Malaga County Water District

Nitrate Assessment Report

Fresno County, CA
February 2021

Prepared for:
Malaga County Water District

Prepared by:
Provost & Pritchard Consulting Group
286 W. Cromwell Avenue
Fresno, CA 93711

Table of Contents

Appendices

List of Figures

List of Tables

Abbreviations

AF	Acre-feet
bsg	Below surface grade
DWR	Department of Water Resources
EAP	Early Action Plan
gpd	Gallons per Day
GW	Groundwater
MCL	Maximum Contaminant Level
MCWD	Malaga County Water District
MGD	Million Gallons per Day
MW	Monitoring Well
NO3	Nitrate
NO3-N	Nitrate as Nitrogen
NOI	Notice of Intent
NTC	Notice to Comply
RWQCB	Central Valley Regional Water Quality Control Board
SGMA	Sustainable Groundwater Management Act
WWTF	Wastewater Treatment Facility

1 Introduction

In 2019, the Central Valley Regional Water Quality Control Board (RWQCB) established new regulations that will affect all RWQCB-issued permits that regulate nitrate discharges. These new regulations are called the "Nitrate Control Program". The Nitrate Control Program requires permittees to choose between an individual permitting approach (Path A) or an approach that allows permittees to work together to reduce nitrate impacts in local areas (Path B). As the RWQCB begins to implement the Nitrate Control Program, the Board is issuing Notices to Comply (NTC). A Notice to Comply legally requires a permittee to tell the RWQCB which approach they will choose.

Malaga County Water District (MCWD) received a Nitrate Control Program Notice to Comply, dated May 29, 2020. MCWD has decided to pursue an individual permitting approach (Path A). The Notice of Intent (NOI) is included in Appendix A. By choosing Path A, MCWD is required to submit a Nitrate Assessment Report that categorizes the impact of its discharge over a 20-year horizon. This Nitrate Assessment Report includes and/or considers the following:

1. General Facility Information
2. Characterize Area of Contribution and Assessing Ambient Shallow Groundwater Quality
3. Determine Nitrate Impacts from the Discharge
4. Develop an Early Action Plan (EAP) – NOT APPLICABLE
5. Categorize the Discharge
6. Propose an Alternative Compliance Project

1.1 Background

Malaga County Water District operates wastewater treatment and disposal facilities that are subject to Waste Discharge Requirements Order Number R5-2020-0001.

MCWD prepared a Groundwater Monitoring Well Installation Work Plan in 2016. MCWD completed the installation of the groundwater monitoring wells and submitted the Installation Report in May 2017.

The effluent from the treatment facilities presently exceeds 10 mg/l of total nitrogen.

1.2 General Facility Information

General facility information is provided below. A vicinity map showing the location of MCWD is included in Figure 1-1.

Facility Name: Malaga County Water District Wastewater Treatment Facility (WWTF)
District Office: 3580 S. Frank St., Fresno, CA 93725
Facility Location: 3749 S. Maple Ave., Fresno, CA 93725
Facility ID: 273180
Order Number: R5-2020-0001
Priority Basin: Kings
CV-SALTS ID: 3311

Figure 1-1 Site Map

ATTACHMENT A – SITE MAP

2 Groundwater Characterization

This Nitrate Assessment Report is intended to characterize the area of potential contribution from the WWTF discharge, to determine the area where the discharge and groundwater meet and where the presence of the discharge can be detected. The characterization should be conducted in the groundwater shallow zone. The groundwater monitoring wells indicate the impacts from the discharge in the immediate vicinity and will therefore be used to characterize the shallow groundwater. The number of domestic wells in the area are limited.

A Groundwater Monitoring Well Installation Work Plan was prepared in 2016, which describes the geologic and hydrogeologic conditions at the site.

The Site is located within the central portion of the Kings Subbasin of the San Joaquin Valley Groundwater Basin. The San Joaquin Valley is a structural trough, approximately 70 miles in width by 200 miles in length, filled with up to 32,000 feet of marine and continental sediments deposited during periodic inundation by the Pacific Ocean and erosion of the surrounding mountains.

The San Joaquin Valley is bounded by the Coast Ranges to the west, the San Emigio and Tehachipi Mountains to the south, the Sierra Nevada to the east, and the Sacramento-San Joaquin Delta and Sacramento Valley to the north. The northern San Joaquin Valley drains towards the Delta by way of the San Joaquin, Fresno, Merced, Tuolumne, and Stanislaus Rivers. The southern San Joaquin Valley drains internally by way of the Kings, Kaweah, Tule, and Kern Rivers into the Tulare drainage basin, which includes the beds of the former Tulare, Buena Vista, and Kern Lakes.

The sediments that comprise the Kings Subbasin aquifer system consist of Tertiary and Quarternary age unconsolidated continental deposits. The Quarternary deposits are generally divided into older alluvium and lucastrine deposits, younger alluvium, and flood-basin deposits. The older alluvium consists of interbedded lenses of clay, silt, silty/sandy clay, clayey/silty sand, sand, gravel, cobbles, and boulders. The younger alluvium consists of fluvial arkosic beds interbedded with flood-basin deposits (DWR, 2006).

Clay beds of the lacustrine and marsh deposits form aquitards that control the vertical and lateral movement of ground water. The most commonly cited regional study is Water Supply Paper 1999-H (Croft, 1972). The paper identifies six primary clay layers which act as horizontal barriers to groundwater flow and separate water occurring above the clay from water below it. The most prominent clay bed is the Corcoran clay, or E-clay, which was formed as a characteristically dark greenish, blue gray silty clay that is stiff and nearly impermeable. The thickness of the Corcoran Clay ranges from about 10 feet near its edge to more than 160 feet beneath the Tulare Lake bed (Page, 1986).

Although the E-clay layer underlies the western one-quarter to one-third of the Kings Subbasin, ranging in depth from approximately 250 to 550 feet below surface grade (bsg) (DWR, 1981), none of the six associated clay layers are mapped as present below the Site.
Soil boring logs for the installation of groundwater monitoring wells MW-1 through MW-4 in 2001 indicate that soils below the Site are comprised of interbedded layers of sandy silts, silty sands,

clayey sands, clays, and sands to approximately 72 feet bsg, the maximum depth explored (Twining, 2001).

2.1 Area of Contribution

Fresno Area-Regional Groundwater Management Group (FARGM) groundwater elevation maps from Spring 2014 and Spring 2015 indicated that groundwater flow below the Site is generally to the northwest. This groundwater flow direction is in agreement with the localized predominant groundwater flow direction that was determined at the Site by the existing monitoring well network prior to the wells going dry. The information obtained from the recently constructed groundwater monitoring wells substantiates the general groundwater flow direction to the northwest.

The control volume is assumed based on a combination of horizontal and vertical hydraulic conductivities, yielding a wider control area at depth than the surface disposal area. The depth to groundwater is approximately 80 feet. With intermittent layers of clay impeding the downward flow of effluent, it is likely that a portion of the wastewater effluent will never reach the groundwater. However, to be conservative, it is assumed that the entire flow discharged to ponds will reach the groundwater aquifer.

To define the control volume, horizontal and vertical hydraulic conductivities were assumed. A horizontal to vertical ratio of 1:1 is used to yield a wide area of potential impact.

Currently, MCWD rotates use of the disposal ponds for disposal of effluent from the WWTF.

The approximate area of potential impact is shown in Figure 2-2.

2.2 Shallow Groundwater Quality

The four new groundwater monitoring wells were constructed in April 2017. Historic groundwater elevation data are summarized in Table 2-1. Nitrate data from the monitoring wells is summarized in

Table 2-2 and illustrated in

Figure 2-1. It is noted that the trend in the past few years has been a declining nitrate as N concentration in the downgradient wells.

Table 2-1 Groundwater Elevation Data

IDENTIFIER BVV7-N2B
Phone: (559) 485-7353

MALAGA COUNTY WATER DISTRICT

WASTEWATER TREATMENT AND DISPOSAL FACILITIES

RWQCB ORDER NO. R5-2020-0001

GROUNDWATER MONITORING REPORT

DATE	MONITORING WELL NO. 1R															
	Casing Elev. 290.14															
	Bottom of Well Elev. 166.14															
	Depth (ft)	GW Elev. (ft)	Vol. Purged (gal)	Ec	DLR	pH	DLR	NO3 as N (mg/l)	DLR	TDS (mg/l)	Cl (mg/l)	Alk (mg/l)	Fe (mg/l)	Mn (mg/l)	Minerals (annual)	Metals (annual)
Apr-17	79.38	210.76		740.0	1	7.80	0.10	8.3	0.9	450	36	230	ND	ND		
May-17	78.50	211.64		770.0	1	7.80	0.10	9.0	0.9	480	42	260	ND	0.00027		
Jun-17	78.50	211.64		720.0	1	7.70	0.10	9.0	0.9	450	37	220	0.01900	ND		
Jul-17	77.30	212.84		720.0	1	7.70	0.10	8.6	0.9	430	36	230	ND	ND		
Aug-17	78.66	211.48		700.0	1	7.70	0.10	10.0	0.9	480	34	220	0.02400	ND		
Sep-17	78.00	212.14		710.0	1	7.80	0.10	9.5	0.9	420	34	260	ND	ND		
Oct-17	77.80	212.34		700.0	1	7.70	0.10	9.3	0.9	430	30	220	ND	ND		
Nov-17	77.50	212.64			1	7.60	0.1	9.4	0.9							
Dec-17	78.00	212.14		700.0	1	7.70	0.1	9.5	0.9	450	32	230	ND	ND		
Jan-18	77.70	212.44		660.0	1	7.8	0.1	9.7	0.9	420	34	210	ND	ND		
Feb-18	77.50	212.64		740.0	1	7.8	0.1	9.7	0.9	450	42	230	ND	ND		
Mar-18	77.50	212.64		700.0	1	7.8	0.1	9.8	0.9	440	30	220	ND	ND		
Apr-18	77.50	212.64		720.0	1	7.6	0.1	9.6	0.9	450	32	230	ND	ND		
May-18	77.50	212.64		720.0	1	7.70	0.10	9.7	0.9	470	31	240	ND	0.00026		
Jun-18	78.20	211.94		730.0	1	7.70	0.1		0.9	450	61	230	ND	0.00041		
Aug-18	77.60	212.54		670.0	1	7.60	0.1	9.8	0.9	430	33	240	ND	ND		
Nov-18	78.00	212.14		730.0	1	7.6	0.1	11.0	0.9	470	39	220	ND	0.00067		
Feb-19	78.80	211.34		770.0	1	7.7	0.1	11.0	0.9	520	41	230	ND	ND		
May-19	78.50	211.64		790.0	1	7.4	0.1	11.0	0.9	510	43	250	0.025	ND		
Aug-19	78.00	212.14		800.0	1	7.8	0.1	11.0	0.9	550	46	260	ND	ND		
Nov-19	78.00	212.14		810.0	1	7.8	0.1	11.0	0.9	520	43	260	0.098	ND		
Feb-20	77.50	212.64		810.0	1	7.6	0.1	10.0	0.9	510	42	260	ND	0.00100		
May-20	78.00	212.14		800.0	1	8.0	0.1	12.0	0.9	550	40	240	ND	0.00190		
Sep-20	79.00	211.14		810.0	1	7.9	0.1	12.0	0.9	490	43	290	ND	0.00180		
Nov-20	83.70	206.44		820.0	1	7.7	0.1	12.0	1	530	45	300	ND	0.00260		

Depth of groundwater and elevations measured in feet.
Depth, elevation, pH, Ec, NO3-N sampled monthly for the first year, annually thereafter.
Minerals are to be sampled annually (TDS, Chloride, Sulfate, bicarbonate alkalinity, carbonate alkalinity, Calcium,.
Magnesium, Potassium, Sodium, Boron, Iron, Phosphate, Manganese, major anions and cations, anion-cation balance).
Metals are to be sampled annually (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron,
Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel,

IDENTIFIER BVV7-N2B
Phone: (559) 485-7353

MALAGA COUNTY WATER DISTRICT

WASTEWATER TREATMENT AND DISPOSAL FACILITIES

RWQCB ORDER NO. R5-2020-0001

GROUNDWATER MONITORING REPORT

MONITORING WELL NO. 2R

Casing Elev. 292.75
Bottom of Well Elev. 164.75

Depth (ft)	GW Elev. (ft)	Vol. Purged (gal)	Ec	DLR	pH	DLR	NO3 as N (mg/l)	DLR	TDS (mg/l)	Cl (mg/l)	Alk (mg/l)	Fe (mg/l)	Mn (mg/l)	Minerals (annual)	Metals (annual)
84.50	208.25		1200.0	1	8.00	0.10	8.10	0.9	740	55	220	ND	0.28		
83.50	209.25		1400.0	1	7.80	0.10	6.0	1.4	1000	61	230	ND	0.02100		
83.30	209.45		1100.0	1	7.60	0.10	5.30	0.9	710	60	200	ND	0.17000		
82.50	210.25		1300.0	1	7.80	0.10	6.10	1.4	820	59	230	ND	0.19000		
82.25	210.50		1300.0	1	7.80	0.10	5.60	1.4	900	59	220	ND	0.12000		
82.00	210.75		1200.0	1	7.80	0.10	4.90	1.4	830	60	230	ND	0.14000		
81.80	210.95		1200.0	1	7.8	0.10	4.70	1.4	800	60	230	ND	0.16000		
81.50	211.25			1	7.7	0.1	6.6	0.9							
81.00	211.75		1200.0	1	7.7	0.1	6.9	0.9	780	57	250	ND	0.14000		
81.00	211.75		1100.0	1	7.8	0.1	4.5	1.4	720	56	240	ND	0.16		
81.00	211.75		1100.0	1	7.8	0.1	5.9	1.4	700	66	240	ND	0.098		
81.80	210.95		1200.0	1	7.9	0.1	5.9	1.4	750	51	240	ND	0.200		
81.20	211.55		1200.0	1	7.7	0.1	6.3	1.4	780	54	280	ND	0.240		
83.00	209.75		1200.0	1	7.80	0.10	9.30	1.4	790	57	270	ND	0.26		
83.10	209.65		1300.0	1	7.8	0.1	9.8	0.9	800	59	280	0.017	0.34		
82.50	210.25		1100.0	1	7.8	0.1	6.6	0.9	780	54	230	ND	0.28		
82.50	210.25		1100.0	1	7.7	0.1	6.4	0.9	720	57	230	ND	0.20		
83.00	209.75		1000.0	1	7.8	0.1	6.3	1.4	690	61	220	ND	0.16		
83.20	209.55		1100.0	1	7.5	0.1	5.5	1.4	730	58	240	0.020	0.18		
82.00	210.75		1100.0	1	7.8	0.1	9.5	1.4	780	57	250	ND	0.16		
81.00	211.75		1100.0	1	7.9	0.1	12.0	1.4	720	53	230	ND	0.074		
80.90	211.85		980.0	1	7.7	0.1	8.4	0.9	660	47	230	ND	0.110		
82.00	210.75		940.0	1	8.0	0.1	8.4	1.4	660	50	200	ND	0.084		
83.00	209.75		910.0	1	8.0	0.1	7.70	0.90	600	52	220	ND	0.077		
79.70	213.05		940.0	1	7.8	0.1	3.7	1	650	55	240	ND	0.540		

6.8

NOTES: Depth of groundwater and elevations measured in feet.
Depth, elevation, pH, Ec, NO3-N sampled monthly for the first year, annually thereafter.
Minerals are to be sampled annually (TDS, Chloride, Sulfate, bicarbonate alkalinity, carbonate alkalinity, Calcium,.
Magnesium, Potassium, Sodium, Boron, Iron, Phosphate, Manganese, major anions and cations, anion-cation balance).
Metals are to be sampled annually (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron,
Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel,

IDENTIFIER BVV7-N2B
Phone: (559) 485-7353

MALAGA COUNTY WATER DISTRICT

WASTEWATER TREATMENT AND DISPOSAL FACILITIES

RWQCB ORDER NO. R5-2020-0001

GROUNDWATER MONITORING REPORT

MONITORING WELL NO. 3R

Casing Elev. 289.98
Bottom of Well Elev. 174.48

Depth (ft)	GW Elev. (ft)	Vol. Purged (gal)	Ec	DLR	pH	DLR	NO3 as N (mg/l)	DLR	TDS (mg/l)	Cl (mg/l)	Alk (mg/l)	Fe (mg/l)	Mn (mg/l)	Minerals (annual)	Metals (annual)
81.94	208.04		1000.0	1	7.80	0.10	13.00	0.9	660	64	190	ND	0.02		
81.20	208.78		1000.0	1	7.70	0.10	6.5	1.2	660	66	200	ND	0.0110		
80.80	209.18		850.0	1	7.60	0.10	13.00	0.9	560	64	140	ND	0.0027		
80.00	209.98		1100.0	1	7.70	0.10	11.00	1.4	720	56	240	ND	ND		
79.00	210.98		850.0	1	7.70	0.10	13.00	0.9	640	65	170	0.0520	0.0017		
79.33	210.65		840.0	1	7.80	0.10	12.00	0.9	560	62	150	ND	0.0009		
79.80	210.18		840.0	1	7.6	0.10	13.00	1.4	550	57	140	ND	0.0013		
79.16	210.82			1	7.6	0.1	12.0	0.9							
78.00	211.98		870.0	1	7.6	0.1	10.00	0.9	590	59	160	ND	0.0010		
77.70	212.28		860.0	1	7.7	0.1	8.7	0.9	560	61	170	ND	ND		
78.10	211.88		930.0	1	7.8	0.1	6.0	0.9	600	73	190	ND	ND		
78.00	211.98		940.0	1	7.8	0.1	10.00	0.9	580	68	190	ND	ND		
79.00	210.98		900.0	1	7.6	0.1	13.0	0.9	620	60	220	ND	ND		
80.00	209.98		830.0	1	7.70	0.10	13.00	0.9	530	60	160	ND	0.0004		
80.50	209.48		830.0	1	7.6	0.1	13.0	0.9	520	57	150	ND	0.0006		
80.00	209.98		770.0	1	7.7	0.1	12.0	0.9	570	52	150	ND	0.0003		
80.00	209.98		790.0	1	7.6	0.1	12.0	0.9	560	54	140	ND	ND		
80.70	209.28		790.0	1	7.7	0.1	12.0	0.9	520	56	140	0.0	ND		
81.00	208.98		790.0	1	7.7	0.1	11.0	0.9	560	56	150	0.360	0.0180		
80.00	209.98		790.0	1	7.8	0.1	9.0	0.9	560	59	160	0.084	0.0090		
78.50	211.48		800.0	1	7.7	0.1	5.2	0.9	550	51	170	0.110	0.0060		
84.00	205.98		820.0	1	7.7	0.1	4.3	0.9	560	50	180	ND	0.0029		
80.00	209.98		820.0	1	8.0	0.1	7.5	1	560	49	150	0.039	0.0039		
80.40	209.58		810.0	1	7.9	0.1	7.6	0.9	540	52	170	0.340	0.0130		
81.20	208.78		810.0	1	7.7	0.1	6.0	1	530	48	170	0.055	0.0057		

10.2

Depth of groundwater and elevations measured in feet.
Depth, elevation, pH, Ec, NO3-N sampled monthly for the first year, annually thereafter.
Minerals are to be sampled annually (TDS, Chloride, Sulfate, bicarbonate alkalinity, carbonate alkalinity, Calcium,.
Magnesium, Potassium, Sodium, Boron, Iron, Phosphate, Manganese, major anions and cations, anion-cation balance).
Metals are to be sampled annually (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron,
Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel,

IDENTIFIER BVV7-N2B
Phone: (559) 485-7353

MALAGA COUNTY WATER DISTRICT

WASTEWATER TREATMENT AND DISPOSAL FACILITIES

RWQCB ORDER NO. R5-2020-0001

GROUNDWATER MONITORING REPORT

MONITORING WELL NO. 4R

Casing Elev. 285.3
Bottom of Well Elev. 156.3

Depth (ft)	GW Elev. (ft)	Vol. Purged (gal)	Ec	DLR	pH	DLR	NO3 as N (mg/l)	DLR	TDS (mg/l)	Cl (mg/l)	Alk (mg/l)	Fe (mg/l)	Mn (mg/l)	Minerals (annual)	Metals (annual)
77.88	207.42		1000.0	1	7.80	0.10	11.00	0.9	670	49	220	ND	ND		
77.25	208.05		910.0	1	7.80	0.10	7.60	0.9	620	47	230	0.0170	0.0012		
76.50	208.80		1000.0	1	7.60	0.10	11.00	0.9	660	51	230	ND	ND		
76.00	209.30		840.0	1	7.70	0.10	13.00	0.9	550	63	140	ND	0		
75.50	209.80		1100.0	1	7.80	0.10	12.00	0.9	760	59	220	ND	ND		
77.50	207.80		950.0	1	7.80	0.10	12.00	0.9	620	60	170	ND	ND		
75.50	209.80		920.0	1	7.6	0.10	12.00	1.4	600	59	280	ND	ND		
75.16	210.14			1	7.6	0.1	11.00	0.9							
75.00	210.30		860.0	1	7.6	0.1	11.00	0.9	560	56	160	ND	ND		
74.20	211.10		850.0	1	7.7	0.1	11.00	0.9	580	57	160	ND	ND		
73.30	212.00		870.0	1	7.7	0.1	12.00	0.9	570	62	150	ND	ND		
74.00	211.30		880.0	1	7.7	0.1	14.00	0.9	570	61	140	ND	ND		
74.20	211.10		880.0	1	7.5	0.1	15.00	0.9	590	58	150	ND	ND		
75.50	209.80		870.0	1	7.70	0.10	13.00	0.9	570	57	160	ND	ND		
76.60	208.70		900.0	1	7.7	0.1	12.0	0.9	610	61	170	ND	ND		
76.30	209.00		850.0	1	7.6	0.1	12.0	0.9	600	58	170	ND	ND		
76.50	208.80		850.0	1	7.4	0.1	11.00	0.9	570	63	160	ND	ND		
76.70	208.60		830.0	1	7.6	0.1	12.0	0.9	530	61	220	0.022	ND		
77.00	208.30		830.0	1	7.8	0.1	13.0	0.9	560	56	150	0.038	ND		
76.00	209.30		790.0	1	7.8	0.1	14.0	0.9	570	60	140	0.022	0.0048		
74.50	210.80		790.0	1	7.7	0.1	12.0	0.9	610	57	150	0.024	ND		
74.20	211.10		840.0	1	7.7	0.1	11.0	0.9	630	57	160	ND	ND		
75.00	210.30		850.0	1	7.9	0.1	8.0	0.9	570	57	170	0.046	0.0015		
76.40	208.90		820.0	1	7.9	0.1	3.2	0.9	540	52	200	ND	0.00095		
71.20	214.10		840.0	1	7.7	0.1	5.0	0.9	570	51	200	ND	0.00300		
					7.7										

NOTES: Depth of groundwater and elevations measured in feet.
Depth, elevation, pH, Ec, NO3-N sampled monthly for the first year, annually thereafter.
Minerals are to be sampled annually (TDS, Chloride, Sulfate, bicarbonate alkalinity, carbonate alkalinity, Calcium,.
Magnesium, Potassium, Sodium, Boron, Iron, Phosphate, Manganese, major anions and cations, anion-cation balance).
Metals are to be sampled annually (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron,
Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel,

Figure 2-1 Historical Groundwater Nitrate Data

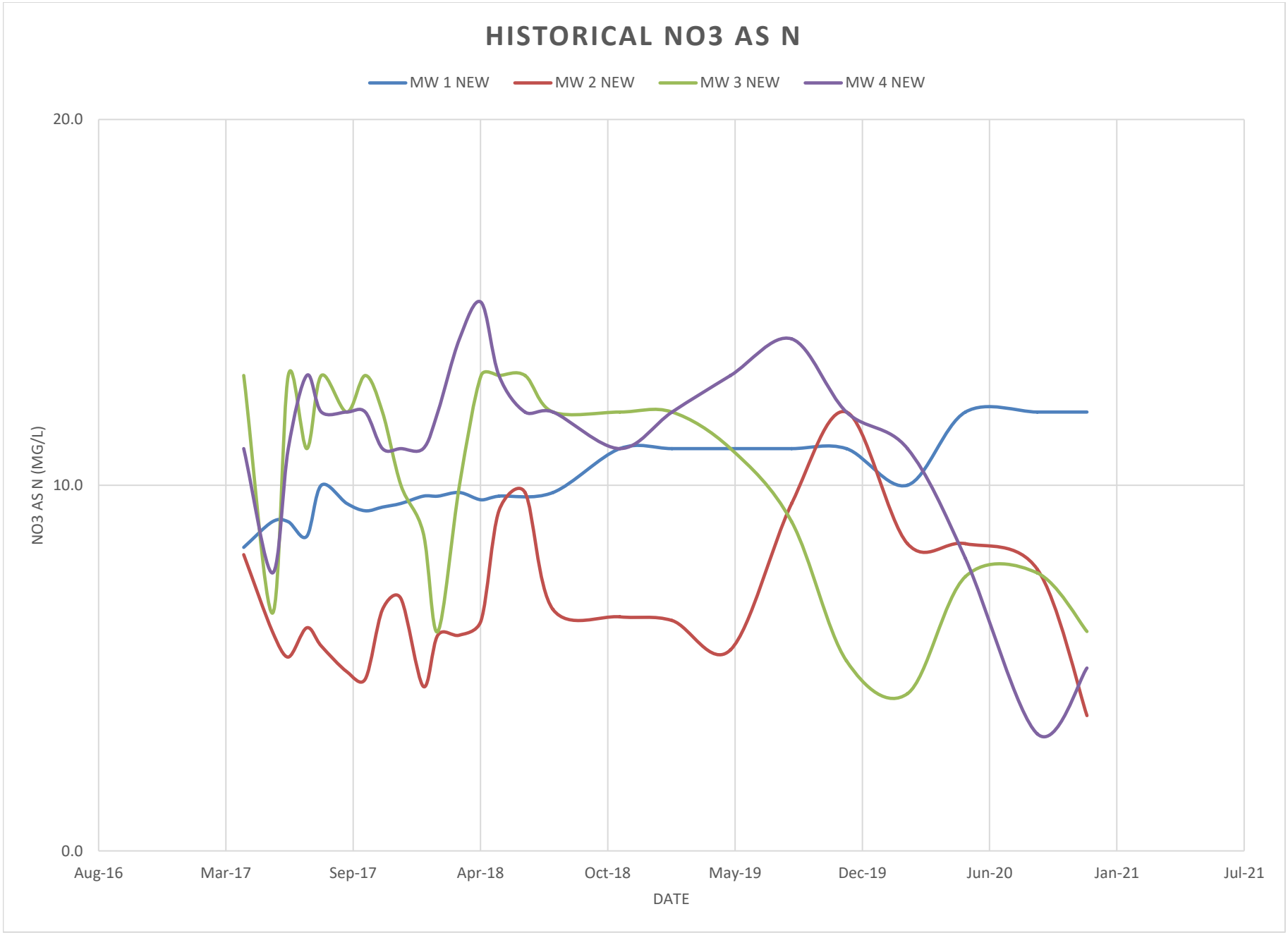
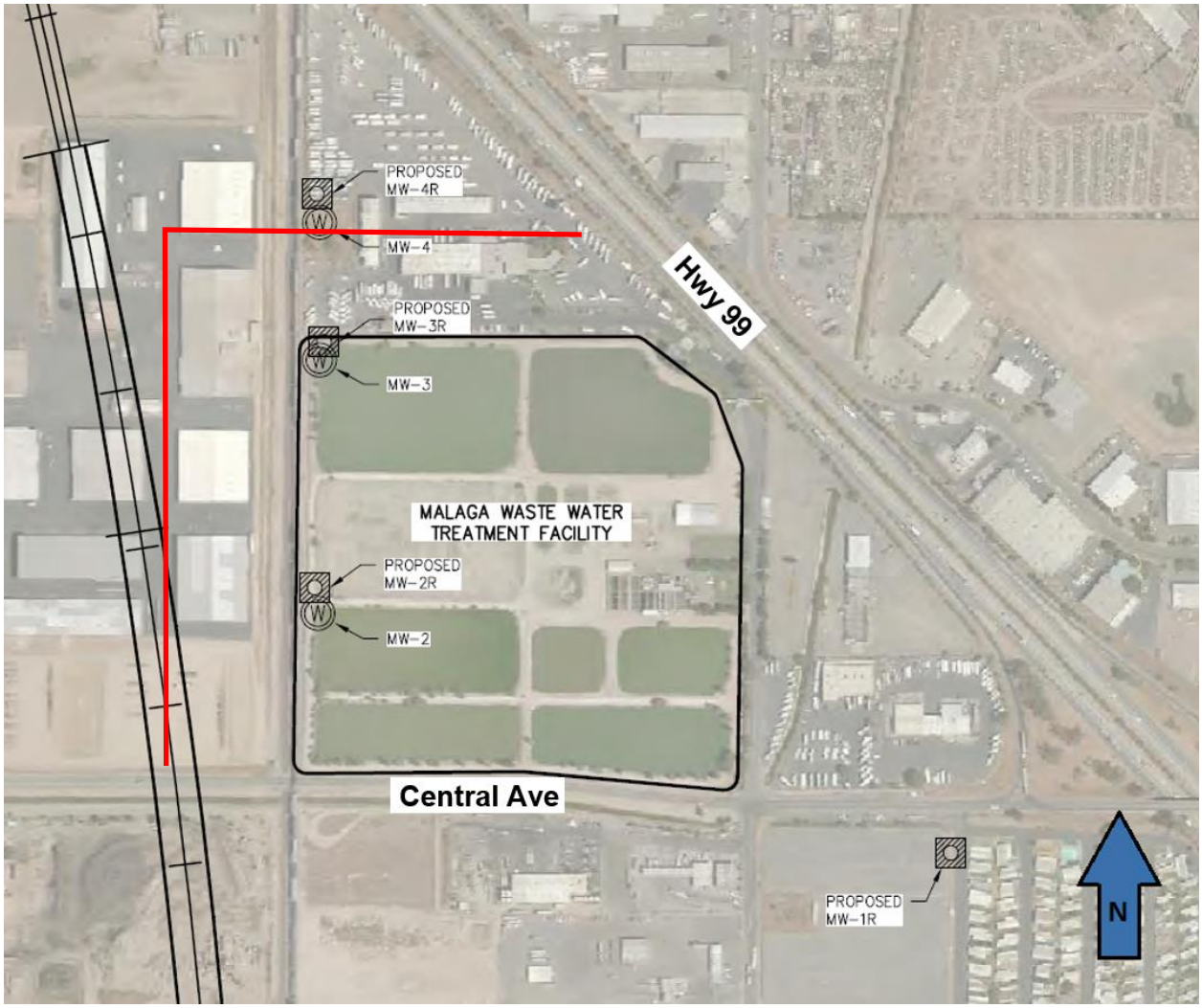

HISTORICAL NO3 AS N
MW 1 NEW
MW 2 NEW
MW 3 NEW
MW 4 NEW
20.0
10.0
0.0
NO3 AS N (MG/L)
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
Jun-20
Jan-21
Jul-21
DATE

Figure 2-2 Area of Potential Impact

ATTACHMENT A – SITE MAP



3 Nitrate Impacts from Discharge

The effluent nitrate levels being discharged from the WWTF are generally on the order of 15 mg/l as N. This exceeds the MCL of 10 mg/L.

Background shallow groundwater quality is assumed to be the historical upgradient monitoring well MW-1R, which had an average nitrate as nitrogen concentration of 10.1 mg/L. The average effluent nitrate level is therefore above the background concentration and the MCL.

A construction project is necessary to further reduce the nitrate as N concentration in the effluent from the treatment facilities. The construction project is necessary to be able to ensure that the treatment and disposal facilities cause no degradation of water quality conditions.

The area downgradient of the WWTP is served by the City of Fresno water system. There are no known domestic wells in the area of impact.

Table 3-1 Effluent Nitrate Data

3.1 Historical Impacts from Existing Facilities

The WWTF has been operating at the present location since the late 1950's. Major upgrades were completed in 1995 to improve various processes. Several other improvements have been made to various unit processes over the subsequent years. There have been some improvements relative to the overall nitrate as N concentration discharged from the WWTF, however, the total effluent nitrate as N concentration is still in the range of 15 mg/l.

Since the installation of the groundwater monitoring wells in April 2017, the average concentration of nitrate as N has been as follows:

Monitoring Well	Average Nitrate as N (mg/l)
1R	10.1
2R	6.8
3R	10.2
4R	7.7

The results are not definitive, however, the effluent from the Malaga WWTF has the potential to impact the water quality of the first encountered groundwater.

4 Early Action Plan

The discharge from the MCWD WWTF is not known to be causing or contributing to an exceedance of a drinking water standard in a public water supply well or domestic well and is therefore not required to prepare an Early Action Plan.

5 Discharge Category

Based on the impact of the discharge in the groundwater shallow zone and the quality of the discharge described above, the discharge is within Category 5. As a Category 5 discharge, the discharge may cause degradation of the groundwater in the shallow zone.

The nitrate discharge categories are described below in Table 5-1.

Table 5-1 Nitrate Discharge Categories

Category	Discharge Quality and Impact to Groundwater
Category 1 No Degradation	Discharge quality, as it reaches the Shallow Zone, is better than the applicable water quality objective and is better than the average nitrate concentration in the Shallow Zone.
Category 2 De Minimis Impacts	The average nitrate concentration in the Shallow Zone is better than the applicable water quality objective, and, over a 20-year planning horizon: 1) The effect of the discharge on the average nitrate concentration in the Shallow Zone is expected to use less than 10% of the available assimilative capacity in the Shallow Zone; and 2) The discharge, in combination with other nitrate inputs to the Shallow Zone, is not expected to cause average nitrate concentrations in the Shallow Zone to exceed a nitrate trigger of 75% of the applicable water quality objective.
Category 3 Degradation Below Trigger	The average nitrate concentration in the Shallow Zone is better than the applicable water quality objective. Estimated that discharge is more than de minimus, but will not cause the average nitrate concentration in the Shallow Zone to exceed a trigger of 75% of the applicable water quality objective over a 20-year planning horizon.
Category 4 Degradation Above Trigger	The average nitrate concentration in the Shallow Zone is better than the water quality objective. Though the discharge is reasonably expected to cause the average nitrate concentration in the Shallow Zone to exceed a trigger of 75% of the applicable water quality objective over a 20-year planning horizon, the average nitrate concentration in the Shallow Zone is expected to remain at or below the applicable water quality objective over the same 20-year planning horizon.

Category 5 Discharge Above Objective	Either: 1) The average nitrate concentration in the Shallow Zone is better than the applicable water quality objective, but the discharge may cause the average nitrate concentration in the Shallow Zone to exceed the water quality objective over a 20-year planning horizon; or 2) The average nitrate concentration in the Shallow Zone exceeds the applicable water quality objective and the discharge quality, as it reaches the Shallow Zone, also exceeds the applicable water quality objective.

6 Alternative Compliance Project

The discharge from the MCWD WWTF is a Category 4 or Category 5 discharge. MCWD is therefore required to prepare an Alternative Compliance Project.

The project will include the design and construction of improvements at the Malaga wastewater treatment facilities. The improvements will include modifications to the aeration system to improve reduction of nitrogen in the effluent and therefore improve groundwater quality. The improvements will also include installation of flexible baffles in two aeration basins to create anoxic zones. Mixers and recirculation pumps will also be installed in the aeration basins to enable the operation of the basins with anoxic and aerobic zones.

6.1 Existing Operation Information

The three existing aeration tanks are about 308,924 gal each (100' x 28'x 14'-9" D). Each existing aeration basin has five (5) diffuser cells, with two (2) branches per cell, and 18 tubular diffusers per branch. These 5 aeration zones are about 61,780 Gal each.

The current Max Month Average Daily Flow (MMADF) for the treatment plant is approximately 0.65 MGD with an annual average daily flow of 0.55 MGD.

The District completed a past project that installed one new blower (Blower #5, ATLAS COPCO ZS 55 + B VSD), a VFD for Blower #3 and #5, and DO sensors for all aeration basins. Blowers #3 and #5 are alternated to provide aeration for aeration basins. Both blowers are VFD controlled based on the DO level in the aeration basins. Two existing blowers (#1 and #2), which are also VFD controlled, are alternated to supply air for sludge digesters.

6.2 Plant Loading and Nitrification Process Calculation

The current MMADF is 0.65 MGD. The BOD loading at the MMADF is 1,085 lb/day with the influent BOD level of 200 mg/L. Approximately 20% of BOD is removed in the Dissolved Air Flotation (DAF) tank with the remaining BOD loading 80% x 1,085 lb/day = 868 lb/day for the aeration basin.

To achieve nitrification, the sludge retention time (SRT) generally needs to be greater than 20 days. One of the existing aeration basins can provide an SRT of 22 days when the MLSS is maintain at 2,500 mg/L. The HRT for aeration is calculated to be 8.4 hours. The aeration volume needed: 8.4 Hr x MMADF = 227,500 Gal. The two aeration tanks currently used in the treatment process provide sufficient volume for the nitrification. A certain portion of the aeration basin maybe partitioned to be converted to anoxic zone for denitrification.

6.3 Aeration Piping for Operation Change

Air supply needed for MMADF at the average influent BOD level of 125 mg/L is 347 SCFM (24 hour average), and the demand will be as high as 441 SCFM for a higher BOD concentration of 160 mg/L.

The existing Blowers #1, #2, and #3 are Sutorbilt Rotary Positive Blower Model GAHMPDA 8MP (75 HP) and are rated at 1,183 CFM at 10 psi and 1,335 RPM. Blower #5 is a ZS-55+ B Blower (Serial # APF 170761) and has a rating of 1,200 SCFM at working pressure of 11.6 psig. The blower is 86.8 HP and was installed in 2012.

All blowers have far more capacity than the required aeration demand for the current loading. It is proposed to modify the air piping manifold to allow for the use of any one of these four blowers for both aeration basins and sludge digesters. The air flow of 1,200 SCFM needs to be reduced to about 300 – 500 SCFM for the aeration basins by diverting more than half of the air to the sludge digesters.

Each existing aeration basin has five (5) diffuser cells, with two (2) branches per cell, and 18 tubular diffusers per branch. There are a total of 180 diffusers in each basin. The air flow will be about 2 ~ 2.5 SCFM/diffuser. According to plant operator, the existing diffuser is EDI FlexAir Magnum Diffuser. The diffuser is rated for 0 – 25 SCFM for micropore model and 0 – 44 SCFM for high capacity model. Optimum oxygen transfer efficiency is achieved when operating in the middle to low end of the air flow range.

Figure 3 shows the piping modification to connect all the blowers and to install a new manifold and to abandon a piece of old underground air pipe. It was noted in the past that the air pipe underground might have a leak since the area was bubbling when it was wet. The air piping modification can provide MCWD with energy saving and better DO control in the aeration basin.

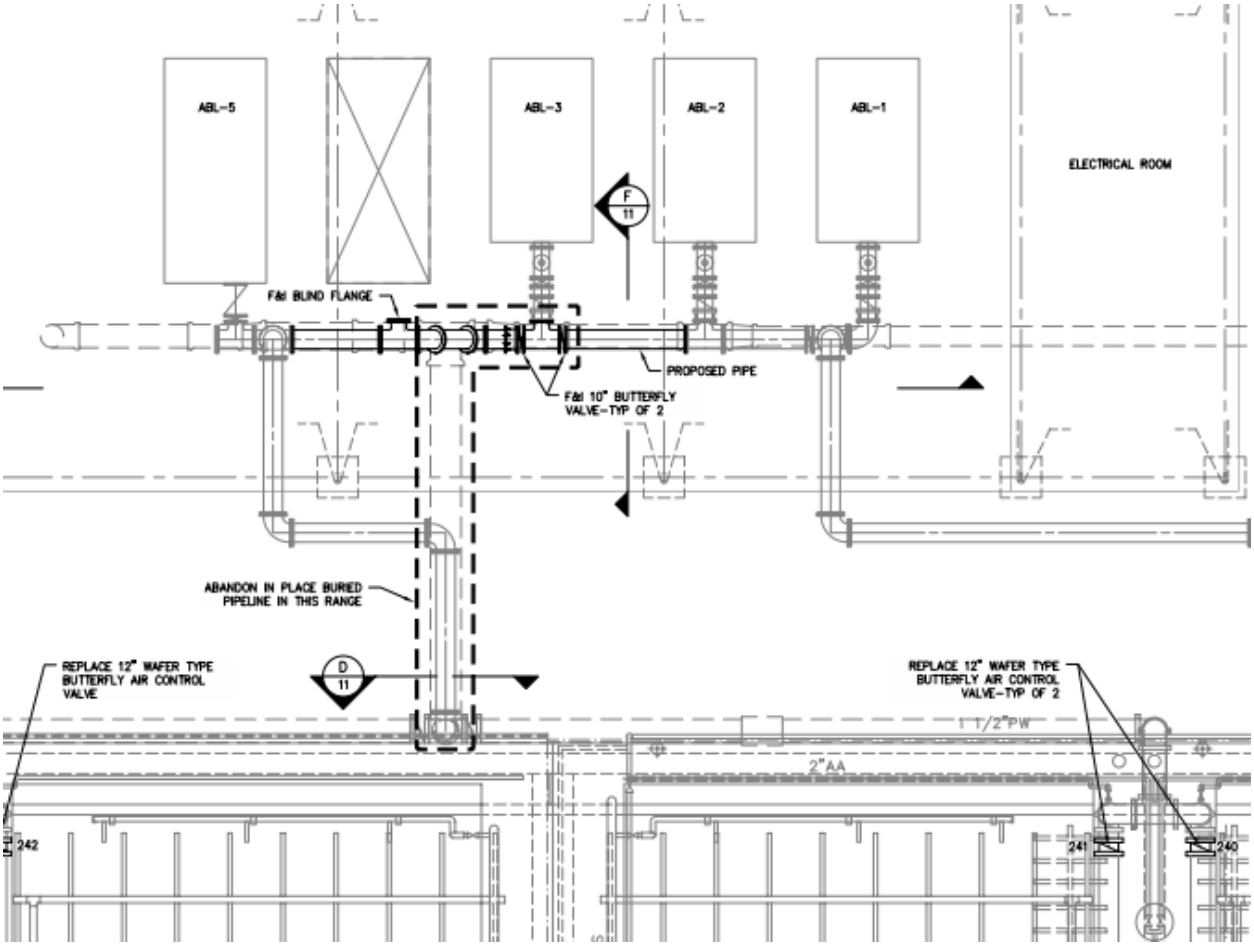


Figure 3 Blower Air Piping Modification for Simultaneous N/dN

6.4 Pre-anoxic Modified Ludzack-Ettinger (MLE) Process for Denitrification

The MLE process requires an anoxic basin before the aeration basin to provide the denitrification process with enough readily available carbon source. The aeration volume needed is about 72% of the existing aeration tank, it is also feasible to partition the aeration tank for a separate anoxic zone. The first cell of the aeration basin can be converted to an anoxic tank by installing a baffle wall and submersible mixers. The influent will be mixed with recirculated mixed liquor from the downstream portion of the aeration basin, which is rich in nitrate, for denitrification.

The project would require following modifications to the system.

1. Install a baffle to create the first cell of the aeration tank

Either a permanent or temporary baffle can be installed for this purpose.

A temporary baffle can be a 28 ft long 15 ft tall plastic pond liner in multiple panels attached to two 28' long 6" capped PVC pipes. One pipe can be filled with sand to sink to the bottom and the other empty to float at surface.

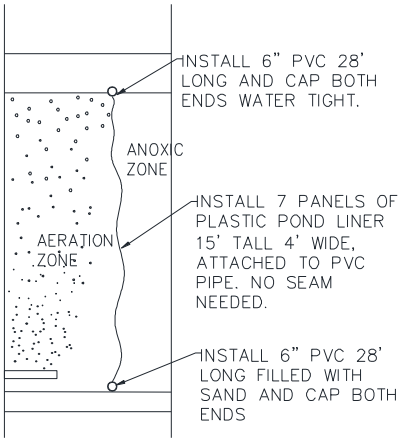


Figure 2 Details of Baffle to Separate Anoxic Zone from Aeration Zone

2. Install two recirculation pumps (Wilo RZP 25-2 or equivalent), two 10-in pipe 75 ft long to return MLQ to the anoxic cell and two 10 x 6 in reducers to provide mixing for anoxic tank with nozzles
3. Turn off (or remove) air diffusers in the anoxic cell
4. Additional mixers may be needed to provide additional mixing for the anoxic zone.

The specific denitrification rate is between 0.03 – 0.11 g NO3-N/g VSS-day (Metcalf & Eddy). For the specific denitrification rate SDNR of 0.052 lbs N/day-lbs MLVSS at 14^{o}C (57 F), the anoxic zone of 123,560 gal (2 basins) can remove about 91 lbs/day of nitrogen out of the total 108 lbs/day of effluent nitrogen.

N removed (lb) = 0.052 lb/lb-day x 123,560 Gal x 2500mg/L (MLVSS) x 8.345 lb/Gal = 134 lbs/day/

TN in effluent = 0.65 MGD x 20 mg/L x 8.345 lbs/gal = 108 lbs/day

In the remaining 4 aeration zones, the airflow to each diffuser will be about 3 SCFM/diffuser for 144 diffusers.

An opinion of cost for the project is attached. The cost is estimated to be $250,000. A budget of $300,000 is recommended.

The Malaga County Water District has submitted an application for funding assistance to the CDBG Program administered by the County of Fresno. If CDBG funding is received, a contract would be prepared by September 2021 and construction may be complete by September 2022. Malaga County Water District will know if it will receive the funds by April 2021.

If CDBG funding is not obtained, it is recommended that the Malaga County Water District obtain the necessary funds to construct the project through a loan. The work would be able to be completed by September 2022 if a loan is obtained by September 2021.

A schedule for the work is summarized as follows:

Complete Construction Documents	November 2021
Advertise for Construction	December 2021
Award Construction	February 2022
Construction	February – August 2022
Initiate Operation	September 2022

7 Conclusions

The current discharge may cause degradation to the groundwater quality concentration for nitrate. Based on the discharge categories defined in Table 5-1, the discharge from the MCWD WWTF is considered a Category 5 discharge. An Alternative Compliance Project is required.

Upon completion of the proposed project, the discharge from the MCWD WWTF is expected to be Category 1, since the discharge quality, as it reaches the Shallow Zone, will be better than the applicable water quality objective and better than the average nitrate concentration in the Shallow Zone. It is anticipated that the groundwater nitrate concentration downgradient of the WWTP would be less than the upgradient nitrate concentration.

Appendix A

Malaga County Water District
Notice of Intent

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

NOTICE OF INTENT (NOI) TO COMPLY WITH NITRATE CONTROL PROGRAM
RESOLUTION R5-2018-0034

You must complete this entire form. Please send the completed, signed form and all necessary attachments to the Central Valley Water Board by the dates indicated on the Notice to Comply. Permittees that do not provide a NOI are subject to enforcement actions.

I. CONTACT INFORMATION
(if there are multiple facility, owner, and operator, please submit information as attachment)

A. Facility

Name:			Phone Number:
Mailing Address:			
City:	County:	State	Zip Code:
Email Address:			
CIWQS Facility ID (can be found in the NTC):			

B. Owner

Name:			Phone Number:
Address:			
City:	County:	State	Zip Code:
Email Address:			

C. Operator

Name:			Phone Number:
Address:			
City:	County:	State	Zip Code:
Email Address:			

D. CV-SALTS ID(s) (can be found in the NTC)

II. COMPLIANCE PATHWAY

You must select from one of the two compliance pathways to comply with the Nitrate Control Program. *Please note - Permittees that are identified as an Initial Participant in a Management Zone's Preliminary Management Zone Proposal shall be assumed to be electing Pathway B for complying with the Nitrate Control Program, unless they otherwise notify the Central Valley Water Board of their intent to withdraw from Pathway B.*

☐ **Pathway A** - Individual Permitting Approach (**PLEASE COMPLETE SECTIONS III.A.**)

☐ **Pathway B** - Management Zone Permitting Approach (**PLEASE COMPLETE SECTION III.B.**)

III. DOCUMENTATION TO SUPPORT COMPLIANCE PATHWAYS

A. Documentation needed to support selection of Individual Permitting Approach (Pathway A).

If you are an existing permittee, you must submit the following items by the date indicated on the Notice to Comply for Priority 1 Basins/Sub-basins. If you are a new or expanding permittee, you must submit the following items with a Report of Waste Discharge. Attachments are to be submitted along with this NOI. Please refer to the Nitrate NOI guidance document for how to comply with the following requirements for Pathway A.

1) Assess Water Quality Conditions in the Shallow Zone

You must estimate the impact of nitrate in your discharge(s) on groundwater in the Shallow Zone over a 20-year planning horizon. The Shallow Zone is defined as the vertical extent of the aquifer representing the shallowest 10% of the domestic water supply wells in a given area. Use of an equivalent alternative to this definition of the Shallow Zone must first be approved by the Central Valley Water Board's Executive Officer.

When evaluating such impacts, you should be looking to determine the impact of your nitrate discharge(s) on average nitrate concentrations in the Shallow Zone.

You may conduct such assessments by using simple mass balance calculations that assume 20 years of nitrate loading as it reaches the water table, and by using readily available information. Alternatively, you may collect data and information, to model your nitrate discharge impacts on groundwater in the applicable Shallow Zone. You are not required to develop expensive, high resolution models. However, you have the option to conduct a more sophisticated analysis should you desire. Further, you are encouraged to use existing assessments that may already exist.

2) Determine if Nitrate is Causing Any Public Water Supply Well or Domestic Well to Exceed Nitrate Drinking Water Standard

You must conduct a survey of the area where the discharge(s) occurs to identify if there are public water supply or domestic wells that have nitrate levels in exceedance of the drinking water standard, and determine if your discharge(s) are the cause of the nitrate exceedance in drinking water well in question.

If it is determined that your discharge(s) will cause exceedance in nitrate levels, you will be required to develop an Early Action Plan (**PLEASE COMPLETE SECTION III.A.3**)

3) Develop Early Action Plan *(If Applicable)*

If you have determined that you have caused a public water supply well or domestic well to exceed the nitrate drinking water standard of 10 parts per million (ppm), then you must prepare and submit an Early Action Plan. You are required to implement the Early Action Plan as soon as reasonably feasible, but no later than **60 days** after submittal.

The Early Action Plan must include the following items:

- ☐ A process to identify affected residents and the outreach utilized the ensure that impacted groundwater users are informed and given the opportunity to participate in the development of proposed solutions;

- ☐ A process for coordinating with others that are not dischargers to address drinking water issues, which must include consideration of coordinating with affected communities, domestic well users and their representatives, the State Water Board's Division of Drinking Water, Local Planning Departments, Local County Health Officials, Sustainable Groundwater Management Agencies and others;

- ☐ Specific actions and a schedule of implementation that is as short as practicable to address the immediate drinking water needs of those initially identified within the management zone, or area of contribution for a Pathway A discharger, that are drinking groundwater that exceeds nitrate standards; and

- ☐ A funding mechanism for implementing the Early Action Plan, which may include seeking funding from Management Zone participants, and/or local, state and federal funds that are available for such purposes.

4) Categorize the Discharge

You are required to categorize your impact for nitrate in the Shallow Zone. Please see the five categories below to make your determination. If your discharge is categorized as **4 or 5**, you may need to submit an Alternative Compliance Project (**PLEASE COMPLETE SECTION III.A.5**).

What is your nitrate discharge category? Select a Category

Category	Discharge Quality and Impact to Groundwater
Category 1 No Degradation	Discharge quality, as it reaches the Shallow Zone, is better than the applicable water quality objective and is better than the average nitrate concentration in the Shallow Zone.
Category 2 *De Minimis* Impacts	The average nitrate concentration in the Shallow Zone is better than the applicable water quality objective, and, over a 20-year planning horizon: 1) The effect of the discharge on the average nitrate concentration in the Shallow Zone is expected to use less than 10% of the available assimilative capacity in the Shallow Zone; and 2) The discharge, in combination with other nitrate inputs to the Shallow Zone, is not expected to cause average nitrate concentrations in the Shallow Zone to exceed a nitrate trigger of 75% of the applicable water quality objective.
Category 3 Degradation Below Trigger	The average nitrate concentration in the Shallow Zone is better than the applicable water quality objective. Estimated that discharge is more than de minimus,but will not cause the average nitrate concentration in the Shallow Zone to exceed a trigger of 75% of the applicable water quality objective over a 20-year planning horizon.
Category 4 Degradation Above Trigger	The average nitrate concentration in the Shallow Zone is better than the water quality objective. Though the discharge is reasonably expected to cause the average nitrate concentration in the Shallow Zone to exceed a trigger of 75% of the applicable water quality objective over a 20-year planning horizon, the average nitrate concentration in the Shallow Zone is expected to remain at or below the applicable water quality objective over the same 20-year planning horizon.
Category 5 Discharge Above Objective	Either: 1) The average nitrate concentration in the Shallow Zone is better than the applicable water quality objective, but the discharge may cause the average nitrate concentration in the Shallow Zone to exceed the water quality objective over a 20-year planning horizon; or 2) The average nitrate concentration in the Shallow Zone exceeds the applicable water quality objective and the discharge quality, as it reaches the Shallow Zone, also exceeds the applicable water quality objective.

5) Propose an Alternative Compliance Project *(If Applicable)*

If you seek the use of assimilative capacity above the trigger level of need an Exception, you must submit an Alternative Compliance Project. It must include the following:

- ☐ Identification of public water supply and domestic wells that exceed nitrate water quality objectives and that are within the discharge areas zone of contribution;
- ☐ A schedule, with identified milestones, for addressing those nitrate-related drinking water issues; and
- ☐ Identification of steps to be taken to meet the management goals of the Nitrate Control Program, which may be phased in over time.

B. Documentation needed to support selection of Management Zone Permitting Approach (Pathway B).

If you choose Pathway B, you need to participate in a Management Zone to ensure that all program deliverables and timelines are met. Please refer to cvsalts.info website for how to comply with requirements for Pathway B.

1) If you are participating in a Management Zone, submitting a NOI is optional since the Preliminary Management Zone Proposal (PMZP) will serve as the NOI.

Please provide the following information if you are listed in a Preliminary Management Zone Proposal (PMZP) (if available):

A. Name of Management Zone

B. Primary Contact

Name:			Phone Number:
Address:			
City:	County:	State	Zip Code:
Email Address:			

2) If you are not already listed in a PMZP and wishes to join one, you may check out the CV-SALTS Program website for Management Zone being proposed for your area and contact to join.

IV. 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 possibility of fine and imprisonment.

Print Name:	Title:
Signature:	Date:

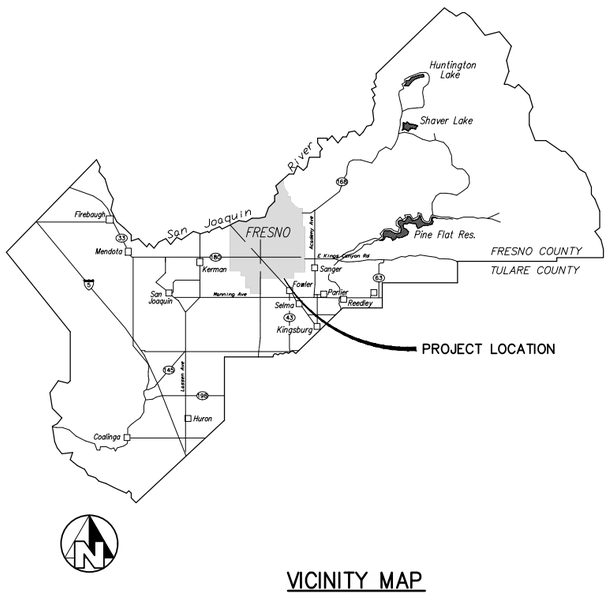
Appendix B

Malaga County Water District
Proposed Compliance Project

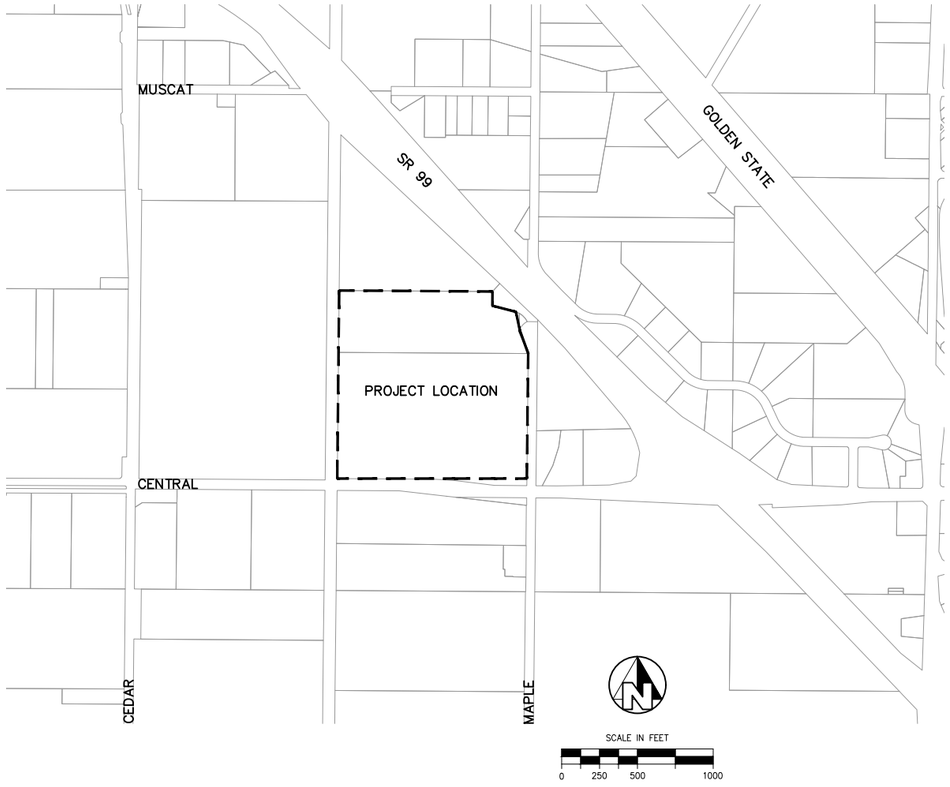
MALAGA COUNTY WATER DISTRICT

FRESNO COUNTY, CA

WWTP UPGRADE PROJECT
~~FOR RAS/WAS FLOWMETERS,~~ ~~DAF PUMP,~~ AIR PIPING



VICINITY MAP
NOT TO SCALE



SITE MAP

CONSULTING ENGINEERS AND LAND SURVEYORS OF CALIFORNIA

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL AND ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

SPECIAL NOTE

WHERE UNDERGROUND AND SURFACE STRUCTURES ARE SHOWN ON THE PLANS, THE LOCATIONS, DEPTH AND DIMENSIONS OF STRUCTURES ARE BELIEVED TO BE REASONABLY CORRECT, BUT ARE NOT GUARANTEED. SUCH STRUCTURES ARE SHOWN FOR THE INFORMATION OF THE CONTRACTOR, BUT INFORMATION SO GIVEN IS NOT TO BE CONSTRUED AS A REPRESENTATION THAT SUCH STRUCTURES WILL, IN ALL CASES, BE FOUND WHERE SHOWN, OR THAT THEY REPRESENT ALL OF THE STRUCTURES WHICH MAY BE ENCOUNTERED.

SITE SAFETY AND PROTECTION NOTES

THE DUTY OF THE ENGINEER, OWNER OR ITS AGENTS TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE AND THE UNDERTAKING OF INSPECTIONS OR THE GIVING OF INSTRUCTIONS AS AUTHORIZED HEREIN IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF THE ACTUAL CONSTRUCTION NOR MAKE THE ENGINEER, OWNER OR ITS AGENTS RESPONSIBLE FOR PROVIDING A SAFE PLACE FOR THE PERFORMANCE OF WORK BY THE CONTRACTOR, SUBCONTRACTORS, OR SUPPLIERS, OR FOR ACCESS, VISITS, USE, WORK, TRAVEL OR OCCUPANCY BY ANY PERSON.

THE CONTRACTOR SHALL HAVE AT THE WORK SITE, COPIES OR SUITABLE EXTRACTS OF CONSTRUCTION SAFETY ORDERS, ISSUED BY CAL-OSHA. HE SHALL COMPLY WITH PROVISIONS OF THESE AND ALL OTHER APPLICABLE LAWS, ORDINANCES AND REGULATIONS. THE CONTRACTOR MUST COMPLY WITH PROVISIONS OF THE SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION, PROMULGATED BY THE SECRETARY OF LABOR UNDER SECTION 107 OF THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT, AS SET FORTH IN TITLE 29 C.F.R.

TO PROTECT THE LIVES AND HEALTH OF HIS EMPLOYEES UNDER THE CONTRACT, THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT PROVISIONS OF THE "MANUAL OF ACCIDENT PREVENTION IN CONSTRUCTION" ISSUED BY THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC., AND SHALL MAINTAIN AN ACCURATE RECORD OF ALL CASES OF DEATH, OCCUPATIONAL DISEASE, AND INJURY REQUIRING MEDICAL ATTENTION OR CAUSING LOSS OF TIME FROM WORK, ARISING OUT OF AND IN THE COURSE OF EMPLOYMENT OR WORK UNDER THE CONTRACT.

THE CONTRACTOR ALONE SHALL BE RESPONSIBLE FOR THE SAFETY, EFFICIENCY, AND ADEQUACY OF HIS FACILITIES, APPLIANCES, AND METHODS AND FOR ANY DAMAGE, WHICH MAY RESULT FROM THEIR FAILURE OR THEIR IMPROPER CONSTRUCTION, MAINTENANCE OR OPERATION.

THE CONTRACTOR AGREES THAT IT SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, PROVOST & PRITCHARD ENGINEERING GROUP, INC., AND THEIR RESPECTIVE AGENTS HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF OWNER, ENGINEER, OR THEIR RESPECTIVE AGENTS.

THE OWNER AND ITS AGENTS' SITE RESPONSIBILITIES ARE LIMITED SOLELY TO THE ACTIVITIES OF THEIR EMPLOYEES ON SITE. THESE RESPONSIBILITIES SHALL NOT BE INFERRED BY ANY PARTY TO MEAN THAT THE OWNER OR ITS AGENTS HAVE RESPONSIBILITY FOR SITE SAFETY. SAFETY IN, ON, OR ABOUT THE SITE IS THE SOLE AND EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR ALONE. THE CONTRACTOR'S METHODS OF WORK PERFORMANCE, SUPERINTENDENCE AND THE CONTRACTOR'S EMPLOYEES, AND SEQUENCING OF CONSTRUCTION ARE ALSO THE SOLE AND EXCLUSIVE RESPONSIBILITIES OF THE CONTRACTOR ALONE.

APPROVALS

MALAGA COUNTY WATER DISTRICT DATE

WARNING
POWER LINES OVERHEAD

811 Know what's below. Call before you dig.

GENERAL LEGEND

NOTE: ALL LEGEND ITEMS NOT IDENTIFIED AS PROPOSED FACILITIES INDICATE EXISTING FACILITIES

AE	ANALYTICAL ELEMENT
BFP	BACK FLOW PREVENTER
BO	BOLLARD
CIP	CAST-IN-PLACE CONCRETE PIPE
CNS	COMPACTED NATIVE SOIL
CO	SEWER CLEAN OUT
DI	STORM DRAIN INLET
DO	DISSOLVED OXYGEN
DS	DIGESTED SLUDGE
DW	DRIVEWAY
EC	ELECTROCONDUCTIVITY
EM	ELECTRIC METER
EPB	ELECTRIC PULL BOX
FL	FLOW LINE
FM	FLOWMETER
F&I	FURNISH & INSTALL
HORIZ	HORIZONTAL
HP	HINGE POINT
INF	INFLUENT
MCC	MOTOR CONTROL CENTER
MCWD	MALAGA COUNTY WATER DISTRICT
MH	MANHOLE
MJ	MECHANICAL JOINT
NIC	NOT IN CONTRACT
OCEW	ON CENTER EACH WAY
OH	OVERHEAD
PB	PULL BOX
PL	PROPERTY LINE
PP	POWER POLE
RAS	RETURN ACTIVATED SLUDGE
SDB	SLUDGE DRYING BED
SE	SECONDARY EFFLUENT
SFM	SLUDGE FLOW METER
SLP	SLUDGE PUMP
SND	SUPERNATANT RETURN
STP	STAND PIPE
T	TEMPORARY SURVEY CONTROL
TBM	TEMPORARY BENCHMARK
TS	THICKENED SLUDGE
TSB	TELEPHONE SPLICE BOX
UE	UNDERGROUND ELECTRIC
UG	UNDERGROUND
WAS	WASTE ACTIVATED SLUDGE
WM	WATER METER
WS	WATER SERVICE
WV	WATER VALVE

SIGN
SEWER MANHOLE (S)
WATER METER (WM)
MONUMENT (SURFACE)
EMBANKMENT
FLOW DIRECTION
EXISTING PAVEMENT
ELECTRIC LINE (AERIAL)
GAS LINE, SIZE AS NOTED (2")
STORM DRAIN LINE, SIZE AS NOTED (18")
SANITARY SEWER LINE, SIZE AS NOTED (8")
TELEPHONE LINE (UNDERGROUND)
TELEPHONE LINE (AERIAL)
WATER LINE, SIZE AS NOTED (8")
CHAIN LINK FENCE
EDGE OF A.C. PAVEMENT

SHEET INDEX

GENERAL NOTES

1. MALAGA COUNTY WATER DISTRICT (559-485-7353) SHALL BE CONTACTED AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK ON OR NEAR EXISTING DISTRICT FACILITIES.
2. USED MATERIAL, REJECTS, MISFITS, OR SECONDS, ETC. ARE NOT ACCEPTABLE FOR USE ON MALAGA COUNTY WATER DISTRICT FACILITIES.
3. ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THESE PLANS, PROJECT SPECIFICATIONS AND MALAGA COUNTY WATER DISTRICT SPECIFICATIONS.
4. CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING FACILITIES PRIOR TO COMMENCING WORK. CALL UNDERGROUND SERVICE ALERT (USA) AT 1-800-227-2600. CONTRACTOR SHALL MAKE ENGINEER AWARE OF ANY DISCREPANCIES.
5. ALL STEEL PIPE AND FITTINGS SHALL BE FURNISHED WITH A SHOP APPLIED HIGH SOLIDS EPOXY COATING ON THE INTERIOR AND EXTERIOR, UNLESS OTHERWISE INDICATED. ALL OTHER EXPOSED STEEL SHALL BE PAINTED WITH A PRE-TREATMENT PRIMER, AN UNDERCOAT AND A FINAL COAT OF PAINT IN ACCORDANCE WITH MALAGA COUNTY WATER DISTRICT SPECIFICATIONS.
6. ALL NUTS, BOLTS, AND WASHERS USED TO SECURE UNDERGROUND FITTINGS SHALL BE STAINLESS STEEL. AFTER INSTALLATION, ALL STEEL HARDWARE SHALL BE COATED WITH A RUST PREVENTATIVE, WRAPPED WITH 4 MIL POLYETHYLENE SHEETING, AND SECURE WITH PVC TAPE.
7. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE HEALTH AND SAFETY LAWS OF THE STATE OF CALIFORNIA AND CAL/OSHA STANDARDS.
8. CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ALL PIPELINE CRACKS, WHICH DEVELOP DURING CONSTRUCTION OF IMPROVEMENTS AFFECTING EXISTING FACILITIES.
9. ALL EXCESS MATERIAL AND/OR DEBRIS SHALL BE REMOVED UPON COMPLETION OF INSTALLATION.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE DUST CONTROL AT ALL TIMES.

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER JERRY V. TENG No. 68783 CIVIL STATE OF CALIFORNIA

DATE SIGNED:

WWTP UPGRADE PROJECT FOR RAS/WAS FLOWMETERS, DAF PUMP, AIR PIPING
MALAGA COUNTY WATER DISTRICT
FRESNO COUNTY, CA

GENERAL

COVER SHEET

PROVOST & PRITCHARD
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER: ZT	
LICENSE NO: 68783	
DRAFTED BY: PPI	CHECKED BY: MGT
DATE: 09-06-2016	
JOB NO: 0105715002	
PROJECT NO: 0105715002	
PHASE: PHASE	

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 1
1 OF 16

10/31/2016 10:03 AM G:\Malaga CWD - 1057\0571500Z-WAS Flowmeters\DWG\SHEET\GENERAL\ COVER SHEET.dwg -Jerry Teng

WARNING
POWER LINES OVERHEAD

811
Know what's below.
Call before you dig.

BLOWER PIPING MODIFICATIONS (SHEETS 10 & 11)

F&I EC METER 1/5

FURNISH AND INSTALL A BAFFLE, MIXER, RECIRCULATION PUMP, AND ASSOCIATED CONTROLS IN AERATION BASINS 1 AND 2.

DAF EQUIPMENT AREA (SHEETS 8 & 9)

FLOW METERS 6"PS (SHEETS 6 & 7)

WAS VALVE 622 (SHEET 6)

WAS VALVE 623 (SHEET 6)

SLUDGE DIGESTER PENETRATION (SHEET 6)

TM-320 TRANSMITTANCE MONITOR

(NOTE ALIGNMENT TO BE SOUTH OF EFFLUENT LINES)

SCALE IN FEET
0 5 10 20

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER ★ ZHENG YANG ★ No. 68783 CIVIL ★ STATE OF CALIFORNIA

DATE SIGNED: ____

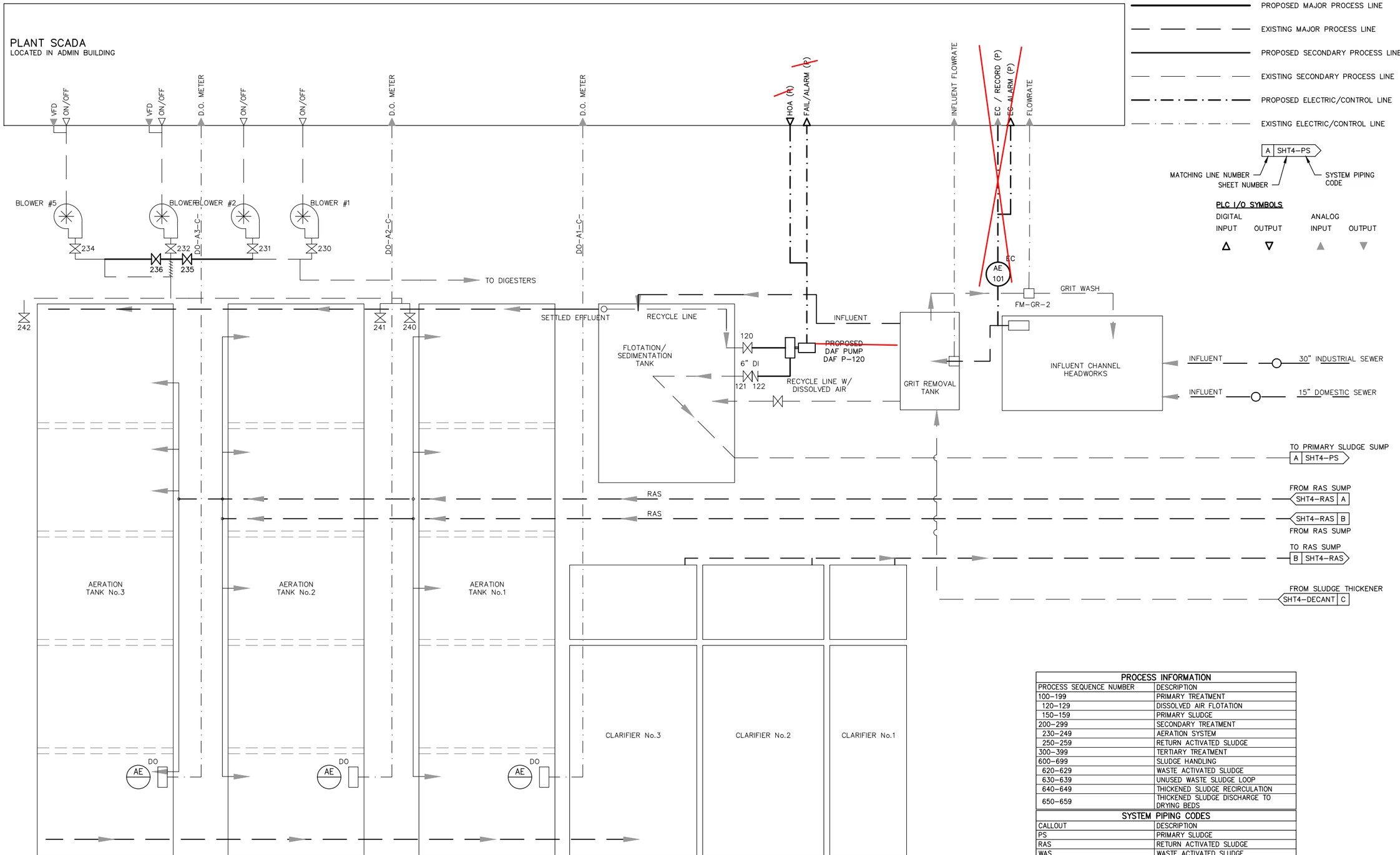
WWTP UPGRADE PROJECT FOR RAS/WAS FLOWMETERS, DAF PUMP, AIR PIPING
MALAGA COUNTY WATER DISTRICT
FRESNO COUNTY, CA
CIVIL

WWTP SITE PLAN

PROVOST & PRITCHARD
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER: ZT
LICENSE NO: 68783
DRAFTED BY: PPI
CHECKED BY: MGT
DATE: 09-06-2016
JOB NO: 0105715002
PROJECT NO: 0105715002
PHASE: PHASE
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 2
2 OF 16

10/31/2016 10:04 AM G:\Malaga CWD - 1057\105715002-WAS Flowmeters\DWG\SHEET\2 WWTP SITE PLAN.dwg -Jerry Teng



LEGEND

- PROPOSED MAJOR PROCESS LINE
- EXISTING MAJOR PROCESS LINE
- PROPOSED SECONDARY PROCESS LINE
- EXISTING SECONDARY PROCESS LINE
- PROPOSED ELECTRIC/CONTROL LINE
- EXISTING ELECTRIC/CONTROL LINE

A | SHT4-PS
MATCHING LINE NUMBER / SHEET NUMBER — SYSTEM PIPING CODE

PLC I/O SYMBOLS

DIGITAL		ANALOG	
INPUT	OUTPUT	INPUT	OUTPUT
△	▽	▲	▼

PROCESS INFORMATION	
PROCESS SEQUENCE NUMBER	DESCRIPTION
100–199	PRIMARY TREATMENT
120–129	DISSOLVED AIR FLOTATION
150–159	PRIMARY SLUDGE
200–299	SECONDARY TREATMENT
230–249	AERATION SYSTEM
250–259	RETURN ACTIVATED SLUDGE
300–399	TERTIARY TREATMENT
600–699	SLUDGE HANDLING
620–629	WASTE ACTIVATED SLUDGE
630–639	UNUSED WASTE SLUDGE LOOP
640–649	THICKENED SLUDGE RECIRCULATION
650–659	THICKENED SLUDGE DISCHARGE TO DRYING BEDS

SYSTEM PIPING CODES	
CALLOUT	DESCRIPTION
PS	PRIMARY SLUDGE
RAS	RETURN ACTIVATED SLUDGE
WAS	WASTE ACTIVATED SLUDGE
TS	THICKENED SLUDGE
DCT	DECANT FLOW
DAF	DISSOLVED AIR FLOTATION
GR	GRIT
SPB	DRYING BEDS

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — JERRY V. TENG — No. 68783 — CIVIL — STATE OF CALIFORNIA

DATE SIGNED:

WWTP UPGRADE PROJECT FOR RAS/WAS FLOWMETERS, DAF PUMP, AIR PIPING
MALAGA COUNTY WATER DISTRICT
FRESNO COUNTY, CA

CIVIL

OVERALL P&ID

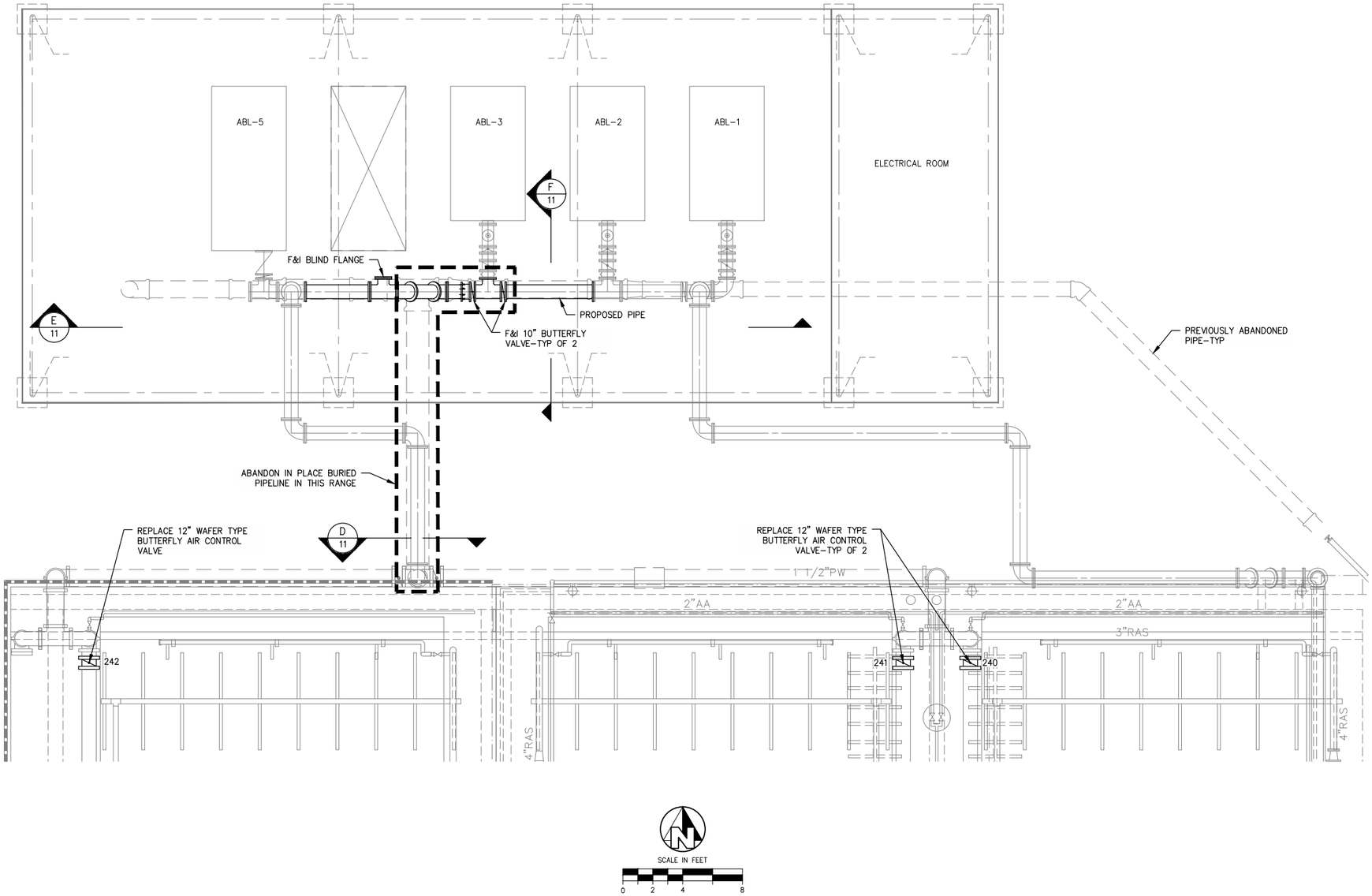
PROVOST & PRITCHARD
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER: ZT
LICENSE NO: 68783
DRAFTED BY: PPI
CHECKED BY: MGT
DATE: 09-06-2016
JOB NO: 0105715002
PROJECT NO: 0105715002
PHASE: PHASE

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 3

10/31/2016 10:04 AM G:\Malaga CWD - 1057\105715002-WAS Flowmeters\DWG\SHEET\3 OVERALL P&ID.dwg -Jerry Teng



SCALE IN FEET

0 2 4 8

WARNING
POWER LINES OVERHEAD

811 Know what's below. Call before you dig.

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER ZT TENG No. 68783 CIVIL STATE OF CALIFORNIA

DATE SIGNED: _____

WWTP UPGRADE PROJECT FOR RAS/WAS FLOWMETERS, DAF PUMP, AIR PIPING
MALAGA COUNTY WATER DISTRICT
FRESNO COUNTY, CA
CIVIL

BLOWER PIPING PLAN

PROVOST & PRITCHARD
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER: ZT
LICENSE NO: 68783

DRAFTED BY:	CHECKED BY:
PPI	MGT

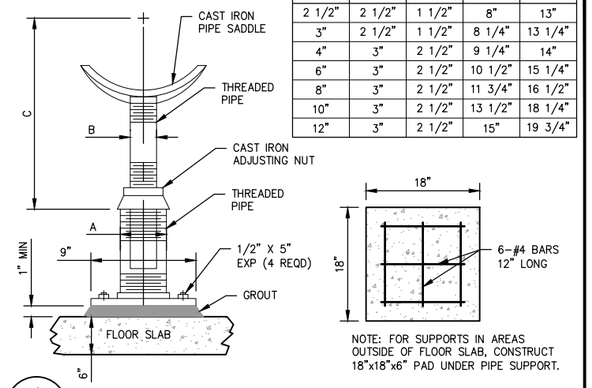
DATE: 09-06-2016
JOB NO: 0105715002
PROJECT NO: 0105715002
PHASE: PHASE

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 10

10 OF 16

10/31/2016 10:07 AM G:\Malaga CWD - 1057\105715002-WAS Flowmeters\DWG\SHEET\10 BLOWER PIPING PLAN.dwg -Jerry Teng

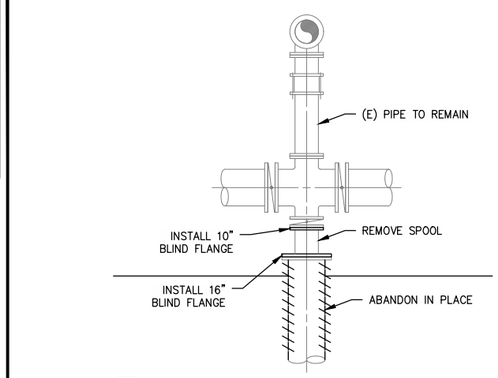


DIMENSIONS				
PIPE SIZE	"A"	"B"	"C" MIN	"C" MAX
2 1/2"	2 1/2"	1 1/2"	8"	13"
3"	2 1/2"	1 1/2"	8 1/4"	13 1/4"
4"	3"	2 1/2"	9 1/4"	14"
6"	3"	2 1/2"	10 1/2"	15 1/4"
8"	3"	2 1/2"	11 3/4"	16 1/2"
10"	3"	2 1/2"	13 1/2"	18 1/4"
12"	3"	2 1/2"	15"	19 3/4"

NOTE: FOR SUPPORTS IN AREAS OUTSIDE OF FLOOR SLAB, CONSTRUCT 18"x18"x6" PAD UNDER PIPE SUPPORT.

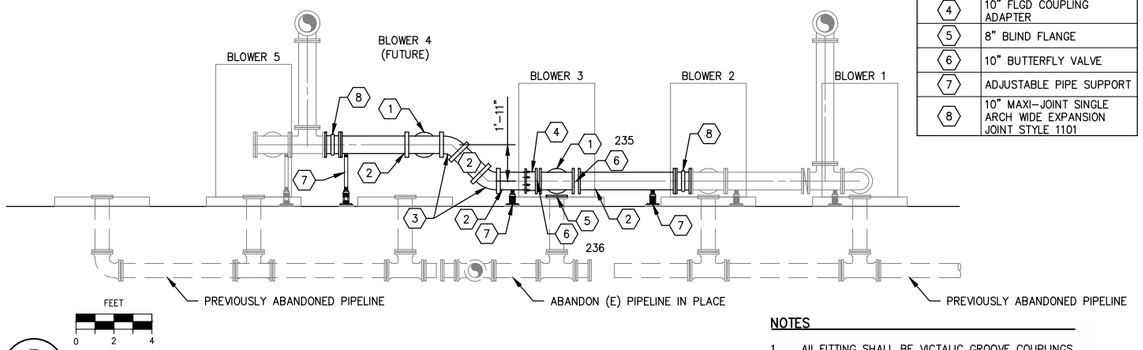
1/11

PIPE SUPPORT



D/11

SECTION D



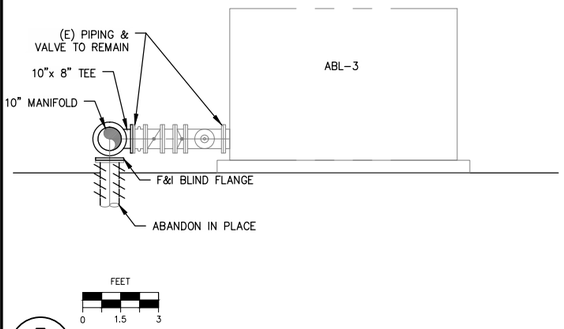
EQUIPMENT LIST	
CALLOUT	DESCRIPTION
1	10"x 8" FLGD DI REDUCING TEE
2	10" DI SPOOL-FIELD FIT
3	10" FLGD 45° BEND
4	10" FLGD COUPLING ADAPTER
5	8" BLIND FLANGE
6	10" BUTTERFLY VALVE
7	ADJUSTABLE PIPE SUPPORT
8	10" MAXI-JOINT SINGLE ARCH WIDE EXPANSION JOINT STYLE 1101

NOTES

1. All fitting shall be victalic groove couplings

E/11

SECTION E



F/11

SECTION F

AIR VALVES

BLOWER ROOM AIR PIPING

BLOWER ROOM AIR PIPING

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER YINBO FENG No. 68783 CIVIL STATE OF CALIFORNIA

DATE SIGNED: _____

WWTP UPGRADE PROJECT FOR RAS/WAS
FLOWMETERS, DAF PUMP, AIR PIPING
MALAGA COUNTY WATER DISTRICT
FRESNO COUNTY, CA
CIVIL

BLOWER PIPING SECTIONS AND DETAILS

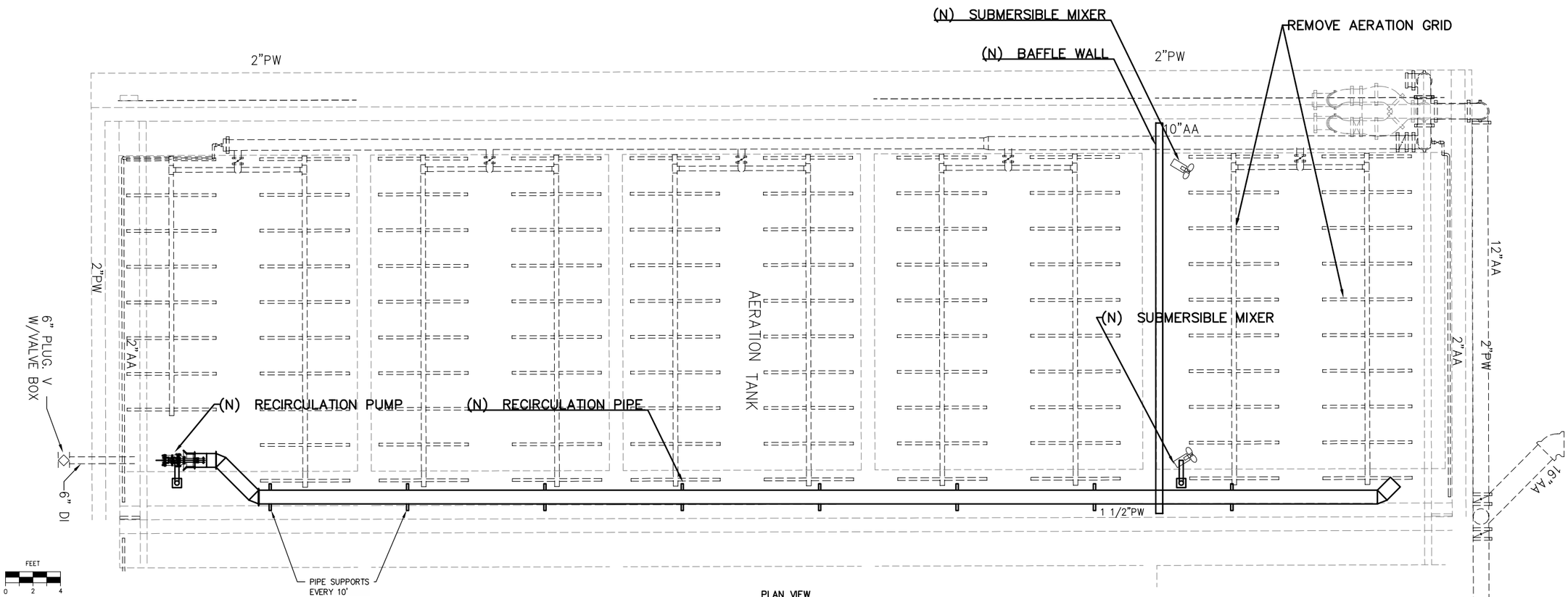
PROVOST & PRITCHARD
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER: ZT
LICENSE NO: 68783
DRAFTED BY: PPI
CHECKED BY: MGT
DATE: 09-06-2016
JOB NO: 0105715002
PROJECT NO: 0105715002
PHASE: PHASE

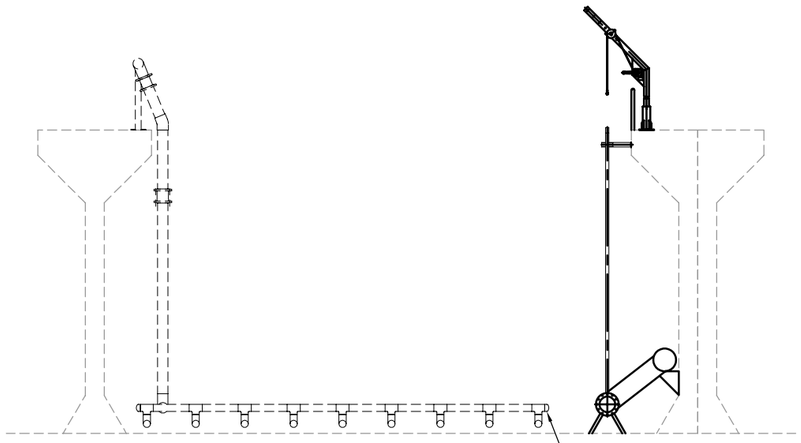
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 11
11 OF 16

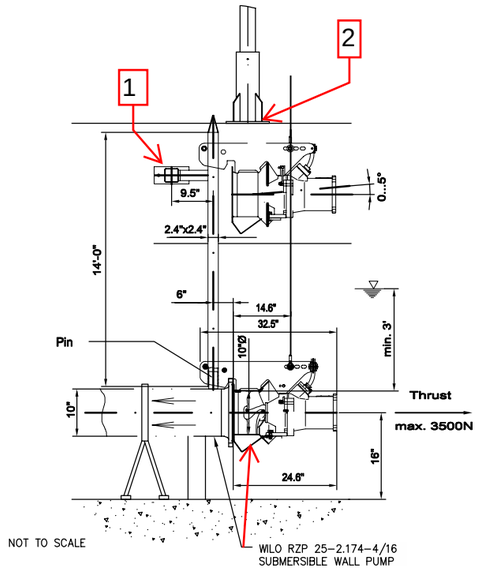
10/31/2016 10:07 AM G:\Malaga CWD - 1057\105715002-WAS Flowmeters\DWG\SHEET\11 BLOWER PIPING SECTIONS AND DETAILS.dwg -Jerry Teng



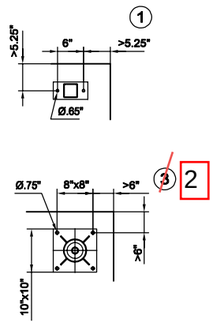
PLAN VIEW

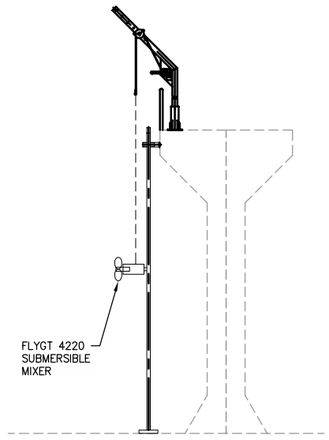


CROSS SECTION



NOT TO SCALE





DESIGN ENGINEER: ####	
LICENSE NO: ####	
DRAFTED BY: ####	CHECKED BY: ####
DATE: ####	
JOB NO: ####	
PROJECT NO: ####	
PHASE: ####	

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET #####

OF

####

4/4/2019 9:13 AM G:\Malaga CWD - 1057\1057G001_Ongoing\400\Nitrogen Reduction\Exhibit MLE NdN.dwg -Mike Brosseau