

B. Facility Inventories

1. Animals

Table B-1

Animal	No. of Animals	Avg. Size	Animal Units (LMFA)	Animal Units (per 1,000 lbs)
Dairy Cows	699	1400	978.6	978.6
Dry Cows	125	1400	175	175
Calves	60	750	36	45
Calves	60	500	36	30
Calves	60	250	36	15
Calves	60	150	36	9
Total Animal Units			1297.6	1252.6

2. Buildings

Table B-2 Livestock Facility Capacity(s)

Facility	Facility Population	Total Square Feet	Storage Facility
Freestall Barn (south)	504		Holding Pond
Freestall Barn (north)	250		Holding Pond
Hospital Barn	70		Holding Pond
Calf Hoop Barn	60	2,600	Dry Pack in Barn
Calf Hoop Barn	60	2,600	Dry Pack in Barn
Calf Hoop Barn	60	2,600	Dry Pack in Barn
Calf Hoop Barn	60	2,600	Dry Pack in Barn

3. Seasonal High Water Table

See Site Soils & Geologic Information Table (A-1)

4. Livestock Waste Production

Table B-4 Livestock Waste Storages

Storage	Animals	Waste Produced (ft ³ /annually)	Capacity (ft ³)	Storage Days
Liquid Manure	1,064	990,870.4	471,956	174
Solid Manure	1,064	51,574.5	31,200	221

Total Livestock Waste Production

See calculations on following page for manure production calculation details.

5. Rainfall Volumes & Evaporation from storage facilities

See following page for rainfall & evaporation calculations expected from lots & open storages.

Animal Unit Calculations

Birchen Farms INC.

Per 1,000 lb Animal Unit

Type of animal	Weight	# of Animals	LMFA AU	Total LMFA AU	Total 1000# AU
Young Dairy Stock	150	60	0.6	36	9
Young Dairy Stock	250	60	0.6	36	15
Young Dairy Stock	500	60	0.6	36	30
Young Dairy Stock	750	60	0.6	36	45
Dry Cows	1400	125	1.4	175	175
Lactating Cows	1400	699	1.4	978.6	978.6
		1064		1297.6	1252.6

Birchen Dairy

Waste Storage Volume Calculations

DAILY MANURE PRODUCTION	Average (1)	Maximum	Solid Manure (2)	Liquid Manure (2)
	Animal Weight	Design Capacity	Production	Volume
	(lbs)	# of Head	(cu.ft./day)	(cu.ft./day)
Dairy	1,400	699	0.0	1,677.6
Dairy - Dry Cows	1,400	125	0.0	227.5
Calves	750	60	60.0	
Calves	500	60	39.6	
Calves	250	60	19.2	
Calves	150	60	12.0	
Totals (Year Round Animals)		1,064.0	118.8	1,905.1

DAILY MISC. PRODUCTION	Bedding - Existing Storage (3)	Bedding - Proposed Storage (3)	Parlor/ Milking Center Water (3)
	(cu.ft./day)	(cu.ft./day)	(cu.ft./day)
Sand - Cow Sall Barns	150.0	0.0	100.0
Straw - Calf Hoop Barns		45.0	
Totals	150.0	45.0	100.0

Additional Storage Area				
Storage Area	Storage Area Size	Bedpack/Solid Storage (ft³)	Storage Area Size	Concrete Pit (liquid Storage)
Hoop Barns (4)	26' x 100' x 3'	31,200.0		
	Totals (ft³)	31,200.0	Totals (ft³)	0.0

Waste Storage Volume Calculations - Pond 1	
284' x 204' x 14'	
Surface Area @ Top ft²	57,936.00
Annual Precipitation (in.) (4)	39.2
Annual Precipitation Volume (ft³)	189,258
Surface Area @ Freeboard ft²	52,224.00
Annual Evaporation (in.) (4)	38.50
Annual Evaporation Volume (ft³)	167,552
Precip/Evap (ft³)	21,706
Precip/Evap (gal)	162,369
25 Year/24 Hour Rain Event (in)	4.9
25 Year/24 Hour Rain Event (ft³)	23,657
25 Year/24 Hour Rain Event (gal.)	176,968

Commodity Bunker	
Surface Area @ Top ft²	67,650.00
Annual Precipitation (in.) (4)	22.3
Annual Precipitation Volume (ft³)	125,716
Surface Area @ Freeboard ft²	0.00
Annual Evaporation (in.) (4)	0.00
Annual Evaporation Volume (ft³)	0
Precip/Evap (ft³)	125,716
Precip/Evap (gal)	940,420
25 Year/24 Hour Rain Event (in)	4.9
25 Year/24 Hour Rain Event (ft³)	27,624
25 Year/24 Hour Rain Event (gal.)	206,639

Waste Storage Volume Calculations - Pond 2	
120' x 75' x 12'	
Surface Area @ Top ft²	9,000.00
Annual Precipitation (in.) (4)	39.2
Annual Precipitation Volume (ft³)	29,400
Surface Area @ Freeboard ft²	6,804.00
Annual Evaporation (in.) (4)	38.50
Annual Evaporation Volume (ft³)	21,830
Precip/Evap (ft³)	7,571
Precip/Evap (gal)	56,631
25 Year/24 Hour Rain Event (in)	4.9
25 Year/24 Hour Rain Event (ft³)	3,675
25 Year/24 Hour Rain Event (gal.)	27,491

Earthen Feedlot Runoff Volume Calculations	
Surface Area @ Top ft²	0.00
Annual Precipitation (in.) (4)	10.0
Annual Precipitation Volume (ft³)	0
Surface Area @ Freeboard ft²	0.00
Annual Evaporation (in.) (4)	0.00
Annual Evaporation Volume (ft³)	0
Precip/Evap (ft³)	0
Precip/Evap (gal)	0
25 Year/24 Hour Rain Event (in)	4.9
25 Year/24 Hour Rain Event (ft³)	0
25 Year/24 Hour Rain Event (gal.)	0

Waste Storage Volume Calculations - Pond 1	
284' x 204' x 14'	
Surface Area - @ top (ft²)	57,936
Surface Area - @ freeboard (ft²)	52,224
Volume (ft³) - @ freeboard	446,975
Volume (gal) - @ freeboard	3,343,605

Waste Storage Volume Calculations - Pond 2	
120' x 75' x 12'	
Surface Area - @ top (ft²)	9,000
Surface Area - @ freeboard (ft²)	6,804
Volume (ft³) - @ freeboard	24,948
Volume (gal) - @ freeboard	186,624

Design Factors - Total Storage	
Storage Length - Required (days)	150
Storage Length - Actual (days)	165

Design Factors - Solid	
Storage Length - Required (days)	180
Storage Length - Actual (days)	221

Liquid Storage Only - Proposed Earthen Basin Expansion				
Required Volume				
	Daily Manure Volume	Daily Misc. Volume	Period	Total Volume
	(cu.ft.)	(cu.ft.)	(days)	(cu.ft.)
Manure Storage Volume	1,905.10	250.00	365	786,612
			Annual Volume (cu.ft.)	1,045,620.4
			Annual Volume (Gals)	7,821,784.5
			Actual Volume (gal.) (6)	3,530,229.4

Solids Storage Only - Existing Solids Bedpacks & Solid Stack				
Required Volume				
	Daily Manure Volume	Daily Bedding Volume	Period	Total Volume
	(cu.ft.)	(cu.ft.)	(days)	(cu.ft.)
Manure Storage Volume	118.8	22.50	365	51,575
			Annual Volume (cu.ft.)	51,574.5
			Annual Volume (Tons)	4,670.3
			Actual Volume (cu.ft.)	31,200.0

- 1 - Average Animal Weight obtained from producer.
- 2 - Manure Storage Volumes = # of head x ft³/day total manure production Livestock Waste Facilities Handbook, MWPS-18 Section 1, Table 6
- The manure production was interpolated from MWPS-18 Table 2-1
- 3 - Bedding Volume = Based on producer estimate of bedding used.
- 3 - Bedding Volume = Organic volume is reduced by half during use as bedpack.
- 4 - Precipitation and evaporation obtained from Livestock Waste Facilities Handbook, Third Edition, MWPS-18 Figures 11-7, 11-12b & 11-14.
- 5 - Required Volume includes 25 year/24 hour rain event & precipitation/evaporation volumes.
- 6 - "Actual" Volume includes two feet set aside for freeboard requirement.