CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

I. FACILITY INFORMATION

A. Facility:

Name: The Morning Star Packing Company, L.P.			
Address: 2211 Old Hwy. 99 West			
City: Williams	County: Colusa	State: CA	Zip Code: 95987
Contact Person: Ross Oliveira		Telephone Number: (530)473-3600	

B. Facility Owner:

Name: Same			Owner Type (Check One): 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☑ Partnership 5. ☐ Other:
Address:			
City:	State:	Zip Code:	
Contact Person:	Telephone Number:	Federal Tax ID:	

C. Facility Operator (The agency or business, not the person):

Name: Same			Operator Type (Check One): 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other:
Address:			
City:	State:	Zip Code:	
Contact Person:	Telephone Number:		

D. Owner of the Land:

Name: Same			Owner Type (Check One): 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other:
Address:			
City:	State:	Zip Code:	
Contact Person:	Telephone Number:		

E. Address Where Legal Notice May Be Served:

Address: Same		
City:	State:	Zip Code:
Contact Person:	Telephone Number:	

F. Billing Address:

Address: Same		
City:	State:	Zip Code:
Contact Person:	Telephone Number:	

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II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☑ A. WASTE DISCHARGE TO LAND ☐ B. WASTE DISCHARGE TO SURFACE WATER

Check all that apply:

- ☐ Domestic/Municipal Wastewater Treatment and Disposal
- ☐ Cooling Water
- ☐ Mining
- ☐ Waste Pile
- ☐ Wastewater Reclamation
- ☐ Other, please describe: _____
- ☐ Animal Waste Solids
- ☐ Land Treatment Unit
- ☐ Dredge Material Disposal
- ☐ Surface Impoundment
- ☑ Industrial Process Wastewater
- ☐ Animal or Aquacultural Wastewater
- ☐ Biosolids/Residual
- ☐ Hazardous Waste (see instructions)
- ☐ Landfill (see instructions)
- ☐ Storm Water

III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

1. Assessor's Parcel Number(s)	2. Latitude	3. Longitude
Facility: 17-090-74	Facility: Not Clear	Facility: Not Clear
Discharge Point: 17-090-74	Discharge Point: Not Clear	Discharge Point: Not Clear

IV. REASON FOR FILING

- ☐ New Discharge or Facility
- ☐ Changes in Ownership/Operator (see instructions)
- ☐ Change in Design or Operation
- ☑ Waste Discharge Requirements Update or NPDES Permit Reissuance
- ☐ Change in Quantity/Type of Discharge
- ☐ Other: _____

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: Colusa County

Has a public agency determined that the proposed project is exempt from CEQA? ☑ Yes ☐ No

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency: Not a new project, Prior EIR from Colusa County

Has a "Notice of Determination" been filed under CEQA? ☐ Yes ☑ No

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☐ EIR ☐ Negative Declaration

Expected CEQA Completion Date: N/A

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WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: Ross Oliveira Title: Washwater Administrator

Signature: Ross Oli Date: 12/30/05

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

REPORT OF WASTE DISCHARGE
TECHNICAL REPORT

Prepared for

THE MORNING STAR PACKING COMPANY, L.P.

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Phone (530) 473-3600
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December 30, 2005

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REPORT OF WASTE DISCHARGE
TECHNICAL REPORT
FOR
THE MORNING STAR PACKING COMPANY, L.P.

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A. FACILITY DESCRIPTION

1. Introduction

This report was prepared to satisfy the California Regional Water Quality Control Board's (**Regional Board**) requirements for The Morning Star Packing Company, L.P. (**Morning Star**), to continue land application of wastewater generated by the existing Morning Star plant. Morning Star currently operates under Waste Discharge Requirements Order No. 95-160. The processing facility was constructed during the winter and spring of 1995 and commenced processing operations in August of that year.

The Report of Waste Discharge (**RWD**) is comprised of this Technical Report and the accompanying Application for Facility Permit/Waste Discharge (**Form 200**).

The Morning Star tomato processing facility and associated land application area are located south of the town of Williams, east of Interstate 5 in rural Colusa County. The facility and associated land application area lie in portions of Sections 19, 20, 29 and 30, Township 15N, Range 2W, MDB&M.

The facility is situated in a rural area on land that was previously used for crop cultivation. The land application area is irrigated using a combination of washwater and fresh water; washwater reuse has not caused changes to historical cropping patterns.

2. Processing Activities

The facility operates continuously for approximately three months annually from late June until early to mid October, depending on the length of harvest. Processing activities occur 24 hours per day, everyday during the processing season.

The facility receives freshly harvested tomatoes in truckloads from fields. The tomatoes are graded at a station located at the processing facility. Trailers of tomatoes are staged near the dump station. Approximately 16,000 tons of tomatoes are processed each day.

The facility is designed to produce aseptic tomato paste and diced tomatoes in bulk packaging. These products are used as ingredients for formulated tomato products at customer facilities.

A list of significant plant equipment at the facility with a description of its purpose is provided below:

Flumes: The tomatoes are transported into the facility with a series of water flumes. These flumes are provided with water from condensate produced during the evaporation process and with well water. The flume system consists of four

parts. Make-up water is provided to System 4, the last system the tomatoes travel through before entering the hot breaks. Spent water from System 4 is used as a source for System 3. Similarly, spent water from System 3 is used as the source water for System 2. System 1, the dirtiest water, is used to remove the tomatoes from the trailers.

Hot Breaks: After sorting, the tomatoes are placed in hot breaks where the breakdown of the tomato pectin is halted.

Peelers: A small portion of the tomato flow is peeled for dicing.

Finishers: The tomatoes then go through the finishers, a series of fine screens that remove the seeds and peel from the tomatoes.

Dicers: These cute the tomatoes into small chunks..

Evaporators: The tomato pulp is then put into a series of three evaporators that remove water from the pulp.

Bag Fillers: Tomato paste or diced tomatoes in juice are transported to the filling area through a series of pipes. They are then put into aseptic packaging in either drums or large bins.

Water Softener: A water softener is used to remove hardness from the well water that is used for boiler feed water and for maintaining seals on some of the equipment.

B. WASTE CHARACTERISTICS

The facility's washwater management system was designed to minimize washwater discharge. A portion of the washwater is continuously recycled and used as the transport medium that brings raw tomatoes into the facility. No significant changes to the washwater management system have occurred since the plant construction.

The processing facility produces five washwater streams, which are discharged to either the cooling pond or the settling pond. The cooling pond receives two source of washwater. The settling pond receives three washwater streams. The fifth washwater stream, condensate, is either discharged to the cooling pond or used in plant operations where it is eventually discharged to the settling pond.

Boiler blow down is also discharged to the cooling pond. Condensate from the evaporation process is either discharged to the cooling pond or used as a water supply source for the tomato flumes.

Washwater used to transport tomatoes through the facility is discharged to the settling pond. Washwater used for sanitation and water softener residual is

captured in drains and transported to a sump where it is pumped to a ditch and combined with water from the settling pond prior to being applied to cropland.

Prior to disposal to the reclamation fields, larger solids are removed by rotary screens. The separated solids fall into a bin where they are collected for off-site transfer. Additionally, soil particles brought into the facility with the raw tomatoes are settled out in the settling pond.

Table 1 below provides a summary of settling pond water quality sample results from the 2005 processing season. Future processing activities are anticipated to produce wastewater of similar quality.

Table 1. Settling Pond Discharge 2005 Water Quality Results

Date	pH	EC (umhos/cm)	BOD (mg/l)	TDS (mg/l)	FDS (mg/l)	Settleable Solids (mg/l)	N-NO3 (mg/l)	Nitrate (mg/l)	TKN (mg/l)	DO (mg/l)
7/18/2005	4.7	1,069	351	800	291	3.0	1.00	4.4	31.3	2.1
7/25/2005	4.7	934	378	697	177	13.0	0.00	1.1	26.5	2.0
8/1/2005	4.0	1,490	664	1,032	484	5.0	0.00	1.1	89.6	1.8
8/8/2005	4.9	960	1,110	718	538	4.0	0.00	0.0	106.4	1.2
8/15/2005	5.6	780	700	600	438	2.0	0.00	0.0	78.4	2.8
8/22/2005	6.0	730	736	526	313	0.6	0.10	0.6	28.0	1.2
8/29/2005	6.0	1,075	581	696	385	0.8	0.70	2.7	84.5	2.8
9/6/2005	5.4	801	776	574	385	2.8	0.30	1.5	78.4	4.2
9/12/2005	6.4	742	316	502	294	0.8	1.40	6.3	61.6	4.0
9/20/2005	6.8	736	312	420	380	4.0	1.20	5.3	44.8	2.8
9/27/2005	7.1	880	139	491	466	0.4	0.00	0.0	16.8	1.4
10/3/2005	6.6	670	261	386	336	0.6	0.00	0.0	50.4	4.3
Averages	5.7	906	527	620	374	3.1	0.4	1.9	58.1	2.6
Min	4.0	670	139	386	177	0.4	0.0	0.0	16.8	1.2
Max	7.1	1490	1110	1032	538	13.0	1.4	6.3	106.4	4.3

The maximum daily discharge from the settling pond is 4,300,000 gpd. The maximum seasonal average daily discharge from the settling pond is 3,850,000 gpd.

On occasions, washwater may also be discharged from the cooling pond. The water contained in the cooling pond is primarily condensate from the evaporation process. Condensate is essentially pure water, better in quality than the well water provided to the facility. Hence, despite the small amount of boiler blowdown that also enters the cooling pond, the water is high quality with an EC that is lower than well water. Water quality results from 2005 are provided in Table 2 below.

Table 2. Cooling Pond 2005 Water Quality Results

Date	pH	Freeboard (ft)	DO mg/l	EC umhos/cm	TDS[1] mg/l	Levee Condition	Water Color
7/6/2005	7.40	3.04	7.7	424	238	Good	Grey/Green
7/11/2005	7.20	3.00	7.6	422	237	Good	Grey/Green
7/18/2005	8.14	2.42	8.0	413	232	Excellent	Clear
7/25/2005	7.15	2.25	1.6	417	234	Excellent	Clear/Green
8/1/2005	8.04	2.25	2.1	432	242	Excellent	Clear/Green
8/8/2005	8.06	2.25	2.2	443	249	Good	Clear/Green
8/15/2005	7.62	2.21	3.6	458	257	Excellent	Clear/Green
8/22/2005	8.01	2.17	2.8	468	263	Good	Clear/Green
8/29/2005	7.47	2.17	4.4	480	269	Good	Clear/Green
9/7/2005	6.99	2.17	3.9	489	274	Good	Clear/Green
9/12/2005	7.31	2.25	4.7	493	277	Excellent	Clear/Green
9/19/2005	7.42	2.25	3.6	502	282	Good	Clear/Green
9/26/2005	7.97	2.33	6.7	498	280	Good	Green/Transparent
10/3/2005	7.36	2.25	2.0	515	289	Good	Clear/Green
10/12/2005	7.50	2.50	6.1	532	299	Good	Green
10/18/2005	7.80	2.50	6.8	519	291	Good	Green
10/25/2005	7.20	2.46	6.9	510	286	Good	Green
Average	**7.47**	**2.43**	**5.5**	**519**	**291**		

[1] *TDS calculated using TDS/EC ratio on 7/6/2005.*

Processing activities remain relatively constant throughout the processing season. Therefore, there are no daily or seasonal fluctuations of note. Water results are obtained using a grab sample from the discharge point from the settling pond. Samples from the cooling pond are also grab samples.

Discharge flow rates are measured at two points. Flow rates from the settling pond are measured downstream from where the sump water is combined with the settling pond. The second measuring point is at the combined discharge point of GCID irrigation water and the washwater. Flow meters are equipped with data loggers that measure the flow rates at 15 minute intervals.

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C. PROCESS FLOW DIAGRAM

A Schematic Flow Diagram has been included with this report as **Exhibit 1**.

D. CHEMICAL USAGE

A summary of the chemicals used and associated quantities is provided in Tables 3 and 4. The facility does not produce or handle any hazardous materials.

Table 3. Washwater Streams Discharged to Crops

Settling Pond Washwater Streams	EC (µmhos/cm)	Average Flow Rate (gpm)	Salt Flow Rate (lbs/min)	Stream Additives	2005 Chemical Usage (gal/year)
Tomato Transport Water					
Source Water					
Well Water	788	450	2.1		
Condensate	20	850	0.1		
Flume Salinity Test Results					
Flume 4	545	1,300	4.1	Tomato Juice	
Flume 3	597	1,300	4.5	Tomato Juice	
Flume 2	666	1,300	5.1	Tomato Juice	
Flume 1	877	1,300	6.7	Tomato Juice	
Sanitation Water					
Source Water					
Well Water	788	200	0.9		
Sanitation Salinity Test Results					
Sump Water	967	200	1.1	50% Caustic Solution	23,098
				Demolish (sodium hydroxide)	440
				Supress (defoamer)	440
Water Softener Reject				Salt (NaCl)	49 tons
Backwash[1]	850	1	0.0		
Brine[2]	7,300	0	0.0		
Slow Rinse[3]	8,600	1	0.1		
Fast Rinse[4]	3,463	2	0.0		
Calculated Discharge to Fields[5]			7.9		
2005 Discharge to Fields	927	1,348	7.3		

[1] *Runs for 15 minutes at 145 gpm each cycle. Softener cycles every 28 hours.*
[2] *Runs for 30 minutes at 25 gpm each cycle. Softener cycles every 28 hours.*
[3] *Runs for 12 minutes at 145 gpm each cycle. Softener cycles every 28 hours.*
[4] *Runs for 16 minutes at 220 gpm each cycle. Softener cycles every 28 hours.*
[5] *Total discharge is calculated as the sum of salt from Flume 1, Sump Water and Water Softener Reject.*

Information on the washwater discharges to the cooling pond was also obtained during the 2005 processing season. However, discharges from the cooling pond to crops were eliminated during the 2005 processing season. Therefore, reducing salt production in these washwater streams will not result in a reduction in crop nutrient loadings. Table 4 provides information on the cooling pond washwater streams.

Table 4. Cooling Pond Washwater Streams

Cooling Pond Washwater Streams	EC (µmhos/cm)	Average Flow Rate (gpm)	Salt Flow Rate (lbs/min)	Chemicals Added to Stream	2005 Chemical Usage (gal/year)
Boiler Blow Down	1,600	22	0.2	Amine	165
				Sulfite	277
				Boiler Water Treatment	550

E. FACILTY LAYOUT

The processing facility consists of approximately 100,000 sq ft of buildings and 900,000 sq ft of warehouse storage (uncovered). The facility has two parking lots. The main parking lot located south of the processing facility is 132 ft by 300 ft. A second parking lot near the trucking headquarters is 132 ft by 222 ft. The facility is also equipped with three stormwater basins: east of the dump station there is a 180,000 sq ft basin, south of the settling pond there is a 35,000 sq ft basin and west of the processing facility there is a 80,000 sq ft basin. A vicinity map is included as **Exhibit 2**.

F. TREATMENT AND HOLDING PONDS

The facility has two washwater holding ponds. The large pond north of the facility is used for cooling processing water. The ponds were constructed using the native clay soils available at the facility.

1. Cooling Pond

Hot water is discharged to the cooling pond and travels around the pond. Cooled water is pumped from the pond at the western side of the pond. The cooling pond has a surface area of approximately 60 acres. Total storage capacity of the cooling pond is approximately 210 ac-ft. There is approximately 5 to 10 feet of separation between the bottom of the pond and groundwater.

The cooling pond generally remains full throughout the year; however, the pond is occasionally emptied for maintenance.

The cooling pond is drained down to achieve a freeboard of approximately 4 feet after the processing season. This allows rainfall on the cooling pond to be contained while maintaining two feet of freeboard.

2. Settling Pond

The settling pond was constructed south of the dump station. The settling pond has approximately 5 ac-ft of storage. The settling pond is equipped with an aerator that maintains the dissolved oxygen at a concentration greater than 1.0 mg/l. There is approximately 13 to 15 feet of separation between the bottom of the pond and groundwater.

Since processing activities occur during the summer months and the settling pond is emptied in the beginning to middle of October, storm water accumulation is not a concern.

The settling pond was constructed with clay soils compacted in lifts with the dump station.

The tomato harvesting activities bring a significant amount of soil into the facility. Soil particles are separated from the washwater in the settling pond. The accumulated soils are removed from the settling pond annually with a backhoe during the off-season. The removal of these soils restores the capacity of the settling pond.

G. SOILS

Soils in the vicinity of the processing facility and land application area consist of loams, sandy loams, and clay loams. The soil types are fertile and are known for producing crops with good yields.

Copies of soil borings performed when the facility was constructed are included as **Exhibit 3**. A soils map is provided in **Exhibit 4**.

H. GROUNDWATER

Groundwater beneath the processing facility and associated cropland is relatively shallow, averaging 5 to 10 ft below ground surface. Groundwater elevation contour mapping from groundwater monitoring activities indicates that groundwater in the vicinity generally flows to the north/northeast (**Exhibit 5**).

A large unlined canal that supplies water to Glenn Colusa Irrigation District (**GCID**) borders the southern edge of the Morning Star property. This canal carries high quality Sacramento River water that is used to irrigate farmland within GCID. Percolation from this canal most likely produces localized improvements in groundwater quality. Because of the possible affects of this canal, no land application area monitoring wells are planned for the southern edge of the facility.

Nine monitoring wells have been installed to monitor the settling pond and land application area. Information obtained from these three wells will help to identify changes (if any) in groundwater quality and gradients. The monitoring well locations are shown in **Exhibit 2**.

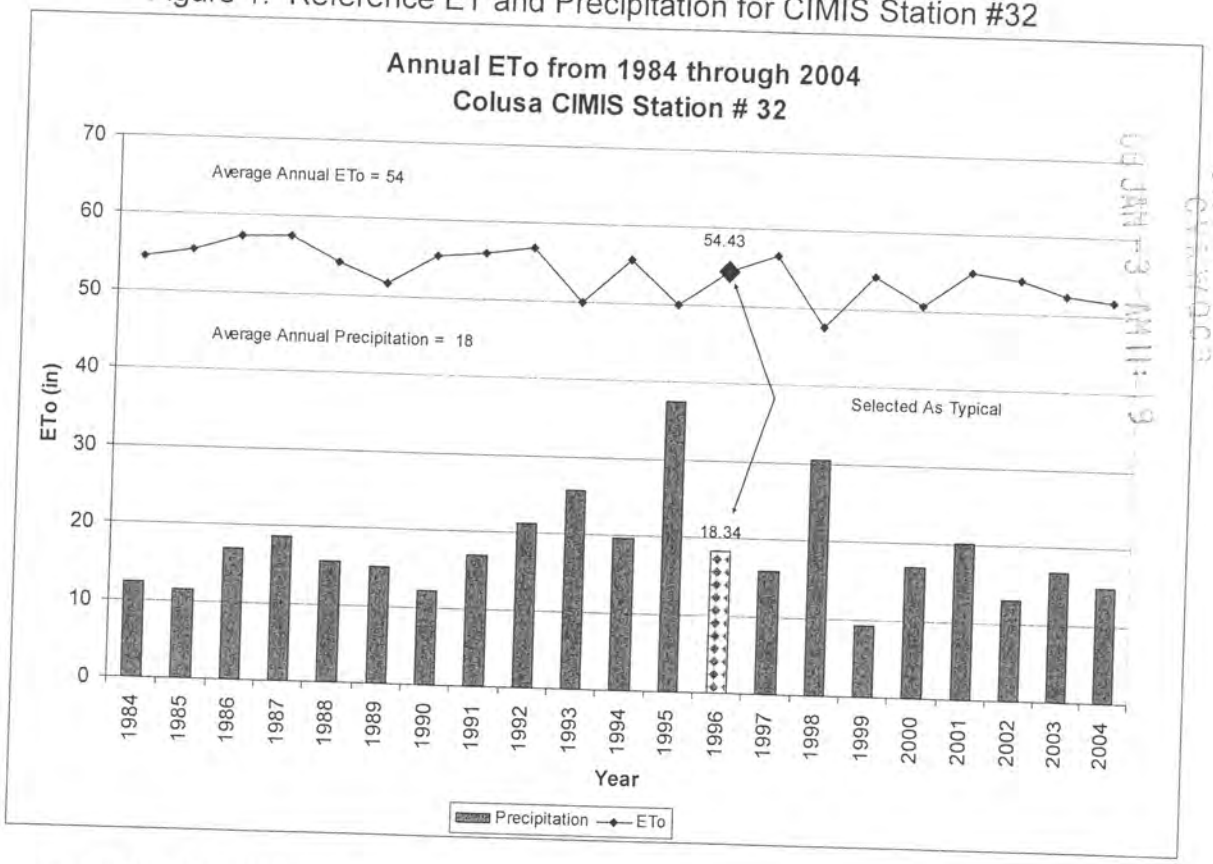
I. SURFACE WATER

Stormwater from the land application areas drains to the Glenn-Colusa Canal tributary to the Colusa Basin Drain. During the processing season, stormwater is not allowed to leave the land application area. This is accomplished through the use of earthen dams that block stormwater culverts and temporary ditches that transport residual irrigation water back into the irrigation system. During the winter, the stormwater from the land application area is allowed to travel through drains (that were not used for transporting irrigation or tailwater) off site. The slope of these drains is approximately 0.002 ft/ft.

Stormwater at the processing facility (excluding farmland) is contained on-site. Drains direct the stormwater to one of several shallow stormwater collection basins. Stormwater collected in these basins is percolated or evaporated.

DWR maintains a network of CIMIS stations to provide weather information for irrigation scheduling. The nearest CIMIS station to the William facility is located near Colusa (Station #32). Daily ETo values for Station #32 were downloaded from the CIMIS database from the period of record available (January 1, 1984 through December 31, 2004.) Reference ET values were plotted and reviewed for consistency; no outliers or suspect values were identified. Reference ET and precipitation were compared on an annual basis to identify a typical year for the area (**Figure 1**). The year of 1996 was identified as the most typical year for the available record since it closely matches average annual ETo and precipitation values.

Figure 1. Reference ET and Precipitation for CIMIS Station #32



J. SOURCE WATER

Water for processing activities is provided by two wells located on the property. One of the wells is designated as the primary water source, with the second well used as a back-up water supply. Water quality results from these wells are included **Exhibit 6**.

During the 2005 processing season, the facility began recycling condensate for use in tomato transport. The reuse of this water has reduced the amount of water that must be produced by the well and has reduced the facility's salt production (since condensate has a much lower salinity than the well water).

K. WASTE MANAGEMENT PLAN

1. Crops Cultivated

Morning Star irrigates 600 acres of adjacent cropland with washwater. Table 3 provides a summary of the fields used and associated acreages.

Table 3. Field and Acreage Summary

Field	Acreage
MS24	159.8
MS20	64.6
MS2,3	82.1
MS11	35.6
MS14	44.5
MS15	26.7
MS16	18.0
MS17	18.7
MS18	78.2
MS21	25.9
MS5	24.6
MS6	21.4

Crops typically grown on the associated acreage include pasture, alfalfa, sudan grass, tomatoes, wheat, and vineseed. Crops chosen for the land application should area have growing seasons that extend through the processing season. Changes to the cropping pattern should be analyzed prior to planting to ensure adequate crop nutrient uptake and irrigation scheduling using a process similar to the 2005 Cropping Plan. The Cropping Plan using typical crop water use information and washwater quality information to predict the nutrient loadings associated with various cropping patterns.

2. Irrigation System

Crops are irrigated using either border strips or furrows, depending upon the crop. Border strips are typically 30 to 50 feet wide. Furrows are typically spaced at either 30 or 40 inch intervals. Border and furrow lengths are dependent upon field size. The furrow and border strip length depends on the field shape. The longest field is approximately 2600 ft long.

Application depths vary during the processing season depending upon the amount of washwater produced and the crop water requirements. However, flood irrigation methods, such as those employed at the Morning Star facility, generally require the application of at least 2 to 3 inches of water to achieve reasonable irrigation efficiencies. At these application rates, the amount of BOD applied to the fields can exceed the 300 lbs/acre/day (although the average application rate is well under the limit). Smaller application depths can be used to stay below this amount; however, there is increased risk that the head of the field will be over irrigated while the tail of the field is under irrigated. The higher irrigation efficiencies achieved with greater application depths allow washwater to be more evenly distributed across the fields thus preventing excessive deep percolation at the head of the field and excessive crop stress at the tail of the field.

Drying times associated with irrigation scheduling depend on the crop water requirements, available water holding capacity (AWHC) of the soil and the depth of water applied during the previous irrigation. In most cases, irrigation is scheduled when the management allowable depletion of 50% of the AWHC has been reached. Drying times are typically 7 to 14 days for mature pasture and alfalfa.

3. BOD Loading Calculations

The Regional Board prescribes a BOD loading of 300 lbs/acre/day maximum and 100 lbs/acre/day average. The daily BOD loading rates are dependent upon the BOD concentration of the washwater, gallons of washwater produced by the facility and the acreage irrigated. A balance must be struck between the crop water needs and the acceptable BOD loadings. To provide guidance to Morning Star personnel, **Exhibit 7** has been prepared. This Exhibit allows personnel to use the estimated BOD concentration and washwater production rate to determine the minimum acreage that needs to be irrigated each day.

4. Washwater Loading Calculations

Washwater loading calculations are provided in **Exhibit 8**.

5. Nitrogen Balance

The nitrogen required by the cropland depends upon the crop grown and yield expected. To determine if there is adequate nitrogen removal, the annual cropping plan should be analyzed prior to planting to determine if the crops are suitable for the projected nutrient uptake and hydraulic loadings.

Nitrogen balance is provided below in **Table 5**. Nitrogen loadings from the application of washwater are less than crop requirements.

Table 5. Nitrogen Balance

Crop	Nitrogen Applied (lbs/acre)	Nitrogen Uptake (lbs/acre)
Pasture	281	320

L. SOLIDS HANDLING

The facility produces three types of solid waste: tomato pomace, screened waste and soil. Tomato pomace consists of seeds and skin removed during the processing of tomato paste. Pomace is collected in semi-trucks and is generally trucked off site for use as animal feed.

Solid waste captured in the washwater screens is also collected and transported off-site for use as animal feed.

The tomato harvesting process causes a large amount of soil to be brought into the facility with the raw tomatoes. Soil particles are allowed to settle out of the washwater in the settling pond. The soil accumulated in the settling pond is removed annually after the processing season. The removed soil is used, for example, to build up roads on the farmland associated with the facility.

M. MONITORING AND REPORTING

A revised Monitoring and Reporting Program was adopted for the Morning Star facility on October 28, 2003. The requirements of this monitoring program are adequate to identify deviations from the Waste Discharge Requirements.

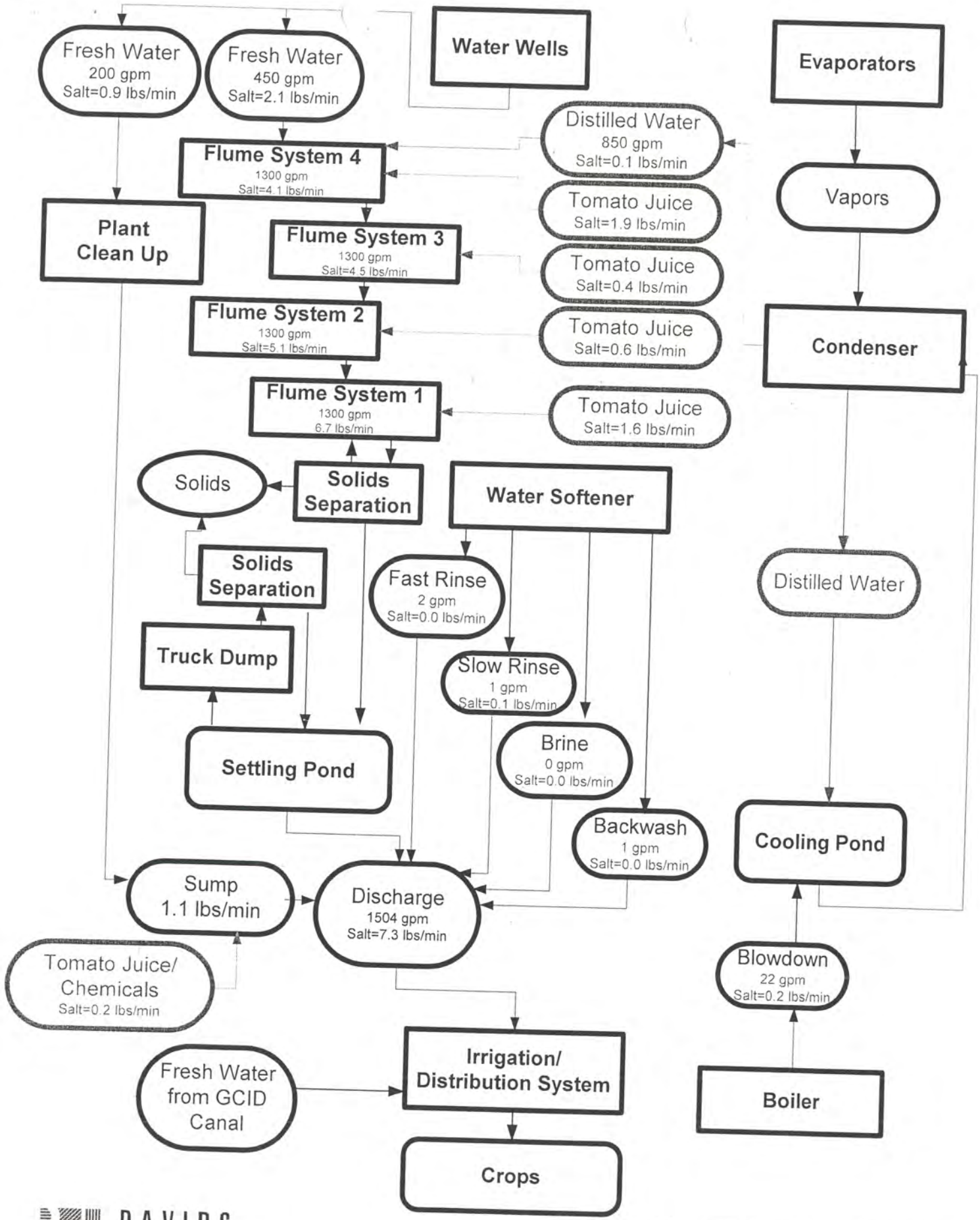
N. CONTACT INFORMATION

Washwater Regulatory Contact

Ross Oliveira
724 Main Street
Woodland, CA 95695
Phone (916) 219-6892
Fax (916) 923-2648

Wastewater Application Area

Marc Haywood
2211 Old Highway 99 W
Williams, CA 95987
Phone (530) 473-3600
Fax (530) 473-3601



DAVIDS
ENGINEERING, INC

Exhibit 1

The Morning Star Packing Company
Williams, CA
Process Flow Diagram

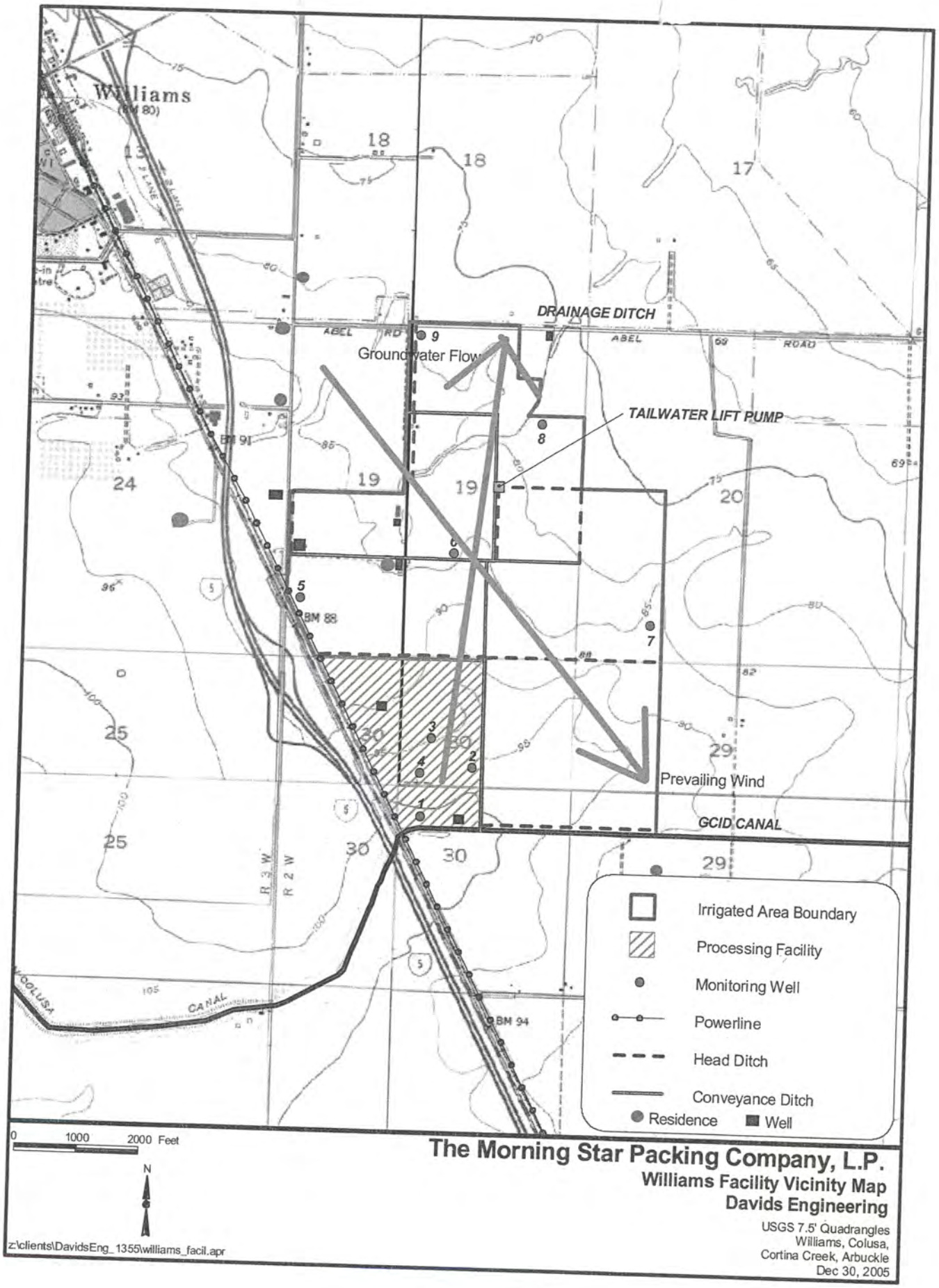

Williams
(BM 80)
DRAINAGE DITCH
ABEL RD
ABEL ROAD
Groundwater Flow
TAILWATER LIFT PUMP
BM 91
BM 88
BM 94
Prevailing Wind
GCID CANAL
COLUSA CANAL
R 3 W
R 2 W
Irrigated Area Boundary
Processing Facility
Monitoring Well
Powerline
Head Ditch
Conveyance Ditch
Residence
Well
0 1000 2000 Feet
N
z:\clients\DavidsEng_1355\williams_facil.apr
The Morning Star Packing Company, L.P.
Williams Facility Vicinity Map
Davids Engineering
USGS 7.5' Quadrangles
Williams, Colusa,
Cortina Creek, Arbuckle
Dec 30, 2005

Exhibit 2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

KLEINFELDER

Drafted By: D. Anderson
Date: 8/30/2004
Project No.: 48371-001
File Number: 48371log

UNIFIED SOIL CLASSIFICATION SYSTEM

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE

A-1

KA-USCS 48371L.PJ 8/30/04

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LOG SYMBOLS

	BULK / BAG SAMPLE	-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
	MODIFIED CALIFORNIA SAMPLER (2-1/2 inch outside diameter)	-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
	CALIFORNIA SAMPLER (3 inch outside diameter)	LL	LIQUID LIMIT (ASTM Test Method D 4318)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)	PI	PLASTICITY INDEX (ASTM Test Method D 4318)
	CONTINUOUS CORE	TXCU	CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (EM 1110-1-1906)
	SHELBY TUBE	EI	EXPANSION INDEX (UBC STANDARD 18-2)
	ROCK CORE	COL	COLLAPSE POTENTIAL
	WATER LEVEL (level where first encountered)	UC	UNCONFINED COMPRESSION (ASTM Test Method D 2166)
	WATER LEVEL (level after completion)		
	SEEPAGE	MC	MOISTURE CONTENT (ASTM Test Method D 2216)

GENERAL NOTES

1. *Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.*
2. *No warranty is provided as to the continuity of soil conditions between individual sample locations.*
3. *Logs represent general soil conditions observed at the point of exploration on the date indicated.*
4. *In general, Unified Soil Classification System designations presented on the logs were evaluated by visual methods. Where laboratory tests were performed, the designations reflect the laboratory test results.*

KA-LOG KEY 4L JG.GPJ 8/30/04

KLEINFELDER

Drafted By: D. Anderson Project No.: 48371-001
Date: 8/30/2004 File Number: 48371log

LOG KEY

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE

A-2

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Surface Conditions: Graded open lot..

Groundwater: Groundwater initially enountered at a depth of approximately 8-1/2 feet below existing site grade and finally at a depth of 7-1/2 feet.

Method: Hollow Stem Auger

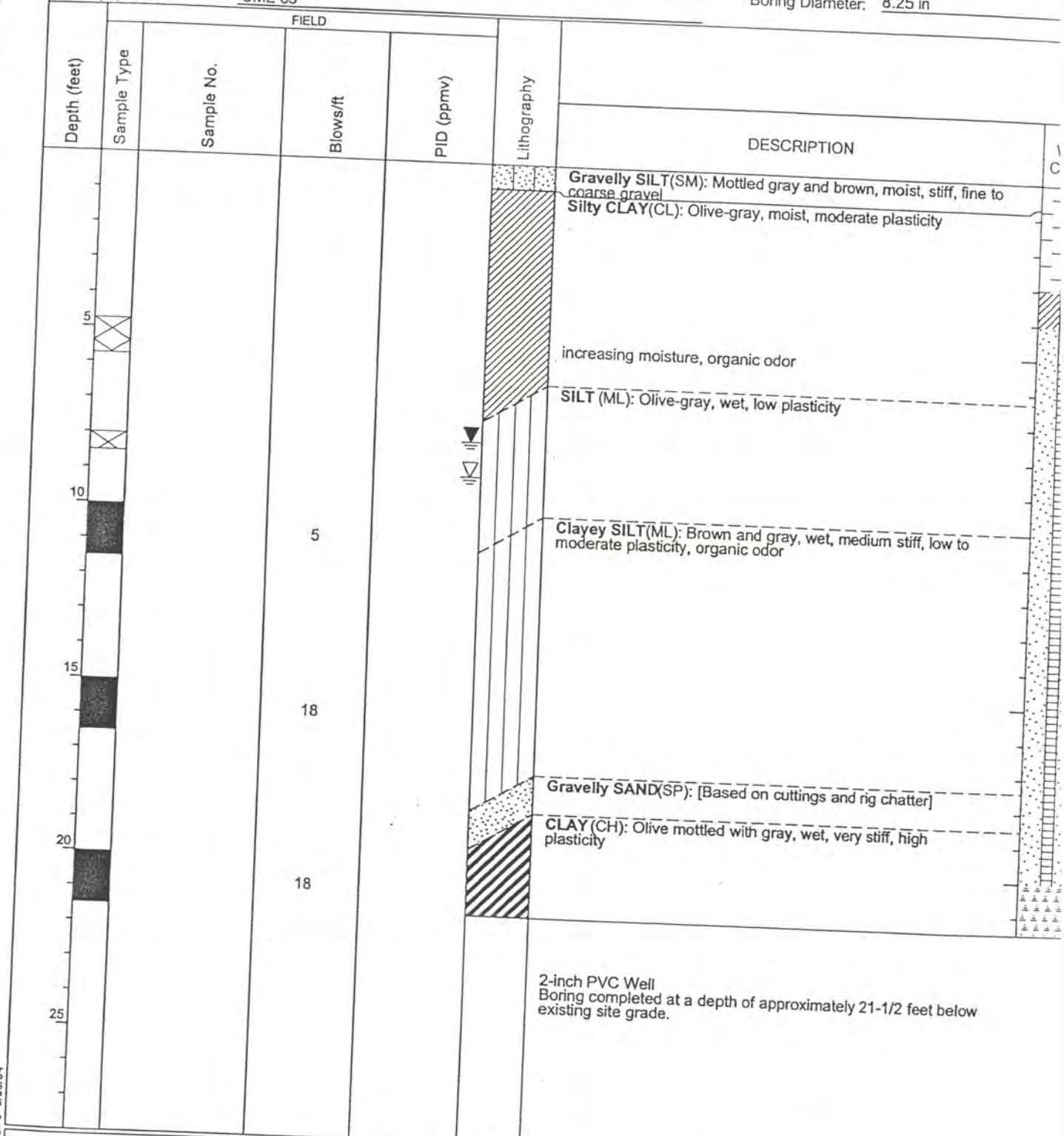
Equipment: CME 85

Date Completed: 8/18/2004

Logged By: W. Lambert

Total Depth: 21-1/2 feet

Boring Diameter: 8.25 in



KLEINFELDER

Drafted By: D. Anderson
Date: 8/30/2004
Project No.: 48371-001
File Number: 48371log

LOG OF BORING MW-4

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE
1 of 1
A-3

SAC 2004 48371.GPJ 8/30/04

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Surface Conditions: Tilled open field.

Groundwater: Groundwater initially enountered at a depth of approximately 8-1/2 feet below existing site grade and finally at a depth of 5 feet.

Method: Hollow Stem Auger

Equipment: CME 85

Date Completed: 8/18/2004

Logged By: W. Lambert

Total Depth: 21-1/2 feet

Boring Diameter: 8.25 in

Depth (feet)	Sample Type	Sample No.	FIELD Blows/ft	FIELD PID (ppmv)	Lithography	DESCRIPTION
5						**SILT** (ML): Olive-gray, moist, some fine to medium gravel no gravel
						CLAY (CH): Dark olive, moist, soft, high plasticity
10			5			**SILT** (ML): Brown, moist, medium stiff, low plasticity
15			8			**Silty CLAY** (CH): Mottled brown and light brown, wet, medium stiff, moderate to high plasticity
20			12			
25						2-inch PVC Well Boring completed at a depth of approximately 21-1/2 feet below existing site grade.

SAC 2004 48371LOG.GPJ 8/30/04

KLEINFELDER

Drafted By: D. Anderson Project No.: 48371-001

Date: 8/30/2004 File Number: 48371log

LOG OF BORING MW- 5

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE

1 of 1

A-4

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Surface Conditions: Graded dirt road.

Groundwater: Groundwater initially enountered at a depth of approximately 6 feet below existing site grade and finally at a depth of 5 feet.

Method: Hollow Stem Auger

Equipment: CME 85

Date Completed: 8/18/2004

Logged By: W. Lambert

Total Depth: 21-1/2 feet

Boring Diameter: 8.25 in

Depth (feet)	Sample Type	Sample No.	FIELD Blows/ft	FIELD PID (ppmv)	Lithography	DESCRIPTION	We Con
						Sandy SILT(ML): Light brown, dry, very stiff, some fine to medium gravel	
						SILT (ML): Green and brown, moist, soft	
5						wet, very soft	
10			9			brown, low plasticity	
						Clayey SILT(ML): Olive, wet, stiff, low plasticity	
15			9			moderate plasticity	
20			6			dark brown, low to moderate plasticity	
						light brown, medium stiff	
25						2-inch PVC Well Boring completed at a depth of approximately 21-1/2 feet below existing site grade.	

SAC 2004 48371L...GPJ 8/30/04

KLEINFELDER

Drafted By: D. Anderson
Date: 8/30/2004
Project No.: 48371-001
File Number: 48371log

LOG OF BORING MW- 6

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE
1 of 1
A-5

Copyright Kleinfelder, Inc. 2004

Surface Conditions: Open tilled field.

Groundwater: Groundwater encountered at a depth of 4 feet below existing site grade.

Method: Hollow Stem Auger

Equipment: CME 85

Date Completed: 8/19/2004

Logged By: W. Lambert

Total Depth: 21-1/2 feet

Boring Diameter: 8.25 in

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: PID (ppmv)	Lithography	DESCRIPTION	Well Const.
0						**Sandy SILT (ML)**	
						SILT (ML): Brown, moist, trace fine sand to fine gravel	
5						wet	
10			7			**Silty CLAY**(CL): Brown, moist to wet, medium stiff, moderate plasticity	
15			8			**CLAY**(CL): Mottled olive with gray to brown, moist to wet, medium stiff, some fine gravel size angular concretions	
20			10			**SILT** (ML): Brown, wet, stiff	
						CLAY (CL): Mottled olive with gray to brown, moist to wet, medium stiff, some fine gravel size angular concretions	
25						2-inch PVC Well Boring completed at a depth of approximately 21-1/2 feet below existing site grade.	

KLEINFELDER

Drafted By: D. Anderson
Date: 8/30/2004
Project No.: 48371-001
File Number: 48371log

LOG OF BORING MW- 9

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE
1 of 1
A-8

SAC 2004 48371L...GPJ 8/30/04

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Surface Conditions: Tilled open field.

Groundwater: Groundwater initially enountered at a depth of approximately 5 feet below existing site grade and finally at a depth of 3 feet.

Method: Hollow Stem Auger

Equipment: CME 85

Date Completed: 8/19/2004

Logged By: W. Lambert

Total Depth: 22-1/2 feet

Boring Diameter: 8.25 in

Depth (feet)	FIELD: Sample Type	FIELD: Sample No.	FIELD: Blows/ft	FIELD: PID (ppmv)	Lithography	DESCRIPTION	We Con
0						Silty GRAVEL(GM): Gray, dry, medium dense, some fine sand	
						Silty SAND(SM): Brown, wet, medium dense, fine to medium grained with some coarse grained	
5							
10			4			Sandy GRAVEL(GM): Brown, wet, loose, fine to coarse rounded gravel, fine sand	
						Gravelly SILT(ML): Brown, wet, soft, low plasticity, some fine sand	
15						Sand /Silty SAND(SP/SM): Heaving sand	
20						clay on bit	
25						2-inch PVC Well Boring completed at a depth of approximately 22-1/2 feet below existing site grade.	

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Drafted By: D. Anderson
Date: 8/30/2004
Project No.: 48371-001
File Number: 48371log

LOG OF BORING MW-7

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE
1 of 1
A-6

SAC 2004 48371L...GPJ 8/30/04

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Surface Conditions: Graded dirt road.

Groundwater: Groundwater initially enountered at a depth of approximately 4-1/2 feet below existing site grade and finally at a depth of 3-1/2 feet.

Method: Hollow Stem Auger

Equipment: CME 85

Date Completed: 8/19/2004

Logged By: W. Lambert

Total Depth: 21-1/2 feet

Boring Diameter: 8.25 in

Depth (feet)	Sample Type	Sample No.	FIELD Blows/ft	FIELD PID (ppmv)	Lithography	DESCRIPTION	Well Cons
5						**Gravelly SILT(ML)**: Gray-brown, dry, stiff	
						dark brown, moist, no gravel	
						Silty SAND(SM): Brown, wet, fine grained, some medium to coarse grained	
10			8			**CLAY(CH)**: Olive, moist to wet, moderate to high plasticity	
15			8			brown, wet	
20			21			**Silty CLAY(CL)**: Mottled brown with light brown and gray, wet, fine to medium hard concretions	
25						2-inch PVC Well Boring completed at a depth of approximately 21-1/2 feet below existing site grade.	

KLEINFELDER

Drafted By: D. Anderson
Date: 8/30/2004
Project No.: 48371-001
File Number: 48371log

LOG OF BORING MW-8

MORNING STAR PACKING COMPANY
WILLIAMS, CALIFORNIA

PLATE
1 of 1
A-7

SAC 2004 48371L...GPJ 8/30/04

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Index
100 - Capay Clay Loam
110 - Hustabel Sandy Loam
112 - Westfan Loam
127- Mallard Clay Loam

Soils Map
from NRCS Soil Survey - Colusa County
Morning Star Packing Company, L.P.
Williams, CA
12/20/05

Exhibit 4

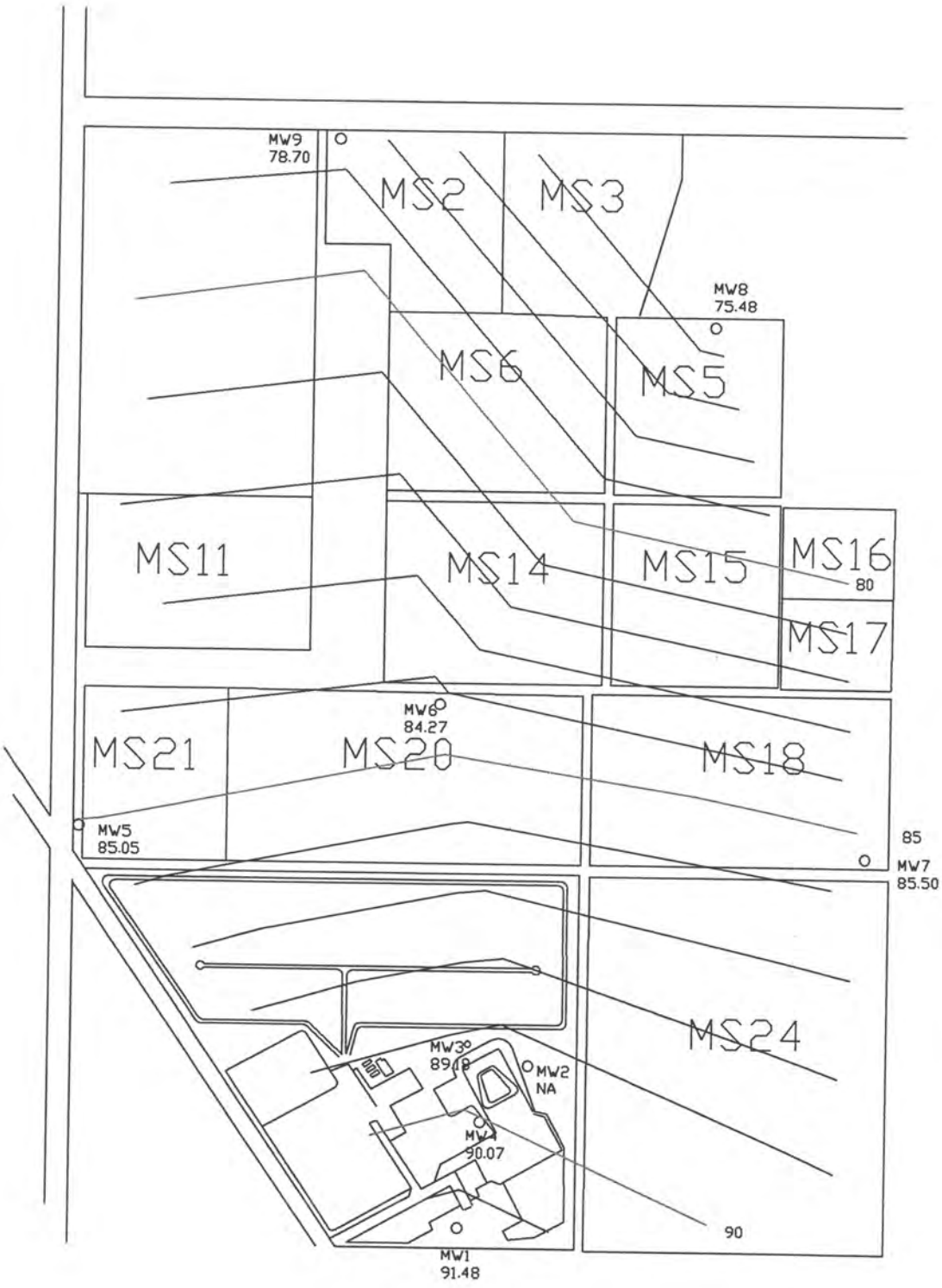
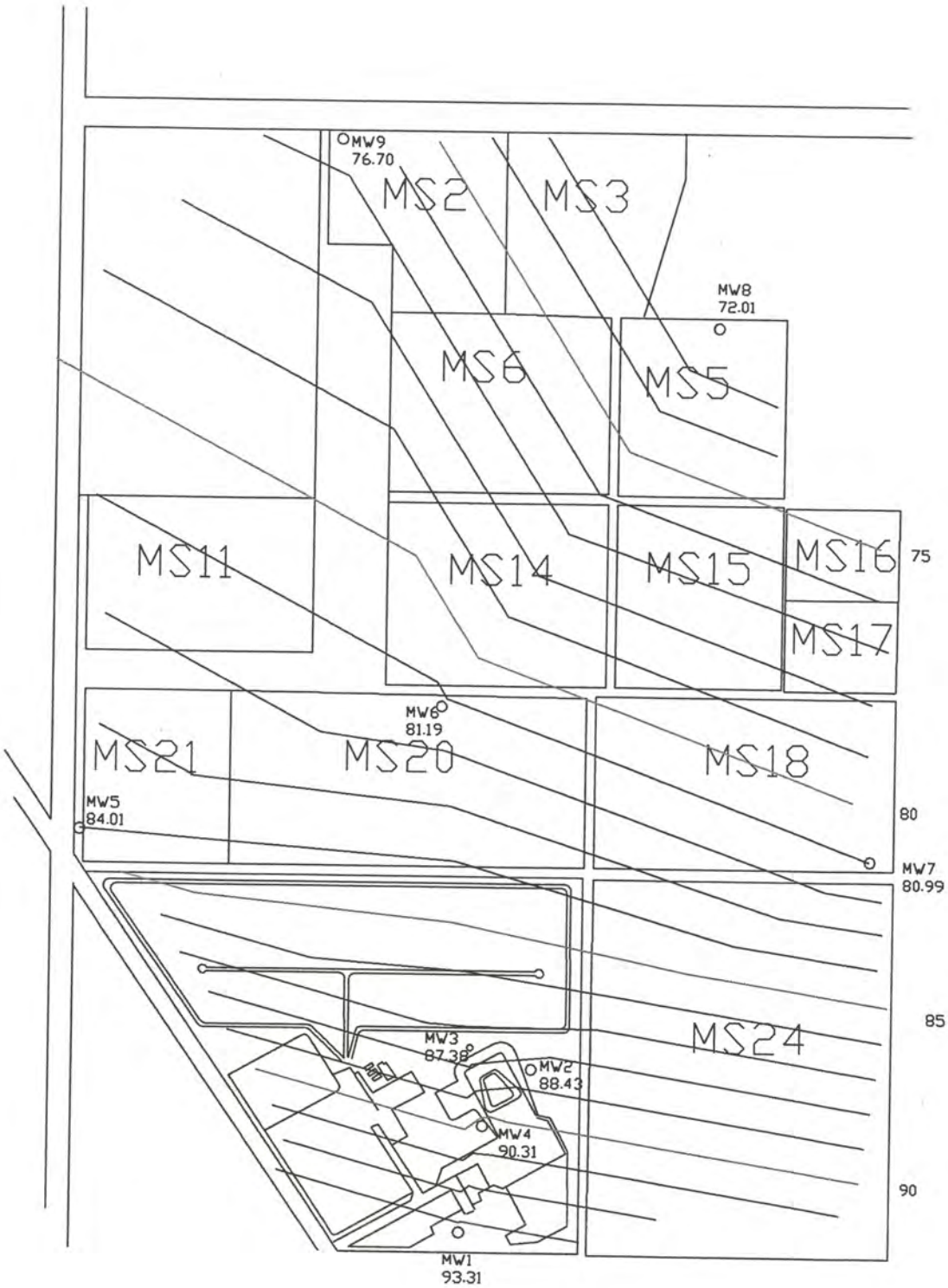
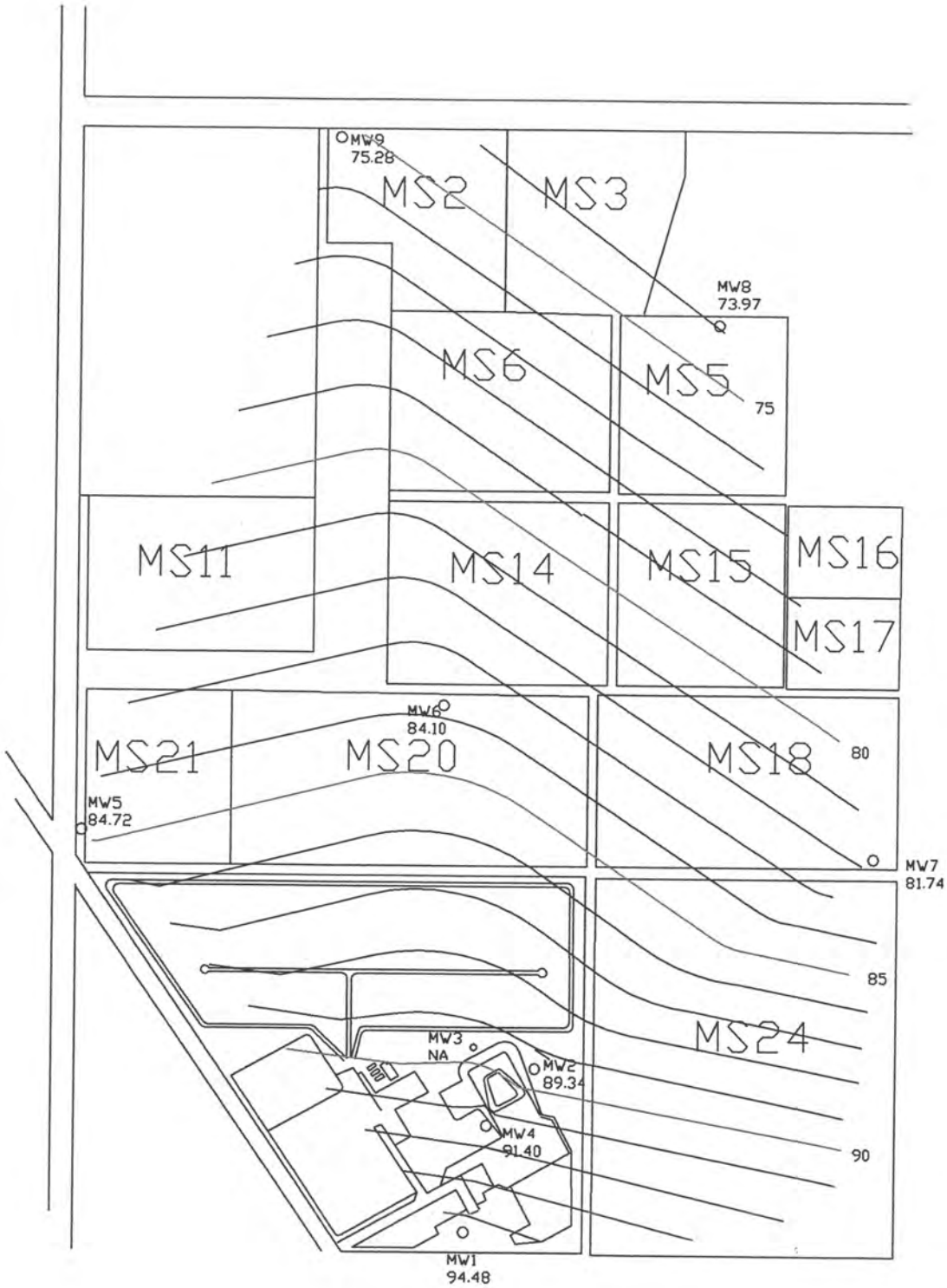


Exhibit 5

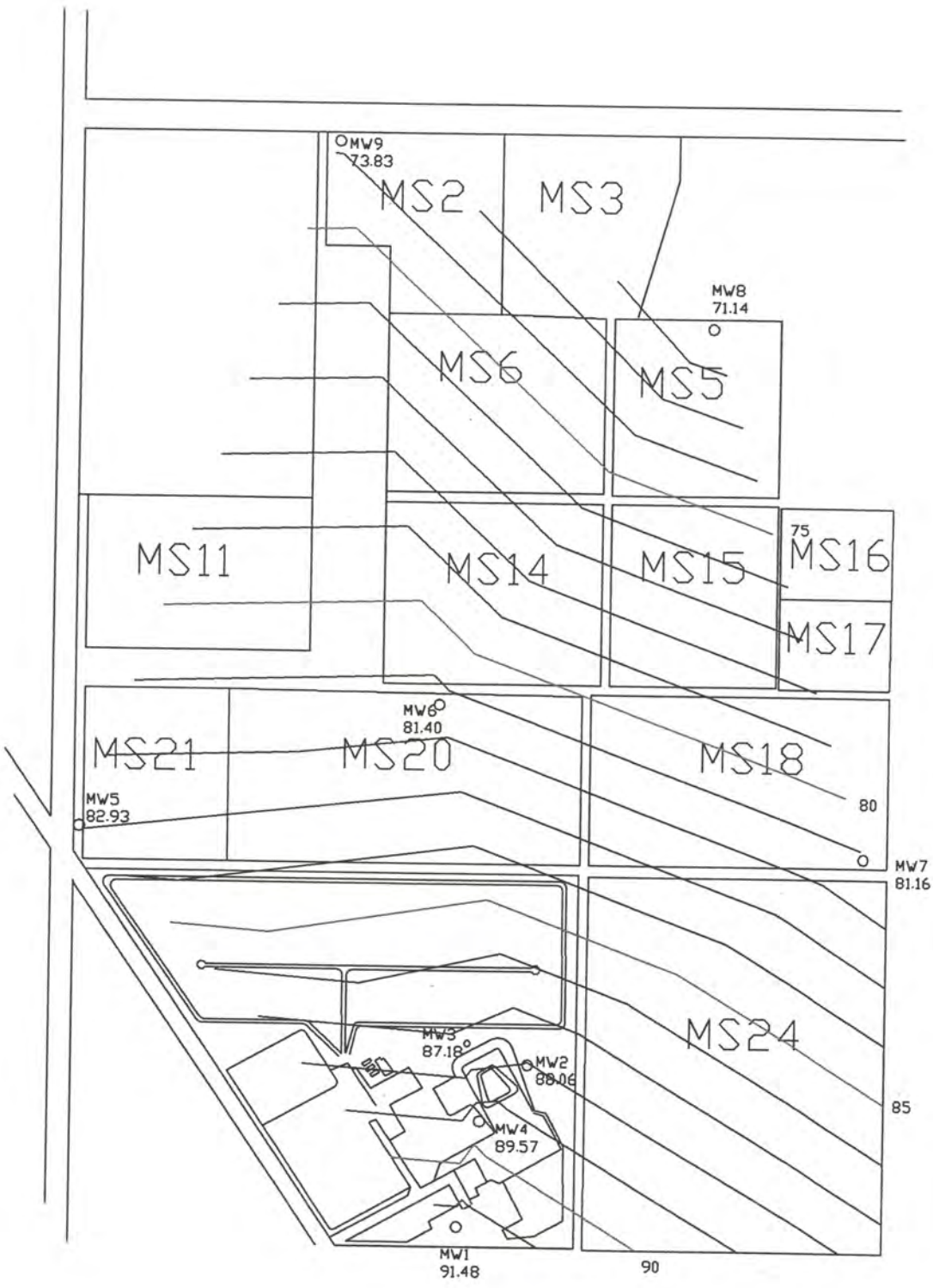
	Quarterly Groundwater Monitoring Morning Star Packing Williams Facility Colusa County					SCALE 1"=1200'	
						DRAWN BY HAR	
	FIRST QUARTER, 2005 NO MW2 GROUNDWATER ELEVATION MAP					REVISED USER, REVISED	
	DESIGN ENGINEER HILARY A. REINHARD DATE 4/27/05 C.E. LICENSE NO. 64379					SHEET 1 OF	
Job No. 1075.01	Date Revised					1 SHEETS	
Dwg. No. 1002	Approval						



	Quarterly Groundwater Monitoring Morning Star Packing Williams Facility Colusa County						SCALE 1"=1200'
							DRAWN BY HAR
	SECOND QUARTER, 2005 GROUNDWATER ELEVATION MAP						REVISED USER_REVISED
	DESIGN ENGINEER HILARY A. REINHARD DATE 7/11/05 C.E. LICENSE NO. 64379						SHEET 1 OF
Job No. 1075.01	Date Revised						1 SHEETS
Dwg. No. 1002	Approval						



	Quarterly Groundwater Monitoring Morning Star Packing Williams Facility Colusa County					SCALE 1"=1200'	
						DRAWN BY HAR	
	THIRD QUARTER, 2005 GROUNDWATER ELEVATION MAP					REVISED USER_REVISED	
	DESIGN ENGINEER HILARY A. REINHARD DATE 10/25/05 C.E. LICENSE NO. 64379					SHEET 1 OF	
Job No. 1075.01 Dwg. No. 1002	Date Revised Approval					1 SHEETS	



	Quarterly Groundwater Monitoring Morning Star Packing Williams Facility Colusa County						SCALE 1"=1200'
							DRAWN BY HAR
	FOURTH QUARTER, 2005 GROUNDWATER ELEVATION MAP						REVISED USER_REVISED
	DESIGN ENGINEER HILARY A. REINHARD DATE 12/14/05 C.E. LICENSE NO. 64379						SHEET 1 OF
Job No. 1075.01 Dwg. No. 1006	Date Revised Approval						1 SHEETS

Well Water Data

Main Plant Well is #1

	Well #1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1	#1
Date	pH	EC uhmos	TDS	Total Coliform	Carbonate CO3	Bicarbonate HCO3	Total Alkalinity CaCO3	Calcium Ca	Chloride Cl	Copper Cu	Iron Fe	Magnesium Mg	Manganese Mn	Potasium K	Sulphates SO4	Nitrite N	Nitrate NO3 N
2/1/1995																	
2/14/1995	8.0	900			<1	326	267	51	54.9	<50	140	28	<30	2.9	69		8.5
3/21/1995																	
6/5/1995	7.9	810	450	0			267	44	57		<100	25	60				<1
1/16/1996																	
2/20/1996			400												70		
11/24/1998																	
2/24/2000	8.0																3.2
3/29/2001	8.0	710	380						52		<100		<20		86		4.8
6/26/2001				0					51		<100		<20		86		4.8
9/18/2001				0													
12/6/2001				0													
3/27/2002				0													
6/15/2002																	
6/24/2002				0						0.13							
9/23/2002				0													
10/23/2002																	
11/20/2002																0	4.7
12/11/2002				0													
1/15/2003																	
2/26/2003																	
3/27/2003				0													
6/10/2003				0													
6/19/2003				0													
9/5/2003				0													
10/15/2003																	2.5
10/16/2003				0													
1/5/2004				0													
4/5/2004				0													
7/7/2004				0													
9/8/2004																	
10/18/2004				0													2.5
7/11/2005				0													
7/14/2005																	
7/28/2005																	
8/8/2005																	
9/8/2005																	
10/19/2005				0	0	240	197	45				22					2
																0	
Averages	8.0	807	410	0	0	283	244	47	54	0	140	25	60	3	78	0.0	4.1
Min	7.9	710	380	0	0	240	197	44	51	0	140	22	60	3	69	0.0	2.0
Max	8.0	900	450	0	0	326	267	51	57	0	140	28	60	3	86	0.0	8.5

Diesel Fire Pump is Well #2

Well #2	#2	#2	#2	#2	#2	#2	#2	#2	#2	#2	#2	#2	#2	#2
pH	EC uhmos	TDS	Total Coliform	E.Coli	Bicarbonate HCO3	Calcium Ca	Chloride Cl	Copper Cu	Iron Fe	Magnesium Mg	Potasium K	Nitrite N	Nitrate NO3 N
8	900	400			326	51	54.9	<50	140	28	2.9		8.5
			0										
													2.7
7.8	760	440					60		<100				3.7
			0										3.6
			0										
			4.7	0									
			0										
							0.26		<.005				
			0										
			2.6	0									
			0										
			0										3.4
			0										
			0										
			0										
			0										
			0										
			0										
			0										3.2
			0										
			0										
			0										
			0										3.1
			8.9	8.9									
			8.9	8.9									
			0										
			0										
			4.7	0									
			0										0
												0	
7.9	830	420			326.0	51	38	<50	140.0	28.0	3	0.0	3.5
7.8	760	400			326.0	51	0	0	140.0	28.0	3	0.0	0.0
8.0	900	440			326.0	51	60	0	140.0	28.0	3	0.0	8.5

Daily BOD Limit 300 lbs/day

Flow Rate (gpd)	Average BOD Results (mg/l)																						
	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600
100,000	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4
125,000	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	5	6
150,000	2	2	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7
175,000	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	7	7	8	8
200,000	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	7	7	8	8	8	8	9	9
225,000	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	8	9	9	9	10	10
250,000	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11
275,000	4	4	5	5	5	6	6	7	7	7	8	8	8	9	9	10	10	10	11	11	11	12	12
300,000	4	5	5	5	6	6	7	7	8	8	8	9	9	10	10	10	11	11	12	12	13	13	13
325,000	5	5	5	6	6	7	7	8	8	9	9	9	10	10	11	11	12	12	13	13	14	14	14
350,000	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	15	16
375,000	5	6	6	7	7	8	8	9	9	10	10	11	11	12	13	13	14	14	15	15	16	16	17
400,000	6	6	7	7	8	8	9	9	10	11	11	12	12	13	13	14	14	15	16	16	17	17	18
425,000	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15	16	17	17	18	18	19
450,000	6	7	8	8	9	9	10	11	11	12	13	13	14	14	15	16	16	17	18	18	19	19	20
475,000	7	7	8	9	9	10	11	11	12	13	13	14	15	15	16	17	17	18	18	19	20	20	21
500,000	7	8	8	9	10	10	11	12	13	13	14	15	15	16	17	17	18	19	19	20	21	22	22
525,000	7	8	9	9	10	11	12	12	13	14	15	15	16	17	18	18	19	20	20	21	22	23	23
550,000	8	8	9	10	11	11	12	13	14	15	15	16	17	18	18	19	20	21	21	22	23	24	24
575,000	8	9	10	10	11	12	13	14	14	15	16	17	18	18	19	20	21	22	22	23	24	25	26
600,000	8	9	10	11	12	13	13	14	15	16	17	18	18	19	20	21	22	23	23	24	25	26	27
625,000	9	10	10	11	12	13	14	15	16	17	17	18	19	20	21	22	23	23	24	25	26	27	28
650,000	9	10	11	12	13	14	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	28	29
675,000	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	23	24	25	26	27	28	29	30
700,000	10	11	12	13	14	15	16	17	18	18	19	20	21	22	23	24	25	26	27	28	29	30	31
725,000	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
750,000	10	11	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
775,000	11	12	13	14	15	16	17	18	19	20	22	23	24	25	26	27	28	29	30	31	32	33	34
800,000	11	12	13	14	16	17	18	19	20	21	22	23	24	26	27	28	29	30	31	32	33	34	36
825,000	11	13	14	15	16	17	18	20	21	22	23	24	25	26	28	29	30	31	32	33	34	36	37
850,000	12	13	14	15	17	18	19	20	21	22	24	25	26	27	28	30	31	32	33	34	36	37	38
875,000	12	13	15	16	17	18	19	21	22	23	24	26	27	28	29	30	32	33	34	35	37	38	39
900,000	13	14	15	16	18	19	20	21	23	24	25	26	28	29	30	31	33	34	35	36	38	39	40
925,000	13	14	15	17	18	19	21	22	23	24	26	27	28	30	31	32	33	35	36	37	39	40	41

Flow Rate (gpd)	Average BOD Results (mg/l)																							
	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	
950,000	13	15	16	17	18	20	21	22	24	25	26	28	29	30	32	33	34	36	37	38	40	41	42	
975,000	14	15	16	18	19	20	22	23	24	26	27	28	30	31	33	34	35	37	38	39	41	42	43	
1,000,000	14	15	17	18	19	21	22	24	25	26	28	29	31	32	33	35	36	38	39	40	42	43	45	
1,025,000	14	16	17	19	20	21	23	24	26	27	29	30	31	33	34	36	37	38	40	41	43	44	46	
1,050,000	15	16	18	19	20	22	23	25	26	28	29	31	32	34	35	37	38	39	41	42	44	45	47	
1,075,000	15	16	18	19	21	22	24	25	27	28	30	31	33	34	36	37	39	40	42	43	45	46	48	
1,100,000	15	17	18	20	21	23	24	26	28	29	31	32	34	35	37	38	40	41	43	44	46	47	49	
1,125,000	16	17	19	20	22	23	25	27	28	30	31	33	34	36	38	39	41	42	44	45	47	49	50	
1,150,000	16	18	19	21	22	24	26	27	29	30	32	34	35	37	38	40	42	43	45	46	48	50	51	
1,175,000	16	18	20	21	23	25	26	28	29	31	33	34	36	38	39	41	42	44	46	47	49	51	52	
1,200,000	17	18	20	22	23	25	27	28	30	32	33	35	37	38	40	42	43	45	47	48	50	52	53	
1,225,000	17	19	20	22	24	26	27	29	31	32	34	36	37	39	41	43	44	46	48	49	51	53	55	
1,250,000	17	19	21	23	24	26	28	30	31	33	35	37	38	40	42	43	45	47	49	50	52	54	56	
1,275,000	18	20	21	23	25	27	28	30	32	34	35	37	39	41	43	44	46	48	50	51	53	55	57	
1,300,000	18	20	22	24	25	27	29	31	33	34	36	38	40	42	43	45	47	49	51	52	54	56	58	
1,325,000	19	21	23	24	26	28	29	31	33	35	37	39	41	42	44	46	48	50	52	53	55	57	59	
1,350,000	19	21	23	25	27	29	31	33	34	36	38	39	41	43	45	47	49	51	53	54	56	58	60	
1,375,000	19	21	23	25	27	29	31	33	34	36	38	40	42	44	46	48	50	52	54	55	57	59	61	
1,400,000	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	53	55	56	58	60	62	
1,425,000	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	55	57	59	61	63	
1,450,000	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	56	58	60	62	64	
1,475,000	21	23	25	27	29	31	33	35	38	40	42	44	46	48	50	52	54	56	58	59	61	63	65	
1,500,000	21	23	25	28	30	32	34	36	38	40	42	45	47	49	51	53	55	57	59	61	63	65	67	
1,525,000	22	24	26	28	30	32	34	37	39	41	43	45	47	50	52	54	56	58	60	62	64	66	68	
1,550,000	22	24	26	28	31	33	35	37	39	42	44	46	48	50	53	55	57	59	61	63	65	67	69	
1,575,000	22	24	27	29	31	33	36	38	40	42	45	47	49	51	53	56	58	60	62	64	66	68	70	
1,600,000	23	25	27	29	32	34	36	38	41	43	45	47	50	52	54	57	59	61	63	66	68	70	72	
1,625,000	23	25	28	30	32	34	37	39	41	44	46	48	50	53	55	57	60	62	64	67	69	71	73	
1,650,000	23	26	28	30	33	35	37	40	42	44	47	49	51	54	56	58	61	63	65	68	70	72	75	
1,675,000	24	26	28	31	33	35	38	40	43	45	47	50	52	54	57	59	61	64	66	69	71	73	76	
1,700,000	24	26	29	31	34	36	38	41	43	46	48	50	53	55	58	60	62	65	67	70	72	74	77	
1,725,000	24	27	29	32	34	37	39	41	44	46	49	51	54	56	58	61	63	66	68	71	73	75	78	
1,750,000	25	27	30	32	35	37	40	42	44	47	49	52	54	57	59	62	64	67	69	72	74	77	79	
1,775,000	25	28	30	33	35	38	40	43	45	48	50	53	55	58	60	63	65	68	70	73	75	78	80	
1,800,000	25	28	30	33	36	38	41	43	46	48	51	53	56	58	61	63	66	69	71	74	76	79	81	
1,825,000																								

	Average BOD Results (mg/l)																						
Flow Rate (gpd)	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600
1,850,000	26	28	31	33	36	39	41	44	46	49	51	54	57	59	62	64	67	69	72	75	77	80	82
1,875,000	26	29	31	34	37	39	42	44	47	50	52	55	57	60	63	65	68	70	73	76	78	81	83
1,900,000	26	29	32	34	37	40	42	45	48	50	53	55	58	61	63	66	69	71	74	77	79	82	85
1,925,000	27	29	32	35	37	40	43	46	48	51	54	56	59	62	64	67	70	72	75	78	80	83	86
1,950,000	27	30	33	35	38	41	43	46	49	52	54	57	60	62	65	68	71	73	76	79	81	84	87
1,975,000	27	30	33	36	38	41	44	47	49	52	55	58	60	63	66	69	71	74	77	80	82	85	88
2,000,000	28	31	33	36	39	42	45	47	50	53	56	58	61	64	67	70	72	75	78	81	83	86	89
2,025,000	28	31	34	37	39	42	45	48	51	54	56	59	62	65	68	70	73	76	79	82	84	87	90
2,050,000	29	31	34	37	40	43	46	48	51	54	57	60	63	66	68	71	74	77	80	83	86	88	91
2,075,000	29	32	35	38	40	43	46	49	52	55	58	61	63	66	69	72	75	78	81	84	87	89	92
2,100,000	29	32	35	38	41	44	47	50	53	55	58	61	64	67	70	73	76	79	82	85	88	91	93
2,125,000	30	33	35	38	41	44	47	50	53	56	59	62	65	68	71	74	77	80	83	86	89	92	95
2,150,000	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	84	87	90	93	96
2,175,000	30	33	36	39	42	45	48	51	54	57	61	64	67	70	73	76	79	82	85	88	91	94	97
2,200,000	31	34	37	40	43	46	49	52	55	58	61	64	67	70	73	76	80	83	86	89	92	95	98
2,225,000	31	34	37	40	43	46	50	53	56	59	62	65	68	71	74	77	80	84	87	90	93	96	99
2,250,000	31	34	38	41	44	47	50	53	56	59	63	66	69	72	75	78	81	84	88	91	94	97	100
2,275,000	32	35	38	41	44	47	51	54	57	60	63	66	70	73	76	79	82	85	89	92	95	98	101
2,300,000	32	35	38	42	45	48	51	54	58	61	64	67	70	74	77	80	83	86	90	93	96	99	102
2,325,000	32	36	39	42	45	49	52	55	58	61	65	68	71	74	78	81	84	87	91	94	97	100	103
2,350,000	33	36	39	42	46	49	52	56	59	62	65	69	72	75	78	82	85	88	92	95	98	101	105
2,375,000	33	36	40	43	46	50	53	56	59	63	66	69	73	76	79	83	86	89	92	96	99	102	106
2,400,000	33	37	40	43	47	50	53	57	60	63	67	70	73	77	80	83	87	90	93	97	100	103	107
2,425,000	34	37	40	44	47	51	54	57	61	64	67	71	74	78	81	84	88	91	94	98	101	105	108
2,450,000	34	37	41	44	48	51	55	58	61	65	68	72	75	78	82	85	89	92	95	99	102	106	109
2,475,000	34	38	41	45	48	52	55	59	62	65	69	72	76	79	83	86	90	93	96	100	103	107	110
2,500,000	35	38	42	45	49	52	56	59	63	66	70	73	76	80	83	87	90	94	97	101	104	108	111
2,525,000	35	39	42	46	49	53	56	60	63	67	70	74	77	81	84	88	91	95	98	102	105	109	112
2,550,000	35	39	43	46	50	53	57	60	64	67	71	74	78	82	85	89	92	96	99	103	106	110	113
2,575,000	36	39	43	47	50	54	57	61	64	68	72	75	79	82	86	90	93	97	100	104	107	111	115
2,600,000	36	40	43	47	51	54	58	61	65	69	72	76	80	83	87	90	94	98	101	105	108	112	116
2,625,000	37	40	44	47	51	55	58	62	66	69	73	77	80	84	88	91	95	99	102	106	110	113	117
2,650,000	37	41	44	48	52	55	59	63	66	70	74	77	81	85	88	92	96	100	103	107	111	114	118
2,675,000	37	41	45	48	52	56	60	63	67	71	74	78	82	86	89	93	97	100	104	108	112	115	119
2,700,000	38	41	45	49	53	56	60	64	68	71	75	79	83	86	90	94	98	101	105	109	113	116	120
2,725,000	38	42	45	49	53	57	61	64	68	72	76	80	83	87	91	95	99	102	106	110	114	117	121

	Average BOD Results (mg/l)																							
Flow Rate (gpd)	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600
2,750,000	38	42	46	50	54	57	61	65	69	73	76	80	84	88	92	96	99	103	107	111	115	119	122
2,775,000	39	42	46	50	54	58	62	66	69	73	77	81	85	89	93	96	100	104	108	112	116	120	124
2,800,000	39	43	47	51	55	58	62	66	70	74	78	82	86	90	93	97	101	105	109	113	117	121	125
2,825,000	39	43	47	51	55	59	63	67	71	75	79	83	86	90	94	98	102	106	110	114	118	122	126
2,850,000	40	44	48	52	55	59	63	67	71	75	79	83	87	91	95	99	103	107	111	115	119	123	127
2,875,000	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108	112	116	120	124	128
2,900,000	40	44	48	52	56	61	65	69	73	77	81	85	89	93	97	101	105	109	113	117	121	125	129
2,925,000	41	45	49	53	57	61	65	69	73	77	81	85	90	94	98	102	106	110	114	118	122	126	130
2,950,000	41	45	49	53	57	62	66	70	74	78	82	86	90	94	98	103	107	111	115	119	123	127	131
2,975,000	41	46	50	54	58	62	66	70	74	79	83	87	91	95	99	103	108	112	116	120	124	128	132
3,000,000	42	46	50	54	58	63	67	71	75	79	83	88	92	96	100	104	108	113	117	121	125	129	134
3,025,000	42	46	50	55	59	63	67	72	76	80	84	88	93	97	101	105	109	114	118	122	126	130	135
3,050,000	42	47	51	55	59	64	68	72	76	81	85	89	93	98	102	106	110	115	119	123	127	132	136
3,075,000	43	47	51	56	60	64	68	73	77	81	86	90	94	98	103	107	111	115	120	124	128	133	137
3,100,000	43	47	52	56	60	65	69	73	78	82	86	91	95	99	103	108	112	116	121	125	129	134	138
3,125,000	43	48	52	57	61	65	70	74	78	83	87	91	96	100	104	109	113	117	122	126	130	135	139
3,150,000	44	48	53	57	61	66	70	74	79	83	88	92	96	101	105	110	114	118	123	127	131	136	140
3,175,000	44	49	53	57	62	66	71	75	79	84	88	93	97	102	106	110	115	119	124	128	132	137	141
3,200,000	45	49	53	58	62	67	71	76	80	85	89	93	98	102	107	111	116	120	125	129	134	138	142
3,225,000	45	49	54	58	63	67	72	76	81	85	90	94	99	103	108	112	117	121	126	130	135	139	144
3,250,000	45	50	54	59	63	68	72	77	81	86	90	95	99	104	108	113	118	122	127	131	136	140	145
3,275,000	46	50	55	59	64	68	73	77	82	87	91	96	100	105	109	114	118	123	128	132	137	141	146
3,300,000	46	50	55	60	64	69	73	78	83	87	92	96	101	106	110	115	119	124	129	133	138	142	147
3,325,000	46	51	55	60	65	69	74	79	83	88	92	97	102	106	111	116	120	125	129	134	139	143	148
3,350,000	47	51	56	61	65	70	75	79	84	89	93	98	103	107	112	116	121	126	130	135	140	144	149
3,375,000	47	52	56	61	66	70	75	80	84	89	94	99	103	108	113	117	122	127	131	136	141	146	150
3,400,000	47	52	57	61	66	71	76	80	85	90	95	99	104	109	113	118	123	128	132	137	142	147	151
3,425,000	48	52	57	62	67	71	76	81	86	91	95	100	105	110	114	119	124	129	133	138	143	148	152
3,450,000	48	53	58	62	67	72	77	82	86	91	96	101	106	110	115	120	125	130	134	139	144	149	154
3,475,000	48	53	58	63	68	73	77	82	87	92	97	102	106	111	116	121	126	131	135	140	145	150	155
3,500,000	49	54	58	63	68	73	78	83	88	92	97	102	107	112	117	122	127	131	136	141	146	151	156
3,525,000	49	54	59	64	69	74	78	83	88	93	98	103	108	113	118	123	127	132	137	142	147	152	157
3,550,000	49	54	59	64	69	74	79	84	89	94	99	104	109	114	119	123	128	133	138	143	148	153	158
3,575,000	50	55	60	65	70	75	80	85	90	94	99	104	109	114	119	124	129	134	139	144	149	154	159
3,600,000	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
3,625,000	50	55	61	66	71	76	81	86	91	96	101	106	111	116	121	126	131	136	141	146	151	156	161

	Average BOD Results (mg/l)																							
Flow Rate (gpd)	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600
3,650,000	51	56	61	66	71	76	81	86	91	96	102	107	112	117	122	127	132	137	142	147	152	157	162
3,675,000	51	56	61	66	72	77	82	87	92	97	102	107	112	118	123	128	133	138	143	148	153	158	164
3,700,000	51	57	62	67	72	77	82	87	93	98	103	108	113	118	124	129	134	139	144	149	154	160	165
3,725,000	52	57	62	67	73	78	83	88	93	98	104	109	114	119	124	130	135	140	145	150	155	161	166
3,750,000	52	57	63	68	73	78	83	89	94	99	104	110	115	120	125	130	136	141	146	151	156	162	167
3,775,000	53	58	63	68	74	79	84	89	95	100	105	110	116	121	126	131	137	142	147	152	158	163	168
3,800,000	53	58	63	69	74	79	85	90	95	100	106	111	116	122	127	132	137	143	148	153	159	164	169
3,825,000	53	59	64	69	74	80	85	90	96	101	106	112	117	122	128	133	138	144	149	154	160	165	170
3,850,000	54	59	64	70	75	80	86	91	96	102	107	112	118	123	129	134	139	145	150	155	161	166	171
3,875,000	54	59	65	70	75	81	86	92	97	102	108	113	119	124	129	135	140	146	151	156	162	167	172
3,900,000	54	60	65	71	76	81	87	92	98	103	108	114	119	125	130	136	141	146	152	157	163	168	174
3,925,000	55	60	66	71	76	82	87	93	98	104	109	115	120	126	131	136	142	147	153	158	164	169	175
3,950,000	55	60	66	71	77	82	88	93	99	104	110	115	121	126	132	137	143	148	154	159	165	170	176
3,975,000	55	61	66	72	77	83	88	94	100	105	111	116	122	127	133	138	144	149	155	160	166	171	177
4,000,000	56	61	67	72	78	83	89	95	100	106	111	117	122	128	134	139	145	150	156	161	167	172	178
4,025,000	56	62	67	73	78	84	90	95	101	106	112	118	123	129	134	140	146	151	157	162	168	174	179
4,050,000	56	62	68	73	79	84	90	96	101	107	113	118	124	130	135	141	146	152	158	163	169	175	180
4,075,000	57	62	68	74	79	85	91	96	102	108	113	119	125	130	136	142	147	153	159	164	170	176	181
4,100,000	57	63	68	74	80	86	91	97	103	108	114	120	125	131	137	143	148	154	160	165	171	177	182
4,125,000	57	63	69	75	80	86	92	98	103	109	115	120	126	132	138	143	149	155	161	166	172	178	184
4,150,000	58	63	69	75	81	87	92	98	104	110	115	121	127	133	139	144	150	156	162	167	173	179	185
4,175,000	58	64	70	75	81	87	93	99	105	110	116	122	128	134	139	145	151	157	163	168	174	180	186
4,200,000	58	64	70	76	82	88	93	99	105	111	117	123	129	134	140	146	152	158	164	169	175	181	187
4,225,000	59	65	71	76	82	88	94	100	106	112	118	123	129	135	141	147	153	159	165	170	176	182	188
4,250,000	59	65	71	77	83	89	95	100	106	112	118	124	130	136	142	148	154	160	166	171	177	183	189
4,275,000	59	65	71	77	83	89	95	101	107	113	119	125	131	137	143	149	155	161	166	172	178	184	190
4,300,000	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156	161	167	173	179	185	191
4,325,000	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	193

Daily BOD Limit

Flow Rate (gpd)	Average BOD Results (mg/l)																				
	1650	1700	1750	1800	1850	1900	1950	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700
100,000	5	5	5	5	5	5	5	6	6	6	6	6	6	6	7	7	7	7	7	7	7	8
125,000	6	6	6	6	6	7	7	7	7	7	7	8	8	8	8	8	9	9	9	9	9	9
150,000	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11
175,000	8	8	9	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13
200,000	9	9	10	10	10	11	11	11	11	12	12	12	13	13	13	13	14	14	14	14	15	15
225,000	10	11	11	11	12	12	12	13	13	13	13	14	14	14	15	15	15	16	16	16	17	17
250,000	11	12	12	13	13	13	14	14	14	15	15	15	16	16	16	17	17	17	18	18	18	19
275,000	13	13	13	14	14	15	15	15	16	16	16	17	17	18	18	18	19	19	20	20	20	21
300,000	14	14	15	15	15	16	16	17	17	18	18	18	19	19	20	20	20	21	21	22	22	23
325,000	15	15	16	16	17	17	18	18	19	19	19	20	20	21	21	22	22	23	23	24	24	24
350,000	16	17	17	18	18	18	19	19	20	20	21	21	22	22	23	23	24	24	25	25	26	26
375,000	17	18	18	19	19	20	20	21	21	22	22	23	23	24	25	25	26	26	27	27	28	28
400,000	18	19	19	20	21	21	22	22	23	23	24	24	25	26	26	27	27	28	28	29	29	30
425,000	20	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	30	30	31	31	32
450,000	21	21	22	23	23	24	24	25	26	26	27	28	28	29	29	30	31	31	32	33	33	34
475,000	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	32	32	33	34	34	35	36
500,000	23	24	24	25	26	26	27	28	29	29	30	31	31	32	33	33	34	35	35	36	37	38
525,000	24	25	26	26	27	28	28	29	30	31	31	32	33	34	34	35	36	37	37	38	39	39
550,000	25	26	27	28	28	29	30	31	31	32	33	34	34	35	36	37	37	38	39	40	41	41
575,000	26	27	28	29	30	30	31	32	33	34	34	35	36	37	38	38	39	40	41	42	42	43
600,000	28	28	29	30	31	32	33	33	34	35	36	37	38	38	39	40	41	42	43	43	44	45
625,000	29	30	30	31	32	33	34	35	36	37	37	38	39	40	41	42	43	43	44	45	46	47
650,000	30	31	32	33	33	34	35	36	37	38	39	40	41	42	42	43	44	45	46	47	48	49
675,000	31	32	33	34	35	36	37	38	38	39	40	41	42	43	44	45	46	47	48	49	50	51
700,000	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
725,000	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
750,000	34	35	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
775,000	36	37	38	39	40	41	42	43	44	45	46	47	49	50	51	52	53	54	55	56	57	58
800,000	37	38	39	40	41	42	43	45	46	47	48	49	50	51	52	53	55	56	57	58	59	60
825,000	38	39	40	41	42	44	45	46	47	48	49	50	52	53	54	55	56	57	59	60	61	62
850,000	39	40	41	43	44	45	46	47	48	50	51	52	53	54	56	57	58	59	60	61	63	64
875,000	40	41	43	44	45	46	47	49	50	51	52	54	55	56	57	58	60	61	62	63	65	66
900,000	41	43	44	45	46	48	49	50	51	53	54	55	56	58	59	60	61	63	64	65	66	68
925,000	42	44	45	46	48	49	50	51	53	54	55	57	58	59	60	62	63	64	66	67	68	69

	Average BOD Results (mg/l)																					
Flow Rate (gpd)	1650	1700	1750	1800	1850	1900	1950	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700
950,000	44	45	46	48	49	50	52	53	54	55	57	58	59	61	62	63	65	66	67	69	70	71
975,000	45	46	47	49	50	52	53	54	56	57	58	60	61	62	64	65	66	68	69	71	72	73
1,000,000	46	47	49	50	51	53	54	56	57	58	60	61	63	64	65	67	68	70	71	72	74	75
1,025,000	47	48	50	51	53	54	56	57	58	60	61	63	64	66	67	68	70	71	73	74	76	77
1,050,000	48	50	51	53	54	55	57	58	60	61	63	64	66	67	69	70	72	73	74	76	77	79
1,075,000	49	51	52	54	55	57	58	60	61	63	64	66	67	69	70	72	73	75	76	78	79	81
1,100,000	50	52	54	55	57	58	60	61	63	64	66	67	69	70	72	73	75	76	78	80	81	83
1,125,000	52	53	55	56	58	59	61	63	64	66	67	69	70	72	74	75	77	78	80	81	83	84
1,150,000	53	54	56	58	59	61	62	64	66	67	69	70	72	74	75	77	78	80	82	83	85	86
1,175,000	54	56	57	59	60	62	64	65	67	69	70	72	74	75	77	78	80	82	83	85	87	88
1,200,000	55	57	58	60	62	63	65	67	68	70	72	73	75	77	78	80	82	83	85	87	88	90
1,225,000	56	58	60	61	63	65	66	68	70	72	73	75	77	78	80	82	83	85	87	89	90	92
1,250,000	57	59	61	63	64	66	68	70	71	73	75	76	78	80	82	83	85	87	89	90	92	94
1,275,000	59	60	62	64	66	67	69	71	73	74	76	78	80	82	83	85	87	89	90	92	94	96
1,300,000	60	61	63	65	67	69	71	72	74	76	78	80	81	83	85	87	89	90	92	94	96	98
1,325,000	61	63	65	66	68	70	72	74	76	77	79	81	83	85	87	88	90	92	94	96	98	100
1,350,000	62	64	66	68	69	71	73	75	77	79	81	83	84	86	88	90	92	94	96	98	100	101
1,375,000	63	65	67	69	71	73	75	76	78	80	82	84	86	88	90	92	94	96	98	99	101	103
1,400,000	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	93	95	97	99	101	103	105
1,425,000	65	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	101	103	105	107
1,450,000	67	69	71	73	75	77	79	81	83	85	87	89	91	93	95	97	99	101	103	105	107	109
1,475,000	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	101	103	105	107	109	111
1,500,000	69	71	73	75	77	79	81	83	86	88	90	92	94	96	98	100	102	104	106	108	111	113
1,525,000	70	72	74	76	78	81	83	85	87	89	91	93	95	98	100	102	104	106	108	110	112	115
1,550,000	71	73	75	78	80	82	84	86	88	91	93	95	97	99	101	103	106	108	110	112	114	116
1,575,000	72	74	77	79	81	83	85	88	90	92	94	96	99	101	103	105	107	110	112	114	116	118
1,600,000	73	76	78	80	82	85	87	89	91	93	96	98	100	102	105	107	109	111	113	116	118	120
1,625,000	75	77	79	81	84	86	88	90	93	95	97	99	102	104	106	108	111	113	115	118	120	122
1,650,000	76	78	80	83	85	87	90	92	94	96	99	101	103	106	108	110	112	115	117	119	122	124
1,675,000	77	79	82	84	86	89	91	93	96	98	100	103	105	107	109	112	114	116	119	121	123	126
1,700,000	78	80	83	85	87	90	92	95	97	99	102	104	106	109	111	113	116	118	121	123	125	128
1,725,000	79	82	84	86	89	91	94	96	98	101	103	106	108	110	113	115	118	120	122	125	127	130
1,750,000	80	83	85	88	90	92	95	97	100	102	105	107	110	112	114	117	119	122	124	127	129	131
1,775,000	81	84	86	89	91	94	96	99	101	104	106	109	111	114	116	119	121	123	126	128	131	133
1,800,000	83	85	88	90	93	95	98	100	103	105	108	110	113	115	118	120	123	125	128	130	133	135
1,825,000	84	86	89	91	94	96	99	102	104	107	109	112	114	117	119	122	124	127	129	132	135	137

	Average BOD Results (mg/l)																					
Flow Rate (gpd)	1650	1700	1750	1800	1850	1900	1950	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700
1,850,000	85	87	90	93	95	98	100	103	105	108	111	113	116	118	121	124	126	129	131	134	136	139
1,875,000	86	89	91	94	96	99	102	104	107	110	112	115	117	120	123	125	128	130	133	136	138	141
1,900,000	87	90	92	95	98	100	103	106	108	111	114	116	119	122	124	127	129	132	135	137	140	143
1,925,000	88	91	94	96	99	102	104	107	110	112	115	118	120	123	126	129	131	134	137	139	142	145
1,950,000	90	92	95	98	100	103	106	108	111	114	117	119	122	125	127	130	133	136	138	141	144	146
1,975,000	91	93	96	99	102	104	107	110	113	115	118	121	124	126	129	132	135	137	140	143	146	148
2,000,000	92	95	97	100	103	106	108	111	114	117	120	122	125	128	131	134	136	139	142	145	147	150
2,025,000	93	96	99	101	104	107	110	113	115	118	121	124	127	130	132	135	138	141	144	146	149	152
2,050,000	94	97	100	103	105	108	111	114	117	120	123	125	128	131	134	137	140	143	145	148	151	154
2,075,000	95	98	101	104	107	110	113	115	118	121	124	127	130	133	136	139	141	144	147	150	153	156
2,100,000	96	99	102	105	108	111	114	117	120	123	126	129	131	134	137	140	143	146	149	152	155	158
2,125,000	98	100	103	106	109	112	115	118	121	124	127	130	133	136	139	142	145	148	151	154	157	160
2,150,000	99	102	105	108	111	114	117	120	123	126	129	132	135	138	141	144	147	150	153	156	158	161
2,175,000	100	103	106	109	112	115	118	121	124	127	130	133	136	139	142	145	148	151	154	157	160	163
2,200,000	101	104	107	110	113	116	119	122	125	129	132	135	138	141	144	147	150	153	156	159	162	165
2,225,000	102	105	108	111	115	118	121	124	127	130	133	136	139	142	145	149	152	155	158	161	164	167
2,250,000	103	106	110	113	116	119	122	125	128	131	135	138	141	144	147	150	153	156	160	163	166	169
2,275,000	104	108	111	114	117	120	123	127	130	133	136	139	142	146	149	152	155	158	161	165	168	171
2,300,000	106	109	112	115	118	122	125	128	131	134	138	141	144	147	150	154	157	160	163	166	170	173
2,325,000	107	110	113	116	120	123	126	129	133	136	139	142	146	149	152	155	158	162	165	168	171	175
2,350,000	108	111	114	118	121	124	127	131	134	137	141	144	147	150	154	157	160	163	167	170	173	177
2,375,000	109	112	116	119	122	126	129	132	135	139	142	145	149	152	155	159	162	165	168	172	175	178
2,400,000	110	113	117	120	124	127	130	134	137	140	144	147	150	154	157	160	164	167	170	174	177	180
2,425,000	111	115	118	121	125	128	132	135	138	142	145	148	152	155	159	162	165	169	172	175	179	182
2,450,000	112	116	119	123	126	129	133	136	140	143	147	150	153	157	160	164	167	170	174	177	181	184
2,475,000	114	117	120	124	127	131	134	138	141	145	148	151	155	158	162	165	169	172	176	179	182	186
2,500,000	115	118	122	125	129	132	136	139	143	146	150	153	156	160	163	167	170	174	177	181	184	188
2,525,000	116	119	123	126	130	133	137	140	144	148	151	155	158	162	165	169	172	176	179	183	186	190
2,550,000	117	121	124	128	131	135	138	142	145	149	153	156	160	163	167	170	174	177	181	184	188	192
2,575,000	118	122	125	129	133	136	140	143	147	150	154	158	161	165	168	172	175	179	183	186	190	193
2,600,000	119	123	127	130	134	137	141	145	148	152	156	159	163	166	170	174	177	181	184	188	192	195
2,625,000	120	124	128	131	135	139	142	146	150	153	157	161	164	168	172	175	179	183	186	190	194	197
2,650,000	122	125	129	133	136	140	144	147	151	155	158	162	166	170	173	177	181	184	188	192	195	199
2,675,000	123	127	130	134	138	141	145	149	153	156	160	164	167	171	175	179	182	186	190	193	197	201
2,700,000	124	128	131	135	139	143	146	150	154	158	161	165	169	173	177	180	184	188	192	195	199	203
2,725,000	125	129	133	136	140	144	148	152	155	159	163	167	171	174	178	182	186	190	193	197	201	205

	Average BOD Results (mg/l)																					
Flow Rate (gpd)	1650	1700	1750	1800	1850	1900	1950	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700
2,750,000	126	130	134	138	142	145	149	153	157	161	164	168	172	176	180	184	187	191	195	199	203	207
2,775,000	127	131	135	139	143	147	151	154	158	162	166	170	174	178	181	185	189	193	197	201	205	208
2,800,000	129	132	136	140	144	148	152	156	160	164	167	171	175	179	183	187	191	195	199	203	206	210
2,825,000	130	134	138	141	145	149	153	157	161	165	169	173	177	181	185	189	193	196	200	204	208	212
2,850,000	131	135	139	143	147	151	155	159	163	166	170	174	178	182	186	190	194	198	202	206	210	214
2,875,000	132	136	140	144	148	152	156	160	164	168	172	176	180	184	188	192	196	200	204	208	212	216
2,900,000	133	137	141	145	149	153	157	161	165	169	173	177	182	186	190	194	198	202	206	210	214	218
2,925,000	134	138	142	146	151	155	159	163	167	171	175	179	183	187	191	195	199	203	207	212	216	220
2,950,000	135	140	144	148	152	156	160	164	168	172	176	181	185	189	193	197	201	205	209	213	217	222
2,975,000	137	141	145	149	153	157	161	166	170	174	178	182	186	190	194	199	203	207	211	215	219	223
3,000,000	138	142	146	150	154	159	163	167	171	175	179	184	188	192	196	200	204	209	213	217	221	225
3,025,000	139	143	147	151	156	160	164	168	173	177	181	185	189	194	198	202	206	210	215	219	223	227
3,050,000	140	144	148	153	157	161	165	170	174	178	182	187	191	195	199	204	208	212	216	221	225	229
3,075,000	141	145	150	154	158	163	167	171	175	180	184	188	192	197	201	205	210	214	218	222	227	231
3,100,000	142	147	151	155	160	164	168	172	177	181	185	190	194	198	203	207	211	216	220	224	229	233
3,125,000	143	148	152	156	161	165	170	174	178	183	187	191	196	200	204	209	213	217	222	226	230	235
3,150,000	145	149	153	158	162	166	171	175	180	184	188	193	197	202	206	210	215	219	223	228	232	237
3,175,000	146	150	155	159	163	168	172	177	181	185	190	194	199	203	208	212	216	221	225	230	234	238
3,200,000	147	151	156	160	165	169	174	178	182	187	191	196	200	205	209	214	218	223	227	231	236	240
3,225,000	148	153	157	161	166	170	175	179	184	188	193	197	202	206	211	215	220	224	229	233	238	242
3,250,000	149	154	158	163	167	172	176	181	185	190	194	199	203	208	212	217	222	226	231	235	240	244
3,275,000	150	155	159	164	169	173	178	182	187	191	196	200	205	210	214	219	223	228	232	237	241	246
3,300,000	151	156	161	165	170	174	179	184	188	193	197	202	207	211	216	220	225	229	234	239	243	248
3,325,000	153	157	162	166	171	176	180	185	190	194	199	203	208	213	217	222	227	231	236	240	245	250
3,350,000	154	158	163	168	172	177	182	186	191	196	200	205	210	214	219	224	228	233	238	242	247	252
3,375,000	155	160	164	169	174	178	183	188	192	197	202	207	211	216	221	225	230	235	239	244	249	253
3,400,000	156	161	166	170	175	180	184	189	194	199	203	208	213	218	222	227	232	236	241	246	251	255
3,425,000	157	162	167	171	176	181	186	191	195	200	205	210	214	219	224	229	233	238	243	248	252	257
3,450,000	158	163	168	173	178	182	187	192	197	202	206	211	216	221	226	230	235	240	245	250	254	259
3,475,000	160	164	169	174	179	184	189	193	198	203	208	213	218	222	227	232	237	242	247	251	256	261
3,500,000	161	166	170	175	180	185	190	195	200	204	209	214	219	224	229	234	239	243	248	253	258	263
3,525,000	162	167	172	177	181	186	191	196	201	206	211	216	221	226	230	235	240	245	250	255	260	265
3,550,000	163	168	173	178	183	188	193	198	202	207	212	217	222	227	232	237	242	247	252	257	262	267
3,575,000	164	169	174	179	184	189	194	199	204	209	214	219	224	229	234	239	244	249	254	259	264	269
3,600,000	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270
3,625,000	166	171	176	182	187	192	197	202	207	212	217	222	227	232	237	242	247	252	257	262	267	272

The Morning Star Packing Company
Wastewater Reclamation - Land Application
Water & Constituent Loading Budget
Pasture - 100 Year Rainfall

DATA:

Month	Number of Days per Month	Working Days per Month	100 Year Rainfall (in/month)	100 Year Evaporation (in/month)	ET Pasture (in/month)	BOD Ave. Applied (mg/l)	Nitrogen Ave. Applied (mg/l)	TDS Ave. Applied (mg/l)
January	31	0	7.97	1.35	0.10	527	58	620
February	28	0	6.38	2.23	0.15	527	58	620
March	31	0	4.40	4.13	0.36	527	58	620
April	30	0	2.45	5.94	2.82	527	58	620
May	31	0	0.66	8.32	7.12	527	58	620
June	30	0	0.49	9.29	8.46	527	58	620
July	31	22	0.07	10.03	9.11	527	58	620
August	31	31	0.17	8.58	7.89	527	58	620
September	30	30	0.83	6.43	5.92	527	58	620
October	31	15	1.96	4.35	4.36	527	58	620
November	30	0	5.80	2.19	1.82	527	58	620
December	31	0	7.04	1.02	1.14	527	58	620
Total	**365**	**98**	**38.22**	**63.86**	**49.25**	**527**	**58.1**	**620**

Effluent Production = **3,850,000** gpd

Pasture Area = **600.1** acres

Pasture Rootzone AWHC = **2.05** inch

STORAGE POND CALCULATIONS:

Month	Effluent Produced (gal/month)	Effluent Exported (gal/month)	Effluent to Ponds (gal/month)	Surface Rainfall (gal/month)	Surface Evaporation (gal/month)	Pond Percolation (gal/month)	Monthly Available (gal/month)	Cumulative Available (gal/month)
January	0	0	0	0	0	0	0	348,425,000
February	0	0	0	0	0	0	0	348,425,000
March	0	0	0	0	0	0	0	348,425,000
April	0	0	0	0	0	0	0	348,425,000
May	0	0	0	0	0	0	0	348,425,000
June	0	0	0	0	0	0	0	348,425,000
July	84,700,000	0	84,700,000	0	0	0	84,700,000	84,700,000
August	119,350,000	0	119,350,000	0	0	0	119,350,000	204,050,000
September	115,500,000	0	115,500,000	0	0	0	115,500,000	319,550,000
October	28,875,000	0	28,875,000	0	0	0	28,875,000	348,425,000 *
November	0	0	0	0	0	0	0	348,425,000
December	0	0	0	0	0	0	0	348,425,000
Total	**348,425,000**	**0**	**348,425,000**	**0**	**0**	**0**	**348,425,000** *	

* *Start at 0 Stored July 1st*

RECLAMATION AREA:

Pasture **600.1** acres — Irrigation Application Efficiency = **70%**

Month	Cumulative Available (gal/month)	Effluent Applied (gal)	Effluent Applied (in)	Effective Rainfall (in)	Fresh Irrigation (in)	Gross Crop Need (in)	Soil Moisture Start (in)	Soil Moisture End (in)	Percolation & Leaching > 5.76 in
January	348,425,000	0	0.00	6.95	0.00	0.14	2.05	8.86	6.81
February	348,425,000	0	0.00	5.46	0.00	0.21	2.05	7.30	5.25
March	348,425,000	0	0.00	2.61	0.00	0.52	2.05	4.14	2.09
April	348,425,000	0	0.00	0.00	4.00	4.03	2.05	2.02	0.00
May	348,425,000	0	0.00	0.00	10.00	10.17	2.02	1.85	0.00
June	348,425,000	0	0.00	0.00	12.00	12.09	1.85	1.76	0.00
July	84,700,000	84,700,000	5.20	0.00	7.00	13.02	1.76	0.94	0.00
August	204,050,000	119,350,000	7.33	0.00	4.00	11.27	0.94	1.00	0.00
September	319,550,000	115,500,000	7.09	0.00	1.40	8.46	1.00	1.03	0.00
October	348,425,000	28,875,000	1.77	1.18	3.00	6.23	1.03	0.75	0.00
November	348,425,000	0	0.00	4.91	0.00	2.60	0.75	3.06	1.01
December	348,425,000	0	0.00	6.08	0.00	1.64	2.05	6.49	4.44
		348,425,000	21.39	27.19	41.40	70.38			19.60
		1,069.3 ac-ft		1,359.7	2,070.3	3,519.6 ac-ft			980.2 ac-ft
Percent of Total =		24%		30%	46%				

BOD Loading Total Weight (lbs/month)	BOD Loading Applied (lbs/ac/day)	Nitrogen Loading Available Total (lbs/month)	Nitrogen Loading 58.1 mg/l Applied (lbs/ac/month)	TDS Loading Available Total (lbs/month)	TDS Loading 620.0 mg/l Applied (lbs/ac/month)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
372,469	20	41,063	68	438,198	730
524,842	28	57,862	96	617,461	1,029
507,912	28	55,996	93	597,543	996
126,978	7	13,999	23	149,386	249
0	0	0	0	0	0
0	0	0	0	0	0
1,532,201	7 Ave.	168,920	281 Total	1,802,588	3004 Total