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## APPENDIX L

NMP and WMP

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**Nutrient Management Plan Report**  
General Order No. R5-2007-0035, Attachment C  
July 1, 2009 deadline

**DAIRY FACILITY INFORMATION**

**A. NAME OF DAIRY OR BUSINESS OPERATING THE DAIRY:** Manuel Oliveira Dairy

Physical address of dairy:

<u>4235 Oak Ave</u>	<u>Merced</u>	<u>Merced</u>	<u>95340</u>
Number and Street	City	County	Zip Code

Street and nearest cross street (if no address): \_\_\_\_\_

Date facility was originally placed in operation: 01/01/1970

Regional Water Quality Control Board Basin Plan designation: San Joaquin River Basin

County Assessor Parcel Number(s) for dairy facility:

0059-0190-0026-0000

**B. OPERATOR NAME:** Oliveira, Manuel & Maria

Telephone no.: (209) 388-0501

Landline Cellular

<u>4235 Oak Ave</u>	<u>Merced</u>	<u>CA</u>	<u>95340</u>
Mailing Address Number and Street	City	State	Zip Code

Operator should receive Regional Board correspondence (check): ☒ Yes ☐ No

**C. LEGAL OWNER NAME:** Oliveira, Manuel & Maria

Telephone no.: (209) 388-0501

Landline Cellular

<u>4235 Oak Ave</u>	<u>Merced</u>	<u>CA</u>	<u>95340</u>
Mailing Address Number and Street	City	State	Zip Code

Owner should receive Regional Board correspondence (check): ☒ Yes ☐ No

**D. CONTACT NAME:** Cardoso, Mariann

Telephone no.: (209) 862-4291

(209) 277-2817

Landline Cellular

Title: Technical Service Provider

<u>1993 Prince St</u>	<u>Newman</u>	<u>CA</u>	<u>95360</u>
Mailing Address Number and Street	City	State	Zip Code

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**AVAILABLE NUTRIENTS**

**A. HERD INFORMATION**

The milk cow dairy is currently regulated under individual Waste Discharge Requirements.

Total number of milk and dry cows combined as a baseline value in response to the Report of Waste Discharge (ROWD) request of October, 2005:

2,900 milk and dry cows combined (regulatory review is required for any expansion)

	Milk Cows	Dry Cows	Bred Heifers (15-24 mo.)	Heifers (7-14 mo. to breeding)	Calves (4-6 mo.)	Calves (0-3 mo.)
Present count	2,500	400	375	375	375	375
Maximum count	2,500	400	375	375	375	375
Avg live weight (lbs)	1,400	1,500	1,100	775		
Daily hours on flush	22	6	6	6	6	0

Predominant milk cow breed: Holstein

Average milk production: 65 pounds per cow per day

**B. IRRIGATION SOURCES**

Irrigation Source Name	Type	Nitrogen (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Discharge Rate
Ag well - heifers 2015	Groundwater (well)	8.49			1,200 gpm
Diesel pump 2015	Groundwater (well)	11.90			1,200 gpm
MID Canal	Surface water (canal, river)	1.40	0.00	0.00	10 cfs

**C. NUTRIENT IMPORTS**

*No nutrient imports entered.*

**D. NUTRIENT EXPORTS**

Nutrient Type/Name	Quantity	Moisture	Nitrogen	Phosphorus (as P2O5)	Potassium (as K2O)
Wastewater	6,000,000.00 gal	0.0%	0.426%	0.090%	0.650%
Solid manure	7,500.00 ton	31.3%	2.960%	2.600%	2.900%

Total nitrogen exported: 518,326.20 lbs

Total phosphorus exported: 136,777.94 lbs

Total potassium exported: 518,169.00 lbs

#### **E. STORAGE PERIOD**

Storage period is the maximum period of time anticipated between land application of process wastewater (from storage ponds/lagoons) to croplands. A qualified agronomist and civil engineer should collaborate and collectively consider predominant soil types, soil infiltration rates, maximum depth, available water, field capacity, permanent wilting point, allowable depletion, crop water use, evapotranspiration, precipitation, irrigation system capacity, water delivery constraints, crop nutrient requirements, soil nutrient adsorption/desorption, rooting depth, nutrient accumulation/availability for current and future crop needs, facility wide process wastewater storage capacity and other factors as deemed necessary across all croplands where process wastewater is applied in selecting a storage period. In many cases conflicts will arise between crop water demands, crop nutrient demands and insufficient process wastewater storage capacity. Process wastewater may not be the best choice as a source of either water and/or nutrients to meet crop demands throughout the year. Groundwater and surface water vulnerability has been considered.

The storage period selected in this Nutrient Management Plan is consistent with the storage period selected in the Waste Management Plan.

Storage period: 120 days



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**APPLICATION AREA**

**A. ASSESSOR PARCEL NUMBER:** 0059-0190-0025-0000

Legal owner of parcel: Owned by Dairy

**ASSESSOR PARCEL NUMBER:** 0059-0190-0027-0000

Legal owner of parcel: Owned by Dairy

**ASSESSOR PARCEL NUMBER:** 0059-0190-0072-0000

Legal owner of parcel: Owned by Dairy

**ASSESSOR PARCEL NUMBER:** 0059-0190-0073-0000

Legal owner of parcel: Owned by Dairy

**ASSESSOR PARCEL NUMBER:** 0059-0190-0074-0000

Legal owner of parcel: Owned by Dairy

**ASSESSOR PARCEL NUMBER:** 0059-0220-0019-0000

Legal owner of parcel: Owned by Dairy

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**B. FIELD NAME:** Buhach Field

Cropable acres: 52

Predominant soil type: Clay loam

Do irrigation system head-to-head flow conditions exist on the field? ☐ Yes ☒ No

Can fresh water for irrigation purposes be delivered to the field year round? ☒ Yes ☐ No

Can process wastewater be delivered to the field at agronomic rates and times? ☒ Yes ☐ No

Tailwater management method: Berm

**Crops grown and rotation:**

Crop Type	Plant Date	Harvest Date	Acres Planted
Oats, silage-soft dough	Early November	Late April	52
Corn, silage	Early June	Middle September	52
Sudangrass, silage	Middle September	Early November	52

**FIELD NAME:** Home Field

Cropable acres: 29

Predominant soil type: Clay loam

Do irrigation system head-to-head flow conditions exist on the field? ☐ Yes ☒ No

Can fresh water for irrigation purposes be delivered to the field year round? ☒ Yes ☐ No

Can process wastewater be delivered to the field at agronomic rates and times? ☒ Yes ☐ No

Tailwater management method: Berm

**Crops grown and rotation:**

Crop Type	Plant Date	Harvest Date	Acres Planted
Oats, silage-soft dough	Early November	Late April	29
Corn, silage	Early June	Middle September	29
Sudangrass, silage	Middle September	Early November	29

**FIELD NAME:** New Field

Cropable acres: 148

Predominant soil type: Clay loam

Do irrigation system head-to-head flow conditions exist on the field? ☐ Yes ☒ No

Can fresh water for irrigation purposes be delivered to the field year round? ☒ Yes ☐ No

Can process wastewater be delivered to the field at agronomic rates and times? ☒ Yes ☐ No

Tailwater management method: Berm

**Crops grown and rotation:**

Crop Type	Plant Date	Harvest Date	Acres Planted
Oats, silage-soft dough	Early November	Late April	148
Corn, silage	Early June	Middle September	148

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Sudangrass, silage	Middle September	Early November	148
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**FIELD NAME:** Pump Field

Cropable acres: 13

Predominant soil type: Clay loam

Do irrigation system head-to-head flow conditions exist on the field? ☐ Yes ☒ No

Can fresh water for irrigation purposes be delivered to the field year round? ☒ Yes ☐ No

Can process wastewater be delivered to the field at agronomic rates and times? ☒ Yes ☐ No

Tailwater management method: Returned to retention pond

**Crops grown and rotation:**

Crop Type	Plant Date	Harvest Date	Acres Planted
Oats, silage-soft dough	Early November	Late April	13
Corn, silage	Early June	Middle September	13
Sudangrass, silage	Middle September	Early November	13

**C. LAND APPLICATION AREA FIELDS AND PARCELS**

Field name	Cropable acres	Total harvests	Parcel number
Buhach Field	52	3	0059-0190-00720000 0059-0190-00730000 0059-0190-00740000
Home Field	29	3	0059-0190-00250000
New Field	148	3	0059-0220-00190000
Pump Field	13	3	0059-0190-00270000
Land application area totals	346	18	

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**NUTRIENT BUDGET**

**A. NUTRIENT BUDGET FOR CROP:** Buhach Field / Oats, silage-soft dough

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	67.0	8.9	61.4	137.8
<i>Nutrient source:</i> Retention pond (lagoon)		50%	80%	80%	
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal	1.9	0.0	0.0	31.0	
	1.9	0.0	0.0		
In season irrigation (with fertilizer)	1	70.0	8.9	61.4	80.8
<i>Nutrient source:</i> Retention pond (lagoon)		50%	80%	80%	
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
Ag well - heifers 2015	10.8	0.0	0.0	110.0	
	10.8	0.0	0.0		

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	14.5	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	204.0	26.7	184.2
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	223.2	26.7	184.2
Potential crop nutrient removal	160.0	25.6	132.8
Nutrient balance	63.2	1.1	51.4
Applied to removal ratio	1.40	1.04	1.39

Fresh water applied: 1.45 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Buhach Field / Corn, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
Dry manure	1	150.0	25.0	165.0	150.0
<i>Nutrient source:</i> From dairy		50%	80%	80%	
<i>Application method:</i> Broadcast/incorporate					



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**NUTRIENT BUDGET FOR CROP (CONTINUED):** Buhach Field / Corn, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (no fertilizer)	2	0.0	0.0	0.0	4.4
<i>Nutrient source:</i> Water only					
<i>Application method:</i> Surface					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		2.2	0.0	0.0	36.0
		2.2	0.0	0.0	
In season irrigation (with fertilizer)	4	60.0	8.9	61.4	248.7
<i>Nutrient source:</i> Retention pond (lagoon)					
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		2.2	0.0	0.0	36.0
		2.2	0.0	0.0	

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	13.1	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	150.0	25.0	165.0
Liquid manure	240.0	35.6	245.6
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	407.7	60.6	410.6
Potential crop nutrient removal	294.0	39.0	249.0
Nutrient balance	113.7	21.6	161.6
Applied to removal ratio	1.39	1.55	1.65

Fresh water applied: 3.43 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Buhach Field / Sudangrass, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	55.0	5.0	60.0	113.9
<i>Nutrient source:</i> Retention pond (lagoon)					
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		1.9	0.0	0.0	32.0
		1.9	0.0	0.0	

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	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	3.9	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	110.0	10.0	120.0
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	118.5	10.0	120.0
Potential crop nutrient removal	88.0	13.6	96.0
Nutrient balance	30.5	-3.6	24.0
Applied to removal ratio	1.35	0.74	1.25

Fresh water applied: 1.02 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Home Field / Oats, silage-soft dough

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	75.0	8.9	61.4	153.5
Nutrient source: Retention pond (lagoon)					
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		1.7	0.0	0.0	16.0
		1.7	0.0	0.0	
In season irrigation (with fertilizer)	2	75.0	8.9	61.4	173.7
Nutrient source: Retention pond (lagoon)					
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
Diesel pump 2015		11.8	0.0	0.0	48.0
		11.8	0.0	0.0	

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	27.1	0.0	0.0

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Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	300.0	35.6	245.6
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	331.8	35.6	245.6
Potential crop nutrient removal	236.8	28.8	211.2
Nutrient balance	95.0	6.8	34.4
Applied to removal ratio	1.40	1.24	1.16

Fresh water applied: 1.64 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Home Field / Corn, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
Dry manure	1	120.0 50%	25.0 80%	165.0 80%	120.0
<i>Nutrient source:</i> From dairy					
<i>Application method:</i> Broadcast/incorporate					
In season irrigation (no fertilizer)	2	0.0 0%	0.0 0%	0.0 0%	4.3
<i>Nutrient source:</i> Water only					
<i>Application method:</i> Surface					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		2.2	0.0	0.0	20.0
		2.2	0.0	0.0	
In season irrigation (with fertilizer)	4	55.0 50%	8.9 80%	61.4 80%	228.7
<i>Nutrient source:</i> Retention pond (lagoon)					
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		2.2	0.0	0.0	20.0
		2.2	0.0	0.0	

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	13.0	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	120.0	25.0	165.0
Liquid manure	220.0	35.6	245.6
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		



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Nutrients applied	357.7	60.6	410.6
Potential crop nutrient removal	255.0	51.0	339.0
Nutrient balance	102.7	9.6	71.6
Applied to removal ratio	1.40	1.19	1.21

Fresh water applied: 3.42 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Home Field / Sudangrass, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	55.0	5.0	60.0	113.9
<i>Nutrient source:</i> Retention pond (lagoon)					
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		2.0	0.0	0.0	18.0
		2.0	0.0	0.0	

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	3.9	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	110.0	10.0	120.0
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	118.6	10.0	120.0
Potential crop nutrient removal	88.0	13.6	96.0
Nutrient balance	30.6	-3.6	24.0
Applied to removal ratio	1.35	0.74	1.25

Fresh water applied: 1.03 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** New Field / Oats, silage-soft dough

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
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**NUTRIENT BUDGET FOR CROP (CONTINUED):** New Field / Oats, silage-soft dough

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	70.0	11.6	79.9	143.8
Nutrient source: Retention pond (lagoon)		50%	80%	80%	
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal	1.9	0.0	0.0	89.5	
	1.9	0.0	0.0		
In season irrigation (with fertilizer)	2	70.0	8.9	61.4	155.5
Nutrient source: Retention pond (lagoon)		50%	80%	80%	
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
Diesel pump 2015	7.7	0.0	0.0	160.0	
	7.7	0.0	0.0		

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	19.3	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	280.0	41.0	282.6
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	303.9	41.0	282.6
Potential crop nutrient removal	217.6	25.6	320.0
Nutrient balance	86.3	15.4	-37.4
Applied to removal ratio	1.40	1.60	0.88

Fresh water applied: 1.48 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** New Field / Corn, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
Dry manure	1	150.0	20.0	140.0	150.0
Nutrient source: From dairy		50%	80%	80%	
Application method: Broadcast/incorporate					

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**NUTRIENT BUDGET FOR CROP (CONTINUED):** New Field / Corn, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (no fertilizer)	2	0.0	0.0	0.0	4.6
<i>Nutrient source:</i> Water only					
<i>Application method:</i> Surface					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal	2.3	0.0	0.0	108.0	
	2.3	0.0	0.0		
In season irrigation (with fertilizer)	4	61.0	8.0	60.0	253.2
<i>Nutrient source:</i> Retention pond (lagoon)					
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal	2.3	0.0	0.0	108.0	
	2.3	0.0	0.0		

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	13.8	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	150.0	20.0	140.0
Liquid manure	244.0	32.0	240.0
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	412.4	52.0	380.0
Potential crop nutrient removal	294.0	39.0	249.0
Nutrient balance	118.4	13.0	131.0
Applied to removal ratio	1.40	1.33	1.53

Fresh water applied: 3.62 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** New Field / Sudangrass, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	55.0	5.0	60.0	113.8
<i>Nutrient source:</i> Retention pond (lagoon)					
<i>Application method:</i> Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal	1.9	0.0	0.0	89.5	
	1.9	0.0	0.0		

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	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	3.8	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	110.0	10.0	120.0
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	118.5	10.0	120.0
Potential crop nutrient removal	88.0	13.6	96.0
Nutrient balance	30.5	-3.6	24.0
Applied to removal ratio	1.35	0.74	1.25

Fresh water applied: 1.00 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Pump Field / Oats, silage-soft dough

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	75.0	8.9	61.4	153.9
Nutrient source: Retention pond (lagoon)		50%	80%	80%	
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		1.9	0.0	0.0	8.0
		1.9	0.0	0.0	
In season irrigation (with fertilizer)	2	75.0	8.9	61.4	163.2
Nutrient source: Retention pond (lagoon)		50%	80%	80%	
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
Diesel pump 2015		6.6	0.0	0.0	12.0
		6.6	0.0	0.0	

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	17.1	0.0	0.0



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Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	300.0	35.6	245.6
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	321.7	35.6	245.6
Potential crop nutrient removal	240.0	25.6	262.4
Nutrient balance	81.7	10.0	-16.8
Applied to removal ratio	1.34	1.39	0.94

Fresh water applied: 1.43 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Pump Field / Corn, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
Dry manure	1	150.0	25.0	165.0	150.0
Nutrient source: From dairy		50%	80%	80%	
Application method: Broadcast/incorporate					
In season irrigation (no fertilizer)	2	0.0	0.0	0.0	4.4
Nutrient source: Water only		0%	0%	0%	
Application method: Surface					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		2.2	0.0	0.0	9.0
		2.2	0.0	0.0	
In season irrigation (with fertilizer)	4	61.0	11.6	79.9	252.7
Nutrient source: Retention pond (lagoon)		50%	80%	80%	
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		2.2	0.0	0.0	9.0
		2.2	0.0	0.0	

	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	13.1	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	150.0	25.0	165.0
Liquid manure	244.0	46.4	319.6
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		

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Nutrients applied	411.7	71.4	484.6
Potential crop nutrient removal	294.0	51.0	279.0
Nutrient balance	117.7	20.4	205.6
Applied to removal ratio	1.40	1.40	1.74

Fresh water applied: 3.43 feet Total harvests: 1

**NUTRIENT BUDGET FOR CROP:** Pump Field / Sudangrass, silage

Activity / Event	# of Events	N (lbs/acre) % avail.	P (lbs/acre) % avail.	K (lbs/acre) % avail.	Total N (lbs/acre)
In season irrigation (with fertilizer)	2	55.0	5.0	60.0	116.3
Nutrient source: Retention pond (lagoon)					
Application method: Pipeline					
Irrigation Source		N (lbs/acre)	P (lbs/acre)	K (lbs/acre)	Runtime (hrs)
MID Canal		3.1	0.0	0.0	13.0
		3.1	0.0	0.0	

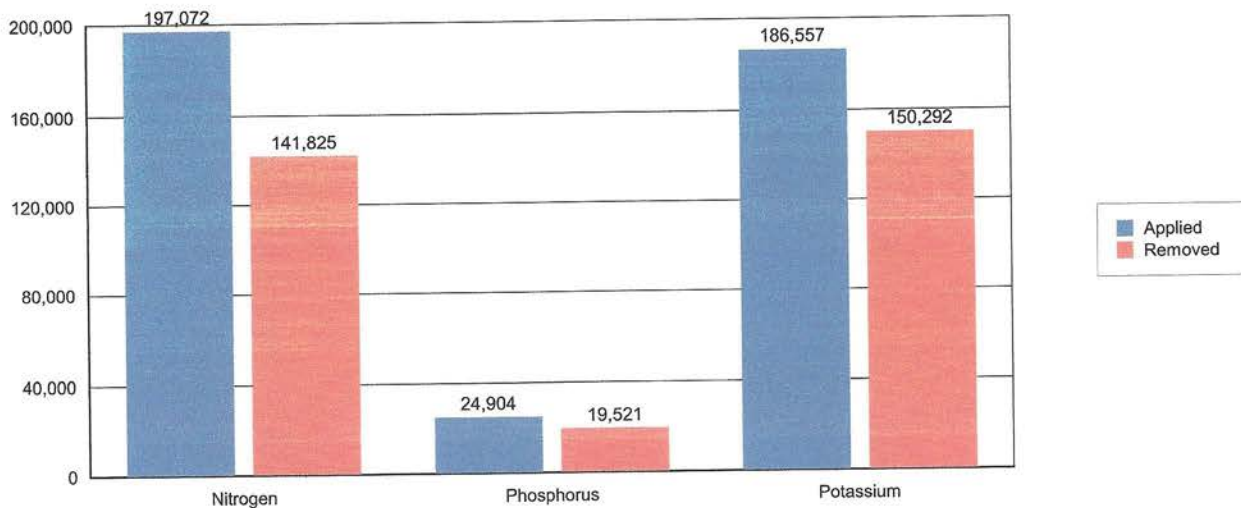
	Total N (lbs/acre)	Total P (lbs/acre)	Total K (lbs/acre)
Irrigation sources	6.3	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	0.0	0.0	0.0
Liquid manure	110.0	10.0	120.0
Other	0.0	0.0	0.0
Atmospheric deposition	4.7		
Nutrients applied	121.0	10.0	120.0
Potential crop nutrient removal	88.0	13.6	96.0
Nutrient balance	33.0	-3.6	24.0
Applied to removal ratio	1.37	0.74	1.25

Fresh water applied: 1.65 feet Total harvests: 1

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**NUTRIENT APPLICATIONS, POTENTIAL REMOVAL, AND BALANCE**

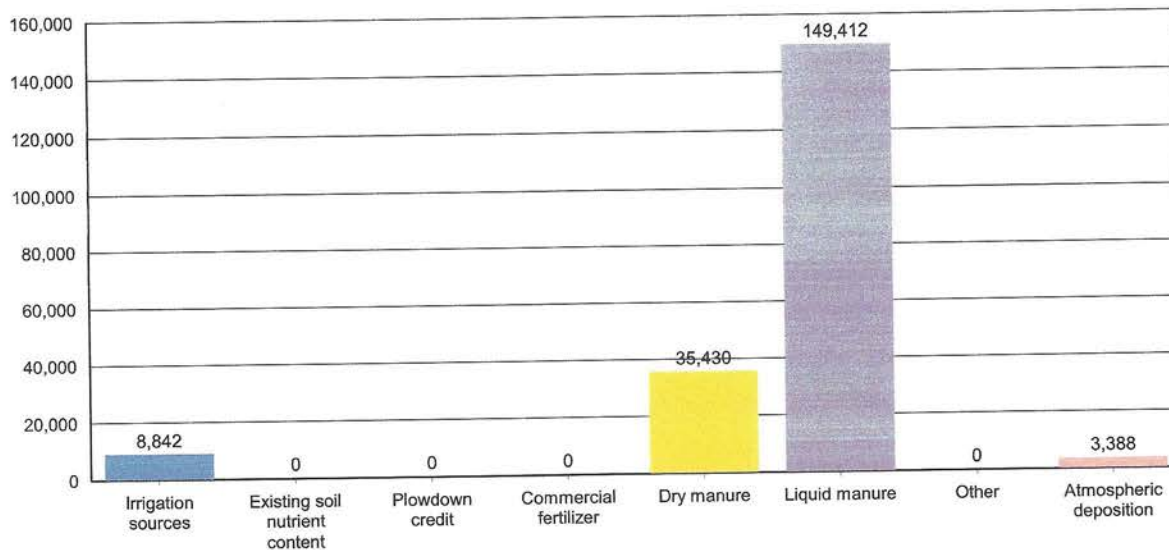
**A. POUNDS OF NUTRIENT APPLIED VS. CROP REMOVAL POTENTIAL**



	Total N (lbs)	Total P (lbs)	Total K (lbs)
Irrigation sources	8,841.7	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	35,430.0	5,310.0	36,230.0
Liquid manure	149,412.0	19,594.4	150,326.8
Other	0.0	0.0	0.0
Atmospheric deposition	3,388.0		
Nutrients applied to all crops	197,071.7	24,904.4	186,556.8
Potential crop nutrient removal	141,825.0	19,521.2	150,291.6
Nutrient balance	55,246.7	5,383.2	36,265.2
Applied to removal ratio	1.39	1.28	1.24

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**B. POUNDS OF NITROGEN APPLIED BY NUTRIENT SOURCE**



	Total N (lbs)	Total P (lbs)	Total K (lbs)
Irrigation sources	8,841.7	0.0	0.0
Existing soil nutrient content	0.0	0.0	0.0
Plowdown credit	0.0	0.0	0.0
Commercial fertilizer	0.0	0.0	0.0
Dry manure	35,430.0	5,310.0	36,230.0
Liquid manure	149,412.0	19,594.4	150,326.8
Other	0.0	0.0	0.0
Atmospheric deposition	3,388.0		
Nutrients applied to all crops	197,071.7	24,904.4	186,556.8
Potential crop nutrient removal	141,825.0	19,521.2	150,291.6
Nutrient balance	55,246.7	5,383.2	36,265.2
Applied to removal ratio	1.39	1.28	1.24

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**NUTRIENT BALANCE**

**A. WHOLE FARM BALANCE**

	Total N (lbs)	Total P (lbs)	Total K (lbs)
Nutrients in storage from herd*			
Daily gross	2,744.6	446.1	1,289.2
Annual gross	1,001,769.5	162,808.9	470,560.6
Net to pond storage after ammonia losses (30% loss applied)	554,282.0	132,642.0	431,347.2
Net to drylot storage after ammonia losses (30% loss applied)	146,956.7	30,166.9	239,963.4
Net in storage (30% loss applied)	701,238.6	162,808.9	671,310.6
Irrigation sources	8,841.7	0.0	0.0
Atmospheric deposition	3,388.0		
Imports	0.0	0.0	0.0
Exports	518,326.2	136,777.9	518,169.0
Potential crop nutrient removal	141,825.0	19,521.2	150,291.6
Nutrient balance	53,317.2	6,509.8	2,850.0
Nutrient balance ratio	1.38	1.33	1.02

\* Potassium excretion from milk cows and dry cows only.



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**SAMPLING AND ANALYSIS PLAN**

**A. MANURE SAMPLING AND ANALYSIS PLAN**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Each application to each land application area	For each applied manure source, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.  For each applied manure source, a scaled weight by truckload will be recorded.	Corral solids Settling basin solids	Date applied and total weight (tons) applied	Percent moisture
Twice per year	For each manure source, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	Corral solids Settling basin solids	None required	Total nitrogen, total phosphorus, total potassium, and percent moisture
Each offsite export of manure	For each manure source exported, a composite sample "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.  For each manure source exported, a scaled weight by truckload will be recorded.	Corral solids Settling basin solids	Date exported and total weight (tons) exported	Percent moisture

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**A. MANURE SAMPLING AND ANALYSIS PLAN (CONTINUED)**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Annually	<p>Annual estimation for total manure dry weight applied to each field will be quantified using the following:</p> <p>Dry weight applied from a source to a crop per application event = weight applied * (1 - (percent moisture / 100))</p> <p>Dry weight applied to crop per application event = sum of dry weights applied from each source</p> <p>Dry weight applied to a crop = sum of dry weights applied during each application</p> <p>Dry weight applied to a field = sum of dry weights applied to each crop</p> <p>Annual estimation for total manure dry weight exported will be quantified using the following:</p> <p>Dry weight exported from a source per event = weight exported * (1 - (percent moisture / 100))</p> <p>Dry weight exported per event = sum of dry weights exported from each source</p> <p>Dry weight exported to any offsite destination = sum of dry weights exported per event</p>	<p>Corral solids</p> <p>Settling basin solids</p>	<p>Total dry weight (tons) manure applied annually to each land application area, and total dry weight (tons) manure exported offsite annually</p>	<p>None required</p>

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**A. MANURE SAMPLING AND ANALYSIS PLAN (CONTINUED)**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Once every two years (biennially)	For each manure source, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	Corral solids Settling basin solids	None required	General minerals, including: calcium, magnesium, sodium, sulfate, chloride  Fixed solids (ash)

**B. PROCESS WASTEWATER SAMPLING AND ANALYSIS PLAN**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Quarterly during one application event	For field measurement: For each pond, a composite or grab sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.  For laboratory analyses: For each pond, a composite or grab sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	Wastewater Storage Pond #1 Wastewater Storage Pond #2	Date applied and electrical conductivity	Nitrate-nitrogen (only when pond is aerated), un-ionized ammonia-nitrogen, total Kjeldahl nitrogen, total phosphorus, total potassium, and total dissolved solids

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**B. PROCESS WASTEWATER SAMPLING AND ANALYSIS PLAN (CONTINUED)**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Once every two years (biennially)	For each pond, a composite or grab sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	Wastewater Storage Pond #1 Wastewater Storage Pond #2	None required	General minerals, including: calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, and chloride
Each application	For each pond, a composite or grab sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	Wastewater Storage Pond #1 Wastewater Storage Pond #2	Date applied and volume (gallons or acre-inches) applied	None required
Annually	A composite or grab sample prior to blending with irrigation water per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	Wastewater Storage Pond #1 Wastewater Storage Pond #2	None required	pH, total dissolved solids, electrical conductivity, nitrate-nitrogen, ammonium-nitrogen, total Kjeldahl nitrogen, total phosphorus, and total potassium

**C. SOIL SAMPLING AND ANALYSIS PLAN**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Once every five years for each land application area (may be distributed over a 5-year period by sampling 20% of the land application areas annually)	For each field, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	See attached Land application area table	None required	Soluble phosphorus

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**C. SOIL SAMPLING AND ANALYSIS PLAN (CONTINUED)**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Fall pre-plant for each crop	For each field, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	See attached land application area table	None required	0 to 1 foot: Electrical conductivity, nitrate-nitrogen, soluble phosphorus, potassium, and organic matter  1 to 2 feet: Nitrate-nitrogen
Spring pre-plant for each crop	For each field, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	See attached land application area table	None required	0 to 1 foot: Nitrate-nitrogen and organic matter  1 to 2 foot: Nitrate-nitrogen

**D. PLANT TISSUE SAMPLING AND ANALYSIS PLAN**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Each crop harvest from each land application area	For each field and crop, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.  For each field and crop, a scaled weight by truckload will be recorded.	See attached land application area table	Date harvested and total weight (tons) of harvested material removed from each land application area	Percent wet weight of harvested plant removed  Laboratory analyses for total nitrogen, total phosphorus, total potassium (expressed on a dry weight basis), fixed solids (ash), and percent moisture

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**D. PLANT TISSUE SAMPLING AND ANALYSIS PLAN (CONTINUED)**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Mid-season, as necessary to assess need for additional nitrogen fertilizer during the growing season (only required if Discharger wants to add fertilizer in excess of 1.4 times the nitrogen expected to be removed by the harvested portion of the crop)	For each field and crop, a composite sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	See attached land application area table	None required	Total nitrogen, expressed on a dry weight basis

**E. IRRIGATION WATER SAMPLING AND ANALYSIS PLAN**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Each fresh water irrigation event for each land application area	List individual irrigation sources and the measurement method, e.g.:  Irrigation Well 1 - inline totalizing flow meter Irrigation Well 2 - flow rate multiplied by runtime Canal 1 - flow rate multiplied by runtime	Irrigation wells MID Canal	Date applied and volume (gallons or acre-inches) applied	None required
One irrigation event during each irrigation season during actual irrigation events – for each irrigation water source (well and canal)	For each irrigation source, a grab sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected. In lieu of sampling the irrigation water, the Discharger may provide equivalent data from the local irrigation district.	Irrigation wells MID Canal	None required	Electrical conductivity, total dissolved solids, and total nitrogen

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**F. GROUNDWATER MONITORING SAMPLING AND ANALYSIS PLAN**

Frequency	Sampling Methods	Source	Minimum data collection requirements	
			Field Analytes	Lab Analytes
Every five years (may be distributed over a 5-year period by sampling 20% of the wells annually)	For each domestic and agricultural supply well, a grab sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	All domestic wells All irrigation wells	None required	General minerals, including: calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, chloride  Total dissolved solids
Annually	For each domestic and agricultural supply well, a grab sample per the "Approved Sampling Procedures for Nutrient and Groundwater Monitoring at Existing Milk Cow Dairies" will be collected.	All domestic wells All irrigation wells	Electrical conductivity and ammonium-nitrogen	Nitrate-nitrogen.  If field measurement indicates the presence of ammonium-nitrogen, the Discharger shall collect a sample for laboratory analysis of ammonium-nitrogen.

**NUTRIENT MANAGEMENT PLAN REVIEW**

**A. NUTRIENT MANAGEMENT PLAN REVIEW**

Person who created the NMP: Cardoso, Mariann *See above for contact information.*  
Date the NMP was drafted: 07/01/2016  
Person who approved the final NMP: Cardoso, Mariann *See above for contact information.*  
Date of NMP implementation: 07/01/2016

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**ATTACHED MAP AND DOCUMENTATION REFERENCES**

The following list, based upon user selections and data entries, describes the minimum required attachments that must be submitted with the Nutrient Management Plan for the reporting schedule of 'July 1, 2009'.

**A. PRELIMINARY DAIRY FACILITY ASSESSMENT**

The NMP will include the initial Preliminary Dairy Facility Assessment (Attachment A) and the annual updates as required by Monitoring and Reporting Program No. R5-2007-0035. Copies of these assessments shall be maintained for 10 years.

**B. LAND AREA MAP(S)**

Identify each land application area (under the Discharger's control, whether it is owned, rented, or leased, to which manure or process wastewater from the production area is or may be applied for nutrient recycling) on a single published base map

1. A field identification system (Assessor's Parcel Number; land application area; crops grown); indication if each land application is owned, rented, or leased by the Discharger; indication of what type of waste is applied (solid manure only, wastewater only, or both solid manure and wastewater); drainage flow direction in each field, nearby surface waters, and storm water discharge points; tailwater and storm water drainage controls; subsurface (tile) drainage systems (including discharge points and lateral extent); irrigation supply wells and groundwater monitoring wells; sampling locations for discharges of storm water and tailwater to surface water from the field.
2. Process wastewater conveyance structures, discharge points and discharge mixing points with irrigation water supplies; pumping facilities; flow meter locations; drainage ditches and canals, culverts, draining controls (berms, levees, etc.), and drainage easements.

Application area map reference number: Land App Map

Identify each field under control of the Discharger and within five miles of the dairy where neither process wastewater nor manure is applied. Each field shall be identified on a single published base map at an appropriate scale by the following:

1. Assessor's Parcel Number.
2. Total acreage.
3. Information on who owns or leases the field

Non-application area map reference number: N/A

Setbacks, Buffers, and Other Alternatives to Protect Surface Water (see Technical Standard VII):

1. Identify all potential surface waters or conduits to surface water that are within 100 feet of any land application area.
2. For each land application area that is within 100 feet of a surface water or a conduit to surface water, identify the setback, vegetated buffer, or other alternative practice that will be implemented to protect surface water (Technical Standard VII).

Setbacks and buffers map reference number: Fac/Land App Map

**C. PROCESS WASTEWATER WRITTEN AGREEMENTS**

Provide copies of written agreements with third parties that receive process wastewater for their own use from the Discharger's dairy (Technical Standards V.A.1 and V.A.3).



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**SAMPLING AND ANALYSIS PLAN CERTIFICATION**

**A. DAIRY FACILITY INFORMATION**

Name of dairy or business operating the dairy: Manuel Oliveira Dairy

Physical address of dairy:

4235 Oak Ave	Merced	Merced	95340
Physical Address Number and Street	City	County	Zip Code

Street and nearest cross street (if no address): \_\_\_\_\_

**B. DOCUMENTATION OF QUALIFICATIONS AND PLAN DEVELOPMENT**

*I certify that I meet the requirements as a certified specialist in developing nutrient management plans as described in Attachment C of Waste Discharge Requirements General Order No. R5-2007-0035 and that I prepared the Sampling and Analysis plan.*

Technical Service Provider \_\_\_\_\_

TITLE/QUALIFICATIONS OF CERTIFIED NUTRIENT MANAGEMENT SPECIALIST \_\_\_\_\_

Mariann Cardoso

SIGNATURE OF TRAINED PROFESSIONAL

9/14/18

DATE

Mariann Cardoso

PRINT OR TYPE NAME

1993 Prince St; Newman, CA 95360

MAILING ADDRESS

(209) 862-4291

PHONE NUMBER

**C. OWNER AND/OR OPERATOR CERTIFICATION**

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

SIGNATURE OF OWNER OF FACILITY

SIGNATURE OF OPERATOR OF FACILITY

Manuel & Maria Oliveira

PRINT OR TYPE NAME

PRINT OR TYPE NAME

DATE

DATE

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**NUTRIENT BUDGET CERTIFICATION**

**A. DAIRY FACILITY INFORMATION**

Name of dairy or business operating the dairy: Manuel Oliveira Dairy

Physical address of dairy:

4235 Oak Ave

Merced

Merced

95340

Number and Street

City

County

Zip Code

Street and nearest cross street (if no address): \_\_\_\_\_

**B. DOCUMENTATION OF QUALIFICATIONS AND PLAN DEVELOPMENT**

*I certify that I meet the requirements as a certified specialist in developing nutrient management plans as described in Attachment C of Waste Discharge Requirements General Order No. R5-2007-0035 and that I prepared the Nutrient Budget plan.*

Technical Service Provider \_\_\_\_\_

TITLE/QUALIFICATIONS OF CERTIFIED NUTRIENT MANAGEMENT SPECIALIST

Mariann Cardoso

9/14/18

SIGNATURE OF TRAINED PROFESSIONAL

DATE

Mariann Cardoso

PRINT OR TYPE NAME

1993 Prince St; Newman, CA 95360

MAILING ADDRESS

(209) 862-4291

PHONE NUMBER

**C. OWNER AND/OR OPERATOR CERTIFICATION**

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

\_\_\_\_\_  
SIGNATURE OF OWNER OF FACILITY

\_\_\_\_\_  
SIGNATURE OF OPERATOR OF FACILITY

Manuel & Maria Oliveira

PRINT OR TYPE NAME

\_\_\_\_\_  
PRINT OR TYPE NAME

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DATE

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**STATEMENTS OF COMPLETION**

Waste Discharge Requirements General Order No. R5-2007-0035 for Existing Milk Cow Dairies (General Order) requires owners and operators of existing milk cow dairies (Dischargers) to develop and implement a Nutrient Management Plan for their land application areas (land under control of the Discharger, whether it is owned, rented, or leased, to which manure or process wastewater from the production area is or may be applied for nutrient cycling). The Discharger is required to maintain the NMP at the dairy, make the NMP available to Central Valley Water Board staff during their inspections, and submit the NMP to the Executive Officer upon request.

The General Order requires the Discharger to submit two Statements of Completion during development of the NMP. The Discharger may use this form to comply with the General Order requirement to submit one or both of these Statements of Completion. Parts A and E must be completed for each Statement of Completion. Parts B, C and D are to be completed for the Statements of Completion due by 1 July 2008, 31 December 2008 and 1 July 2009, respectively. Both the owner and the operator of the dairy must sign this form in Part E below.

**A. DAIRY FACILITY INFORMATION**

Name of dairy or business operating the dairy: Manuel Oliveira Dairy

<u>4235 Oak Ave</u>	<u>Merced</u>	<u>Merced</u>	<u>95340</u>
Number and Street	City	County	Zip Code

Street and nearest cross street (if no address): \_\_\_\_\_

Operator name: \_\_\_\_\_ Telephone no.: \_\_\_\_\_

	<u>Landline</u>	<u>Cellular</u>
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<u>Mailing Address Number and Street</u>	<u>City</u>	<u>State</u>	<u>Zip Code</u>
--	-------------	--------------	-----------------

Legal owner name: Oliveira, Manuel & Maria Telephone no.: (209) 388-0501

	<u>Landline</u>	<u>Cellular</u>
--	-----------------	-----------------

<u>4235 Oak Ave</u>	<u>Merced</u>	<u>CA</u>	<u>95340</u>
Mailing Address Number and Street	City	State	Zip Code

**Nutrient Management Plan Report**  
General Order No. R5-2007-0035, Attachment C  
July 1, 2009 deadline

**B. STATEMENT OF COMPLETION DUE 1 JULY 2008**

I have completed the following items of the Nutrient Management Plan (check the boxes of completed sections), which are due 1 July 2008:

☐ **Item I.A.1 Land Application Information**

Identification of land used for manure application and needed information on a facility map.

☐ **Item I.B Land Application Information**

Information list for information provided on map above.

☐ **Item I.C Land Application Information**

Copies of written third-party process wastewater agreements.

☐ **Item I.D Land Application Information**

Identification of fields under control of the discharger within five miles of the dairy where neither process wastewater nor manure is applied.

☐ **Item II Sampling and Analysis Plan**

☐ **Item IV Setbacks, Buffers, and Other Alternatives to Protect Surface Water**

Identification of all potential surface waters or conduits to surface waters within 100 feet of land application areas and appropriate protection.

☐ **Item VI Record-Keeping Requirements**

Identification of monitoring records that will be maintained as required in the production and land application areas.

Has Item II (Sampling and Analysis Plan) of the Nutrient Management Plan been certified by a Certified Nutrient Management Specialist as required in the General Order?

☐ Yes ☐ No

**C. STATEMENT OF COMPLETION DUE 31 DECEMBER 2008**

I have completed the following items of the Nutrient Management Plan (check the boxes of completed sections), which are due 31 December 2008:

☐ **Item V Field Risk Assessment**

Evaluation of the effectiveness of management practices used to control the discharge of waste constituents from land application areas by assessing the water quality monitoring results of discharges of manure, process wastewater, tailwater, subsurface (tile) drainage, or storm water from the land application areas.

**D. STATEMENT OF COMPLETION DUE 1 JULY 2009**

I have completed the following items of the Nutrient Management Plan (check the boxes of completed sections), which are due 1 July 2009:

☐ **Item I.A.2 Land Application Area Information**

Identification of process wastewater conveyance, mixing and drainage information for each land application area on a facility map.

☐ **Item III Nutrient Budget**

Established planned rates of nutrient applications by crop based on nutrient monitoring results for each land application area.

Has Item III (Nutrient Budget) of the Nutrient Management Plan been certified by a Certified Nutrient Management Specialist as required in the General Order?

☐ Yes ☐ No



**Nutrient Management Plan Report**  
General Order No. R5-2007-0035, Attachment C  
July 1, 2009 deadline

**E. CERTIFICATION STATEMENT**

*I certify under penalty of law that I have completed the items of the Nutrient Management Plan that are checked in Parts B, C and/or D above for the dairy identified in Part A above and that the appropriate certified nutrient management specialist has certified the items requiring such certification as noted in part B and/or D above and that I have personally examined and am familiar with the information submitted in Parts A, B, C and D of this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

SIGNATURE OF OWNER OF FACILITY

SIGNATURE OF OPERATOR OF FACILITY

Manuel & Maria Oliveira




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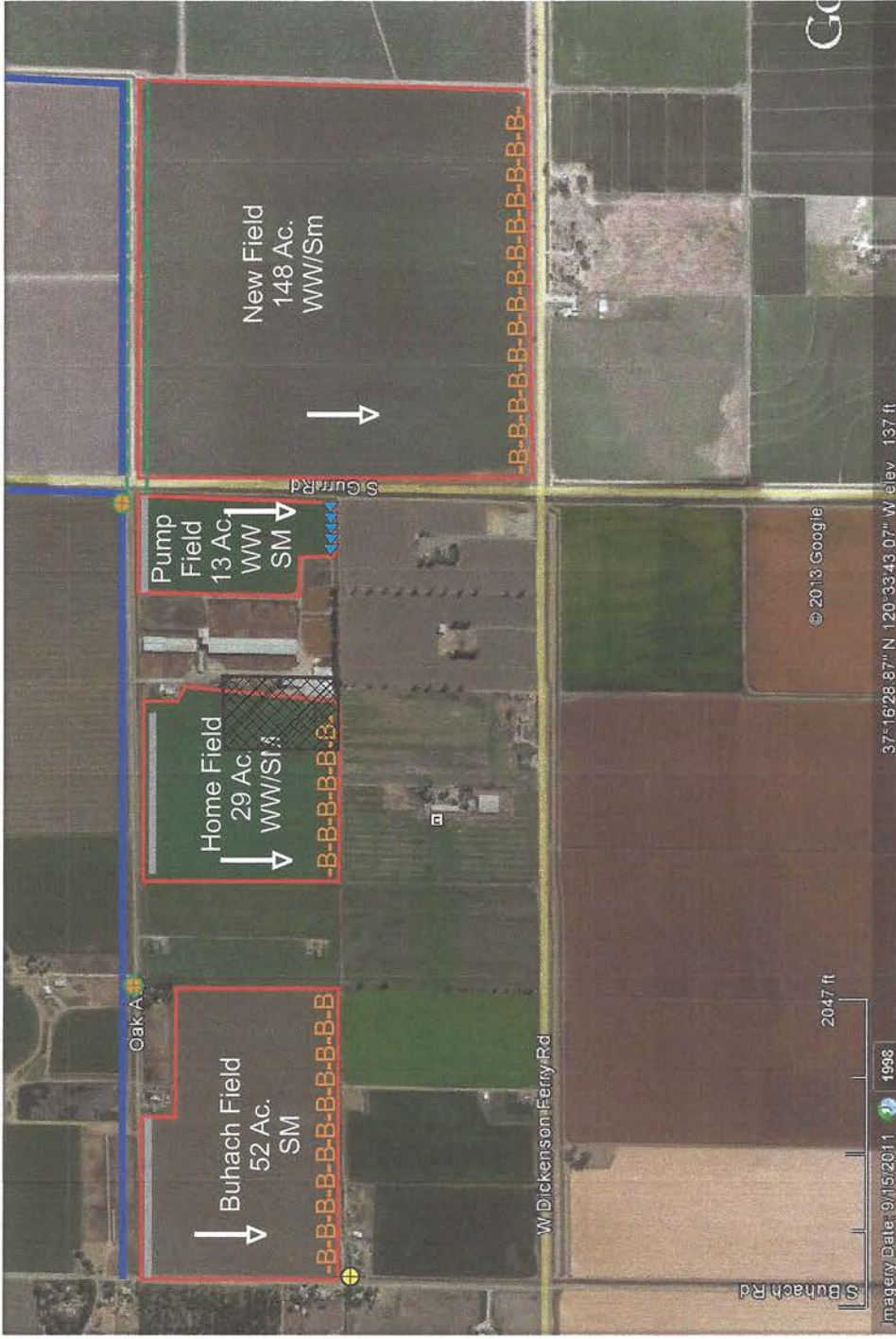
PRINT OR TYPE NAME


DATE

DATE


**Legend:**

- Field Boundary
- Flow Direction
- B-B- Berm
-  Irrigation Well
- Irrigation Pipeline
- Irrigation Ditch
- MID Canal
- <<<< Tail Water
-  Drain (Capped)
-  Proposed Facility





**CARDOSO AG SERVICES**



2047 Ft.  
Scale

Project No.

**Manuel Oliviera Dairy**  
 4235 Oak Ave.  
 Merced, CA 95341

Date:	Drawn By:	App By:
01/14/2016	DA	MC

## Field Map Proposed



**WASTE MANAGEMENT PLAN  
FOR  
MANUEL OLIVEIRA DAIRY  
MERCED COUNTY, CA**

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- c. Results and Conclusions

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- c. Sheet 3 – Site Map – Production Area
- d. Sheet 4 – Site Map – Production Area, Heifer Corrals
- e. Sheet 5 – Production Area Hydrologic Map
- f. Sheet 6 – Production Area Hydrologic Map – Heifer Corrals
- g. Sheet 7 – FEMA Panel No. 06047C0150G

**3. DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE DOCUMENTATION**

- a. Waste Management Plan Report / Process Wastewater Calculations
- b. Production Area Design & Construction Report
- c. Backflow Prevention Documentation
- d. Flood Protection Analysis
- e. Vector Control Plan



## 1. NARRATIVE

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## **INTRODUCTION**

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This Waste Management Plan (WMP) has been prepared at the request of the subject dairy's owner and/or operator in order to comply with Section H.1.b., *Waste Management Plan*, of Order No. R5-2013-0122, *Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies*, (Order) adopted by the California Regional Water Quality Control Board (CRWQCB) Central Valley Region. Per the requirements set forth by the aforementioned Order it is the intent of this plan to provide an evaluation of the existing milk cow facility's design, construction, operation, and maintenance for flood protection and waste containment and to determine whether the facility complies with Prohibition A.14 and General Specifications B.1 through B.3 and B.10 through B.16. Should the evaluation provided by this plan determine that the existing facility does not comply with the requirements of the Order, then modifications will be proposed for the facility that will bring it into compliance and those modifications shall be made a part of this plan.

## COMPLIANCE CRITERIA

As required by the Order this plan must evaluate the existing facility's compliance with Prohibition A.14 and General Specifications B.1 through B.3 and B.10 through B.16. The criteria set forth by this Prohibition and General Specifications are as follows:

**Prohibition A.14:** *"The direct discharge of wastewater into groundwater via backflow through water supply or irrigation supply wells is prohibited."*

The water, irrigation, and wastewater systems of this facility have been examined by a Registered Civil Engineer licensed in the State of California. There is one location noted on Exhibit Sheet 3 that has the potential for discharge of wastewater into groundwater. An existing irrigation well pumps directly into an irrigation pipeline; the same irrigation pipeline also receives wastewater from a pump at one of the existing wastewater ponds. Currently backflow is prevented by a check valve; however the check valve does not meet current regulatory requirements. As stated in Section 3.d., Backflow Prevention Documentation, it is recommended that a compliant check valve be installed or a compliant air gap be constructed at this location.

**General Specification B.1:** *"The existing milk cow dairy shall have facilities that are designed, constructed, operated, and maintained to retain all facility process wastewater generated during the storage period (maximum period of time anticipated between land application of process wastewater), together with all precipitation on and drainage through manured areas, up to and including during a 25-year, 24-hour storm (see item II of Attachment B, which is attached to and made part of this Order)."*

Attachment B is contained in Section 3.d. of this plan and demonstrates the facility's ability to retain all process wastewater and precipitation generated by the 25-year, 24-hour storm. The tributary areas for storm drain runoff were determined by utilizing field measurements and aerial photography.

The existing Wastewater Basins (WW) were also field measured. Depths were determined by field measurements.

**General Specification B.2:** *"In the Sacramento and San Joaquin River Basins, ponds and manured areas at existing milk cow dairies in operation on or before 27 November 1984 shall be protected from inundation or washout by overflow from any stream channel during 20-year peak stream flows. Existing milk cow dairies that were in operation on or before 27 November 1984 and that are protected against 100-year peak stream flows must continue to provide such protection. Existing milk cow dairies built or expanded after 27 November 1984 shall be protected against 100-year peak stream flows (Title 27 Section 22562(c))."*

The facility is in the San Joaquin River Basin and was constructed before 27 November 1984. However the facility has been expanded since 27 November 1984 and thus must have protection against the 100-year storm event. The relevant Flood Zone Maps published by the Federal Emergency Management Agency (FEMA) are Panel Nos. 06047C150G and 06047C350G. This map indicates that the existing dairy facility is in Zone A and is thus subject to inundation by the 100-year storm event. An analysis describing locations and levels of inundation and recommended protection measures is included in the Plan in Section 3.d.

**General Specification B.3:** *“In the Tulare Lake Basin, existing milk cow dairies that existed as of 25 July 1975 shall be protected from inundation or washout from overflow from any stream channel during 20-year peak stream flows and existing milk cow dairies constructed after 25 July 1975 shall be protected from 100-year peak stream flows. Existing milk cow dairies expanded after 8 December 1984 shall be protected from 100-year peak stream flows.”*

As the facility is in the San Joaquin River Basin this specification is not applicable.

**General Specification B.10:** *“The level of waste in the process wastewater retention ponds shall be kept a minimum of two (2) feet from the top of each aboveground embankment and a minimum of one (1) foot from the ground surface of each belowground pond. Less freeboard may be approved by the Executive Officer when a Civil Engineer who is registered pursuant to California law, or other person as may be permitted under the provisions of the California Business and Professions Code to assume responsible charge of such work, demonstrates that the structural integrity of the pond will be maintained with the proposed freeboard.*

1' of freeboard has been assigned to the all wastewater retention ponds as all of the ponds have been constructed largely below grade.

**General Specification B.11:** *“Ponds shall be managed and maintained to prevent breeding of mosquitoes and other vectors. In particular,*

- a. Small coves and irregularities shall not be allowed around the perimeter of the water surface;*
- b. Weeds shall be minimized through control of water depth, harvesting, or other appropriate method;*
- c. Dead algae, vegetation, and debris shall not accumulate on the water surface; and*
- d. Management shall be in accordance with the requirements of the Mosquito Abatement District.”*

An Operations and Maintenance Plan addressing these items has been included in Section 3.a. and is hereby made a part of this plan.

**General Specification B.12:** *“All precipitation and surface drainage from outside of the existing milk cow dairy (i.e., “run on”) shall be diverted away from any manured areas unless such drainage is fully contained (Title 27 Section 22562(b)).”*

Precipitation and surface drainage outside of the Dairy Production Area (DPA, Exhibit Sheet 3) are diverted away from the DPA or are self-contained.

**General Specification B.13:** *“Ponds designated to contain the 25-year, 24-hour storm event runoff must have a depth marker that clearly indicates the minimum capacity necessary to contain the runoff and direct precipitation from a 25-year, 24-hour storm event.”*

A marker meeting this specification will be installed in all of the facility's ponds by the compliance date.

**General Specification B.14:** *“All roofs, buildings, and non-manured areas located in the production area of the existing milk cow dairy shall be constructed or otherwise designed so that clean rainwater is diverted away from manured areas and waste containment facilities, unless such drainage is fully contained in the wastewater retention system (Title 27 Section 22562(b)).”*

Exhibit Sheet 4, “Production Area Hydrologic Map”, indicates all areas that contribute runoff to the wastewater retention system. All other areas are diverted away from the wastewater retention system or are self-contained.

**General Specification B.15:** *“Roof drainage from barns, milk houses, or shelters shall not drain into the corrals unless the corrals are properly graded and drained (Title 3 CCR, Division 2, Chapter 1, Article 22, Section 661).”*

Roof drainage on this facility will be collected by gutters and directed fields; the destination of roof drainage for structures in the DPA is indicated in Section 3.a., *Waste Management Plan Report*.

**General Specification B.16:** *“The milk parlor, animal confinement area (including corrals), and manure and feed storage areas shall be designed and maintained to convey all water that has contacted animal wastes or feed to the wastewater retention system and to minimize standing water as of 72 hours after the last rainfall and the infiltration of water into the underlying soils.*

The milk parlor, animal confinement areas, and the feed storage area are constructed or will be constructed in such a manner to convey water that has contacted animal wastes or feed to the wastewater retention system and to minimize standing water.

## **RESULTS AND CONCLUSIONS**

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After conducting a visual inspection of the site, obtaining herd and facility information from the operator, performing the required measurements of facility improvements, and performing the calculations included in Attachment B it has been determined that the design, construction, operation, and waste containment of this facility are in compliance with Prohibition A.14 and General Specifications B.1 through B.3 and B.10 through B.16 of Order No. R5-2013-0122, *Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies*.

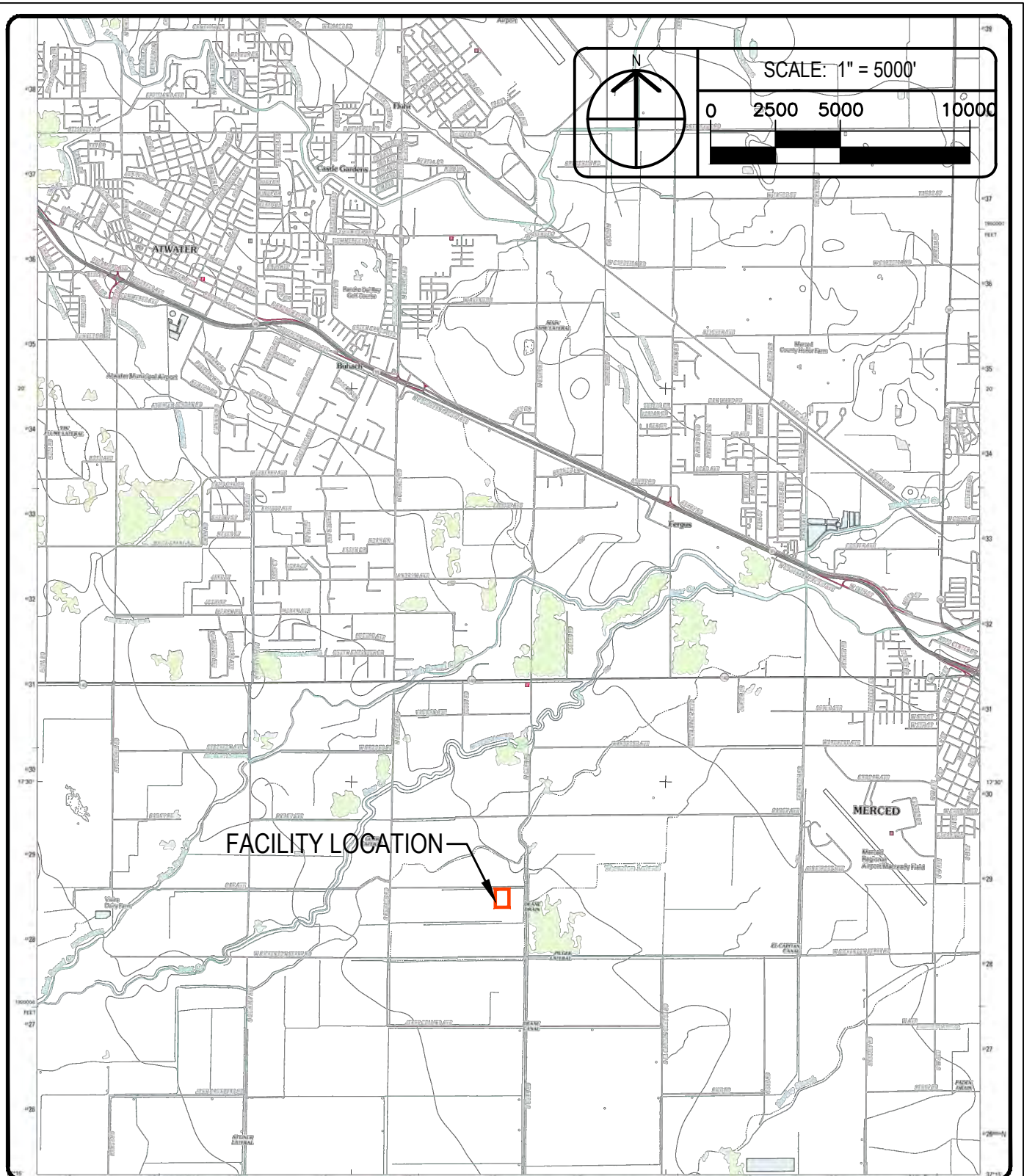
Some improvements will be required to ensure that the proposed facility expansion meets the General Order's requirements for flood protection. Those improvements are described in detail in Section 3.d., *Flood Protection Analysis*, of this Plan.

## 2. EXHIBITS

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### 3. DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE DOCUMENTATION





**SOUSA**  
ENGINEERING  
INFRASTRUCTURE - DEVELOPMENT -  
AGRICULTURE

PO BOX 1613  
OAKDALE, CA 95361

PH: (209)238-3151  
WWW.SOUSAENG.COM

VICINITY MAP

MANUEL OLIVEIRA DAIRY

MERCED COUNTY,

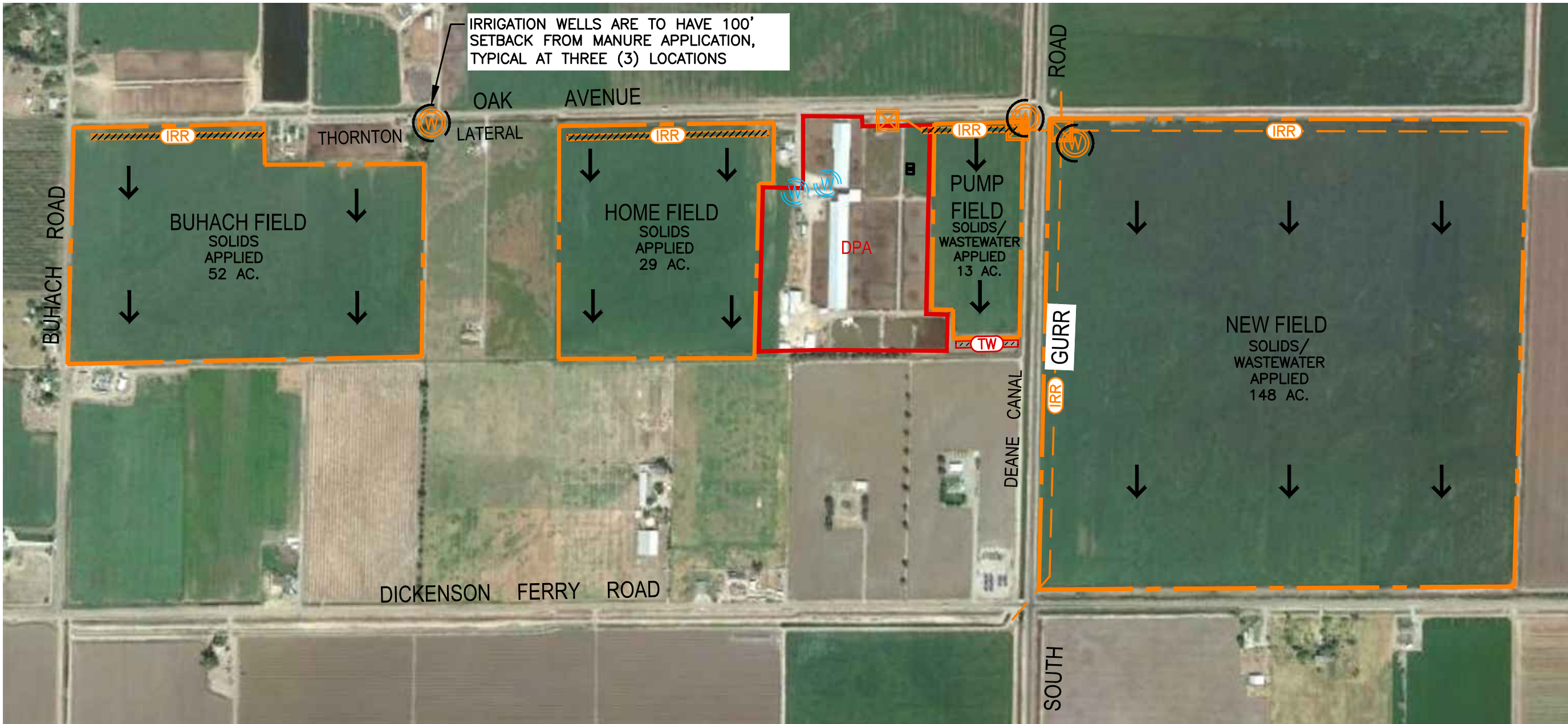
CA

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DATE: 10/29/15

FILE:01\_VIC

JOB NO.:2015-025



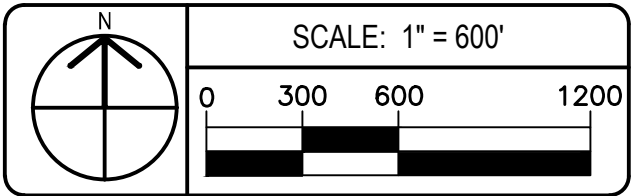
IRRIGATION WELLS ARE TO HAVE 100' SETBACK FROM MANURE APPLICATION, TYPICAL AT THREE (3) LOCATIONS

LEGEND

- LAND APPLICATION AREA
- IRRIGATION LINE
- IRRIGATION DITCH
- IRRIGATION CONTROL BOX
- IRRIGATION STANDPIPE

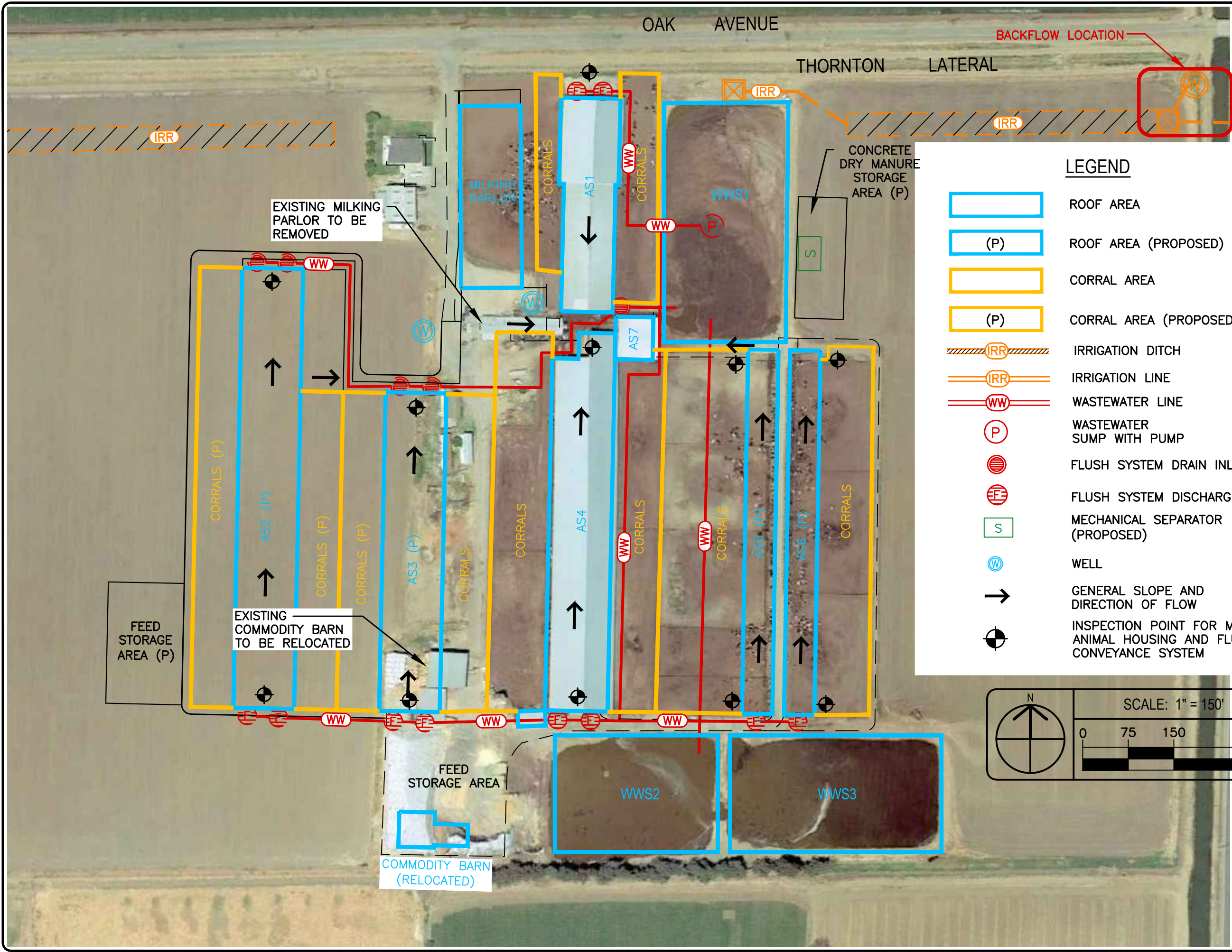
- IRRIGATION WELL
- TAILWATER DITCH
- DOMESTIC WELL
- GENERAL SLOPE AND DIRECTION OF FLOW

DISCHARGE POINTS		
LAND APP. AREA	LATITUDE	LONGITUDE
BUHACH FIELD	N37° 16' 41.83"	W120° 34' 31.62"
HOME FIELD	N37° 16' 42.70"	W120° 34' 02.25"
PUMP FIELD	N37° 16' 43.85"	W120° 33' 40.83"
NEW FIELD	N37° 16' 37.26"	W120° 33' 20.95"



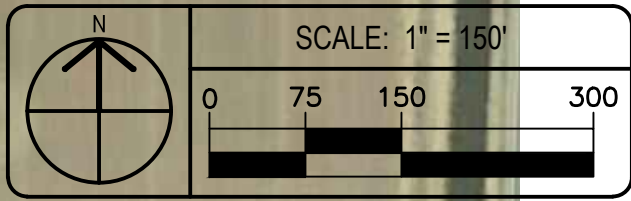
SYMBOL	REVISIONS DESCRIPTION	APPD.





**LEGEND**

- ROOF AREA
- ROOF AREA (PROPOSED)
- CORRAL AREA
- CORRAL AREA (PROPOSED)
- IRRIGATION DITCH
- IRRIGATION LINE
- WASTEWATER LINE
- WASTEWATER SUMP WITH PUMP
- FLUSH SYSTEM DRAIN INLET
- FLUSH SYSTEM DISCHARGE VALVE
- MECHANICAL SEPARATOR (PROPOSED)
- WELL
- GENERAL SLOPE AND DIRECTION OF FLOW
- INSPECTION POINT FOR MONITORING ANIMAL HOUSING AND FLUSH WATER CONVEYANCE SYSTEM



SHEET 3 OF 5

**Sousa Engineering**  
INFRASTRUCTURE - DEVELOPMENT - AGRICULTURE

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WWW.SOUSAENG.COM

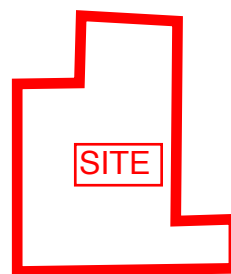
**SITE MAP - PRODUCTION AREA**  
MANUEL OLIVEIRA DAIRY  
MERCED COUNTY, CA

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DATE: 7/30/2018  
FILE: 03\_dpa\_revised site 2016.dwg  
JOB NO.: 2015-025

REVISIONS		APPD.
SYMBOL	DESCRIPTION	







**Waste Management Plan Report**  
General Order No. R5-2007-0035, Attachment B  
July 1, 2010 deadline

**DAIRY FACILITY INFORMATION**

**A. NAME OF DAIRY OR BUSINESS OPERATING THE DAIRY:** Manuel Oliveira Dairy

Physical address of dairy:

<u>4235 Oak AVE</u>	<u>Merced</u>	<u>Merced</u>	<u>95340</u>
Number and Street	City	County	Zip Code

Street and nearest cross street (if no address): \_\_\_\_\_

TRS Data and Coordinates:

<u>7S</u>	<u>13E</u>	<u>32</u>	<u>Mt. Diablo</u>	<u>37° 16' 47.91" N</u>	<u>120° 33' 51.48" W</u>
Township (T_)	Range (R_)	Section (S_)	Baseline meridian	Latitude (N)	Longitude (W)

Date facility was originally placed in operation: 01/01/1970

Regional Water Quality Control Board Basin Plan designation: San Joaquin River Basin

County Assessor Parcel Number(s) for dairy facility:

0059-0190-0026-0000

**B. OPERATOR NAME:** Oliveira, Manuel & Maria Telephone no.: (209) 388-0501

Landline Cellular

<u>4235 Oak AVE</u>	<u>Merced</u>	<u>CA</u>	<u>95340</u>
Mailing Address Number and Street	City	State	Zip Code

Operator should receive Regional Board correspondence (check): ☒ Yes ☐ No

**C. LEGAL OWNER NAME:** Oliveira, Manuel & Maria Telephone no.: (209) 388-0501

Landline Cellular

<u>4235 Oak AVE</u>	<u>Merced</u>	<u>CA</u>	<u>95340</u>
Mailing Address Number and Street	City	State	Zip Code

Owner should receive Regional Board correspondence (check): ☒ Yes ☐ No

**D. CONTACT NAME:** Cardoso, Mariann Telephone no.: (209) 277-2817

Landline Cellular

Title: Technical Service Provider

<u>1993 Prince ST</u>	<u>Newman</u>	<u>CA</u>	<u>95360</u>
Mailing Address Number and Street	City	State	Zip Code

**CONTACT NAME:** Sousa, Manny Telephone no.: (209) 238-3151

Landline Cellular

Title: Registered Civil Engineer

<u>P.O. Box 1613</u>	<u>Oakdale</u>	<u>CA</u>	<u>95361</u>
Mailing Address Number and Street	City	State	Zip Code



**Waste Management Plan Report**  
General Order No. R5-2007-0035, Attachment B  
July 1, 2010 deadline

**HERD AND MILKING EQUIPMENT**

**A. HERD AND MILKING**

The milk cow dairy is currently regulated under individual Waste Discharge Requirements.

Total number of milk and dry cows combined as a baseline value in response to the Report of Waste Discharge (ROWD) request of October, 2005:

2,900 milk and dry cows combined (regulatory review is required for any expansion)

Type of Animal	Present Count	Maximum Count	Daily Flush Hours	Avg Live Weight (lbs)
Milk Cows	2,500	2,500	22	1,400
Dry Cows	400	400	6	1,500
Bred Heifers (15-24 mo.)	375	375	6	1,100
Heifers (7-14 mo.)	375	375	6	775
Calves (4-6 mo.)	375	375	6	
Calves (0-3 mo.)	375	375	0	

Predominant milk cow breed:

Holstein

Average milk production:

65 pounds per cow per day

Average number of milk cows per string sent to the milkbarn:

120 milk cows per string

Number of milkings per day:

2.0 milkings per day

Number of times milk tank is emptied/filled each day:

2.0 per day

Number of hours spent milking each day:

20.0 hours per day

**B. MILKBARN EQUIPMENT AND FLOOR WASH**

Bulk tank wash and sanitizing:

4.0 run cycles/wash

Bulk tank wash vat volume:

50 gallons/cycle

Bulk tank wash wastewater:

400.0 gallons/day

Pipeline wash and sanitizing:

4.0 run cycles/wash

Pipeline wash vat volume:

100 gallons/cycle

Pipeline wash wastewater:

800.0 gallons/day

Reused / recycled water is the source of parlor floor wash water:

☒ Yes   ☐ No

Milkbarn / parlor floor wash volume:

7,500 gallons/day

Plate coolers type:

Mechanically/Air Cooled

Plate coolers volume:

0 gallons/day

Vacuum pumps / air compressors / chillers type:

Mechanically/Air Cooled

Vacuum pumps / air compressors / chillers volume:

0 gallons/day

Milkbarn and equipment wastewater volume generated daily:

8,700 gallons/day

**Waste Management Plan Report**  
General Order No. R5-2007-0035, Attachment B  
July 1, 2010 deadline

**C. OTHER WATER USES**

Reused/recycled water is the source of herd drinking water: ☐ Yes ☒ No

	Milk Cows	Dry Cows	Bred Heifers (15-24 mo.)	Bred Heifers (7-14 mo.)	Calves (4-6 mo.)	Calves (0-3 mo.)
Number of cows drinking from reusable water:	0	0	0	0	0	0
	of 2,500	of 400	of 375	of 375	of 375	of 375
Gallons per head per day:	0	0	0	0	0	0

Total reusable water consumed by herd: \_\_\_\_\_ 0 gallons/day

Reused/recycled water is the source of sprinkler pen water: ☒ Yes ☐ No

Number of sprinklers in the holding pen: \_\_\_\_\_ 100 sprinklers

Duration of each sprinkler cycle: \_\_\_\_\_ 0.1 minutes

Number of sprinkler pen runs/milking: \_\_\_\_\_ 0 cycles/milking

Flow rate for each sprinkler head: \_\_\_\_\_ 0.1 gallons/minute

Total sprinkler pen wastewater volume: \_\_\_\_\_ 0 gallons/day

Total fresh water used in manure flush lane system(s): \_\_\_\_\_ 0 gallons/day

**D. MISCELLANEOUS EQUIPMENT**

*No miscellaneous equipment entered.*

**E. MILKBARN AND EQUIPMENT SUMMARY**

Number of days in storage period: \_\_\_\_\_ 120 days

Water available for reuse/recycle: \_\_\_\_\_ 0 gallons/day

Recycled water reused: \_\_\_\_\_ 7,500 gallons/day

Recycled water leaving system: \_\_\_\_\_ 0 gallons/day

Reusable water balance: \_\_\_\_\_ 0 gallons/day

Volume of milkbarn and equipment wastewater generated for storage period: \_\_\_\_\_ 1,044,000 gallons/storage period

**MANURE AND BEDDING SOLIDS**

**A. IMPORTED AND FACILITY GENERATED BEDDING**

Bedding Type	Imported or Generated (tons)	Density (lbs/cu. ft.)	Applied Separation Efficiency (default)	Solids to Pond (cu. ft./period)
Facility generated bedding	92	40.0	50%	2,300
Total:				2,300

**B. SOLIDS SEPARATION PROCESS**

Combined manure solids separation efficiency (weight basis): \_\_\_\_\_ 30 %

Description of all solids separation equipment used in flushed lane manure management systems:

Mechanical Separator (to be added with facility expansion)

**Waste Management Plan Report**  
General Order No. R5-2007-0035, Attachment B  
July 1, 2010 deadline

**C. MANURE AND BEDDING SOLIDS SUMMARY**

	cubic feet		gallons	
	day	storage period	day	storage period
Manure generated by the herd (pre-separation):	6,911.60	829,393	51,702.40	6,204,287
Manure generated by the herd sent to pond(s):	4,831.45	579,775	36,141.79	4,337,014
Manure generated by the herd sent to dry lot(s):	1,549.95	185,994	11,594.40	1,391,328
Manure solids (herd) removed by separation:	256.67	30,800	1,920.03	230,403
Liquid component in separated solids not sent to pond(s):	273.53	32,824	2,046.18	245,542
Imported and facility generated bedding sent to pond(s):	19.17	2,300	143.38	17,205
Total manure and bedding sent to pond(s):	4,850.62	582,075	36,285.16	4,354,220
Residual manure solids and bedding sent to pond(s) w/factor:	309.03	37,084	2,311.72	277,406
	cubic feet per year		gallons per year	
Residual manure solids and bedding sent to pond(s) w/factor:	112,797		843,777	

**RAINFALL AND RUNOFF**

**A. RAINFALL ESTIMATES**

Rainfall station nearest the facility: Merced

25 year/24 hour storm event (default NOAA Atlas 2, 1973): 2.50 inches/storage period

25 year/24 hour storm event (user-override):          inches/storage period

Storage period rainfall (default DWR climate data): 8.05 inches/storage period

Storage period rainfall (user-override):          inches/storage period

Flood zone: Zone A

**B. IMPERVIOUS AREAS**

Name	Surface Area (sq. ft.)	Quantity	25yr/24hr Storm Runoff Coefficient	Storage Period Runoff Coefficient	Runoff Destination
Impervious Area - IA1	43,500	1	0.95	0.50	Drains into pond(s).
Impervious Area - IA2	92,700	1	0.95	0.50	Drains into pond(s).
Impervious Area - IA3	1,900	1	0.95	0.50	Drains into pond(s).
Impervious Area - IA4	8,350	1	0.95	0.50	Drains into pond(s).
Impervious Area - IA5	16,000	1	0.95	0.50	Drains into pond(s).

**Waste Management Plan Report**  
General Order No. R5-2007-0035, Attachment B  
July 1, 2010 deadline

Surface area that does not run off into pond(s): 0 sq. ft.

Surface area that runs off into pond(s): 162,450 sq. ft.

Total surface area: 162,450 sq. ft.

Runoff from normal storage period rainfall: 407,602 gallons/storage period

Runoff from normal storage period rainfall with 1.5 factor: 611,403 gallons/storage period

25 year/24 hour storm event runoff: 240,510 gallons/storage period

Total surface area runoff: 648,112 gallons/storage period

Total surface area runoff with 1.5 factor: 851,913 gallons/storage period

**C. ROOF AREAS**

Name	Surface Area (sq. ft.)	Quantity	Runoff Destination
Animal Shelter - AS1	31,750	1	Field / Stormwater Pond
Animal Shelter - AS2 (proposed)	62,500	1	Field / Stormwater Pond
Animal Shelter - AS3 (proposed)	62,500	1	Field / Stormwater Pond
Animal Shelter - AS4	62,320	1	Field / Stormwater Pond
Animal Shelter - AS5 (proposed)	30,000	1	Field / Stormwater Pond
Animal Shelter - AS6 (proposed)	30,000	1	Field / Stormwater Pond
Animal Shelter - AS7	4,340	1	Field / Stormwater Pond
Commodity Barn	5,335	1	Field / Stormwater Pond
Milking Parlor - proposed	30,000	1	Field
Shed	1,125	1	Field / Stormwater Pond

Surface area that does not run off into pond(s): 319,870 sq. ft.

Surface area that runs off into pond(s): 0 sq. ft.

Total surface area: 319,870 sq. ft.

Runoff from normal storage period rainfall: 0 gallons/storage period

Runoff from normal storage period rainfall with 1.5 factor: 0 gallons/storage period

25 year/24 hour storm event runoff: 0 gallons/storage period

Total surface area runoff: 0 gallons/storage period

Total surface area runoff with 1.5 factor: 0 gallons/storage period

**D. EARTHEN AREAS**

Name	Surface Area (sq. ft.)	Quantity	25yr/24 Storm Coefficient	Storage Period Coefficient	Runoff Destination
Earthen Area - EA1	21,100	1	0.35	0.20	Drains into pond(s).
Earthen Area - EA2	24,300	1	0.35	0.20	Drains into pond(s).
Earthen Area - EA3	75,400	1	0.35	0.20	Drains into pond(s).
Earthen Area - EA4	87,500	1	0.35	0.20	Drains into pond(s).

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Earthen Area - EA5	99,500	1	0.35	0.20	Drains into pond(s).
Earthen Area - EA6	132,000	1	0.35	0.20	Drains into pond(s).
Earthen Area - EA7	58,000	1	0.35	0.20	Drains into pond(s).
Earthen Area - EA8	14,600	1	0.35	0.20	Drains into pond(s).

Surface area that does not run off into pond(s):	<u>0</u> sq. ft.
Surface area that runs off into pond(s):	<u>512,400</u> sq. ft.
Total surface area:	<u>512,400</u> sq. ft.
Runoff from normal storage period rainfall:	<u>514,263</u> gallons/storage period
Runoff from normal storage period rainfall with 1.5 factor:	<u>771,395</u> gallons/storage period
25 year/24 hour storm event runoff:	<u>279,491</u> gallons/storage period
Total surface area runoff:	<u>793,754</u> gallons/storage period
Total surface area runoff with 1.5 factor:	<u>1,050,886</u> gallons/storage period

**E. TAILWATER MANAGEMENT**

*No fields with tailwater entered.*

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LIQUID STORAGE

**A. POND OR BASIN DESCRIPTION:** WWS1

Pond is rectangular in shape: ☒ Yes ☐ No

Dimensions			
Earthen Length (EL):	<u>391</u> ft.	Earthen Depth (ED):	<u>10</u> ft.
Earthen Width (EW):	<u>200</u> ft.	Side Slope (S):	<u>1.4</u> ft. (h:1v)
Free Board (FB):	<u>1</u> ft.	Dead Storage Loss (DS):	<u>2.0</u> ft.
Calculations			
Liquid Length (LL):	<u>388</u> ft.	Storage Volume Adjusted for Dead Storage Loss:	<u>496,609</u> cu. ft.
Liquid Width (LW):	<u>197</u> ft.		
Pond Surface Area:	<u>78,200</u> sq. ft.	Pond Marker Elevation:	<u>8.4</u> ft.
Storage Volume:	<u>624,498</u> cu. ft.	Evaporation Volume:	<u>477,443</u> gals/period
		Adjusted Surface Area:	<u>76,095</u> sq. ft.

**POND OR BASIN DESCRIPTION:** WWS2

Pond is rectangular in shape: ☒ Yes ☐ No

Dimensions			
Earthen Length (EL):	<u>284</u> ft.	Earthen Depth (ED):	<u>7</u> ft.
Earthen Width (EW):	<u>203</u> ft.	Side Slope (S):	<u>3.7</u> ft. (h:1v)
Free Board (FB):	<u>1</u> ft.	Dead Storage Loss (DS):	<u>0.0</u> ft.
Calculations			
Liquid Length (LL):	<u>277</u> ft.	Storage Volume Adjusted for Dead Storage Loss:	<u>265,663</u> cu. ft.
Liquid Width (LW):	<u>196</u> ft.		
Pond Surface Area:	<u>57,652</u> sq. ft.	Pond Marker Elevation:	<u>5.4</u> ft.
Storage Volume:	<u>265,663</u> cu. ft.	Evaporation Volume:	<u>333,089</u> gals/period
		Adjusted Surface Area:	<u>53,088</u> sq. ft.



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**POND OR BASIN DESCRIPTION:** WWS3

Pond is rectangular in shape: ☒ Yes ☐ No

Dimensions			
Earthen Length (EL):	<u>345 ft.</u>	Earthen Depth (ED):	<u>7 ft.</u>
Earthen Width (EW):	<u>200 ft.</u>	Side Slope (S):	<u>3.7 ft. (h:1v)</u>
Free Board (FB):	<u>1 ft.</u>	Dead Storage Loss (DS):	<u>0.0 ft.</u>
Calculations			
Liquid Length (LL):	<u>338 ft.</u>	Storage Volume Adjusted for Dead Storage Loss:	<u>323,451 cu. ft.</u>
Liquid Width (LW):	<u>193 ft.</u>		
Pond Surface Area:	<u>69,000 sq. ft.</u>	Pond Marker Elevation:	<u>5.4 ft.</u>
Storage Volume:	<u>323,451 cu. ft.</u>	Evaporation Volume:	<u>400,841 gals/period</u>
		Adjusted Surface Area:	<u>63,886 sq. ft.</u>

Potential storage losses (due to dead storage): 127,889.0 cubic feet - or - 956,676.2 gallons

Liquid storage surface area: 195,678 sq. ft.

Rainfall onto retention pond(s): 1,027,985 gallons/storage period

Rainfall runoff into retention pond(s): 921,865 gallons/storage period

Normal rainfall onto retention pond(s) with 1.5 factor: 1,541,977 gallons/storage period

Normal rainfall runoff into retention pond(s) with 1.5 factor: 1,382,798 gallons/storage period

Storage period evaporation (default): 13.42 inches/storage period

Storage period evaporation (user-override):                      inches/storage period

Storage period evaporation volume: 1,211,373 gallons/storage period

Manure and bedding sent to pond(s): 4,354,220 gallons/storage period

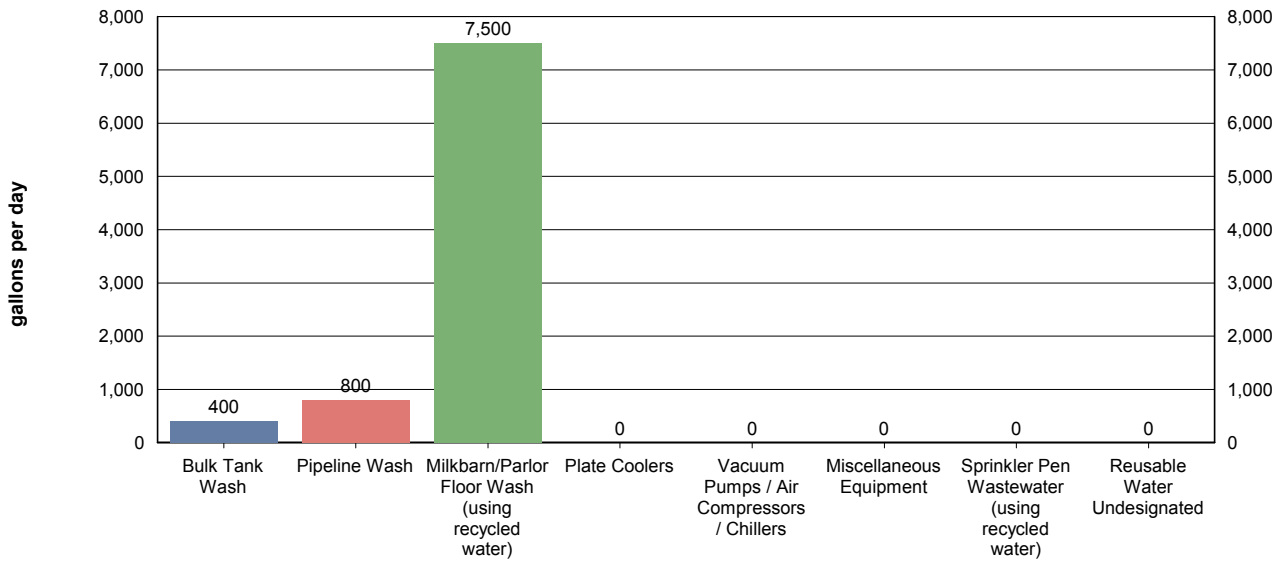
Milkbarn water sent to pond(s): 1,044,000 gallons/storage period

Fresh flush water for storage period: 0 gallons/storage period

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CHARTS

**A. MILKBARN WASTEWATER SENT TO POND(S)**



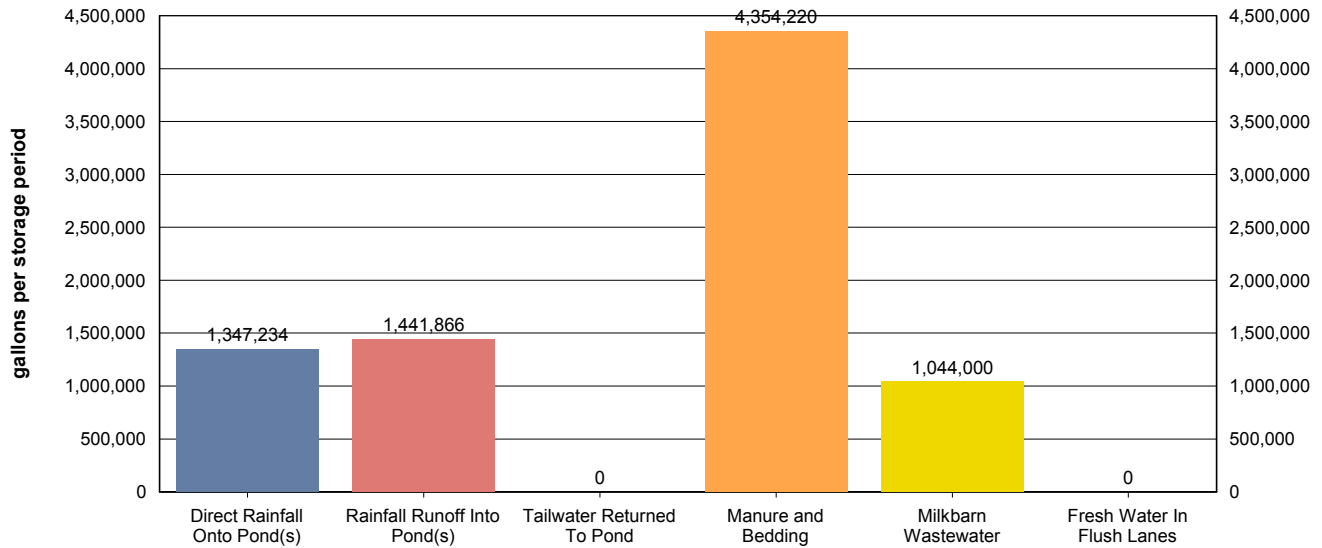
*Values shown in chart are approximate values per day.*

Total milkbarn wastewater generated daily: 8,700 gallons/day

Total milkbarn wastewater generated per period: 1,044,000 gallons/storage period

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**B. PROCESS WASTEWATER (NORMAL PRECIPITATION)**



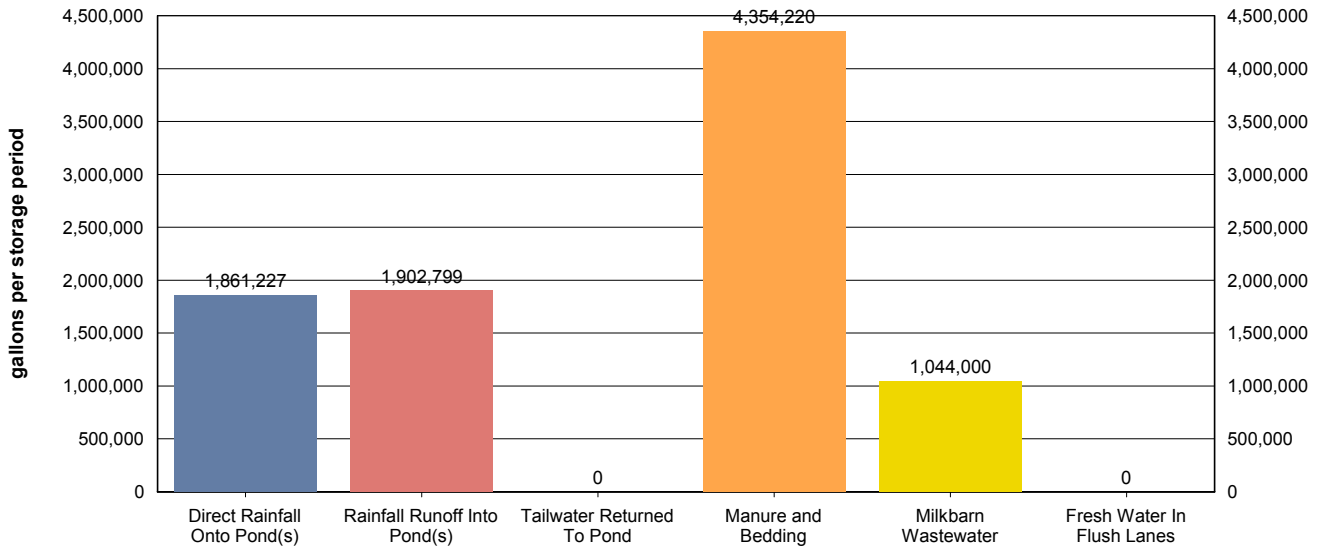
*Values shown in chart are approximate values for storage period.*

Storage period:	<u>120 days</u>
Total process wastewater generated daily:	<u>68,228 gallons/day</u>
Total process wastewater generated per period:	<u>8,187,321 gallons/storage period</u>
Total process wastewater removed due to evaporation:	<u>1,211,373 gallons/storage period</u>
Total storage capacity required:	<u>6,975,948 gallons</u>
	<u>932,549 cu. ft.</u>
Existing storage capacity (adjusted for dead storage loss):	<u>8,121,772 gallons</u>
	<u>1,085,723 cu. ft.</u>

**Considering normal precipitation, existing capacity meets estimated storage needs:**      ☒ Yes    ☐ No

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**C. PROCESS WASTEWATER (NORMAL PRECIPITATION WITH 1.5 FACTOR)**



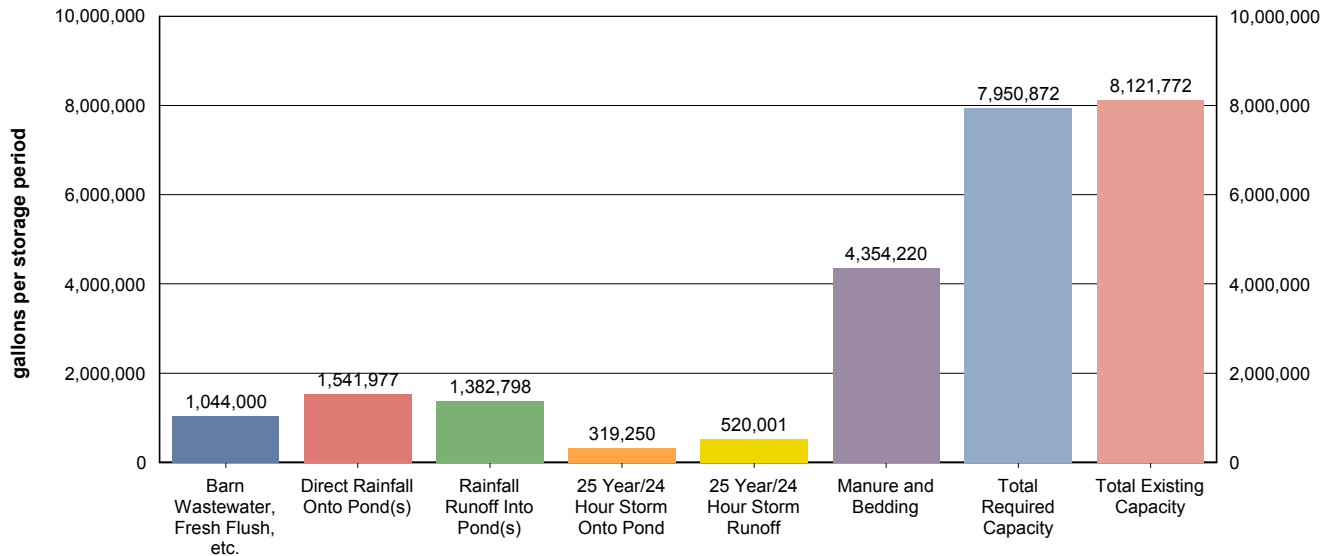
*Values shown in chart are approximate values for storage period.*

Storage period:	<u>120 days</u>
Total process wastewater generated daily:	<u>76,352 gallons/day</u>
Total process wastewater generated per period:	<u>9,162,245 gallons/storage period</u>
Total process wastewater removed due to evaporation:	<u>1,211,373 gallons/storage period</u>
Total storage capacity required:	<u>7,950,872 gallons</u>
	<u>1,062,877 cu. ft.</u>
Existing storage capacity (adjusted for dead storage loss):	<u>8,121,772 gallons</u>
	<u>1,085,723 cu. ft.</u>

**Considering factored precipitation, existing capacity meets estimated storage needs:**      ☒ Yes    ☐ No

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**D. STORAGE VOLUME ASSESSMENT (NORMAL PRECIPITATION WITH 1.5 FACTOR)**



*Values shown in chart are approximate values for storage period.*

Storage period:	<u>120 days</u>
Barn wastewater, fresh flush water, and tailwater:	<u>1,044,000</u> gallons/storage period
Manure and bedding sent to pond:	<u>4,354,220</u> gallons/storage period
Precipitation onto pond:	<u>1,541,977</u> gallons/storage period
Precipitation runoff:	<u>1,382,798</u> gallons/storage period
25 year/24 hour storm onto pond:	<u>319,250</u> gallons/storage period
25 year/24 hour storm runoff:	<u>520,001</u> gallons/storage period
Residual solids after liquids have been removed (liquid equivalent):	<u>277,406</u> gallons/storage period
Total process wastewater removed due to evaporation:	<u>1,211,373</u> gallons/storage period
Total required capacity:	<u>7,950,872</u> gallons/storage period
Total existing capacity:	<u>8,121,772</u> gallons/storage period
<b>Existing capacity meets estimated storage needs:</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

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**OPERATION AND MAINTENANCE PLAN**

The goal of the Operation and Maintenance Plan is to eliminate discharges of waste or storm water to surface waters from the production area and the protection of underlying soils and ground water.

**A. POND MAINTENANCE**

i. FREEBOARD MONITORING

1. Freeboard will be monitored monthly from June 1 through September 1 (dry season) and weekly from October 1 through May 31 (wet season). The results will be recorded on a Dairy Production Area Visual Inspection Form.
2. Freeboard will be monitored during and after each significant storm event and the results recorded on a Production Area Significant Storm Event Inspection Form.
3. Ponds will be photographed on the first day of each month. Pond photos will be labeled and maintained with the dairy's monitoring records.

ii. PREPARATION FOR MAINTAINING WINTER STORAGE CAPACITY

1. The retention pond(s) will begin to be lowered to the minimum operating level on or before a designated date each year.
2. The minimum operating level will include the necessary storage volume as identified in Section II.A in Attachment B of the General Order.

iii. OTHER POND MONITORING

1. At the time of each monitoring for freeboard, the pond(s) will be inspected for evidence of excessive odors, mosquito breeding, algae, or equipment damage; and issues with berm integrity, including cracking, slumping, erosion, excess vegetation, animal burrows, and seepage. Any issues identified and corrective actions performed will be recorded on a Dairy Production Area Visual Inspection Form - Other Pond Monitoring.
2. At the time of each monitoring during and after each significant storm event, the ponds will be inspected for evidence of any discharge and issues with berm integrity, including cracking, slumping, erosion, excess vegetation, animal burrows, and seepage. Any issues identified and corrective actions performed will be recorded on a Production Area Significant Storm Event Inspection Form.

iv. SOLIDS REMOVAL PROCEDURES

1. The average thickness of the solids accumulated on the bottom of the pond(s) will be measured on the designated interval using the owner, operator, and/or designer specified procedure.
2. Once solids/sludge on the bottom of the pond(s) reach the owner, operator, and/or designer specified critical thickness, solids/sludge will be removed so that adequate capacity is maintained.
3. When necessary, solids/sludge will be removed using the owner, operator, and/or designer specified methods for protecting any pond liner.

*No waste management pond(s) selected.*

**B. RAINFALL COLLECTION SYSTEM MAINTENANCE**

i. Annually, rainfall collection systems will be assessed to ensure:

1. Conveyances are free of debris and operating within designer/manufacturer specifications.
2. Components are properly fastened according to designer/manufacturer specifications.
3. All downspouts and related infrastructure are connected to conveyances that divert water away from manured areas.
4. Water from the rainfall collection system(s) is diverted to an appropriate destination.



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<b><i>Buildings with rooftop rainfall collection systems</i></b>	<b>Quantity</b>	<b>Surface Area (sq. ft.)</b>
Animal Shelter - AS1	1	31,750
Animal Shelter - AS2 (proposed)	1	62,500
Animal Shelter - AS3 (proposed)	1	62,500
Animal Shelter - AS4	1	62,320
Animal Shelter - AS5 (proposed)	1	30,000
Animal Shelter - AS6 (proposed)	1	30,000
Animal Shelter - AS7	1	4,340
Commodity Barn	1	5,335
Milking Parlor - proposed	1	30,000
Shed	1	1,125

Assessment for buildings with rooftop rainfall collection systems will occur on or before: 1st of October

Assessment for other rainfall collections systems will occur on or before: 1st of October

Description of how rainfall collection systems will be assessed:

Gutters, downspouts, and all other collection and conveyance systems are to be inspected, cleaned, and/or repaired as required.

#### **C. CORRAL MAINTENANCE**

- i. Monthly from June 1st through September 30th (dry season) and weekly from October 1st through May 31st (wet season), the perimeter of the corrals and pens will be assessed to ensure that runoff controls such as berms are functioning correctly, and that all water that contacts waste is collected and diverted into the wastewater retention pond (s). Any issues identified and corrective actions performed will be recorded on a Dairy Production Area Visual Inspection Form - Corrals.
- ii. The corrals will be assessed by the designated date to determine:
  1. Whether manure needs to be removed from the corrals based on the owner, operator, and/or designer specified conditions.
  2. Whether there are depressions within the corrals that should be filled/groomed to prevent ponding.
- iii. Removal of manure and/or regrading, when necessary, will be completed on or before the designated month/day of each year.

Day of the month dry season assessment will occur: 1st of each month

Day of the week wet season assessment will occur: Monday

Solid manure removal and regrading assessment will occur on or before: 1st of October

Conditions requiring manure removal and/or regrading:

Corrals will be scraped twice annually to remove solids and maintain proper gradient for drainage.

Solid manure removal and/or regrading will occur on or before: 1st of November

#### **D. FEED STORAGE AREA MAINTENANCE**

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- i. During the dry season and prior to the wet season, the perimeter of storage areas will be assessed to ensure all runoff controls such as berms are functioning correctly and runoff and leachate from the areas are collected and diverted into the wastewater pond(s). Any issues identified and corrective actions performed will be recorded on a Dairy Production Area Visual Inspection Form - Manure and Feed Storage Areas.
- ii. During the wet season, feed storage area(s) will be assessed to determine if there are depressions within any feed storage area that should be filled or repaired to prevent ponding.
- iii. Any necessary regrading/resurfacing and berm/conveyance maintenance will be completed on an annual basis.

Day of the month dry season assessment will occur: 1st of each month

Day of the week wet season assessment will occur: Monday

Regrading/resurfacing and berm maintenance assessment will occur on or before: 1st of October

Regrading/resurfacing and berm maintenance completion will occur on or before: 1st of November

**E. SOLID MANURE STORAGE AREA MAINTENANCE**

- i. During the dry season and prior to the wet season, the perimeter of manure storage areas will be assessed to ensure all runoff controls such as berms are functioning correctly and runoff and leachate from the areas are collected and diverted into the wastewater pond(s). Any issues identified and corrective actions performed will be recorded on a Dairy Production Area Visual Inspection Form - Manure and Feed Storage Areas.
- ii. During the wet season, manure storage area(s) will be assessed to determine if there are depressions within any manure storage area that should be filled to prevent ponding.
- iii. Any necessary regrading/resurfacing and berm/conveyance maintenance will be completed on an annual basis.

Day of the month dry season assessment will occur: 1st of each month

Day of the month wet season assessment will occur: Monday

Regrading/resurfacing and berm maintenance assessment will occur on or before: 1st of October

Regrading/resurfacing and berm maintenance completion will occur on or before: 1st of November

**F. ANIMAL HOUSING AND FLUSH WATER CONVEYANCE SYSTEM MAINTENANCE**

- i. A map will be attached that identifies critical points for monitoring the animal housing and flush water conveyance system to verify that water is being managed as identified in this Waste Management Plan. These points will be maintained at owner, operator, and/or designer specified intervals.

Animal housing area assessment will occur on or before: 1st of October

Animal housing drainage system maintenance will occur on or before: 1st of October

Animal housing area drainage system assessment and maintenance methods:

Flush and/or wastewater conveyance lanes are to be inspected and cleared of debris and/or other obstructions as required. Defects in said conveyance, such as failed concrete and/or pipes, shall be repaired as needed.

**G. MORTALITY MANAGEMENT**

- i. Dead animals will be stored, removed, and disposed of properly.

Rendering company or landfill name: Darline International

Rendering company or landfill telephone number: (559) 268-5325

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**H. ANIMALS AND SURFACE WATER MANAGEMENT**

- i. A system will be in place, monitored, and maintained to prevent animals from entering any surface waters when a stream or other surface water crosses or adjoins the corral(s).

Does a stream or any other surface water cross or adjoin the corrals?      ☐ Yes   ☒ No

**I. MONITORING SALT IN ANIMAL RATIONS**

- i. The combined quantity of minerals as salt in animal drinking water and feed rations will be reviewed by a qualified nutritionist on a routine basis to verify that minerals are limited to the amount required to maintain animal health and optimum production . As feed rations change, mineral content may change.

Assessment interval: Semiannually

**J. CHEMICAL MANAGEMENT**

- i. Chemicals and other contaminants handled at the facility will not be disposed of in any manure or process wastewater, storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.

Chemical Name	Quantity	Units	Frequency	Usage Area	Destination (Used Chemical / Container)	Disposal Company		Collection Frequency
						Name	Phone	
Roundup	10	gallons	year	Wastewater storage ponds	Containers are disposed of by solid waste disposal company.	Winton Disposal / Waste Management	(209) 358-5272	routine

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**REQUIRED ATTACHMENTS**

The following list, based upon user selections and data entries, describes the minimum required attachments that must be submitted with the Waste Management Plan for the reporting schedule of 'July 1, 2010'.

**A. SITE MAP(S)**

Provide a site map (or maps) of appropriate scale to show property boundaries and the location of the features of the production area including the following in sufficient detail: structures used for animal housing, milk parlor, and other buildings; corrals and ponds; solids separation facilities (settling basins or mechanical separators); other areas where animal wastes are deposited or stored; feed storage areas; drainage flow directions and nearby surface waters; all water supply wells (domestic, irrigation, and barn wells) and groundwater monitoring wells.

Production area map reference number: Exhibit Sheet 3

Provide a site map (or maps) of appropriate scale to show property boundaries and the location of the features of all land application areas (land under the Discharger's control, whether it is owned, rented, or leased, to which manure or process wastewater from the production area is or may be applied for nutrient recycling) including the following in sufficient detail: a field identification system (Assessor's Parcel Number; field by name or number; total acreage of each field; crops grown; indication if each field is owned, leased, or used pursuant to a formal agreement); indication of what type of waste is applied (solid manure only, wastewater only, or both solid manure and wastewater); drainage flow direction in each field, nearby surface waters, and storm water discharge points; tailwater and storm water drainage controls; subsurface (tile) drainage systems (including discharge points and lateral extent); irrigation supply wells and groundwater monitoring wells; sampling locations for discharges of storm water and tailwater to surface water from the field.

Application area map reference number: Exhibit Sheet 2

Provide a site map (or maps) of appropriate scale to show property boundaries and the location of all cropland (land that is part of the dairy but not used for dairy waste application) including the following in sufficient detail: Assessor's Parcel Number, total acreage, crops grown, and information on who owns or leases the field. The Waste Management Plan shall indicate if such cropland is covered under the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Order No. R5-2006-0053 for Coalition Group or Order No. R5-2006-0054 for Individual Discharger, or updates thereto).

Non-application area map reference number: n/a

Provide a site map (or maps) of appropriate scale to show property boundaries and the location of all off-property domestic wells within 600 feet of the production area or land application area(s) associated with the dairy and the location of all municipal supply wells within 1,500 feet of the production area or land application area(s) associated with the dairy.

Well area map reference number: Exhibit Sheets 2&3

Provide a site map (or maps) of appropriate scale to show property boundaries and a vicinity map, north arrow and the date the map was prepared. The map shall be drawn on a published base map (e.g., a topographic map or aerial photo) using an appropriate scale that shows sufficient details of all facilities.

Vicinity map reference number: Exhibit Sheet 1

**B. PROCESS WASTEWATER MAP(S)**

Provide a site map (or maps) of appropriate scale to show property boundaries and the location of the features of the production area including the following in sufficient detail: process wastewater conveyance structures, discharge points, and discharge /mixing points with irrigation water supplies; pumping facilities and flow meter locations; upstream diversion structures, drainage ditches and canals, culverts, drainage controls (berms/levees, etc.), and drainage easements; and any additional components of the waste handling and storage system.

Production infrastructure system area map reference number: Exhibit Sheets 2&3

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Provide a site map (or maps) of appropriate scale to show property boundaries and the location of the features of all land application areas (land under the Discharger's control, whether it is owned, rented, or leased, to which manure or process wastewater from the production area is or may be applied for nutrient recycling) including the following in sufficient detail: process wastewater conveyance structures, discharge points and discharge mixing points with irrigation water supplies; pumping facilities; flow meter locations; drainage ditches and canals, culverts, drainage controls (berms, levees, etc.), and drainage easements.

Land application infrastructure system area map reference number: Exhibit Sheet 2

**C. EXCESS PRECIPITATION CONTINGENCY REPORT**

*There were no attachment references entered or required for this attachment section.*

**D. OPERATION AND MAINTENANCE PLAN**

Attach a map that identifies critical points for monitoring the system to verify that water is being managed as identified in this Waste Management Plan (see Attachment B, Pg B-7 V.F, V.G, and V.H for additional requirements).

Animal housing assessment map reference number: Exhibit Sheet 3

**E. FLOOD PROTECTION / INUNDATION REPORT**

Provide an engineering report showing that the facility has adequate flood protection.

Flood zone map and/or document reference number: Section 3.c.

**F. BACKFLOW PROTECTION**

Attach documentation from a trained professional (i.e. a person certified by the American Backflow Prevention Association, an inspector from a state or local governmental agency who has experience and/or training in backflow prevention, or a consultant with such experience and/or training), as specified in Required Reports and Notices H.1 of Waste Discharge Requirements General Order No. R5-2007-0035, that there are no cross-connections that would allow the backflow of wastewater into a water supply well, irrigation well, or surface water as identified on the Site Map.

Backflow documentation reference number: Sec 3d CDQAP doc.

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CERTIFICATION

**A. DAIRY FACILITY INFORMATION**

Name of dairy or business operating the dairy: Manuel Oliveira Dairy

Physical address of dairy:

4235 Oak AVE

Merced

Merced

95340

Number and Street

City

County

Zip Code

Street and nearest cross street (if no address): \_\_\_\_\_

**B. DOCUMENTATION OF QUALIFICATIONS AND PLAN DEVELOPMENT**

*I have reviewed the portion of the waste management plan that is related to storage capacity facility and design specifications in accordance with Item II, Attachment B of the Waste Discharge Requirements General Order for Existing Milk Cow Dairies - Order No. R5-2007-0035 and certify that this plan was prepared by, or under the responsible charge of, and certified by a civil engineer who is registered pursuant to California law or other person as may be permitted under the provisions of the California Business and Professions Code to assume responsible charge of such work.*

Storage capacity is:

Insufficient

- ☐ Retrofitting Plan/Schedule/Design Criteria attached in accordance with Attachment B, II.B. 1-5 and Attachment B, II. C.

Sufficient

- ☒ Certification 1 - Certified in accordance with Attachment B, II. A. 1-8. (no contingency plan)
- ☐ Certification 2 - Certified in accordance with Attachment B, II. A. 1-8, II. C. (with contingency plan attached)



CIVIL ENGINEER'S WET STAMP

9/14/2018

SIGNATURE OF CIVIL ENGINEER

DATE

Manny Sousa

PRINT OR TYPE NAME

P.O. Box 1613; Oakdale, CA 95361

MAILING ADDRESS

(209) 238-3151

PHONE NUMBER



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**C. OWNER AND/OR OPERATOR CERTIFICATION**

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

Manuel V. Oliveira

SIGNATURE OF OWNER

SIGNATURE OF OPERATOR

Manuel & Maria Oliveira

PRINT OR TYPE NAME

PRINT OR TYPE NAME

9/14/2018

DATE

DATE



## PRODUCTION AREA DESIGN & CONSTRUCTION REPORT

### PART I: DAIRY FACILITY INFORMATION

A. Name of Dairy or Business Operating the Dairy: Manuel Oliveira Dairy

Physical address of Dairy:

<u>4235 Oak Avenue</u>	<u>Merced</u>	<u>Merced</u>	<u>95340</u>
Number and Street	City	County	Zip Code

B. Operator Name: Antonio Nunes Telephone No: (209) 384-0948

Operator mailing address:

<u>4235 Oak Avenue</u>	<u>Merced</u>	<u>Merced</u>	<u>95340</u>
Number and Street	City	County	Zip Code

C. Owner Name: Manuel and Maria Oliveira Telephone No: (209) 388-0501

Owner Mailing Address:

<u>4235 Oak Avenue</u>	<u>Merced</u>	<u>Merced</u>	<u>95340</u>
Number and Street	City	County	Zip Code

### PART II: DESIGN AND CONSTRUCTION DETAILS

#### A. Corrals and Pens

(1) Is all process wastewater collected in the retention pond? ☒ Yes ☐ No

If Yes, describe how (circle all that apply):

ditch curbs berm(s) drainpipe sumps pumps other

Explain how your system works: Corrals are sloped to drain to drain inlets and sumps. From the sumps wastewater is pumped to the solids settling basin.

If No, describe what is done with it: \_\_\_\_\_

(2) Is all run on water (clean precipitation and surface drainage) diverted away from the production area? ☒ Yes ☐ No

If Yes, describe how (circle all that apply):

ditch curbs berm(s) slope elevation other

Explain how your system works: The production area is elevated above

the surrounding areas in order to prevent storm water run on.

If No, identify areas where the run on occurs: \_\_\_\_\_

If No, identify how the run on is contained: \_\_\_\_\_

- (3) If run on water has the potential to contact manure and is not contained, explain what modifications or improvements are proposed, and provide a schedule for construction. (Note: a certification of completion must be provided when complete): n/a

- (4) Are there areas where water contacting manure stands for more than 72 hours? ☐ Yes ☒ No

If No, explain how standing water is avoided: The production area is properly graded and has proper infrastructure in place to convey runoff to inlets and sumps, and then pump runoff to the wastewater retention ponds.

If Yes, describe what modifications or improvements are proposed, and provide a schedule for construction. (Note: a certification of completion must be provided when complete.): \_\_\_\_\_

- (5) Are there conveyance structures such as earthen ditches, bermed channels, or swales where manure water stands for more than 72 hours? ☐ Yes ☒ No

If No, explain how standing water is avoided: The production area is properly graded and has proper infrastructure in place to convey runoff to inlets and sumps, and then pump runoff to the wastewater retention ponds.

If Yes, explain what modifications or improvements are proposed, and provide a schedule for construction. Note: a certification of completion must be provided when complete): \_\_\_\_\_

**B. Animal Housing Area**

- (1) Is the animal housing area (i.e., barn, shed, milk parlor, paved and unpaved roadways and areas within the production area, etc.) designed, and constructed to drain all water that has contacted animal wastes to the retention pond? ☐Yes ☐No ☐Partially

If Yes, describe how (circle all that apply)

ditch curbs berm(s) slope elevation drainpipe other

Explain how your system works: Wastewater is collected in flush lanes which convey the wastewater to drain inlets and sumps. From the sumps wastewater is pumped to the solids settling basin.

If No or Partially, describe the areas not diverted to the retention pond: \_\_\_\_\_

For the areas not diverted to the retention pond, explain what modifications or improvements are proposed, and a schedule for construction. (Note: a certification of completion must be provided when complete): Runoff from roofs will be diverted to adjacent fields prior to contact with animal wastes.

- (2) Are there any areas, outside of the retention system, where water that has contacted manure stands for more than 72 hours? ☐Yes ☒No

If No, describe how your system works to avoid standing water: The production area is properly graded and has proper infrastructure in place to convey runoff to inlets and sumps, and then pump runoff to the wastewater retention ponds.

If Yes, explain what modifications or improvements are proposed, and provide a schedule for construction. A certification of completion must be provided when complete: \_\_\_\_\_

- (3) Are there conveyance structures such as earthen ditches, bermed channels, or swales where water that has contacted manure stands for more than 72 hours, or where parts of the conveyance system are used for storage of manure water? ☐Yes ☒No

If Yes, explain what modifications or improvements are proposed to prevent this condition, and provide a schedule for construction. (Note: a certification of completion must be provided when complete): \_\_\_\_\_

**C. Manure and Feed Storage Area**

- (1) Is all leachate or water that has contacted stored manure, bedding, or feed collected in the retention pond? ☒ Yes ☐ No

If Yes, describe how (circle all that apply):

ditch curbs berm(s) drainpipe sumps pumps other

Explain how your system works: The production area is properly  
graded and has proper infrastructure in place to convey  
runoff to inlets and sumps, and then pump runoff to the  
wastewater retention ponds.

If No, describe where it is collected and what is done with it: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

If necessary, explain what modifications or improvements are proposed, and provide a schedule for construction. (Note: a certification of completion must be provided when complete): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

- (2) Are there any areas where leachate or water contacting stored manure, bedding, or feed stands for more than 72 hours? ☐ Yes ☒ No

If No, describe how standing leachate and water is prevented or handled: The production  
area is properly graded and has proper infrastructure in place to  
convey runoff to inlets and sumps, and then pump runoff to the  
wastewater retention ponds.

If Yes, explain what modifications or improvements are proposed, and provide a schedule for construction. (Note: a certification of completion must be provided when complete): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

- (3) Are there conveyance structures such as earthen ditches, bermed channels, or swales where leachate or water that has contacted stored manure, bedding, or feed stands for more than 72 hours, or are there parts of the system that are used for storage of leachate or manure water? ☐ Yes ☒ No

If Yes, explain what modifications or improvements are proposed to prevent this condition, and provide a schedule for construction. (Notes: a certification of completion must be provided when complete): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

I certify that the modifications or improvements identified above or similar alternatives were completed to achieve collection and management of all process wastewater, water that has contacted animal wastes, and runoff and leachate from manure and feed storage areas.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Manuel V. Oliveira

SIGNATURE OF OWNER

\_\_\_\_\_  
SIGNATURE OF OPERATOR

MANUEL OLIVEIRA

PRINT OR TYPE NAME

\_\_\_\_\_  
PRINT OR TYPE NAME

2-12-16

DATE

\_\_\_\_\_  
DATE

**FORM FOR DOCUMENTING BACKFLOW PREVENTION  
UNDER  
WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2007-0035  
FOR  
EXISTING MILK COW DAIRIES**



This form consists of six parts and can be used to document compliance with the requirements in Waste Discharge Requirements General Order No. R5-2007-0035 for owners/operators of existing milk cow dairies (Dischargers) to:

1. Identify cross-connections that would allow the backflow of wastewater into a water supply well, irrigation well, or surface water as identified on the dairy's Site Map;
2. Propose and schedule corrective action to prevent backflow of wastewater into a water supply well, irrigation well, or surface water as identified on the dairy's Site Map; and/or
3. Document there are no cross-connections that would allow the backflow of wastewater into a water supply well, irrigation well, or surface water as identified on the dairy's Site Map.

The Discharger must complete this form except for Parts IV and V, which are to be completed by a trained professional<sup>1</sup>. Both the owner and the operator of the dairy must sign the certification statement in Part VI. Additional sheets may be attached as necessary to complete Parts I, II, and III.

A Site Map must be attached to this form that shows all water supply wells, irrigation wells, and surface water bodies in the dairy's Production Area and all Land Application Areas that are under the Discharger's control. The Site Map must also show all wastewater conveyance structures, wastewater discharge points to surface water, and where wastewater is mixed/blended with fresh irrigation water in these areas. Each of these locations must be identified by a name or number and listed in Part II below. Completion of Part II will identify how backflow can or does occur at each location and any current backflow preventive measures.

**PART I: DAIRY FACILITY INFORMATION**

- A. Name of Dairy or Business Operating the Dairy: Manuel Oliveira Dairy
- Physical address of Dairy:
- |                        |               |               |              |
|------------------------|---------------|---------------|--------------|
| <u>4235 Oak Avenue</u> | <u>Merced</u> | <u>Merced</u> | <u>95340</u> |
| Number and Street      | City          | County        | Zip Code     |
- B. Operator Name: Manuel Oliveira Telephone No: (209) 388-0501
- Operator mailing address:
- |                        |               |               |              |
|------------------------|---------------|---------------|--------------|
| <u>4235 Oak Avenue</u> | <u>Merced</u> | <u>Merced</u> | <u>95340</u> |
| Number and Street      | City          | County        | Zip Code     |
- C. Owner Name: Manuel and Maria Oliveira Telephone No: (209) 388-0501
- Owner Mailing Address:
- |                        |               |               |              |
|------------------------|---------------|---------------|--------------|
| <u>4235 Oak Avenue</u> | <u>Merced</u> | <u>Merced</u> | <u>95340</u> |
| Number and Street      | City          | County        | Zip Code     |

<sup>1</sup> A trained professional could be a person certified by the American Backflow Prevention Association, an inspector for a state or local governmental agency who has experience and/or training in backflow prevention, or a consultant with such experience and/or training.



**FORM FOR DOCUMENTING BACKFLOW PREVENTION  
UNDER  
WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2007-0035  
FOR  
EXISTING MILK COW DAIRIES**



**PART II: IDENTIFICATION OF EXISTING BACKFLOW CONDITIONS (due by 1 July 2008)**

The attached Site Map identifies all of the locations in the Production Area and all Land Application Areas under the control of the Discharger at the dairy identified in Part I above where there are cross-connections that could, or do, allow the backflow of wastewater into a water supply well, irrigation well, or surface water. For each location shown on the map, the table below describes:

- a. How and where wastewater can potentially, or does, backflow to a groundwater supply and/or surface water supply (if there are no current or potential backflow problems, indicate so with "none"), and
- b. How backflow of process wastewater into the groundwater or surface water supply is currently prevented (if there is no current prevention method, indicate so with "none").

Location Where Backflow can Occur	How Backflow Can or Does Occur	Current Backflow Preventive Measure
none		

**FORM FOR DOCUMENTING BACKFLOW PREVENTION  
UNDER  
WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2007-0035  
FOR  
EXISTING MILK COW DAIRIES**



**PART III: PROPOSED BACKFLOW CORRECTIVE ACTIONS AND SCHEDULE (due by 1 July 2008)**

For each location identified in Part II above where there is currently no backflow prevention, the table below identifies:

- a. The method proposed to be implemented that will prevent backflow, and
- b. A schedule to install the preventive measure.

If there are no current or potential backflow problems identified in Part II above, this Part does not need to be completed.

Location With No Current Backflow Prevention	Proposed Backflow Prevention Method	Schedule to Install Proposed Backflow Prevention Method
Irrigation Well at Pump Field	New check valve meeting regulatory requirements or construction of an air gap meeting regulatory requirements.	By the end of calendar year 2016.

**PART IV: DOCUMENTATION OF EXISTING BACKFLOW CONDITIONS AND PROPOSED BACKFLOW PREVENTION METHODS (due by 1 July 2008)**

*As a trained professional in backflow prevention, I certify that, based on the information provided to me by the Discharger named above and my personal examination of the wastewater system, the above information in Part II above is true, accurate, and complete and the proposed backflow prevention method in Part III above will be effective to prevent the backflow of wastewater into a water supply well, irrigation well, or surface water at the dairy named in Part I above.*

CA Registered Civil Engineer No. 65379

QUALIFICATIONS OF TRAINED PROFESSIONAL (EDUCATION AND/OR EXPERIENCE)

*Manuel K. Sousa*  
SIGNATURE OF TRAINED PROFESSIONAL

*2-11-16*  
DATE

Manny Sousa

PRINT OR TYPE NAME

**FORM FOR DOCUMENTING BACKFLOW PREVENTION  
UNDER  
WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO. R5-2007-0035  
FOR  
EXISTING MILK COW DAIRIES**



**PART V: DOCUMENTATION THAT THERE ARE NO CROSS-CONNECTIONS THAT  
WOULD ALLOW THE BACKFLOW OF WASTEWATER INTO A WATER SUPPLY WELL,  
IRRIGATION WELL, OR SURFACE WATER (due by 1 July 2009)**

*As a trained professional in backflow prevention, I certify that, based on the information provided to me by the Discharger named in Part I above and my personal examination of the wastewater system, that the backflow prevention methods proposed in Part III above (if any) have been completed, and/or there are currently no cross-connections that would allow the backflow of wastewater into a water supply well, irrigation well, or surface water at the dairy named in Part I above.*

\_\_\_\_\_  
QUALIFICATIONS OF TRAINED PROFESSIONAL (EDUCATION AND/OR EXPERIENCE)

\_\_\_\_\_  
SIGNATURE OF TRAINED PROFESSIONAL

\_\_\_\_\_  
DATE

*y. Boussa*

\_\_\_\_\_  
PRINT OR TYPE NAME

**PART VI: OWNER AND/OR OPERATOR CERTIFICATION**

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

*Manuel V. Oliveira*  
\_\_\_\_\_  
SIGNATURE OF OWNER

\_\_\_\_\_  
SIGNATURE OF OPERATOR

*Manuel OLIVEIRA*  
\_\_\_\_\_  
PRINT OR TYPE NAME

\_\_\_\_\_  
PRINT OR TYPE NAME

*2.12.16*  
\_\_\_\_\_  
DATE

\_\_\_\_\_  
DATE

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**FLOOD PROTECTON ANALYSIS  
FOR  
MANUEL OLIVEIRA DAIRY  
MERCED COUNTY, CA**

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1. Introduction / Project Overview
2. Determination of Base Flood Elevation (BFE)
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5. Exhibits
  - a. Vicinity Map
  - b. FIRM Panel No. 06047C0415G
  - c. Estimated 100-Year Base Flood Elevation
  - d. Existing Topography – Existing and Proposed Improvements
  - e. Conceptual Flood Protection Plan / Grading Plan



## INTRODUCTION / PROJECT OVERVIEW

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This analysis has been prepared to accompany an application for the proposed expansion of the existing Manuel Oliveira dairy facility in Merced County, CA. A Waste Management Plan (WMP) describing the generation and management of dairy wastewater under the proposed expanded conditions must be prepared in accordance with Merced County and Central Valley Regional Water Quality Control Board (CVRWQCB) requirements. CVRWQCB General Order No. R5-20013-0122, *Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies*, (Order) was adopted by the California Regional Water Quality Control Board (CRWQCB) Central Valley Region in 2013 and establishes the criteria for preparation of the WMP.

Per the requirements set forth by the aforementioned Order each existing milk cow dairy in the Central Valley Region that is located in an area subject to inundation from the prescribed flood event must have or must construct improvements that provide protection from that flood event. More particularly the aforementioned Order states the following:

**General Specification B.2:** *“In the Sacramento and San Joaquin River Basins, ponds and manured areas at existing milk cow dairies in operation on or before 27 November 1984 shall be protected from inundation or washout by overflow from any stream channel during 20-year peak stream flows. Existing milk cow dairies that were in operation on or before 27 November 1984 and that are protected against 100-year peak stream flows must continue to provide such protection.*

*Existing milk cow dairies built or expanded after 27 November 1984 shall be protected against 100-year peak stream flows (Title 27 Section 22562(c)).”*

Given the proposed expansion of this existing dairy facility it will be required to provide protection against 100-year peak stream flows.

The above referenced section of Title 27 (Section 22562 of Chapter 7, Subchapter 2) also states the following criterion in its item (3):

*“The determination of peak stream flows shall be from data provided by a recognized federal, state, local, or other agency.”*

The source of flood information for this analysis is Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) Flood Insurance Studies (FISs). FIRMs and FISs are industry standard sources of flood information for engineers, scientists, lending institutions, and other industries with a vested interest in the location of real property as it relates to areas subject to flood inundation.

The existing Manuel Oliveira Dairy site and its proposed expansion area lie within a FEMA Zone A, or an area determined to be subject to inundation by the 100-year flood event. It is the intent of this analysis to do the following:

1. Determine a Base Flood Elevation (BFE) for the site.
2. Determine the elevations of existing Dairy Production Area (DPA) improvements relative to the determined BFE.
  - a. If the DPA is currently protected from inundation by the design storm event, then the extent

of this protection will be demonstrated.

- b. If the DPA is not protected from inundation by the design storm event, then the extent of inundation will be demonstrated.
3. If portions of the existing and proposed DPA are determined not to be protected from the design storm event by existing conditions, then a plan for constructing improvements to provide adequate protection will be developed.

Neither this analysis nor any of the information contained herein represent a certificate of elevation or Letter of Map Revision or Amendment (LOMR / LOMA) for the project site.

## **DETERMINATION OF BASE FLOOD ELEVATION (BFE)**

---

The existing Manuel Oliveira Dairy site and its proposed expansion area lie within Zone A per the relevant FIRM. Zone A is defined as an area subject to inundation by the 100-year storm event but for which a Base Flood Elevation (BFE) has not been established. The location of the DPA is shown on the FIRM on the attached Exhibit B.

The hydrologic analysis used to determine the boundary of Zone A in these cases typically has been performed utilizing topographic information available on quadrangle maps prepared by the United States Geological Survey (USGS). The method of determining an estimated flood elevation for Zone A sites as recommended by FEMA is to superimpose the Zone A boundary defined by the FIRM over the relevant USGS quadrangle map and interpolate the elevation along said Zone A boundary (see *Managing Floodplain Development in Approximate Zone A Areas*, Federal Emergency Management Agency, April, 1995).

Combining the aforementioned method with current technology in an effort to create a flood plain model that is as accurate as possible given the available information, three dimensional models of the existing topography and of the water surface have been created from which to estimate the BFE for the project site. The method utilized is based on the methods described in *Managing Floodplain Development in Approximate Zone A Areas*, Federal Emergency Management Agency, and, is particularly described in *Base Flood Elevation Determination Module*, Federal Emergency Management Agency, June, 2003, prepared by Nolte Associates, Inc.

The FIRM was digitally superimposed over the relevant USGS quadrangle map for the project site. The 5' contours on the quadrangle map were digitized and a three-dimensional model of the existing terrain was generated. Three dimensional feature lines along the Zone A boundary were then created and elevations from the existing terrain surface were sampled along those feature lines at the Zone A boundary. For this particular Zone A area, the Zone A boundary represents the outer edge of the floodplain at its southwest and southeast extents. Thus the sampled elevations on the aforementioned feature line represent the floodplain elevation at its outer edge in these southwest and southeast locations. However at some locations along its northern and eastern edges, the Zone A boundary meets boundaries of various AO, AH, and AE zones. For these cases the following methods were used in order to generate three dimensional feature lines that were representative of the floodplain elevations at the respective locations:

1. Zone AO: these are areas subject to inundation by the 100-year flood event of various depths (i.e., 1', 2, or 3'). Where the Zone A boundary meets an AO zone, the sampled elevations of the existing terrain surface along the Zone A boundary were adjusted upward, or increased, by the corresponding flooding depth of the adjacent AO zone. For a 1' AO zone, the elevations of the feature line were increased by 1', and so forth for the 2' and 3' AO zones.
2. Zone AH: these are areas subject to inundation by the 100-year flood event where a Base Flood Elevation has been determined. Where the Zone A boundary meets an AH zone, the sampled elevations of the existing terrain surface were adjusted, if necessary, to match the established BFE for the AH zone. The BFE shown on the FIRM references NAVD88 datum, while the elevations on the USGS quadrangle map and the three dimensional model of the existing terrain surface reference NGVD29 datum. Per the Merced County FIS, the conversion from NGVD29 to NAVD88 varies from +2.32' to +2.45' for various areas of the County. In an effort to be accurate and conservative, the NAVD88 elevations were adjusted downward, or decreased, by 2' for conversion



to whole number NGVD29 elevations.

3. Zone AE: these are areas subject to inundation by the 100-year flood event where a Base Flood Elevation has been determined. These elevations may vary within the zone and are usually marked by contours within the floodway or channel. Where the Zone A boundary meets an AE zone, the sampled elevations of the existing terrain surface were adjusted, if necessary, to match the established BFE for the AE zone. As with the AH zones the elevations shown on the respective FIRMs were adjusted downward by 2' for conversion to whole number NGVD29 elevations.

After creation of accurate feature lines using the methods described above, a three dimensional surface of the flood plain was then created from said features lines thus allowing for observation of the estimated BFE on the project site. The elevations and contours of the flood plain are shown on Exhibit C, Estimated 100-Year Base Flood Elevation.

An engineering survey was performed in order to determine the actual existing elevations of facilities within the DPA relative to the estimated flood elevation. USGS benchmarks were used to establish elevations based on the datum corresponding to that of the quadrangle map relevant to the project site. The elevations shown on the quadrangle map are based on the National Geodetic Vertical Datum of 1929 (NGVD29); while this datum has since been superseded by the North American Vertical Datum of 1988 (NAVD88), NGVD29 datum for the utilized benchmarks is available and was used for this analysis. Elevations of the existing site improvements are shown on Exhibit D, Existing Topography – Existing Improvements.

## **DETERMINATION OF ELEVATIONS OF EXISTING DAIRY PRODUCTION AREA AND PROPOSED EXPANSION AREA WITHIN FEMA ZONE A**

---

The results of the estimated Base Flood Elevation (BFE) determination and engineering survey can be summarized as follows:

1. As indicated on Exhibit C, Estimated 100-Year Base Flood Elevation, the DPA lies between the 136' and 138' contours of the three dimensional flood plain model. The elevation of the flood plain decreases with the existing terrain as it flows to the west to the tributaries and wetlands of the San Joaquin River. Thus the estimated BFE for the site ranges between 136' and approximately 137.5' (NGVD29 datum) for the DPA.
2. It is apparent upon visual inspection that the majority of the existing DPA was raised significantly above existing grade during construction. Approximately 70% of the existing DPA is constructed to finished elevations of 136.7' or higher and as such is above the estimated BFE. These areas include the milking parlor, approximately 90% of the corral areas, all of the animal housing areas, the solids settling basin, and a portion of the north embankment of the wastewater storage basins. These areas are outlined in red on the aforementioned Exhibit D.
3. As also shown on Exhibit D, approximately 30% of the existing DPA would be subject to inundation levels of approximately 1' to 2' based on the estimated 100-year BFE. These areas are outlined in blue on the aforementioned Exhibit D and include the feed storage area, approximately 10% of the corrals, and the wastewater storage basins.

## **DETERMINATION OF LEVELS OF FLOOD PROTECTION AND INUNDATION / CONCEPTUAL FLOOD PROTECTION PLAN**

As discussed in the previous section approximately 70% of the existing DPA has been elevated to elevations above the estimated flood elevation and as such currently meets the requirements of General Specification B.2. of the General Order for flood protection. However the remaining 30% of the existing DPA and the expansion area would be subject to inundation levels of approximately 1' to 2' in the event of a 100-year storm at their current elevations.

A Conceptual Grading Plan / Flood Protection Plan has been prepared and is incorporated in this Analysis as Exhibit E. This Plan includes proposed improvements that would provide adequate flood protection as required by the Order. A summary of the proposed improvements is as follows:

1. Constructing an access road along the west, south, and southeast boundary of the DPA where it is currently lower than the estimated BFE. Such a berm or access road should be constructed to finished elevations of between 137' to 138' or higher depending on the relative location to the floodplain.
2. New structures should be constructed with finished floor elevations a minimum of 1' above the estimated BFE. Finished floor elevations for the proposed structures are shown on Exhibit E.

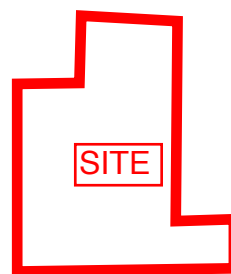
With construction of the proposed improvements described above and shown conceptually on Exhibit E, the proposed Manuel Oliveira Dairy expansion should have adequate protection from the 100-year flood event.

Note: the elevations indicated above and shown on the attached Exhibits are referenced to NGVD29 datum. For conversion to NAVD88 datum add 2.32' per the Merced County Flood Insurance Study (FIS).

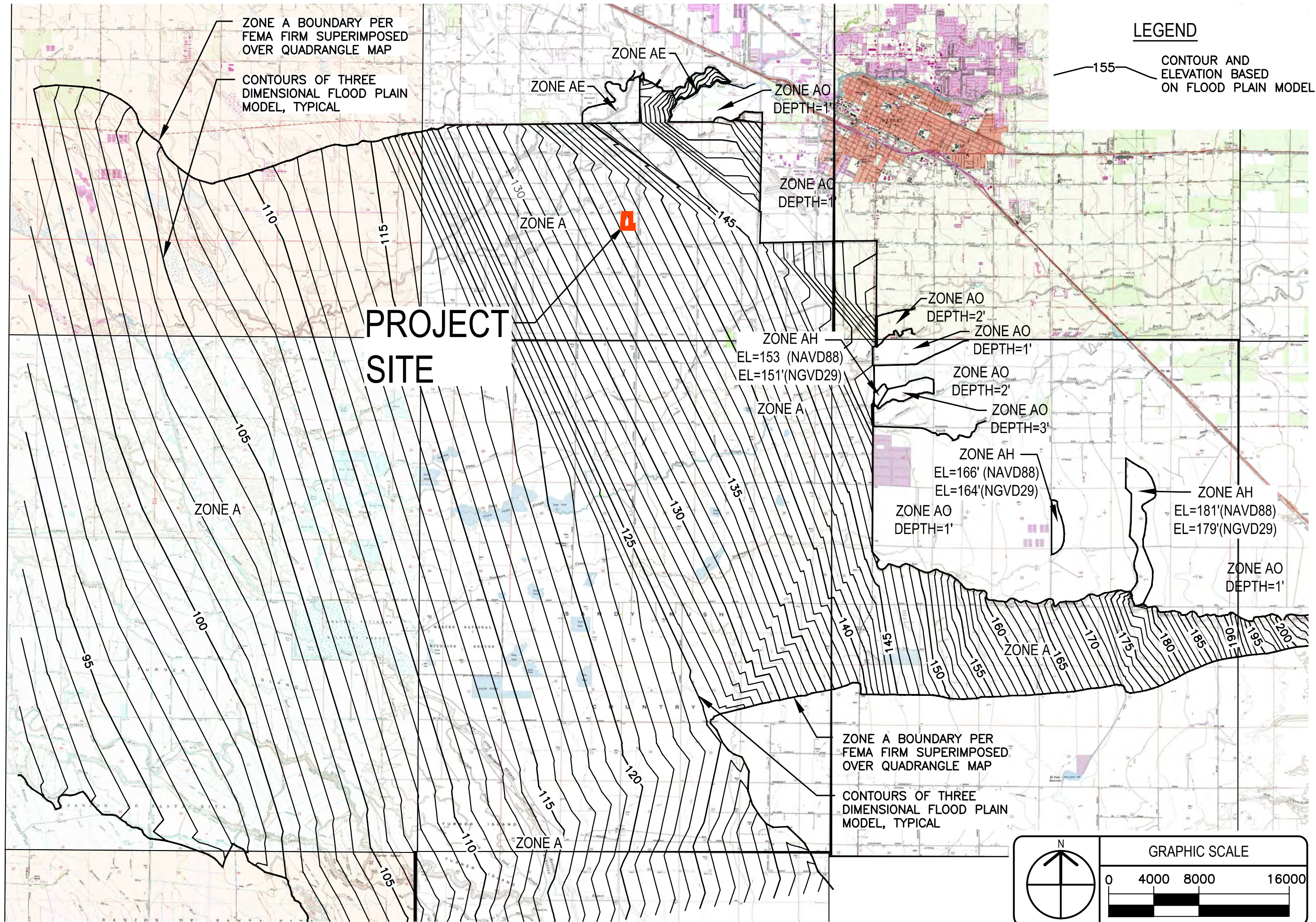
## **EXHIBITS**

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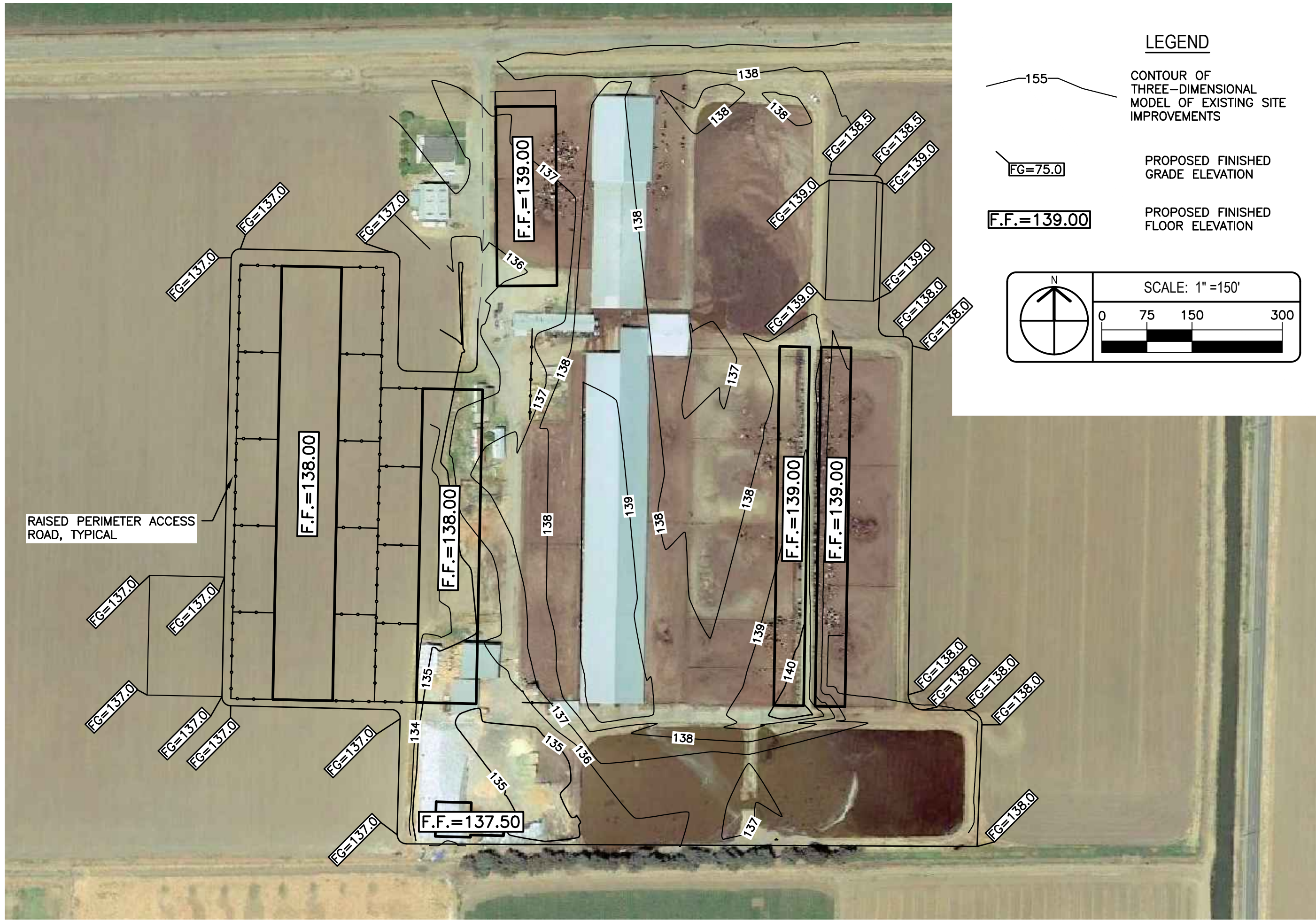


DRAWN BY: MS	DATE: 1/21/2016	FILE: 03_site.dwg	JOB NO.: 2015-025
SYMBOL	REVISIONS	DESCRIPTION	APPD.









**LEGEND**

155  
CONTOUR OF THREE-DIMENSIONAL MODEL OF EXISTING SITE IMPROVEMENTS

FG=75.0  
PROPOSED FINISHED GRADE ELEVATION

F.F.=139.00  
PROPOSED FINISHED FLOOR ELEVATION

SCALE: 1"=150'  
0 75 150 300

**Sousa**  
ENGINEERING  
INFRASTRUCTURE - DEVELOPMENT - AGRICULTURE

PH: (209)238-3151  
WWW.SOUSAENG.COM

PO BOX 1613  
OAKDALE, CA 95361

EXHIBIT E  
CONCEPTUAL GRADING AND  
FLOOD PROTECTION PLAN  
MANUEL OLIVEIRA DAIRY  
MERCED COUNTY, CA

DRAWN BY: MS	REVISIONS	APPD.
DATE: 7/30/2018	DESCRIPTION	
FILE: 05_grad.dwg		
JOB NO.: 2015-025		

**VECTOR CONTROL PLAN  
FOR  
MANUEL OLIVEIRA DAIRY  
MERCED COUNTY, CA**

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- 1. INTRODUCTION**
- 2. BEST MANAGEMENT PRACTICES**
  - a. Land Application Areas
  - b. Dairy Production Area (DPA)
- 3. CONTACT INFORMATION**

## 1. INTRODUCTION

---

Vector control is an important aspect of disease prevention and public health. Without proper management, agricultural production facilities can create or enhance opportunities for vectors to develop and proliferate. Certain land management practices can reduce vector populations thereby reducing long-term vector treatment costs, reducing the amount of pesticides used in vector control operations, helping to protect public health, and contributing to an integrated pest management (IPM) approach to vector control.

Integrated Pest Management is an approach that focuses on site-specific, scientifically sound decisions to manage pest populations by matching a wide variety of techniques with the conditions found on site. These techniques are commonly grouped into four categories:

1. Source reduction or physical control—environmental manipulation that results in a reduction of vector development sites.
2. Biological Control—use of biological agents to limit vector populations
3. Chemical Control—larvicides (materials that kill immature larval vectors and mosquitoes) and adulticides (materials that kill adult vectors and mosquitoes)
4. Cultural Control—change the behavior of people so that their actions prevent the development of vectors or the transmission of vector-borne disease.

Through the adoption of these policies and procedures, this Plan will provide an outline to effectively control vectors by physical, cultural, and biological means.

The Vector Reduction Best Management Practices (BMPs) referred to in this document are the recommended land management practices that can provide a reduction in vector populations by various means including: reducing or eliminating breeding areas, increasing the efficacy of biological controls, increasing the efficacy of chemical controls, and improving access for control operations.

While it is generally accepted that vector production from all sources may be reduced through the widespread implementation of vector Reduction BMPs, these policies specifically target the most severe vector problems with the greatest likelihood of responding through the use of BMPs.

## 2. **BEST MANAGEMENT PRACTICES (BMPs)**

---

- a. **Land Application Areas:** for Land Application Areas, the following are areas of concern and recommended BMPs for vector control:

### Common Vector Development Areas

- Vegetated ditches
- Seepage or flooding of fallow fields
- Irrigation tail water return sumps
- Blocked ditches or culverts
- Leaky water control structures
- Irrigated pastures
- Low areas caused by improper grading
- Broken or leaky irrigation pipes or valves

### Special Concerns

Agricultural practices vary among growers, locations, and conventional or organic production methods. Pesticide regulations can affect the ability to use chemical control. The Best Management Practices below are offered as tools to balance the economic and agronomic requirements of the growers and land owners with the need for effective vector control.

### General Vector Reduction Principles

1. Prevent or eliminate unnecessary standing water that stands for more than 72 –96 hours during mosquito season which can start as early as March and extend through October depending on weather.
2. Maintain access for Abatement District staff to monitor and treat mosquito breeding sources.
3. Minimize emergent vegetation and surface debris on the water.
4. Contact the County Department of Environmental Health or Mosquito Abatement District for technical guidance or assistance in implementing vector reduction BMPs.

### **Vector Reduction BMPs for Land Application Areas**

#### Ditches and Drains

- DD-1** Construct or improve ditches with at least 2:1 slopes and a minimum 4-foot bottom. Consider a 3:1 slope or greater to discourage burrowing animal damage, potential seepage problems, and prevent unwanted vegetation growth. Other designs may be approved by the MVCD based on special circumstances.
- DD-2** Keep ditches clean and well-maintained. Periodically remove accumulated sediment and vegetation. Maintain ditch grade to prevent areas of standing water.

- DD-3** Design irrigation systems to use water efficiently and drain completely to avoid standing water.

#### Irrigated Pastures

- IP-1** Grade field to achieve efficient use of irrigation water. Use NRCS guidelines for irrigated pastures. Initial laser leveling and periodic maintenance to repair damaged areas are needed to maintain efficient water flow.
- IP-2** Irrigate only as frequently as is needed to maintain proper soil moisture. Check soil moisture regularly until you know how your pasture behaves
- IP-3** Do not over fertilize. Excess fertilizers can leach into irrigation tail water, making mosquito production more likely in ditches or further downstream
- IP-4** Apply only enough water to wet the soil to the depth of rooting.
- IP-5** Drain excess water from the pasture within 24 hours following each irrigation. This prevents scalding and reduces the number of weeds in the pasture. good check slopes are needed to achieve drainage. A drainage ditch may be used to remove water from the lower end of the field.
- IP-6** Inspect fields for drainage and broken checks to see whether re-leveling or reconstruction of levees is needed. Small low areas that hold water can be filled and replanted by hand. Broken checks create cross-leakage that provide habitat for vectors.
- IP-7** Keep animals off the pasture while the soil is soft. An ideal mosquito habitat is created in irrigated pastures when water collects in hoof prints of livestock that were run on wet fields or left in the field during irrigation. Keeping animals off wet fields until soils stiffen also protects the roots of the forage crop and prevents soil compaction that interferes with plant growth.
- IP-8** Break up pastures into smaller fields so that the animals can be rotated from one field to another. This allows fields to dry between irrigations and provides a sufficient growth period between grazings. It also prevents hoof damage (pugging), increases production from irrigated pastures, and helps improve water penetration into the soil by promoting a better root system.

- b. Dairy Production Area (DPA):** for the Dairy Production Area, the following are areas of concern and recommended BMPs for vector control:

#### Common Vector Development Areas

- Wastewater lagoons
- Animal washing areas

- Drain ditches
- Sumps/ponds
- Watering troughs
- Corrals
- Milk barn
- Calf areas
- Free stalls and flush lanes
- Shades
- Feed storage and feeding areas

#### Special Concerns

Dairy and associated agricultural practices vary; however, these practices need to consider mosquito and vector control issues. The Best Management Practices for Vector Reduction below offer options to balance the requirements of the dairy operators with the need for effective vector control.

#### General Vector Control Principles

1. Prevent or eliminate unnecessary standing water that remains for more than 72 –96 hours during mosquito season which can start as early as March and extend through October depending on weather.
2. Maintain access for Abatement District staff to monitor and treat mosquito breeding sources.
3. Minimize emergent vegetation and surface debris on the water.
4. Inspect Common Vector Development Areas monthly for evidence of presence of vectors.
5. Contact the County Department of Environmental Health or Mosquito Abatement District for technical guidance or assistance in implementing vector reduction BMPs.

#### **Vector Reduction BMPs for Dairy Production Area**

- DA-1 All holding ponds should be surrounded by lanes of adequate width to allow safe passage of vector control equipment. This includes keeping the lanes clear of any materials or equipment (e.g. trees, calf pens, hay stacks, silage, tires, equipment, etc.).
- DA-2 If fencing is used around the holding ponds, it should be placed on the outside of the lanes with gates provided for vehicle access.
- DA-3 It is recommended that all interior banks of the holding ponds should have a grade of at least 2:1.
- DA-4 An effective solids separation system should be utilized such as a mechanical separator or two or more solids separator ponds. If ponds are used, they should not exceed sixty feet in surface width.



- DA-5 Drainage lines should not by-pass the separator ponds whenever possible, except those that provide for normal corral run-off and do not contain solids. All drain inlets must be sufficiently graded to prevent solids accumulation.
- DA-6 Floating debris should be minimized in all ponds; mechanical agitators may be used to break up crusts.
- DA-7 Vegetation should be controlled regularly to prevent emergent vegetation and barriers to access. This includes access lanes, interior pond embankments and any weed growth that might become established within the pond surface.
- DA-8 Dairy wastewater discharged for irrigation purposes should be managed so that it does not stand for more than three days.
- DA-9 All structures and water management practices should meet current California Regional Water Quality Control Board requirements.
- DA-10 Tire sidewalls or other objects that will not hold water should be used to hold down tarps (e.g. on silage piles). Whole tires or other water-holding objects should be replaced.

### 3. **CONTACT INFORMATION**

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