GLENN COUNTY CONFINED ANIMAL FACILITIES ELEMENT TECHNICAL REPORT COMPONENT DESCRIPTIONS

MISSION LIVESTOCK
ORLAND, CALIFORNIA

DRAFT

Prepared for

Mission Livestock

Prepared by

VESTRA Resources, Inc.
5300 Aviation Drive
Redding, California 96002

SEPTEMBER 2020

VESTRA

5300 Aviation Drive | Redding, CA 96002
Phone 530.223.2585 | Fax 530.223.1145
info@vestra.com | www.vestra.com

GIS, Environmental, & Engineering Services

September 1, 2020

72007

Gary Conant
Glenn County Planning Department
225 North Tehama Street
Willows, CA 95988

Via Email
gconant@countyofglenn.net

RE: Technical Report Component Descriptions
Glenn County Confined Animal Facilities Element
Mission Livestock Feedlot
Orland, California

Dear Mr. Conant:

As requested, please find the Technical Report Component Descriptions from the Glenn County Confined Animal Facilities Element addressing the proposed Mission Livestock feedlot. This submittal covers the conversion of the former Greenwood Dairy to a feedlot to be managed by Mission Livestock. Greenwood Dairy was approved for 5,567 Animal Units (AU) and underwent CEQA review in 2007.

Please call me with questions regarding this submittal at (530) 223-2585.

Sincerely,

VESTRA Resources, Inc.

Wendy Johnston
Project Manager

Attachments

CC: Doug Freitas/ Mission Livestock
Julia Violich/Violich Farms

GLENN COUNTY CONFINED ANIMAL FACILITIES ELEMENT TECHNICAL REPORT COMPONENT DESCRIPTIONS

MISSION LIVESTOCK
ORLAND, CALIFORNIA

Prepared for

Mission Livestock

DRAFT

Prepared by

VESTRA Resources, Inc.
5300 Aviation Drive
Redding, California 96002

72007

SEPTEMBER 2020

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

A GENERAL SITE INFORMATION

Facility Description:

Facility Name: Mission Livestock
County: Glenn
Facility Address: 6569 County Road 27 Orland, CA 95963 (see Figure 1)
Parcel Number: Portion of APN 024-100-017-0
Contact Information: Douglas Freitas, Mission Livestock
Mailing Address: P.O. Box 933 Dixon, CA 94914
Phone number: (510) 996-8455

Mission Livestock is submitting a Technical Report with component descriptions at the request of Glenn County Planning. The proposed location is a historical dairy facility that has been operated as a dairy since 2001. In June 2020 the dairy closed and Mission Livestock will lease portions of the facility as a feedlot. The facility was operated as a feedlot from 1978 to 1995. The facility meets the requirements of the Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements General Order for Confined Bovine Feeding Operations (Order R5-2017-0058) as an existing facility. The dairy completed an expansion in 2008 and the maximum herd size was addressed in a CEQA document (VESTRA 2007) approved by Glenn County in 2007.

The former dairy facility and surrounding properties are now owned by Paul Violich Revocable Trust; Violich Farms, Inc.; and Alcatraz Farming, Inc. (see Figure 2). Mission Livestock will lease only the former dairy facility infrastructure. All adjoining cropland has been converted to almonds. No wastewater will be applied to cropland.

The site includes six clay-lined wastewater ponds, three freestall barns, manure separator and drying area, medical barns, exercise pens, stormwater retention pond (non-contact), and numerous feed storage buildings.

Structures: No new structures are planned for this facility. Onsite structures to be used by the feedlot are summarized in Table 1 and shown on Figure 3.

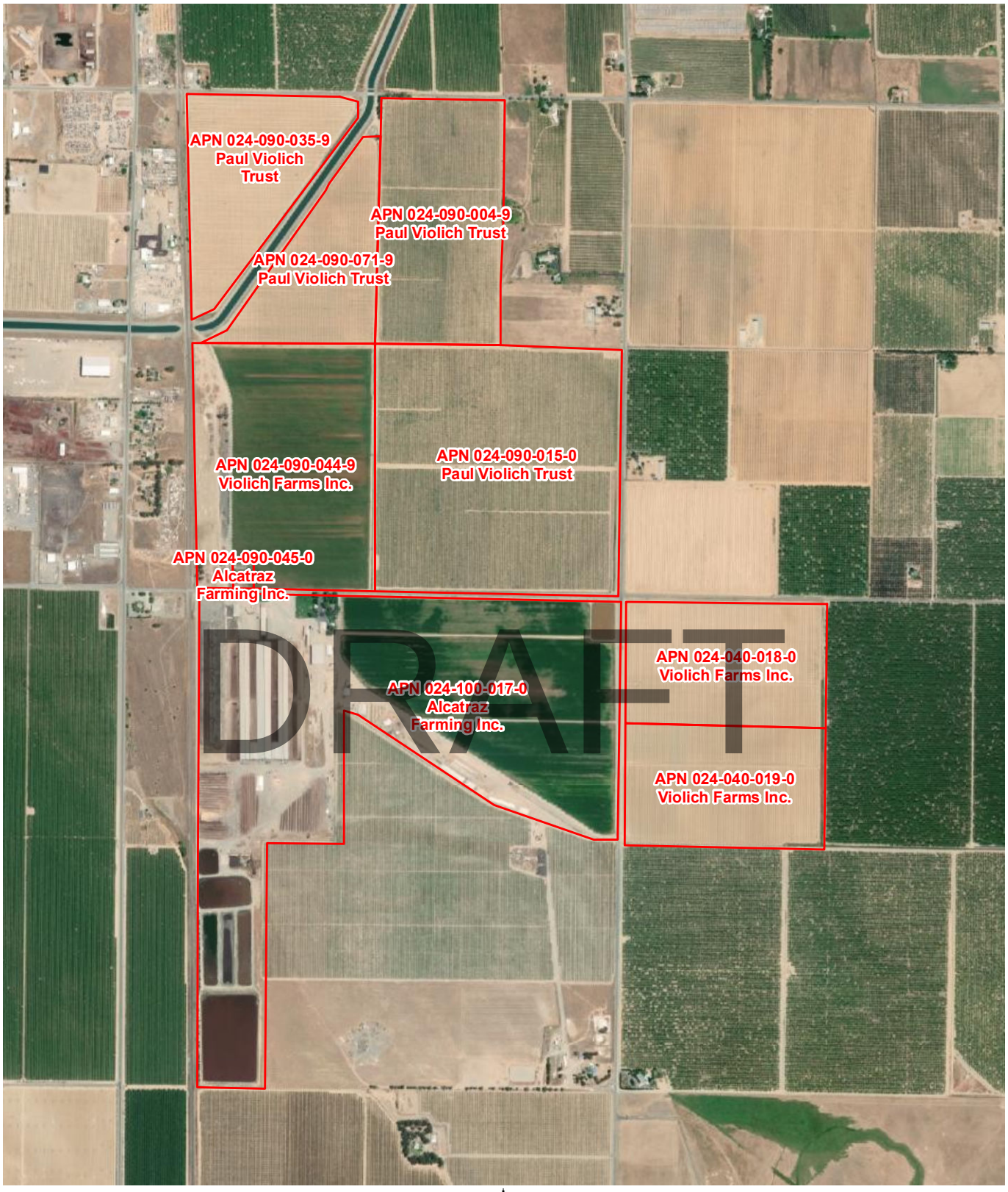
Previous wastewater ponds will be used to collect stormwater from the site.

Number of Animals: The expansion permitted in 2007 addressed 5,567 Animal Units (AU) (4,100 Holstein cows and heifers; see Table 2). Mission Livestock proposes to convert the dairy to a feedlot, housing an average of approximately 7,100 head of beef cattle with a maximum of 9,000 head. The cattle would be comprised of mixed breeds. The calves would weigh approximately 350 to 500 pounds when arriving at the feedlot. Cattle would be at the feedlot for approximately 150 days. The weight of the cattle when leaving the feedlot will be approximately 950 pounds. The overall average weight of cattle at the feedlot is estimated to be 675 pounds.

VESTRA

FIGURE 1
GENERAL SITE LOCATION
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_GeneralSiteLocation.mxd

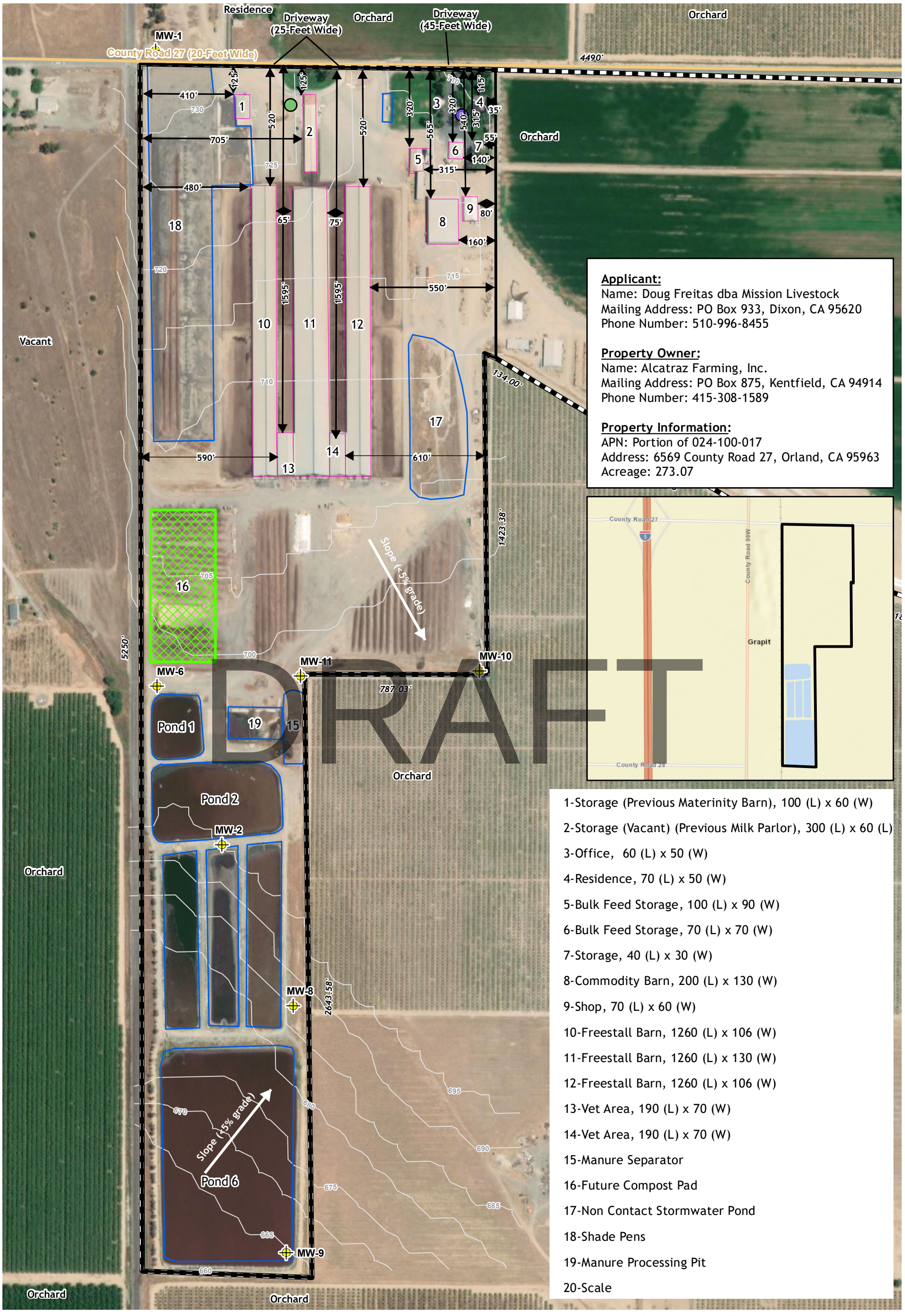


VESTRA

SOURCE: DIGITALGLOBE 2018 AERIAL PHOTOGRAPH

FIGURE 2
OWNERSHIP FORMER GREENWOOD DAIRY
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_GreenwoodDairyOwnership.mxd



Applicant:
Name: Doug Freitas dba Mission Livestock
Mailing Address: PO Box 933, Dixon, CA 95620
Phone Number: 510-996-8455

Property Owner:
Name: Alcatraz Farming, Inc.
Mailing Address: PO Box 875, Kentfield, CA 94914
Phone Number: 415-308-1589

Property Information:
APN: Portion of 024-100-017
Address: 6569 County Road 27, Orland, CA 95963
Acreage: 273.07

1-Storage (Previous Materinity Barn), 100 (L) x 60 (W)
2-Storage (Vacant) (Previous Milk Parlor), 300 (L) x 60 (L)
3-Office, 60 (L) x 50 (W)
4-Residence, 70 (L) x 50 (W)
5-Bulk Feed Storage, 100 (L) x 90 (W)
6-Bulk Feed Storage, 70 (L) x 70 (W)
7-Storage, 40 (L) x 30 (W)
8-Commodity Barn, 200 (L) x 130 (W)
9-Shop, 70 (L) x 60 (W)
10-Freestall Barn, 1260 (L) x 106 (W)
11-Freestall Barn, 1260 (L) x 130 (W)
12-Freestall Barn, 1260 (L) x 106 (W)
13-Vet Area, 190 (L) x 70 (W)
14-Vet Area, 190 (L) x 70 (W)
15-Manure Separator
16-Future Compost Pad
17-Non Contact Stormwater Pond
18-Shade Pens
19-Manure Processing Pit
20-Scale

Monitoring Well
Barn Well
Domestic Well
Future Paved Compost Area
Current Lease Boundary
Approximate Parcel Boundary
Buildings
Property Features

VESTRA
SOURCE: DIGITALGLOBE 2018 AERIAL PHOTOGRAPH

0 200 400 800 Feet
1 inch = 400 feet

Prepared by: Jennifer Williams, VESTRA Resources, Inc.
Address: 5300 Aviation Drive, Redding, CA 96002
Phone Number: (530) 223-2585
Date of Preparation: February 28, 2020

FIGURE 3
SITE PLAN, MISSION LIVESTOCK
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_SitePlan.mxd

Table 1 CURRENT BUILDINGS AND APPURTENANCES		
Structure	**Size (feet)**	**Year Constructed**
Freestall Barn 1	1260 x 106	2000
Freestall Barn 2	1260 x 106	2000
Shop	60 x 70	1948
Feed Barn	100 x 60	1969
Hay Barn 1	70 x 70	1948
Hay Barn 2	70 x 100	1948
Hay Barn 3	80 x 120	Unknown
Pole Barn	200 x 130	2002
Milking Parlor	300 x 60	2000
Maternity Barn	100 x 60	1970
Office	60 x 50	1920s
Freestall Barn	1260 x 130	2008
Shade Structures (10)	30 x 120	2012
Saudi-Style Barn	1260 x 80	2008
Hay Barns	88 x 300	2014

Table 2 PREVIOUS DAIRY FACILITY APPROVED OPERATING HERD SIZE			
Milk Cow (Holstein)	**Animal Count**	**Factor**	**AU**
Dry Cow (Holstein)	3,500	1.40	4,900
Heifers 12-24 months	550	1.12	616
Heifers 3-12 months	50	1.02	51
Calves	0	0.49	0
Total	4,100	--	5,567

According to the General Order specifications and calculation of AUs, the average 7,100 head of beef cattle is estimated to be approximately 2,485 AU using the 0.35 AU conversion. The 9,278 head would be 3,247 AUs. Both are below the currently permitted operating limit of 5,567 AU. The 5,567 AU expansion underwent CEQA review and was approved by Glenn County in 2007. Greenwood Dairy has ceased operations and transported all cows offsite in May 2020. Although Mission Livestock does not anticipate housing this cattle volume, this would be the maximum allowed under the RWQCB Order.

Manure Management: Manure will continue to be composted onsite. The manure will be combined with almond processing waste from the adjoining orchards, composted onsite, and returned to the adjacent orchards. Water from the ponds may be used to provide moisture to the compost. The composting operation meets the definition of "agricultural composting" under the current Order WQ 2015-0121-DWQ General Waste Discharge Requirements for Composting Operations and is exempt from the requirements of the Order. If required to do so, the facility will limit the production of compost to no more than 25,000 cubic yards processed onsite at any given time to meet the requirements of the pending amendment to the Order dated October 31, 2019 (not yet adopted).

Location: The facility is located 4 miles south of Orland in Glenn County at 6569 County Road 27, Section 15, Township 21 North, Range 3 West, M.D.B.M. Based on U.S. Geological Survey (USGS) Orland 7.5-minute Quadrangle, the site coordinates are Latitude: 39.674°N, Longitude: 122.190°W. County Road 27 borders the property to the north, Southern Pacific Railroad line and private parcels border the property to the west, and the Fulton Reclamation and Recycling facility borders the property to the south. Irrigated croplands border the property to the northeast. The previous land application areas (cropland) have been converted to almonds. No land application of wastewater will occur. The onsite wastewater ponds will be used to collect and retain onsite stormwater from areas that contact manure. Roof runoff and other "non-contact" water is directed to a separate stormwater detention pond.

Topography: Topography onsite slopes gently to the southeast. Site elevation ranges from approximately 730 feet above sea level at the northwest corner of the property near the intersection of Highway 99W and County Road 25 to approximately 660 feet above sea level at the southwest corner of the property at the intersection of Highway 99W and County Road 28.

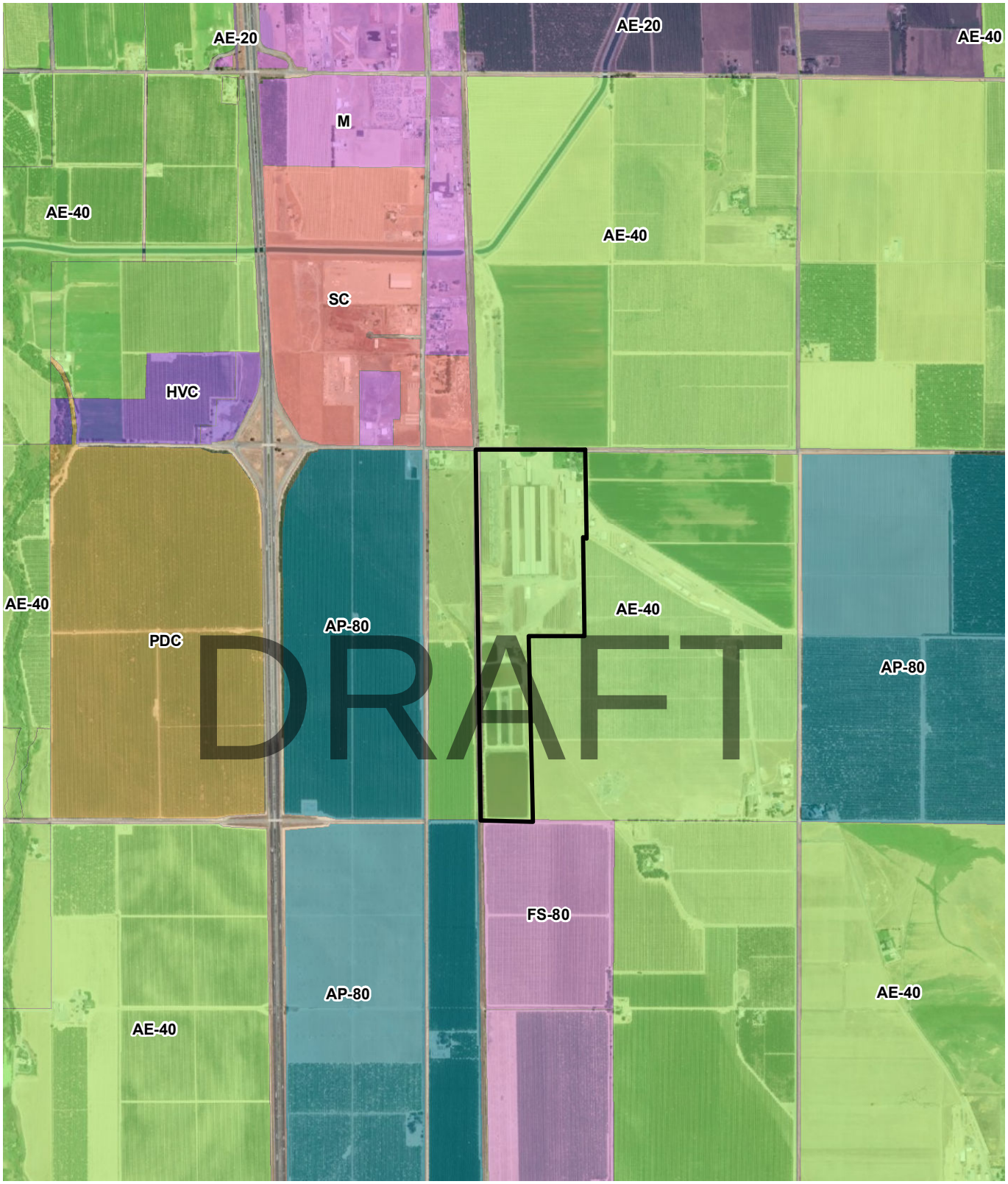
Zoning: The property being leased by Mission Livestock is zoned *Intensive Agriculture, 40-acre minimum,* as shown on Figure 4.

Aesthetics: This facility is surrounded by farmland. Paul Violich Revocable Trust; Violich Farms, Inc.; and Alcatraz Farming, Inc., have purchased this facility and surrounding ground. Violich Farms will complete planting almond orchards on the ground previously used for wastewater disposal in 2020. There will no longer be wastewater disposal to cropland. This facility has housed bovines since the late 1970s and there will be no change in aesthetics to the feedlot facility. The closest urban area is 2.5 miles from the facility.

Soils: The soils in the immediate vicinity of the feedlot facility, including the area of the wastewater ponds, are composed of Cortina very gravelly sandy loam. The Cortina series consists of excessively drained soils on recent gravelly alluvium from schistose, sedimentary, and metavolcanic rocks. These soils are characteristically gravelly or very gravelly and coarse textured or moderately coarse textured. They are shallow to moderately deep over channel sand and gravel. These soils typically have a light brownish-gray or grayish-brown surface layer that is slightly acid. The soil depth to sand and gravel is more than 36 inches. Permeability is very rapid and the available moisture holding capacity is 3 to 5 inches. Cortina series soils generally occupy narrow areas that are small or medium in size. Cortina soils are of limited agricultural value due to low water retention capacities. In this area, the Cortina series overlays the Stony Creek alluvial fan. Soils were addressed in the Waste Management Plan (VESTRA 2020a) submitted to the RWQCB for compliance with Order R5-2017-0058 Waste Discharge Requirements General Order for Confined Bovine Feeding Operation (RWQCB 2017) in April 2020 with copies to Glenn County Planning. Wastewater will no longer be applied to surrounding cropland.

B GEOTECHNICAL REPORT

A Conditional Use Permit to expand the previous dairy was approved by the Glenn County Department of Planning and Public Works on December 19, 2007. The expansion included increasing the herd size to 5,567 AU and adding shade structures; freestall barns, hay barns, and new maternity barns. In addition, the three wastewater storage ponds and the emergency



SOURCE: GLENN COUNTY PLANNING DEPARTMENT 2020

FIGURE 4
ZONING
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_Zoning.mxd

overflow detention basin constructed in 2006 were added to the Use Permit. Previous Geotechnical Reports are on file at the County and are referenced in Section N. No new structures are planned for this facility.

C DRAINAGE ANALYSIS

Flood Protection: The feedlot is not located near any streams and is outside of any 100-year flood hazard zones. The site is located in an area of minimal flooding, Zone X. Flood potentials are derived from the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA). The FIRM Map, Community Panel No. 06021C0400D, dated August 5, 2010, is shown on Figure 6.

Precipitation: The Orland weather station (No. 046506) averages approximately 20 inches of precipitation per year with a period of record 1903-2019. Most precipitation falls during the winter months, with 81 percent of the annual total received between November and March. Summer thundershowers account for less than 1 percent of the annual precipitation. Average annual precipitation is summarized in Table 3.

Evaporation: Pan evaporation for the Chico Experiment Station (1906-2005) and evapotranspiration (ETo) data for the Durham CIMIS Station are summarized in Table 3.

Table 3
PRECIPITATION, PAN EVAPORATION, AND EVAPOTRANSPIRATION

Month	Average Precipitation[1]	Average Precipitation x 1.5	Pan Evaporation[2]	ETo[3]
10	1.05	1.58	4.46	3.33
11	2.32	3.48	2.09	1.63
12	3.52	5.28	1.30	1.05
1	4.04	6.06	1.26	1.21
2	3.43	5.15	2.13	1.95
3	2.66	3.99	3.82	3.40
4	1.30	1.95	5.63	4.89
5	0.73	1.10	8.28	6.58
6	0.37	0.56	10.11	7.35
7	0.04	0.06	11.48	7.54
8	0.11	0.17	9.71	6.61
9	0.37	0.56	7.36	4.92
Total	**19.94**	**29.91**	**67.63**	**50.46**

Notes:
1 Orland, California (046506), 1903-2016, WRCC 2020
2 Chico Experiment Station, 1906-2005, WRCC 2020
3 Durham CIMIS Station 12, CIMIS 2020

25-Year/24-Hour Storm: The 25-year, 24-hour storm for the site (NOAA Atlas 14, Volume 6, Version 2, Orland Station No. 046506) is 3.89 inches. Native soils are described as Cortina, very gravelly, sandy loam. These soils are alluvial, somewhat excessively drained, and have a high capacity to transmit water. Historically, the detention pond area has percolated very rapidly and had minimal storage of water.

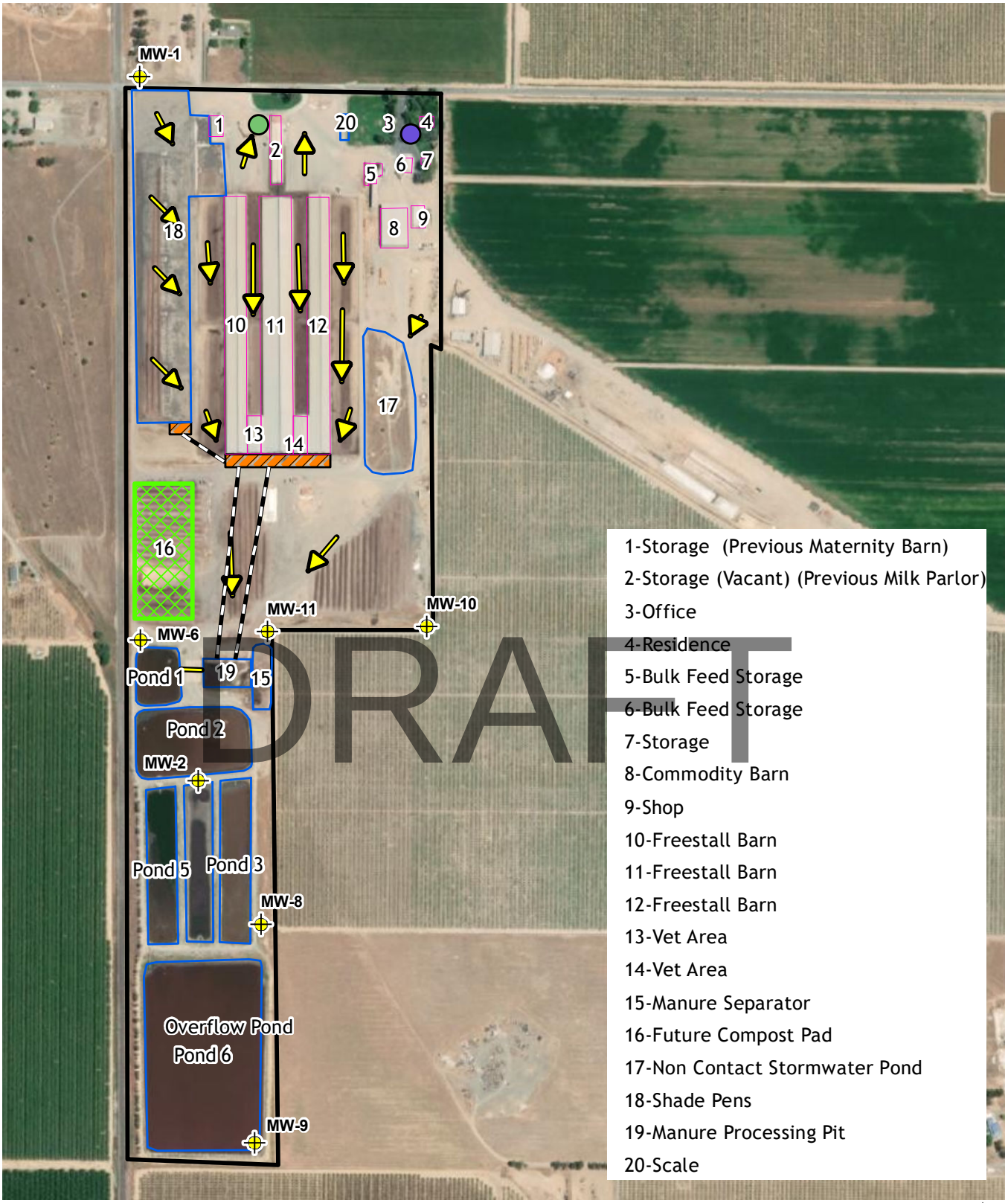


FIGURE 5
SURFACE DRAINAGE MAP
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

SOURCE: DIGITALGLOBE 2018 AERIAL PHOTOGRAPH

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_SurfaceDrainageMap.mxd

VESTRA

SOURCE: DIGITALGLOBE 2018 AERIAL PHOTOGRAPH; FEMA 2019

FIGURE 6
FEMA FLOOD ZONES
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_FEMAFloodZones.mxd

Wastewater Generation: The feedlot will not flush and will not generate wastewater with the exception of contact stormwater. Barn roof drains collect clean runoff where it is conveyed to the non-contact stormwater pond located east of the corrals (see Figure 5). This water percolates to groundwater.

The corral drainage and any flush water from the barns will flow to sumps located at the south end of the corral area and barns. It will be collected into sumps and pumped to the wastewater lagoons via an underground piping system. All corral areas are constructed to direct contaminated runoff to the sumps and hence to the wastewater ponds as shown on Figure 5.

There are six wastewater ponds onsite. Ponds 1 2, 3, 4, and 5 are used for wastewater storage as needed and to provide improved sediment removal. Pond 6 serves as an emergency pond for use only in times of heavy precipitation. Pond construction details are shown in Table 4. All wastewater ponds were constructed with clay liners.

Table 4
POND INFORMATION

Pond ID	Top Water Surface Area (sq feet)	Bottom Surface Area (sq feet)	Side Slopes	Depth (feet)	Storage Volume Available (cu feet)[1]
1	52,975	22,810	3.3:1	12.5	473,656
2	173,580	104,970	4:1	11.5	1,601,662.5
3	105,790	44,890	3:1	12	904,080
4	103,810	44,140	3:1	12	887,700
5	106,505	47,820	3:1	12	925,950
				Total Pond Volume	**4,793,050**
Overflow	543,735	499,580	3:1	6	3,129,945
				Contingency Pond Volume	**3,129,945**

Notes: 1 Storage volume does not include 2 feet of freeboard (No Discharge Technical Report, VESTRA 2015)

Kleinfelder designed Ponds 1 and 2 for the original dairy in 2001. These ponds were lined with 24 inches of clay material compacted to 90 percent relative compaction with a permeability of 10^{-6} centimeters per second (cm/sec) or less. Additional details are available in the *Geotechnical Investigation Report, Proposed Verboom Dairy Ponds, Orland, California* (Kleinfelder 2001), on file with the County. Ponds 3, 4, 5, and 6 were installed in 2006. These ponds were lined with 12 inches of clay material compacted to 95 percent relative compaction with a permeability of 10^{-6} cm/sec or less.

Ponds will be dry by mid-October each year to allow for pond cleaning as well as provide storage capacity for rainy seasons and stormwater runoff.

Wastewater Capacity Calculation: The wastewater capacity calculation was included in the Waste Management Plan submitted to the RWQCB in April 2020 (VESTRA 2020a). The available storage capacity (which excludes 2 feet of freeboard) in the six onsite wastewater storage ponds is approximately 8,000,000 cubic feet or 180 acre-feet. These ponds were

constructed by the former dairy and will be used to contain all wastewater runoff from the feedlot facility.

Key input parameters for the water balance are presented in Table 5.

Table 5
WATER BALANCE INPUT PARAMETERS

Parameter	Value	Units	Source
Average Annual Precipitation	29.91	inches	See Table 3
Precipitation Factor	1.5	---	Order R5-2017-0058, Attachment B
25-year, 24 hour design storm	3.89	inches	NOAA Atlas 14, Volume 6, Version 2, Orland 04-6506
Average Annual ETo	50.46	inches	See Table 3
Evaporation Factor	1.1	---	Conservative estimate to calculate pond evaporation from reference ETo
Total Pond Surface Area	25	acres	Table 6
Average Pond Surface Area	21	acres	Calculated
Runoff Area	50.5	acres	From Site Plan
Runoff Factor	0.4	fraction	Conservative estimate based on 2016 WMP Update
Compost Area	3.5	acres	From Site Plan
Compost Water Use	0.0921	aft/acre/month	Based on water use at a compost facility in Orland

Based on the result of the water balance, the maximum water storage volume required based on the input parameters presented in Table 5 is approximately 3,500,000 cubic feet or 80 acre-feet at the end of March. This maximum water storage volume is less than the available storage capacity of the wastewater ponds of 8,000,000 cubic feet. Based on this calculation, the wastewater ponds have sufficient capacity to meet the rainfall criteria outlined in RWQCB General Order R5-2017-0058 Waste Discharge Requirements General Order for Confined Bovine Feeding Operations.

Also based on the results of the water balance, the wastewater ponds will be dry by the end of August. This conclusion is based on the assumption that it may be necessary to manage residual water in the wastewater ponds to maximize evaporation following wet winter seasons. For example, if only Ponds 1 through 5 are used for water storage during a wet winter, it may be necessary to transfer water from these ponds into Pond 6 during the summer months to maximize surface evaporation.

D GROUNDWATER EVALUATION

Depth to Useable Groundwater: The locations of surrounding monitoring and water supply wells within 600 feet of the site are included on Figure 7. There are two domestic wells on the site. One is located near the milking barn and will be used for livestock water. The other well is the house domestic well. The approximate depth to water at both wells in between 40 and 50 feet. A local well within the vicinity of the feedlot is monitored by DWR (well 366909N1221638W001). During the years of reported monitoring, the approximate depth to water in this well is 40 to 80 feet. Onsite well locations are shown on Figure 7.

Monitoring Well
Offsite Well
Barn Well
Current Lease Area
Domestic Well
600-Foot Buffer Around Current Lease Area

N

VESTRA

0 500 1,000 2,000 Feet

SOURCE: DIGITALGLOBE 2018 AERIAL PHOTOGRAPH

FIGURE 7
WELL LOCATIONS WITHIN 600 FEET
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_WellLocations.mxd

Proximity to Water Courses: There are no surface waters located on the project site. The feedlot operations will not generate additional wastewater from operations. All stormwater that comes in contact with manure or cattle holding areas will be contained in the retention ponds onsite. See previous discussion. Portions of the existing groundwater monitoring network will be retained to verify that groundwater is not being impacted by site activities. The wells will be sampled per RWQCB General Order R5-2017-0058. The project will not substantially degrade surface water or groundwater quality.

Ground and Surface Water Separation: The deepest pond is 12 feet deep. This depth leaves a minimum of approximately 30 feet from the surface to groundwater.

Baseline Groundwater Quality: The barn well and domestic well are separate from any wastewater connections and supply only fresh water to the existing barn and residence. In the feedlot operation, there will be no wastewater application to surrounding croplands. Backflow protection was in place in all wells associated with the previous dairy operation.

A monitoring well network was established under individual Waste Discharge Requirements (R5-2008-0122) associated with Greenwood Dairy. The previous well locations and groundwater elevation contours are shown on Figure 8.

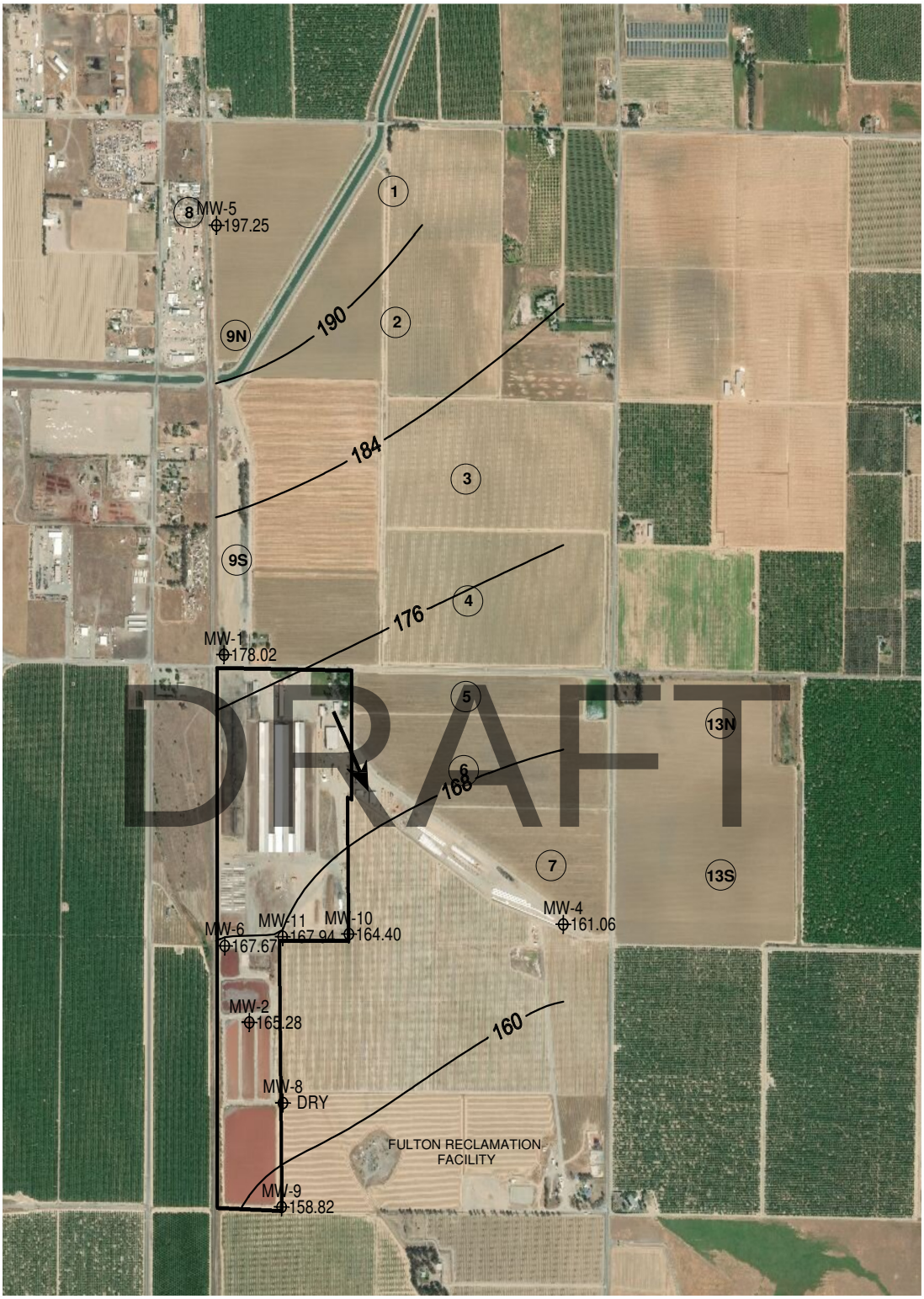
Monitoring Wells MW-2, MW-6, MW-8, and MW-9 are associated with the wastewater ponds and will be retained for future sampling. In addition, Monitoring Well MW-10 will be retained because it is associated with the composting area used by the feedlot. Monitoring well details are shown in Table 6. Most recent groundwater elevations are summarized in Table 7. Historical groundwater analytical data are included in Appendix A (VESTRA 2020b).

Monitoring Wells MW-1, MW-4, MW-5, and MW-11 were abandoned in July 2020 with the cessation of land application of wastewater.

Table 6
MONITORING WELL CONSTRUCTION DETAILS

Well No.	Installation Date	Construction Material	Total Depth (ft bgs)	Screened Interval (ft bgs)	Sand Interval (ft bgs)	TOC Elevation (ft above msl)
MW-1[1]	3/28/01	2-inch Sch. 40 PVC	46.5	20-45	18-46.5	221.28
MW-2	1/4/01	2-inch Sch. 40 PVC	50	20-50	18-50	214.59
MW-4	3/27/01	2-inch Sch. 40 PVC	46.5	20-45	18-46.5	206.68
MW-5	3/27/01	2-inch Sch. 40 PVC	46.5	20-45	18-46.5	228.10
MW-6[1]	1/4/01	2-inch Sch. 40 PVC	49	19-49	17-49	213.06
MW-8	3/20/08	2-inch Sch. 40 PVC	45	25-45	23-50	210.28
MW-9	3/20/08	2-inch Sch. 40 PVC	50	30-50	26-50	207.30
MW-10	1/14/08	2-inch Sch. 40 PVC	45	20-45	18-45	209.52
MW-11	1/14/08	2-inch Sch. 40 PVC	50	30-50	25-50	215.93

Notes:
[1] Screened intervals were modified in the Second Semi-Annual 2010 Monitoring Report to reflect the actual total depths for the two wells measured in the field; the well identification numbers are believed to have been interchanged during late 2001.
MW-3 was abandoned pursuant to RWQCB approval on 11/30/11.
MW-7 was abandoned during construction of Ponds 3, 4, 5, and 6 in March 2008.
MW-1, 4, 5, and 11 were abandoned in July 2020.
MW-2, 6, 8, 9, and 10 were retained.



GROUNDWATER GRADIENT 0.0047 FT/FT ON MAY 30, 2019

LEGEND

- GROUNDWATER FLOW DIRECTION
- 176 GROUNDWATER ELEVATION CONTOUR
- PROPERTY BOUNDARY
- MW-9 158.82 MONITORING WELL W/GROUNDWATER ELEVATIONS
- (3) FIELD NUMBER

0 750 1,500 3,000 Feet

VESTRA

FIGURE 8

GROUNDWATER ELEVATION CONTOURS
MAY 2019
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_GW Elevations.pdf

Table 7 GROUNDWATER ELEVATIONS MAY 2019				
Well No.	**TOC Elevation (ft above msl)**	**Screened Interval (ft bgs)**	**Depth to Groundwater (ft below TOC)**	**Groundwater Elevation (ft above msl)**
MW-1	221.28	20-50[1]	43.26	178.02
MW-2	214.59	20-50	49.31	165.28
MW-4	206.68	20-45	45.62	161.06
MW-5	228.1	20-45	30.85	197.25
MW-6	213.06	19-49[1]	45.39	167.67
MW-8	210.28	23-50	Dry	--
MW-9	207.3	26-50	48.48	158.82
MW-10	209.52	18-45	45.12	164.4
MW-11	215.93	25-50	47.99	167.94
Note: [1] Screened intervals were modified in the Second Semi-Annual 2010 Monitoring Report to reflect the actual total depths for the two wells measured in the field; the well identification numbers are believed to have been interchanged during late 2001.				

Groundwater Monitoring: The monitoring network will be sampled annually per RWQCB Order R5-2017-0058. Monitoring of the barn well and domestic well will be discontinued. The monitoring wells will be sampled for the parameters in Order R5-2017-0058 including:

- Field measurement of electrical conductivity and ammonium nitrogen
- Nitrate nitrogen
- General mineral (calcium, magnesium, sodium, potassium, bicarbonate carbonate, sulfate chloride, and total dissolved solids)
- Groundwater elevation

E NUTRIENT MANAGEMENT PLAN

There will not be any land application to crops from this facility. No nutrient management plan is required.

F DEAD ANIMAL MANAGEMENT PLAN

Dead animals will be immediately removed from corrals or barns and temporarily relocated to an isolated site away from both County Road 27 and Railroad Avenue, out of public view, until removal. Dead animals will be disposed of in a way that does not adversely affect ground or surface water. During the summer months, lime will be applied to the area for sanitation and odor mitigation.

Sacramento Rendering Company pickup days are Monday, Wednesday, and Friday. Mission Livestock will have a better percentage basis for mortality numbers at the feedlot following an operational period. The previous dairy had many upgrades to the facility including more areas for shade and more room for animals to be housed. The previous death loss was between 4 and 6 percent. The feedlot will implement Best Management Practices (BMPs) to ensure livestock is

treated humanely with adequate food, water, and shelter from weather elements. The industry standard for feedlot mortality according to the agweb.com Cattle Network is about 2 percent.

The contact information for Sacramento Rendering Company is:

Sacramento Rendering Company
11350 Kiefer Boulevard
Mather, California 95830
airyourthoughts@SRCCompanies.com
1-800-339-6493

G PEST AND VECTOR CONTROL

Glenn County has a fogging schedule for mosquito control from May through October 2020. The feedlot facility is in an area that will be sprayed once a week; see glennmosquito.specialdistrict.org/fogging-schedule for more information. The feedlot will use BMPs to ensure stagnant or standing waters do not contribute to the breeding of mosquitoes.

Manure removal, composting, pesticides, fly tape, fly traps, and fly predators will be used as a means to control fly populations. Mission Livestock will utilize fly predators as a biological control, fly traps as a mechanical control, and efficiency of manure to compost management as a cultural control. Standing water will be minimized. Insecticides will be used as a last resort.

Manure Management: The average manure generation will be approximately 21.5 pounds per head per day at 65 percent dry matter. With an average of 7,100 cattle at the feedlot facility, roughly 152,650 pounds per day of manure will be generated. Tons of manure per year is estimated at 27,858 tons. Barns will be scraped or vacuumed daily.

The main storage area for manure is between the barns and ponds. Manure at the dairy was composted in this area. Composting will continue under the new operation. Manure will be removed from the barns by a loader or vacuum. In the winter months, if sufficient volume in the detention ponds is available, some flushing may occur. Scraping or vacuuming will be used during the summer season. The plan is to pave the manure composting area. The new operator is evaluating manure removal options and may use a combination of flushing, scraping, and vacuuming in the barns. External pen areas will be scrapped.

Composting: Manure at the dairy was composted and used as bedding or applied to adjacent almond orchards. Manure composting will continue under the feedlot operation. Winter composting will be conducted on a low-permeable surface (compacted material or asphalt). Water from the ponds may be used to provide moisture to the compost. The composting operation meets the definition of "agricultural composting" under the current Order WQ 2015-0121-DWQ General Waste Discharge Requirements for Composting Operations and is exempt from the requirements of the Order. If required to do so, the facility will limit the production of compost to no more than 25,000 cubic yards processed onsite at any given time to meet the requirements of the pending amendment to the Order dated October 31, 2019 (not yet adopted).

Wastewater Pond Management: To help manage wastewater, a mechanical separator will be used to remove any solid material greater than 0.025 inches in diameter from the water stream before entering Pond 2. The removal of solids prevents buildup of material in the ponds that could serve as a surface for breeding pests. Solids that are removed by the separator are then stored on a concrete apron adjacent to the processing pits prior to composting.

The ponds will be dry by mid-October each year to allow for pond cleaning as well as ensuring sufficient storage holding for incoming rainy seasons and stormwater runoff.

Chemical Use: Mission Livestock will focus on BMPs and good housekeeping to control pests. Keeping pests under control by managing hatch times for lifecycle interference is one of the best methods. The best times to spray is before the population of pests gets out of control. Using the appropriate mixing ratio on the label will treat the most amounts of pests most effectively. Using one chemical at a time and not mixing is best for human and animal safety. Using chemicals that are safe for animals and their environment is another important factor. It is important to choose a chemical that will give the best results with the least potential environmental impact outside the spray area. Chemical selection is best made off of a qualified consultant recommendation. Limited chemicals will be used in addition to the facility's BMPs. Any chemicals used will be administered, stored, and disposed of according to the product labels and in accordance with Federal and State laws and regulations.

Glyphosate will be used for weed control. Glyphosate is the most commonly used broad-spectrum, non-selective systemic herbicide in the United States. It is categorized as a phosphonomethyl amino acid. This herbicide is widely used in forestry, agriculture, residential, and industrial areas. Roundup kills both broadleaf plants and grasses. It works by preventing plants from making certain proteins that they need for plant growth. The product is absorbed through the leaves and translocated throughout the plant. It concentrates in the meristem tissue where it stunts growth, malforms and discolors leaves, and causes plant death. This enzyme is not present in mammalian systems.

General: Mission Livestock will apply BMPs and good housekeeping as follows:

- Daily pest and vector control
- Odor control from proper manure and pond management
- Daily barn flushing, scraping, or vacuuming
- Pond agitation
- Careful management of internal composting temperatures
- Regular removal of compost offsite
- Follow recommended inspection schedules
- Follow current Waste Discharge Requirements (WDR)
- Follow careful health management procedures for cattle (vaccinating and worming schedule)
- Supply adequate nutrition, water, and shelter to cattle
- Ensure employees are properly trained in BMPs

H DUST CONTROL PLAN

Mission Livestock is located in the Northern Sacramento Valley Air Quality Management District, which identifies those air quality factors that may be of a concern to citizens of Glenn County. Glenn County has relatively good air quality, with both federal and state attainment for carbon monoxide, sulfur dioxide, nitrogen dioxide and $PM_{2.5}$ (particulate matter with a diameter less than 2.5 micrometers). PM_{10} (particulate matter with a diameter less than 10 micrometers) is the only air quality issue that is in non-attainment, with ozone being in a transitional stage (Glenn County Confined Animal Facilities Element 2005).

Particulate matter is a mixture of solid particles and liquid droplets found in the air. Some particles are large enough to be seen as dust or dirt; others are so small they can be detected only with an electron microscope. $PM_{2.5}$ describes the "fine" particles that are less than or equal to 2.5 micrometers in diameter. PM_{10} refers to all particles less than or equal to 10 micrometers in diameter. A particle 10 micrometers in diameter is about one-seventh the diameter of a human hair (EPA 2006). The typical off-field sources for PM_{10} emissions from feedlot facilities include corrals and unpaved roadways.

Mission Livestock has identified feedlot activities that may contribute to fugitive dust, as well as management practices that they can implement in order to ensure the incidence of fugitive dust is lessened. No on-field activities are planned.

The following off-field sources of fugitive dust emissions have been identified at Mission Livestock:

- Unpaved roads
- Unpaved parking areas
- Storage piles of dirt and/or aggregate materials
- Manure waste storage and handling (unpaved corrals)
- Feed preparation, storage, and handling

Mission Livestock has developed a comprehensive Dust Control Plan which presents BMPs that mitigate the incidence of fugitive dust emissions. The BMPs are focused on the off-field sources of fugitive dust listed above. These BMPs are performed and/or abided by all facility employees and guests. They are implemented, monitored, and enforced by the foreman. The following subsections present the BMPs applied to each off-field source. Table 8 summarizes the BMPs by source and includes a description of the BMP's effectiveness.

Unpaved Roads: Farm traffic on unpaved roads with loose surface material creates a source for fugitive dust that may contribute to PM_{10} emissions. Mission Livestock has already lessened the possibility for fugitive dust emissions by paving the main entrance and graveling the majority of unpaved road and parking areas within the barn area. The main entrance to the feedlot, accessed from County Road 27 (paved), is currently rock and pavement.

In addition, of the approximately 1.7 miles (9,030 feet) of unpaved road on the facility, 1 mile is graveled. The addition of gravel is a BMP widely recommended for fugitive dust control and is listed as a mitigation measure in the Glenn County Confined Animal Facilities Element

Programmatic Environmental Impact Report. This is due to the fact that dust emissions from unpaved roads are directly related to the silt content in the road surface materials (EPA 1998). The EPA dictates that percent silt content be calculated by the percentage of material that falls through a #200 sieve. According to the soil mechanics tests performed by NRCS, the average silt content of the lean clay soils (without gravel added) found in the barn area is about 93 percent. The average silt content of gravel is only about 6 percent (EPA 1998), resulting in a significant decrease in fugitive dust emissions.

In addition, as did the previous operator, Mission Livestock will treat unpaved roads onsite with commercial dust control agents or water for the treatment of road aggregate. Products will be approved by CalEPA, USEPA, and the U.S. Department of Agriculture.

Dust control agents contain effective binding agents to hold soil particles together and prevent them from being dispersed into the air. In addition to suppressing the irritating effects of airborne dust itself, they effectively stabilize road base aggregate materials, reducing soil erosion and protecting vegetation from blowing dust and sand. These will be used in accordance with the standard practices listed for the product for reducing the generation of airborne particulate matter from unpaved roads.

Mission Livestock will use the following BMPs to control fugitive dust emissions from unpaved roads:

- Routinely used unpaved roads are graveled (more than half of the 1.7 miles of unpaved roads within the barn area are graveled).
- Graveled roads will be treated with PENNZSUPPRESS® D or equivalent to control PM_{10} emissions without adverse effects to the environment.
- Access to unpaved roadways will be restricted to only those vehicles necessary for management of the feedlot operations.
- When possible, vehicles and farm equipment will be turned around in the field, and not on a paved public roadway, to prevent the transference of loose surface material.
- If vehicles must turn around on a paved public roadway, the roadway will be cleaned of residual materials. The main entrance to the facility is cemented, preventing direct access from unpaved roads to the paved County Road 27 and minimizing the possibility of transference.
- Speed limits on all unpaved roads are 15 mph and are controlled by signage and worker behavior modification.
- Use of water truck.

Unpaved Parking Areas: Unpaved parking areas with loose surface material create a source for fugitive dust that may contribute to PM_{10} emissions. Mission Livestock has already mitigated the possibility of fugitive dust from unpaved parking areas by paving the main parking lot and feed area.

Table 8 DUST CONTROL PLAN BEST MANAGEMENT PRACTICES		
Potential Off-field Source	**BMP Used to Control Source**	**Effect**
Unpaved Roads	Routinely used roads are graveled	Lowers silt content, thereby lowering PM_{10} emissions
	Restricted access	Decreases traffic and resulting emissions
	Equipment turned around in field not public road	Keeps dirt from being transferred to public areas
	Public roads cleaned if necessary	Decreases wind and traffic dispersion
	Speed limits	Lessens surface material disturbance and dispersion
	Dust suppressant application	Stabilizes road base aggregate materials, reducing erosion and particle dispersion into the air
Unpaved Parking Areas	Major parking lot paved	Decreases occurrence of loose surface material
	Restricted access	Decreases traffic and resulting emissions
	Vehicles cleaned before entering public road	Keeps dirt from being transferred to public areas
	Routinely used parking lots are graveled	Lowers silt content, thereby lowering PM_{10} emissions
	Speed limits	Lessens surface material disturbances and dispersion
Storage Piles of Dirt and/or Aggregate Materials	Small piles covered with tarp	Prevents wind dispersion
	Piles are moistened if possible	Lessens wind dispersion
	Transported materials are done so slowly, covered if possible and with 6 inches of freeboard space to top of truck	Lessens wind dispersion
Manure Storage and Handling (Unpaved Corrals)	Feed and traffic alleys are scraped or vacuumed	Prevents buildup of materials that could be dispersed by herd/workers/vehicles/wind
	Corrals and loafing areas are scraped	Prevents buildup of materials that could be dispersed by herd/workers/vehicles/wind (corrals are scraped in the morning when moisture levels are highest)
	Loafing corrals are shaded	Helps to maintain moisture levels in surface materials (i.e. manure, dirt), which inhibits dispersion
Feed Preparation, Storage and Handling	Feed unloaded and stored in commodity barn or three-sided, covered shed	Prevents wind dispersion
	Augured delivery trucks are booted or socked	Prevents escape of particles during unloading and prevents wind dispersion
	Feed is loaded and unloaded slowly	Loading/unloading at a lower velocity decreases the release of particles and lessens wind dispersion
	Feed is mixed with wet feed on bottom	Higher moisture content lessens dust created by mixing and lessens wind dispersion
	Spilled feed cleaned up quickly	Prevents buildup of materials susceptible to wind dispersion

Mission Livestock will use the following BMPs to control fugitive dust emissions from unpaved parking areas:

- The major parking areas are paved to control incidences of fugitive dust.
- Access to unpaved parking areas is restricted to only those vehicles necessary for management of the feedlot operations.
- Vehicles will be cleaned before returning to a paved public roadway. The main entrance to the facility is cemented, preventing direct access to the paved County Road 27 and minimizing the possibility of transference.
- Routinely used unpaved parking areas are graveled.
- Speed limits are controlled by signage and worker behavior modification.
- A water truck is used to wet unpaved roads.

Storage Piles of Dirt and/or Aggregate Material: Daily operations may require storage piles of loose materials that are subject to dispersion due to wind (feed storage piles are discussed later).

In the event that piles of dirt or other aggregate materials exist onsite, the following BMPs will be taken into effect to control fugitive dust:

- Piles will be covered with tarps, plastic or suitable material, protected by three-sided structures, or kept in commodity barns that will protect the material from wind.
- Piles will be moistened with water if the addition of water will not damage the stored material.
- Loose material being transported will be moved at a low speed, will be covered or moistened with water if possible, and/or loaded with at least 6 inches of freeboard space from top of the container, to mitigate fugitive dust emissions.

Manure Waste Storage and Handling: A primary constituent of controlling dust, odor, and pests is moisture content of open lot or corral surfaces (Auvermann 2001). The problem is that dust predominates at a lower moisture content, while odor and pest infestation issues arise at higher moisture contents. The primary issue for controlling dust at the Mission Livestock (and many animal feeding facilities across the nation) is the need to strike a balance between management of fugitive dust and of vectors. Mission Livestock has chosen those BMPs that best minimize fugitive dust while successfully controlling pests.

Mission Livestock currently has three freestall barns, which will house the feedlot cattle and allow them to lie in individual stalls. The advantages of freestall housing include a decrease in herd activity, which lessens the disturbance of surface material in the corrals, and a roofed area that prevents the dissemination of dust into the atmosphere. Shaded corral areas are also used; the shading serves much of the same purpose as cover over barns.

Due to frequent scraping, the corrals are firm and hard, with a maximum manure depth of less than 1 inch. Less than 1 inch of dry manure in corrals ranks as *Low Emissions – Rank 3*, according to the California Dairy Quality Assurance Program, Air Curriculum, Farm-A-Syst Assessment worksheet. *Low Emissions – Rank 3* is the lowest ranking of dust emission probability.

Mission Livestock will use the following BMPs to control fugitive dust emissions related to manure handling and storage:

- Feed and traffic alleys will be scraped or vacuumed daily, preventing a dried layer of manure from forming that would be pulverized by herd activity and susceptible to wind dispersion.
- Depth of dry manure in corrals at time of scraping will be less than 1 inch, which ranks as *Low Emissions – Rank 3* according to the California Quality Assurance, Air Curriculum, Farm-A-Syst Assessment worksheet. *Low Emissions – Rank 3* is the lowest ranking of emissions probability.
- Manure in the corrals will be pulled into long strips (windrows) on each side of the corral. This will increase the surface area exposed to oxygen, decreasing drying time of the manure.
- The corrals and outside loafing areas will be cleaned using a pull-type box scraper on a tractor in the morning, when natural moisture helps to keep down the incidence of fugitive dust. Pull-type box scrapers (unlike push-type scrapers) not only keep manure to a minimum in the corrals but also help to maintain a level ground surface that prevents the accumulation of dust (and water) in ground depressions (Auvermann 2001).
- Shades are used in the open loafing corral that lessen cattle movement, keep dust from rising into the atmosphere, and help to maintain moisture.

Feed Preparation, Storage and Handling: The preparation, storage, and handling of bulk feed create additional possible off-field sources for fugitive dust emissions. Bulk feed will be transported onsite by truck. Feeds will be loaded into a mixer truck, blended, and then poured into feed bunks. Unused feed will be stored in large piles that, if unprotected, is susceptible to wind dispersion.

Mission Livestock will use the following BMPs to control fugitive dust emissions from feed preparation, storage, and handling:

- Bulk feeds will be unloaded and stored either inside an enclosed commodity barn or under a roofed and three-sided commodity barn, protecting bulk piles and feed being unloaded from wind, and keeping dust from rising into the atmosphere.
- When feed is delivered, augered delivery trucks will be booted or socked.
- All loading and unloading will be done slowly.
- Feeds will be loaded into a mixer truck with wet feeds placed on the bottom, which will lessen the amount of dust that rises out of the truck when dried feed commodities are added.
- Feed spilled during delivery or feeding will be cleaned up quickly.

Implementation and Quality Control: The BMPs listed above will be implemented by the feedlot. Implementation, monitoring, and enforcement of new BMPs is the responsibility of the operator foreman.

- The foreman will be responsible for implementation of new BMPs and ensuring that employees are properly trained in the execution of those practices.
- The foreman will monitor activities visually and through employee chain-of-command.
- Employees will be routinely given specific jobs for which they are responsible on a daily basis. This will increases consistency and allow for effective monitoring of BMP effectiveness.
- Speed limits will be controlled by signage and worker behavior modification.

Compliance with Glenn County Air Pollution Control District

The Glenn County EIR Confined Animal Facilities (CAF) Element lists four goals for CAFs:

CAF 1: Attraction of new confined animal facilities to Glenn County

CAF 2: Protection of established confined animal facilities from encroachment by incompatible land uses

CAF 3: Facilitation of County and State regulatory processes for permitting of confined animal facilities

CAF 4: Protection of the environment and residents from the potential impacts of confined animal facilities

The CAF Element lists policies adopted by Glenn County that will support the goals listed above. Goals CAF 3 and CAF 4 include policies related to air quality. These specific policies and the method in which Mission Livestock is complying with those policies are discussed below.

Goal CAF 1

The change in use from a dairy to a feedlot is retention of an existing CAF in Glenn County. There is no planned expansion in number of animal units; in fact, the feedlot will generally carry fewer animal units than were found at the dairy.

The feedlot will continue to compost manure onsite and will mix the manure with almond waste for use on adjacent orchards. No fields will be farmed, thus reducing in-field dust impacts.

Stormwater collected during the winter and water from onsite wells will be used to assist in dust control. In addition, feedlot cattle are not moved daily for milking, so movement dust will be eliminated.

Policy CAF 3.5: *Glenn County shall encourage applicants to develop project designs and management plans using Best Management Practices available from government, university extension, and industry association sources.*

Compliance Measures: The plans presented in this technical report (including the Dust Control Plan) employ BMPs gleaned from government, university, and industry association sources. These sources include, but are not limited to, the California EPA; University of California, Davis Cooperative Extension; Glenn County EIR Confined Animal Facilities Element; and Texas A&M University.

Policy CAF 3.10: *Glenn County shall support the appropriate ongoing regulatory and compliance activities of the California Air Resources Board with respect to "large confined animal facilities" as defined by the Air Resources Board.*

Compliance Measures: The California Air Resources Board (CARB) regulates and manages air quality for the state. CARB oversees the County Air Pollution Control districts (APCDs), including the Glenn County Air Pollution Control District (GCAPCD), through state standards, research, planning and coordination activities. Glenn County's General Plan contains goals and policies that support CARB regulations, and the Confined Animal Facilities (CAF) Element includes specific information on the contribution of air pollutants by CAFs. Included in this Technical Report for the Conditional Use Permit application package, Mission Livestock will include (as required by the Glenn County CAF Element) both a Dust Control Plan and Odor Control Plan. As fugitive dust is the main source of PM_{10} from CAFs, the Dust Control Plan fulfills the CGAPCD's requirements for PM_{10} emission mitigation.

Policy CAF 3.11: *To facilitate compliance with air quality regulations, all applications for new confined animal facilities and expansions of confined animal facilities that require a Minor Use Permit or Conditional Use Permit shall include a Dust Control Plan as part of the Technical Report (see CAF 3.4).*

Compliance Measures: Although the feedlot is a continuing CAF operation, Mission Livestock has submitted an application for a Conditional Use Permit.

Goal CAF 4

Policy CAF 4.6: *Production facilities for new or expanding confined animal facilities requiring a Minor Use Permit or Conditional Use Permit may not be located within urban windsheds. The urban windshed shall be defined as an area around urban limit lines, as denoted in the Glenn County General Plan, that is one mile in the direction of prevailing winds and one-half (1/2) mile in any other direction from urban limit lines.*

Compliance Measures: The facility is in an area zoned for Extensive Agriculture. The closest urban area is 2.5 miles from the site.

Policy CAF 4.7: *Production facilities for new or expanding confined animal facilities requiring a Minor Use Permit or Conditional Use Permit may not be located within the windshed of existing public or private school sites, medical or nursing care facilities, or concentrations of five or more residences. The windshed shall be defined as an area that is one mile in the direction of prevailing winds and one-half (1/2) mile in any other direction from existing public or private school sites, medical or nursing care facilities, or concentrations of five or more residences.*

Compliance Measures: The facility is in an area zoned for Extensive Agriculture. The closest urban area is 2.5 miles from the site.

Policy CAF 4.8: *Production facilities for new or expanding confined animal facilities requiring a Minor Use Permit or Conditional Use Permit may not be located less than a one-half (1/2) mile from Interstate 5.*

Compliance Measures: The facility is located 0.5 miles from Interstate 5.

Policy CAF 4.9: *To minimize the public nuisances caused by odors, dust, flies, vectors, and excessive light and glare, all applications for new confined animal facilities and expansions of confined animal facilities that require a Minor Use Permit or Conditional Use Permit shall include an Odor Control Plan; a Dust Control Plan; a Dead Animal Management Plan, a Pest and Vector Control Plan; and a Light and Glare Control Plan (see CAF 3.4).*

I ODOR CONTROL PLAN

Open-lot animal facilities, such as feedlots, can be significant sources of odor emissions. Because odor particles disperse quickly and are diluted within short distances of the source, odor is considered to be a nuisance as opposed to a health risk (Glenn County Confined Animal Facilities Element 2005). As odor emission is considered a nuisance and therefore a land-use issue, it is regulated at the local level.

It is difficult to measure the human health effects of odor exposure as they can manifest both psychologically and physiologically. The Glenn County Confined Animal Facilities Element lists the following reasons why it is difficult to evaluate odor and its health effects:

- Psychological and physical health effects are not necessarily independent.
- Odor from livestock is made up of about 160 compounds. Humans have many and varied responses to these compounds.
- The proportion and characteristics of odor contributed by each of the primary sources (barns, storages and land application) are not well understood. Research is underway to characterize odors released from each of these sources.
- Odor intensity and offensiveness vary between individuals.
- Combining different odor compounds can have positive and negative effects on odor's intensity and offensiveness. These effects are not easily predicted. Eliminating all odor from livestock operations is not feasible; however, there are management practices that can control odor with reasonable limits. Odor mitigation practices should strive to reduce the nuisance to neighbors, by minimizing the frequency, intensity, duration and offensiveness of odors.

The Glenn County Confined Animal Facilities Element (May 2005) states: "*Odor is generally considered more of a nuisance than a health risk to neighbors …*" Because of this possibility of creating a nuisance, Mission Livestock is taking steps to lessen any odor source from the proposed facility. This Odor Control Plan (OCP) discusses the potential for odor emissions and the BMPs used by Mission Livestock to control emissions. In addition, Mission Livestock management will always

respond to neighbors that may be adversely affected by odors and will take prompt corrective action if possible.

Wind Direction Seasonality: Mission Livestock is located on County Road 27 which runs east and west, with the two closest neighbors residing on the west side of the ponds and feedlot facility. According to the May 2005 Glenn County Confined Animal Facilities Element, wind direction is primarily north and south due to the channeling effect of the mountain ranges on either side of the valley. During the summer months surface air movement is primarily from the south, mainly in the afternoon hours. During the winter months the wind direction may be more variable. A wind rose is included as Figure 9.

The highest risk period for odor production would be afternoons in the summer months of July and August when the ambient temperature has an average high of 94 degrees and the wind picks up and blows from the south.

Identification of Odor Emission Sources: The main sources of odor are related to manure handling, collection and storage, and livestock handling. The main principle of odor control is avoiding anaerobic conditions by keeping (a) the moisture content of manure and other organic materials minimized, (b) manure storages and surfaces exposed to oxygen, and (c) corral surfaces hard, smooth, and free of uncompacted manure for livestock handling to reduce dust with movement.

In addition to manure management, confined animal feedlots can mitigate odor emissions through proper animal handling, mortality management, controlling fugitive dust and controlling elements in the ration (feed) that can lead to excess odors.

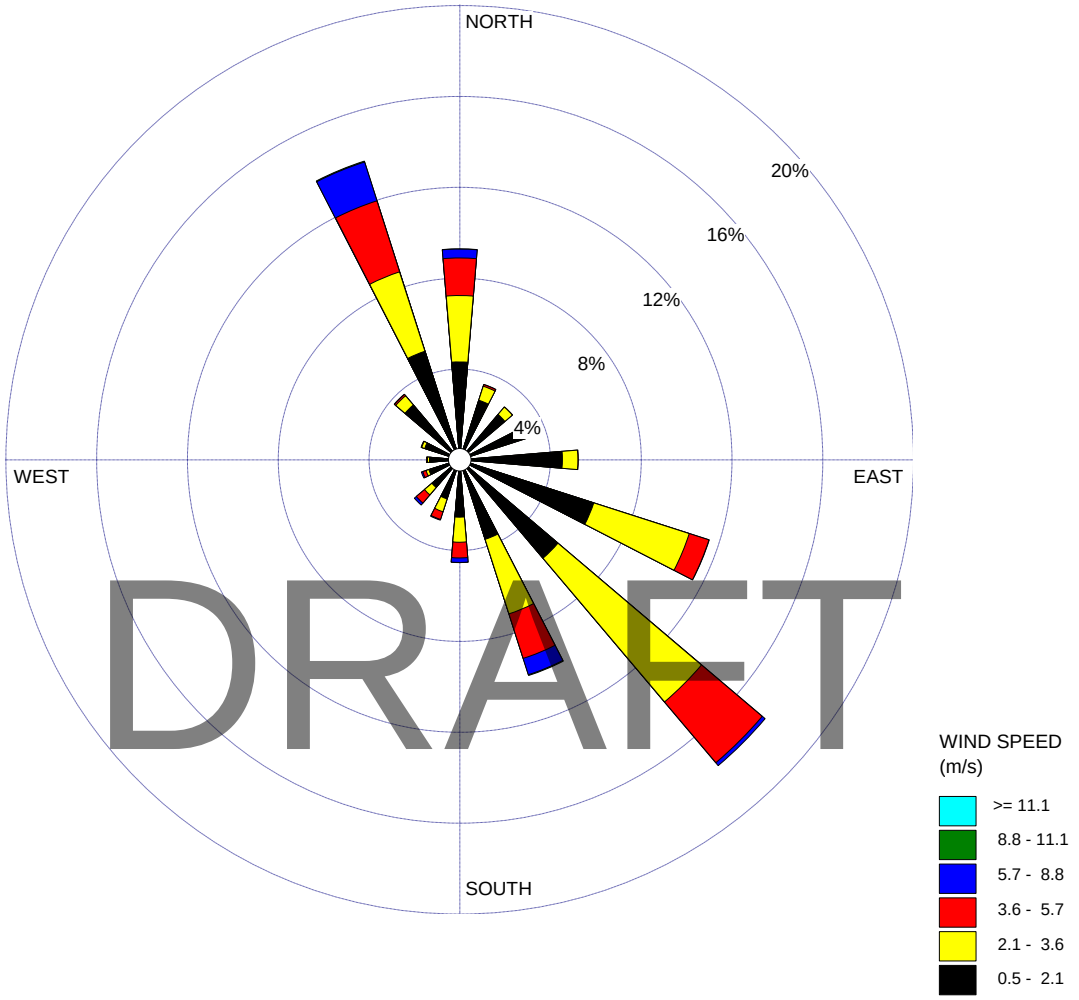
Manure Collection: Manure in the holding corral and feed and traffic lanes will be controlled by routine removal. Manure will be vacuumed or scraped from barns daily. Manure will be removed and windrowed to be composted. Composting is usually conducted onsite and will continue. Manure will remain as dry as possible to reduce odor impacts.

BMPs to be implemented are as follows:

- Feed and traffic lanes will be scraped or vacuumed daily to prevent manure buildup and keep cows clean.
- Manure generated will be arranged for drying that expedites drying and oxygen exposure.

Manure management practices in the open loafing pens alter slightly between winter and summer and vary depending upon the amount of rainfall. The normal routine has the manure being collected with a pull-type box scraper to one edge of the loafing pen in a long windrow. The next day, the corral is scraped and the manure is moved to the opposite edge of the pen. This routine creates a drying mechanism as well as serves to level out the pen daily. The freestalls and open loafing area are raked and turned two times daily. Mission Livestock will commit one and a half workers each day to manure management and good housekeeping practices.

WIND ROSE PLOT:	DISPLAY:
Station #99032	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	1993 1994 1996 1997 **Jan 1 - Dec 31** **00:00 - 23:00**	MODELER:	
	CALM WINDS: **3.93%**	TOTAL COUNT: **35064 hrs.**	
	AVG. WIND SPEED: **2.37 m/s**	DATE: **7/15/2003**	PROJECT NO.: **.993, 1994, 1996, 199**

VESTRA

SOURCE: STATION 99032, COLUSA CIMIS STATION

FIGURE 9
WIND ROSE
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_WindRose.docx

Once the weather dries, manure will be utilized in the same manner as in the summertime. It will be windrowed for drying and composted for use on almonds or as dry bedding in the freestalls or be sold to other agricultural operations for their use as a natural fertilizer.

BMPs to be used are as follow:

- Pens will be scraped daily with a pull-type scraper; pull-type scrapers clear manure and keep the surface level, unlike push-type scrapers that can gouge the surface, inhibiting the water-shedding ability of the corrals.
- Manure spills occurring during transport between corrals and the storage area will be cleaned up immediately.
- Corrals will be sloped to improve drainage and keep moisture at acceptable levels (a proper balance of moisture is maintained to minimize fugitive dust emissions, without causing odor and/or pest issues).
- Freestalls (bedding areas) will be scraped or vacuumed daily to collect manure to keep bedding materials as dry as possible. This in turn will keep the cows as clean and dry as possible.
- Manure will be windrowed and composted in an area behind the barns. The area will be paved to expedite drying and exposure to oxygen.
- Stored manure will be checked frequently for moisture content and spread and turned to minimize moisture.

Livestock Handling: The manner in which the cattle are handled can have several effects on odor emissions:

- Moving cows in the feedlot will be minimal to reduce odor and dust emissions.
- Dirty and/or persistently wet cattle serve as a source of odor (dirty cattle also lead to fugitive dust emissions, which can carry odor particles into the atmosphere).
- Cows playing and kicking-up dust in the corrals disperse odor particles into the air.

Cattle will be handled in a slow and sedate manner to not only lessen stress and the chance of injury, but to minimize the tracking and kicking-up of manure (and fugitive dust) and to keep the cows as clean as possible. Keeping the cattle dry and clean is the best housekeeping method for control of odors.

BMPs to be used are as follow:

- Cows will be moved slowly and calmly.
- Freestalls and open corrals will be cleaned, raked, and turned in the cattle's absence.

Manure Treatment and Application: Freestall areas will generally be scraped or vacuumed to remove manure; not flushed. The only flushing that may occur is in late winter when wastewater ponds have filled with stormwater. Ponds are to be used only for the

collection of site stormwater that contacts cattle areas. Stormwater stored in the ponds will be used for composting, dust control, and rare flushing events.

The feedlot will be using only the portions of the facility "dairy proper." No land application of wastewater to fields will occur, thus eliminating this odor source.

BMPs to be used are as follow:

- Separator and ponds will be kept in good working order and checked on a daily basis.
- Solids will continue to be removed from stormwater by the separator.
- Passive biological decomposition in the ponds will assist in alleviating odors.

Fugitive Dust Control: Mission Livestock employs a Dust Control Plan to mitigate fugitive dust emissions. Fugitive dust can serve as a carrier for odorous compounds (Glenn County Confined Animal Facility Element). The Dust Control Plan uses a variety of BMPs to control dust emissions, including manure management, graveling of unpaved roads, and revegetation of unused areas. The main predictor of dust and odor emissions is the moisture content of open corrals/loafing areas. Low moisture content leads to dust emissions, while higher moisture content can cause odor problems. Mission Livestock will strive to maintain that balance of moisture that keeps fugitive dust to a minimum, without leading to odor emissions.

J TRAFFIC ANALYSIS

Routes to be Used: The feedlot is located at 6569 County Road 27. General site location was included on Figure 1. The site is bordered by County Road 27 to the north (cropland belonging to the site is located north of County Road 27) and by State Route 99W to the west. Slightly farther west is Interstate 5.

County Road 27, from the west end to State Route 99W, is designated by the Glenn County General Plan as a Rural Major Collector (Glenn County 2005). The forecasted annual daily traffic average for that portion of road is 1,000 vehicles per day and is designated as Level of Service B.

County Road 25, from County Road C to State Route 99W, is designated as a Rural Minor Collector. This portion of road has a forecasted annual daily traffic average of 400 vehicles per day and is designated as Level of Service A.

County Road 28, from the west end to State Route 99W, is designated as a Rural Local Road. This segment of road has a forecasted annual daily traffic average of 150 vehicles per day and is designated as Level of Service A.

A summary of roadway designations and levels of service (derived from Glenn County 2005 Final Regional Transportation Plan) are included in Table 9. Table 10 includes descriptions of designations and level of service codes.

Table 9 NEARBY ROADWAY DESIGNATIONS[1]					
Roadway Name	**From**	**To**	**Roadway Classification**	**Existing (2005) Average Daily Traffic (# of Vehicles)**	**Existing (2005) Level of Service**
County Road 27	West End	SR 99W	Rural Major Collector	400	A
County Road 25	Road C	SR 99W	Rural Minor Collector	400	A
County Road 28	West End	SR 99W	Rural Local Road	150	A
State Route 99W	County Road 33	Road 27	Rural Minor Arterial	2,075	A
State Route 99W	County Road 27	Road 17 ½ (South Orland)	Rural Minor Arterial	2,500	B
[1]Source: Glenn County 2005 Final Regional Transportation Plan					

Table 10 LEVEL OF SERVICE DESCRIPTIONS[1]	
Level of Service	**Description**
A	Represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Speed is controlled by drivers' desires, stipulated speed limits, or physical roadway conditions.
B	Stable flow, but the presence of others in the traffic stream begins to be noticeable. Speeds begin to be restricted; little or no restrictions on maneuverability from other vehicles.
C	Stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by the interactions with others in the traffic stream. Speeds and maneuverability more closely restricted; occasional backups behind left-turning vehicles at intersections.
D	Conditions approach unstable flow; tolerable speeds can be maintained but temporary restrictions may cause extensive delays; little freedom to maneuver; comfort and convenience low; at intersections, some motorists, especially those making left turns, may wait through one or more signal changes.
E	Represents operating conditions at or near the capacity level. Unstable flow with stoppages of momentary duration; maneuverability severely limited.
F	Represents forced breakdown of flow. Stoppages for long periods; low operating speeds. Delays at intersections average 60 seconds or more.
[1]Source: Glenn County 2005 Final Regional Transportation Plan	

Current feedlot traffic includes delivery trucks, feed trucks, employee trips, and offsite transport of manure. The current traffic to and from the feedlot results in fewer than 32 vehicle trips per day, half of which is mostly traveling the short distance on County Road 27 to SR 99W or Interstate 5. Half of the 32 vehicle trips per day are passenger vehicles bringing employees to and from the site.

Feed Truck: Cattle feed is supplied by offsite sources. Loads of grain and hay are brought into the feedlot from outside sources. These loads are trucked in via Interstate 5 and State Route 99 W, and the portion of County Road 27 between the dairy and these arterial roads. The feedlot currently requires an average of 1 loads of hay and 1 loads of grain per day, equaling 5 total vehicle trips per day. This is less than the previous dairy facility.

Employee Trips: Current staff includes 6 full-time, and 2 part-time employees. There are two 8 hour shifts, and each employee gets 1 day off a week (several employees get 2 days off a week). A total of 8 employees work at the dairy in any given 24-hour period. We can determine that at the most staff generate approximately 16 vehicle trips per day, both north and south of County Road 27 on State Route 99W.

K BIOLOGICAL RESOURCES

The site is developed as a dairy and has operated as a dairy since 2001. The property is developed and disturbed. The California Natural Diversity Database (CNDDB) was reviewed and the results are included on Figure 10. Species that have been observed in the vicinity of the site are shown in Table 11.

Table 11
CNDDB OBSERVED SPECIES

Common Name	Scientific Name	Federal Listing	California Listing
Burrowing owl	*Athene cunicularia*	None	None
Crotch bumble bee	*Bombus crotchii*	None	Candidate Endangered
Swainson's hawk	*Buteo swainsoni*	None	Threatened
Tricolored blackbird	*Agelaius tricolor*	None	Threatened
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	None

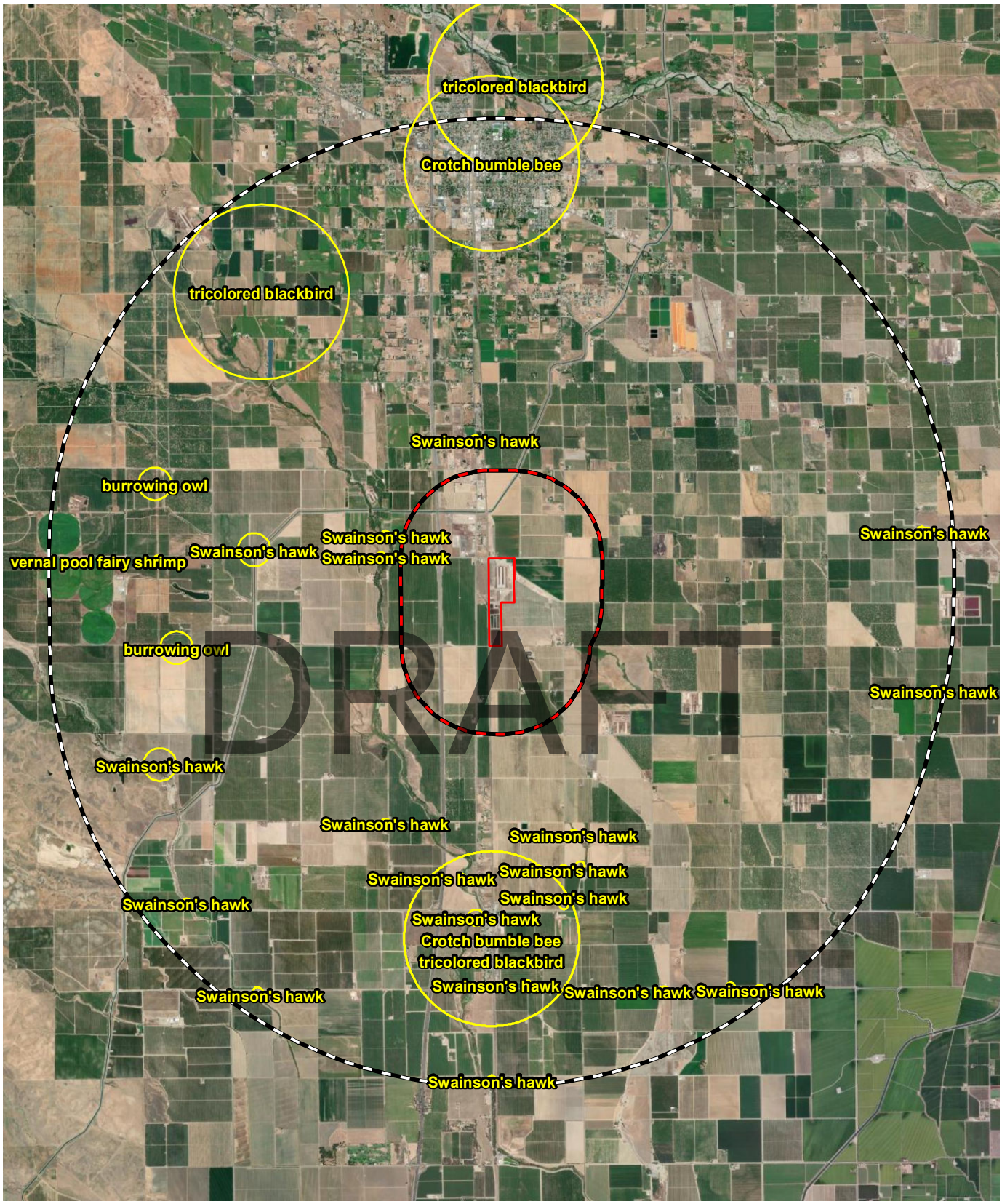
Special-Status Species: No populations of special-status plant species have been recorded in the CNDDB as occurring in the vicinity of the previous dairy. The graded and exposed soil and the lack of vegetation cover on the site of the dairy barns, intervening soil areas, and manure-treatment ponds preclude the presence of any special-status plants.

The special-status plant species known to occur in Glenn County are all associated with specific habitat conditions:

- Serpentine soils
- Chaparral vegetation
- Alkaline flats playas and meadows
- Vernal pools
- Adobe soils
- Dry talus slopes
- Bogs
- Volcanic soils
- Riverbanks, ditches
- Freshwater marsh

With the exception of ditches, these habitat conditions do not occur within the project site. Oregon fire weed *(Epilobium oreganum)* is known from small streams and ditches at elevations from 1600 to 2133 feet, a higher topographic elevation than that of the dairy property (approximately 200 feet). No potential habitat for the other species listed occurs on the site. The project, therefore, is not expected to impact special-status plant species.

A number of special-status animal species have been reported from undeveloped grasslands, wetlands, riparian forest, lakes, rivers, and coniferous forests within Glenn County per the CNDDB. These include:



CNDDB Occurrence
Lease Boundary
1-Mile Buffer Around Lease Boundary
5-Mile Buffer Around Lease Boundary

VESTRA

0 0.75 1.5 3 Miles

SOURCE: DIGITALGLOBE 2018 AERIAL PHOTOGRAPH; CDFW CNDDB MARCH 2020

FIGURE 10
CNDDB OCCURRENCES
MISSION LIVESTOCK
GLENN COUNTY, CALIFORNIA

P:\GIS\72007 Mission Livestock\Figures\TechnicalReport\72007_CNDDB.mxd

- Vernal Pool Fairy Shrimp
- Valley Elderberry Longhorn Beetle
- Foothill Yellow-Legged Frog
- Giant Garter Snake
- Northern Goshawk (nesting colony)
- Tricolored Blackbird
- Burrowing Owl
- Swainson's Hawk
- Western Yellow-Billed Cuckoo
- Bald Eagle (nesting and wintering)
- Osprey (nesting)
- Bank Swallow (nesting)
- Great Gray Owl (nesting)
- Northern Spotted Owl
- Pacific Fisher

The site does not contain vernal pools, elderberry, streams or rivers, rice fields adjacent to irrigation ditches, coniferous forest trees, riparian habitat, or old-growth forest. The animal species having the best potential to use the site, however, are Swainson's hawk, burrowing owl, and tricolored blackbird.

Swainson's hawks forage in grasslands, irrigated meadows, and agricultural fields that support rodent populations, but nest in trees near these areas. There are few trees on the site of the dairy barns and ponds, but the few eucalyptus trees adjacent to Road 27 and at the intersection of Road 25 and Road M could provide suitable nesting habitat. These trees would not be removed or impacted by continual usage of the facility; therefore, no impacts to potential Swainson's hawk nest sites are anticipated. The property does not contain a foraging habitat.

Burrowing owl burrows have been recorded within creek banks and drainage berms in areas east of the Orland Buttes and southwest of the town of Orland. The closest recorded burrowing owl site is located approximately 4.5 miles southwest of the project site. Additional grading for the additional freestall barns and manure/process water treatment ponds could eliminate California ground squirrel habitat and therefore potential burrows for the burrowing owl. The agricultural drainage ditches along Road M, the eastern portion of Road 27, and other ditches may also provide suitable habitat. These ditches remain under current use and no modification of these structures is anticipated. Operation of the feedlot will not affect potential habitat for burrowing owl nesting.

The tricolored blackbird requires open water and freshwater marsh habitat near grassland or agricultural cropland foraging areas. Tricolored blackbirds usually nest in dense cattails or tules and in thickets of willow, blackberry, wild rose, and tall vegetation. The nest is usually a few feet over or near fresh water, but may be hidden on the ground among low-growing vegetation. The species is highly colonial and the nesting area must be large enough to support a minimum colony of about 50 pairs (Grinnell and Miller 1944). Nesting habitat for tricolored blackbird is not present within the improved portion of the project site containing the dairy barns and manure treatment ponds. Agricultural ditches in other portions of the property may have scattered clumps of cattails, but the small size and isolated pattern of plants do not provide the optimum habitat conditions to support nesting colonies of the blackbird. No impacts to tricolored blackbird nesting habitat or colonies are anticipated as a result of the feedlot facility.

L CULTURAL RESOURCES

A survey of records at the California Historic Resources Information Services, conducted prior to the original construction of this facility in 2000, did not identify any recorded archaeological resources at or adjacent to the site. Therefore, the feedlot would not result in any changes to known archaeological resources. Agricultural grading and existing activities over many years have modified the entire surface of the project site. If archaeological resources were present at the surface (or within 3 feet of the surface), they have likely been disturbed. Previous grading for construction of the facility and process water ponds is complete. However, it is possible that unknown archaeological resources are present in areas of the site that have not been excavated.

The site does not contain unique geologic features. The site is located on the relatively uniform surface of the expansive Stony Creek alluvial fan. The surface is relatively flat and has been modified by agricultural grading. It is possible that the deposits of the fan contain fossils of Pleistocene flora and fauna. However, the sediments of the fan were deposited in an active alluvial setting. Therefore, the occurrence of articulated remains of animals is not likely. The potential for paleontological resources would be similar to that expected at any location on the Stony Creek alluvial fan. Therefore, such resources would not be considered unique.

The site does not include any known or formal cemeteries. The site is within a rural agricultural area and no known farmsteads are present in facility area. The potential for encountering human remains during continued excavation is low. However, such remains may be present if unknown archaeological remains are encountered.

M LIGHT AND GLARE CONTROL PLAN

The proposed project does not include any new or additional lighting that would affect the night sky. Lighting for barns is protected by roofs and/or enclosures, and any outside lighting used around the buildings is directed at the ground or building and not at adjoining properties. Minimal lighting is used for nighttime activities and extreme care is taken to preserve the night sky and protect neighboring properties from glare resulting from outside lighting.

N REFERENCES

Auvermann, Brent. 2001. Lesson 42: *Controlling Dust and odor from Open Lot Livestock Facilities, Livestock and Poultry Environmental Stewardship Curriculum*. MidWest Plan Service, Iowa State University, Ames, Iowa.

DWR (California Department of Water Resources). Water Data Library. *California Department of Water Resources* [online]. Available at <http://well.water.ca.gov>.

DWR. 2003. California's Groundwater. California Department of Water Resources. Bulletin 118-03.

DWR. 1978. Evaluation of Groundwater Resources: Sacramento Valley. Department of Water Resources in cooperation with the United States Geological Survey. Appendix B. Bulletin 118-6.

FIRM (Flood Insurance Rate Map), August 5, 2010, Glenn County, Panel 400 of 900, Community Panel No. 06021C0400D.

Glenn County General Plan. 2005 Final Regional Transportation Plan. Chapter II – Needs Assessment.

Grinnell, J. and A.H. Miller. 1944 The Distribution of the Birds of California. Pac. Coast Avifauna No. 27, 608 pp.

Kleinfelder, Inc. 2001. *Geotechnical Investigation Report Proposed Verboom Dairy Ponds, Orland, California.* March 6, 2001.

NOAA. Precipitation Frequency Data Server. Atlas 14, Volume 6 Version 2 Orland Station ID: 04-6506. 25 year 24 hour storm precipitation. https://hdsc.nws.noaa.gov

RWQCB. Regional Water Quality Control Board Order R5-2017-0058 *Waste Discharge Requirements General Order for Confined Bovine Feeding Operations.*

SWRCB. State Water Resources Control Board Order WQ-2015-0121 DWQ *General Waste Discharge Requirements for Composting Operations.*

U.S. Department of Agriculture, Soil Conservation Service. Soil Survey, Glenn County, California.

U.S. Environmental Protection Agency. 1998. *Emission Factor Documentation for AP-42, Section 13.2.2, Unpaved Roads, Final Report.* Available at: http://www.epa.gov/ttnchie1/ap42/ch13/bgdocs/b13s02-2.pdf

U.S. Environmental Protection Agency. 2000. *Profile of the Agricultural Livestock Production Industry.* [cited 1 March 2006]. Available from World Wide Web at <http://www.epa.gov>.

U.S. Environmental Protection Agency. 2004. *Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Small Units).* [cited 1 March 2006]. Available from World Wide Web at <http://www.epa.gov>.

VESTRA 2020a. Waste Management Plan, Mission Livestock, Orland, California, Order No. R5-2017-0058. VESTRA Resources, Inc. 2020.

VESTRA 2020b. Groundwater Monitoring Report, First Semi-Annual 2020 and Final Site Closure. Prepared by VESTRA Resources, Inc., for Greenwood Dairy. July 2020.

VESTRA 2007. Greenwood Dairy Expansion, Conditional Use Permit Application and Submittal Package. Prepared by VESTRA Resources, Inc., for Greenwood Dairy. August 2007.

WRCC (Western Regional Climate Center). 2005. *Historical Climate Information,* [cited May 2006]. Available from World Wide Web: http://www.wrcc.dri.edu.

DRAFT

Appendix A

Historical Groundwater Data

Appendix B-1
MONITORING WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	pH (units)	EC (umhos/cm)	Alk. (mg/l)	OH (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	TKN (mg/l)	NH3-N (mg/l)	Total P (mg/l)	Total Coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)	Fe (mg/l)	Ca (mg/l)	Mg (mg/l)	Mn (mg/l)	K (mg/l)	Na (mg/l)	NH4 (mg/l)
MW-1	1/14/03	7	580	--	--	250	<0.1	22.4	31	48	380	< 1	--	--	--	--	--	36	37	--	--	22	--
	12/19/03	6.9	590	--	--	226	<0.1	30.2	--	52.8	360	< 1	--	--	--	--	--	40	37	--	--	22	--
	1/6/05	7	570	--	--	268	<0.1	23.1	--	43.2	330	< 1	<0.02	--	--	--	--	32	32	--	--	23	<0.02
	8/2/05	6.9	559	209	<2	255	<0.1	24	7	37.4	373	1.6	<0.02	<0.02	<2	<2	110	49	64	2.25	12	12	<0.02
	9/21/06	6.9	558	203	<5	248	<5	24.8	8.91	43.1	395	2.7	0.15	5.24	17	17	153	50	45	3.91	2	24	0.16
	5/31/07	7.20	494	220	<5.0	268	<0.10	20	6.5	36	410	3.6	<0.2	2.6	<2	<2	410	93	190	8.8	8.5	26	<0.2
	12/28/07	7.76	590	203	<1	247	<1	20.4	7.23	37.8	--	--	0.32	--	--	--	--	63	69	--	4	27	0.34
	5/28/08	6.81	461	213	<1	260	<1	20	6.26	38	--	--	2.2	--	--	--	--	68	91	--	17	28	2.33
	12/2/08	6.23	563	280	<1	342	<1	15.9	10.3	32	450	--	0.8	87.8	--	--	--	247	419	--	45	36	0.85
	5/29/09	6.96	676	DRY																			
	11/24/09	DRY																					
	5/12/10	6.94	466	--	--	--	--	--	7.18	--	420	--	0.27	3.46	--	<2	--	--	--	--	5.3	--	0.35
	12/13/10	7.07	415	210	<1	256	<1	18.8	7.10	35.3	422	--	0.05	3.04	--	<2	--	53	64	--	6.4	26	0.05
	6/9/11	6.64	502	--	--	--	--	--	7.14	--	360	--	0.05 J	4.12	--	<2	--	--	--	--	6.2	--	0.05 J
	12/2/11	6.88	523	207	<1	252	<1	19.5	6.71	34.8	443	--	<0.02	2.62	--	<2	--	57	70	--	6.3	24	<0.02
	5/16/12	DRY																					
	12/11/12	DRY																					
	5/7/13	DRY																					
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/17	6.78	642	--	--	--	--	--	9.23	--	424	--	<0.05	2.32	--	<2	--	--	--	--	16.8	--	<0.06
	12/18/17	DRY																					
	5/31/18	DRY																					
	12/13/18	DRY																					
	5/30/19	7.10	493	--	--	--	--	--	8.51	--	444	--	<0.02	1.47	--	<2	--	--	--	--	13.2	--	<0.0257
	12/17/19	7.60	560	197	<2	240	<2	25.9	9.32	31.8	390	--	<0.02	0.278	--	2	--	42.4	72.2	--	12.0	--	<0.0257
	5/29/20	DRY																					
MW-2	1/14/03	7	570	--	--	250	<0.1	24	31	42.2	370	< 1	--	--	--	--	--	38	34	--	--	19	--
	12/19/03	6.9	550	--	--	226	<0.1	31.2	--	41.3	320	< 1	--	--	--	--	--	40	28	--	--	19	--
	1/6/05	7	550	--	--	256	<0.1	24	--	41	330	< 1	<0.02	--	--	--	--	32	29	--	--	20	<0.2
	8/2/05	6.8	499	195	<2	237	<0.1	18.4	< 2	31.4	343	2.8	0.03	0.07	<2	<2	256	66	66	5.75	2	16	0.03
	9/21/06	6.9	489	196	<5	240	<5	20.1	6.47	31.8	327	1.6	0.2	2.7	<2	<2	91.2	44	39	1.72	2	20	0.21
	5/31/07	7.06	498	220	<1	264	<1.0	20	7.1	34	410	2	<0.2	2.6	<2	<2	240	68	110	4.3	6	22	<0.2
	12/28/07	7.21	561	217	<1	247	<1	20.4	7.23	37.8	--	--	0.3	--	--	--	--	92	112	--	6	26	0.32
	5/28/08	6.74	475	220	<1	268	<1	21.7	6.26	38	--	--	0.04 J	--	--	--	--	76	119	--	22	26	0.04 J
	12/2/08	DRY																					
	5/29/09	7.04	769	--	--	--	--	--	5.30	--	625	--	0.06	6.49	--	<2	--	--	--	--	8	--	0.06
	11/24/09	DRY																					
	5/12/10	6.72	816	--	--	--	--	--	6.30	--	657	--	<0.15	2.07	--	<2	--	--	--	--	5.2	--	<0.16
	12/13/10	6.88	677	425	<1	519	<1	56	5.14	31.1	612	--	0.05	6.69	--	<2	--	122	169	--	14.2	31	0.05
	6/9/11	6.37	595	--	--	--	--	--	6.99	--	400	--	0.05 J	2.06	--	<2	--	--	--	--	5.6	--	0.05 J
	12/13/11	6.70	838	313	<1	382	<1	33.8	7.47	32.2	453	--	0.04 J	0.38	--	<2	--	61	55	--	3.4	25	0.04 J

Appendix B-1
MONITORING WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	pH (units)	EC (umhos/cm)	Alk. (mg/l)	OH (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	TKN (mg/l)	NH3-N (mg/l)	Total P (mg/l)	Total Coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)	Fe (mg/l)	Ca (mg/l)	Mg (mg/l)	Mn (mg/l)	K (mg/l)	Na (mg/l)	NH4 (mg/l)
MW-2	5/16/12	6.90	828	--	--	--	--	--	5.05	--	499	--	<0.03	0.42	--	4	--	--	--	--	6.8	--	<0.03
	12/11/12	DRY																					
	5/7/13	6.62	1,092	--	--	--	--	--	2.64	--	792	--	0.11	0.52	--	2	--	--	--	--	5.1	--	0.15
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/16	6.62	1,499	--	--	--	--	--	8.17	--	937	--	<0.05	0.96	--	<2	--	--	--	--	10.9	--	<0.06
	12/18/17	DRY																					
	5/31/18	DRY																					
	12/13/18	DRY																					
	5/30/19	6.92	1,334	--	--	--	--	--	15.8	--	855	--	<0.02	1.34	--	<2	--	--	--	--	10.9	--	<0.0257
	12/17/19	DRY																					
	5/29/20	DRY																					
MW-3 [3]	1/14/03	7	1,200	--	--	732	<0.1	64	< 2	33.1	660	6	--	--	--	--	--	76	94	--	--	37	--
	12/19/03	6.8	1,150	--	--	610	<0.1	67.5	--	18.2	640	4.3	--	--	--	--	--	70	110	--	--	35	--
	1/6/05	6.8	1,030	--	--	610	<0.1	53.3	--	46.1	560	2.8	1.3	--	--	--	--	52	59	--	--	35	1.38
	8/2/05	6.5	1,193	565	<10	690	<0.1	72.3	< 2	28.1	668	9.6	7.16	<0.02	<2	<2	31	78	94	3.22	11	32	7.58
	9/21/06	6.8	1,290	671	<5	819	<5	82.4	0.04	17.6	794	9.8	3.89	2.08	>1,600	>1,600	8.21	89	111	3.99	19	44	4.12
	5/31/07	6.65	3,610	730	<1	841	<1.0	880	<1.5	35	2200	14	4.2	3.9	17	<2	130	310	250	11	34	450	4.45
	12/28/07	6.78	595	580	<1	265	<1	422	3.3	84.3	--	--	3.23	--	--	--	--	127	161	--	23	178	3.42
	5/28/08	6.71	1,348	722	<1	881	<1	142	0.43	21.2	--	--	--	--	--	--	--	106	129	--	24	64	--
	12/2/08	7.04	2,044	1,500	<1	1,830	<1	138	0.1	4.99	2,170	--	46.1	16.4	--	--	--	200	225	--	102	104	48.8
	5/29/09	7.35	2,254	--	--	--	--	--	0.07	--	2,890	--	20.2	5.34	--	13	--	--	--	--	48	--	21.4
	11/24/09	DRY																					
	5/12/10	6.77	1,947	--	--	--	--	--	<0.01	--	1,480	--	19.6	--	--	500	--	--	--	--	63.6	--	25.2
	12/13/10[1]	6.96	1,493	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	6/9/11[1]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	1/14/03	7.1	590	--	--	275	<0.1	31.2	25	30.2	340	< 1	--	--	--	--	--	60	23	--	--	23	--
	12/19/03	7	650	--	--	268	<0.1	27.3	--	37.9	380	< 1	--	--	--	--	--	68	26	--	--	25	--
	1/6/05	7	670	--	--	317	<0.1	30.9	--	39.4	380	< 1	<0.02	--	--	--	--	56	22	--	--	32	<0.02
	8/2/05	7	723	256	<2	312	<0.1	36.2	13	39.1	469	< 1	0.06	0.03	<2	<2	33.2	78	34	0.514	4	27	0.06
	9/21/06	7	671	261	<5	319	<5	38.5	11.8	47.8	459	0.1	0.08	0.98	7	<2	30.9	81	30	0.52	2	32	0.08
	5/31/07	7.19	544	12	<1	77	<1.0	25	6.9	36	400	<1.0	<0.2	3.9	<2	<2	97	250	95	4	<40	32	<0.2
	12/28/07	7.94	601	209	<1	255	<1	26.4	7.98	39.8	--	--	0.37	--	--	--	--	92	56	--	4	32	0.39
	5/28/08	6.87	560	245	<1	298	<1	29.8	9.3	43.1	--	--	0.07	--	--	--	--	96	70	--	15	34	0.07
	12/2/08	DRY																					
	5/29/09	7.45	653	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/24/09	DRY																					
	5/12/10	6.85	677	--	--	--	--	--	15.3	--	527	--	<0.15	0.80	--	2	--	--	--	--	5.3	--	<0.19
	12/13/10	6.83	532	276	<1	337	<1	34.2	8.66	43.1	484	--	<0.15	26.0	--	50	--	118	81	--	8.3	32	<0.16
	6/9/11	6.48	750	--	--	--	--	--	8.45	--	496	--	0.04 J	1.11	--	<2	--	--	--	--	4.0	--	0.04 J
	12/2/11	6.81	714	322	<1	392	<1	36.0	3.81	41.3	487	--	0.06	0.71	--	2	--	94	42	--	3.3	28	0.06
	5/16/12	DRY																					
	12/11/12	DRY																					

Appendix B-1
MONITORING WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	pH (units)	EC (umhos/cm)	Alk. (mg/l)	OH (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	TKN (mg/l)	NH3-N (mg/l)	Total P (mg/l)	Total Coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)	Fe (mg/l)	Ca (mg/l)	Mg (mg/l)	Mn (mg/l)	K (mg/l)	Na (mg/l)	NH4 (mg/l)
MW-4	5/7/13	DRY																					
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/17	6.53	1,043	--	--	--	--	--	16.8	--	666	--	<0.05	1.01	--	<2	--	--	--	--	18.7	--	<0.06
	12/18/17	DRY																					
	5/31/17	DRY																					
	12/13/18	DRY																					
	5/30/19	6.91	916	--	--	--	--	--	11.1	--	640	--	<0.02	6.05	--	30	--	--	--	--	11.7	--	<0.0257
	12/17/19	DRY																					
	5/29/20	DRY																					
MW-5	1/14/03	7	670	--	--	305	<0.1	31.2	34	43.7	370	< 1	--	--	--	--	--	42	39	--	--	39	--
	12/19/03	6.9	740	--	--	293	<0.1	39.1	--	52.8	390	< 1	--	--	--	--	--	46	43	--	--	39	--
	1/6/05	7	670	--	--	311	<0.1	32	--	47.5	400	< 1	<0.02	--	--	--	--	40	37	--	--	41	<0.02
	8/2/05	6.8	704	257	<2	313	<0.1	37.7	8	45.6	484	1.4	<0.02	<0.02	<2	<2	91.6	58	69	1.99	14	34	<0.02
	9/21/06	7	740	287	<5	351	<5	41.3	9.12	47.4	437	0.7	0.12	0.94	<2	<2	35.8	54	50	0.643	4	36	0.13
	5/31/07	7.90	554	260	<5	339	<1.0	27	6.4	38	410	<1.0	<0.2	2.7	<2								
	12/28/07	7.87	567	236	<1	288	<1	25.8	6.48	39.2	--	--	0.49	--	--	--	--	60	55	--	4	32	0.52
	5/28/08	6.79	502	206	<1	293	<1	24	6.42	35.9	--	--	0.08	--	--	--	--	67	69	--	15	32	0.08
	12/2/08	7.19	515	134	<1	164	<1	22.3	6.09	34.6	410	--	0.05	0.55	--	--	--	52	44	--	5	27	0.05
	5/29/09	7.17	576	--	--	--	--	--	5.15	--	391	--	0.04	0.48	--	<2	--	--	--	--	5	--	0.04
	11/24/09	7.09	570	241	<1	294	<1	22.3	5.36	33.9	390	--	0.21 J	2.88	--	<2	--	61	58	--	7	28	0.27 J
	5/12/10	6.82	560	--	--	--	--	--	10.7	--	487	--	0.06	4.72	--	<2	--	--	--	--	5.1	--	0.07
	12/13/10	6.89	473	244	<1	298	<1	27.6	7.78	35.7	451	--	0.03 J	0.89	--	6	--	50	46	--	4.1 J	32	0.03 J
	6/9/11	6.40	619	--	--	--	--	--	7.26	--	401	--	0.04 J	1.07	--	<2	--	--	--	--	4.0	--	0.04 J
	12/2/11	6.66	678	277	<1	338	<1	30.6	7.04	38.8	433	--	0.03 J	0.30	--	<2	--	52	46	--	3.2	33	0.03 J
	5/16/12	6.97	1,031	--	--	--	--	--	2.39	--	--	--	<0.03	0.12	--	<2	--	--	--	--	3.2	--	<0.03
	12/11/12	6.75	807	293	<1	358	<1	29.3	5.09	33.1	406	--	0.05	0.10	--	<2	--	54	40	--	2.5	32	0.05
	5/7/13	6.75	1,190	--	--	--	--	--	3.80	--	811	--	0.48 J	1.71	--	30	--	--	--	--	4.4	--	0.62
	12/10/13	6.76	564	244	<1	298	<1	28.5	6.26	36.2	384	--	<0.03	0.09	--	<2	--	49	56	--	2.2	28	<0.03
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	6.82	1,142	584	<1	713	<1	68.4	<0.02	38.6	820	--	0.13	2.35	--	>1,600	--	104	81.1	--	5.6	58.3	--
	12/7/16	6.80	751	349	<1	426	<1	37.8	0.04 J	36.0	439	--	0.17	0.26	--	<2	--	58.3	44.9	--	4.6	39.2	0.22
	5/24/17	6.58	1,118	--	--	--	--	--	15.0	--	612	--	0.18	0.23	--	<2	--	--	--	--	6.0	--	0.23
	12/18/17	6.5	1,068	523	<2	638	<2	51.1	0.08	42.7	680	--	1.83	0.89	--	2	--	99.5	75.6	--	19.6	58.9	2.35
	5/31/18	6.91	1,677	--	--	--	--	--	<0.02	--	1,040	--	3.04	1.55	--	900	--	--	--	--	17.7	--	3.90
	12/13/18	DRY																					
	5/30/19	7.07	916	--	--	--	--	--	12.0	--	567	--	0.560	0.824	--	<2	--	--	--	--	8.2	--	0.720
	12/17/19	7.44	880	299	<2	364	<2	55.7	14.3	56.7	561	--	<0.02	1.08	--	4	--	67.4	60.9	--	6.1	38.1	<0.0257
	5/29/20	7.17	755	--	--	--	--	--	0.52	--	486	--	0.196	0.135	--	<2	--	--	--	--	6.8	--	--

Appendix B-1
MONITORING WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	pH (units)	EC (umhos/cm)	Alk. (mg/l)	OH (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	TKN (mg/l)	NH3-N (mg/l)	Total P (mg/l)	Total Coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)	Fe (mg/l)	Ca (mg/l)	Mg (mg/l)	Mn (mg/l)	K (mg/l)	Na (mg/l)	NH4 (mg/l)
MW-6	12/28/07	7.55	507	193	<1	235	<1	20	6.46	38.2	--	--	0.59	--	--	--	--	56	67	--	4	23	0.62
	5/28/08	6.87	444	206	<1	251	<1	19.8	6.39	19.8	--	--	0.05	--	--	--	--	58	73	--	14	24	0.05
	12/2/08	DRY																					
	5/29/09	7.21	544	--	--	--	--	--	5.66	--	282	--	0.07	1.07	--	2	--	--	--	--	5	--	0.07
	11/24/09	DRY																					
	5/12/10	7.10	477	--	--	--	--	--	6.99	--	375	--	0.20	3.42	--	<2	--	--	--	--	4.4	--	0.26
	12/13/10	6.96	408	209	<1	255	<1	17.9	6.11	33.3	383	--	0.05	3.22	--	7	--	58	72	--	6.7	24	0.05
	6/9/11	6.50	484	--	--	--	--	--	6.67	--	354	--	0.04 J	3.52	--	<2	--	--	--	--	4.4	--	0.04 J
	12/13/11	6.96	587	198	<1	241	<1	18.4	7.05	30.5	325	--	0.05	0.18	--	<2	--	41	40	--	2.5	21	0.05
	5/16/12	7.16	521	--	--	--	--	--	6.81	--	337	--	0.05	0.48	--	<2	--	--	--	--	5.1	--	0.05
	12/11/12	DRY																					
	5/7/13	6.76	516	--	--	--	--	--	7.58	--	407	--	<0.30	0.98	--	<2	--	--	--	--	3.8	--	<0.39
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/17	6.37	679	--	--	--	--	--	8.37	--	453	--	<0.05	0.97	--	<2	--	--	--	--	11.6	--	<0.06
	12/18/17	DRY																					
	5/31/18	DRY																					
	12/13/18	DRY																					
	5/30/19	7.05	622	--	--	--	--	--	12.4	--	489	--	<0.02	1.82	--	<2	--	--	--	--	11.1	--	<0.0257
	12/17/19	7.25	534	201	<2	245	<2	20.9	7.99	28.3	382	--	<0.02	1.39	--	<2	--	52.5	64.0	--	12.7	21.6	<0.0257
	5/29/20	DRY																					
MW-8	5/28/08	6.93	561	272	<1	331	<1	318	6.82	35.1	--	--	0.14	--	--	--	--	81	94	--	15	27	0.15
	12/2/08	DRY																					
	5/29/09	7.44	703	DRY																			
	11/24/09	DRY																					
	5/12/10	7.13	626	--	--	--	--	--	6.35	--	487	--	<0.15	0.93	--	<2	--	--	--	--	6.2	--	<0.19
	12/13/10	6.97	567	353	<1	431	<1	34.4	6.08	34.9	498	--	0.06	1.38	--	<2	--	80	72	--	5.7	27	0.06
	6/9/11	6.43	828	--	--	--	--	--	6.56	--	552	--	0.05	0.73	--	<2	--	--	--	--	4.4	--	0.05 J
	12/13/11	6.82	762	285	<1	347	<1	25.6	6.62	31.9	438	--	0.04 J	0.22	--	<2	--	58	44	--	3.0	22	0.04 J
	5/16/12	6.96	678	--	--	--	--	--	7.10	--	432	--	0.05	0.34	--	<2	--	--	--	--	3.8	--	0.05
	12/11/12	DRY																					
	5/7/13	6.79	695	--	--	--	--	--	7.66	--	407	--	<0.3	0.84	--	<2	--	--	--	--	5.6	--	<0.39
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/17	6.74	1,062	--	--	--	--	--	6.81	--	630	--	<0.05	3.40	--	<2	--	--	--	--	22.4	--	<0.06
	12/18/17	DRY																					
	5/31/18	DRY																					
	12/13/18	DRY																					

Appendix B-1
MONITORING WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	pH (units)	EC (umhos/cm)	Alk. (mg/l)	OH (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	TKN (mg/l)	NH3-N (mg/l)	Total P (mg/l)	Total Coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)	Fe (mg/l)	Ca (mg/l)	Mg (mg/l)	Mn (mg/l)	K (mg/l)	Na (mg/l)	NH4 (mg/l)
	5/30/19	DRY																					
	12/17/19	DRY																					
	5/29/20	DRY																					
MW-9	5/28/08	7	479	220	<1	268	<1	23.3	6.77	37	--	--	0.04 J	--	--	--	--	77	100	--	18	26	0.04 J
	12/2/08	7.82	524	244	<1	297	<1	21.8	5.88	35.5	405	--	0.42	19	--	--	--	315	634	--	74	36	0.44
	5/29/09	7.14	730	--	--	--	--	--	1.42	--	479	--	0.08	0.91	--	<2	--	--	--	--	5	--	0.08
	11/24/09	DRY																					
	5/12/10	7.31	669	--	--	--	--	--	5.61	--	524	--	0.25	3.05	--	<2	--	--	--	--	4.3	--	0.32
	12/13/10	7.16	534	329	<1	402	<1	27.9	5.02	32.8	455	--	0.04 J	0.75	--	<2	--	78	55	--	3.8 J	27	0.04 J
	6/9/11	6.65	692	--	--	--	--	--	6.02	--	461	--	0.03 J	1.00	--	<2	--	--	--	--	2.8	--	0.04 J
	12/13/11	6.87	791	307	<1	374	<1	26.0	5.94	31.6	484	--	0.04 J	0.67	--	<2	--	91	100	--	8.7	26	0.04 J
	5/16/12	6.92	668	--	--	--	--	--	6.35	--	431	--	0.05	0.65	--	<2	--	--	--	--	7.9	--	0.05
	12/11/12	DRY																					
	5/7/13	6.71	676	--	--	--	--	--	7.47	--	477	--	<0.3	1.14	--	<2	--	--	--	--	3.5	--	<0.39
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/17	7.08	914	--	--	--	--	--	6.44	--	589	--	<0.05	0.86	--	<2	--	--	--	--	10.1	--	<0.06
	12/18/17	6.9	818	384	<2	469	<2	30.0	6.95	32.7	578	--	<0.05	18.7	--	<2	--	263	431	--	58.5	34.1	<0.06
	5/31/18	DRY																					
	12/13/18	DRY																					
	5/30/19	7.28	886	--	--	--	--	--	6.71	--	592	--	<0.02	0.564	--	<2	--	--	--	--	5.6	--	<0.0257
	12/17/19	7.44	852	379	<2	462	<2	32.2	6.83	31.3	563	--	<0.02	0.960	--	<2	--	102	79.0	--	9.2	26.9	<0.0257
	5/29/20	7.21	812	--	--	--	--	--	6.97	--	647	--	<0.02	3.65	--	<2	--	--	--	--	15.0	--	--
MW-10	5/28/08	6.97	464	208	<1	254	<1	20	11.9	33.2	--	--	0.07	--	--	--	--	68	90	--	18	26	0.07
	12/2/08	DRY																					
	5/29/09	7.86	352	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/24/09	DRY																					
	5/12/10	7.00	351	--	--	--	--	--	10.8	--	311	--	0.26	6.04	--	4	--	--	--	--	17.6	--	0.33
	12/13/10	6.91	335	158	<1	193	<1	5.84	5.73	15.0	308	--	<0.15	3.77	--	300	--	76	121	--	15.9	17	<0.16
	6/9/11	6.61	480	--	--	--	--	--	11.3	--	361	--	0.23	6.22	--	1,600	--	--	--	--	18.3	--	0.23
	12/13/11	6.87	517	165	<1	202	<1	10.2	13.8	15.8	359	--	0.16	1.34	--	30	--	60	120	--	22.7	17	0.17
	5/16/12	DRY																					
	12/11/12	DRY																					
	5/7/13	DRY																					
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/17	6.79	333	--	--	--	--	--	10.1	--	334	--	0.17J	10.3	--	17	--	--	--	--	90.1	--	0.22
	12/18/17	DRY																					

Appendix B-1
MONITORING WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	pH (units)	EC (umhos/cm)	Alk. (mg/l)	OH (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	TKN (mg/l)	NH3-N (mg/l)	Total P (mg/l)	Total Coliform (MPN/100ml)	Fecal Coliform (MPN/100ml)	Fe (mg/l)	Ca (mg/l)	Mg (mg/l)	Mn (mg/l)	K (mg/l)	Na (mg/l)	NH4 (mg/l)
MW-10	5/31/18	DRY																					
	12/13/18	DRY																					
	5/30/19	6.95	667	--	--	--	--	--	16.4	--	504	--	1.35	25.9	--	900	--	--	--	--	75.2	--	1.74
	12/17/19	DRY																					
	5/29/20	DRY																					
MW-11	5/28/08	6.56	910	463	<1	565	<1	86.2	2.67	86.2	--	--	0.13	--	--	--	--	94	133	--	22	45	0.14
	12/2/08	DRY																					
	5/29/09	7.17	1,118	--	--	--	--	--	5.6	--	753	--	0.44	11.7	--	<2	--	--	--	--	35	--	0.47
	11/24/09	DRY																					
	5/12/10	6.61	1,007	--	--	--	--	--	30.0	--	782	--	0.06	0.51	--	<2	--	--	--	--	10.2	--	0.06
	12/13/10	6.75	828	469	<1	573	<1	70.2	18.7	44.9	762	--	<0.15	3.34	--	4	--	90	101	--	6.6	43	<0.15
	6/9/11	6.39	985	--	--	--	--	--	16.7	--	710	--	0.06	0.31	--	17	--	--	--	--	9.3	--	0.06
	12/13/11	6.61	1,362	435	<1	530	<1	47.3	37.6	41.3	733	--	0.06	0.18	--	2	--	85	96	--	4.8	39	0.06
	6/12/12	6.42	948	--	--	--	--	--		--	1,070	--	2.45	1.73	--	7	--	--	--	--	15.2	--	2.59
	12/11/12	DRY																					
	5/7/13	6.77	1,725	--	--	--	--	--	0.45	--	1,090	--	5.02	3.00	--	30	--	--	--	--	19.0	--	6.45
	12/10/13	DRY																					
	5/21/14	DRY																					
	12/22/14	DRY																					
	5/29/15	DRY																					
	12/17/15	DRY																					
	6/7/16	DRY																					
	12/7/16	DRY																					
	5/24/17	6.62	1,381	--	--	--	--	--	11.0	--	784	--	0.99	5.6	--	13	--	--	--	--	21.7	--	1.28
	12/18/17	DRY																					
	5/31/18	DRY																					
	12/13/18	DRY																					
	5/30/19	7.25	974	--	--	--	--	--	41.1	--	687	--	<0.02	0.408	--	300	--	--	--	--	5.1	--	<0.0257
	12/17/19	DRY																					
	5/29/20	DRY																					

Notes:
[1] = Samples not collected due to poor aquifer recovery
[2] = Samples were collected within six-weeks of process wastewater land application that occurred in November 2010.
[3] = MW-3 was abandoned on November 30, 2011

Appendix B-2
IRRIGATION AND DOMESTIC WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	Field Parameters			Laboratory Analysis													
		pH (units)	EC (umhos/ cm)	Temp (°C)	Alk (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	OH (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	NH3 (mg/l)	F. Col (MPN/ 100ml)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	NH4 (mg/l)
IR-1	12/2/08	7.54	532	15.9	218	265	<1	<1	25	6.54	34.6	354	0.08	---	56	30	19	---
	6/16/09	6.4	677	21	---	---	---	---	---	6.17	---	356	0.09	7	---	---	---	---
	11/24/09	7.35	561	20.2	222	271	<1	<1	25.7	6.06	33.4	360	0.06	2	58	28	19	0.08
	6/2/10	7.72	527	---	---	---	---	---	---	6.72	---	---	---	---	---	---	---	---
	12/16/10	7.29	528	18.2	220	269	<1	<1	26.4	7.31	33.8	375	0.04 J	<2	50	30	20	0.04 J
	12/18/12	6.90	551	19.0	220	268	<1	<1	25.2	6.91	30.4	342	0.03J	<2	56	30	20	0.04
	12/22/14	7.43	515	20.0	229	279	<1	<1	25.1	6.07	30.7	352	<0.03	<2	61	30	20	<0.04
	12/7/16	6.90	639	17.4	236	288	<1	<1	30.0	6.49	34.5	358	<0.01	<2	61.2	32.3	20.5	<0.01
	12/13/18	7.46	590	17.8	233	284	<2	<2	28.4	6.36	31.5	358	<0.025	<2	67.8	31.8	21.6	<0.0321
IR-2	12/2/08	7.35	569	16.3	251	306	<1	<1	27.3	7.3	40.4	390	0.05	---	60	36	24	---
	6/16/09	7.18	634	22	---	---	---	---	---	6.82	---	403	0.18	2	---	---	---	---
	11/24/09	6.96	623	21.2	256	312	<1	<1	27	6.53	38	391	0.05	<2	62	33	24	0.07
	6/2/10	7.09	580	---	---	---	---	---	---	13.3	---	---	---	---	---	---	---	---
	12/16/10	7.00	644	16.4	270	329	<1	<1	36.6	11.4	42.5	465	<0.03	<2	58	40	30	<0.03
	12/18/12	6.95	699	18.7	295	360	<1	<1	30.8	5.84	33.8	426	0.08	8	60	38	29	0.10
	12/22/14	7.02	642	18.5	302	368	<1	<1	29.6	4.62	33.3	419	<0.03	50	69	38	22	<0.04
	12/7/16	6.94	691	17.7	281	343	<1	<1	33.8	4.94	35.3	407	<0.01	<2	61.3	35.7	29.3	<0.01
	12/13/18	UNABLE TO SAMPLE-WELL NO LONGER OPERATIONAL																
IR-3	12/2/08	7.4	484	15.3	218	266	<1	<1	23.3	4.91	35	343	0.06	---	62	24	21	---
	6/16/09	7.14	620	19.9	---	---	---	---	---	5.09	---	370	0.09	<2	---	---	---	---
	11/24/09	7.5	544	18.8	216	263	<1	<1	24.1	4.66	36.3	350	0.04	<2	62	23	21	0.05
	6/2/10	7.48	534	---	---	---	---	---	---	5.19	---	---	---	---	---	---	---	---
	12/16/10	7.01	526	15.8	214	261	<1	<1	26.7	5.28	45.7	374	<0.03	<2	57	23	23	<0.03
	12/18/12	7.05	553	18.0	216	264	<1	<1	24.3	5.25	33.8	332	0.32	4	62	24	30	0.41
	12/22/14	7.31	505	17.8	218	266	<1	<1	21.7	6.74	30.8	334	<0.03	<2	66	26	22	<0.04
	12/7/16	7.07	516	15.0	206	252	<1	<1	22.3	4.32	32.2	302	<0.01	<2	57.9	22.1	20.1	<0.01
	12/13/18	UNABLE TO SAMPLE-WELL NO LONGER OPERATIONAL																
IR-4	12/2/08	7.29	641	13.4	268	327	<1	<1	33.7	9.92	45.2	465	0.06	---	80	30	28	---
	6/16/09	7.02	678	21.2	---	---	---	---	---	7.88	---	402	0.12	<2	---	---	---	---
	11/24/09	7.28	700	19.5	274	334	<1	<1	32.9	8.58	43.9	441	0.04	<2	80	29	28	0.05
	6/2/10	7.45	730	---	---	---	---	---	---	11.7	---	---	---	---	---	---	---	---
	12/16/10	6.90	650	17.0	277	337	<1	<1	34.0	10.2	48.4	455	0.05	<2	73	29	30	0.05
	12/18/12	6.95	736	17.5	277	338	<1	<1	34.8	11.1	45.5	443	<0.03	2	83	32	30	<0.04

Appendix B-2
IRRIGATION AND DOMESTIC WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	Field Parameters			Laboratory Analysis													
		pH (units)	EC (umhos/ cm)	Temp (°C)	Alk (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	OH (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	NH3 (mg/l)	F. Col (MPN/ 100ml)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	NH4 (mg/l)
IR-4	12/22/14	UNABLE TO SAMPLE																
	5/29/15	7.33	929	18.9	361	441	<1	<1	45.3	16.8	58.5	618	<0.03	<2	114	42.7	33.2	<0.04
	12/7/16	6.96	957	15.1	365	445	<1	<1	47.1	16.5	70.8	616	<0.05	<2	116	44.1	34.9	<0.06
	12/13/18	UNABLE TO SAMPLE-WELL NO LONGER OPERATIONAL																
IR-5	12/2/08	7.44	546	16.4	230	280	<1	<1	28.3	8.89	37.2	383	0.06	---	63	31	21	---
	6/16/09	6.86	670	22.4	---	---	---	---	---	7.21	---	376	0.11	<2	---	---	---	---
	11/24/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6/2/10	7.37	584	---	---	---	---	---	---	9.18	---	---	---	---	---	---	---	---
	12/16/10	7.12	562	17.7	239	292	<1	<1	27.1	8.24	35.1	403	0.04 J	2	58	32	23	0.04 J
	12/18/12	7.03	641	18.0	256	312	<1	<1	28.9	8.88	37.0	401	0.03J	<2	66	33	24	0.04
	12/22/14	7.24	723	18.8	316	385	<1	<1	34.9	9.44	38.6	481	<0.03	2	83	42	29	<0.04
	12/7/16	7.00	850	15.5	341	416	<1	<1	40.6	11.6	47.0	514	<0.01	2	91.6	46.5	29.6	<0.01
	12/13/18	7.08	842	14.8	334	407	<2	<2	41.2	7.21	44.2	512	<0.025	<2	97.3	45.7	31.1	<0.0321
IR-6	5/29/15	UNABLE TO SAMPLE																
	12/17/15	7.73	386	18.5	153	187	<1	<1	9.94	0.96	7.37	193	<0.01	<2	20.5	17.2	26.3	<0.04
	12/18/17	7.4	360	18.4	150	183	<2	<2	11.7	1.50	10.1	212	<0.01	<2	22.5	18.9	24.0	<0.01
	12/13/18	7.94	382	19.9	172	210	<2	<2	14.9	2.40	11.4	231	<0.025	<2	24	18.8	38.7	<0.0321
Barn	12/2/08	7.31	496	16.1	209	255	<1	<1	23.4	6.53	34.5	351	0.8	---	54	30	20	---
	6/16/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	11/24/09	7.35	540	21.9	213	260	<1	<1	23.4	6.43	33.6	354	0.04	<2	53	29	20	0.05
	6/2/10	7.38	525	---	---	---	---	---	---	6.96	---	---	---	---	---	---	---	---
	12/16/10	6.98	515	15.5	210	257	<1	<1	23.2	7.47	34.2	357	<0.03	<2	49	29	21	<0.03
	12/18/12	7.37	532	18.2	207	252	<1	<1	23.8	6.98	31.3	336	<0.03	<2	48	27	19	<0.03
	12/22/14	7.34	509	19.6	214	262	<1	<1	23.6	6.65	31.9	332	0.04 J	<2	53	29	20	0.06 J
	12/7/16	7.85	354	19.1	161	197	<1	<1	13.3	1.39	8.8	195	<0.01	<2	21.4	17.9	30.7	<0.01
	12/13/18	6.78	378	18.2	161	196	<2	<2	14.1	2.49	11.8	222	<0.025	<2	25	19.2	34.8	<0.0321
House	12/2/08	7.31	523	15.7	208	254	<1	<1	23.8	6.71	33.9	343	0.08	---	54	30	19	---
	6/16/09	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	11/24/09	7	540	23.6	239	292	<1	<1	23.7	0.04	33.9	336	0.05	<2	53	28	19	0.07
	6/2/2010	7.44	538	---	---	---	---	---	---	2.38	---	---	---	---	---	---	---	---
	12/16/10	6.76	520	16.4	211	257	<1	<1	23.4	7.34	34.2	357	0.05	<2	48	29	21	0.05
	12/18/12	7.21	536	14.1	207	252	<1	<1	24.2	7.03	31.2	341	<0.03	<2	52	29	20	<0.04
	12/22/14	7.61	504	16.6	214	261	<1	<	23.7	6.77	31.9	332	<0.03	2	53	29	21	<0.04

Appendix B-2
IRRIGATION AND DOMESTIC WELL HISTORICAL ANALYTICAL RESULTS

Well No.	Date	Field Parameters			Laboratory Analysis													
		pH (units)	EC (umhos/ cm)	Temp (°C)	Alk (mg/l)	HCO3 (mg/l)	CO3 (mg/l)	OH (mg/l)	Cl (mg/l)	NO3-N (mg/l)	SO4 (mg/l)	TDS (mg/l)	NH3 (mg/l)	F. Col (MPN/ 100ml)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	NH4 (mg/l)
House	12/7/16	7.41	630	13.9	212	259	<1	<1	21.9	4.67	21.7	304	<0.01	<2	48.3	27.7	27.4	<0.01
	12/13/18	7.48	718	17.8	289	353	<2	<2	35.4	6.88	36.9	462	<0.025	<2	84.4	39.3	28.9	<0.0321

Notes:
-- = Not analyzed.
J Flag = Constituent detected but concentration below reporting limit.
See Appendix A for a complete list of abbreviations.

Appendix B-3
HISTORICAL GROUNDWATER ELEVATIONS, MONITORING WELLS

Well No.	Date	Top of Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-1	8/2/2005	221.28	37.44	183.84
	9/21/2006		35.88	185.40
	5/31/2007		42.96	178.32
	12/28/2007		42.82	178.46
	5/28/2008		42.39	178.89
	12/2/2008		46.21	175.07
	5/29/2009		Dry	--
	11/24/2009		Dry	--
	5/12/2010		40.65	180.63
	12/13/2010		42.82	178.46
	6/9/2011		40.72	180.56
	12/2/2011		42.28	179.00
	5/16/2012		Dry	--
	12/11/2012		Dry	--
	5/7/2013		Dry	--
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		Dry	--
	12/7/2016		Dry	--
	5/24/2017		43.00	178.28
	12/18/2017		Dry	--
	5/31/2018		Dry	--
	12/13/2018		Dry	--
	5/30/2019		43.26	178.02
	12/17/2019		37.09	184.19
	5/29/2020		Dry	--
MW-2	8/2/2005	214.59	38.74	175.85
	9/21/2006		38.34	176.25
	5/31/2007		42.56	172.03
	12/28/2007		46.06	168.53
	5/28/2008		43.99	170.60
	12/2/2008		Dry	--
	5/29/2009		48.71	165.88
	11/24/2009		Dry	--
	5/12/2010		44.94	169.65
	12/13/2010		47.53	167.06
	6/9/2011		43.25	171.34
	12/13/2011		45.88	168.71
	5/16/2012		48.37	166.22
	12/11/2012		Dry	--
	5/7/2013		48.36	166.23
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		Dry	--
	12/7/2016		Dry	--
	5/24/2017		48.41	166.18
	12/18/2017		Dry	--
	5/31/2018		Dry	--
	12/13/2018		Dry	--
	5/30/2019		49.31	165.28
	12/17/2019		Dry	--
	5/29/2020		Dry	--
MW-3[1]	8/2/2005	215.06	38.88	176.18
	9/21/2006		38.40	176.66
	5/31/2007		42.19	172.87
	12/28/2007		46.10	168.96

Appendix B-3
HISTORICAL GROUNDWATER ELEVATIONS, MONITORING WELLS

Well No.	Date	Top of Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-3[1]	5/28/2008	215.06	43.47	171.59
	12/2/2008		43.42	171.64
	5/29/2009		48.35	166.71
	11/24/2009		Dry	--
	5/12/2010		44.38	170.68
	12/13/2010		47.00	168.06
	6/9/2011		41.27	173.79
MW-4	8/2/2005	206.68	32.05	174.63
	9/21/2006		31.82	174.86
	5/31/2007		38.68	168.00
	12/28/2007		41.88	164.80
	5/28/2008		40.35	166.33
	12/2/2008		Dry	--
	5/29/2009		44.90	161.78
	11/24/2009		Dry	--
	5/12/2010		38.25	168.43
	12/13/2010		43.92	162.76
	6/9/2011		39.31	167.37
	12/2/2011		42.75	163.93
	5/16/2012		Dry	--
	12/11/2012		Dry	--
	5/7/2013		Dry	--
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		Dry	--
	12/7/2016		Dry	--
	5/24/2017		44.87	161.81
	12/18/2017		Dry	--
	5/31/2018		Dry	--
	12/13/2018		Dry	--
	5/30/2019		45.62	161.06
	12/17/2019		Dry	--
	5/29/2020		Dry	--
MW-5	8/2/2005	228.10	32.15	195.95
	9/21/2006		29.01	199.09
	5/31/2007		38.35	189.75
	12/28/2007		41.88	186.22
	5/28/2008		36.21	191.89
	12/2/2008		35.38	192.72
	5/29/2009		39.17	188.93
	11/24/2009		39.88	188.22
	5/12/2010		31.93	196.17
	12/13/2010		32.78	195.32
	6/9/2011		34.04	194.06
	12/2/2011		32.55	195.55
	5/16/2012		41.32	186.78
	12/11/2012		34.41	193.96
	5/7/2013		35.68	192.42
	12/10/2013		36.45	191.65
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		43.80	184.30
	12/7/2016		41.22	186.88
	5/24/2017		31.84	196.26
	12/18/2017		34.45	193.65
	5/31/2018		42.97	185.13
	12/13/2018		Dry	--

Appendix B-3
HISTORICAL GROUNDWATER ELEVATIONS, MONITORING WELLS

Well No.	Date	Top of Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-5	5/30/2019	228.10	30.85	197.25
	12/17/2019		32.66	195.44
	5/29/2020		41.51	186.59
MW-6	8/2/2005	213.06	35.54	177.52
	9/21/2006		Dry	--
	5/31/2007		Dry	--
	12/28/2007		34.95	178.11
	5/28/2008		40.48	172.58
	12/2/2008		Dry	--
	5/29/2009		45.41	167.65
	11/24/2009		Dry	--
	5/12/2010		40.91	172.15
	12/13/2010		43.55	169.51
	6/9/2011		39.51	173.55
	12/13/2011		42.00	171.06
	5/16/2012		45.13	167.93
	12/11/2013		Dry	--
	5/7/2013		44.96	168.10
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		Dry	--
	12/7/2016		Dry	--
	5/24/2017		44.36	168.70
	12/18/2017		Dry	--
	5/31/2018		Dry	--
	12/13/2018		Dry	--
	5/30/2019		45.39	167.67
	12/17/2019		46.83	166.23
	5/29/2020		Dry	--
MW-8	5/28/2008	210.28	41.98	168.30
	12/2/2008		Dry	--
	5/29/2009		Dry	--
	11/24/2009		Dry	--
	5/12/2010		43.58	166.70
	12/13/2010		46.16	164.12
	6/9/2011		41.64	168.64
	12/13/2011		44.35	165.93
	5/16/2012		46.23	164.05
	12/11/2012		Dry	--
	5/7/2013		46.53	163.75
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		Dry	--
	12/7/2016		Dry	--
	5/24/2017		47.34	162.94
	12/18/2017		Dry	--
	5/31/2018		Dry	--
	12/13/2018		Dry	--
	5/30/2019		Dry	--
	12/17/2019		Dry	--
	5/29/2020		Dry	--
MW-9	5/28/2008	207.30	40.70	166.60
	12/2/2008		49.17	158.13
	5/29/2009		44.44	162.86
	11/24/2009		Dry	--
	5/12/2010		42.92	164.38

Appendix B-3
HISTORICAL GROUNDWATER ELEVATIONS, MONITORING WELLS

Well No.	Date	Top of Casing Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-9	12/13/2010	207.30	45.73	161.57
	6/9/2011		40.74	166.56
	12/13/2011		43.46	163.84
	5/16/2012		44.85	162..45
	12/11/2012		Dry	--
	5/7/2013		44.56	162.74
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		Dry	--
	12/7/2016		Dry	--
	5/24/2017		47.55	159.75
	12/18/2017		50.74	156.56
	5/31/2018		Dry	--
	12/13/2018		Dry	--
	5/30/2019		48.48	158.82
	12/17/2019		49.41	157.89
	5/29/2020		52.31	154.99
MW-10	5/28/2008	209.52	39.29	170.23
	12/2/2008		Dry	--
	5/29/2009		44.58	164.94
	11/24/2009		Dry	--
	5/12/2010		40.25	169.27
	12/13/2010		43.91	165.61
	6/9/2011		38.95	170.57
	12/13/2011		42.34	167.18
	5/16/2012		Dry	--
	12/11/2012		Dry	--
	5/7/2013		Dry	--
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--
	6/7/2016		Dry	--
	12/7/2016		Dry	--
	5/24/2017		44.61	164.91
	12/18/2017		Dry	--
	5/31/2018		Dry	--
	12/13/2018		Dry	--
	5/30/2019		45.12	164.40
	12/17/2019		Dry	--
	5/29/2020		Dry	--
MW-11	5/28/2008	215.93	44.03	171.90
	12/2/2008		Dry	--
	5/29/2009		48.02	167.91
	11/24/2009		Dry	--
	5/12/2010		43.82	172.11
	12/13/2010		47.06	168.87
	6/9/2011		42.90	173.03
	12/13/2011		45.38	170.55
	5/16/2012		45.12	170.81
	6/12/2012		45.24	170.69
	12/11/2012		Dry	--
	5/7/2013		46.47	169.46
	12/10/2013		Dry	--
	5/21/2014		Dry	--
	12/22/2014		Dry	--
	5/29/2015		Dry	--
	12/17/2015		Dry	--

Appendix B-3 HISTORICAL GROUNDWATER ELEVATIONS, MONITORING WELLS				
Well No.	**Date**	**Top of Casing Elevation (ft)**	**Depth to Groundwater (ft)**	**Groundwater Elevation (ft)**
MW-11	6/7/2016	215.93	Dry	--
	12/7/2016		Dry	--
	5/24/2017		46.35	169.58
	12/18/2017		Dry	--
	5/31/2017		Dry	--
	12/13/2018		Dry	--
	5/30/2019		47.99	167.94
	12/17/2019		Dry	--
	5/29/2020		51.69[2]	--[2]

[1]= Monitoring Well MW-3 abandoned on November 30, 2011
[2]= Well did not recover after one purge, groundwater elevation suspect