

**MOUNTAIRE FARMS OF DELAWARE, INC.
MILLSBORO, DELAWARE**

**DESIGN DEVELOPMENT
REPORT ADDENDUM**

**2011 WASTEWATER TREATMENT IMPROVEMENTS
MOUNTAIRE FARMS OF DELAWARE, INC.
MILLSBORO, DELAWARE**

DECEMBER 7, 2010



**CABE ASSOCIATES, INC.
CONSULTING ENGINEERS**

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P.O. BOX 877
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302-674-9280

PROJECT NO. 206-067

DESIGN DEVELOPMENT REPORT ADDENDUM

MOUNTAIRE FARMS OF DELAWARE, INC.

MILLSBORO, DELAWARE

LTS 5011-87-09

DECEMBER 7, 2010

Mountaire Farms of Delaware, Inc. (Mountaire) plans to expand and upgrade the existing wastewater treatment plant (WWTP) to improve treatment capability at the Millsboro, Delaware facility.

1.0 - Site Description

Section 1.0 is not applicable and is not included as agreed by the preliminary meeting held on October 26, 2010.

2.0 - Preliminary Site Layout

A preliminary site layout of the proposed improvements to the existing WWTP is provided as Attachment A. In accordance with the preliminary meeting held on October 26, 2010, other typical inclusions to Section 2.0 were deemed not necessary for this submission.

3.0 - Design Wastewater Characteristics

The upgrade includes three major changes to the current unit processes. New Dissolved Air Flotation units will be installed to provide pretreatment of fats, oils, and greases. The two existing anaerobic lagoons will continue to be used as equalization basins. The existing oxidation ditch will be abandoned and a Modified Ludzack-Ettinger (MLE) BNR Treatment Process with two anoxic and aerobic basins designed to provide biological nutrient removal will be provided. The existing clarifiers, sludge storage and spray storage lagoon will continue to be used.

The proposed wastewater treatment plant upgrade design wastewater characteristics are provided below. The proposed DAF system provides 70% and 40% reductions of BOD and TKN, respectively. In order to consistently achieve the 15.6 mg/L TN level set forth in the Coastal Zone Permit application, the design effluent BOD and TN concentrations are 8 and 10 mg/L, respectively. Other constituent effluent values are assumed to remain unchanged from the current WWTP.

Design Wastewater Characteristics

		DAF Influent	BNR Influent	BNR Effluent
ADF (5-Day)	MGD	3.64		
ADF (7-Day)	MGD		2.60	2.60
MDF (7-Day)	MGD		2.60	2.60
BOD5	mg/L	4,500	1350	8.0
TSS	mg/L	500	120	10.0
TN	mg/L	n/a	n/a	15.6
NH3	mg/L	n/a	n/a	4.5
TKN	mg/L	200	120	n/a
TP	mg/L	n/a	40	9.0
Chloride	mg/L	n/a	n/a	265
SAR				
EC	(S·m-1)			
pH		n/a	n/a	7.5
Metals				
ZINC	mg/L	n/a	n/a	<0.0500
NICKEL	mg/L	n/a	n/a	0.0040
CADMIUM	mg/L	n/a	n/a	<0.0004
COPPER	mg/L	n/a	n/a	<0.0040
MAGNES.	mg/L	n/a	n/a	16.0000
CALCIUM	mg/L	n/a	n/a	18.0000
LEAD	mg/L	n/a	n/a	0.0040
ARSENIC	mg/L	n/a	n/a	<0.0040

4.0 - Detailed Soil Investigation Report

Section 4.0 is not applicable and is not included as agreed by the preliminary meeting held on October 26, 2010.

5.0 - Water Balance

There are no changes to the existing water balance. Therefore, an amended Section 5.0 is not necessary and is not included as agreed by the preliminary meeting held on October 26, 2010.

6.0 - Nitrogen Balance

The WWTP upgrade targets a design TN annual average of 15.6 mg/L. A new nitrogen balance that incorporates expected lower TN concentrations is included Attachment B. After

taking into account nitrogen loads from rainfall, fertilizer, plow down and crop uptake, only 422 acres are required to achieve an estimated percolate TN concentration of less than 5 mg/L. This would result in an annual average nitrogen loading from wastewater of 244.47 lbs/acre after ammonia volatilization and nitrification / denitrification.

Mountaire has 952.88 acres available for disposal by spray irrigation and after ammonia volatilization and nitrification / denitrification, annual average nitrogen loadings from the wastewater are expected to be 108.27 lbs/acre. Based on the nitrogen balance, the nitrogen loading including that from wastewater, rainfall, crop uptake, plow down, and additional fertilizer will not result in percolate that violates drinking water standards. Additional N fertilizer will be used, as needed, per agronomic requirements.

7.0 - Phosphorus and Other Constituent Loading Rates

The phosphorus balance is included as Attachment C. Total P applied, at the design rate of 9.0 mg/l and a design flow rate of 2.6 MGD, corresponds to an annual phosphorus load of 71,232 lbs or 74.80 lbs/acre.

Phosphorus is an essential nutrient for crops. Crop rotation regimens of corn/wheat/soybean/corn and continuously irrigated corn require between 63 and 80 lbs/acre of phosphorus (Univ. of DE, Phosphorus Removal by Delaware Crops, 2002). Design Phosphorus loadings will meet crop requirements in some years. Supplemental Phosphorus application may be required.

8.0 - Determination of Land Limiting Constituent (LLC)

The metals cadmium, copper, lead, nickel and zinc have been evaluated to determine if they can be satisfactorily assimilated by the existing disposal fields. At existing and design WWTP effluent and soil neutral pH levels, trace metals are bound to the soil and generally do not migrate with the soil water. Minimum CEC values were assumed in determining the site lifetime expectancy for trace metal absorption shown on Attachment D. Lifetime values range from 602 to more than 15,000 years. Annual spray irrigation monitoring requirements will provide data points to track.

9.0 - Determination of Wetted Field Areas and Required Storage Volume

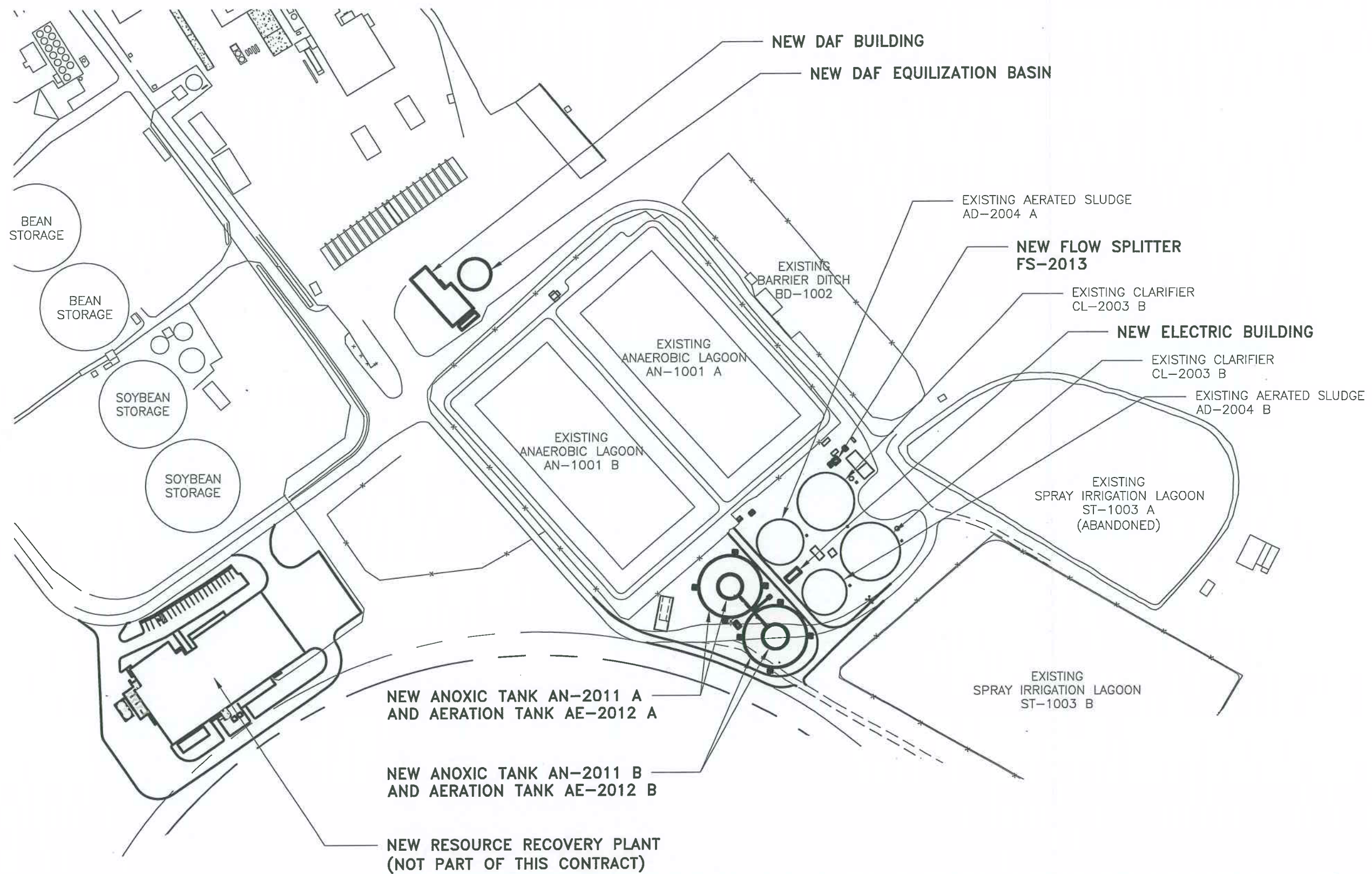
Section 9.0 is not applicable and is not included as agreed by the preliminary meeting held on October 26, 2010. There are no changes to the existing water balance or the required storage volume.

10.0 - Process Design for Wastewater Treatment Facility

A process flow diagram for the proposed improvements is provided as Attachment E.

11.0 - Groundwater and Effluent Monitoring Plan

Mountaire proposes to modify the existing groundwater and effluent monitoring with the addition of a percolate monitoring plan via lysimeters as discussed in correspondence dated October 20, 2010 to the Ground Water Discharges Section, a copy is included as Attachment F. Lysimeters will be sampled quarterly for specific conductance, temperature, pH, nitrate, ammonia, chloride and sodium. Lysimeter locations are provided in Attachment F.



SCALE: 1" = 200'

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OVERALL SITE PLAN
 2011 WASTEWATER TREATMENT IMPROVEMENTS
 MOUNTAIRE FARMS OF DELAWARE, INC.
 MILLSBORO, DELAWARE

ATTACHMENT
 A

NITROGEN BALANCE
BASED ON REQUIRED LAND

Month	422 acres												Total	
	January	February	March	April	May	June	July	August	September	October	November	December		
Spray Field Acreage - Required														
Total Flow (MG)	80.60	72.80	80.60	78.00	80.60	78.00	80.60	80.60	78.00	80.60	78.00	80.60	80.60	949.00
Application (in/month/acre)	7.03	6.35	7.03	6.81	7.03	6.81	7.03	7.03	6.81	7.03	6.81	7.03	7.03	82.81
Total N (mg/l)	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	
Ammonia N (mg/l)	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	
Total Pounds N (lbs/acre)	24.85	22.44	24.85	24.05	24.85	24.05	24.85	24.85	24.05	24.85	24.05	24.85	24.85	292.58
Ammonia N (lbs/acre)	7.17	6.47	7.17	6.94	7.17	6.94	7.17	7.17	6.94	7.17	6.94	7.17	7.17	84.40
5% Volatilization	0.36	0.32	0.36	0.35	0.36	0.35	0.36	0.36	0.35	0.36	0.35	0.36	0.36	4.22
15% Nitrification/Denitrification	3.73	3.37	3.73	3.61	3.73	3.61	3.73	3.73	3.61	3.73	3.61	3.73	3.73	43.89
Total Adjusted N (lbs/acre)	20.76	18.75	20.76	20.09	20.76	20.09	20.76	20.76	20.09	20.76	20.09	20.76	20.76	244.47
Total N Adjusted (lbs/acre/yr)													244.47	
Chemical N (lbs/acre/yr)													50.00	
Plow Down (lbs/acre/yr)													25.00	
Total N (lbs/acre/yr)													319.47	
Nitrogen Balance (lbs/acre/yr)													319.47	
Remaining Capacity (lbs/acre/yr)													0.53	

NITROGEN BALANCE
 BASED ON AVAILABLE LAND

Spray Field Acreage - Available	952.88 acres												
Month	January	February	March	April	May	June	July	August	September	October	November	December	Total
Total Flow (MG)	80.60	72.80	80.60	78.00	80.60	78.00	80.60	80.60	78.00	80.60	78.00	80.60	949.00
Application (in/month/acre)	3.11	2.81	3.11	3.01	3.11	3.01	3.11	3.11	3.01	3.11	3.01	3.11	36.67
Total N (mg/l)	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	15.60	
Ammonia N (mg/l)	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	
Total Pounds N (lbs/acre)	11.00	9.94	11.00	10.65	11.00	10.65	11.00	11.00	10.65	11.00	10.65	11.00	129.57
Ammonia N (lbs/acre)	3.17	2.87	3.17	3.07	3.17	3.07	3.17	3.17	3.07	3.17	3.07	3.17	37.38
5% Volatilization	0.16	0.14	0.16	0.15	0.16	0.15	0.16	0.16	0.15	0.16	0.15	0.16	1.87
15% Nitrification/Denitrification	1.65	1.49	1.65	1.60	1.65	1.60	1.65	1.65	1.60	1.65	1.60	1.65	19.44
Total Adjusted N (lbs/acre)	9.20	8.31	9.20	8.90	9.20	8.90	9.20	9.20	8.90	9.20	8.90	9.20	108.27
Total N Adjusted (lbs/acre/yr)	108.27												
Chemical N (lbs/acre/yr)	50.00												
Plow Down (lbs/acre/yr)	25.00												
Total N (lbs/acre/yr)	183.27												
Nitrogen Balance (lbs/acre/yr)	183.27												
Remaining Capacity (lbs/acre/yr)	136.73												

NITROGEN BALANCE

	ADDF BASED ON REQUIRED LAND	BASED ON AVAILABLE LAND
Average Daily Flow, ADF (mgd)	2.60	2.60
Average Design Wastewater Loading (in/week)	1.59	0.71
ADF Wetted Area (acres)	422.00	952.88
Nitrogen input from Wastewater (lbs/acre-year)	244.47	108.27
Nitrogen input from Rainfall (lbs/acre-year)	8.33	8.33
Nitrogen input from Plowdown and Fertilizer (lbs/acre-year)	75.00	75.00
Total Nitrogen Input (lbs/acre-year)	327.81	191.60
Net Plant Uptake and Storage (lbs/acre-year)	225.00	225.00
Nitrogen Leached by Percolate (lbs/acre-year)	102.81	-33.40
Precipitation (in/year)	36.79	36.79
Wastewater Applied (in/year)	82.81	36.67
PET (in/year)	27.80	27.80
Percolate (in/year)	91.80	45.66
Estimated Percolate TN (mg/l)	4.94	-3.23

Input - Uptake

Coastal Zone PCS

Total Nitrogen
25 mg/l

PHOSPHORUS BALANCE

Loading Rate

Acreage	952.88 acres												Total	
Month	January	February	March	April	May	June	July	August	September	October	November	December		
Total Flow (MG)	80.60	72.80	80.60	78.00	80.60	78.00	80.60	80.60	78.00	80.60	78.00	80.60	80.60	949.00
Total P (mg/l)	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Total Pounds P (lbs/acre)	6.35	5.74	6.35	6.15	6.35	6.15	6.35	6.35	6.15	6.35	6.15	6.35	6.35	74.80
Total P (lbs/acre/yr)	74.80													

may have to use P removal in new system

Use of guidance for P

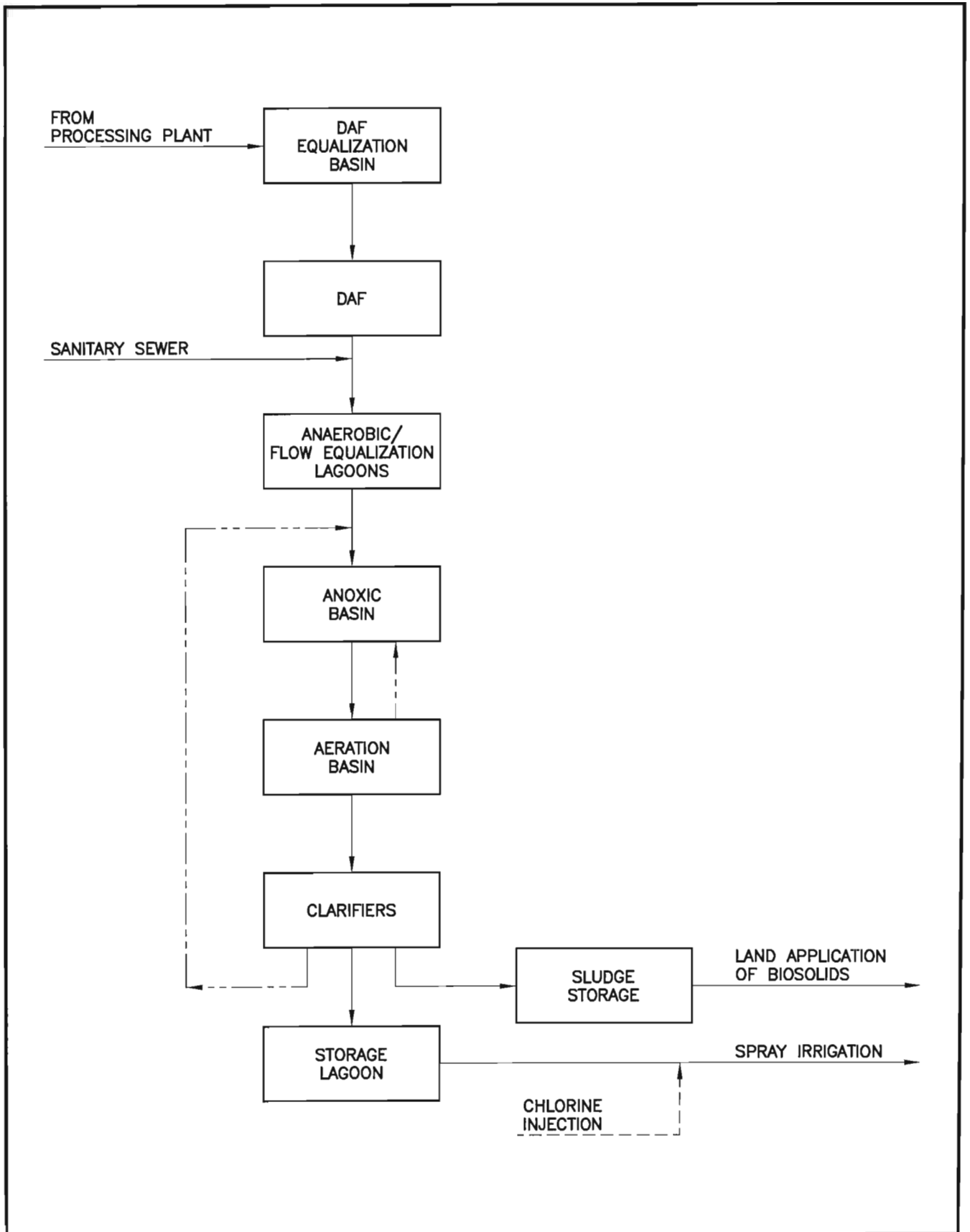
63 - 80 mg/l range

LAND LIMITING CONSTITUENT METALS

ADF (MGD) 2.6
 Total Flow (MG) 949
 Acreage 952.88

	Conc (1) mg/l	Loading lbs/ac/yr	CEC (2) <5 lb/acre	Expected	
				Site Lifetime (years)	Site Lifetime (years)
ZINC	< 0.0500	0.42	250	602	602
NICKEL	0.0040	0.03	125	3,762	3,762
CADMIUM	< 0.0004	0.00	4.04	1,216	1,216
COPPER	< 0.0040	0.03	125	3,762	3,762
LEAD	< 0.0040	0.03	500	15,049	15,049

- (1) 2008 annual sampling lab results
- (2) Current USEPA Guidelines(5) For Zn, Cu, Cd, Ni, and Pb
 Application to Land Used for Production of Food-chain Crops



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PROCESS FLOW DIAGRAM
 2011 WASTEWATER TREATMENT IMPROVEMENTS
 MOUNTAIRE FARMS OF DELAWARE, INC.
 MILLSBORO, DELAWARE

ATTACHMENT
 E



October 20, 2010

Mr. Dave J. Schepens
State of Delaware-DNREC
Division of Water Resources
Ground Water Discharges Section
89 Kings Highway
Dover, DE 19901

Re: Lysimeter construction plan and sampling plan

Dear Mr. Schepens:

Mountaire Farms of Delaware, Inc. is submitting this letter which is one of the required actions cited in the Non-Compliance Notification letter signed by you and dated September 7, 2010.

Mountaire has enlisted the services of Earth Data, Inc. to install the seven lysimeters at the locations specified in the Department's GPB Hydrogeological Memorandum dated May 12, 2010 (revised June 17, 2010). Please see the attached drawing of the lysimeters, for your review. Earth Data will also be assisting us with the proper technique for sampling the lysimeters.

Upon receiving approval from the Department, and after all crops have been harvested, Earth Data will install the seven lysimeters at the locations designated on the attached map (provided by DNREC). Upon completion of the construction and break-in period, we will then sample each one for the following parameters; specific conductance, temperature, pH, nitrate, ammonia, chloride and sodium. Please review the attached work plan for a complete breakdown of the schedule.

If you have any questions, please contact me at (302) 934-3094.

Sincerely,

A handwritten signature in cursive script that reads "Beth Sise".

Beth Sise
Environmental Manager

dds

cc: Jim Nilan (Mountaire)
John Wren (Mountaire)

A handwritten signature in cursive script that reads "John Wren".

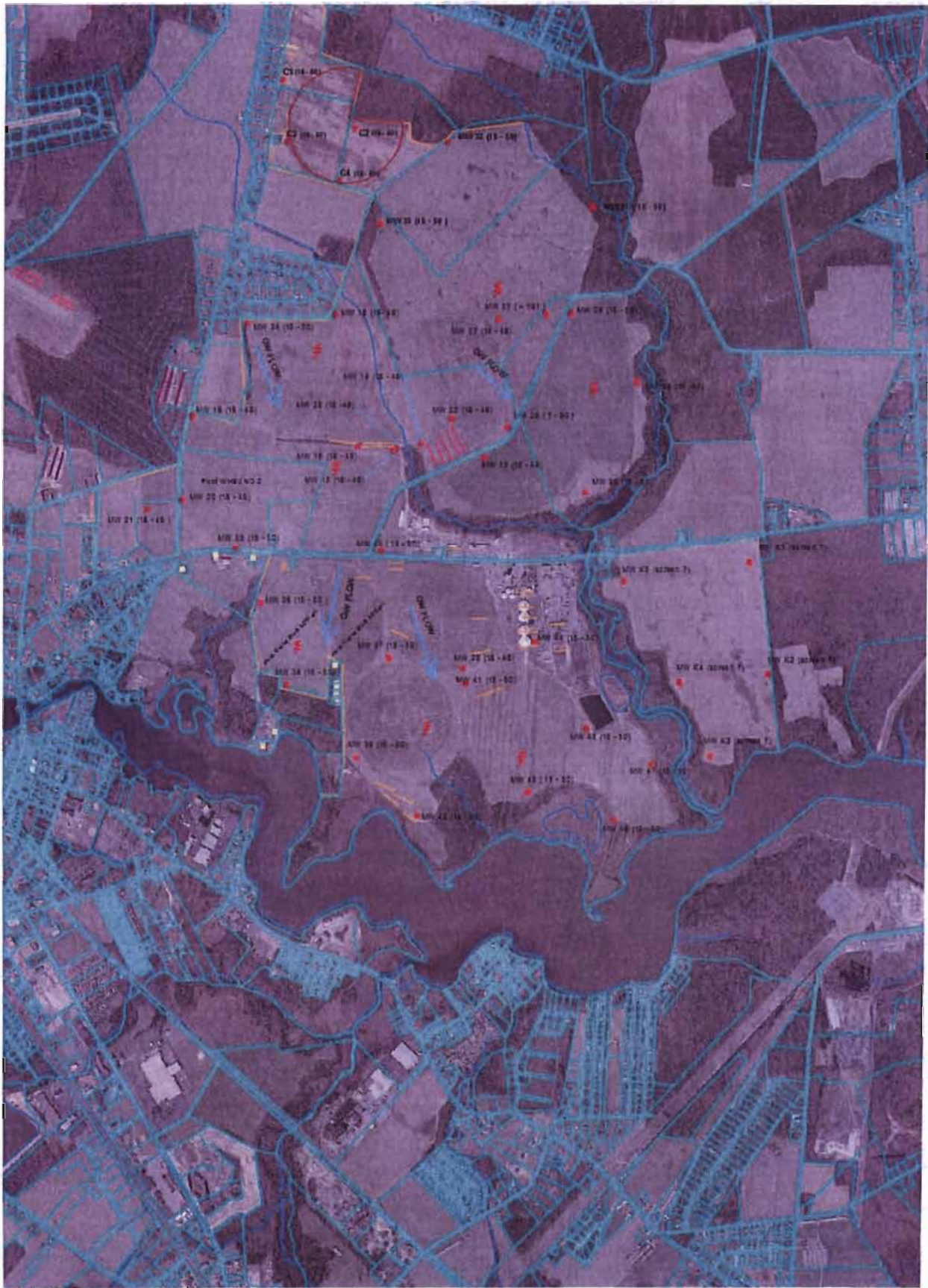


Mountaire Farms of Delaware, Inc.
P.O. Box 1320, Millsboro, Delaware 19966
(302) 934-1100 Toll Free (877) 887-1490

"We measure quality by how well we service our internal and external customers." ATTACHMENT F

Mountaire Farms Site Map

Figure 1



- Lysimeter Locations
- Chicken houses existing as of 2007
- Chicken houses existing as of 2002
- Cordrey Farm Spray Field
- Observation Well
- Parcel
- Property Boundary
- Monitor Wells
- Streams
- Dwellings (potentially at risk)
- Proximal Dwellings (low risk)
- Chicken Houses (past operations)

1000 0 1000 2000 Feet