

# HEARTLAND Model

## NPDES Permit NMP

Strategic Plan Years: 2007-2011

ABC Feedlots  
Att: Feedlot Owner  
P.O. Box 11  
Anytown, USA 55555

### General Information

State NPDES Permit Number 10-100-00-0-01  
EPA: ST0075001  
Facility ID # : 10001  
Expiration Date: May 3, 2011

### Date of Implementation

July 31, 2007

### Date of latest update of NMP

November 1, 2006

### Farm Ownership

ABC Feedlots, Attn: Feedlot Owner  
Office: 555.555.5555

### 911 Address

911 Convenient St, Anytown, USA 55555

### Location

SE1/4 NE1/4 Sec.22, SW1/4 NW1/4 Sec.23, T10N, R10W, Rival County, USA.

### Mailing Address

P.O. Box 11  
Anytown, USA 55555

### Preamble

Manure utilization is a two-part planning process, a Strategic Plan which in this case focuses on expected manure generation volumes, manure storage times, and expected manure nutrient contents to develop a general cropping plan and to estimate the number of acres to properly land distribute the manure nutrients. The second component can be referred to the Annual Plan. The annual plan covers the record of acres devoted to each crop raised, actual locations and acres of manure distribution, results of periodic analyses of soil and manure samples, and crop yields.

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- Setbacks: <http://www.iowadnr.com/afo/files/sepdstb4.pdf>
- Manure Sampling: <http://www.extension.iastate.edu/Publications/PM1558.pdf>
- Spreader Calibration: <http://www.extension.iastate.edu/Publications/PM1941.pdf>
- Soil Sampling Protocol: <http://www.extension.iastate.edu/Publications/PM287.pdf>

## **Web Resources:**

Crop nutrient removal

<http://www.extension.iastate.edu/Publications/pm1811.pdf>

<http://www.iowadnr.com/afo/forms/appena.pdf>

Crop Nutrient and Limestone Recommendations

<http://www.extension.iastate.edu/Publications/PM1688.pdf>

<http://www.extension.iastate.edu/Publications/PM1779D.pdf>

## **Record keeping/Monitoring Requirements:**

- Daily inspections of water lines and fountains
- Weekly inspections of pens, sediment basins and effluent collection ponds
- Actual quantities and source of manure produced
- Field distribution records with date, field ID, quantity distributed, method of distribution, weather conditions before, during, and after hauling, and initials of person hauling the manure
- Crop harvest dates and yields, including residue harvest
- Manure and soil analysis records
- Date of plan review and results of review

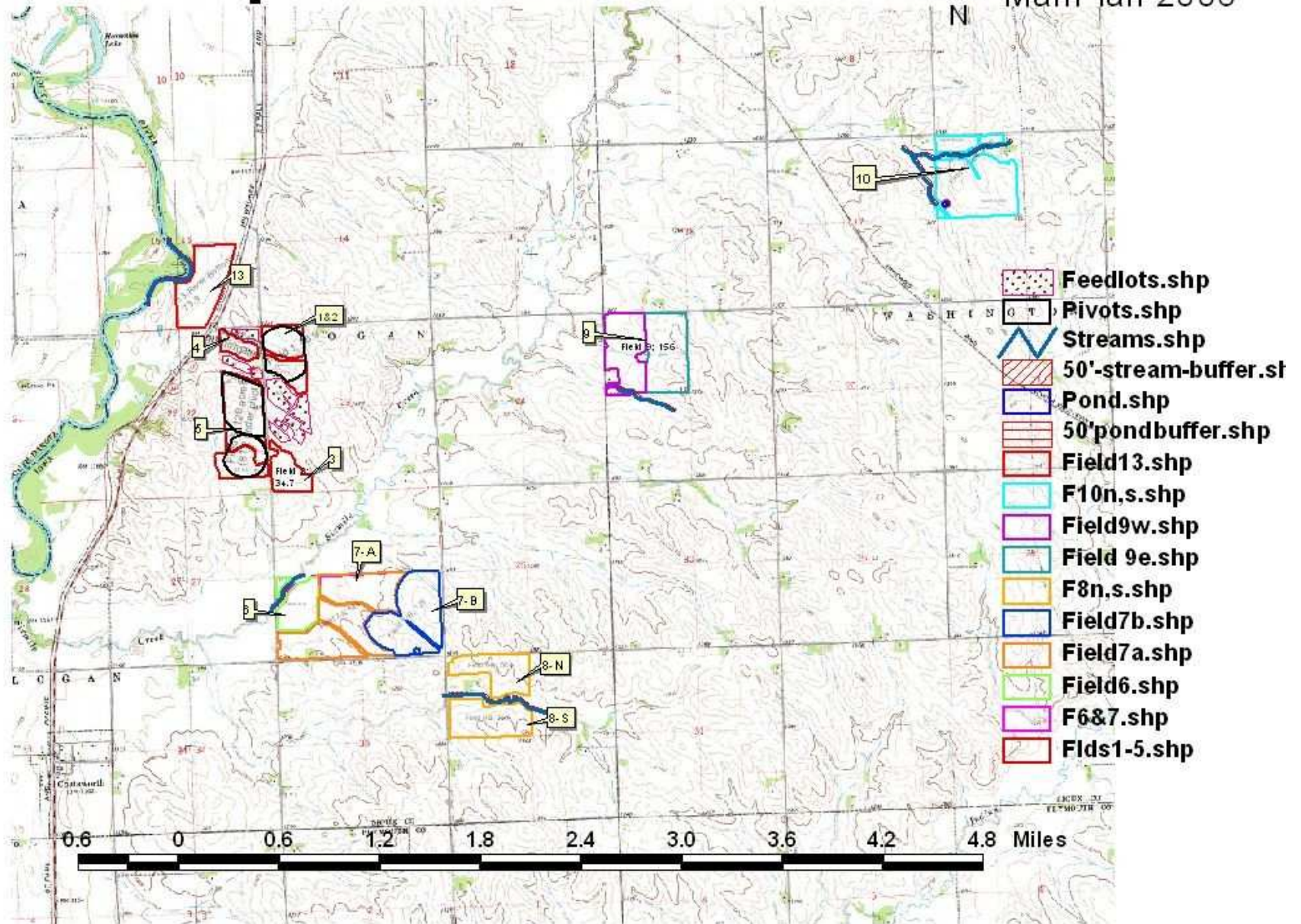
# ***Township Map Ownership***

# ***Township Map Dwellings***

# Example Feedlot



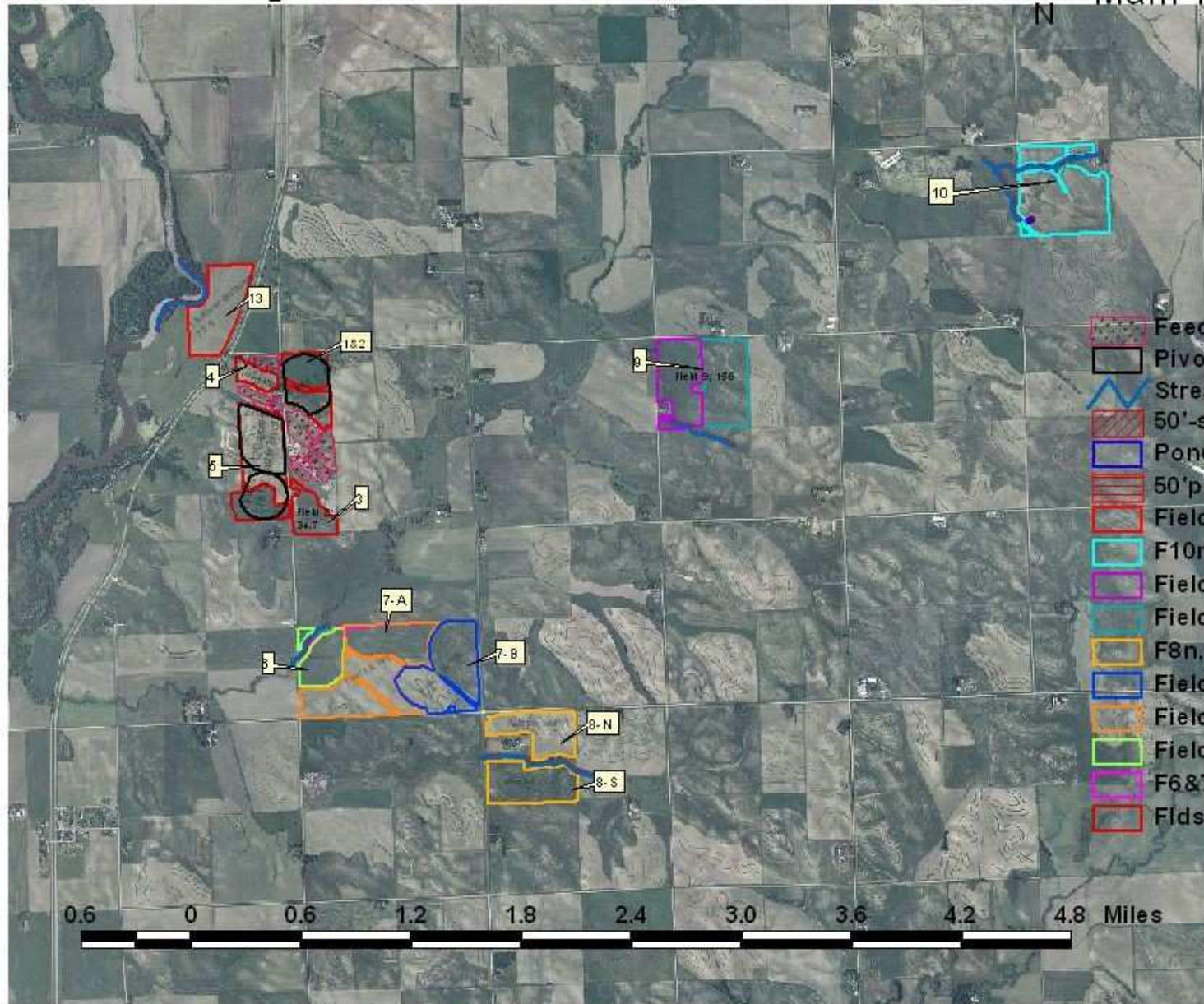
Maps by  
ManPlan 2006











# Example Feedlot

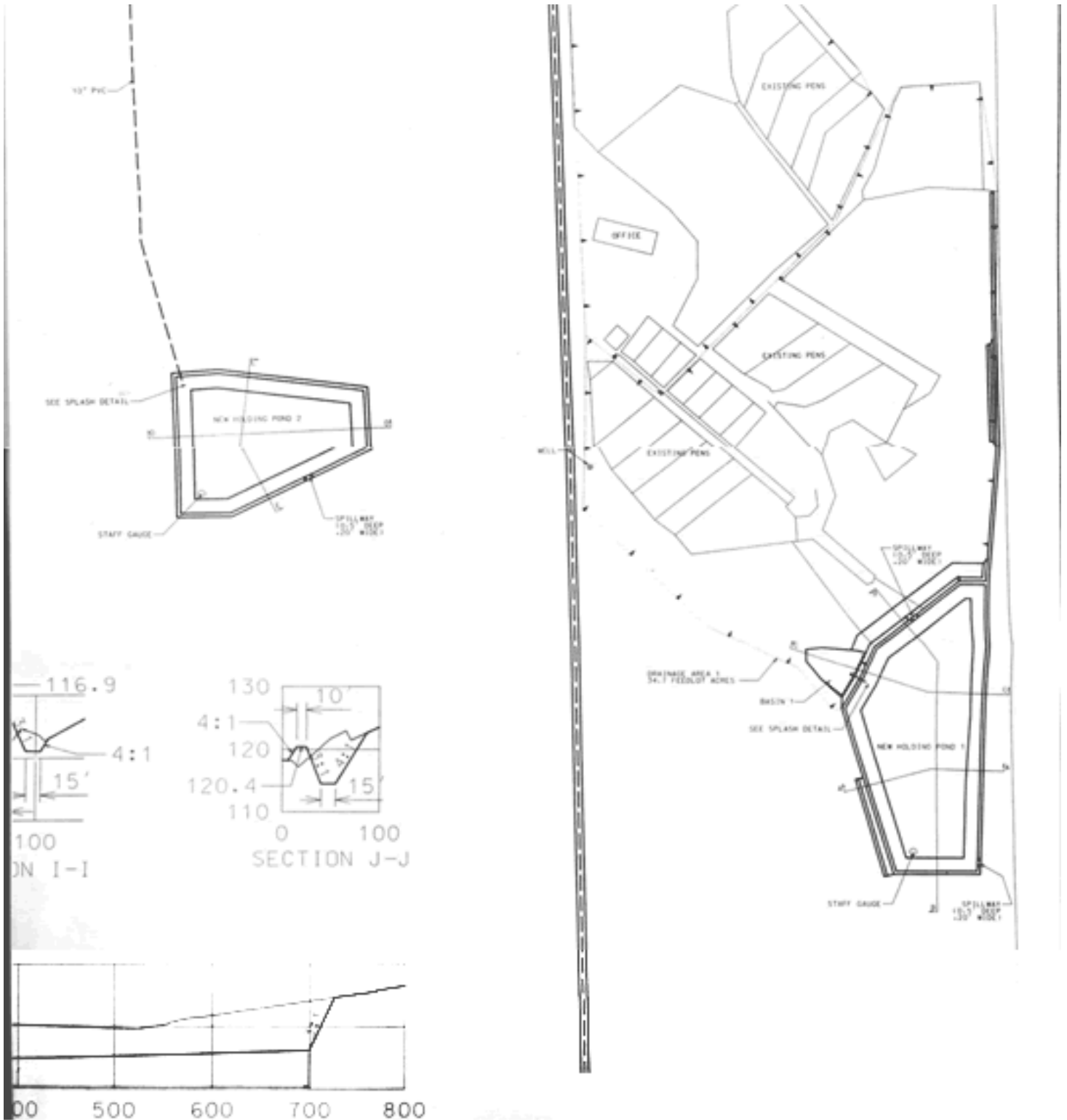


Maps by  
ManPlan 2006



-  Feedlots.shp
-  Pivots.shp
-  Streams.shp
-  50'-stream-buffer.shp
-  Pond.shp
-  50'pondbuffer.shp
-  Field13.shp
-  F10n.s.shp
-  Field9w.shp
-  Field 9e.shp
-  F8n.s.shp
-  Field7b.shp
-  Field7a.shp
-  Field6.shp
-  F6&7.shp
-  Flds1-5.shp

## Section 2: Design Engineer Documentation





## MMP Input Data from AWM for: Example Feedlot

Assisted by: ManPlan Inc

Date: 11/16/06

Facility	Manure		Bedding		Wash Water	Flush Water	Runoff	Rainfall	25Yr Rain	Runoff	Facility Total	
	Tons	Gallons	Tons	Gallons	Gallons	Gallons	Gallons	Gallons	Gallons	Tons	Gallons	
Storage Pond #1	NA	0	NA	0	0	0	8171002	67245	4338109	NA	12576356	
Dry Stack (Uncovered) #1	10040	NA	0	NA	NA	NA	NA	NA	NA	15348	NA	
<i>Annual Total</i>	10040	0	0	0	0	0	8,171,002	67,245	4,338,109	15,348	12,576,356	

## Animal Data

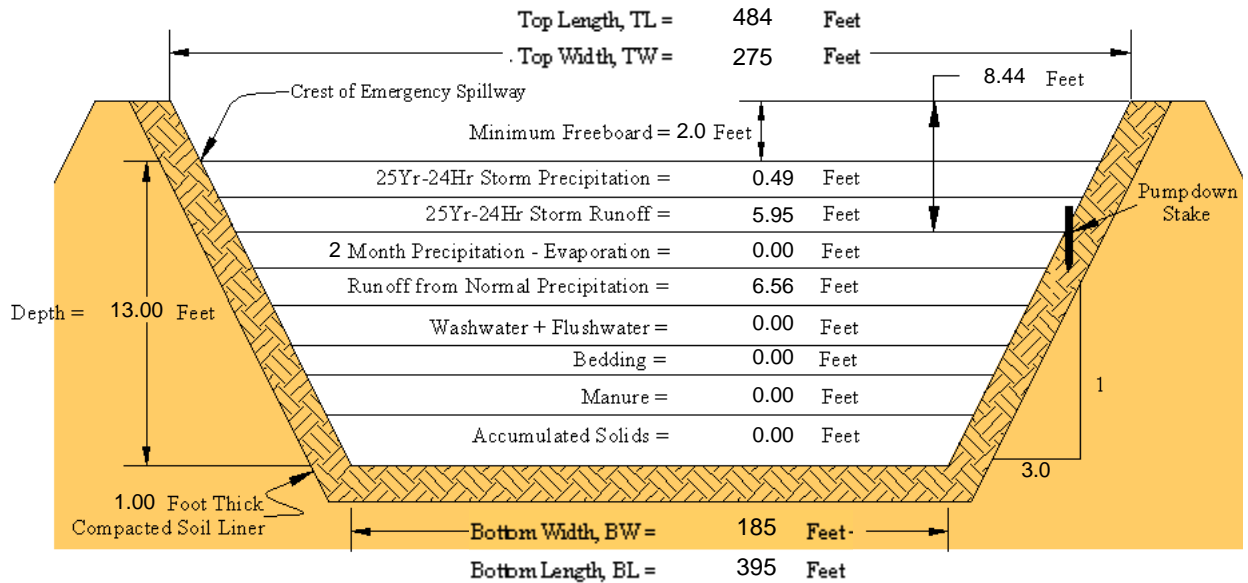
Animal	Type of Animal	Number	Weight in Lb	Manure Produced per Animal Unit in CF/Day	Total Manure Proeuced in CF/Day	Annual Manure Produced in CF	Annual Manure Produced in Gal
Feeder-Grain	Beef	5000	850	0.31	1317.50	482,205	3,606,893
<b>Totals</b>		5000	N/A	N/A	1317.50	482,205	3,606,893

# AWM

## Waste Storage Pond Data for: Example Feedlot

Designed by: ManPlan Inc

<b>Facility .....</b>	<b>Rectangular Storage Pond #1</b>	
<b>Storage Period .....</b>	2 Months	2
<b>Manure .....</b>	0 Cubic Feet	0 Gallons
<b>Bedding .....</b>	0 Cubic Feet	0 Gallons
<b>FlushWater .....</b>	0 Cubic Feet	0 Gallons
<b>WashWater .....</b>	0 Cubic Feet	0 Gallons
<b>Normal Rain and 25Yr-24Hr Storm Runoff from Drainage Area .....</b>	1,214,600 Cubic Feet	9,085,208 Gallons
<b>Normal Rain plus 25Yr- 24Hr Storm on pond surface Area minus Evaporation .....</b>	54,343 Cubic Feet	406,486 Gallons
<b>Accumulated Solids .....</b>	0 Cubic Feet	0 Gallons
<b>Total Volume to Store .....</b>	1,268,943 Cubic Feet	9,491,694 Gallons
<b>Total Volume of Pond .....</b>	1,268,943 Cubic Feet	9,491,694 Gallons



# SECTION 3

## ***Part 1: Background and Site Information***

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### **Management**

Feedlot Owner has been farming and operating the cattle feedlot since 1988. There are several employees on a full-time and seasonal basis. The cattle and crop operations are handled jointly. The crop operation compliments the feedlot feed and bedding requirements, as well as provide for manure distribution from the feedlot. There are no plans for expansion.

This NMP is complying with IDNR permit : 10-100-00-0-1

Manure is handled as solid manure and is distributed to crop production acres. Manure in excess of crop production needs and land availability during crop growing season will be stockpiled. Excess manure may be distributed to neighbors lands. Collected and stored open feedlot effluent (surface runoff) is planned to be irrigated during peak water requirement needs of growing crops.

### **Animals**

The feedlot permit is for 5000 head of beef cattle, on 80.9 acre open feedlot. This plan covers feeder cattle of all weight and sex arriving to be fed to heavier weights (harvest).

This nutrient management plan uses book values from Pub 22XX (University) for quantities and analysis of solid manure produced. Annual manure analysis reports will be compiled over the life of this Strategic NMP and programmed into Annual Plan updates for the next growing crop season.

The manure analysis book values (Pub 22XX) show a manure analysis of 22-16-14, before calculations for volatilization of Nitrogen losses and slow release of organic Nitrogen are totaled.

### **Facilities**

Open feedlot penning is employed in this feedlot, with baled cornstalk and soybean residue added as bedding during inclement weather. Fence line feeding systems are filled with daily formulated rations from a mixer/scale delivery vehicle. Stationary fountains provide fresh drinking water. Cattle do not come in contact with waters of the state.

All solids settling basins and settled open feedlot effluent basins are designed by a licensed engineer and approved by IDNR. Routine operation and maintenance of pens, settling basins and effluent basins are designed for animal comfort, labor workload, environmental considerations, site specific facility resources and ambient weather conditions.

## **Crop Fields**

All land in this plan is owned/rented. There are 1021 tillable acres with a planned corn/corn/corn/soybean rotation. Rival County average plus 10% yield for Corn is 191 bushels and soybeans average 56 bushels/acre. A list of all fields for this NMP is included, along with soil tests results.

## **Strategic Land Application Strategy**

Fields are generally rotated corn/corn/corn/soybeans. Manure is planned to be applied that supplies four years of phosphorus using the rating score on the P Index Risk Assessment.

It is planned to apply the manure on a priority basis to fields that have been harvested as corn silage, baled residue or soybean stubble. Actual manure distribution will take into account soil test, crop yields and uptake, ambient weather conditions, manure stockpiled, soil moisture conditions, manure analyses and growing crop production.

Management strategies that will continue to evolve over the life of this Strategic NMP will include crop rotation changes, feed ingredients management, tillage practices, and conservation practices and treatments, seed varieties, pest management, and water conservation. This also allows for any residual nitrogen from the soybean crop to be accounted for in the corn year. All management adjustments will comply with state and federal regulations.

There are several fields adjacent to surface water on this farm and appropriate setbacks are maintained during manure and commercial nutrient distribution. The primary resource concern is surface water runoff. This is being addressed by employing strategic terrace construction, grassed waterways, contour farming, and residue management.

Employee training on manure storage, manure handling and distribution, and BMP's will be recorded.

Changes in livestock numbers and/or land base would be noted in the Annual Plan update. This plan will be renewed in the permit renewal year 2011.

## Part 2: Settled Open Feedlot Effluent Basin

### 1. Volume Design Requirements

**Table 1a – Storage Design The 24 hour, 25-year storm in Rival County is 5 inches.**

Storage ID	Storage Type	Dimensions, Capacity
Basin # 1	Earthen berm	200' X14' X 500' = 11,506,000 gal.
Basin # 2	Earthen berm	200' X14' X 1000' = 16,152,000 gal.

**Table 1b – Estimated Days of Storage**

Storage ID	Storage Type	Capacity	Units	Annual Collected (wash water, rain, runoff if applicable)	Days of Storage
Basin # 1	Earthen berm	11,506,000	Gal	Normal 8,200,000	500
Basin # 2	Earthen berm	16,152,000	Gal	Normal 11,300,000	500

Storage Totals	Capacity	Units	Annual Collected
Liquid Manure	27,658,000	Gal	19,500,000

**Table 1c – Annual Animal Output (Production): Solid Manure (based on pm 1811)**

Animal ID	Avg. Wt (lbs)	Avg. Head	Expected Tons
Pens, settled solids, stockpile	850 lbs	5,000	10,000 T.

**Table 1d – Solid Manure Nutrient Analysis First year PAN**

Storage ID	First year Avail. N	P2O5	K2O	Units	Source
Pens, settled solids, stockpile	7.5	14	23	Lb/Tons	MWPS # 18 Table 10-6
Pens, settled solids, stockpile	6	16	14	Lb/Tons	Pub XX22

*Available N = Estimate based on actual manure analysis or book values, plant available nutrients, first year.*

Manure samples are taken at the time of loading, and are taken from the spreader. They are submitted to an approved commercial testing laboratory within 48 hours.

### 2. Physical Design and Construction Requirements

An existing components inventory was completed on the storage structures. The inspection indicated that the structures are consistent with the requirements

of a NMP. The components inventory as well as design documentation of the storage structures is on file at the farm. See *Engineer's site diagram*.

### **3. Inspection Requirements**

Feedlot Owner is responsible for all the manure nutrients distributed to owned/rented land, and that manure analysis is provided to neighbors distributing nutrients on their fields. All manure transferred off site to neighbors is recorded annually.

A weekly inspection of all production site resources will include a visual look for, and record, any signs of deterioration/maintenance needs. Any overflows from the manure storage structures as well as any corrective actions taken will be documented. The inspection will also include documentation of manure depth in both Settled Open Feedlot Effluent Basins and Solids Settling Basins.

The production site area, including the feed processing area will be inspected weekly to ensure clean water diversions are maintained.

### **4. Storage Structure Operation and Maintenance Requirements**

The O & M schedule will be conducted in accordance with the regular inspections. Records of inspections and records documenting any actions taken to correct deficiencies will be kept at the farm with the NMP for a minimum of 5 years (see sample inspection form in attachment #3 record keeping).

## ***Part 3: Best Management Practice Requirements***

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### **1. Conservation Practices**

There are open ditches adjacent to several fields in this NMP. Minimum manure distribution setbacks will be maintained along the waterways and will be documented in manure application records. Locations and setback distances are determined according to State form 113 for each field and are documented on Annual Plan distribution forms. All practices, including grassed waterways and headlands, have been established and new practices and land treatments will be based on NRCS standards and specifications.

Manure on this farm is surface distributed.

Conservation Best Management Practices of terraces, grassed waterways, contour farming, and residue management are integrated with crop production practices that provide continuous improvement in crop yields, sustainable soil tilth, and water conservation. Highly erodible lands are protected with site-specific land treatments and practices. A high level of crop residue is maintained due to the use of minimum topsoil disturbance. RUSLE2 and P Index Risk Assessment were calculated on every field. All fields under the current management system fall below T.

### **2. Clean Water Diversion**

This is a site-specific NMP. All clean rainwater is diverted from feedlot collection system designed to collect feedlot surface water and solids settling basins.

The production site facilities will be checked weekly to insure that clean rainwater continues to flow away from the feedlot penning.

### **3. Preventing Direct Contact of Animals with Waters of the State**

Confined animals have no access to waters of the state.

### **4. Animal Mortality**

Dead animals will be disposed of through rendering services. Burial, composting, or incineration may be the choice in the future if rendering discontinues. If rendering services are used, dead animals should be picked up within 24 hours. Dead animals should not be buried within 100 feet of a private well or surface water. They should not be buried where ground water would enter the burial site. There should be 30 inches or more soil over the animal. Composting sites should be located outside a 100 year flood plain and be 100 feet or more from a well or surface water. Composting will be done in a manner that prevents runoff or leachate. If incineration is used, all dead animals are to be incinerated in a DNR approved incinerator within 24 hours of death.

Records of animal mortality handling practices will be kept with the annual records for at least 5 years.

## 5. Chemical Disposal

The introduction of hazardous or toxic chemicals (i.e., pesticides, petroleum products) into waste storage structures will be prevented. Any banned pesticides or those no longer needed will be properly disposed of at a hazardous waste landfill. Also refer to Emergency Plan for steps in handling products as a result of a spill, leak, or accident.

## 6. Inspection, Proper Operation and Maintenance

Daily inspection of water lines will be conducted and recorded. All liquid effluent handling equipment will be inspected daily during operation and recorded. Off season maintenance and winterization will be conducted on irrigation equipment and records kept for 5 years.

Records of the inspections and corrective actions taken will be kept for a minimum of 5 years. An inspection of manure distribution equipment will be conducted daily during use of the equipment.

## 7. Land Distribution of Manure and Commercial Nutrients

### a.) *Field-by-Field Assessment of all land application areas*

The assessment will determine the form, source, amount, timing, rate and method of application to assure that the distribution is in accordance with appropriate utilization of nutrients.

The assessment has identified soil types, slope, erosion potential, surface residue and offsite conditions such as buffers and distance to surface water.

### b.) *Field Inspections*

Records of inspections, monitoring, and sampling will be recorded in the Annual NMP. Annual NMP updates will follow State protocol.

Manure nutrient analysis will follow University procedure for collecting and analyzing manures. A minimum of once per year for nutrient content of each type of manure source will be followed. Nutrient levels, analysis methods used, and the basis for determining land application rates will follow State protocol for manure sampling and analysis. An average of the samples is utilized for planning purposes. The entire Nutrient Management Plan is on file at the farm for State and Federal field inspections.

Soil sampling on fields will take place once every 5 years using recommendations specified in the NMP.

Sampling procedures: Feedlot Owner, or his designated representative, takes soil samples following University procedures for sampling soils for crop production. Samples are taken to 6 inch



depth, 10 cores per sample. Samples generally represent 10 acres based on crop management unit.

Soil samples are collected every five years and nutrient recommendations are based on crop to be grown and realistic yield goals.

Approved agricultural laboratories are used for soil analysis. The soil test analysis reports are incorporated with the rest of the nutrient recommendations criteria of this NMP to calculate nutrient distributions.

All application equipment will be calibrated annually to ensure proper application rates. Written records of inspections and calibrations will be maintained.

c.) *Rates*

Land application rates are applied on the basis of: 1) preventing dry weather discharges, 2) wet weather discharges, and 3) not exceeding the capacity of the soil and planned crops to assimilate nutrients, and are quantified and based on the soil profile analysis, type of crop, realistic crop yield goals, soil type, and all nutrient inputs in addition to those from the feedlot.

All nitrogen and phosphorus applications are based on University recommendations in accordance with State rules and regulations for crop production. The basis for determining nutrient applications for each individual field is carefully considered prior to distribution and procedures and protocols for evaluating and determining the optimum distribution rate are included below. Records of nutrient distribution will be kept on site as part of the Annual Plan. Annual Plan updates will be provided State according to State protocols.

This farm has a history of managing crop nutrients to achieve long-term sustainability, and will continue to adjust rotations, crops produced, land treatments and practices, and crop yield goals, as internal and external forces of market conditions, labor resources, and financial resources impact operational goals and objectives.

d.) *Prohibitions*

Distribution of commercial and manure nutrients are planned so that these nutrients can be applied on land that is not flooded or saturated with water or during rainfall events. In the event of long periods of continuous rainfall, management considerations will include potential runoff from field distribution of nutrients.

e.) *Methods*

All solid manure is planned to be surface distributed. Effluent from the Settled Open Feedlot Basins is planned to be irrigated during crop production season.

f.) *Setbacks*

Manure nutrient distribution is planned to be no closer than 200 feet (50' if vegetated buffer is established between state waters and nutrient application area, and /or incorporated within 24 hrs) to state waters, sinkholes, abandoned well, drinking water well, cistern, or designated wetland.

g.) *Land Distribution Log of Nutrients*

The Annual NMP Land Distribution Log will be kept on file for a minimum of 5 years. Records of the following will be kept:

The time, date, quantity, method, field location, and application rate for each source of manure nutrients

Expected and actual crop yields for each field receiving nutrients. Calculations showing the total nitrogen and phosphorus planned to be applied to each field.

The total amount of nitrogen and phosphorus actually applied to each field, including documentation of calculations for the total amount applied.

A written description of weather conditions at time of application and for 24 hours prior to and following application based on visual observation.

# Heartland Water Quality Project

## Strategic Component of NMP

### Rate Calculation Methodology *(Example for Beef Feedlot in a R7 State)*

#### Crop Nutrient Requirements

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#### Calculations:

Net Nutrient Requirement = [Expected Crop Yield X Nutrient Usage/Removal Rate] - Nutrient Credits (1)

N Credits = Legume Credits + Past Manure Credits + Commercial Fertilizer Credit (2)

P Credits = Commercial Fertilizer Credit (3)

**Expected Crop Yields are to be determined in accordance with State Regulation 65.17(6).**

For Example: Expected Crop Yield = most recent 3-year yield average x 1.1 (4)

#### Assumptions:

- ❖ **Nutrient usage/ removal for crops (pounds):** (a)

	<u>Units</u>	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>
Corn	bu	1.1	0.375
Corn silage	T.	7.5	3.5
Soybean	bu	3.8	0.8
Alfalfa	T.	50	12.5

- ❖ **Commercial Fertilizer Credit (N and P): All commercial fertilizers applied are credited at rates equal to the full N and P values.** (b)

- ❖ **Legume Nutrient Credit (N only):** (c)

<u>Previous Crop</u>	Nitrogen Fertilizer Credits for Crop Following Legume (lbs./acre)
Soybeans	50
Soybeans < 50 bu./ac. due to season-long stress	1.0 lb./bu.
Alfalfa (70-100% stand, >4 plants/ft <sup>2</sup> )	150
Alfalfa (30-69% stand, 1.5 to 4 plants/ft <sup>2</sup> )	120
Alfalfa (0-29% stand, <1.5 plants/ft <sup>2</sup> )	90

- ❖ **Past Manure Application Credit (N only):** (d)
  - Previous Year: 17.5% times total manure nitrogen applied last year.
  - Two Years Ago: 8.75% times total manure nitrogen applied 2 years ago.

## Manure and Nitrogen Application Rates

### Calculations:

$$\text{N-Based Application Rate} = \text{Net Crop Nutrient Requirement} / \text{Crop Available Manure Nitrogen} \quad (5)$$

$$\text{P-Based Application Rate} = \text{Nutrient Requirement} \times \text{Yrs Crop P Applied} / \text{Total Manure P} \quad (6)$$

$$\text{Crop Available Manure N (first year)} = (\text{NH}_4\text{-N} \times \text{volatilization correction factor}) + (\text{Org-N} \times 0.35) \quad (7)$$

*Example for surface applied dry manure with no incorporation:*

$$\text{Crop Available Manure N (first year)} = [\text{NH}_4\text{N} \times 0.70] + [\text{Org-N} \times 0.35]$$

### Assumptions:

- ❖ The correction factor for first year nitrogen losses shall be determined for the method of application by the following ammonia nitrogen volatilization correction factors: (e)

Knifed in or soil injection of liquids	0.98
Surface-apply liquid or dry with incorporation within 24 hours	0.95
Surface-apply liquid or dry with incorporation after 24 hours	0.80
Surface-apply liquids with no incorporation	0.75
Surface-apply dry with no incorporation	0.70
Irrigated liquids with no incorporation	0.60

- ❖ First year organic nitrogen release factor from manure is 35%. (f)

## Manure and Phosphorus Application Rates

**P-Index:** The P Index rating determines whether to use a Nitrogen or Phosphorus application rate for manure nutrients.

(1) A P-Index rating of less than 2 will allow for the manure rates to be calculated at a Nitrogen utilization rate.

(2) A P-Index rating between 2 and 5 will require Phosphorus utilization manure management to be calculated

at 2 times the Phosphorus utilization rate of the crop schedule.

(3) A P-Index rating over 5 allows no manure application until practices are adopted to reduce the P Index rating

to 5 or below.

RUSLE2 score results are input to the State P Index (NRCS – State Aug 2004) as follows:

State P Index field rating = RUSLE2 score + erosion component + runoff component + tile/subsurface recharge component

#### *Fields Available for Manure Application*

Field ID:	Location					Field Size	Cropped Acres	Owner-ship	Map (page)
	¼	Section	Township	Range	E or W				
08-S; Bob's S – T39240-8s						124.4	124.4	Owned	9
06 - Bill's W – T1623-6						125.0	125.0	Leased	9
Additional Fields									

## **Requirements for application of a phosphorus-based manure rate to a field include:**

- a. Phosphorus removal by harvest for each crop in the crop schedule shall be determined using the optimum crop yield as determined in State Regulation 65.17(6) and phosphorus removal rates of the harvested crop. Phosphorus crop removal shall be determined by multiplying optimum crop yield by the phosphorus removal rate of the harvested crop.
- b. Phosphorus removal by the crop schedule shall be determined by summing the phosphorus crop removal values determined in State Regulation 65.17(19) "a" for each crop in the crop schedule.
- c. No single manure application shall exceed the nitrogen-based rate of the planned crop receiving the particular manure application.
- d. Phosphorus in manure should be considered 100 percent available unless soil phosphorus concentrations are below optimum levels for crop production. In that case, values suggested in State University extension publication PM 0000, "Managing Manure Nutrients for Crop Production" will be used.
- e. If the actual crop schedule differs from the planned crop schedule, then any surplus or deficit of phosphorus shall be accounted for in the subsequent manure application.

## **Producer Instructions:**

- **Crop Nutrient Requirement Calculations**

- All calculations are repeated annually based upon updated information on yields, previous crops, previous years manure applications, and commercial fertilizer application plans.

- **Application Rates**

- Manure analysis is completed at least annually.
- Each field application rate is adjusted based on crop nutrient requirements, the results of the P-Index, manure analysis, and the method of application.

- **Records**

- Records are to be maintained which summarize verifiable yields, the results of the P-Index, previous crops, previous manure applications, and commercial fertilizer applied for all fields that will potentially receive manure.
- Records of manure analysis and the method of application on each field receiving manure shall also be maintained.



# Iowa Phosphorous Index

v. 7/1/2004

Field	Erosion							+	Runoff				+	Tile / Subsurface Recharge			= Overall	
	Gross Erosion	Sediment X Trap Factor	SDR X	Buffer Factor	Enrichment X Factor	STP X Factor	Erosion = PI		RCN Factor	STP (Factor	P App + Factor)	Runoff = PI		Flow Factor	STP X Factor	Tile/Sub = PI	P Index	Rate
1, 06 - Bill's W – T1623-6	-2.90	1.00	0.37	1.00	1.10	2.04	2.41	0.83	1.64	0.15	1.49	0.00	0.12	0.00	3.90	P-Based		
3, East Feedlot-South	2.20	1.00	0.41	1.00	1.10	1.71	1.69	1.03	1.25	0.15	1.45	0.00	0.12	0.00	3.14	P-Based		
4, West Feedlot-North	2.70	1.00	0.33	1.00	1.10	2.20	2.18	0.83	1.83	0.15	1.65	0.00	0.12	0.00	3.84	P-Based		
5, West Feedlot-South	2.80	1.00	0.36	1.00	1.10	1.25	1.41	0.83	0.71	0.15	0.72	0.00	0.12	0.00	2.13	P-Based		
6, Bill Farmer West	1.40	1.00	0.75	1.00	1.10	1.51	1.76	1.60	1.02	0.15	1.88	0.00	0.12	0.00	3.64	P-Based		
7a Bill Farmer East	1.70	1.00	0.58	1.00	1.10	1.27	1.39	0.83	0.73	0.15	0.74	1.00	0.12	0.12	2.25	P-Based		
<b>7b, Bill Farmer East</b>	<b>3.80</b>	<b>1.00</b>	<b>0.46</b>	<b>1.00</b>	<b>1.10</b>	<b>1.27</b>	<b>2.43</b>	<b>0.83</b>	<b>0.73</b>	<b>0.15</b>	<b>0.74</b>	<b>1.00</b>	<b>0.12</b>	<b>0.12</b>	<b>3.28</b>	<b>P-Based</b>		
8n, Bob Farmer, north	2.60	1.00	0.50	1.00	1.10	1.26	1.82	0.83	0.72	0.15	0.73	0.00	0.12	0.00	2.55	P-Based		
<b>8s, Bob Farmer, south</b>	<b>2.50</b>	<b>1.00</b>	<b>0.58</b>	<b>1.00</b>	<b>1.10</b>	<b>0.91</b>	<b>1.46</b>	<b>0.83</b>	<b>0.30</b>	<b>0.15</b>	<b>0.38</b>	<b>0.00</b>	<b>0.06</b>	<b>0.00</b>	<b>1.84</b>	<b>N-Based</b>		
9, 08-S; Bob's S – T39240-8s	2.40	1.00	0.45	1.00	1.10	0.90	1.07	0.83	0.29	0.15	0.37	1.00	0.06	0.06	1.50	N-Based		
10, Ray's	1.60	1.00	0.50	1.00	1.10	1.04	0.92	1.03	0.45	0.15	0.62	1.00	0.06	0.06	1.60	N-Based		
13, River Bottom	0.64	1.00	0.52	1.00	1.10	1.12	0.41	1.60	0.55	0.15	1.13	0.00	0.12	0.00	1.53	N-Based		

Credits:

Iowa State University  
 USDA National Soil Tilth Laboratory

USDA Natural Resource Conservation Service

# Annual Plan for 2007 Cropping Systems Nutrient Management

## Part A. Individual Field Expected Yields and Nutrient Requirements

### Sample Calculations

08-S; Bob's S – T39240-8s:  
07-B - Bill's W – T1623-7b  
Reference:

Expected Yield (2007)  
1.1 x (168 + 175 + 182) / 3 = 191  
Adams County Average  
Strategic Plan (equation 4)

N Requirement (2007)  
1.1 x 191 = 210  
3.8 x 57 = 217  
Strategic Plan (equation 1  
assumption a)

P<sub>2</sub>O<sub>5</sub> Requirement (2007)  
0.375 x 191 = 72  
0.8 x 57 = 46  
Strategic Plan (equation 1  
assumption a)

K<sub>2</sub>O Requirement (2007)  
0.3 x 191 = 57  
1.5 x 57 = 86  
Strategic Plan (equation  
assumption a)

### Field Records/Plan Summaries

Field	Plan Year	Crop Name	Actual Yield	Yield Potential		Crop Nutrient Requirement (lbs nutrient/acre)			
				Expected	Cty. Field Avg. Specific	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	
08-S; Bob's S – T39240-8s	2002	Corn	168 bu/ac		<input type="checkbox"/>	<input checked="" type="checkbox"/>			
	2003	Corn	175 bu/ac		<input type="checkbox"/>	<input type="checkbox"/>			
	2004	Corn Stover	23 t/ac		<input type="checkbox"/>	<input type="checkbox"/>			
	2005	Corn	182 bu/ac		<input type="checkbox"/>	<input type="checkbox"/>			
	2006	Soybeans	52 bu/ac		<input type="checkbox"/>	<input checked="" type="checkbox"/>			
	2007	Corn		191 bu/ac		<input type="checkbox"/>	210	72	57
	2008					<input type="checkbox"/>			
	2009					<input type="checkbox"/>			
	2010					<input type="checkbox"/>			
	07-B - Bill's W – T1623-6	2002	Soybeans	48 bu/ac		<input checked="" type="checkbox"/>	<input type="checkbox"/>		
2003		Corn	165 bu/ac		<input type="checkbox"/>	<input type="checkbox"/>			
2004		Corn Stover	21 t/ac		<input type="checkbox"/>	<input type="checkbox"/>			
2005		Corn	174 bu/ac		<input type="checkbox"/>	<input type="checkbox"/>			
2006		Corn	163 bu/ac		<input checked="" type="checkbox"/>	<input type="checkbox"/>			
2007		Soybeans		57 bu/ac		<input type="checkbox"/>	217	46	86
2008						<input type="checkbox"/>			
2009						<input type="checkbox"/>			
2010						<input type="checkbox"/>			
Additional Fields		2002		bu/ac		<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	2003		bu/ac		<input type="checkbox"/>	<input type="checkbox"/>			
	...				<input type="checkbox"/>	<input type="checkbox"/>			
	2010				<input type="checkbox"/>	<input type="checkbox"/>			

## Part B. Crop Available Nutrients

### Sample Calculations

	<u>N – Current Year (2007)</u>	<u>N – 2<sup>nd</sup> Year (2007)</u>	<u>N – 3<sup>rd</sup> Year (2007)</u>	<u>P<sub>2</sub>O<sub>5</sub> Available (2007)</u>	<u>K<sub>2</sub>O Available (2007)</u>
Scraped Solids from Pens:	$4 \times 0.7 + 16 \times 0.35 = 8.4$	$(4 + 16) \times 0.175 = 3.5$	$(4 + 16) \times 0.0875 = 1.8$	$14 \times 1.0 = 14$	$19 \times 1.0 = 19$
Holding Pond Liquids	$1.7 \times 0.3 + 0.2 \times 0.35 = 0.6$	$(1.7 + 0.2) \times 0.175 = 0.3$	$(1.7 + 0.2) \times 0.0875 = 0.2$	$4.0 \times 1.0 = 4.0$	$7.5 \times 1.0 = 7.5$
Reference:	Strategic Plan (equation 7)	Strategic Plan (equation 8)	Strategic Plan (equation 9)	Strategic Plan (assumption i)	

### Results

Facility / Manure Source	Year	Head Capacity	Manure Produced		Manure Sample (lbs/1000 gallons or lbs/ton)						Crop Available Manure Nutrients				
			Predicted (Gallons or tons)	Actual (Gallons or tons)	NH <sub>4</sub> -N	Org-N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Book Value	Farm History	N Current Yr	N 2 <sup>nd</sup> Year	N 3 <sup>rd</sup> Year	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Scraped Solids from Pens	2004	4600			4	16	13	18							
	2005	5000			5	19	17	20							
	2006	4200		9,480 t	4	15	14	19							
	2007	5000	10,000 t		4	16	14	19	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8.4	3.5	1.8	14	19
	2008								<input type="checkbox"/>	<input type="checkbox"/>					
	2009								<input type="checkbox"/>	<input type="checkbox"/>					
	2010								<input type="checkbox"/>	<input type="checkbox"/>					
Holding Pond Liquids	2004	4600													
	2005	5000													
	2006	4200			1.7	0.2	2.0	7.5							
	2007	5000	8,212,500 g		1.7	0.2	2.0	7.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0.6	0.3	0.2	2.0	7.5
	2008								<input type="checkbox"/>	<input type="checkbox"/>					
	2009								<input type="checkbox"/>	<input type="checkbox"/>					
	2010								<input type="checkbox"/>	<input type="checkbox"/>					
	2004														
	2005														
	2006														
	2007								<input type="checkbox"/>	<input type="checkbox"/>					
	2008								<input type="checkbox"/>	<input type="checkbox"/>					
	2009								<input type="checkbox"/>	<input type="checkbox"/>					
	2010								<input type="checkbox"/>	<input type="checkbox"/>					
2011								<input type="checkbox"/>	<input type="checkbox"/>						



## Part C. Manure and Fertilizer Application Rates

### Sample Calculations

Scraped Solids from Pens:  
Reference:

### N-Based Manure Application Rate

$140/8.4 = 16.6$  T  
Strategic Plan  
(equation 5)

### P-Based Manure Application Rate

$46 \times 4 / 14 = 13.1$  T  
Strategic Plan  
(equation 6)

### Results: Rate Calculations for Fields Receiving Nutrients on N-Based Rate

Year : 2007

Field ID	Planned Crop	Net Crop N Requirement (lb/ac)	All Nitrogen Credits (lb/ac)			Net Crop N Requirement (lb/ac)	Crop Available N from Manure		Recommended Manure Application Rate (t/ac or 1,000/ac)	Other Manure Nutrients Applied (lb/ac)	
			Fertilizer/Product	Legume	Past Manure		(lb/ton or 1,000 gal)	Source		P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
08-S; Bob's S T39240-8s	Corn	210	20 lb starter	50	0	140	8.4 lb/t	Scraped Solids	17 t/ac	476	323
Additional Fields											

### Results: Rate Calculations for Fields Receiving Nutrients on P-Based Rate

Year : 2007

Field ID	Planned Crop	Net Crop P <sub>2</sub> O <sub>5</sub> Requirement (lb/ac)	All P <sub>2</sub> O <sub>5</sub> Credits (lb/ac)		Net Crop Annual P <sub>2</sub> O <sub>5</sub> Requirement (lb/ac)	Crop Available P <sub>2</sub> O <sub>5</sub> from Manure		Recommended Manure Application		Other Manure Nutrients Applied (lb/ac)	
			Fertilizer/Product			(lb/ton or 1,000 gal)	Source	Years P Needs Met	Rate (t/ac or 1,000/ac)	N	K <sub>2</sub> O
07-B - Bill's W – T1623-6	Soybeans	46	0		46	14 lb/t	Scraped Solids	4 year	13 t/ac	24	66
Additional fields											

## Heartland Water Quality Project - Annual Component of NMP Field Applications

**2007: 08S – Bob’s S – T3940-8s, Total Acres: 124.40 Manure Spreadable Acres: 124.40 Setback Acres: 0.00**

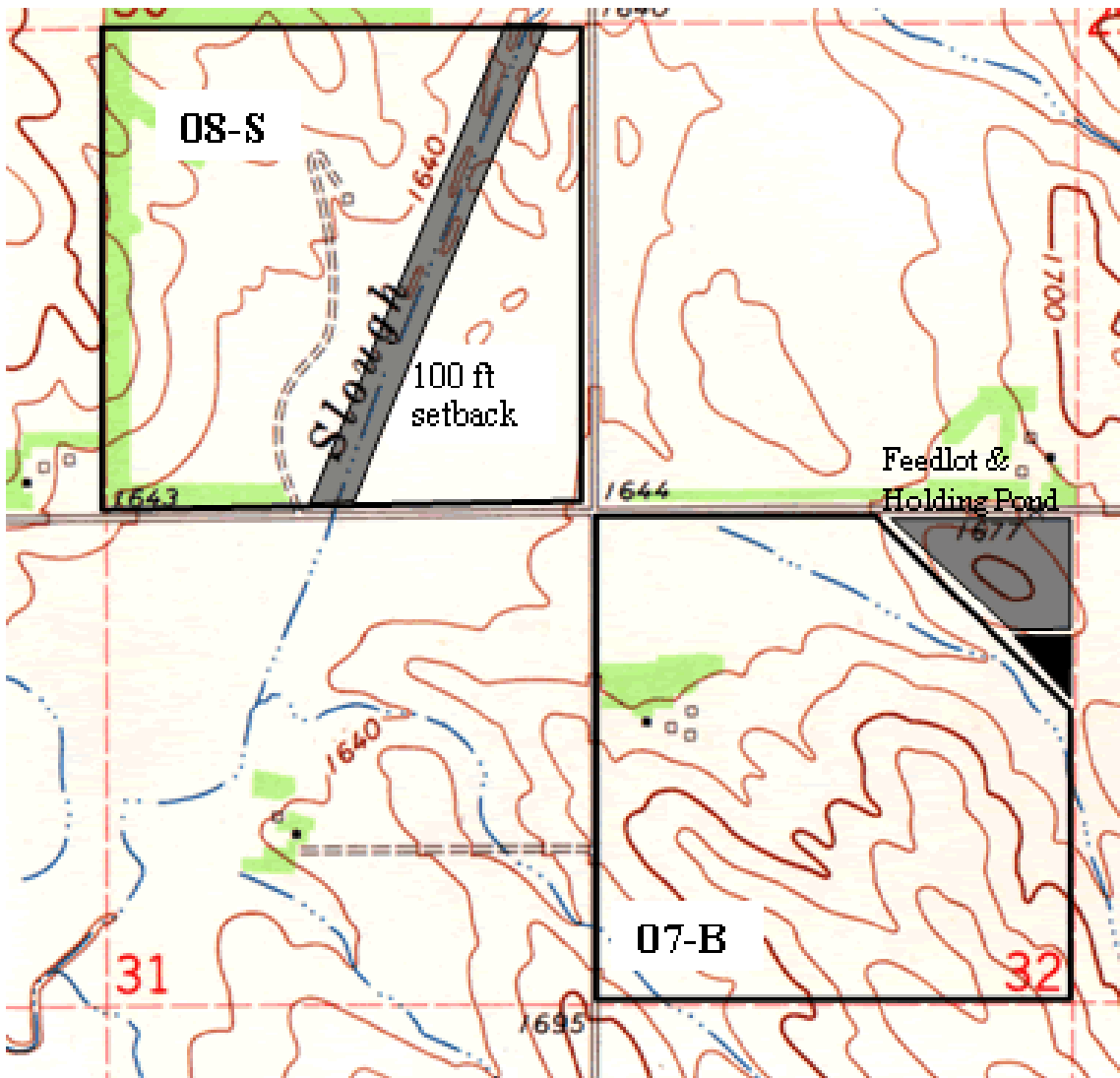
Crops Planted: Corn, Yield Potential: 191 bu; Avg. Bray P1: 80.00; Avg. K2O: 504.00; Avg. Soil pH: 7.1

Date	Source/Product	Quantity T.	Form	Per/ac
Fall '06	solid manure	2100	dry	17 T.

**2007: 07B – Bill’s W – T1623-6 – Total Acres: 125.00 Manure Spreadable Acres: 125.00 Setback Acres: 0.00**

Crops Planted: Soybeans; Yield Potential: 57; Avg. Bray P1: 136.00; Avg. K2O: 666.00; Avg. Soil pH: 7.0

Date	Source/Product	Quantity T.	Form	Per/ac
Spring '07	solid manure	875	dry	13 T.



# Records for Crop Nutrient Management Plan

Records Checklist	NPDES NMP	Sample Record
<b>Strategic Plans/Records</b>		
Standard operating procedures for: Soil testing  Manure sample collection  P Index Results	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	Part C of Annual Plan (pg 7)
<b>Annual or Continuously Updated Records</b> Most items should be completed for each field or management area		
Field Nutrient Balance: a. Crop Available manure nutrient credit b. Annual pre-season plan for field-specific nitrogen and phosphorus balance summarizing planned crops, yields, nutrient credits for all nutrient sources). c. Post-season summary of crops grown, actual yields and nutrient balance  Application Plan for equipment operator: a. Annual application plan identifying location, rate, form, method, and timing for manure and fertilizer. b. Post season summary of manure and fertilizer application rate  Field specific nutrient application record: a. Date, rate, method and weather conditions (24 hours prior and following application) for manure application. b. Date and rate of fertilizer application c. Irrigation water use and nitrate analysis  Testing and monitoring a. Field specific soil test results b. Manure source specific test results  Application equipment records a. Application equipment calibration results b. Application equipment checklist c. Application equipment maintenance log  Report of all manure spills resulting from land application to permitting authority (phone notification in 24 hours and written report within 5 days...check with your permitting authority for possible differences in reporting times for your individual state.  Annual Report (Submitted to permitting authority by January 31 of each year) a. Total number of acres of land that are covered by this facility's nutrient management plan b. Total number of acres of land where manure, litter, or process wastewater generated at this facility was spread. Include only land application areas that are under the control of this CAFO facility. c. Is the facility's nutrient management plan developed or approved by a certified nutrient management planner? <b>d. Amount of manure, litter, and process wastewater that were generated at the facility in the 12 month period covered by this report.</b>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	Part A, B, and D Of Annual Plan (pg 7, 9, and 10) or Annual Pre-Season Plan and Post- Season Summary for N and P (Heartland <sup>1</sup> – pg 26-27)  Equipment Operators Nutrient Applicators Plan (Heartland <sup>1</sup> – pg 29)  Solid Manure And Irrigation Field Application Record (Heartland <sup>1</sup> – pg 30 & 32)  Attach Lab Summary & Enter into Part B, Crop Available Nutrients (pg 6)  Solid Manure Spreader Calibration & Maintenance (Heartland <sup>1</sup> – pg 35-36, 39-40)  Livestock Waste Discharge Notification (Heartland <sup>1</sup> – pg 21-22)  Annual NPDES Report (Heartland <sup>1</sup> – pg 45-47)

<sup>1</sup>Heartland refers to Heartland Regional Water Quality project publication "Records Checklist and Samples for Animal Feeding Operations" found at <http://www.heartlandwq.iastate.edu/ManureManagement/recordkeeping/checklistandforms/planrecordschecklist.htm>

Permit Section III: General Operation :

1. Daily Climatic conditions
2. Overflow and release data
3. Solids handling records
4. Pen Inventory changes
5. Daily water line inspection

Weekly Inspections:

1. Solid and liquid storage structures for depth and soundness
2. Irrigation equipment during use
3. Solid spreaders during use
4. Sediment collection basins are do not exceed design depth for solids
5. Surface water collection ponds do not exceed maximum operating level per design

General operation and maintenance:

1. Follow guidelines for annual manure analysis
2. Follow guidelines for soil analysis

Reporting Requirements:

Quarterly well water use, pond levels, daily precipitation, results of manure and soil analysis, lab identity.

## **Annual Filing Report for Iowa DNR**

by Jan.10th

to:

**State Department of Natural Resources**

**Field office #57**

**1900 Main St**

**Anytown, USA 55555**

1. Number and type of animals in feedlot as of Jan.1<sup>st</sup>
2. Total solid manure handled by feedlot owner operations
3. Total manure transferred off-site to other people
4. Total number of acres for land application covered by the NMP
5. Total number of acres under control used for manure application
6. Summary of all discharges from the production area including date, time, and approximate volume
7. Was current version of NMP developed by certified planner
8. Water withdrawal report