonwood Creek is a rock fault area 1.5 miles upstream s.w. of dairy &no srings or seeps untill 2.5 miles downstream from dairy.

4.On May 2000 I made plan map on dairy complex & farm ,plus surveyed area for east storm runoff pond. I imformed him that this was a good site due to pond & borrow area was in a deep Pima silt loam soil (has a heavier clay layer at 4' deapth). This would make it impossible for a hydrologic connection from surface to 80' deapth water table.(borings 0ver 20' of this soil).

5.May 2002-Resurveyed & redesigned pond on these soils to hold 32.8 ac./ft storm runoff (need for 25 yr./ storm=25.3 ac./ft.

6.May 2000 figured hydrology for storm runoff pond # 2(see attached U.S.A N.M. Eng. 21-attached), which meant that after 25yr. event storm that water would run off on alf. flg. 1hr.+ after start of said rainstorm. and spread over 60% of flg. on Pima(Pe) soils before entering pond area.

7.The following are important agronomic factors of alfalfa,soils,& infiltration properties

A.The soil's available water holding capacity is 2.1"/ft..Alfalafa rooting death is over 6 ft.; therefore would take 12.6" to fill.

B.Alfalfa will use over 5 ac./ft. if that much was made avaiable. Basically will use 10"+/ cutting(30 day),depending +or— upon weather.

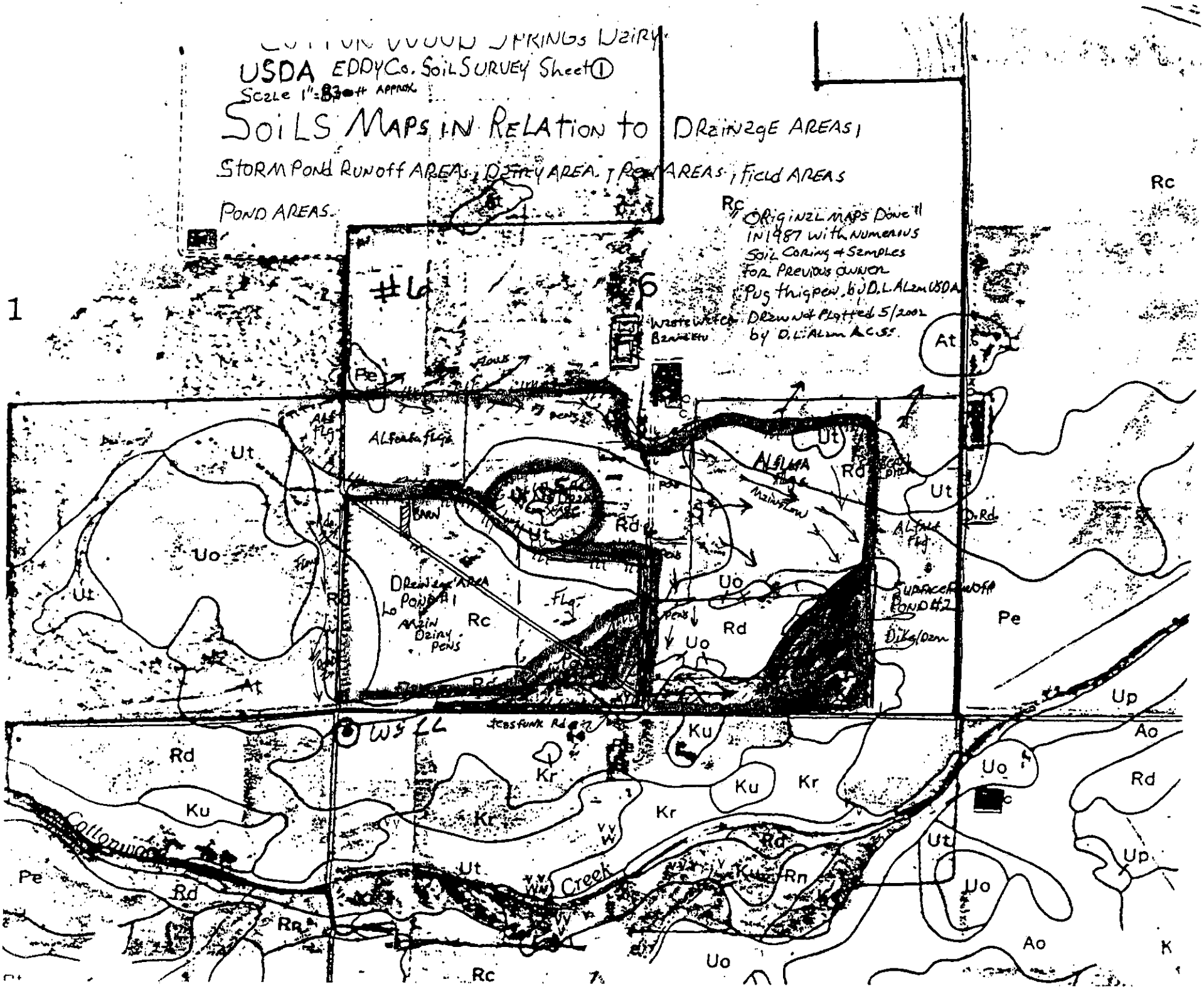
C.By Ariz.,Nebr.,Kansas research by scientific trials on silt loam soils that alfalfa will use more N &P than anyother crop.; if its available. Riz. bacteria's N is not produced ,if soil's N is high supply.

D.These silt loam soils are in the .5 intake family,which means the first 1"water has a lot faster infiltration rate than the next inch,& it keeps decreasing as total " increase. To fill 4 ft. profile it takes at .4"/hr. 22 hr.s to apply 8.8" & then some run off will occur. It takes 36 hr. for top 2 ft. of super saturated (22hr.s) to fill the bottom 2ft.(4ft. total) to field capacity.Therefore water flowing across these soils would have flow over 36 hr.s to get to 5ft. level. This has never happened from a 50yr.strom event.

E.Using pond water for irrigation is absolutely no problem because of C.& D above..

In summary there is&never will be a problem agronomical&,hydrological from using these runoff ponds & using their water for irrig. (to drain after a event).This is from 35 yr.s experience,&sound science.

Don Alam—A.C.S.



USDA EDDY Co. Soil Survey Sheet ①
Scale 1" = 830 ft Approx.
Soils Maps in Relation to Drainage Areas,
Storm Pond Runoff Areas, Dairy Area, Pen Areas, Field Areas
Pond Areas.
Original Maps Done in 1987 with Numerous Soil Coring + Samples for Previous Owner
Pug thigpen by D.L. Alam USDA
Drawn & Plotted 5/2002 by D.L. Alam A.C.S.
#6
Waste Water Barn etc
Alfalfa Flgs
Drainage Area Pond #1
Main Dairy Pens
Surface Runoff Pond #2
Dike/Dam
Jessfunk Rd
Cottonwood Creek
Rc
Rd
Ut
Uo
Pe
At
Ku
Kr
Rn
Up
Ao
K

RECORD OF COOPERATOR'S DECISIONS AND PROGRESS IN APPLICATION

FIELD NO.	PLANNED AMOUNT	PLANNED YEAR	APPLIED	MONTH AND YEAR	LAND USE AND TREATMENT
					LOCATION: Section 6, Township 16S, Range 25E a 8 miles North of Artesia on US 825 and 5 miles West on Funk Road. LAND STATUS: Private land- 884.3 acres total Cropland - 408.1 acres Rds & Rtways - 12.7 acres (12) HQ, Lots, reservoirs- 34 acres (9, "Grazing lands" - 429.5 acres (8,3
	PREVIOUSLY APPLIED PRACTICES				
			3		Irrigation wells- #1=2000 gal/min; #2=1200 gal/mi & #3=1200-1400 gal/min
			1		Irrigation reservoir - 60 acre feet
			200 acres	50-77	Land leveling
			12743'	60-73	Concrete lined ditch
			2240'	79-80	80 PSI P.V.C. 10" diameter
			2640'	1983	80 PSI P.V.C. 12" diameter
			2200'	1983	80 PSI P.V.C. 10" diameter
			5	1979	Unit siderolls
			5	1983	Unit siderolls
	RESOURCE MANAGEMENT SYSTEM NO. 1 - FIELDS 1,2,3,4,5,6 & 7- 408.1 acres cropland				
1,2,4,5,6 & 7	345.1 acres	1987			Conservation Cropping System: Consists of alfal 5-8 years; cotton (or chile equivalent) 2-3 year winter small grains - 1 year; set aside or acir 1 year; back to alfalfa. Vegetables and other crops may be grown depending on the market. Farmer returning crop residues and uses active fertilizer program. Cropland is winter and earl spring grazed by sheep or cattle. Re & Rd - Reagan = soils grouping 14 Pe - Pima - soils grouping 14 Ku - Karro = soils grouping 10 Ut - Upton = soils grouping 4 At - Atoka = soils grouping 11
3	53.7 acres	1987			Pecans doing well = 3-5" diameter. Farmed by cleaned till method; gravity irrigated from concrete lined ditch.
4,5,6,7	286.5 acres	1987			Irrigation Water Management: Sprinkler Producer's objectives are to maximize the production on a per acre foot of water and energy used basis. Irrigation on sprinkler system is designed to apply 9.8 gal/min/spp at 30-35 PSI at nozzle (¼" tips), with 60' moves this gives .4"/acre/hour gross application rates. With 22 hour sets 8.8" gross application can be applied/acre.

COOPERATOR	ASSISTED BY	DATE
Thigpen - Conklin Section 6	Don Alam	12/87

RECORD OF COOPERATOR'S DECISIONS AND PROGRESS IN APPLICATION

FIELD NO.	PLANNED AMOUNT	PLANNED YEAR	APPLIED	APPLIED MONTH AND YEAR	LAND USE AND TREATMENT
					Alfalfa total consumptive use can vary from 3.0 - 5.0 acre feet depending on producers goals and th weather. (8tons can be achieved on 3.5 acre feet) Recommend 12-16" plus be applied before first cutting. This provides a leaching and fills profile for season to 4' plus soil profile, "The earlier the better". Average soil holds 1.8 - 2.2 of available moisture per foot total consumptive use of winter small grains can vary from 12"-24" depending on varieties, weather (wind, humidity, temperature and etc..) Consumptive use will vary on size of tree, weather. Presently 1.5 acre fee to mature 4.0 acre feet. Chile has a specific type need. It's total consumptive use varies as plant/population/acre plus varieties and weather. It will vary from 1.6 to 3.6 acre feet/year. Milo is the same as chile in its variance. Soils are in the .5 intake family but good structure/ minimum tillage (less compaction), high organic matter, residue on and in surface area can change it to a 1.0 family. (infiltration varies tremendou ly according to soil's condition, residues, compaction and past crops) Fertility program should be based on good soils testing and cash flows percentage increases. Average efficiency 65-75%.
1,2,3	121.6	1987			Irrigation Water Management - Gravity Average yearly efficiency 40%. Fed by concrete lined ditch and countour ditches. Runs 660' in length. Application needs and etc.. are the same as above.
6,7			132 ac. 1 no.	1983	Sprinkler System No. I: Fed by well on side of Co. road and is water rights from another farm. Well 1200-1400 gal/min. 2 no. 46 spp units, 1 no. 34, 1 no. 20, and 1 no. 30 = total 5 units & 176 sprinkler units. Only 4 units run. Average of 1300 gal/min at one time. Average days to cover 14-15 days.
4, 5			154.5 ac.	1979	Sprinkler System No. II: Fed out of reservoir which is fed by two wells (#1 & #2) = 2400 gal/min Available (these wells also feed 121.6 ac. gravity system) Booster pump feeds 10" line to 5 unit siderolls. Total sprinklers 167 or 1670 gal/min. Days to cover field: (5) - South part - 11 days rest - 18 days (4) - 16 days P/loss in (5) 37 spp & 27 spp is 15#, plus need to adapt it differently.

cont. page 3

COOPERATOR | ASSISTED BY | DATE

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SCS-CPA-6E
1-82

RECORD OF COOPERATOR'S DECISIONS AND PROGRESS IN APPLICATION

FIELD NO.	PLANNED AMOUNT	PLANNED YEAR	APPLIED	APPLIED MONTH AND YEAR	LAND USE AND TREATMENT
1,2,3	Just Oct.		121.6 ac	1960's	Gravity System No. I: Fed out of same reservoi as mentioned on previous page, then to concrete lined ditch (24"), then to contour ditches & furrows & boarder. This system could be incorp orated into sprinkler system except for field (3) pecans. Improvements to above systems. 1. Replace C.L.D. with 50# PSI 15" diameter P.V.C. (1 & 4) 1180' up to field. 2. This would allow field (4) siderolls to cov evenly and put 3 acres of field (1) into field (4). 3. Add onto line from sprinkler system No. I 400 feet of 8" diameter 80 PSI and use exist ingsideroll to take care of 14.7 acres of field (1) with existing system or add 650' and take care of 24 acres of field (1) or; 4. Add 3000' 8" diameter P.V.C. straight North West side of field (1) and add valves with 180' spacing. Having 1 no. 10 spp unit, 17 unit spp; 1-32 unit spp for total of 59 sprinklers and cover 65 acres with 600 gal/ min and cover in 18 days using 60' moves and 22 hour sets. Hook onto end of System #1 & join system #1 & #2.
	RESOURCE MANAGEMENT SYSTEM NO. II				- FIELDS 9,10 & 12 - HQ Lots, Rds, Reservoirs - 46.7 acres
					No special treatment planned.
	RESOURCE MANAGEMENT SYSTEM NO III.				- Fields 8 & 11 = 429.5 acres
					Lands that are used as wildlife land, grazed wit croplands 429.5 acres. Some areas of farm is leased to Cottonwood Gun Club for quail and pheasant developments. This is one of many farm leased. Most range grass is in fair condition and winter grazing is done. Some sites are in good condition. No treatment planned. Animal unit months total 120 = 130 divided by 5 months winter grazing with cropland - 26 animal units. Alternative would be to refurbish crossfences for 80 acre unit; 140 acre unit; 190 acre unit & add a few waterings.

COOPERATOR	ASSISTED BY	DATE
Tnigpen - Conklin Section 6	Don Alam	12/07

Symbol	County	Description
Kr	Eddy	KARRO LOAM, 0 TO 1 PERCENT SLOPES
Kr		Soils of this series typically have a surface layer of
Kr		light brownish-gray loam about 10 inches thick. The next layer,
Kr		also 10 inches thick, consists of a pale brown loam.
Kr		The substratum is a very pale brown and pink silty clay or clay
Kr		loam that extends to a depth of more than 60 inches. Calcium
Kr		carbonate has accumulated at a depth of about 46 inches.
Kr		The major hazard is soil blowing, resulting from excessive
Kr		tillage operations and non-irrigated conditions. This
Kr		soil is moderately fertile, but productivity is restric-
Kr		ted by the high lime content which can tie up available nutrients.
Kr		Corrosivity to untreated pipe is high and building foundations are
Kr		limited. K= .37, water holding capacity is 2.0"/ft. average, permeability
Kr		is .8 - 2.5"/hr., Capability class is IIIs, and soils grouping is 8.
Ku		
Ku	Eddy	KARRO LOAM, 1 TO 3 PERCENT SLOPES
Ku		Soils of this series typically have a surface layer of
Ku		light brownish-gray loam about 10 inches thick. The next
Ku		layer, also 10 inches thick, consists of a pale brown loam.
Ku		The substratum is a very pale brown and pink clay or silty
Ku		clay loam that entends to a depth of more than 60 inches.
Ku		This soil is adjacent to Karro loam, 0 to 1 percent slopes.
Ku		Calcium carbonate has accumulated at a depth of about 46 inches.
Ku		The major hazard is soil blowing, resulting from excessive
Ku		tillage operations and non-irrigated conditions. It is
Ku		on relatively short side slopes along drainageways and is very
Ku		susceptible to water erosion if soil is loose or excessively tilled.
Ku		This soil is moderately fertile, but productivity is restricted
Ku		the high lime content which can tie up available nutrients.
Ku		Corrosivity to untreated pipe is high and building foundations are
Ku		limited. K= .37, water holding capacity is 2.0"/ft. average, permeability
Ku		is .8 - 2.5"/hr., Capability class is IIe, and soils grouping is 14.
PeE		
PeE	Eddy	PIMA SILT LOAM, 0 TO 1 PERCENT SLOPES
PeE		This soil is deep (60"+) and well drained. The surface texture
PeE		is a silt loam with a substratum texture being higher in clay.
PeE		This soil was formed by 1 - 5 yr. flooding with sheet-type flows.
PeE		The available water holding capacity is 2.1"/foot average and the
PeE		permeability is .8 - 2.5 "/hour.
PeE		Wind erosion hazard is moderate when soil is bare or exces-
PeE		sively tilled. Periodic flooding may occur. K = .43, T = 5,
PeE		and capability class is IIe. Soil grouping is 14.
Gs	Eddy	GYPSUM LAND - COTTONWOOD COMPLEX, 0 TO 1 PERCENT SLOPES
Gs		Gypsum land makes up approximately 50 to 70 percent of the
Gs		soil and Cottonwood loam makes up approximately 20 to 40
Gs		percent. Included is about 10 percent Reeves loam. This soil is
Gs		shallow and sinkholes are common. Gypsum land has very rapid
Gs		surface runoff, very low available water holding capacity, is
Gs		well-drained, but droughty and saline. Soft or hard gypsum can
Gs		be found at depths between 9 - 36 inches and can be highly
Gs		corrosive to untreated steel pipe. This soil is very unfavorable
Gs		for building sites or foundations and cannot support concrete
Gs		lined ditches . This soil becomes "powdery" under excessive
Gs		tillage and is a high wind erosion hazard. For the Cottonwood Complex,
Gs		K = .37, MLRA = 42C, WHC = 2.2"/foot, permeability is moderate,
Gs		at .8 to 2.5"/hr.. Capability class is IVs.and soil grouping is 4.

RECORD OF COOPERATOR'S DECISIONS AND PROGRESS IN APPLICATION

FIELD NO.	PLANNED AMOUNT	PLANNED YEAR	APPLIED	APPLIED MONTH AND YEAR	LAND USE AND TREATMENT
1,2,3	Just Oct.		121.6 ac	1960's	Gravity System No. I: Fed out of same reservoi as mentioned on previous page, then to concrete lined ditch (24"), then to contour ditches & furrows & boarder. This system could be incorp orated into sprinkler system except for field (3) pecans. Improvements to above systems. 1. Replace C.L.D. with 50# PSI 15" diameter P.V.C. (1 & 4) 1180' up to field. 2. This would allow field (4) siderolls to cov evenly and put 3 acres of field (1) into field (4). 3. Add onto line from sprinkler system No. I 400 feet of 8" diameter 80 PSI and use exis ingsideroll to take care of 14.7 acres of field (1) with existing system or add 650' and take care of 24 acres of field (1) or; 4. Add 3000' 8" diameter P.V.C. straight North West side of field (1) and add valves with 180' spacing. Having 1 no. 10 spp unit, 17 unit spp; 1-32 unit spp for total of 59 sprinklers and cover 65 acres with 600 gal/ min and cover in 18 days using 60' moves and 22 hour sets. Hook onto end of System #1 & join system #1 & #2.
	RESOURCE MANAGEMENT SYSTEM NO. II				- FIELDS 9,10 & 12 - HQ Lots, Rds, Reservoirs - 46.7 acres
					No special treatment planned.
	RESOURCE MANAGEMENT SYSTEM NO III				- Fields 8 & 11 = 429.5 acres
					Lands that are used as wildlife land, grazed wit croplands 429.5 acres. Some areas of farm is leased to Cottonwood Gun Club for quail and pheasant developments. This is one of many farm leased. Most range grass is in fair condition and winter grazing is done. Some sites are in good condition. No treatment planned. Animal unit months total 120 = 130 divided by 5 months winter grazing with cropland - 26 animal units. Alternative would be to refurbish crossfences for 80 acre unit; 140 acre unit; 190 acre unit & add a few waterings.

COOPERATOR	ASSISTED BY	DATE
Thigpen - Conklin Section 6	Don Alam	12/87

Symbol	County	Description
Kr	Eddy	KARRO LOAM, 0 TO 1 PERCENT SLOPES Soils of this series typically have a surface layer of light brownish-gray loam about 10 inches thick. The next layer, also 10 inches thick, consists of a pale brown loam. The substratum is a very pale brown and pink silty clay or clay loam that extends to a depth of more than 60 inches. Calcium carbonate has accumulated at a depth of about 46 inches. The major hazard is soil blowing, resulting from excessive tillage operations and non-irrigated conditions. This soil is moderately fertile, but productivity is restricted by the high lime content which can tie up available nutrients. Corrosivity to untreated pipe is high and building foundations are limited. K= .37, water holding capacity is 2.0"/ft. average, permeability is .8 - 2.5"/hr., Capability class is IIIs, and soils grouping is 8.
Ku	Eddy	KARRO LOAM, 1 TO 3 PERCENT SLOPES Soils of this series typically have a surface layer of light brownish-gray loam about 10 inches thick. The next layer, also 10 inches thick, consists of a pale brown loam. The substratum is a very pale brown and pink clay or silty clay loam that entends to a depth of more than 60 inches. This soil is adjacent to Karro loam, 0 to 1 percent slopes. Calcium carbonate has accumulated at a depth of about 46 inches. The major hazard is soil blowing, resulting from excessive tillage operations and non-irrigated conditions. It is on relatively short side slopes along drainageways and is very susceptible to water erosion if soil is loose or excessively tilled. This soil is moderately fertile, but productivity is restricted the high lime content which can tie up available nutrients. Corrosivity to untreated pipe is high and building foundations are limited. K= .37, water holding capacity is 2.0"/ft. average, permeability is .8 - 2.5"/hr., Capability class is IIe, and soils grouping is 14.
PeE	Eddy	PIMA SILT LOAM, 0 TO 1 PERCENT SLOPES This soil is deep (60"+) and well drained. The surface texture is a silt loam with a substratum texture being higher in clay. This soil was formed by 1 - 5 yr. flooding with sheet-type flows. The available water holding capacity is 2.1"/foot average and the permeability is .8 - 2.5 "/hour. Wind erosion hazard is moderate when soil is bare or excessively tilled. Periodic flooding may occur. K = .43, T = 5, and capability class is IIe. Soil grouping is 14.
Gs	Eddy	GYPSUM LAND - COTTONWOOD COMPLEX, 0 TO 1 PERCENT SLOPES Gypsum land makes up approximately 50 to 70 percent of the soil and Cottonwood loam makes up approximately 20 to 40 percent. Included is about 10 percent Reeves loam. This soil is shallow and sinkholes are common. Gypsum land has very rapid surface runoff, very low available water holding capacity, is well-drained, but droughty and saline. Soft or hard gypsum can be found at depths between 9 - 36 inches and can be highly corrosive to untreated steel pipe. This soil is very unfavorable for building sites or foundations and cannot support concrete lined ditches . This soil becomes "powdery" under excessive tillage and is a high wind erosion hazard. For the Cottonwood Complex, K = .37, MLRA = 42C, WHC = 2.2"/foot, permeability is moderate, at .8 to 2.5"/hr., Capability class is IVs,and soil grouping is 4.

At Eddy ATOKA GRAVELLY LOAM, 1 TO 3 PERCENT SLOPES
At This soil consists of moderately deep, well-drained, medium
At textured, moderately permeable (.6-2"/hr.) calcareous soils with fine loamy
At and fine silty subsoils and gypsiferous material and hard caliche
At at 20 to 40 inches. Slopes are 1 to 3 percent. Runoff is slow
At to moderate and water erosion hazard is slight to moderate.
At Available water holding capacity is 2.3"/foot average and effective
At rooting depth is 20 to 40 inches.
At The major hazard is soil blowing, resulting from excessive
At tillage operations & non-irrigated conditions. The major
At limitations are moderate depth and high lime content. Risk of
At corrosion of steel is high and when substratum is gypsum, concrete
At corrosion is high, plus foundation problems could occur. Capability
At class is IVe. T = 2 - 5, K = .37 and Soil grouping is 8.

Rc Eddy REAGAN LOAM, 0 TO 1 PERCENT SLOPES
Rc This soil is typical of the series; deep, well-drained, moderately
Rc dark colored, calcareous loams that developed in old alluvium
Rc derived from calcareous, sedimentary rocks of the uplands.
Rc In some places caliche or gypsum occurs below a depth of 4 ft.
Rc Water holding capacity is high, at 1.8-2.2"/ft. average,
Rc permeability is moderate, at 1.8 - 2.5"/hr.
Rc The major hazard is soil blowing, resulting from excessive
Rc tillage operations and non-irrigated conditions. Slight surface
Rc crusting impedes emergence of seedlings in areas where the
Rc high-lime zone is exposed. K = .37, capability class is IIe,
Rc soil grouping is 14.

Rd Eddy REAGAN LOAM, 1 TO 3 PERCENT SLOPES
Rd This soil is typical of the series; deep, well-drained, moderately
Rd dark colored, calcareous loams that developed in old alluvium
Rd derived from calcareous, sedimentary rocks of the uplands.
Rd In some places caliche or gypsum occurs below a depth of 4 feet.
Rd Water holding capacity is high, at 1.8-2.2"/ft. average,
Rd permeability is moderate, at 1.8 - 2.5"/hr.
Rd The major hazard is wind & water erosion, resulting from excessive
Rd tillage operations and non-irrigated conditions. The limitations
Rd are maintaining fertility and tilth. K = .37, capability class
Rd is IIIe, and soil grouping is 10.

Uo Eddy UPTON GRAVELLY LOAM, 0 TO 9 PERCENT SLOPES
Uo This unit consists of moderately dark colored, calcareous, gravelly
Uo soils that developed in old alluvium derived from calcareous
Uo sedimentary rocks. It is very shallow to shallow (10 to 20") over
Uo caliche and cemented gravel. It occurs as whalebacks, or elongated
Uo areas with rounded crests.
Uo This soil is uneroded or only slightly eroded. Runoff is slow
Uo to medium. Permeability is moderate, at .8 - 2.5"/hr. and available
Uo water holding capacity is 1.3 - 1.6"/ft. average. The major
Uo limitation is its shallowness over indurated caliche. K = .20,
Uo T = 5, capability class is VIIs and soils grouping is 1.

Ut Eddy UPTON SOILS, 1 TO 3 PERCENT SLOPES
Ut Except for the greater slope, these soils are very much
Ut similar to the Upton Soils, 0 to 1 percent slopes.
Ut This unit consists of calcareous loam and sandy loam on uplands
Ut and is very shallow to shallow (10 - 20") over indurated caliche.
Ut This soil is uneroded or only slightly eroded. Runoff is slow to
Ut medium. Permeability is moderate, at .8 - 2.5"/hr. and available
Ut water holding capacity is 1.3 - 1.6"/ft. average.
Ut The major limitation is its shallowness over caliche, which makes
Ut leveling difficult. They are moderately fertile. K = .20, T = 5,
Ut capability class is IVs and soil grouping is 4.

Cottonwood Springs Dairy

491 West Funk Road
Lake Arthur, New Mexico 88253
(505) 365-2741

ollema, *Partner*
ome (505) 365-2729
Mobile (505) 365-8835
Fax (505) 365-2473

Phil Troost, *Partner*
Home (505) 365-2793
Mobile (505) 365-7605
Fax (505) 365-2794

COPY

January 4, 2000

New Mexico Environment Department
Ground Water Section
P.O. Box 26110
Santa Fe, NM 87502

Attn: Karma Anderson
RE: DP-734

Dear Ms. Anderson,

Enclosed please find the Monitor Well Locations and Elevations and the Monitor Well Logs as you requested. The wells have been sampled by Cowbell Testing and the results will be forwarded to you as soon as they are received.

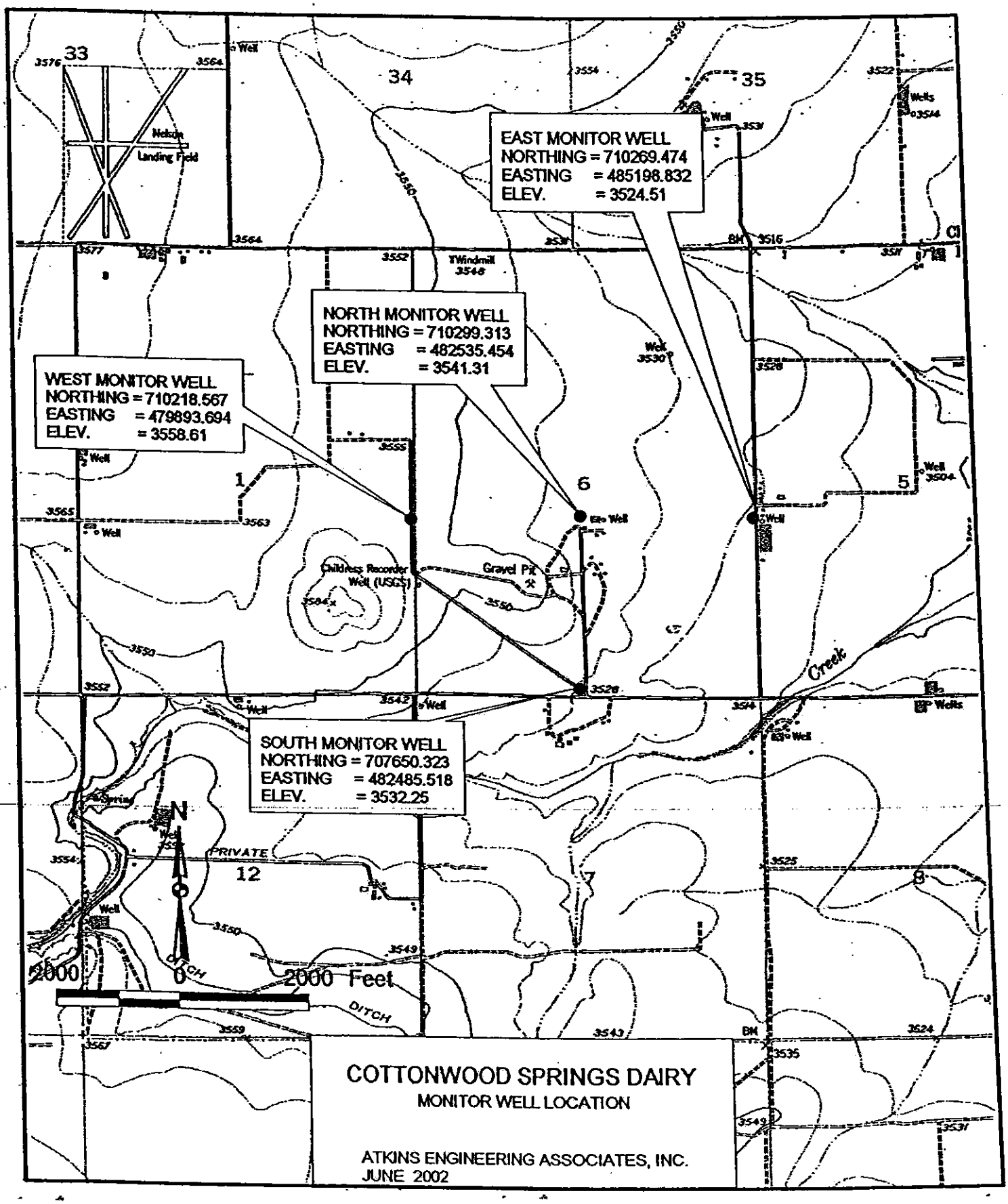
If you have any questions please feel free to contact me.

Sincerely,

Philip Troost

Certified Mail Receipt #P 056 034 060

cc: Jay Lazarus, Glorieta Geoscience, Inc.


EAST MONITOR WELL
NORTHING = 710269.474
EASTING = 485198.832
ELEV. = 3524.51
NORTH MONITOR WELL
NORTHING = 710299.313
EASTING = 482535.454
ELEV. = 3541.31
WEST MONITOR WELL
NORTHING = 710218.567
EASTING = 479893.694
ELEV. = 3558.61
SOUTH MONITOR WELL
NORTHING = 707650.323
EASTING = 482485.518
ELEV. = 3532.25
33
34
35
1
6
5
12
7
8
Nelson Landing Field
Windmill
Childress Recorder Well (USGS)
Gravel Pit
Creek
PRIVATE
DITCH
N
2000 0 2000 Feet
COTTONWOOD SPRINGS DAIRY
MONITOR WELL LOCATION
ATKINS ENGINEERING ASSOCIATES, INC.
JUNE 2002

COTTONWOOD SPRINGS DAIRY

MONITOR WELL LOCATIONS AND ELEVATIONS

MONITOR WELL	NORTHING	EASTING	ELEVATION
NORTH	710299.313	482535.454	3541.31
SOUTH	707650.323	482485.518	3532.25
WEST	710218.567	479893.694	3558.61

NOTES:

1. Horizontal coordinates are New Mexico Eastern Zone Grid coordinates referenced to U.S.G.S. triangulation station LAKE ARTHUR.
2. Elevations are measured at NORTH SIDE TOP OF CASING.
3. Elevations are referenced to U.S.C.&G.S. Benchmark number C255 with an elevation of 3340.65 feet above mean sea level.

JACKIE D. ATKINS
NEW MEXICO
8504
LAND SURVEYOR

Dec 14, 1999

(505) 624-2420
FAX: (505) 624-2421
caea@dfn.com

2904 West Second Street
Post Office Box 3156
Roswell, New Mexico 88202-3156

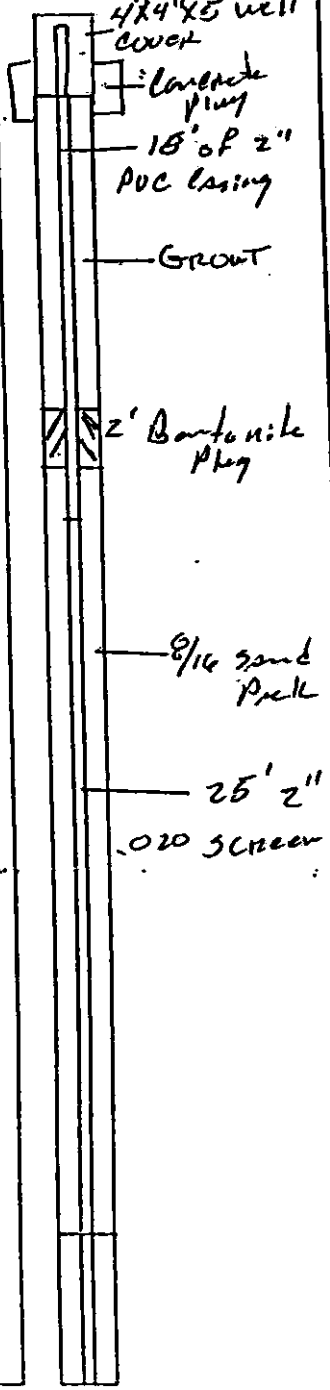
Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202

LOG OF BORING Cottonwood Spring South M/W (Page 1 of 5)

Co. Name: Cotton Wood Spring Dairy
Co. Address: 504 W. Jones Funk Rd
Artesia N.M
Contact: Phil Troost
Job #: 95302.0

Date: 9-23-95
Drill Start: 0915
Drill End: 1230
Boring Location: S.E. Corner of Holding Pond
Site Location: 504 W Jones Funk Rd.
Auger Type: Hollow Stem
Logged By: Mort Bates

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v	Blows/Ft
0				Silty Clay Sand w/small Trace of Caliche Tan Loose Damp			
5							
10							
				Sand & Gravel Tan Loose Damp			
15							
20				Sand Tan Loose moist			
				W/L 20.55			
25							
				Sand Tan Loose wet			
30							
35							
				Clay Sand Reddish Tan soft wet			
40				T/D 40'			
45							



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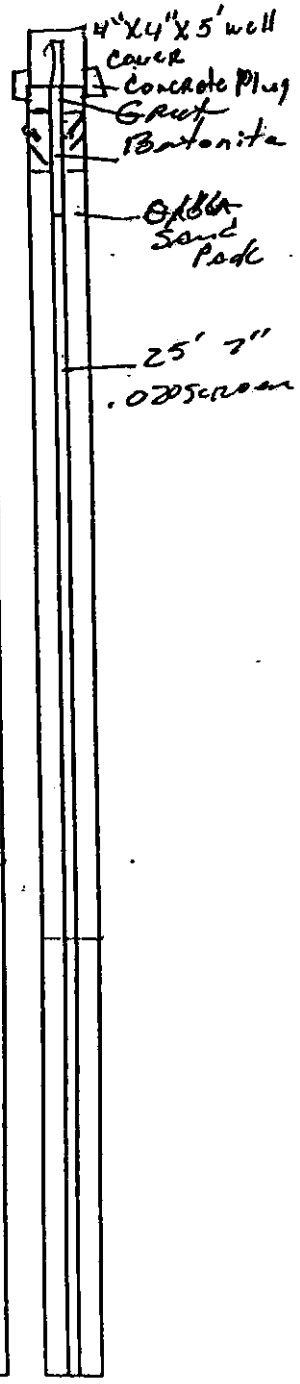
Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202

LOG OF BORING Cotton Wood Spring Dairy North M/W

Co. Name: Cotton Wood Springs Dairy
Co. Address: 504 W. James Funk Rd
Contact: Phil Troost
Job #: 99302.0

Date	: 9-23-99	Site Location	: 504 W. James Funk Rd.
Drill Start	: 0900	Auger Type	: Hollow Stem
Drill End	: 1000 9-24-99	Logged By	: Mort Bales
Boring Location	: W. side of the North Reservoir		

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v	Blows/ft
0				Silty Clay w/ Traces of Caliche Tan Loose Damp			
5				Silty Clay Sand Tan Loose Damp			
				W/L 7.42			
10							
15				Silty Clay Sand Tan Loose wet			
20				Clay Sand Reddish Tan soft wet			
25							
30				T/D			
35							
40							
45							



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P.O. Box 3156
Roswell, New Mexico 88202

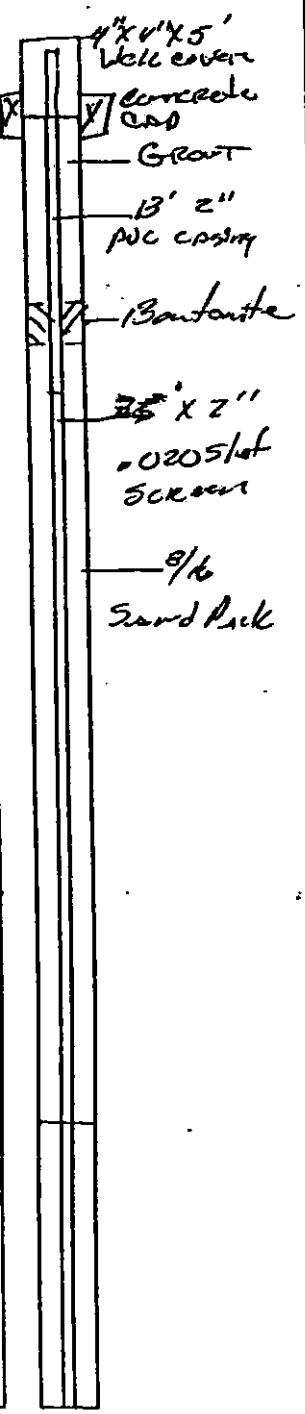
LOG OF BORING Cottonwood Springs Dairy West M/W

(Page 1 of 5)

Co. Name: Cottonwood Dairy
Co. Address: 504 W. Jane Funk Rd Artesia N.M.
Contact: Phil Troost
Job #: 99302

Date: 9-24-99
Drill Start: 1010
Drill End: 1300
Boring Location: NW. of Dairy 1/8 mile & W. 1/4 mile of N. MW.
Site Location: 504 W. Jane Funk Rd.
Auger Type: Hollow Stem
Logged By: Mort Bates

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v	Blows/Ft
0				Silty Clay Sand, Trace of Caliche Tan Loose Damp			
5							
10							
				Silty Clay Sand Reddish Tan Soft moist			
15				W/L 16.22			
20							
25							
				Silty Sandy Clay Soft Reddish Tan wet			
30							
35				T/D			
40							
45							



Atkins Engineering Associates, Inc.
2904 W. 2nd St., Roswell, NM 88202-3156

LOG OF BORING COTTONWD SPGS DAIRY MW 4

Cottonwood Springs Dairy
491 West Funk Road
Lake Arthur, NM 88253

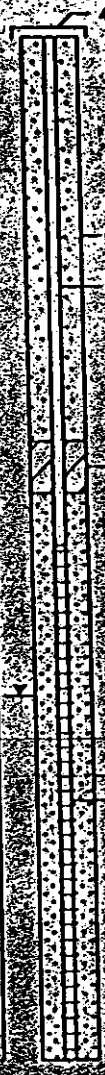
Contact: Phil Troost

Project #: COTONWD.DAR.02

Date	: 6/20/02	Site Location	: North of Artesia
Drill Start/End	: 0845/1230	Auger Type	: Hollow Stem
Boring Location	: 1/2 mi E of holding Pond : 1/2 m N Funk Rd	Logged By	: Mort Bates

Depth in feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab
0		CL		Silty clay, brown, loose, dry	
5		CL		Clay w/caliche, tan, loose, dry	
10					
		SC		Clayey sand, red, loose, damp	
15		SM		Silty sand, red, loose, damp	
		SW		Sand w/gravel, red, firm, damp	
20		CL		Sandy clay, red, firm, damp	
		SW		Sand w/gravel, red, firm, damp	
25				Sandy clay, red, soft, wet	
30		CL			
35					
40					
45					
50					

Well: MW 4



TD = 40 feet
WL = 25.80 feet

08-21-2002 C:\WTECH46\COTTONWD\mw4.bor

Animal Feeding Operation Name Cottonwood Springs Dairy

Address 491 West James Funk Rd.

City, State, Zip Code Lake Arthur, NM 88253

Legal description T16S, R25E, Sections 6, Eddy County

Name and Phone(s) of Owner: Mr. Phil Troost, Phone: 505 365 2741

Name and Phone(s) of Operator: Mr. Phil Troost, Phone: 505 365 2741

Environmental Consultant (if any): Glorieta Geoscience, Inc.

Crop Consultant (if any): Glorieta Geoscience, Inc.

Discharge Permit from NM GWQB: 84,000 **gallons/day** **Expiration Date:** Nov 2, 2006 (Permit in renewal with NMED)

applied for 140,000 GPD during renewal

EPA CAFO NPDES Permit (if applicable): NMG010052

Emergency equipment includes: (e.g. front end loader, tractors w/PTO, portable pumps)
Trailer-mounted pump, backhoe, tractor, frontend loader, blade, spreader truck, pivot sprinkler, grader

Distance of Facility to Surface Water or any Well Approx. 200 ft to intermittent channel
(surface water may include a perennial or intermittent stream, river, lake, pond, irrigation canal, or wetland)

Depth to Ground Water Table: 18 - 28 **ft Source:** Measured MW static water level

Min. Depth to Ground Water: 18 **ft Source:** Measured MW static water level

Flow Direction of Ground Water: SE

ID Number: _____ **Location:** _____ **High nitrates? Yes** ☐ **No** ☐

ID Number: _____ **Location:** _____ **High nitrates? Yes** ☐ **No** ☐

ID Number: _____ **Location:** _____ **High nitrates? Yes** ☐ **No** ☐

Type of Animals	Actual Animal #'s	Planned Animal #'s	Avg. Weight (lbs)	Number of Days in System Confined
Milk Cows	2800	3200	1400	365
Heifers	1260	1260		180
Calves				
Dry Cows	423	500		180
Calves and others	1905	1905		180

Total Animal Units: 4760(milking) **Number of times Cows are Milked:** 2 **/day**

Bedding Materials Used in Barn				Barn Water/Flush Water Gallons		
Type of Bedding	Amount Used	Hours Used (D/W/M)	Total Tons Used (Yr)	Amount of Water	Hours Used (D/W/M)	Total Used
NA	NA	NA	NA			

D=daily, W=weekly, M=monthly, Yr=yearly

Teat Dip: Iodine 1% **Hoof Dip:** _____

Is Alley Flush System in use: **Yes** ☐ **No** ☒

What type of water is used: _____

Gallons/Flush: _____

How Many Times/Day: _____

Where is it Collected: _____

Where is it Stored: _____

Housing (Describe the type of housing such as open lot, free stall, stanchion; and number and type of animals housed):

Open lot with standchions on each lot. Milking cows housed in corrals.

[illegible]	[illegible] animals	[illegible] animals	[illegible] lbs	[illegible]
Milk Cows	2800	3200	1400	365
Heifers	1260	1260		180
Calves				
Dry Cows	423	500		180
Calves and others	1905	1905		180

Total Animal Units: 4760(milking) **Number of times Cows are Milked:** 2 **/day**

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NA	NA	NA	NA			

D=daily, W=weekly, M=monthly, Yr=yearly

Teat Dip: Iodine 1% **Hoof Dip:** _____

Is Alley Flush System in use: **Yes** ☐ **No** ☒

What type of water is used: _____

Gallons/Flush: _____

How Many Times/Day: _____

Where is it Collected: _____

Where is it Stored: _____

Housing (Describe the type of housing such as open lot, free stall, stanchion; and number and type of animals housed):

Open lot with standchions on each lot. Milking cows housed in corrals.

Roof and/or Runoff (Describe how runoff is collected and/or diverted and if so how):

Includes all stormwater that comes in contact with the corrals and calf pens. The runoff from south corrals flows into a drainage channel from where it is diverted into the runoff pond located southeast end of the corrals. The runof from north and east corrals is contained in a stormwater catchment located at the southeast corner of the facility. The runoff/stormwater in the ponds will be pumpted out within 14 days from the day of the stormwater event. The stormwater is either directly applied to land application area or pumped to the greenwater lagoon provided adequate storage is available.

Barn Lot (loafing area) Surface Type: **concrete pad**

Barn Lot Size (sq ft): _____

What is the size and type of cover of the runoff area:

Type of cover	**roofs, concrete pavement**	**2.0**	**acres**
Type of cover	**Feedlot-confined animal area, unpaved to runoff pond**	**84.4**	**acres**
Type of cover	**Feedlot-Confined animal area, unpaved to runoff catchment**	**28.8**	**acres**
Type of cover	_____	_____	**acres**

What is the storage capacity of the runoff pond: **28.5** **ac. ft.**

with 2 feet freeboard Runoff catchment 282 ac-ftDea

Type of holding pond liner: _____ **(clay, synthetic, none...)**

Dead Animal and Veterinary Waste Management (Describe how dead animals and veterinary waste are disposed of and by whom):

Dead animals are picked up within 24 hours by a local hauler. Veternary wastes are disposed off in accordance with State and Federal regulations.

Describe how solid and liquid manure is collected, transferred, treated, and stored (Include how often, method used, storage sizes, equipment used, manure test values, etc. How often is manure scraped/cleaned? Where is manure stored? Attach manure test information)

Solid:

Manure solids includes solids separated from the dairy process greenwater and manure from the corrals. Manure solids separated from the process greenwater are temporarily stored on a concrete pad beneath the separator and then hauled off-site. Manure solids from the corrals are transported off-site as they are collected.

Liquid: (how is wash water collected at the barn; how is wash water transferred to holding ponds – pipeline size, pump, gravity…; how are the solids in wash water separated – screen separator, passive tank, …)

Process generated greenwater is generated through washdown of the cows prior to entering the milking parlor, through wash down of the milking parlor. Greenwater from the milking parlor flows via underground pipelines to a concrete sump located southeast end of the milking parlor. From the sump, greenwater is pumped via underground pipelines to a mechanical solids screen separator. The separated liquids are stored in a three chambered synthetically lined greenwater lagoon. Furhter separation of solids occurs in cell A (settling chamber) and greenwater devoid of solids overflows though an overflow pipe into cell B (main storage chamber) and Cell C (additional storage chamber).

What is the storage capacity of the holding ponds: 45.34 ac. ft.

Type of holding pond liner: 40 ml HDPE liner (clay, synthetic, none)

Crop Rotation: _____ **Farm # :** _____ **Tract:** _____

Acres Farmland Owned by Facility: _____ **acres**

Field Information:

Field # or Name	Date Year	Crop	Acres	Yield	Grazed (AM)	NMPI	Resource Concerns	Sensitive Areas/Site Problems
Field # 1	2010	Alfalfa	18		harvested			
Field # 2	2010	Wheat/ pasture	52		harvested or Grazed			
Field # 3	2010	Bermuda	30		harvested or Grazed			
Field # 4	2010	Corn/ Winter Wheat	120		harvested or Grazed			
Field # 5	2010	Alfalfa/ Oats	85		harvested or Grazed			
Field # 6	2010	Alfalfat	36		harvested			
Field # 7	2010	Corn	40		harvested or Grazed			

***NMPI**=New Mexico Phosphorus Index; **Resource Concerns**=Soil, Water, Air, Plant, or Animal; **Sensitive Areas**=areas next to water, wetlands, etc.; **Site Problems** = Problems such as rocky or sandy soils, watertables, shallow soil depths, steep slopes, etc.

Farmland that allows waste utilization by dairy:

Location	**Field #1**	**Acres**	**18**
Location	**Field #3**	**Acres**	**30**
Location	**Field #4**	**Acres**	**120**
Location	**Field # 5**	**Acres**	**85**
	Field # 6		**36**
	Field # 7		**40**

Field #2 **52**

Irrigation Wells (locate on map):

Location	**SE1/4, Sec 6, T15S, R25E**	**gpm**	**1500**
Location	**S1/2, NE 1/4, Sec 6, T15S, R25E**	**gpm**	**900**
Location	**S1/2, NE 1/4, Sec 6, T15S, R25E**	**gpm**	**1000**
Location		**gpm**	

Describe how solid and liquid manure is utilized (Include time manure is applied, amount applied, crop(s) and acres applied to, how and when incorporated, equipment used, etc., or other ways manure is utilized such as for composting, bedding, or feed, how many tons of manure hauled offsite annually):

Solid:

Manure solids from the separator and from corral scrappings are hauled off-site in trucks or land applied on fields (380 acres) owned by the dairy. Manure solids are land applied using a spreader.

Liquid: (when is wash water applied, what is the mixture ratio of wash water to irrigation water, how is the wash water applied, type of irrigation system, ...)

Greenwater is temporarily stored in the lagoons from where it is pumped to land application fields with field #1, #2, #3, #4, #5, #6 and #7. Greenwater is blended with freshwater in the ratio of 1:2 prior to land application. Land application fields are irrigated by either center pivot sprinkler system or by side roll sprinkler systems.

Manure Application Equipment					
Type of Spreader	Dimensions (Length/Dia)	Capacity (ft³/bu/gal)	Number and Kind of Spreader Settings	Spread Width (ft)	Spread Distance (ft)
Pivot sprikler	diameter 2580 feet	1000 gpm		dia 2580	120 ac
Sideroll sprinkler Spreader truck	length - 1200 ft	800		640-2600 ft	283 ac

Length, w=width, h=average height when full of manure, ft^3=cubic feet, bu=bushels, gal=gallons, type of spreader=box, slurry, tank, etc., kind of spreader settings=PTO, apron, etc.

Irrigation Water Management							
Field # or Name	Method of Irrigation	Stream Size (cfs or gpm)	Field Length (ft)	Width of Sets (ft)	Hours/Set	Total Irrigations (#)	Volume of Irrigation Applied (ac/ft)
Field #1	Side roll	800	1220	640			
Field #3	Side roll	800	1540	850			
Field #4	Center Pivot	1000	1290				
Field #5	Side roll	800	2500	1500			
Field #2	Side roll	800	1620	1400			
Field #6	Sideroll	800	670	2600			
Field #7	Flood/Sprinkler	800	1170	1500			

Method of Irrigation=wheeline, border, furrow, etc., cfs=cubic feet per second, gpm=gallons per minute

Irrigation Water Rights: 3990 **ac./ft./yr.**

Irrigation Water Delivery (Include if source is from a stream or well, if it is delivered on demand or on turns or some other way, variability of stream size, No_3 –N PPM in Water etc.):

Fresh Water irrigation is supplied by three wells located in SE1/4, Sec 6, T15S, R25E; S1/2, NE 1/4, Sec 6, T15S, R25E; S1/2, NE 1/4, Sec 6, T15S, R25E. Green water irrigation is supplied by green water lagoons located at SE1/4,SE1/4, NW1/4, Sec 6, T15S, R25E.

Grazing Management								
Field or Name	Acres	Yield	Grass/Crop Grown	Animal Type	# of Animals	Average Weight	Days on Field	Months of Field
see 590								

*Include only those fields where manure is or will be applied in addition to grazing

Feed management (Describe any measures that are or will be used to alter manure nutrient content through feed management such as phytase feeding, milk urea nitrogen testing, etc.):

Cottonwood Springs Dairy utilizes a veternarian/nutrition specialist to provide accurate and precise management of phosphorus nutrition that is crucial to optimize perfromance and health of the dairy animals and to minimize phosphorus excretion.

Conservation Practices You Believe Are Needed (List and describe the practices such as changes needed in collection, storage, treatment, transfer, or utilization, changes in land management practices, animal numbers or type, feed management, etc.):

Improve irrigation water management, nutrient management, conservation crop rotation. Implement regular soil testing.

Tillage Type and Timing:

Crop Rotation Sequence: **Wheat to Corn; Bermuda**

Tillage Name	Date
Ripper 3 feet deep	Harvest late March/early April
Disc twice	
"do-it-all" once	
Air seeder	Plant corn by April 15
Bermuda	
No till drill (sometimes)	
Air seeder	

Crop Rotation Sequence: **Alfalfa to Oats; Wheat to Pasture**

Tillage Name	Date
Ripper 3ft, 6 shanks (sometimes)	Harvest corn by August 15
Disc twice	
Bedding operation	
Air seeder	Plant wheat by September 1
Wheat to Pasture	Harvest late March/early April
Ripper 3 feet deep	
Disc twice	
"do-it-all" once	Plant corn by April 15
Air seeder	

Pesticide Application

Herbicides			
Crop	Weeds/Pests	Chemical used	Application Rate
Alfalfa	weevil	Warrior	3.84 oz of Warrior 4 oz Forsband
Corn	ear worm spider, mite	Tracer Oberon	2.25 oz Tracer 8 oz Oberon
winter wheat/ oats/ bermuda	none	none	none

Insecticides			
Crop	Insect/Pests	Chemical used	Application Rate

Disease Control			
Crop	Cause/Disease	Chemical used	Application Rate
None used			

Irrigated Leaching Index and Leaching Requirements for Salt Management

Client:	Cottonwood Springs Dairy	**Field No:**	1	**Acres:**	18	**Date:**	11/20/09
Impaired water body or know water contaminated area:							
Crop Grown:	alfalfa, hay, southern; Artesia			**EC water (dS/m):**	1	**ECe Crop:**	3.4
Irrigation Type:	☐ Surface Irrigation	**Leaching Percent Increase for Surface:**					
	☑ Sprinkler & Drip Irrigation	**Leaching Percent Increase for Sprinkler:**	4%				

	Jan (in/mo)	Feb (in/mo)	Mar (in/mo)	Apr (in/mo)	May (in/mo)	Jun (in/mo)	Jul (in/mo)	Aug (in/mo)	Sep (in/mo)	Oct (in/mo)	Nov (in/mo)	Dec (in/mo)
CU by Month[1] (in):	0.0	0.0	0.8	3.7	6.2	8.0	9.0	7.2	4.5	2.8	0.3	0.0
Salt Leaching Requirement[2] (in):	0.0	0.0	0.0	0.1	0.24	0.3	0.3	0.3	0.2	0.1	0.0	0.0
Net Irrigation Requirement (in):	0.0	0.0	0.8	3.9	6.4	8.3	9.4	7.5	4.6	2.9	0.3	0.0
Actual or Estimated Net Application (in):			0.9	4	6.5	8.5	9.5	7.7	4.9	3.2	0.4	
Net Irrigation-Net Application (in):	**0.0**	**0.0**	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**	**0.2**	**0.3**	**0.3**	**0.1**	**0.0**
Leaching Index[3]:	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Total Annual Crop Need (inches/year) = **44.1**

[1]The Irrigation Water Requirements are calculated from the Blaney Criddle (TR21) Model. Precepitation is the latest 30 year average. Inches are calculated for an 80% chance of the rainfall occuring. This means 8 out of 10 years rainfall will be met.

[2]The leaching volume is calculated using the leaching equation from Rhoades, US., Salinity Laboratory, Riverside, CA, 1992. **High Frequency Irrigation (drip and sprinkler)** is $LF=0.1794/(ECe/ECw)^{3.0417}$; **Conventional Irrigation (surface)** is $LF=0.3086/(ECe/ECw)^{1.7020}$.

[3]**Leaching Index (LI):** The LI statement of "**Not Meeting CU**", means CU plus the leaching requirement is not met, and that crop stress may reduce yield and salts may build up. The LI statement of "**OK**" means that there is 0 to 0.75/in/mo of excess irrigation. A LI statement of "**Potent. for Leach**" means that there is excess leaching (> 0.75/in/mo) and a potential for ground water pollution exists. Improved irrigation water management (IWM) must be applied, and additional conservation practices should be considered. The statement "**Do Not Exceed TWHC**" means that water has been applied when there is no CU of a crop. Do not apply more water than the soil can hold.

Irrigated Leaching Index and Leaching Requirements for Salt Management

Client:	Cottonwood Springs Dairy	**Field No:**	2	**Acres:**	52	**Date:**	11/20/09
Impaired water body or know water contaminated area:							
Crop Grown:	pasture, cool season grass; Artesia MA			**EC water (dS/m):**	1	**ECe Crop:**	9.9
Irrigation Type:	☐ Surface Irrigation	**Leaching Percent Increase for Surface:**					
	☑ Sprinkler & Drip Irrigation	**Leaching Percent Increase for Sprinkler:**	1%				

	Jan (in/mo)	Feb (in/mo)	Mar (in/mo)	Apr (in/mo)	May (in/mo)	Jun (in/mo)	Jul (in/mo)	Aug (in/mo)	Sep (in/mo)	Oct (in/mo)	Nov (in/mo)	Dec (in/mo)
CU by Month[1] (in):	0.0	0.0	0.4	2.5	4.0	5.0	5.4	4.3	2.9	1.4	0.0	0.0
Salt Leaching Requirement[2] (in):	0.0	0.0	0.0	0.0	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Irrigation Requirement (in):	0.0	0.0	0.4	2.5	4.0	5.0	5.4	4.3	2.9	1.4	0.0	0.0
Actual or Estimated Net Application (in):			0.5	2.6	4	5.1	5.5	4.5	3	1.5	0	0
Net Irrigation-Net Application (in):	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.1**	**0.1**	**0.2**	**0.1**	**0.1**	**0.0**	**0.0**
Leaching Index[3]:	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Total Annual Crop Need (inches/year) = **26.0**

[1]The Irrigation Water Requirements are calculated from the Blaney Criddle (TR21) Model. Precepitation is the latest 30 year average. Inches are calculated for an 80% chance of the rainfall occuring. This means 8 out of 10 years rainfall will be met.

[2]The leaching volume is calculated using the leaching equation from Rhoades, US., Salinity Laboratory, Riverside, CA, 1992. **High Frequency Irrigation (drip and sprinkler)** is $LF=0.1794/(ECe/ECw)^{3.0417}$; **Conventional Irrigation (surface)** is $LF=0.3086/(ECe/ECw)^{1.7020}$.

[3]**Leaching Index (LI):** The LI statement of "**Not Meeting CU**", means CU plus the leaching requirement is not met, and that crop stress may reduce yield and salts may build up. The LI statement of "**OK**" means that there is 0 to 0.75/in/mo of excess irrigation. A LI statement of "**Potent. for Leach**" means that there is excess leaching (> 0.75/in/mo) and a potential for ground water pollution exists. Improved irrigation water management (IWM) must be applied, and additional conservation practices should be considered. The statement "**Do Not Exceed TWHC**" means that water has been applied when there is no CU of a crop. Do not apply more water than the soil can hold.

Irrigated Leaching Index and Leaching Requirements for Salt Management

Client:	Cottonwood Springs Dairy	**Field No:**	3	**Acres:**	30	**Date:**	11/20/09
Impaired water body or know water contaminated area:							
Crop Grown:	pasture, cool season grass; Artesia MA	**EC water (dS/m):**	1	**ECe Crop:**	9.9		
Irrigation Type:	☐ Surface Irrigation	**Leaching Percent Increase for Surface:**					
	☑ Sprinkler & Drip Irrigation	**Leaching Percent Increase for Sprinkler:**	1%				

	Jan (in/mo)	Feb (in/mo)	Mar (in/mo)	Apr (in/mo)	May (in/mo)	Jun (in/mo)	Jul (in/mo)	Aug (in/mo)	Sep (in/mo)	Oct (in/mo)	Nov (in/mo)	Dec (in/mo)
CU by Month[1] (in):	0.0	0.0	0.4	2.5	4.0	5.0	5.4	4.3	2.9	1.4	0.0	0.0
Salt Leaching Requirement[2] (in):	0.0	0.0	0.0	0.0	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Irrigation Requirement (in):	0.0	0.0	0.4	2.5	4.0	5.0	5.4	4.3	2.9	1.4	0.0	0.0
Actual or Estimated Net Application (in):			0.9	2.6	4	5.2	5.5	4.4	3	1.5	0	0
Net Irrigation-Net Application (in):	**0.0**	**0.0**	**0.5**	**0.1**	**0.0**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.0**	**0.0**
Leaching Index[3]:	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**

Total Annual Crop Need (inches/year) = **26.0**

[1]The Irrigation Water Requirements are calculated from the Blaney Criddle (TR21) Model. Precepitation is the latest 30 year average. Inches are calculated for an 80% chance of the rainfall occuring. This means 8 out of 10 years rainfall will be met.

[2]The leaching volume is calculated using the leaching equation from Rhoades, US., Salinity Laboratory, Riverside, CA, 1992. **High Frequency Irrigation (drip and sprinkler)** is $LF=0.1794/(ECe/ECw)^{3.0417}$; **Conventional Irrigation (surface)** is $LF=0.3086/(ECe/ECw)^{1.7020}$.

[3]**Leaching Index (LI):** The LI statement of "**Not Meeting CU**", means CU plus the leaching requirement is not met, and that crop stress may reduce yield and salts may build up. The LI statement of "**OK**" means that there is 0 to 0.75/in/mo of excess irrigation. A LI statement of "**Potent. for Leach**" means that there is excess leaching (> 0.75/in/mo) and a potential for ground water pollution exists. Improved irrigation water management (IWM) must be applied, and additional conservation practices should be considered. The statement "**Do Not Exceed TWHC**" means that water has been applied when there is no CU of a crop. Do not apply more water than the soil can hold.

Irrigated Leaching Index and Leaching Requirements for Salt Management

Client:	Cottonwood Springs Dairy	**Field No:**	4	**Acres:**	120	**Date:**	11/20/09
Impaired water body or know water contaminated area:							
Crop Grown:	wheat, winter, grain; Carlsbad			**EC water (dS/m):**	1	**ECe Crop:**	7
Irrigation Type:	☐ Surface Irrigation	**Leaching Percent Increase for Surface:**					
	☑ Sprinkler & Drip Irrigation	**Leaching Percent Increase for Sprinkler:**	1%				

	Jan (in/mo)	Feb (in/mo)	Mar (in/mo)	Apr (in/mo)	May (in/mo)	Jun (in/mo)	Jul (in/mo)	Aug (in/mo)	Sep (in/mo)	Oct (in/mo)	Nov (in/mo)	Dec (in/mo)
CU by Month[1] (in):	0.9	1.7	3.7	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7
Salt Leaching Requirement[2] (in):	0.0	0.0	0.0	0.1	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Irrigation Requirement (in):	0.9	1.7	3.8	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7
Actual or Estimated Net Application (in):	0.9	1.8	4	5.5	0	0	0	0	0	0	0.8	0.8
Net Irrigation-Net Application (in):	**0.0**	**0.1**	**0.2**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.1**
Leaching Index[3]:	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**

Total Annual Crop Need (inches/year) = **13.1**

[1]The Irrigation Water Requirements are calculated from the Blaney Criddle (TR21) Model. Precepitation is the latest 30 year average. Inches are calculated for an 80% chance of the rainfall occuring. This means 8 out of 10 years rainfall will be met.

[2]The leaching volume is calculated using the leaching equation from Rhoades, US., Salinity Laboratory, Riverside, CA, 1992. **High Frequency Irrigation (drip and sprinkler)** is $LF=0.1794/(ECe/ECw)^{3.0417}$; **Conventional Irrigation (surface)** is $LF=0.3086/(ECe/ECw)^{1.7020}$.

[3]**Leaching Index (LI):** The LI statement of "**Not Meeting CU**", means CU plus the leaching requirement is not met, and that crop stress may reduce yield and salts may build up. The LI statement of "**OK**" means that there is 0 to 0.75/in/mo of excess irrigation. A LI statement of "**Potent. for Leach**" means that there is excess leaching (> 0.75/in/mo) and a potential for ground water pollution exists. Improved irrigation water management (IWM) must be applied, and additional conservation practices should be considered. The statement "**Do Not Exceed TWHC**" means that water has been applied when there is no CU of a crop. Do not apply more water than the soil can hold.

Irrigated Leaching Index and Leaching Requirements for Salt Management [illegible]

Client:	Cottonwood Springs Diary	**Field No:**	5	**Acres:** 85	**Date:** 11/20/09
Impaired water body or know water contaminated area:					
Crop Grown:	alfalfa, hay, southern; Artesia			**EC water (dS/m):** 1	**ECe Crop:** 3.4
Irrigation Type:	☐ Surface Irrigation	**Leaching Percent Increase for Surface:**			
	☑ Sprinkler & Drip Irrigation	**Leaching Percent Increase for Sprinkler:**	4%		

	Jan (in/mo)	Feb (in/mo)	Mar (in/mo)	Apr (in/mo)	May (in/mo)	Jun (in/mo)	Jul (in/mo)	Aug (in/mo)	Sep (in/mo)	Oct (in/mo)	Nov (in/mo)	Dec (in/mo)
CU by Month[1] (in):	0.0	0.0	0.8	3.7	6.2	8.0	9.0	7.2	4.5	2.8	0.3	0.0
Salt Leaching Requirement[2] (in):	0.0	0.0	0.0	0.1	0.24	0.3	0.3	0.3	0.2	0.1	0.0	0.0
Net Irrigation Requirement (in):	0.0	0.0	0.8	3.9	6.4	8.3	9.4	7.5	4.6	2.9	0.3	0.0
Actual or Estimated Net Application (in):			0.9	4	6.5	8.5	9.5	7.7	4.9	3	0.4	
Net Irrigation-Net Application (in):	**0.0**	**0.0**	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**	**0.2**	**0.3**	**0.1**	**0.1**	**0.0**
Leaching Index[3]:	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**

Total Annual Crop Need (inches/year) = **44.1**

[1]The Irrigation Water Requirements are calculated from the Blaney Criddle (TR21) Model. Precepitation is the latest 30 year average. Inches are calculated for an 80% chance of the rainfall occuring. This means 8 out of 10 years rainfall will be met.

[2]The leaching volume is calculated using the leaching equation from Rhoades, US., Salinity Laboratory, Riverside, CA, 1992. **High Frequency Irrigation (drip and sprinkler)** is $LF=0.1794/(ECe/ECw)^{3.0417}$; **Conventional Irrigation (surface)** is $LF=0.3086/(ECe/ECw)^{1.7020}$.

[3]**Leaching Index (LI):** The LI statement of "**Not Meeting CU**", means CU plus the leaching requirement is not met, and that crop stress may reduce yield and salts may build up. The LI statement of "**OK**" means that there is 0 to 0.75/in/mo of excess irrigation. A LI statement of "**Potent. for Leach**" means that there is excess leaching (> 0.75/in/mo) and a potential for ground water pollution exists. Improved irrigation water management (IWM) must be applied, and additional conservation practices should be considered. The statement "**Do Not Exceed TWHC**" means that water has been applied when there is no CU of a crop. Do not apply more water than the soil can hold.

Calculated Leaching Index and Leaching Requirements for Salt Management

Client:	Cottonwood Springs Dairy	**Field No:**	6	**Acres:**	36	**Date:**	11/20/09
Impaired water body or know water contaminated area:							
Crop Grown:	oat, hay; Deming			**EC water (dS/m):**	1	**ECe Crop:**	3.2
Irrigation Type:	☐ Surface Irrigation	**Leaching Percent Increase for Surface:**					
	☑ Sprinkler & Drip Irrigation	**Leaching Percent Increase for Sprinkler:**		4%			

	Jan (in/mo)	Feb (in/mo)	Mar (in/mo)	Apr (in/mo)	May (in/mo)	Jun (in/mo)	Jul (in/mo)	Aug (in/mo)	Sep (in/mo)	Oct (in/mo)	Nov (in/mo)	Dec (in/mo)
CU by Month[1] (in):	0.0	0.0	2.3	5.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salt Leaching Requirement[2] (in):	0.0	0.0	0.1	0.2	0.09	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Irrigation Requirement (in):	0.0	0.0	2.4	5.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual or Estimated Net Application (in):			2.5	5.3	2.3	0	0	0	0	0	0	0
Net Irrigation-Net Application (in):	**0.0**	**0.0**	**0.1**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Leaching Index[3]:	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**

Total Annual Crop Need (inches/year) = **9.8**

[1]The Irrigation Water Requirements are calculated from the Blaney Criddle (TR21) Model. Precepitation is the latest 30 year average. Inches are calculated for an 80% chance of the rainfall occuring. This means 8 out of 10 years rainfall will be met.

[2]The leaching volume is calculated using the leaching equation from Rhoades, US., Salinity Laboratory, Riverside, CA, 1992. **High Frequency Irrigation (drip and sprinkler)** is $LF=0.1794/(ECe/ECw)^{3.0417}$; **Conventional Irrigation (surface)** is $LF=0.3086/(ECe/ECw)^{1.7020}$.

[3]**Leaching Index (LI):** The LI statement of "**Not Meeting CU**", means CU plus the leaching requirement is not met, and that crop stress may reduce yield and salts may build up. The LI statement of "**OK**" means that there is 0 to 0.75/in/mo of excess irrigation. A LI statement of "**Potent. for Leach**" means that there is excess leaching (> 0.75/in/mo) and a potential for ground water pollution exists. Improved irrigation water management (IWM) must be applied, and additional conservation practices should be considered. The statement "**Do Not Exceed TWHC**" means that water has been applied when there is no CU of a crop. Do not apply more water than the soil can hold.

Irrigated Leaching Index and Leaching Requirements for Salt Management

Client:	Cottonwood Springs Dairy	**Field No:**	7	**Acres:**	40	**Date:**	11/20/09
Impaired water body or know water contaminated area:							
Crop Grown:	corn, silage, Artesia			**EC water (dS/m):**	1	**ECe Crop:**	2.5
Irrigation Type:	☑ Surface Irrigation	**Leaching Percent Increase for Surface:**	1%				
	☐ Sprinkler & Drip Irrigation	**Leaching Percent Increase for Sprinkler:**					

	Jan (in/mo)	Feb (in/mo)	Mar (in/mo)	Apr (in/mo)	May (in/mo)	Jun (in/mo)	Jul (in/mo)	Aug (in/mo)	Sep (in/mo)	Oct (in/mo)	Nov (in/mo)	Dec (in/mo)
CU by Month[1] (in):	0.0	0.0	0.0	1.6	3.6	6.6	8.7	7.1	1.7	0.0	0.0	0.0
Salt Leaching Requirement[2] (in):	0.0	0.0	0.0	0.0	0.04	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Net Irrigation Requirement (in):	0.0	0.0	0.0	1.6	3.6	6.6	8.8	7.2	1.7	0.0	0.0	0.0
Actual or Estimated Net Application (in):			0	1.8	3.7	6.7	8.9	7.3	1.7	0	0	0
Net Irrigation-Net Application (in):	**0.0**	**0.0**	**0.0**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**
Leaching Index[3]:	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**

Total Annual Crop Need (inches/year) = **29.5**

[1]The Irrigation Water Requirements are calculated from the Blaney Criddle (TR21) Model. Precepitation is the latest 30 year average. Inches are calculated for an 80% chance of the rainfall occuring. This means 8 out of 10 years rainfall will be met.

[2]The leaching volume is calculated using the leaching equation from Rhoades, US., Salinity Laboratory, Riverside, CA, 1992. **High Frequency Irrigation (drip and sprinkler)** is $LF=0.1794/(ECe/ECw)^{3.0417}$; **Conventional Irrigation (surface)** is $LF=0.3086/(ECe/ECw)^{1.7020}$.

[3]**Leaching Index (LI):** The LI statement of "**Not Meeting CU**", means CU plus the leaching requirement is not met, and that crop stress may reduce yield and salts may build up. The LI statement of "**OK**" means that there is 0 to 0.75/in/mo of excess irrigation. A LI statement of "**Potent. for Leach**" means that there is excess leaching (> 0.75/in/mo) and a potential for ground water pollution exists. Improved irrigation water management (IWM) must be applied, and additional conservation practices should be considered. The statement "**Do Not Exceed TWHC**" means that water has been applied when there is no CU of a crop. Do not apply more water than the soil can hold.

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Mr. Phil Troost	Field(s):	1	Date:	11/20/2009
Planner:	Reddy Ganta	Location:	Lake Arthur, NM	Crop:	Alfalfa-Oats
Soil Permeablity (in/hr):	0.5	Slope (%):	0.012	Planned/Exist.:	Exist

Site Characteristic	Place an X in the approprate box for each of the Site Characteristic listed below					Sub Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
					X	8
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
				X		4
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
		X				1.5
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<6 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS≥10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			X			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	<20 feet wide	No Buffer	
	X					0

P Hazard Class: Medium **Total Index Points:** 22.5

Phosphorus Application Classification: N Based

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Mr. Phil Troost	Field(s):	2	Date:	11/20/2009
Planner:	Reddy Ganta	Location:	Lake Arthur, NM	Crop:	Pasture-WW
Soil Permeablity (in/hr):	0.5	Slope (%):	0.003	Planned/Exist.:	Exist

Site Characteristic	Place an X in the approprate box for each of the Site Characteristic listed below.					Sub Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
					X	8
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
				X		4
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
		X				1.5
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<6 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS>10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			X			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
	X					0

P Hazard Class: Medium **Total Index Points:** 22.5

Phosphorus Application Classification: N Based

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Mr. Phil Troost	Field(s):	3	Date:	11/20/2009
Planner:	Reddy Ganta	Location:	Lake Arthur, NM	Crop:	Bermuda
Soil Permeablity (in/hr):	0.5	Slope (%):	0.002	Planned/Exist.:	Exist

Site Characteristic	Place an X in the appropriate box for each of the Site Characteristic listed below					Sub-Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
					X	8
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
				X		4
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
		X				1.5
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<6 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS>10 for erodible soils	QS>8 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			X			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
	X					0

P Hazard Class:	Medium	Total Index Points:	22.5
Phosphorus Application Classification:	N Based		

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Mr. Phil Troost	Field(s):	4	Date:	11/20/2009
Planner:	Reddy Ganta	Location:	Lake Arthur, NM	Crop:	Corn-WW
Soil Permeability (in/hr):	0.5	Slope (%):	0.003	Planned/Exist.:	Exist

Site Characteristic	Place an X in the appropriate box for each of the Site Characteristic listed below					Sub Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
					X	8
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
				X		4
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
		x				1.5
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<8 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS>10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			x			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
	X					0

P Hazard Class:	Medium	Total Index Points:	22.5
Phosphorus Application Classification:	N Based		

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Mr. Phil Troost	Field(s):	5	Date:	11/20/2009
Planner:	Reddy Ganta	Location:	Lake Arthur, NM	Crop:	Alfalfa-Oats
Soil Permeability (in/hr):	0.5	Slope (%):	0.016	Planned/Exist.:	Exist

Site Characteristic	Place an X in the approprate box for each of the Site Characteristic listed below.					Site Total
Soil Test P Level	Very Low <8 ppm	Low 8-16 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
					X	8
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
				X		4
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
		X				1.5
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<6 for very erodible soils or QS<10 for resistant soils	QS<10 for erosion resistant soils	QS>10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			X			1
Vegetative Buffer	>100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
	X					0

P Hazard Class: Medium

Total Index Points: 22.5

Phosphorus Application Classification: N Based

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Mr. Phil Troost	Field(s):	6	Date:	5/27/2010
Planner:	Reddy Ganta	Location:	Lake Arthur, NM	Crop:	Alfalfa-Oats
Soil Permeablity (in/hr):	0.5	Slope (%):	0.001	Planned/Exist.:	Exist

Site Characteristic	Place an X in the approprate box for each of the Site Characteristic listed below.					Sub Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
					X	8
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
				X		4
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
		X				1.5
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<6 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS>10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			X			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
	X					0

P Hazard Class: Medium **Total Index Points:** 22.5

Phosphorus Application Classification: N Based

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Mr. Phil Troost	Field(s):	7	Date:	11/20/2009
Planner:	Reddy Ganta	Location:	Lake Arthur, NM	Crop:	Corn
Soil Permeablity (in/hr):	0.5	Slope (%):	0.001	Planned/Exist.:	Exist

Site Characteristic	Place an X in the appropriate box for each of the Site Characteristic listed below					Sub Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
					X	8
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
				X		4
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
		x				1.5
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<5 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS>10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			x			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
	X					0

P Hazard Class:	Medium	Total Index Points:	22.5
Phosphorus Application Classification:	N Based		

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

NRCS - WEQ INPUT WORKSHEET, Version 8.05 5/22/03

Producer: Mr. Phil Troost
Planner: RG
Crop Rot: Alfalfa-Oats
Location: Eddy Co

Climate Data Station: NM ROSWELL
Field Width (Ft.): 640
Field Direction (NS/EW): EW
Adjusted Soil "I": 38

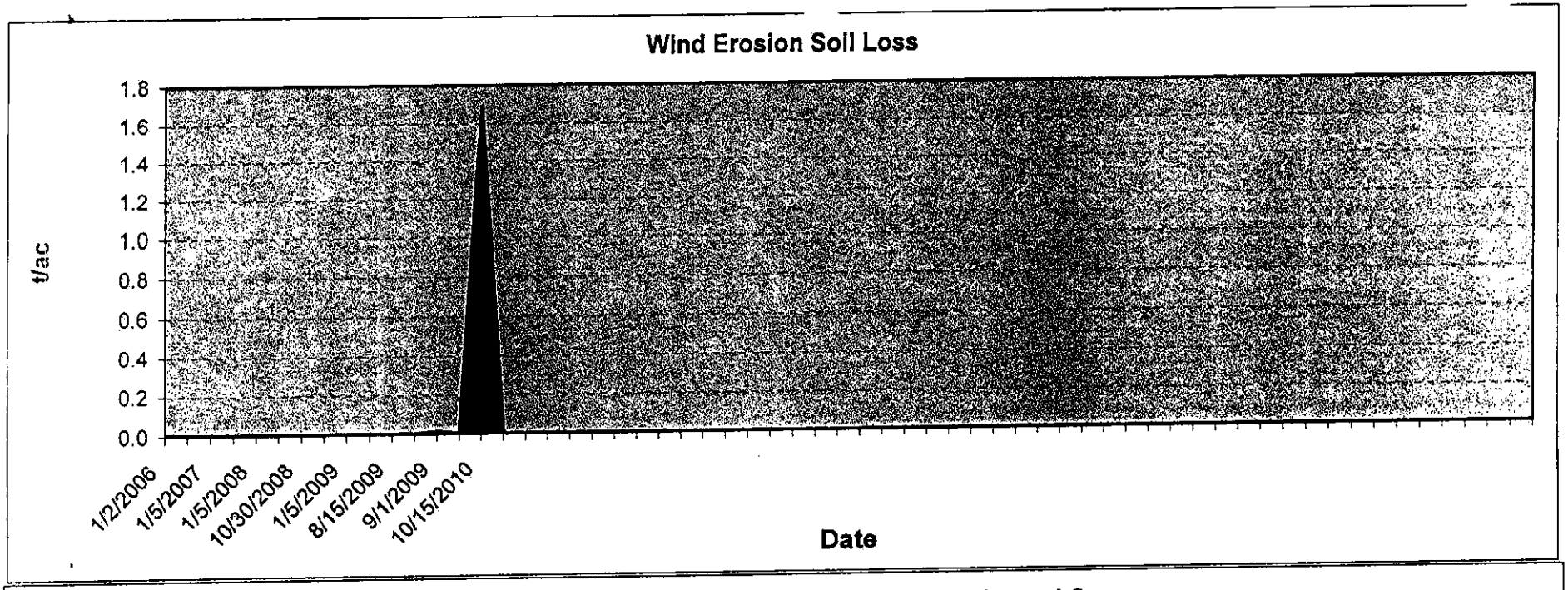
Tillage Direct (NS/EW): NS
Length/Width Ratio: 2.0
Site "C" Value: 150

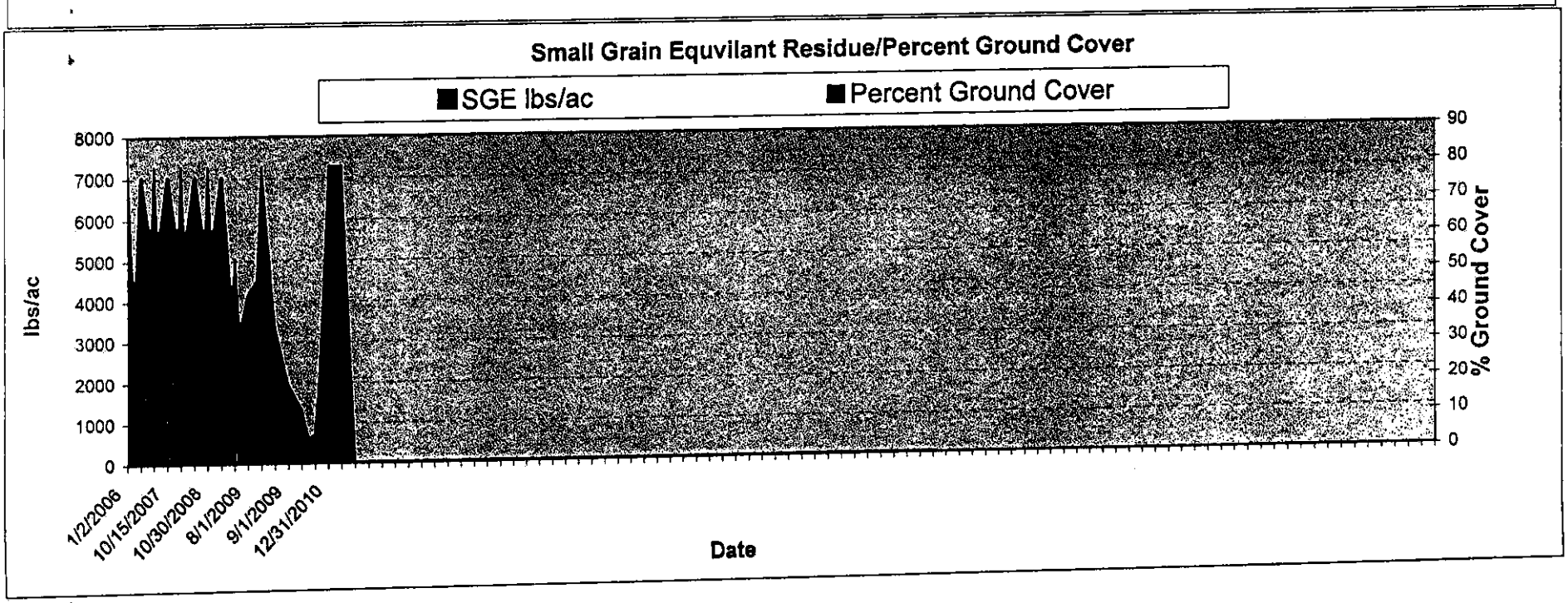
Tract: Field: 1
Irrigated? (y or n): Y
Wind Erodibility Group: 7 (1-7)

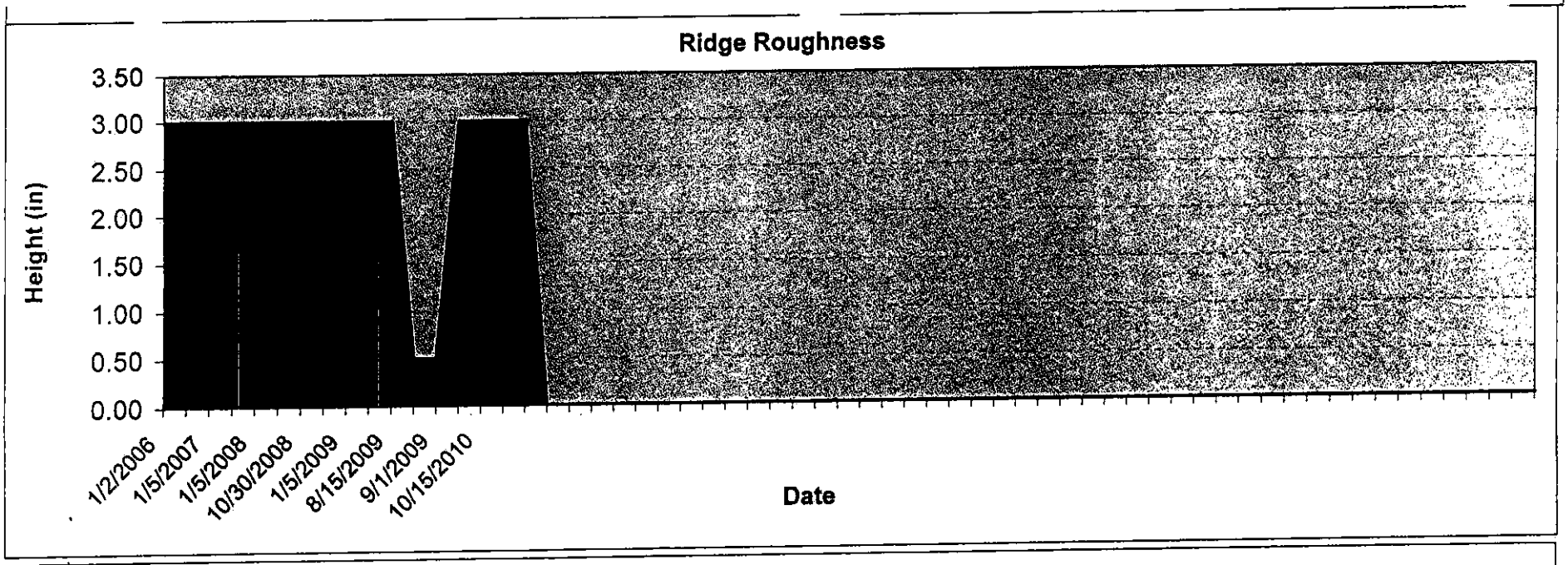
Average Annual Wind Erosion (t/ac): 0.3 Yrs in Rotation: 5.0 Sum Period Erosion: 1.7 (tons/ac)

Crop and Operation Management Records/Residue Calculations (green and dry)

Operation Date (date)	Crop (name)	Operation (name)	No. of Irr./Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
1/1/2006	-	Start Rotation		100%	-	- -	3	10	0.90	3000	82	0	0	0	0.50
1/2/2006	Alfalfa, fall	Grow	9	0%			3	10	1.00	3000		8108	0	0	0.50
8/1/2006	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
1/5/2007	Alfalfa, fall	Grow	9	0%			3	10	1.00	3000		8108	0	0	0.50
10/15/2007	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
1/5/2008	Alfalfa, fall	Grow	9	0%			3	10	1.00	3000		8108	0	0	0.50
10/15/2008	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
10/30/2008	Oat Hay irr	Grow	9	0%			3	10	1.00	3000		8108	0	0	0.50
1/1/2009	Oat Hay irr	Harvest		80%	50%	3 ton/ac	3	10	1.00	1500	57	2594	0	0	0.50
1/5/2009	Alfalfa, fall	Grow	9	0%			3	10	1.00	1500		4145	0	0	0.50
8/1/2009	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
8/15/2009	Alfalfa, fall	Disk, tandem, heavy, primary op. N		100%			1	13	0.25	750	38	1272	0	0	0.70
8/19/2009	Alfalfa, fall	Disk, tandem, finishing N		100%			1	7	0.50	375	22	734	0	0	0.40
9/1/2009	Alfalfa, fall	Drill or Air seeder, chisel or hoe opener N		100%			3	10	0.65	244	15	521	0	0	0.50
9/2/2009	Alfalfa, fall	Grow	9	0%			3	10	1.00	244		714	0	0	0.50
10/15/2010	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
12/31/2010		End Rotation					3	10	1.00	3000	82				0.50


Wind Erosion Soil Loss
t/ac
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1/2/2006
1/5/2007
1/5/2008
10/30/2008
1/5/2009
8/15/2009
9/1/2009
10/15/2010
Date


Small Grain Equvilant Residue/Percent Ground Cover
SGE lbs/ac
Percent Ground Cover
lbs/ac
8000
7000
6000
5000
4000
3000
2000
1000
0
% Ground Cover
90
80
70
60
50
40
30
20
10
0
1/2/2006
10/15/2007
10/30/2008
8/1/2009
9/1/2009
12/31/2010
Date


Ridge Roughness
Height (in)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/2/2006
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1/5/2008
10/30/2008
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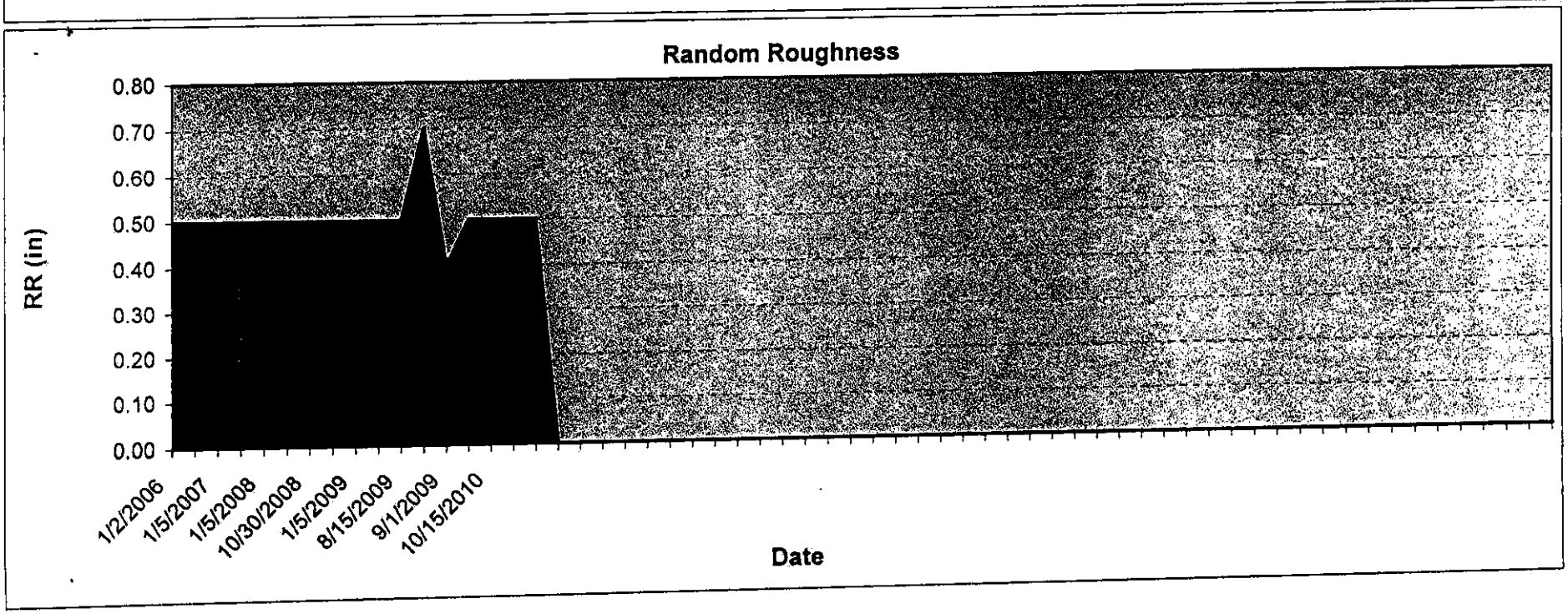
8/15/2009
9/1/2009
10/15/2010
Date


Random Roughness
RR (in)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/2/2006
1/5/2007
1/5/2008
10/30/2008
1/5/2009
8/15/2009
9/1/2009
10/15/2010
Date

NRCS - WEQ INPUT WORKSHEET, Version 8.05 5/22/03

Producer: Mr. Phil Troost
Planner: RG
Crop Rot: Bermuda
Location: Eddy Co

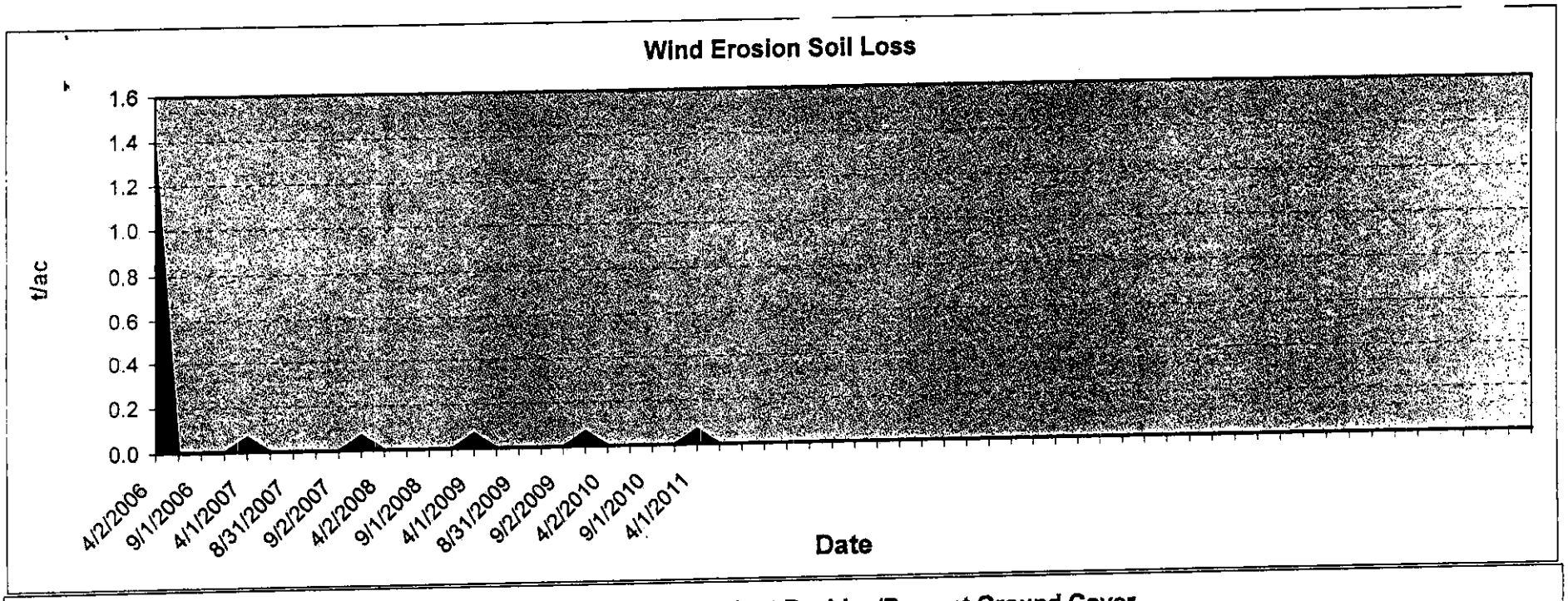
Climate Data Station: NM, ROSWELL
Field Width (Ft.): 850
Tillage Direct (NS/EW): NS
Field Direction (NS/EW): NS
Length/Width Ratio: 2.0
Adjusted Soil "I": 38
Site "C" Value: 160

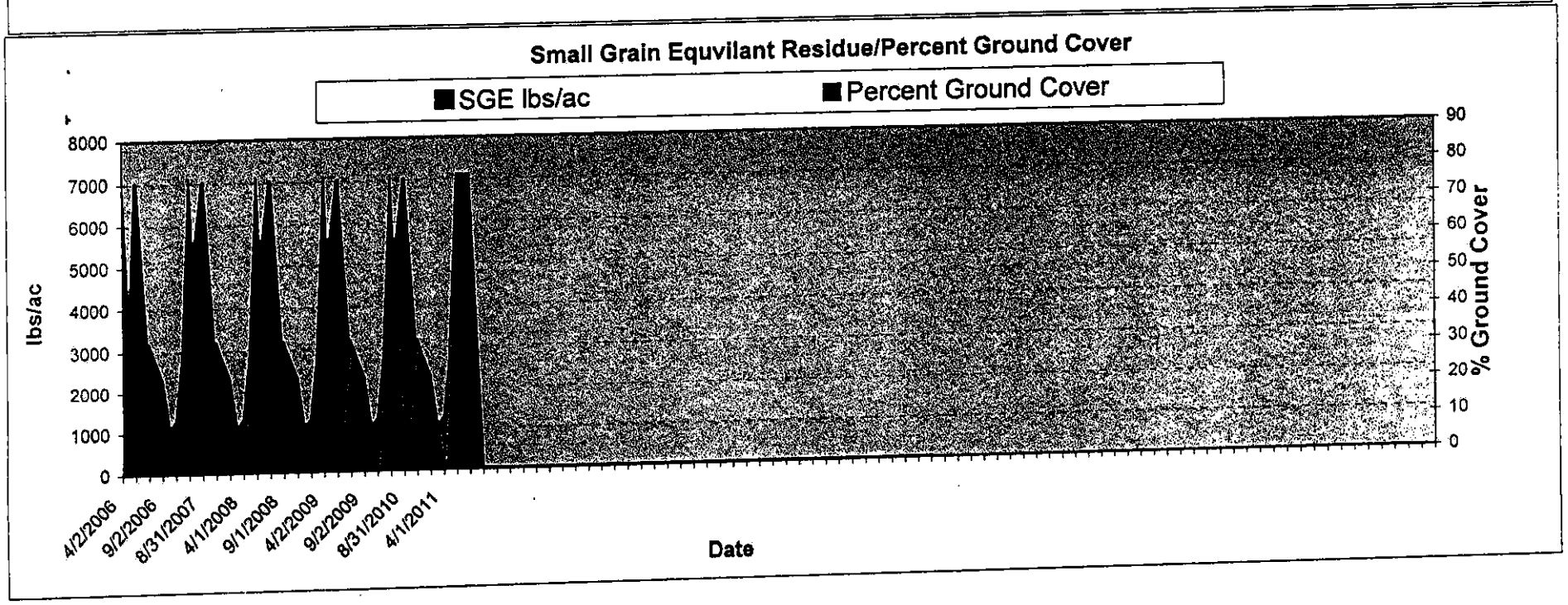
Tract: ____ Field: 3
Irrigated? (y or n): Y
Wind Erodibility Group: 7 (1-7)

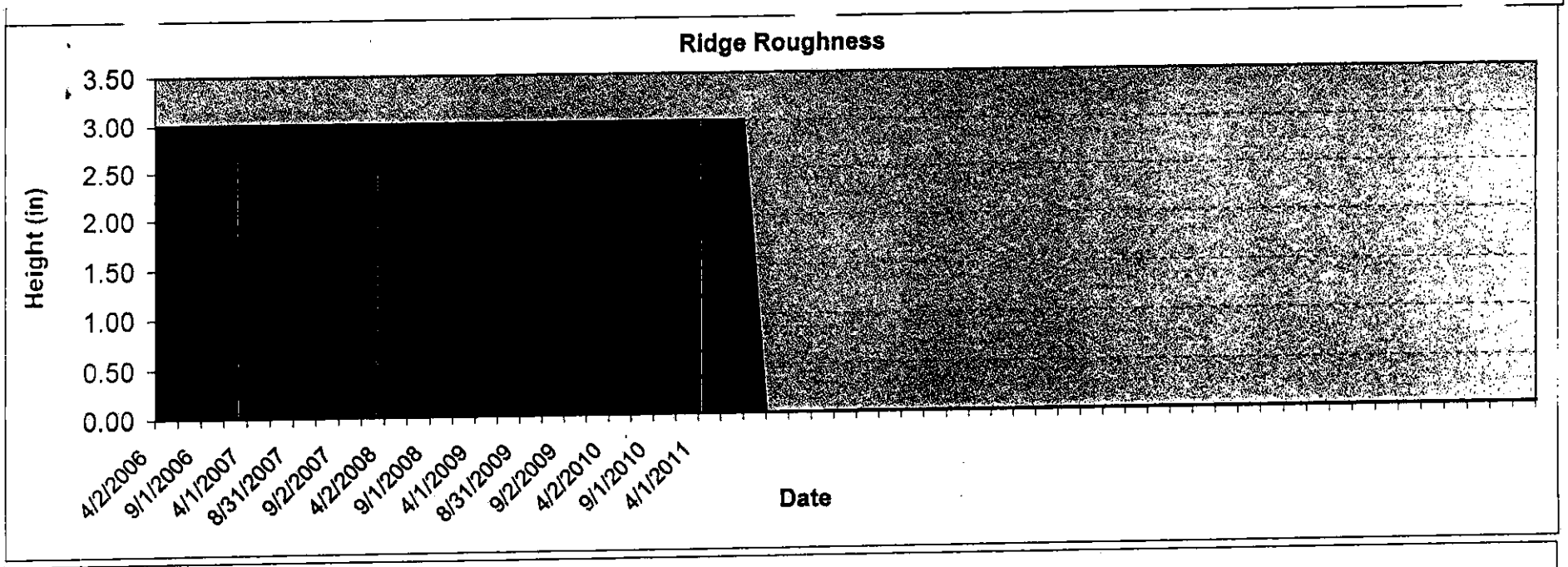
Average Annual Wind Erosion (t/ac): [redacted] Yrs in Rotation: [redacted] Sum Period Erosion: [redacted] (tons/ac)

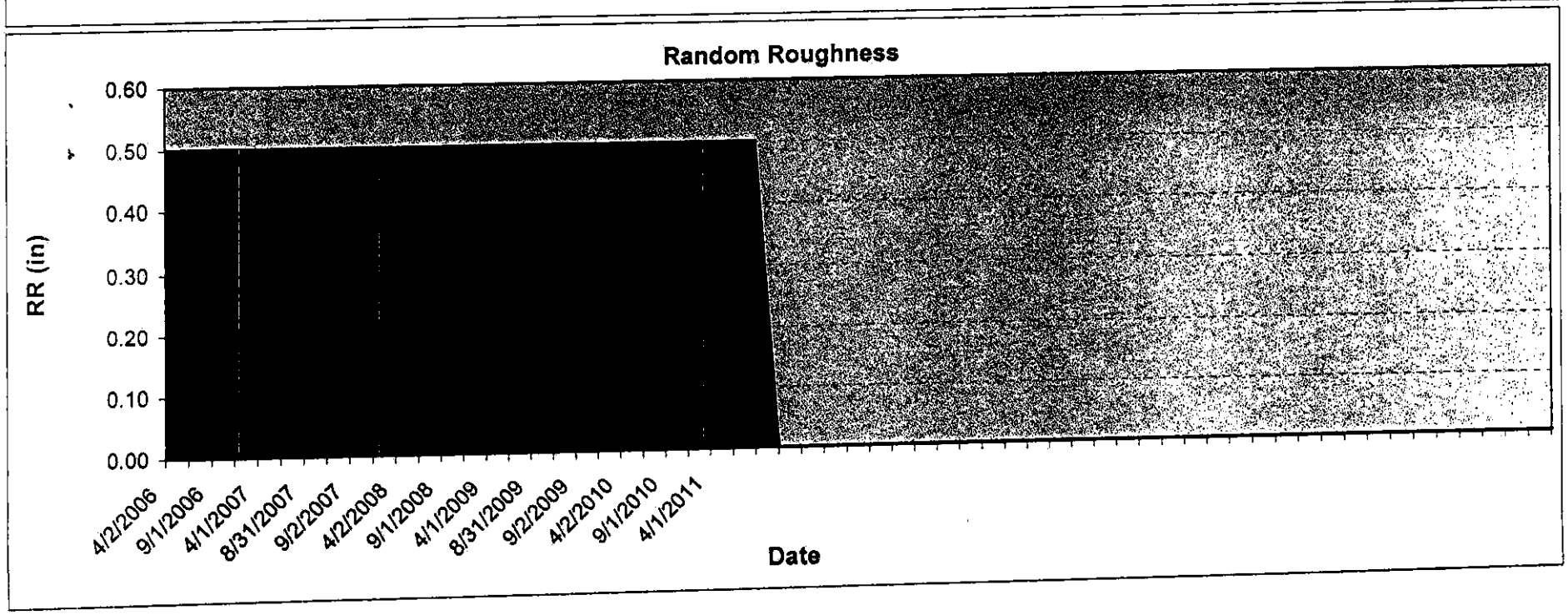
Crop and Operation Management Records/Residue Calculations (green and dry)

Operation Date (date)	Crop (name)	Operation (name)	No. of Irr./Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
1/1/2006	-	Start Rotation		100%	-	- -	3	10	0.90	2800	80	0	0	0	0.50
4/2/2006	Pasture, irr	Grow	9	0%			3	10	1.00	2800		7584	0	0	0.50
8/31/2006	Pasture, irr	Grazing, 75%		0%			3	10	0.25	700	36	1982	0	0	0.50
9/1/2006	Pasture, irr	Drill or Air seeder, chisel or hoe opener N		100%			3	10	0.65	455	26	856	0	0	0.50
9/2/2006	Pasture, irr	Grow	4	0%			3	10	1.00	455		1306	0	0	0.50
4/1/2007	Pasture, irr	Harvest		80%	40%	8 ton/ac	3	10	1.00	2800	80	4413	0	0	0.50
4/2/2007	Pasture, irr	Grow	9	0%			3	10	1.00	2800		7584	0	0	0.50
8/31/2007	Pasture, irr	Grazing, 75%		0%			3	10	0.25	700	36	1982	0	0	0.50
9/1/2007	Pasture, irr	Drill or Air seeder, chisel or hoe opener N		100%			3	10	0.65	455	26	856	0	0	0.50
9/2/2007	Pasture, irr	Grow	4	0%			3	10	1.00	455		1306	0	0	0.50
4/1/2008	Pasture, irr	Harvest		80%	40%	8 ton/ac	3	10	1.00	2800	80	4413	0	0	0.50
4/2/2008	Pasture, irr	Grow	9	0%			3	10	1.00	2800		7584	0	0	0.50
8/31/2008	Pasture, irr	Grazing, 75%		0%			3	10	0.25	700	36	1982	0	0	0.50
9/1/2008	Pasture, irr	Drill or Air seeder, chisel or hoe opener N		100%			3	10	0.65	455	26	856	0	0	0.50
9/2/2008	Pasture, irr	Grow	4	0%			3	10	1.00	455		1306	0	0	0.50
4/1/2009	Pasture, irr	Harvest		80%	40%	8 ton/ac	3	10	1.00	2800	80	4413	0	0	0.50
4/2/2009	Pasture, irr	Grow	9	0%			3	10	1.00	2800		7584	0	0	0.50
8/31/2009	Pasture, irr	Grazing, 75%		0%			3	10	0.25	700	36	1982	0	0	0.50
9/1/2009	Pasture, irr	Drill or Air seeder, chisel or hoe opener N		100%			3	10	0.65	455	26	856	0	0	0.50
9/2/2009	Pasture, irr	Grow	4	0%			3	10	1.00	455		1306	0	0	0.50
4/1/2010	Pasture, irr	Harvest		80%	40%	8 ton/ac	3	10	1.00	2800	80	4413	0	0	0.50
4/2/2010	Pasture, irr	Grow	9	0%			3	10	1.00	2800		7584	0	0	0.50
8/31/2010	Pasture, irr	Grazing, 75%		0%			3	10	0.25	700	36	1982	0	0	0.50
9/1/2010	Pasture, irr	Drill or Air seeder, chisel or hoe opener N		100%			3	10	0.65	455	26	856	0	0	0.50
9/2/2010	Pasture, irr	Grow	4	0%			3	10	1.00	455		1306	0	0	0.50
4/1/2011	Pasture, irr	Harvest		80%	40%	8 ton/ac	3	10	1.00	2800	80	4413	0	0	0.50
4/2/2011		End Rotation					3	10	1.00	2800	80				0.50


Wind Erosion Soil Loss
t/ac
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
4/2/2006
9/1/2006
4/1/2007
8/31/2007
9/2/2007
4/2/2008
9/1/2008
4/1/2009
8/31/2009
9/2/2009
4/2/2010
9/1/2010
4/1/2011
Date


Small Grain Equvilant Residue/Percent Ground Cover
SGE lbs/ac
Percent Ground Cover
lbs/ac
8000
7000
6000
5000
4000
3000
2000
1000
0
% Ground Cover
90
80
70
60
50
40
30
20
10
0
4/2/2006
9/2/2006
8/31/2007
4/1/2008
9/1/2008
4/2/2009
9/2/2009
8/31/2010
4/1/2011
Date


Ridge Roughness
Height (in)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
4/2/2006
9/1/2006
4/1/2007
8/31/2007
9/2/2007
4/2/2008
9/1/2008
4/1/2009
8/31/2009
9/2/2009
4/2/2010
9/1/2010
4/1/2011
Date


Random Roughness
RR (in)
0.60
0.50
0.40
0.30
0.20
0.10
0.00
4/2/2006
9/1/2006
4/1/2007
8/31/2007
9/2/2007
4/2/2008
9/1/2008
4/1/2009
8/31/2009
9/2/2009
4/2/2010
9/1/2010
4/1/2011
Date

NRCS - WEQ INPUT WORKSHEET, Version 8.05 5/22/03

Producer: Mr. Phil Troost
Planner: RG
Crop Rot: corn/winter wheat
Location: Eddy Co

Climate Data Station: NM, ROSWELL
Field Width (Ft.): 1290 Tillage Direct (NS/EW): NS
Field Direction (NS/EW): NS Length/Width Ratio: 1.0
Adjusted Soil "I": 38 Site "C" Value: 150

Tract: Field: 4
Irrigated? (y or n): Y
Wind Erodibility Group: 7 (1-7)

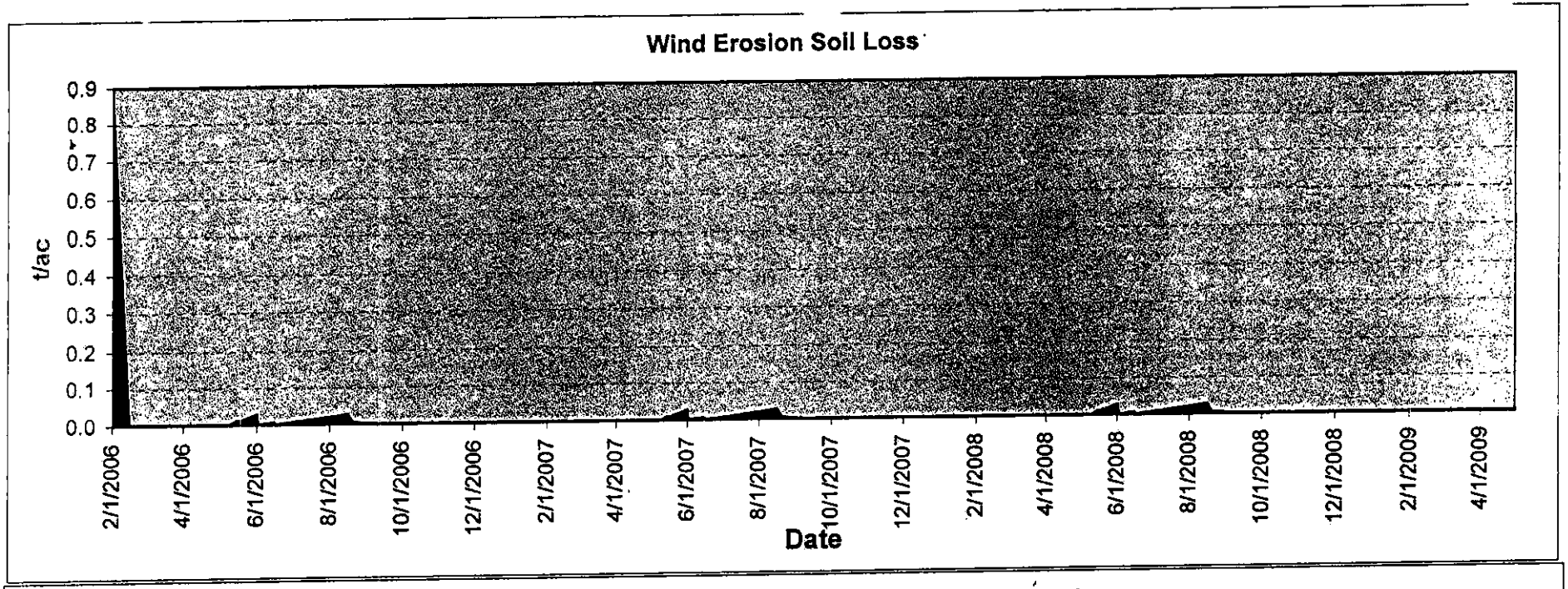
Average Annual Wind Erosion (t/ac): 0.2 Yrs in Rotation: 5.3 Sum Period Erosion: 1.3 (tons/ac)

Crop and Operation Management Records/Residue Calculations (green and dry)

Operation Date (date)	Crop (name)	Operation (name)	No. of Irr./Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
1/1/2006	-	Start Rotation		100%	-	- -	1	8	0.90	13104	100	0	0	0	0.30
2/1/2006	Wheat, winter, irr, early 150	Grow		0%			1	8	1.00	13104		43532	400	414	0.30
2/15/2006	Wheat, winter, irr, early 165	Grow	1	0%			1	8	1.00	13104		43509	650	670	0.30
2/28/2006	Wheat, winter, irr, early 180	Grow	1	0%			1	8	1.00	13104		43476	1000	1025	0.30
4/15/2006	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	13104		43397	1900	1619	0.30
4/30/2006	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2006	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2006	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2006	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2006	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44'	827	0	0	0.30
8/20/2006	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2006	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2006	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2006	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2006	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2006	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2007	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2007	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2007	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2007	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2007	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2007	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70

Operation Date (date)	Crop (name)	Operation (name)	No. of Irr./Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
5/15/2007	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2007	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2007	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2007	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2007	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2007	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2007	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2007	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2008	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2008	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2008	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2008	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2008	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2008	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2008	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2008	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2008	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2008	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2008	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2008	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2008	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2008	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2009	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2009	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2009	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2009	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2009	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2009	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70

Operation Date (date)	Crop (name)	Operation (name)	No. of Irr./Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
5/15/2009	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2009	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2009	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2009	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2009	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2009	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2009	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2009	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2010	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2010	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2010	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2010	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2010	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2010	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2010	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2010	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2010	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2010	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2010	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2010	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2010	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2010	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2011	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2011	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
4/30/2011	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2011		End Rotation					1	8	1.00	13104	100				0.30


Wind Erosion Soil Loss
t/ac
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2/1/2006
4/1/2006
6/1/2006
8/1/2006
10/1/2006
12/1/2006
2/1/2007
4/1/2007
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12/1/2007
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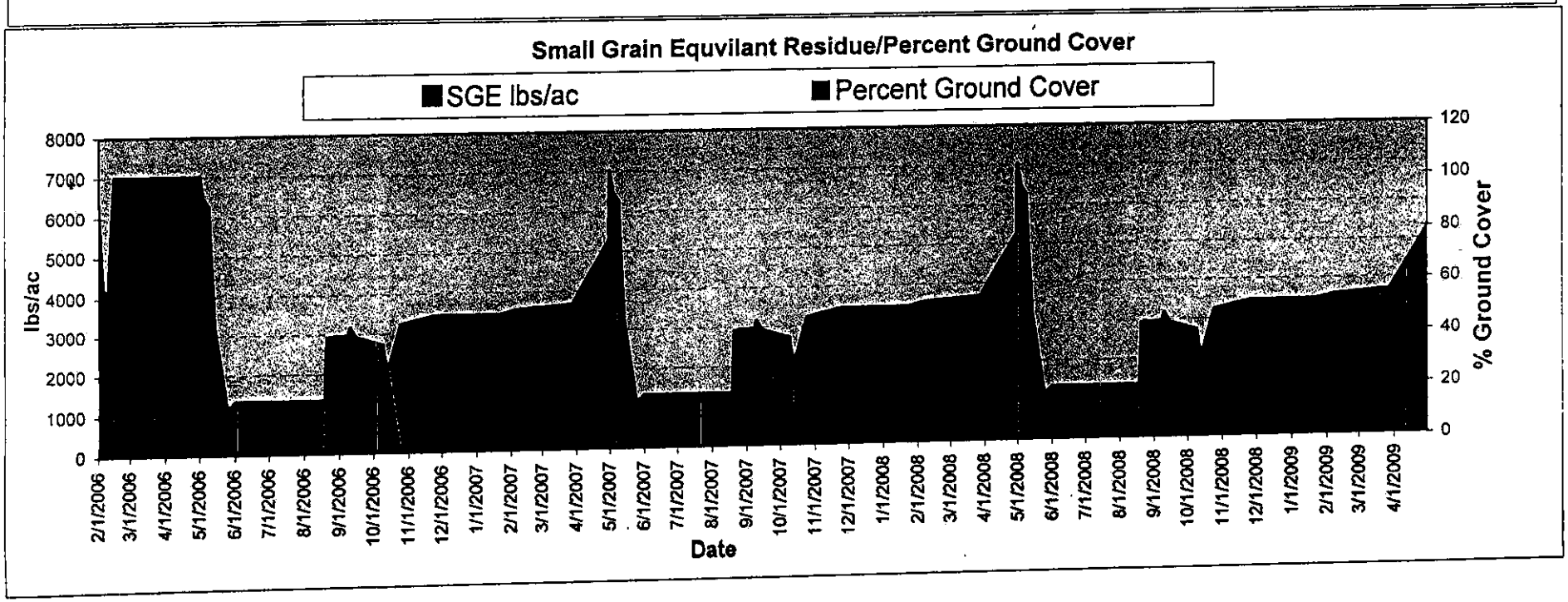
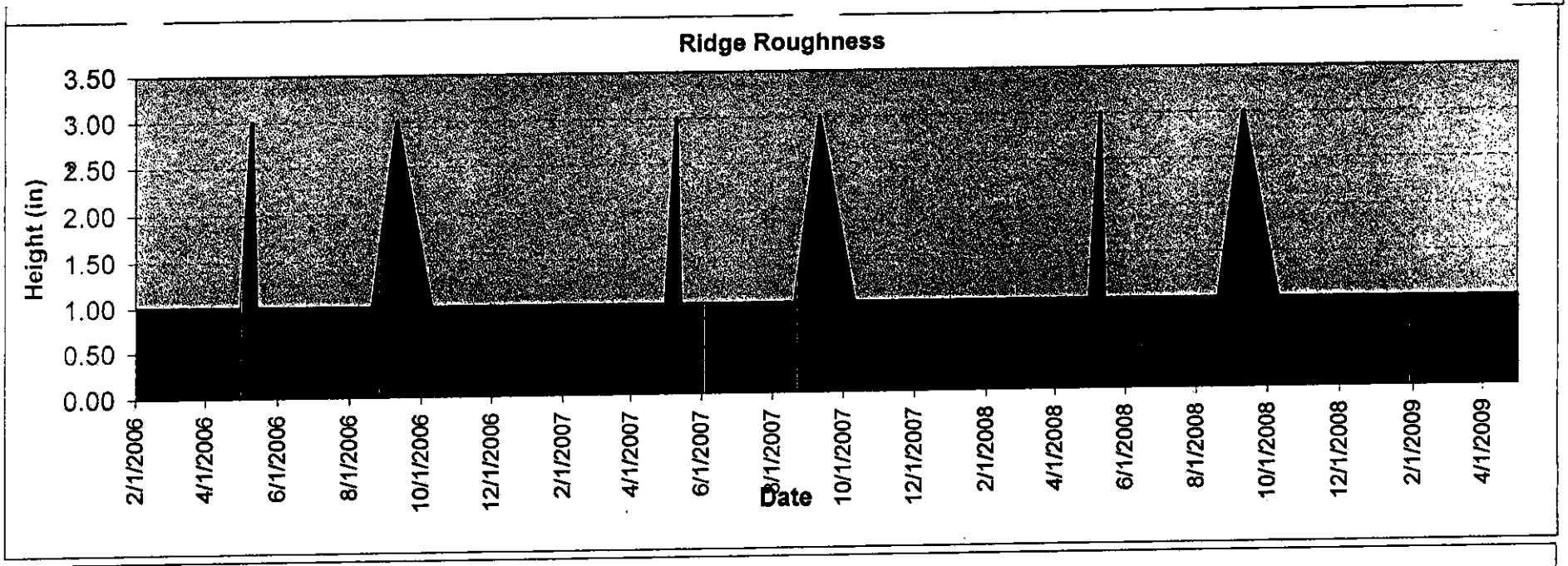
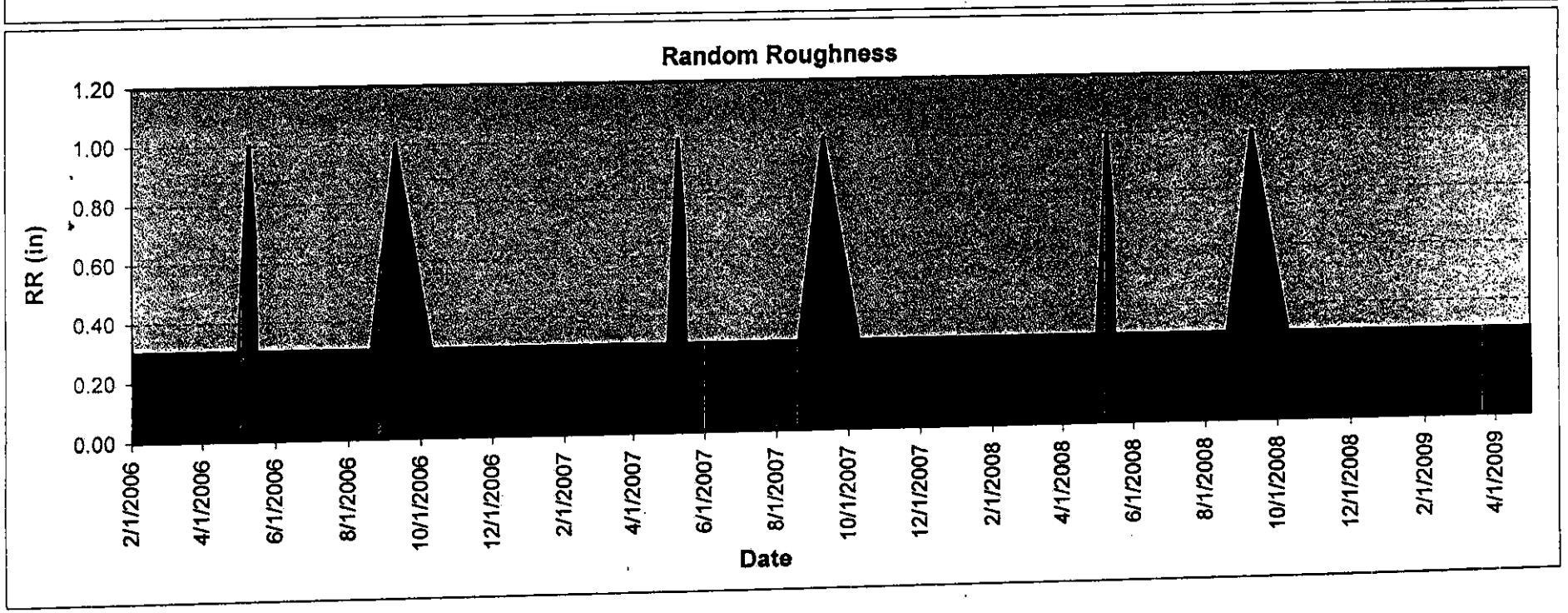
4/1/2009
Date


Small Grain Equvilant Residue/Percent Ground Cover
SGE lbs/ac
Percent Ground Cover
lbs/ac
8000
7000
6000
5000
4000
3000
2000
1000
0
% Ground Cover
120
100
80
60
40
20
0
2/1/2006
3/1/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
1/1/2007
2/1/2007
3/1/2007
4/1/2007
5/1/2007
6/1/2007
7/1/2007
8/1/2007
9/1/2007
10/1/2007
11/1/2007
12/1/2007
1/1/2008
2/1/2008
3/1/2008
4/1/2008
5/1/2008
6/1/2008
7/1/2008
8/1/2008
9/1/2008
10/1/2008
11/1/2008
12/1/2008
1/1/2009
2/1/2009
3/1/2009
4/1/2009
Date


Ridge Roughness
Height (in)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2/1/2006
4/1/2006
6/1/2006
8/1/2006
10/1/2006
12/1/2006
2/1/2007
4/1/2007
6/1/2007
8/1/2007
10/1/2007
12/1/2007
2/1/2008
4/1/2008
6/1/2008
8/1/2008
10/1/2008
12/1/2008
2/1/2009
4/1/2009
Date


Random Roughness
RR (in)
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2/1/2006
4/1/2006
6/1/2006
8/1/2006
10/1/2006
12/1/2006
2/1/2007
4/1/2007
6/1/2007
8/1/2007
10/1/2007
12/1/2007
2/1/2008
4/1/2008
6/1/2008
8/1/2008
10/1/2008
12/1/2008
2/1/2009
4/1/2009
Date

NRCS - WEQ INPUT WORKSHEET, Version 8.05 5/22/03

Producer: Mr. Phil Troost
Planner: RG
Crop Rot: Alfalfa-Oats
Location: Eddy Co

Climate Data Station: NM, ROSWELL
Field Width (Ft.): 670
Field Direction (NS/EW): NS
Adjusted Soil "I": 38

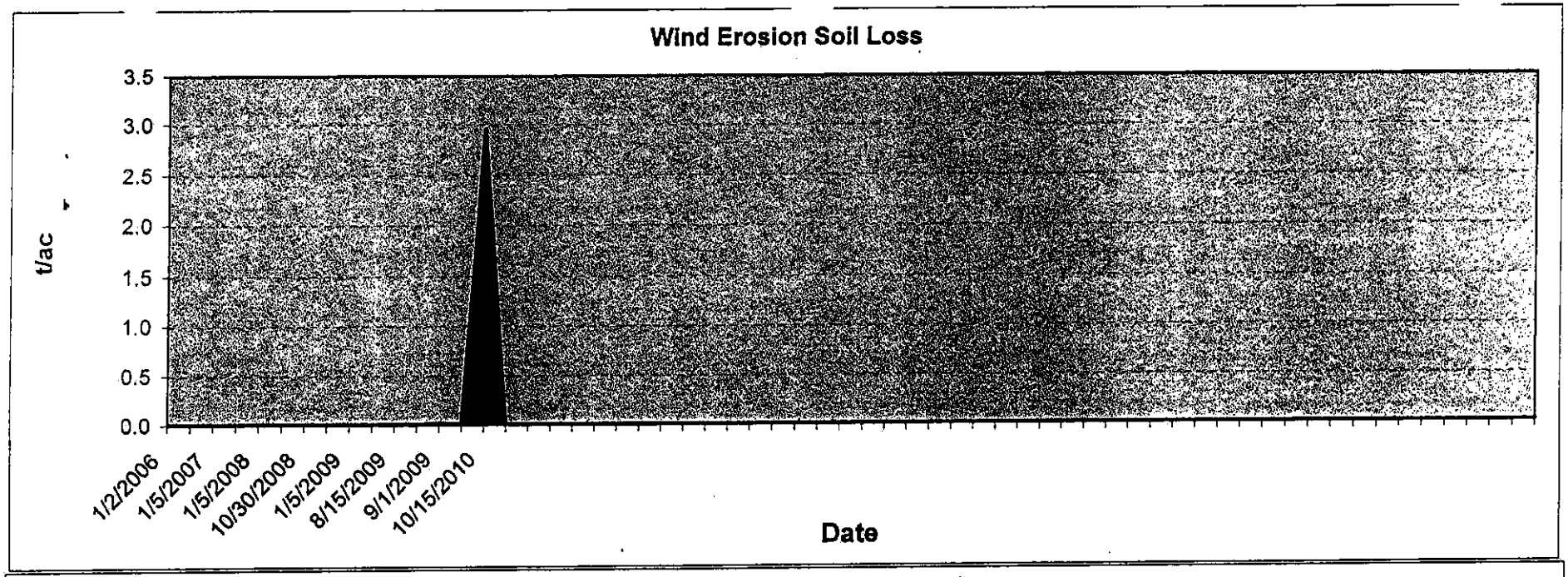
Tillage Direct (NS/EW): NS
Length/Width Ratio: 4.0
Site "C" Value: 150

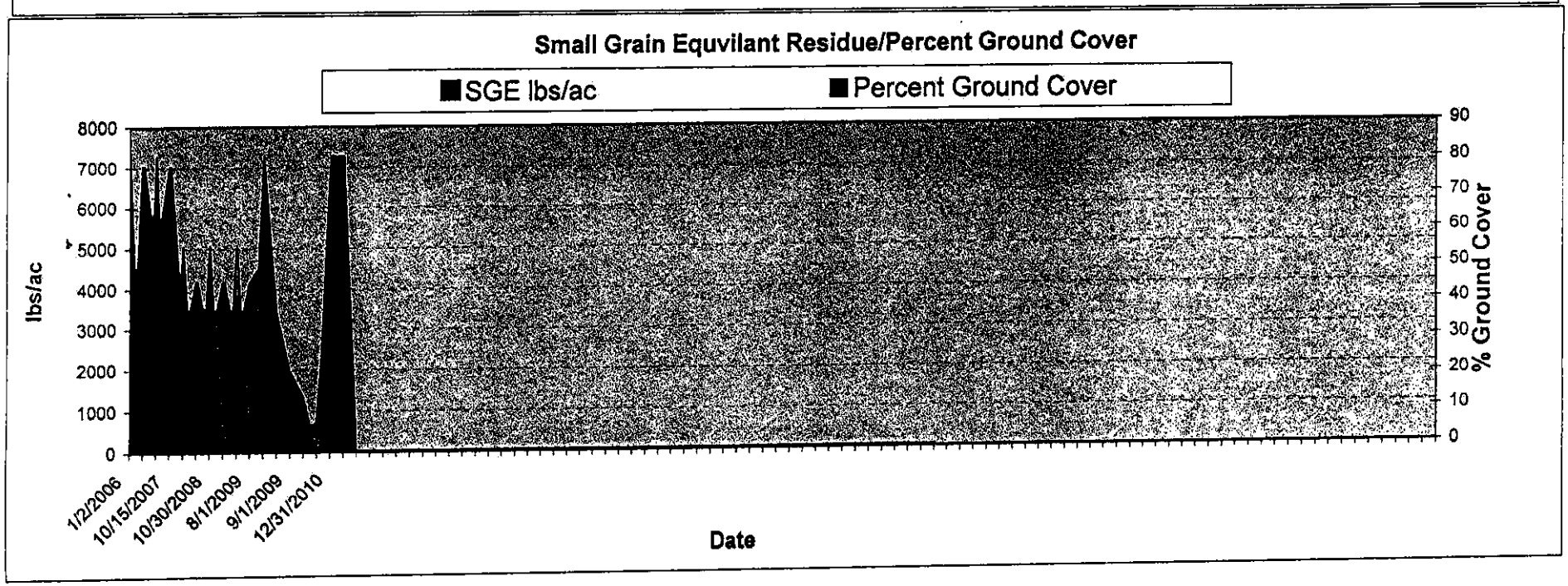
Tract: 7029
Field: 6
Irrigated? (y or n): Y
Wind Erodibility Group: 7 (1-7)

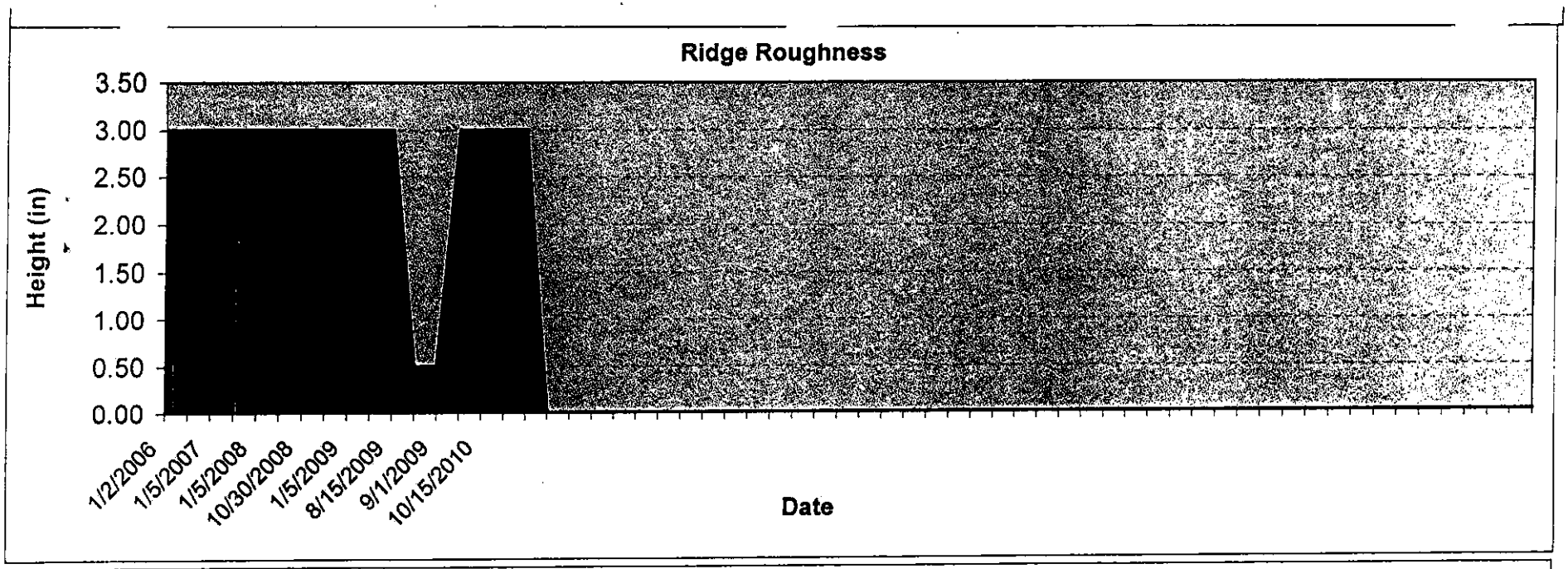
Average Annual Wind Erosion (t/ac): 0.8
Yrs in Rotation: 5.0
Sum Period Erosion: 3.0 (tons/ac)

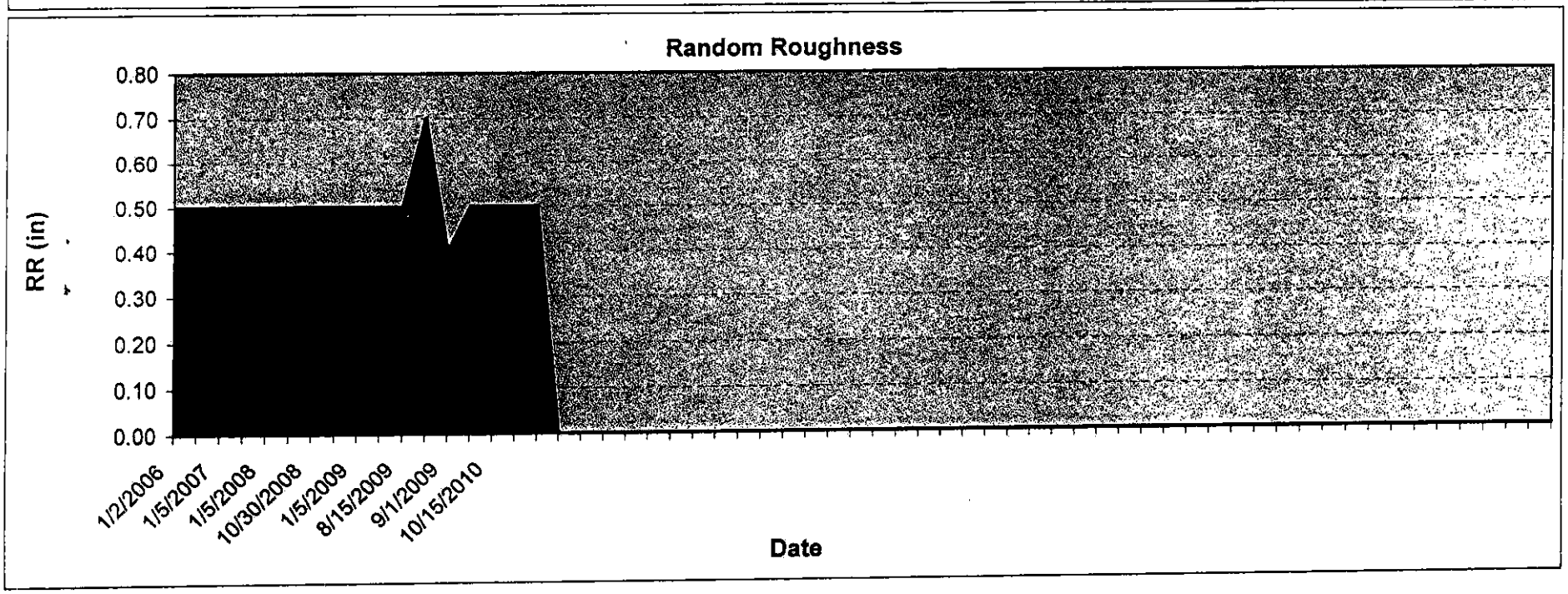
Crop and Operation Management Records/Residue Calculations (green and dry)

Operation Date (date)	Crop (name)	Operation (name)	No. of Irr. Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (unit/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res. Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
1/1/2006	-	Start Rotation		100%	-	- -	3	10	0.90	3000	82	0	0	0	0.50
1/2/2006	Alfalfa, fall	Grow	9	0%			3	10	1.00	3000		8108	0	0	0.50
8/1/2006	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
1/5/2007	Oat Hay irr	Grow	9	0%			3	10	1.00	3000		8108	0	0	0.50
10/15/2007	Oat Hay irr	Harvest		80%	50%	3 ton/ac	3	10	1.00	1500	57	2594	0	0	0.50
1/5/2008	Oat Hay irr	Grow	9	0%			3	10	1.00	1500		4145	0	0	0.50
10/15/2008	Oat Hay irr	Harvest		80%	50%	3 ton/ac	3	10	1.00	1500	57	2594	0	0	0.50
10/30/2008	Oat Hay irr	Grow	9	0%			3	10	1.00	1500		4145	0	0	0.50
1/1/2009	Oat Hay irr	Harvest		80%	50%	3 ton/ac	3	10	1.00	1500	57	2594	0	0	0.50
1/5/2009	Alfalfa, fall	Grow	9	0%			3	10	1.00	1500		4145	0	0	0.50
8/1/2009	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
8/15/2009	Alfalfa, fall	Disk, tandem, heavy, primary op. N		100%			1	13	0.25	750	38	1272	0	0	0.70
8/19/2009	Alfalfa, fall	Disk, tandem, finishing N		100%			1	7	0.50	375	22	734	0	0	0.40
9/1/2009	Alfalfa, fall	Drill or Air seeder, chisel or hoe opener N		100%			3	10	0.65	244	15	521	0	0	0.50
9/2/2009	Alfalfa, fall	Grow	9	0%			3	10	1.00	244		714	0	0	0.50
10/15/2010	Alfalfa, fall	Harvest		80%	50%	9 ton/ac	3	10	1.00	3000	82	4681	0	0	0.50
12/31/2010		End Rotation					3	10	1.00	3000	82				0.50


Wind Erosion Soil Loss
t/ac
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/2/2006
1/5/2007
1/5/2008
10/30/2008
1/5/2009
8/15/2009
9/1/2009
10/15/2010
Date


Small Grain Equvilant Residue/Percent Ground Cover
SGE lbs/ac
Percent Ground Cover
lbs/ac
8000
7000
6000
5000
4000
3000
2000
1000
0
% Ground Cover
90
80
70
60
50
40
30
20
10
0
1/2/2006
10/15/2007
10/30/2008
8/1/2009
9/1/2009
12/31/2010
Date


Ridge Roughness
Height (in)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1/2/2006
1/5/2007
1/5/2008
10/30/2008
1/5/2009
8/15/2009
9/1/2009
10/15/2010
Date


Random Roughness
RR (in)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1/2/2006
1/5/2007
1/5/2008
10/30/2008
1/5/2009
8/15/2009
9/1/2009
10/15/2010
Date

NRCS - WEQ INPUT WORKSHEET, Version 8.05 5/22/03

Producer: Mr. Phil Troost
Planner: RG
Crop Rot: corn/winter wheat
Location: Eddy Co

Climate Data Station: NM, ROSWELL
Field Width (Ft.): 1250 Tillage Direct (NS/EW): NS
Field Direction (NS/EW): NS Length/Width Ratio: 1:0
Adjusted Soil "I": 38 Site "C" Value: 150

Tract: ____ Field: 7
Irrigated? (y or n): Y
Wind Erodibility Group: 7 (1-7)

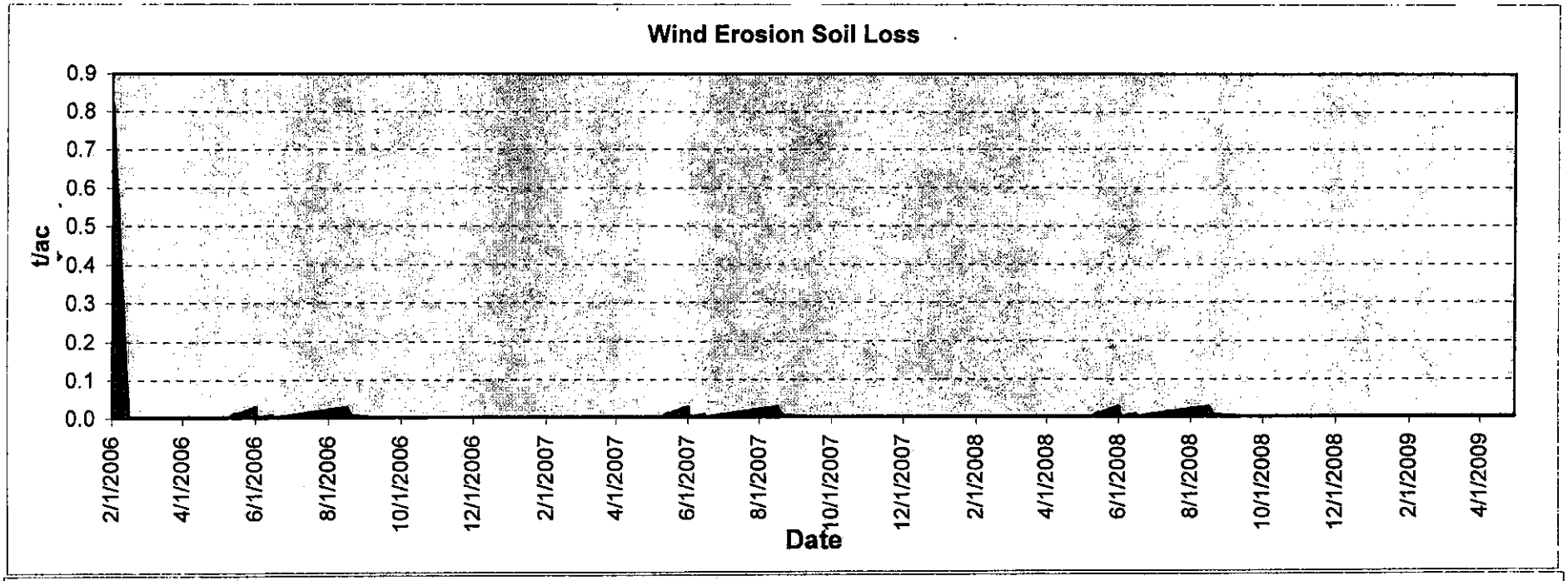
Average Annual Wind Erosion (t/ac): 0.2 | Yrs in Rotation: 5.3 | Sum Period Erosion: 1.2 (tons/ac)

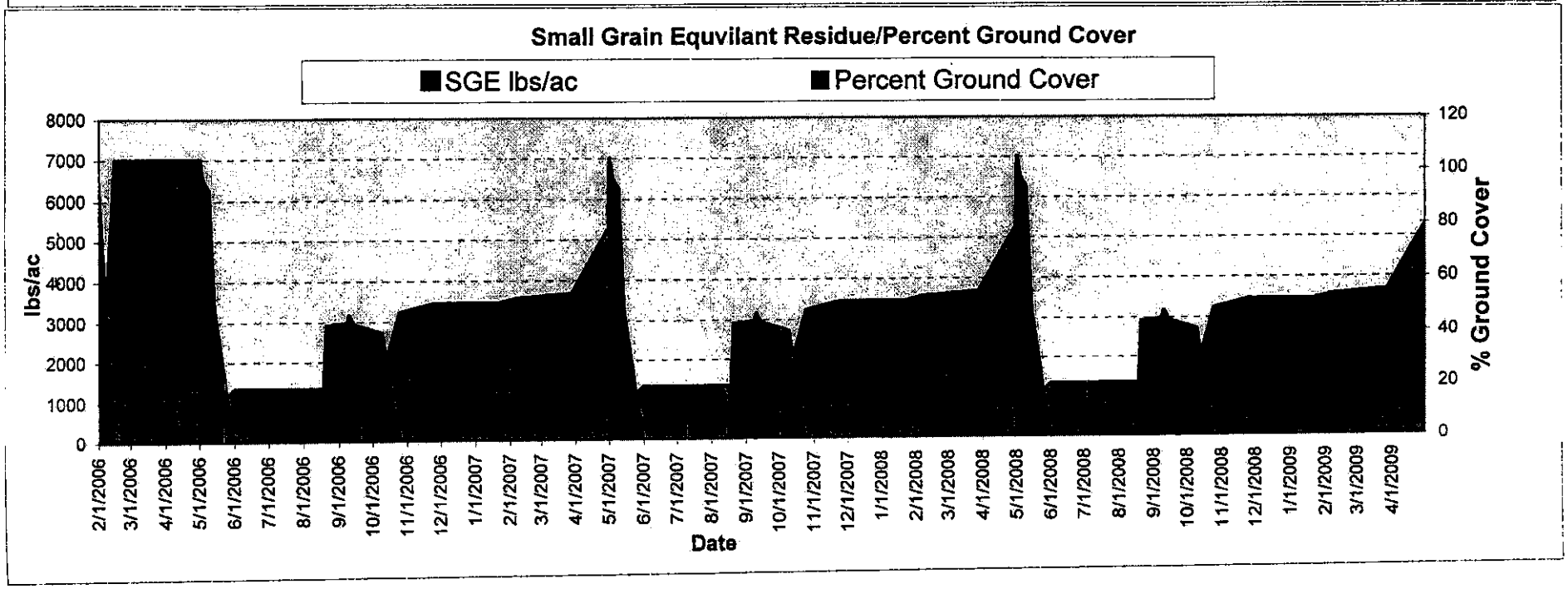
Crop and Operation Management Records/Residue Calculations (green and dry)

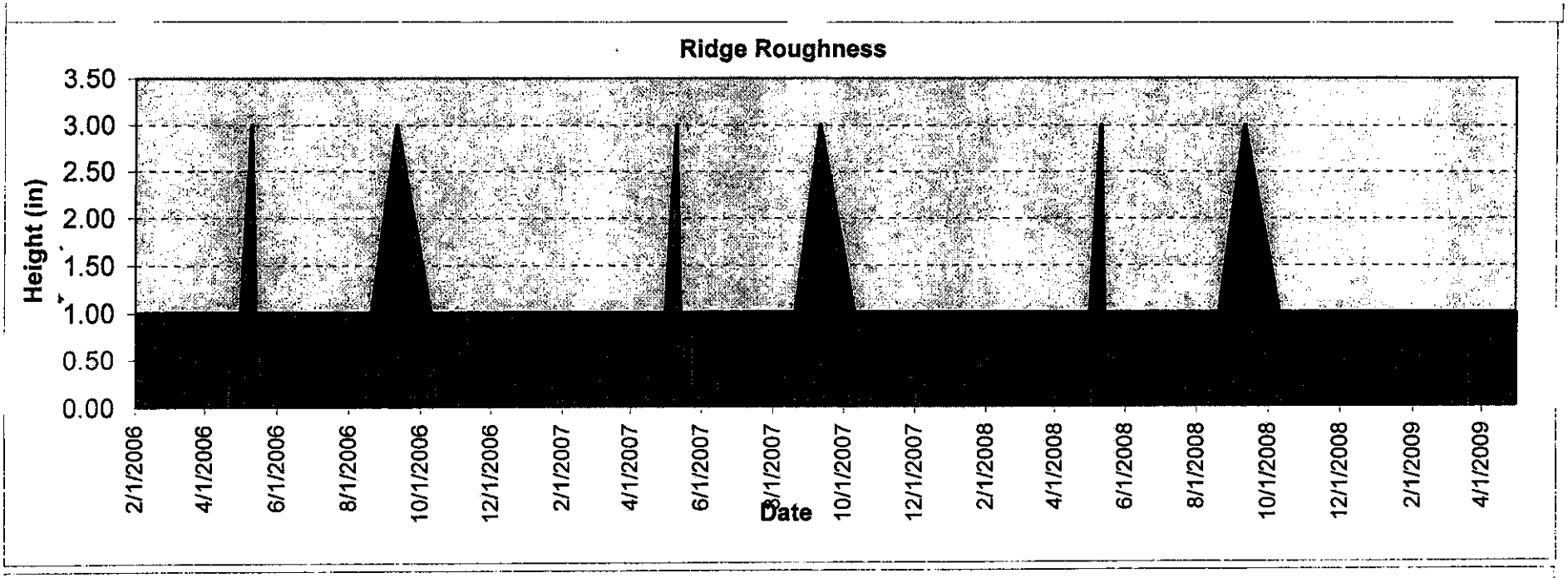
Operation Date (date)	Crop (name)	Operation (name)	No. of Irr/Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res. Retention (fact)	Est. Res. (lb/ac) Dry Matter	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
1/1/2006	-	Start Rotation		100%	-	- -	1	8	0.90	13104	100	0	0	0	0.30
2/1/2006	Wheat, winter, irr, early 150	Grow		0%			1	8	1.00	13104		43532	400	414	0.30
2/15/2006	Wheat, winter, irr, early 165	Grow	1	0%			1	8	1.00	13104		43509	650	670	0.30
2/28/2006	Wheat, winter, irr, early 180	Grow	1	0%			1	8	1.00	13104		43476	1000	1025	0.30
4/15/2006	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	13104		43397	1900	1619	0.30
4/30/2006	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2006	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2006	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2006	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2006	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2006	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2006	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2006	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2006	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2006	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2006	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2006	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2007	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2007	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2007	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2007	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2007	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00

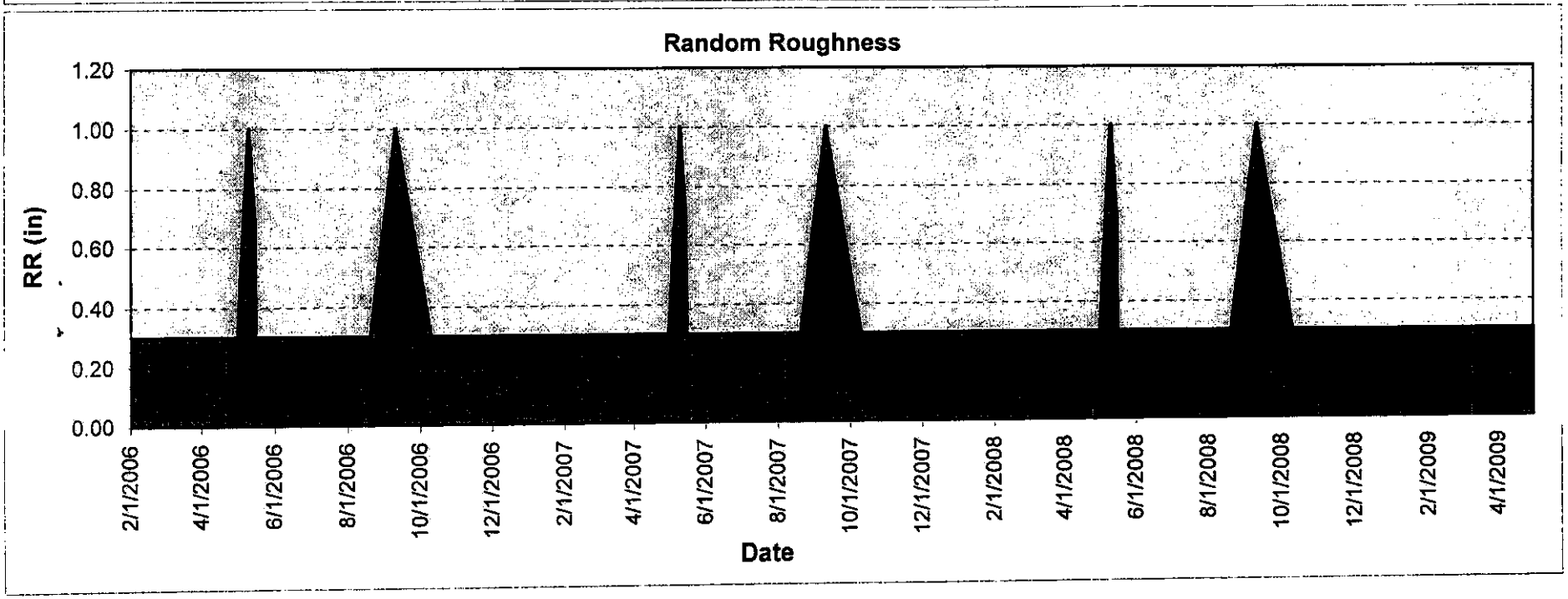
Operation Date (date)	Crop (name)	Operation (name)	No. of Irr Period (#)	Flat Res (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res. Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
5/10/2007	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2007	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2007	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2007	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2007	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2007	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2007	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2007	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2007	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2007	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2008	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2008	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2008	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2008	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2008	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2008	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2008	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2008	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2008	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2008	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2008	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2008	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2008	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2008	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2008	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2009	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2009	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2009	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2009	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2009	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00

Operation Date (date)	Crop (name)	Operation (name)	No. of Irr. Period (#)	Flat Res. (%)	Yield Adjustment (%)	Yield (units/ac)	Ridge Height (in)	Ridge Spacing (in)	Est. Res Retention (fact)	Est. Res. Dry Matter (lb/ac)	Est. Ground Cover (%)	SGe Dry Residue (lb/ac)	Green Dry Matter (lb/ac)	SGe Green Growth (lb/ac)	Random Roughness (in)
5/10/2009	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2009	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2009	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2009	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2009	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2009	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2009	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2009	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2009	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2009	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2010	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2010	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
3/28/2010	Wheat, winter, irr, early 195	Grow	1	0%			1	8	1.00	842		2930	1900	2331	0.30
4/30/2010	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2010	Corn, silage	Chisel, straight points N		20%			3	30	0.60	7862	94	5582	0	0	1.00
5/10/2010	Corn, silage	Disk, tandem, heavy, primary op. N		80%			1	13	0.25	1966	49	1049	0	0	0.70
5/15/2010	Corn, silage	Drill or Air seeder, single disk openers N		80%			1	8	0.90	1769	46	940	0	0	0.30
5/16/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/1/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/2/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/15/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
6/16/2010	Corn, silage	Grow	1	0%			1	8	1.00	1769		1337	0	0	0.30
8/16/2010	Corn, silage	Harvest		90%	10%	30 ton/ac	1	8	1.00	1650	44	827	0	0	0.30
8/20/2010	Wheat, winter, yield irr	Chisel, straight points N		20%			3	30	0.60	990	45	3159	0	0	1.00
9/10/2010	Wheat, winter, yield irr	Drill or Air seeder, DD opener N		80%			1	8	0.85	842	41	1722	0	0	0.30
10/10/2010	Wheat, winter, irr, early 030	Grow	1	0%			1	8	1.00	842		3022	120	216	0.30
10/25/2010	Wheat, winter, early 045	Grow	1	0%			1	8	1.00	842		3016	190	336	0.30
11/10/2010	Wheat, winter, irr, early 060	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
11/25/2010	Wheat, winter, irr, early 075	Grow	1	0%			1	8	1.00	842		3011	250	437	0.30
1/22/2011	Wheat, winter, irr, early 135	Grow	1	0%			1	8	1.00	842		3005	325	561	0.30
2/7/2011	Wheat, winter, irr, early 150	Grow	1	0%			1	8	1.00	842		2999	400	681	0.30
4/30/2011	Wheat, winter, yield irr	Harvest		0%	40%	168 bu/ac	1	8	1.00	13104	100	43571	0	0	0.30
5/1/2011		End Rotation					1	8	1.00	13104	100				0.30


Wind Erosion Soil Loss
t/ac
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2/1/2006
4/1/2006
6/1/2006
8/1/2006
10/1/2006
12/1/2006
2/1/2007
4/1/2007
6/1/2007
8/1/2007
10/1/2007
12/1/2007
2/1/2008
4/1/2008
6/1/2008
8/1/2008
10/1/2008
12/1/2008
2/1/2009
4/1/2009
Date


Small Grain Equvilant Residue/Percent Ground Cover
SGE lbs/ac
Percent Ground Cover
lbs/ac
8000
7000
6000
5000
4000
3000
2000
1000
0
% Ground Cover
120
100
80
60
40
20
0
2/1/2006
3/1/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
1/1/2007
2/1/2007
3/1/2007
4/1/2007
5/1/2007
6/1/2007
7/1/2007
8/1/2007
9/1/2007
10/1/2007
11/1/2007
12/1/2007
1/1/2008
2/1/2008
3/1/2008
4/1/2008
5/1/2008
6/1/2008
7/1/2008
8/1/2008
9/1/2008
10/1/2008
11/1/2008
12/1/2008
1/1/2009
2/1/2009
3/1/2009
4/1/2009
Date


Ridge Roughness
Height (in)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2/1/2006
4/1/2006
6/1/2006
8/1/2006
10/1/2006
12/1/2006
2/1/2007
4/1/2007
6/1/2007
8/1/2007
10/1/2007
12/1/2007
2/1/2008
4/1/2008
6/1/2008
8/1/2008
10/1/2008
12/1/2008
2/1/2009
4/1/2009
Date


Random Roughness
RR (in)
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2/1/2006
4/1/2006
6/1/2006
8/1/2006
10/1/2006
12/1/2006
2/1/2007
4/1/2007
6/1/2007
8/1/2007
10/1/2007
12/1/2007
2/1/2008
4/1/2008
6/1/2008
8/1/2008
10/1/2008
12/1/2008
2/1/2009
4/1/2009
Date

Physical Soil Properties

Eddy Area, New Mexico

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
At:														
Atoka	0-8	---	---	20-27	1.40-1.50	4.23-14.11	0.16-0.18	0.0-2.9	0.5-0.9	.37	.37	2	4L	86
	8-33	---	---	25-27	1.40-1.50	4.23-14.11	0.19-0.21	3.0-5.9	0.3-0.5	.32	.32			
	33-37	---	---	---	---	0.00-0.42	---	---	---	---	---			
Gs:														
Gypsum land	---	---	---	---	---	---	---	---	---	---	---	1	---	---
Cottonwood	0-9	---	---	18-27	1.30-1.50	4.23-14.11	0.11-0.18	0.0-2.9	0.5-1.0	.32	.32	1	4L	86
	9-60	---	---	---	---	1.41-141.14	---	---	---	---	---			
Kr:														
Karro	0-10	---	---	20-27	1.35-1.45	4.23-14.11	0.14-0.16	0.0-2.9	1.0-2.0	.32	.32	5	4L	86
	10-90	---	---	27-35	1.50-1.60	1.41-4.23	0.16-0.19	3.0-5.9	0.5-1.0	.28	.32			
Ku:														
Karro	0-10	---	---	20-27	1.35-1.45	4.23-14.11	0.14-0.16	0.0-2.9	1.0-2.0	.32	.32	5	4L	86
	10-90	---	---	20-35	1.50-1.60	1.41-4.23	0.16-0.19	3.0-5.9	0.5-1.0	.28	.32			
Pe:														
Pima	0-3	---	---	18-25	1.50-1.60	4.23-14.11	0.16-0.21	0.0-2.9	1.0-2.0	.49	.49	5	4L	86
	3-60	---	---	27-30	1.20-1.35	1.41-4.23	0.19-0.21	3.0-5.9	0.5-1.0	.43	.43			
Rc:														
Reagan	0-8	---	---	18-27	1.35-1.50	4.23-14.11	0.15-0.20	3.0-5.9	0.5-2.0	.37	.37	5	7	38
	8-82	---	---	20-40	1.35-1.50	4.23-14.11	0.10-0.16	3.0-5.9	0.5-1.0	.32	.32			

Physical Soil Properties

Eddy Area, New Mexico

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodibility group	Wind erodibility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Rd:														
Reagan	0-8	---	---	18-27	1.35-1.50	4.23-14.11	0.15-0.20	3.0-5.9	0.5-2.0	.37	.37	5	7	38
	8-82	---	---	20-40	1.35-1.50	4.23-14.11	0.10-0.16	3.0-5.9	0.5-1.0	.32	.32			
Uo:														
Upton	0-9	---	---	15-27	1.30-1.50	4.23-14.11	0.08-0.14	0.0-2.9	0.5-1.0	.15	.28	2	8	0
	9-13	---	---	15-27	1.30-1.50	4.23-14.11	0.08-0.14	0.0-2.9	0.5-1.0	.15	.28			
	13-21	---	---	---	---	0.07-4.23	---	---	---	---	---			
	21-60	---	---	15-27	1.35-1.55	4.23-14.11	0.08-0.14	0.0-2.9	0.5-1.0	.15	.32			
Ut:														
Upton	0-8	---	---	15-27	1.30-1.50	4.23-14.11	0.08-0.14	0.0-2.9	0.5-1.0	.15	.28	2	8	0
	8-12	---	---	15-27	1.30-1.50	4.23-14.11	0.08-0.14	0.0-2.9	0.5-1.0	.15	.28			
	12-21	---	---	---	---	0.07-4.23	---	---	---	---	---			
	21-60	---	---	15-27	1.35-1.55	4.23-14.11	0.08-0.14	0.0-2.9	0.5-1.0	.15	.32			

Physical So.. Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

"Depth" to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

"Sand" as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

"Silt" as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

"Clay" as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

"Moist bulk density" is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

"Saturated hydraulic conductivity (Ksat)" refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

"Available water capacity" refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

"Linear extensibility" refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

"Organic matter" is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Physical So.. .'roperties

"Erosion factors" are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

"Erosion factor Kf" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

"Erosion factor T" is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

"Wind erodibility groups" are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

"Wind erodibility index" is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://www.soils.usda.gov)

RUSLE2 Related Attributes

Eddy Area, New Mexico

Map symbol and soil name	Pct. of map unit	Hydrologic group	Kf	T factor	Representative value		
					% Sand	% Silt	% Clay
At:							
Atoka	100	C	.37	2	39.2	37.3	23.5
Gs:							
Gypsum land	60	C	—	1	—	—	—
Cottonwood	30	C	.32	1	39.8	37.7	22.5
Kr:							
Karro	100	B	.32	5	39.2	37.3	23.5
Ku:							
Karro	100	B	.32	5	39.2	37.3	23.5
Pe:							
Pima	100	B	.49	5	11.2	67.3	21.5
Rc:							
Reagan	100	B	.37	5	39.8	37.7	22.5
Rd:							
Reagan	100	B	.37	5	39.8	37.7	22.5
Uo:							
Upton	100	C	.28	2	41.6	37.4	21.0
Ut:							
Upton	100	C	.28	2	41.6	37.4	21.0