

## **B. Facility Inventories**

### **1. Animals**

**Table B-1**

| <b>Animal</b>             | <b>No. of Animals</b> | <b>Avg. Size</b> | <b>Animal Units (LMFA)</b> | <b>Animal Units (per 1,000 lbs)</b> |
|---------------------------|-----------------------|------------------|----------------------------|-------------------------------------|
| Dairy Cattle              | 1400                  | 1400             | 1400                       | 1960                                |
| <b>Total Animal Units</b> |                       |                  | <b>1400</b>                | <b>1960</b>                         |

### **2. Buildings**

**Table B-2 Livestock Facility Capacity(s)**

| <b>Facility</b>    | <b>Facility Population</b> | <b>Total Square Feet</b> | <b>Storage Facility</b>   |
|--------------------|----------------------------|--------------------------|---------------------------|
| Existing Freestall | 400                        | 46,953                   | Existing Earthen Storages |
| Existing Freestall | 400                        | 46,400                   |                           |
| Existing Freestall | 600                        | 55,680                   |                           |

### **3. Seasonal High Water Table**

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

#### 4. Livestock Waste Production

Livestock Waste Storages

**Table B-3**

| <b>Storage</b>              | <b>Animals</b> | <b>Waste Produced<br/>(Gallons Annually)</b> | <b>Capacity<br/>(Gallons)</b> | <b>Storage<br/>Days</b> |
|-----------------------------|----------------|--|-------------------------------|-------------------------|
| Existing Earthen<br>Storage | 1400           | 16,418,739                                   | 21,753,352                    | 484                     |
| <b>Total</b>                | <b>1400</b>    | <b>16,418,739</b>                            | <b>21,753,352</b>             | <b>484</b>              |

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.

## Bosma Dairy Waste Volume Calculations

| DAILY MANURE PRODUCTION | Average (1)            | Maximum                      | Total Manure (2)           |
|-------------------------|------------------------|------------------------------|----------------------------|
|                         | Animal Weight<br>(lbs) | Design Capacity<br># of Head | Production<br>(cu.ft./day) |
| Dairy Cattle            | 1,400                  | 1,400                        | 3,500                      |
|                         |                        |                              | 0                          |
| <b>Totals</b>           |                        | <b>1,400.0</b>               | <b>3,500.0</b>             |

| DAILY MISC. PRODUCTION | Sand Bedding Volume (3)    | Milking Parlor (4)         | Recycle Flush Water (4)    |
|------------------------|----------------------------|----------------------------|----------------------------|
|                        | Production<br>(cu.ft./day) | Production<br>(cu.ft./day) | Production<br>(cu.ft./day) |
| Dairy Cattle           | 980                        | 490.0                      | 0.0                        |
| <b>Totals</b>          | 980                        | 490.0                      | 0.0                        |

| Concrete Pad Runoff Volume Calculations        |           |
|--|-----------|
| Surface Area @ Top ft <sup>2</sup>             | 82,720.00 |
| Annual Precipitation (in.) (5)                 | 20.5      |
| Annual Precipitation Volume (ft <sup>3</sup> ) | 141,313   |
| Surface Area @ Freeboard ft <sup>2</sup>       | 0.00      |
| Annual Evaporation (in.) (5)                   | 0.00      |
| Annual Evaporation Volume (ft <sup>3</sup> )   | 0         |
| Precip/Evap (ft <sup>3</sup> )                 | 141,313   |
| Precip/Evap (gal)                              | 1,057,094 |
| 25 Year/24 Hour Rain Event (in) (5)            | 5.6       |
| 25 Year/24 Hour Rain Event (ft <sup>3</sup> )  | 38,603    |
| 25 Year/24 Hour Rain Event (gal.)              | 288,767   |

| Earthen Storage Basin Volume Calculations       |            |
|---|------------|
| Earthen Basin - Dimensions Vary - See Plot Plan |            |
| Surface Area - @ top (ft <sup>2</sup> )         | 250,000    |
| Surface Area - @ freeboard (ft <sup>2</sup> )   | 232,000    |
| Volume (ft <sup>3</sup> ) - @ freeboard         | 2,908,000  |
| Volume (gal.) - @ freeboard                     | 21,753,352 |

| Waste Storage Volume Calculations               |         |
|---|---------|
| Earthen Basin - Dimensions Vary - See Plot Plan |         |
| Annual Precipitation (in.) (5)                  | 35.00   |
| Annual Precipitation Volume (ft <sup>3</sup> )  | 729,167 |
| Annual Evaporation (in.) (5)                    | 32.60   |
| Annual Evaporation Volume (ft <sup>3</sup> )    | 630,267 |
| Precip/Evap (ft <sup>3</sup> )                  | 98,900  |
| Precip/Evap (gal)                               | 739,821 |
| 25 Year/24 Hour Rain Event (in) (5)             | 5.6     |
| 25 Year/24 Hour Rain Event (ft <sup>3</sup> )   | 102,000 |
| 25 Year/24 Hour Rain Event (gal.)               | 763,011 |

| Earthen Storage Basin - Annual Production Calculation |                          |  |                          |
|---|--------------------------|--|--------------------------|
| Annual Volume Produced                                | Daily Volume<br>(cu.ft.) | Period<br>(days)                         | Total Volume<br>(cu.ft.) |
| Manure Storage Volume                                 | 4,970.0                  | 365                                      | 1,814,050                |
|   |                          | Annual Precipitation vs. Evaporation (9) | 380,816                  |
|   |                          | Annual Production Volume (cu.ft.)        | <b>2,194,866</b>         |
|   |                          | Annual Production Volume (gal.) (6)      | 16,418,739.0             |

| Earthen Storage Basin |                          |   |                          |
|-----------------------|--------------------------|---|--------------------------|
| Required Volume       | Daily Volume<br>(cu.ft.) | Period<br>(days)                          | Total Volume<br>(cu.ft.) |
| Manure Storage Volume | 4,970.0                  | 150                                       | 745,500                  |
|                       |                          | Annual Precipitation vs. Evaporation      | 240,213                  |
|                       |                          | 25 Year/24 Hour Rain Event                | 140,603                  |
|                       |                          | Required Volume (cu.ft.)                  | <b>984,820</b>           |
|                       |                          | Required Volume (gal.) (7)                | 7,366,969.3              |
|                       |                          | Actual Facility Storage Volume (gal.) (8) | 21,753,352.2             |

| DESIGN FACTORS                     |     |
|------------------------------------|-----|
| Storage Length - Required (days)   | 150 |
| Storage Length - "As Built" (days) | 484 |

- 1 - Average Animal Weight obtained from Livestock Waste Facilities Handbook, Third Edition, MWPS-18 Table 2-1
- 2 - Manure Storage Volume = # of head x ft<sup>3</sup>/day total manure production livestock Waste Facilities Handbook, Third Edition, MWPS-18 Table 2-1
- 3 - Bedding Volume = Average Total Animal Weight at any time divided by 1,000 x Bedding Value.
  - Sand Bedding Value of 0.5 cu.ft./day/1,000 lbs obtained from Dairy Free stall Housing and Equipment, 6th Edition, 1997 (MWPS-7), Tables 8-4 for Free stall bedding.
- 4 - Parlor & Flush Water Volume = Based on producer estimate; flush water will be recycled from proposed earthen storage basin.
- 5 - Precipitation and evaporation data obtained from ISWS Bulletin 70-1989; AWMFH 10C-27 and if applicable, runoff from earthen and surfaced feedlots from USDA SCS AWMFH Figures 10C-1 & 10-C2.
  - Annual Runoff from earthen feedlots = N/A of annual precipitation.
  - Annual Runoff from paved feedlots = 58.5% of annual precipitation.
- 6 - Annual Production Volume estimates animal waste and misc. facility production, all precipitation (including 25 year/24 hour rain event) & evaporation volumes over 365 days.
- 7 - Required Volume includes 25 year/24 hour rain event & precipitation/evaporation volumes.
- 8 - Actual Volume at Freeboard Elevations (two feet set aside for freeboard requirement).
- 9 - Annual Precipitation vs Evaporation includes annual precipitation for both the concrete pad and earthen storage as well as the 25 year/24 hour storm totals for both structures.