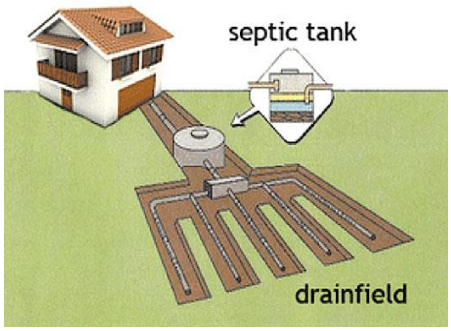
MONTEREY PARK TRACT
COMMUNITY SERVICES DISTRICT



SEPTIC TO SEWER SYSTEM FEASIBILITY STUDY

September 2021

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ABBREVIATIONS

ACS	American Community Survey
Bgs	Below Ground Surface
BOD_5	Biochemical Oxygen Demand
CCR	California Code of Regulations
CGC	California Governing Code
City	City of Ceres
DDW	Division of Drinking Water
DER	Department of Environmental Resources
DFA	Division of Financial Assistance
DWSRF	Drinking Water State Revolving Fund
eAR	electronic Annual Report
FEMA	Federal Emergency Management Agency
Gal	Gallons
gpcd	Gallons per Capita Day
gpd	Gallons per Day
gpm	Gallons per Minute
HP	Horsepower
kWh	Kilowatt Hour
LAFCO	Local Agency Formation Commission
MCL	Maximum Contaminant Level
MDD	Maximum Daily Demand
MHI	Median Household Income
MND	Mitigated Negative Declaration
MPTCSD	Monterey Park Tract Community Service District
MPT	Monterey Park Tract
O&M	Operation and Maintenance

OWTS	Onsite Wastewater Treatment System
RWQCB	Regional Water Quality Control Board
SCWS	Small Community Water System
SDAC	Severely Disadvantaged Community
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
TMF	Technical, Managerial, and Financial
US EPA	United States Environmental Protection Agency
WWTP	Wastewater Treatment Plant
WDRs	Waste Discharge Requirements
WSA	Water Service Agreement
Well 1	North Well
Well 2	South Well

CHAPTER 1 INTRODUCTION

1.1. Purpose of Study

The purpose of this Septic to Sewer Feasibility Study (Study) is to evaluate feasible alternatives to improve the individual on-site septic systems currently being used at Monterey Park Tract (MPTCSD). This Study is intended to determine the most feasible alternative to collect, treat and dispose of wastewater generated within MPTCSD.

This Study includes an overview of the existing on-site wastewater treatment systems (OWTS) and an evaluation of five feasible alternatives. The Study also includes opinions of probable construction cost and operation and maintenance (O&M) costs for each alternative.

1.2. Background

MPTCSD is a small rural community located approximately 5 miles southerly of the City of Ceres in Stanislaus County. More specifically, MPTCSD is located approximately one mile west of the intersection of Crows Landing Road and West Monte Vista Avenue. Figure 1-1 contains an aerial photo showing the service area of the MPTCSD in relation to the City of Ceres.

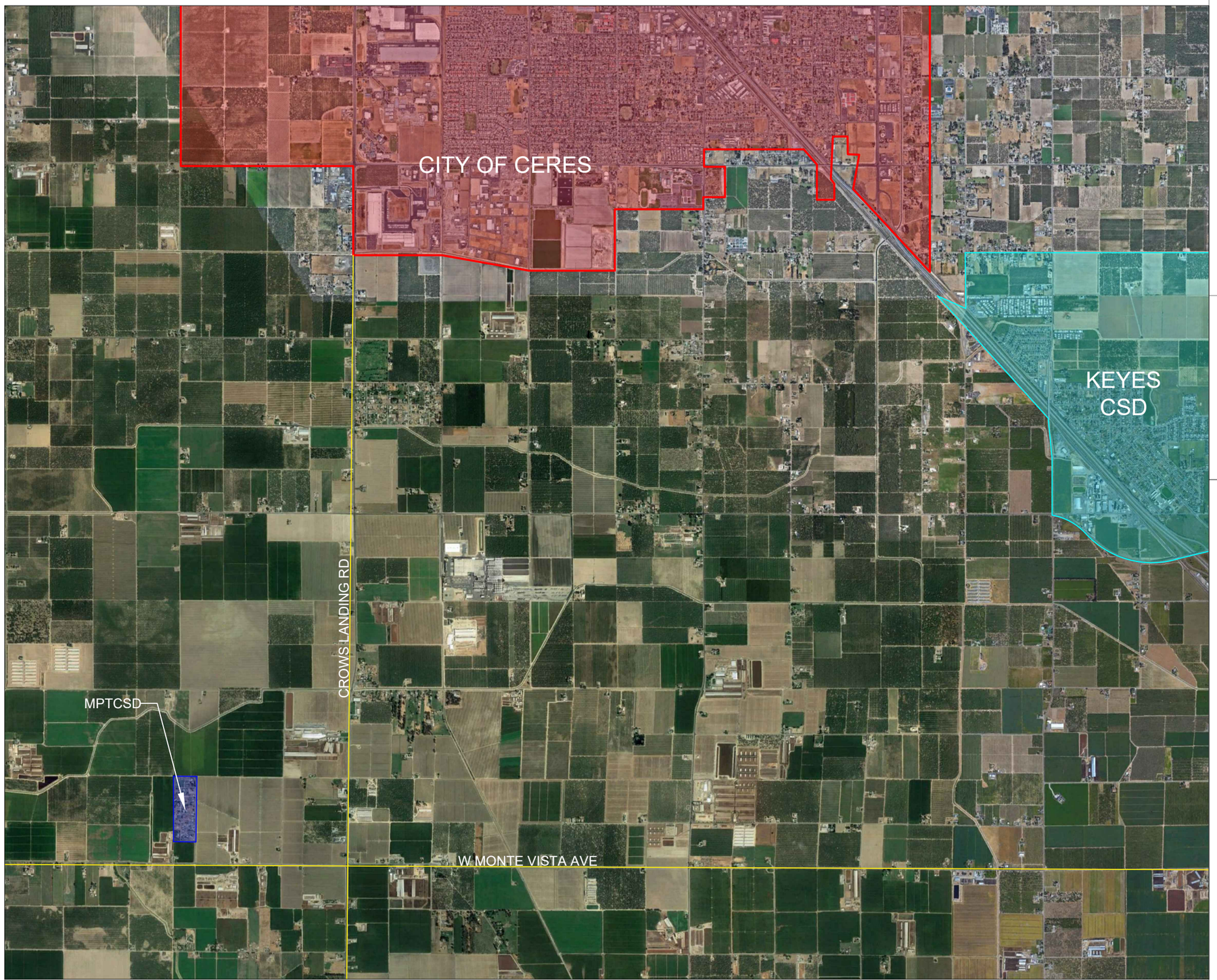
MPTCSD currently only provides water service to the residence of the MPTCSD. MPTCSD was enabled by the California Governing Code (CGC) 61000 and is the responsible agency with the authority to provide services to residents within the boundaries of the Community Services District. This authority was given by consent of registered voters in the community and formed by the Stanislaus County Board of Supervisors in 1984.

MPTCSD owns and operates a community's water system which presently serves 49 residential households, 4 farming households, a church and a community center for a total of 55 active water service connections. Farming households are classified as households that are used to primarily grow crops and do not regularly have residents or permanent restroom facilities. The estimated population of the community is approximately 133 people according to the 2010 census.

MPTCSD is primarily comprised of lots created by the Foy and Morris subdivision. The average lot has a frontage of 53 feet and a depth of 190 feet (just under a quarter of an acre). MPT's land use is classified as rural-residential with surrounding land uses including dairies, a hog farm and agricultural land in field or row crops.

Individual septic tanks and leach fields are used for sewer service and there are growing concerns about groundwater contamination caused by the elevated density of septic systems. The State Water Resources Control Board adopted the Onsite Wastewater Treatment Systems (OWTS) Policy in July 2012. The OWTS Policy established new requirements that affect the regulation and management of septic systems. The requirements of the OWTS policy are expected to increase the long-term costs of operating and maintaining individual septic systems.

MPTCSD is considered a Severely Disadvantaged Community (SDAC). According to the 2010-2014 U.S. Census American Community Survey, MPTCSD Median Household Income (MHI) was $27,468.



MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

- CITY OF CERES SERVICE AREA BOUNDARY
- KEYES CSD SERVICE AREA BOUNDARY
- MPTCSD SERVICE AREA BOUNDARY
- MAJOR STREETS

NORTH

SCALE IN FEET

0 3,000 FT

FIGURE 1-1
MPTCSD SERVICE AREA

MPTCSD is conducting this study to evaluate the feasibility of providing a community sewer collection and treatment system to all parcels in the service area. The goal is to protect the underlying groundwater and to provide a sustainable and affordable way to provide sewer service to the community. Several Alternatives are further investigated in this Study. The most feasible Alternatives being considered are:

1. Alternative I: Septic systems upgrade,
2. Alternative II: Wastewater consolidation with the City of Ceres,
3. Alternative III: Community sewer collection system with a centralized wastewater treatment facility,
4. Alternative IV: Wastewater consolidation with the Keyes Community Services District, and
5. Alternative V: Wastewater consolidation with the Stanislaus County Public Safety Center

This planning study will conduct a feasibility analysis of potential sewer system alternatives and determine any improvements required to provide sewer service to the community under a preferred alternative.

CHAPTER 2 EXISTING FACILITIES

2.1. Study Area Location and Setting

MPTCSD is an unincorporated community located approximately 5 miles south of the City of Ceres. MPTCSD lies between the larger cities of Modesto, approximately 8 miles to the north, and Turlock, approximately 9.5 miles to the southeast. The community includes four streets that create a loop around the community. The four streets are labeled as Foy Avenue, La Siesta Avenue, Monterey Avenue and Durango Street. Figure 2-1 displays the layout of MPT.

MPTCSD is largely bounded by agricultural uses and agricultural residences. The Trinkler Dairy and the American Hog Farm are located northeast and southeast of the project area, respectively. There are two other dairies located around the perimeter of MPT. One is adjacent to the northern most parcel and the other is adjacent to the southwest corner of the MPT. Otherwise, the community is dominated by residential development and agricultural uses. MPTCSD has a church, and a community center for its residents but does not include a school.

The MPTCSD service area and vicinity does not contain any watercourses, ponds, springs, or elevated ground such as ridges and knolls that could be considered potentially archeologically or historically sensitive. There is also no evidence of endangered plants or animals within the MPTCSD service area.

Surface geology in the study area is generally flat. The study area soil consists mostly of silty sand to depths of 3 and 13 feet underlain by layers of poorly graded sand, poorly graded sand with silt, silty sand, and sandy silt extending to 51.5 feet below ground surface. The granular soils generally have a relative consistency of medium dense to very dense, while the fine-grained soils generally have a relative consistency of very stiff to hard. Soils such as gravel and sand are ideal for leach fields because they allow the wastewater to seep through the soil more rapidly than clay.

Topography in the MPTCSD service area gently slopes downward from north to south with no significant topographical landmarks. The change in elevation from the northernmost point to the southernmost point of MPTCSD is approximately 5 ft. The MPTCSD service area lies within a Federal Emergency Management Agency (FEMA) designated flood plain. More specifically, the MPTCSD lies within a Zone X flood designation (Map Number 06099C0545E, dated September 26, 2008), indicating areas determined to be outside the 0.2 percent annual chance (500-year) floodplain.

MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

MPTCSD SERVICE AREA BOUNDARY

NORTH

SCALE IN FEET

0 300 FT

FIGURE 2-1
MONTEREY PARK TRACT
COMMUNITY LAYOUT

2.2. Population Growth

According to the 2010 Census, the MPTCSD had a population of 133 people. The estimated population of the region as of 2018 was 186 people, according to the Division of Drinking Water. This represents an average annual growth rate of approximately 4.28 percent from the years of 2010 to 2018. MPTCSD is a small community where expansion is not expected to exceed a population of 200 people. For this reason, this study has capped the population of MPTCSD to 200 people. Table 2-1 provides a population projection for the MPTCSD through 2040.

Table 2-1 MPTCSD Population Projection

Year	Population
2010	133
2018	186
2020	200
2025	200
2030	200
2035	200
2040	200

2.3. Sewer & Septic

Properties within MPTCSD rely on individual septic systems as the primary treatment and disposal method for their wastewater. Wastewater is disposed of in individual leach fields or seepage pits where it percolates through the soil. There is no sanitary sewer collection system or wastewater treatment facility in the community, or immediately adjacent to it.

The current individual septic tank/leach field system approach to providing wastewater treatment and disposal service presents a difficult situation for MPTCSD residents, most of whom are economically disadvantaged. Staying with the individual septic tank/leach field systems keeps near-term costs low but may have costly changes in the future due to increasing stringent regulations. Additionally, there may be significant future costs associated with staying with individual septic tank/leach field systems: individually replacing systems failing simply from age and decay or replacing systems in mass because of groundwater contamination and/or changes in regulations. Moving away from individual septic tank/leach field systems is infeasible economically for the community without major grant funding.

2.4. Collection System

MPTCSD does not have a community sewer collection system. MPTCSD residents utilize individual parcel septic tanks and on-site leach fields or seepage pits as described above. Therefore, there is no existing collection system for the area other than the on-site drains from structures to the septic tank locations.

2.5. Wastewater Treatment and Effluent Disposal Facilities

MPTCSD utilizes individual septic tanks and on-site leach fields/seepage pits. The septic tanks facilitate anaerobic breakdown of organics in the sewage and accumulate solids in the septic tank that must be

periodically removed and disposed of at a permitted septage receiving facility. Common durations between septic tank pumping range from three years to seven years, with an approximate five-year average.

Modern septic system standards call for septic tanks to be sized based on the building service and anticipated sewage load. For residential homes, tanks are most often sized based on the number of bedrooms in the house, with the expectation that bedrooms reflect the population and wastewater generation that may be produced and discharged to the septic system. Table 2-2 displays the minimum septic tank capacity required for residential homes in California, according to the 2016 California Plumbing Code, based on the number of rooms in the residence.

Table 2-2 Capacity of Septic Tanks in California

Single Family Dwellings	Multiple Dwellings Units or Apartments	Minimum Septic Tank Capacity
Number of Bedrooms	Number of Bedrooms	Gallons
1 or 2	-	750
3	-	1000
4	2 units	1200
5 or 6	3	1500
-	4	2000
-	5	2250
-	6	2500
-	7	2750
-	8	3000
-	9	3250
-	10	3500

The sizes of the existing septic tanks in MPTCSD are unknown and probably vary, but it is known that many of them have not been replaced/repaired since the community was constructed in 1984. Thirty-five years ago, it was common to install 500- to 800-gallon septic tanks and it is therefore possible that the existing MPTCSD septic tanks do not meet current design standards.

Leach fields are sized based on the results of soil percolation, soil mantle data (water percolation rates into the soil and the geomorphology of the near surface soils) and the expected flow produced per residence. For the purpose of this study, the wastewater flows produced from each residence will be estimated using the population of the community and a wastewater generation factor of 100 gallons per capita day (gpcd). Table 2-3 shows the wastewater production for the MPTCSD through the year 2040.

Table 2-3 Projected Wastewater Production

	2010	2020	2025	2030	2035	2040
Projected Service Area Population	133	200	200	200	200	200
Projected Wastewater Production (gpd)	13,300	20,000	20,000	20,000	20,000	20,000

Details of the percolation, mantle data, and the existing leach fields for the MPTCSD are unknown as of the writing of this report. As the criteria for leach fields/seepage pits have become more stringent over time, it is possible that some of the existing leach fields do not meet current design criteria.

2.6. Condition of Existing Wastewater Facilities

A parcel-specific survey of the septic tank conditions was conducted, and the findings can be found in Appendix A of this study. The survey received a 60 percent response rate from the residents of the MPTCSD. The conditions of the existing individual septic tanks and leach fields/seepage pits are unknown at this time because they must be individually dug up and examined. While there are no known problems manifesting in the MPTCSD septic systems, some of the existing facilities could be nearing the end of their useful life or may have sizing deficiencies. Concrete tanks could be experiencing internal or external corrosion, there could be pipe connection leaks or breaks, and the leach fields could be binding the soils. These conditions could result in degradation or contamination of groundwater over time or surfacing of septic system effluent. It should be noted that only 12.5 percent of the responders to the septic tank survey have reported problems with their individual parcel septic tank/leach systems.

2.7. Existing Potable Water Facilities

MPTCSD owns and operates the community's water system which currently serves single family residential households, farm households, a church, and a community center for a total of 55 active water service connections.

MPTCSD water supply previously consisted of two groundwater wells: the north well (Well 1) or primary well, and the south well (Well 2) or secondary well. The water produced by the wells contained high nitrates, arsenic, manganese, and Total Dissolved Solids (TDS). In order to address water quality issues, in January of 2015, the Stanislaus County Board of Supervisors approved a Water Service Agreement (WSA) between Stanislaus County, the City of Ceres, and MPTCSD. As part of the agreement, the City of Ceres would provide potable water to MPTCSD. MPTCSD would be responsible for improvements and maintenance and operation.

Since 2017, the City of Ceres supplies up to 60,000 gallons of water per day at a rate no greater than 41 gallons per minute through a water delivery system consisting of underground pipes, valves, pumps, and metering equipment. The water delivery system connects to the City of Ceres's water system at a water main on Crows Landing Road approximately one-half mile south of Service Road and extend approximately 4.5 miles to the MPTCSD's delivery system.

As part of the connection Well 1 and 2 were abandoned and sealed off. The new storage tank is located on two parcels on Monterey Avenue within MPTCSD's service area and receives potable water from the City.

2.8. Operation Management of Existing Facilities

MPTCSD receives potable water from the City of Ceres. MPTCSD owns and operates the community's water system and is responsible for providing water service to the community. Because there is presently no community wastewater collection, treatment, or disposal system, sewer service is not currently provided by MPTCSD. The existing septic systems are private and their service, mostly periodic septic pumping, is provided by property owners or their designees. Any communitywide wastewater collection and treatment facilities will be provided by MPTCSD. If installed, MPTCSD's services would be expanded to also maintain and operate the sewer facilities.

2.9. Financing Status of Existing Facilities

MPTCSD's source of revenue is derived from connection fees and monthly water service fees. In 2012, MPTCSD secured a $2.2 million Prop 84 grant to address water quality issues. The grant helped fund the construction of the water line from the City of Ceres to MPTCSD and pay for connection fees.

To support the City of Ceres rate structure MPTCSD conducted a Prop 218 ballot procedure to increase water rates. The vote passed in May of 2012 and new rates were implemented in July that year. The new rate structure is aligned with anticipated rate increases as projected by the City of Ceres. Table 2-4 displays the current average water rates structure for the MPTCSD.

Table 2-4 MPTCSD Water Rates

Active Connections	Inactive Connections
$93.14	$69.70

As part of the WSA between Stanislaus County, the City, and the MPTCSD, MPTCSD had to deposit a sum of $75,000 into a reserve account upon completion of the connection to the City of Ceres. The purpose of the reserve account was to ensure that the City had sufficient funds to cover MPTCSD water service billings on a monthly basis. The $75,000 provides approximately 2.5 years of reserve utility billing.

The WSA also states that if for any reason MPTCSD is unable to meet the obligations described in the WSA, the County agrees to take formal action to assume all obligations of MPTCSD in order to provide continued water service to the residents of Monterey Park Tract. After a 15-year term, if the MPTCSD shows fiscal solvency, the obligation of the County may be reduced.

CHAPTER 3 NEED FOR THE PROJECT

3.1. Project Need

This section describes the need for improvements to MPT's current sewer handling method. The ultimate goal is to provide MPTCSD with sewer collection, treatment and disposal facilities that protect public health, preserve groundwater resources, prevent nuisance odors and risks from septic tank failures, preserve the environment, and foster community prosperity in a manner affordable for the severely disadvantaged MPT.

The need for this project is driven by several factors:

1. Existing septic systems are over 35 years old.
2. With the smaller lot sizes, there may be insufficient space for a new septic system within the existing lot, if the existing leach/seepage facilities fail.
3. Eliminate the potential for community exposure to surfacing septic system effluent.
4. Reduce the potential for groundwater degradation. Possible future groundwater supply to augment high water supply costs from the City of Ceres.
5. Compliance with Stanislaus County LAMP and the OWTS Policy.

These factors can affect the health, sanitation, security, environment, and community prosperity for the following reasons:

1. Inefficient septic tank leaching/seeping can result in surfacing of septic tank effluent, which can be a health, safety, and environmental hazard.
2. Old septic systems are subject to failure due to corrosion, pipe cracking, and clogs, which can result in surfacing of sewage or potential contamination of groundwater, which would be detrimental to the public health, security, and prosperity of the community.
3. Small individual lots can have insufficient space to replace on-site systems to newer accepted design standards when the old systems ultimately fail.
4. Reliance on on-site septic systems limits the ability of the community to attract higher density residential developments. This lack of growth may affect the economic security and long-term prosperity of the community.

CHAPTER 4 ALTERNATIVES CONSIDERED

4.1. Introduction

The following feasible wastewater treatment and collection alternatives are evaluated in this Study:

6. Alternative I: Septic systems upgrade,
7. Alternative II: Wastewater consolidation with the City of Ceres,
8. Alternative III: Community sewer collection system with a centralized wastewater treatment facility,
9. Alternative IV: Wastewater consolidation with the Keyes Community Services District, and
10. Alternative V: Wastewater consolidation with the Stanislaus County Public Safety Center

Consolidation to the neighboring City of Turlock was originally evaluated and later discarded after the City of Turlock expressed their unwillingness to accept consolidation with the MPTCSD. Appendix B includes a statement from the City of Turlock denying the consolidation Project.

Consolidation with the City of Modesto was originally evaluated and later discarded after the City voiced their unwillingness to permit consolidation. AM Consulting Engineers and MPTCSD representatives had a meeting with the City of Modesto on January 26, 2021, via Microsoft Teams. William Wong, City of Modesto Director of Utilities, and Ben Koehler, City of Modesto Quality Control Superintendent – Chief Plant Operator, were in attendance during this meeting.

During the meeting, discussions were had regarding potential consolidation options. The City of Modesto stated that they have two WWTP's in the surrounding area. One located to the west of the MPTCSD, Jennings WWTP, and one located on the southwest boarder of the City, Sutter WWTP. As the Jennings WWTP is in close proximity with the MPTCSD, this option seemed the most feasible. The City of Modesto has all of their wastewater screened at the Sutter WWTP prior to being discharged into the Jennings WWTP for final treatment and disposal. If the MPTCSD were to consolidate with the Jennings WWTP, the MPTCSD would need to construct over 5 miles of force main and a screening facility at the Jennings Plant. The City of Modesto expressed that if a screening facility were to be constructed prior to discharging into the Jennings WWTP, the screening facility would need to be constructed at the Jennings WWTP and maintained by the City of Modesto to ensure proper operation and disposal. As screening facilities have high maintenance requirements and the City does not plan on installing screening infrastructure at the Jennings WWTP, they expressed their unwillingness to permit direct consolidation with the Jennings WWTP.

As direct consolidation with the Jennings WWTP was not feasible, consolidation with the Sutter's WWTP was explored. Consolidation with the Sutter's WWTP would require the installation of approximately 9 miles of force main, as well as multiple lift stations. The City of Modesto agreed that this alternative may prove to be feasible and that their Engineering Department would thoroughly examine this alternative and propose required infrastructure to permit consolidation. After a significant amount of discussion and thoughtful consideration, the City of Modesto conveyed several concerns they had with the

proposed consolidation plan and ultimately declined consolidation by recommended the MPTCSD to construct their own WWTP onsite.

4.2. Alternative I – Septic Systems Upgrade

This alternative considers the upgrade of existing onsite septic systems. This study assumes that most of the septic systems were installed in 1984 which is the same year when MPTCSD was formed. Therefore, the septic tanks have been operating for approximately 35 years and are approaching the end of their service life.

For this alternative, 53 conventional septic systems will be replaced with new advanced OWTSs and disposal fields (leach fields). Retrofitting houses with ultra-low flush toilets and other water conserving plumbing devices may also be recommended to reduce the volume of wastewater. The specific siting and design criteria for each alternative technology would have to be in accordance with currently adopted standards of the County and RWQCB or based on criteria developed and agreed upon by both agencies specifically for this Project.

This alternative would provide for replacement and upgrade of all existing septic systems in the Study Area. Septic systems would need to be upgraded to a minimum set of standards or determined to be in compliance with a minimum performance standard that would assure proper functioning and elimination of public health and water quality concerns. The current standards for Stanislaus County and the Regional Water Quality Control Board (RWQCB) would apply, with the possibility of adopting certain local modifications with concurrence by both of these agencies. In general, all applicable siting criteria (i.e., soil depth, percolation, groundwater, etc.) would be considered to the greatest extent possible in evaluating and designing septic system upgrades.

This alternative will include a monitoring system to oversee the OWTS's functionality. More specifically, a programmable logic unit would be incorporated into each OWTS to control the systems pump and provide alarm functions.

The primary shortcoming of this alternative is the heavy reliance on advanced OWTSs and the substantial variances to normal siting and design standards. The septic system upgrade efforts would largely eliminate the public health hazards and water quality threat from septic systems. Existing substandard or marginally operating systems would be eliminated in favor of advanced treatment units, including new leach fields.

Potential negative aspects of this plan would be that upgrades and replacements would be required in the future after the life expectancy of the new OWTS's are reached. This alternative represents a substantial improvement in reliability over existing conditions through the proposed implementation of advanced OWTS's.

4.2.1. Description of Proposed OWTS

A conventional onsite treatment system consists of a septic tank followed by a leach field. Wastewater flows from a residence into a buried tank. Under anaerobic conditions in the tank, most of the nitrogen remains in ammonia and organic form and is discharged with the septic tank effluent. Septic tanks

typically discharge to leach fields, which provide some further treatment by filtering the septic tank effluent.

The solids that accumulate in the septic tank need to be removed periodically, depending on the specific application and wastewater characteristics. Solids removal is usually conducted by a licensed septic hauler using a septic pumping and hauling truck. The septic hauler removes the settled sludge, liquid contents, and scum layer. The liquid and solid contents from the septic tank are typically hauled to a wastewater treatment facility for treatment.

Septic tank and leach field discharges contain elevated nitrogen concentrations and supplementary treatment technologies must be added to reduce nitrogen in the septic tank effluent. Regulatory agencies have adopted a maximum contaminant level (MCL) of 10 mg/l for total nitrogen in wastewater that percolates into an aquifer used to supply drinking water. The MCL is consistent with the drinking water MCL and is intended to protect the beneficial uses of the groundwater. The following technologies are commercially available to reduce nitrogen to less than 10 mg/l.

4.2.2. Trickling Biofilters (Attached Growth Aerobic Treatment Systems)

The fundamental components of the trickling biofilter system are (1) a medium upon which a microbial community (biofilm) develops, (2) a container or lined excavated pit to house the medium, (3) a system for applying the water to be treated to the medium, and (4) a system for collection and distribution of the treated water. The water to be treated is applied, periodically, in small doses to the medium. Trickling biofilters can be operated in single pass of multi-pass configurations. Some biofilters require a separate aerobic pre-treatment while others are housed in the same unit.

Examples of commercially available trickling biofilters able to provide total nitrogen levels below 10 mg/L include Orenco's AdvanTex series septic tanks. More information about these systems and how they operate is included in Appendix C.

4.2.3. Suspended Growth Aerobic Treatment Systems

Suspended growth OWTS consists of a tank with a suspension of wastewater and treatment organisms in an aerated tank. The suspended growth process can be used for onsite wastewater treatment, generally requiring the addition of an air pump to deliver oxygen to the system and provide mixing energy. Suspended growth treatment systems can be secondary only (require supplemental primary treatment) or combined primary and secondary treatment processes. Designs typically consist of aeration, clarification, and sludge return processes. Some systems operate under an extended aeration mode for enhanced constituent transformation.

Examples of a suspended growth aerobic treatment system able to provide total nitrogen levels below 10 mg/L are Norweco's Singulair TNT and Orenco Advantex AX20. More information about these systems and how they operate is included in Appendix C.

4.2.4. Reliability

Typically, advanced OWTS technologies rely on biological treatment. Wastewater must contain low levels of toxic substances for the system to function properly. Public education about the types of chemicals

and toxic substances that could damage the biology of the advanced OWTS will be required to improve the performance of this alternative.

The advanced OWTS requires consistent levels of nutrients. If a household is vacant for part of the year, the microbes will die during this period, and it will take some time to reestablish its microbial communities after the flows start up again. This is not considered to be an issue in the MPTCSD.

4.2.5. Disposal

There are two commonly used options for disposal of advanced OWTS effluent: leach fields and subsurface irrigation. The existing OWTS in the MPTCSD use leach fields as the primary method of disposal. If leach fields are utilized, their size is dependent on the percolation rate of the soil. Once the percolation rate has been determined, an appropriate wastewater loading rate can be established and the leach field can be sized. In order to use leach fields, the percolation rate is required to be within the range of 1 to 120 minutes per inch.

For this Study, each parcel will continue using leach fields as the primary disposal method for their effluent wastewater. Since the advanced OWTS will be designed to reduce the total nitrogen concentration in the effluent to less than 10 mg/l, it would not require additional nitrogen reduction through subsurface irrigation.

4.2.6. Monitoring and Control Systems

Monitoring of process operation and performance is necessary. Most advanced OWTS are complex and automated monitoring and control systems are critical. System controls are necessary for controlling pumps, alarms, and other process equipment. Most manufacturers of onsite wastewater treatment systems provide basic control and alarm systems to alert the system owner of a malfunction.

4.2.7. Footprint Requirements

Installing advanced OWTS will require extensive ground disturbance within each individual lot. It is assumed that most septic systems are beyond their service life and will be replaced to ensure no leakage. Advanced treatment steps would require additional excavation adjacent to the septic tanks to install a suspended growth system or an intermittent attached growth filter.

For effluent disposal, direct discharge to the groundwater via leach fields will be used. New leach fields may need to be built to ensure proper disposal of the effluent.

4.2.8. Groundwater Contamination

The groundwater underlying the MPTCSD is already contaminated with nitrates. The recognized beneficial uses of the groundwater underlying the MPTCSD include municipal supply. If an onsite system was to be permitted, the effluent nitrogen limits would need to be protective of the recognized beneficial uses. In the Waste Discharge Requirements (WDRs) issued for recent projects, the Regional Water Quality Control Board has established effluent limits at 10 mg/L to be protective of groundwater.

4.2.9. Capital Costs

The cost of an advanced OWTS depends on the selected supplementary treatment technology manufacturer and how the effluent is disposed. Equipment costs vary among manufacturers. During

the preparation of this Study, quotes were requested from reputable manufacturers. After evaluation, the Orenco AdvanTex AX20-RT OWTS was selected to be implemented at all of the residential households, and the AdvanTex AX25-RT was selected to be incorporated into both the church and community center locations. The full estimate received from Orenco can be found in Appendix D of this report. The life expectancy of the leach fields are approximately half that of individual septic system depending on the volume of waste that is discharged and the soil properties. For this reason, it is recommended to simultaneously replace the existing leach fields with the septic systems. Typical leach fields cost approximately $12,000 construction and installation. A cost of $12,000 per connection has been included in this alternative to remove/dispose of the existing septic systems and construct a new sewer lateral out of each property. New laterals must be replaced simultaneously with the septic systems upgrades. Mobilization, demobilization and bonding costs are estimated to be approximately 10% of the total capital construction costs.

Table 4-1 shows the estimated costs to remove the existing septic systems, furnish and install new septic tanks, the Orenco AdvanTex AX20-RT/AX25-RT advanced OWTS, and new leach fields. Only developed parcels are used in this estimate. Undeveloped parcels will not require the installation of an OWTS. Table 4-1 also includes costs associated with engineering, environmental documentation, construction management and a contingency fund.

Table 4-1 Alternative I: Capital Construction Costs

Item	Description	Quantity	Unit	Unit Cost	Total
1	Mobilization, Demobilization, Bonds, Etc.	1	LS	$360,000	$360,000
2	Advantex AX20-RT with Installation	51	LS	$2,004,191	$2,004,191
3	Advantex AX25-RT with Installation	2			
4	Septic Tank Replacement - 1,000 Gal with Installation	51			
5	Septic Tank Replacement - 1,500 Gal with Installation	2			
6	MVP Control Panel, AdvanTex System with Discharge Pump	53			
7	Delivery	1			
8	New Leach Field with Installation	53	EA	$12,000	$636,000
9	Existing Septic Tank Destroy/Removal, New Sewer Lateral Addition	53	EA	$12,000	$636,000
				Subtotal	**$3,636,191**
Contingency		10%	of subtotal		$363,619
Engineering, Environmental, Construction Adm. (25%)		25%	of subtotal		$909,048
				Total	**$4,908,858**
				Total Construction Cost per Active Connection [(1)]	**$92,620**

Note:
[(1)] $4,908,858 / 53 Active Connections = $92,620 per Active Connection

According to Table 4-1, the cost to furnish and install new septic tanks, advanced OWTS, and leach fields in all of the developed and occupied parcels within MPTCSD Service Area would be approximately $4,908,858 or $92,620 per connection.

4.2.10. O&M Costs

According to Orenco, the new AdvanTex AX20/25-RT has been designed to passively vent to drastically reduce the electrical cost to run each unit. Orenco estimates the monthly electrical cost to be approximately $5 per month to power each Orenco treatment unit. That cost would be paid by individual property owners but is included here as part of the overall operational cost of this alternative.

Annual operation and maintenance costs for Alternative I are summarized in Table 4-2. O&M costs were estimated based on administration costs, annual O&M costs for the OWTS and a capital reserve. Administrative costs include the costs associated to produce and mail monthly bills. The annual OWTS Operations/Maintenance costs were developed based on the energy costs to run each unit, filter cleaning (approximately $215 per unit per year), miscellaneous maintenance on each unit and solids pumping which must occur, at a maximum, every 5 years. The estimated annual OWTS Operations/Maintenance costs for an advanced OWTS are expected to range from $250 to $450 per unit. An average cost of $350 per OWTS per year is used in this report. The annual OWTS Operations/Maintenance costs includes the approximately $100 per year for pumping of accumulated solids which is estimated to be approximately $500 every 5 years. A capital reserve is included in this report to fund the replacement of short-lived assets. According to Orenco, the short lived assets associated with the OWTS's are the treatment unit's influent pump and 4 floats which control various alarms. These short lived assets are expected to last approximately 20 years. The influent pump costs approximately $1,750 to purchase and install, while each float cost approximately $125 to purchase and install. The total cost of $2,250 has been distributed across the 20 year life span and multiplied by 53 to fund the replacement of all OWTS short lived assets. These costs are included in Table 4-2.

Table 4-2 provides a summary of annual costs associated with this alternative. It assumed that the O&M costs would be equally shared by the 53 active connections.

Table 4-2 Alternative I: Annual O&M Costs

Item Description	Total Cost
Administration	$5,000
OWTS Operation/Maintenance	$40,000
Capital Reserve	$6,000
Total Annual O&M Cost	**$51,000**
Total Annual O&M Cost per Active Connection [(1)]	**$962.26**
Sewer Rate per Month [(2)]	**$80.19**

Note:

[(1)] $51,000 / 53 Active connections = $962.26

[(2)] $962.26 / 12 Months = $80.19

4.2.11. Project Funding

The MPTCSD is a severely disadvantaged community and for this reason, has obtained grant funding to complete this Study. If this Study is accepted by the community, then a construction grant will be awarded to complete the construction of the sewer improvements.

4.2.12. Regulatory Concerns and Permitting Issues

The installation of advanced OWTS can perform as intended if the individual systems are adequately maintained at all times. Regulatory agencies will require assurance that MPTCSD will perform the required maintenance on each OWTS on a regular basis. Without those assurances obtaining a permit for this alternative may be challenging.

4.3. Alternative II: Wastewater Consolidation with the City of Ceres

Alternative II includes the construction of a community sewer collection system, a pumping station, and a force main to a discharge location within the City of Ceres sewer collection system for ultimate treatment and disposal of the wastewater.

The community sewer collection would consist of a network of conventional gravity sewer mains and manholes. Wastewater will flow by gravity from the individual properties into the sewer mains and ultimately into the pumping station. A 6.5-mile-long force main will be constructed to convey flows from the pumping station to a discharge location near Crows Landing and E Service Rd within the City sewer collection system. This location was selected based on its capacity and location in relation to the City's Wastewater Treatment Plant (WWTP) and the MPTCSD.

The sewer collection system will require approximately 3,800 feet of gravity collection mains and 10 manholes. Manholes will be placed strategically based on Stanislaus County standards. According to the standards, spacing between manholes cannot exceed 500 ft and if possible, will be placed at equal distances around the collection system. For this reason, manholes will be placed every 380 feet. The gravity sewer collection system will convey the sewage from the entire MPTCSD to a pumping station located near the intersection of La Siesta Ave and Foy Ave. A new 4" force main will convey the sewage from the MPTCSD to the City's wastewater plant for treatment and disposal. A preliminary layout of the proposed gravity sewer collection system is shown in Figure 4-1. A detail of the force main connecting to the City is shown in Figure 4-2.

The force main is assumed to be installed within the existing right-of-way using mostly conventional pipe trenching methods. Directional drilling or trenchless construction (i.e. bore and jack) may be required under major traffic routes, canals, or other waterways. The force main will be installed to maintain a minimum cover of at least 3 feet following the natural contouring of the ground.

Discharging to the City will require a startup connection fee and a monthly discharge fee based on the metered flows discharged into the system. Alternative II is consistent with RWQCB policies that encourage consolidation with a larger utility whenever feasible. This alternative would require that the MPTCSD authority expand their services to include sewer service in order to remain independent from the City of Ceres.

The City of Ceres has voiced that if consolidation with the MPTCSD is proven feasible, the City of Ceres will explore upgrades required to sustainably serve the MPTCSD. These upgrades will be included in a separate funding agreement and will be evaluated through a separate feasibility study at a later time.

Monterey Park Tract

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

- 4" SEWER PIPELINE
- 6" SEWER MAIN
- 4" FORCE MAIN

NORTH

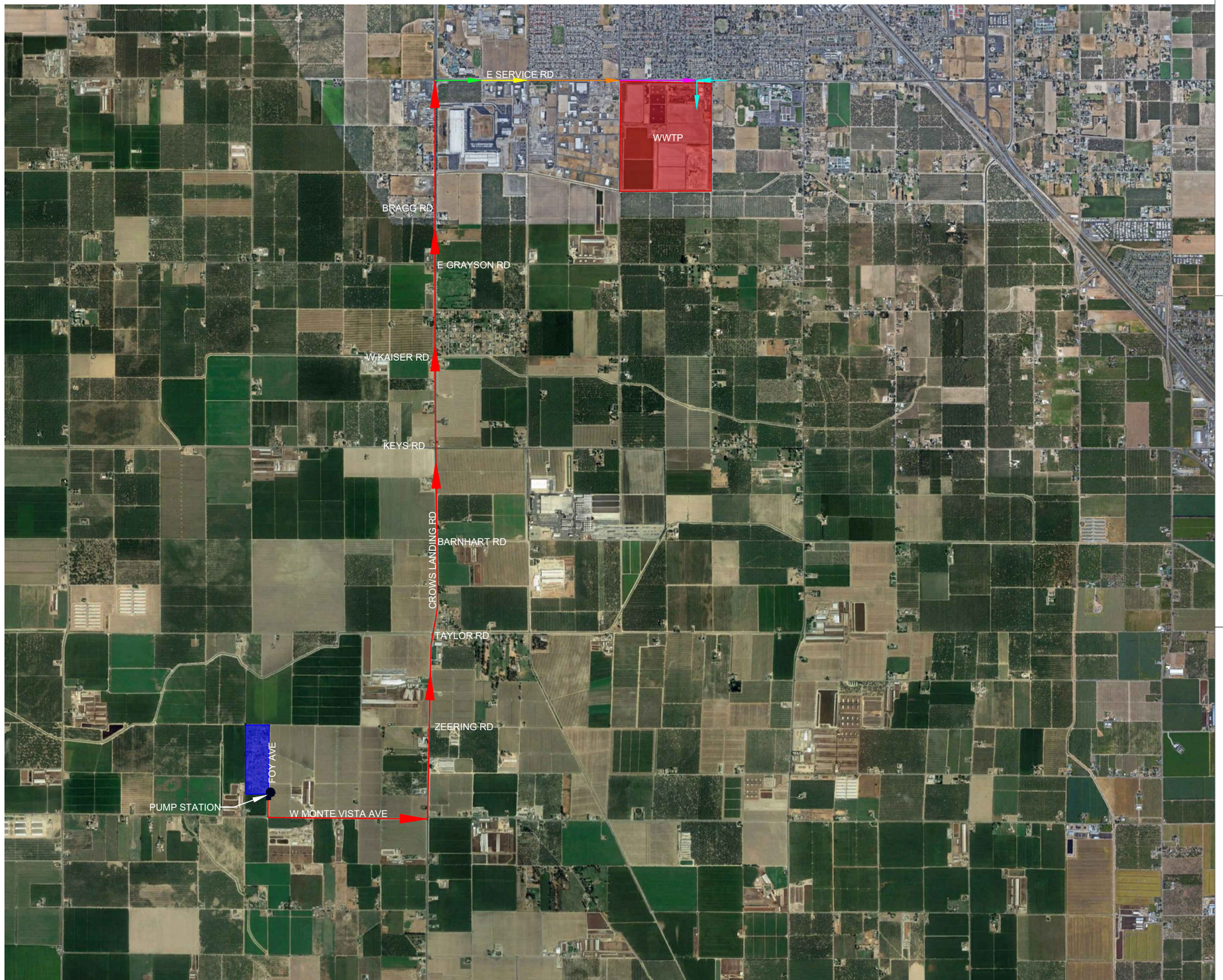
SCALE IN FEET

0 200 FT

FIGURE 4-1
PROPOSED MPTCSD GRAVITY SEWER COLLECTION SYSTEM

MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY



LEGEND

- WWTP BOUNDARY
- MPTCSD BOUNDARY
- 4" FORCE MAIN
- EXISTING 10" SEWER PIPELINE
- EXISTING 12" SEWER PIPELINE
- EXISTING 15" SEWER PIPELINE
- EXISTING 18" SEWER PIPELINE
- EXISTING 42" SEWER PIPELINE

NORTH

SCALE IN FEET

0 1,500 FT

FIGURE 4-2
FORCE MAIN CONNECTION TO CITY OF CERES WWTP

4.3.2. Reliability

The use of a collection system and a discharge to the City's sewer collection system would be a very reliable alternative. New sewer collection systems, if adequately designed and constructed, require little maintenance and are very reliable. Annually, sewer collection systems may require cleaning through hydro flushing to remove grease and other materials that accumulate on the walls of the pipes. A pump station would be required to pump wastewater from the MPTCSD to the discharge point within the City's sewer system, at the intersection of Crows Landing and E Service Rd. The pumping stations would be powered by electricity from either the grid or from a standby generator during power outages. At a minimum, the pumping station would have one pump to accommodate peaks flows and a redundant pump in case of mechanical failure. Instrumentation and controls to enable remote monitoring of the facility and a building to house the electrical and mechanical equipment will also be installed.

4.3.3. Capital Costs

Capital costs for consolidation with the City of Ceres sewer collection system include startup connection fees imposed by the City, construction of the gravity collection system with the prescribed manholes, a pump station and a force main to transport the waste to the City's connection point. The City would charge a startup connection fee of $6,080 per residence. The estimated cost for the gravity sewer collection system was approximately $155 per linear foot (LF) and $8,400 per manhole, while the estimated cost for the force main was approximately $140 LF. The estimated cost to furnish and install the pump station is approximately $180,000 based on the distance the wastewater must travel to reach the City of Ceres WWTP and possible land acquisition. A cost of $12,000 per connection has been included in this alternative to remove/dispose of the existing septic systems and construct a new sewer lateral out of each property. New laterals must be replaced simultaneously with the sewer systems upgrades. The City of Ceres has expressed that in order for the City to accept the MPTCSD waste, they would require upgrades to their existing sewer collection system and wastewater treatment facility headworks. A cost of $600,000 has been included in this alternative to fund these capital improvements. This Alternative includes a supervisory control and data acquisition (SCADA) unit to allow system monitoring and operational controls for the system. A cost of $60,000 has been included in this section for SCADA infrastructure. Mobilization, demobilization and bonding costs are estimated to be approximately 10% of the total capital construction costs.

Estimated capital costs for this Alternative are shown in Table 4-3. Only developed parcels are used in this estimate. Undeveloped parcels will be required to connect to the proposed sewer collection system as they develop. Table 4-3 also includes costs associated with engineering, environmental documentation, construction management and a contingency fund.

Table 4-3 Alternative II: Capital Construction Costs

Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization, Demobilization, Bonds, Etc.	1	LS	$690,000	$690,000
2	6" Gravity Sewer Collection	3,800	LF	$155	$589,000
3	4" Force Main	27,016	LF	$140	$3,782,240
4	Manholes	10	EA	$8,400	$84,000
5	Lift Stations	1	EA	$180,000	$180,000
6	Connection Fee	53	EA	$6,080	$322,240
7	SCADA Controls	1	LS	$60,000	$60,000
8	Existing Septic Tank Destroy/Removal, New Sewer Lateral Addition	53	EA	$12,000	$636,000
9	Sewer Collection System/Wastewater Treatment Plant Upgrades	1	LS	$600,000	$600,000
				Subtotal	**$6,943,480**
Contingency		10%	of Subtotal		$694,348
Engineering, Environmental, Construction Adm. (25%)		25%	of Subtotal		$1,735,870
				Total	**$9,373,698**
				Total Construction Cost per Active Connection [(1)]	**$176,862**

Note:
[(1)] $9,373,698 / 53 Active Connections = $176,862 per Active Connection

4.3.4. O&M Costs

Annual O&M costs in this alternative will include administrative costs, preventive/corrective maintenance on the sewer collection system, preventive/corrective maintenance to the pump station, a monthly discharge fee charged by the City of Ceres and a capital reserve to fund the replacement of short-lived assets. Administrative costs include the costs associated to produce and mail monthly bills. Preventive/corrective maintenance on the collection system include the costs required to hydroflush the gravity collection system and a reserve to fund the replacement of valves, pipelines and other aspects of the force main and gravity system that can unexpectedly fail at any time. A cost of $1000 has been included in this section to fund yearly hydro flushing and a cost of $180,000 has been distributed across 20 years to fund the replacement of various parts of the collection system. Preventive/corrective maintenance to the pump station include annual cleaning, flushing and regulatory maintenance. Which is estimated to cost approximately 7% of the total capital construction cost of the pump station. A monthly discharge fee would be paid to the City for treatment and disposal of the community's wastewater. The discharge fee is approximately $59 per month per residence. A capital reserve has been included in this section to fund the replacement of the pump station after its live expectancy, 10 years. This section includes a $5,000 annual capital reserve to replace a $50,000 pump after 10 years.

The total O&M costs are divided by the number of users in the system, 53, to determine the total annual cost per active connection. For this Alternative, it is assumed that the annual O&M costs will be shared among developed parcels. Table 4-4 displays the annual operation and maintenance fees associated with Alternative II.

Table 4-4 Alternative II: Annual O&M Costs

Item	Cost
Administrative Costs	$ 5,000
Sewer Collection System	$ 10,000
Pumping Stations	$ 10,500
Discharge Fee	$ 37,524
Capital Reserve	$ 5,000
Total Annual O&M Cost	**$ 68,024**
Total Annual O&M Cost per Active Connection [(1)]	**$ 1,283.47**
Sewer Rate per Month [(2)]	**$ 106.96**

Note:
[(1)] $68,024 / 53 Active connections = $1,283.47
[(2)] $1,283.47 / 12 Months = $106.96

4.3.5. Disposal

Alternative II does not require any wastewater disposal methods. Raw wastewater will be discharged into the City of Ceres sewer collection system and treated at the City's Wastewater Treatment Facility. The City of Ceres will be responsible for the treatment and disposal of the raw wastewater. The City currently disposes of their treated effluent into percolation ponds, as well as exportation to the City of Turlock's WWTP.

4.3.6. City of Ceres Wastewater Treatment Facility Treatment and Disposal Capacity

The overall capacity of the City of Ceres wastewater treatment and disposal facilities are limited based primarily on the disposal method chosen. These limitations are based on differing water quality criteria depending on the discharge location, permit or agreement limitations, intrinsic hydraulic capacity of the discharge location, and on the expected performance of the treatment system to meet the water quality requirements.

Discharge to On-site Percolation Ponds

The predicted hydraulic capacity limit, under long-term 100-year precipitation season conditions, of existing on-site disposal is limited to 2.8 mgd. However, the existing permit limits discharge to 2.5 mgd. To obtain the 2.8 mgd disposal capacity, the City would have to obtain a new permit. The existing permit does not limit effluent biochemical oxygen demand (BOD_5). It is anticipated that future permits will limit effluent BOD_5 discharged for on-site disposal to 40 mg/L on a 30-day average.

Discharge to the Turlock WWTP

The existing agreement with the City of Turlock limits the City's export to the Turlock WWTP to 2.0 mgd and contains limits for effluent BOD_5 and Total Suspended Solids (TSS) of 100 mg/L each.

Combined Discharge to On-site and Turlock WWTP

The combined hydraulic capacity for the on-site disposal and discharge to the Turlock WWTP is 4.5 mgd based on the existing on-site permit limit and agreement with Turlock. With discharge requirements on the effluent wastewater concentrations of BOD_5 and TSS, maximum concentration of 100 mg/L, being exported to the Turlock WWTP.

Depending on the degree of discharge to the Turlock WWTP and the City's ability to update current permit conditions, available capacity in existing facilities is summarized in Table 4-5, as documented in the 2013 City of Ceres Sewer Master Plan.

The limiting factor that determines the maximum capacity of the City of Ceres WWTP is the capacity of the disposal methods. If discharge to the Turlock WWTP is maximized, the existing WWTP capacity is limited to 4.5 mgd, according to the Master Plan.

Table 4-5 City of Ceres WWTP Treatment and Disposal Capacity

Discharge Type	Amount	Units
On-site Percolation Ponds	2.5	mgd
Turlock WWTP	2	mgd
Combined	**4.5**	**mgd**

4.3.7. Community Issues/Environmental Impacts

Construction of a community sewer collection system will likely produce temporary disruptions on traffic. Alternative II will likely encounter the following environmental issues which will carefully be addressed in the Mitigated Negative Declaration (MND):

- Roadway disruptions during construction of force mains. Traffic will likely be rerouted and access to individual homes constrained for short periods. Careful noticing will be required.
- Pump stations and standby power facilities may require visual mitigation depending upon location.
- Odor control facilities may be required at the pump station.
- Permitting and regulatory requirements for crossing canals and waterways may be required.

4.3.8. Contractual Issues

The MPTCSD will enter into a sewer service agreement with the City of Ceres to accept the discharge of wastewater generated from the community. The City of Ceres has an agreement with the City of Turlock to allow discharge of the treated effluent wastewater to the Turlock WWTP. Approval from both entities may be required before discharge can be approved.

4.4. Alternative III: Community Sewer Collection System with a Centralized Wastewater Treatment Facility

This alternative consists of constructing a community sewer collection system to convey wastewater to a centralized location and a new WWTP for treatment and disposal of the wastewater. The sewer collection system would have a similar scope as the one proposed for Alternative II. The sewer collection system would require approximately 3,800 linear feet of gravity collection mains and 10 manholes. Figure 4-3 shows the preliminary layout of the sewer collection system for Alternative III and the proposed location of the centralized WWTP.

4.4.1. Siting

It is estimated that approximately 0.5 to 1 acres of land would be sufficient to house the centralized treatment units, as well as the leach fields required for disposal. The treatment plant optimal placement would be within the MPTCSD service area to avoid high land acquisition costs related to purchasing farmland from the surrounding region. Due to the general topography of the area, the preferred location for a WWTP would be on two parcels of land located in the northern region of the community. The MPTCSD owns the lower proposed parcel and would have to purchase the upper parcel in order to meet the land requirements stated above.

These are the only vacant lots with the MPTCSD that has sufficient acreage to house the treatment facility. If this location was not available, the MPTCSD would need to purchase the land in the vicinity of the community to house the centralized treatment facility.

4.4.2. Treatment Technologies

There are multiple alternative treatment processes that can be used to treat domestic wastewater generated from a small community. Most of that WWTPs that have been created for small communities use package wastewater treatment facilities because of the simplicity and reliability associated with the units. Orenco offers advanced wastewater treatment systems that are perfect for rural environments that require advanced treatment and disposal capable of meeting standards set by regulatory agencies.

Orenco offers many different sized advanced treatment units based on the population of the region and the purpose of the treatment unit. The AdvanTex AX-Max Treatment System would be recommended for this Alternative. The AdvanTex AX-Max is a packaged WWTP that offers sizes varying from 14 to 42 feet long and approximately 7 to 8 feet wide depending on the length of the unit. The AdvanTex AX-Max 42 and 35-foot-long treatment units would be recommended due to the maximum size of the Monterey Park Tract community and the area of textile required for efficient treatment.

The packaged WWTP would include one 10,000 gallon Xerxes septic tanks before the AdvanTex AX-Max treatment units and two 20,000-gallontanks for the AdvanTex Units.

Monitoring of process operation and performance of the treatment units would be necessary. System controls are necessary for controlling pumps, alarms, and other process equipment. This alternative will utilize a TCOM control system to monitor the performance and process operations of the centralized treatment units.

Monterey Park Tract

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

- 4" SEWER PIPELINE
- 6" SEWER MAIN
- WWTP LOCATION BOUNDARY

NORTH

SCALE IN FEET

0 200 FT

FIGURE 4-3
PROPOSED MPTCSD GRAVITY SEWER COLLECTION SYSTEM WITH A CENTRALIZED WWTP

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The leach field required for the centralized treatment system would be sized based on the California Plumbing Code. The maximum wastewater generation for the MPTCSD is approximately 20,000 gpd. The California Plumbing Code also requires 20 square feet of leaching area for every 100 gallons for coarse sand soil types, or 4,000 square feet for 20,000 gallons. Figure 4-4 displays the potential layout of Alternative III. An additional leach field would be constructed for redundancy and because leach fields only have a life expectancy of approximately 20 years. Once the first leach field shows signs of failing, it can be transitioned to the new leach field while the failing one is repaired.

The Basin Plan designates the Municipal beneficial use of the underlying groundwater because it is used for potable water purposes. In order to protect the beneficial use, the wastewater going to the leach field would be required to have 10 mg/l or less of total nitrogen. The Orenco AdvanTex AX-Max is capable of treating wastewater to that standard.

4.4.3. Capital Costs

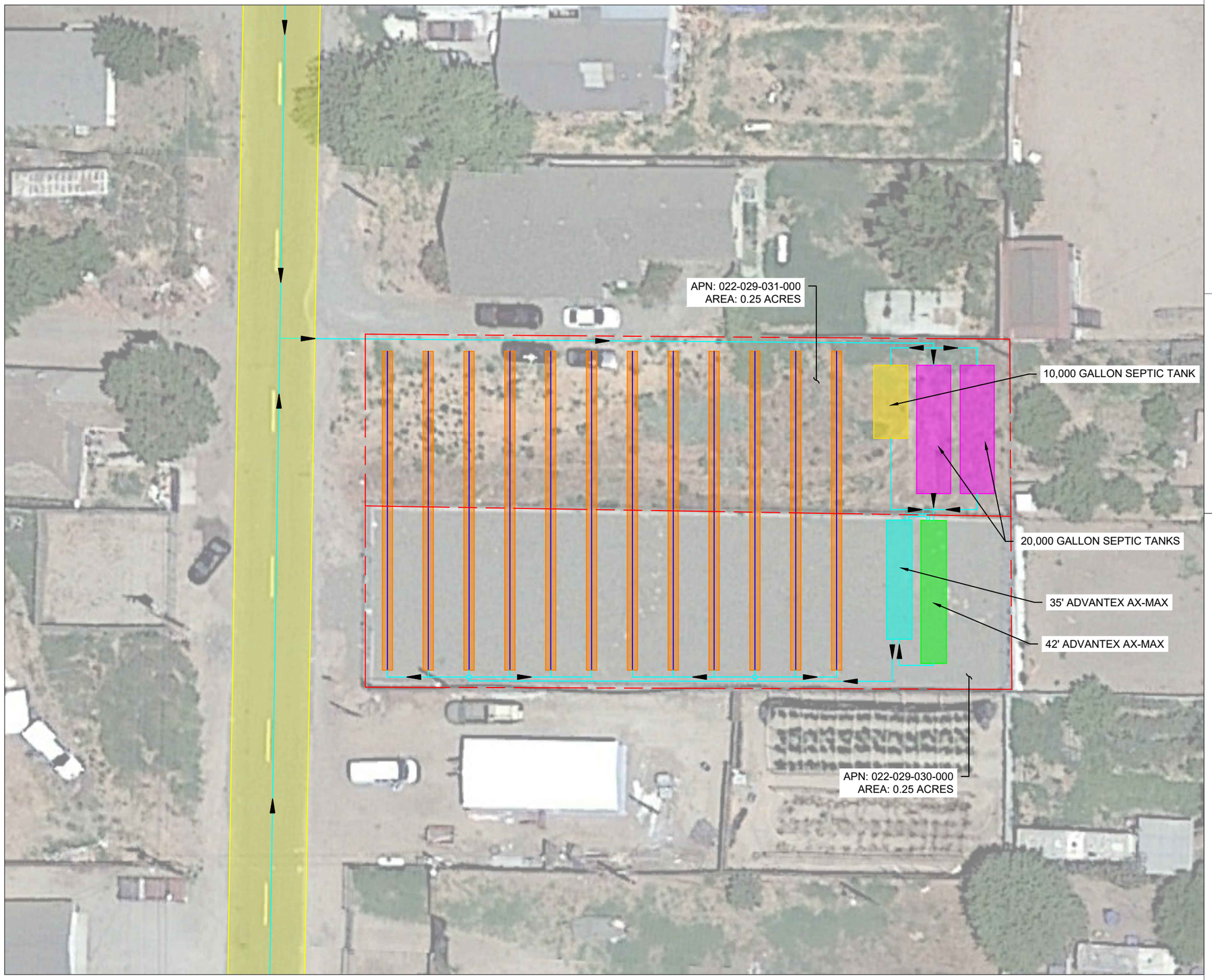
Capital costs for this alternative include the construction of 3,800 LF of gravity sewer mains, the purchase and installation of two Orenco AX-Max treatment units, two 20,000 gallon Xerxes septic tanks, one 10,000 gallon Xerxes septic tank, the construction of two new centralized leach fields, one active and one for redundancy, and the acquisition of adjacent land for the placement of the proposed treatment facility.

The costs associated with the construction of the collection system are similar to those used in Alternative II and include the costs of gravity sewer mains and manholes. The cost of an advanced wastewater treatment unit depends on the selected supplementary treatment technology manufacturer and how the effluent is disposed. During the preparation for this Study, a quote was requested from Orenco to determine the costs associated to furnish and install two AdvanTex AX-Max wastewater treatment units and three Xerxes septic tanks. This estimate can be found in Appendix E of this report. A cost of $12,000 per connection has been included in this alternative to remove/dispose of the existing septic systems and construct a new sewer lateral out of each property. New laterals must be replaced simultaneously with the sewer system upgrades. The estimated cost, $216,000, to install the two new centralized leach fields include construction costs, as well as, start up and permitting fees. A cost of $180,000 has been estimated to purchase the upper parcel of land for the proposed sitting of the treatment facility. Mobilization, demobilization and bonding costs are estimated to be approximately 10% of the total capital construction costs.

Table 4-6 displays the estimated capital costs to construct this alternative. Only developed parcels are used in this estimate. Undeveloped parcels will be required to connect to the proposed sewer collection and treatment system as they develop. Table 4-6 also includes costs associated with engineering, environmental documentation, construction management and a contingency fund.

MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY



LEGEND

- PROPERTY LINES
- SANITARY SEWER PIPELINE
- LEACH FIELD PIPELINES
- ROADWAYS
- LEACHING AREA (TRENCH)

NORTH

SCALE IN FEET

0 30 FT

FIGURE 4-4
PROPOSED CENTRALIZED WWTP SITE PLAN

Table 4-6 Alternative III: Capital Construction Costs

Item	Description	Quantity	Unit	Unit Cost	Total
1	Mobilization, Demobilization, Bonds, Etc.	1	LS	$360,000	$360,000
2	6" Gravity Sewer Collection	3,800	LF	$155	$589,000
3	Manholes	10	EA	$8,400	$84,000
4	Orenco AdvanTex AX-Max, 42' long	1	LS	$1,006,611	$1,006,611
5	Orenco AdvanTex AX-Max, 35' long	1			
6	TCOM Control Panel	1			
7	Anti-floatation Equipment	2			
8	Delivery	1			
9	Xerxes Septic Tank, 20,000 Gal	2	LS	$544,943	$544,943
10	Xerxes Septic Tank, 10,000 Gal	1			
11	Orenco Pumping Package, 50 gpm	1			
12	Anti-floatation Equipment	3			
13	Delivery	1			
14	New Leach Field	2	LS	$108,000	$216,000
15	Existing Septic Tank Destroy/Removal, New Sewer Lateral Addition	53	EA	$12,000	$636,000
16	Land Acquisition	1	EA	$180,000	$180,000
				Subtotal	**$3,616,554**
Contingency		10%	of Subtotal		$361,655
Engineering, Environmental, Construction Adm. (25%)		25%	of Subtotal		$904,138
				Total	**$4,882,348**
				Total Construction Cost per Active Connection [(1)]	**$92,120**

Note:
[(1)] $4,882,348 / 53 Active Connections = $92,120 per Active Connection

4.4.4. O&M Costs

O&M costs for this alternative will include administrative costs, as described in Alternatives I and II, preventive/corrective maintenance of the sewer collection system, annual O&M costs associated with the centralized treatment facility and a capital reserve to fund the replacement of short-lived assets.

Maintenance of the sewer collection system requires costly equipment such as a vacuum truck and a hydro flusher. The table below includes the maintenance costs associated with contracting someone to perform these costly maintenance actions and funding the replacement of various valves, pipelines and other aspects of the sewer collection system. A cost of $1000 has been included in this section to fund yearly hydro flushing and a cost of $180,000 has been distributed across 20 years to fund the replacement of various parts of the collection system.

The O&M costs for the treatment facility will include labor, energy, cleaning, pumping of both the AdvanTex AX-Max units and the Xerxes septic tanks and general repairs. In terms of labor, the centralized wastewater treatment unit will require a part time operator. To make the treatment unit more sustainable, Orenco has developed a way to operate the AdvanTex AX-Max using less than 2 kWh per 1000 gallons of wastewater treated. A cost of 5 percent of the equipment cost of the centralized treatment facility is estimated to fund the annual O&M costs. A capital reserve has been included in this alternative to fund the replacement of short-lived assets for both the AdvanTex AX-Max and the Xerxes septic tanks. Short lived assets for both include the replacement of pumps, floats, and valves. Table 4-7 contains the estimated annual costs associated with Alternative III.

Table 4-7 Alternative III: Annual O&M Costs

Item Description	Total Cost
Administration	$5,000
Sewer Collection System	$10,000
WWTP Operations/Maintenance	$25,500
Capital Reserve	$4,000
Total Annual O&M Cost	**$44,500**
Total Annual O&M Cost per Active Connection [(1)]	**$839.62**
Sewer Rate per Month [(2)]	**$69.97**
Note: [(1)] $44,500 / 53 Active connections = $839.62 [(2)] $839.62 / 12 Months = $69.97	

4.4.5. Disposal

Treated effluent from the MPTCSD wastewater treatment unit will be disposed of through a newly constructed leach field. The new leach field will be consistent with new regulation and standards for the Stanislaus county and the RWQCB.

4.4.6. Community Issues/Environmental Impacts

Constructing a centralized community wastewater treatment facility will require cooperation with the residents near the recommended location. The recommended site is the only rural and vacant location within the MPTCSD that is large enough to house both the wastewater treatment units and the new leach field. The recommended location of the treatment unit may provoke opposition from neighbors who fear aesthetic impacts from the plant. If this problem arises, the AdvanTex AX-Max can be partially buried to reduce the footprint of the unit within the community. Additionally, odor control and impacts from maintenance personnel and sludge hauling truck traffic must be carefully considered.

4.5. Alternative IV: Wastewater Consolidation with Keyes Community Services District

Keyes CSD was established in 1955 as a local government agency under California Government Code Section 61000, et. seq., for the purpose of providing sewer, water and street lighting to the community of Keyes, an unincorporated area of Stanislaus County. The sanitary sewer system is publicly owned and operated. Keyes CSD generates approximately 0.35 MGD on average, dry weather, and 0.5 MGD on maximum, wet weather. The Keyes CSD sanitary sewer system consists entirely of a community wide sewer collection system and a centralized lift station located at the north end of Foote road. The lift station coveys the community wastewater to the adjacent City of Turlock for ultimate treatment and disposal. The lift station is currently being upgraded to have a 1 MGD discharge capacity by replacing the existing pumps with two new 70 HP Flygt submersible pumps. These new pumps will be capable to meet the additional capacity introduced by consolidation with the MPTCSD. Figure 4-5 displays the location of the Keyes CSD lift station and the discharge alignment to the City of Turlock WWTP. This discharge pipeline travels as force main from the Keyes CSD lift station to Monte Vista Ave, where it transitions to a gravity pipeline until it reaches Tuolumne Road. At Tuolumne Road, it taps into the City of Turlock's sewer collection system.

Expansion of the Keyes CSD has been impeded due to the capacity limitations set by the City of Turlock and the sewer lift station. The City of Turlock has set a flow limitation of 0.513 MGD of wastewater and must meet or exceed the wastewater quality discharge limitations listed in Table 4-8.

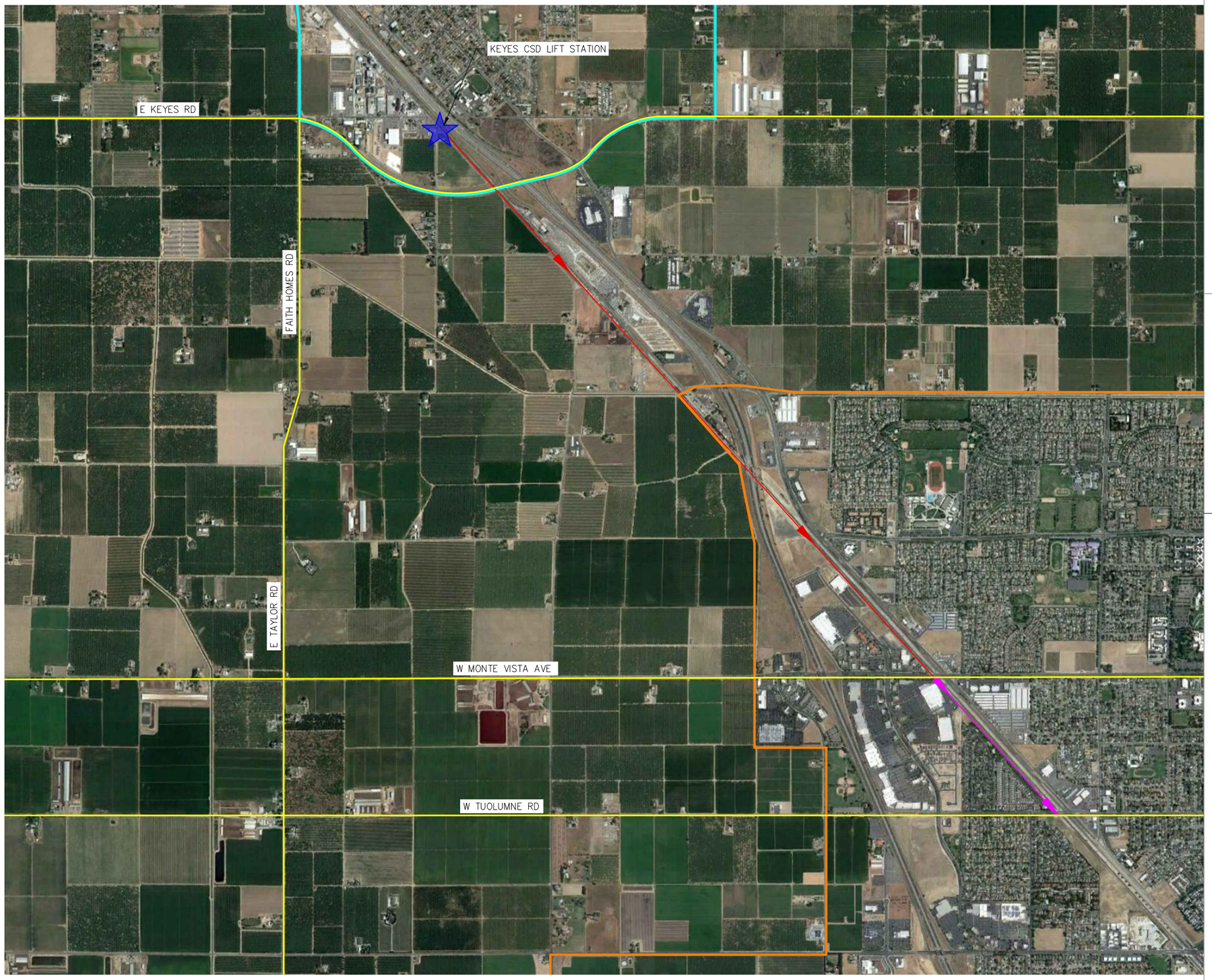
Table 4-8 Keyes CSD Wastewater Quality Discharge Limitation

Wastewater Quality Parameter	Concentration
BOD	1,200 lbs/day
Suspended Solids	1,697 lbs/day
pH	5.5 - 10.5

The City of Turlock charges the Keyes CSD a variable rate based on the amount of wastewater discharged to the City of Turlock's WWTP. This rate fluctuations based on the time of year. For this reason, close coordination between both Keyes CSD and the City of Turlock will be required.

Consolidation of the MPTCSD wastewater with Keyes CSD will involve the construction of a community wide sewer collection system within the MPTCSD that will lead to a new lift station. The lift station will discharge into a new force main that will covey the MPTCSD wastewater to the Keyes CSD sewer collection system and ultimately to the City of Turlock WWTP.

The MPTCSD community sewer collection system proposed in Alternative II will be utilized in Alternative III. The MPTCSD residential wastewater will be gravity fed through approximately 3,800 linear feet of sewer pipe to a centralized lift station, as shown in Figure 4-1. The lift station will discharge into a 7.8-mile-long force main that will covey the MPTCSD waste to the Keyes CSD lift station where it will be directed to the City of Turlock WWTP. The proposed alignment can be observed in Figure 4-6.



MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

- KEYES CSD LIFT STATION
- CITY OF TURLOCK SERVICE AREA BOUNDARY
- KEYES CSD SERVICE AREA BOUNDARY
- EXISTING FORCE MAIN
- EXISTING GRAVITY PIPELINE

NORTH

SCALE IN FEET

0 2,000 FT

FIGURE 4-5
KEYES CSD SEWER LIFT STATION LOCATION AND DISCHARGE ALIGNMENT

MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

CITY OF CERES
E KEYES RD
KEYES CSD
CROWS LANDING RD
BARNHART RD
BYSTRUM RD
CENTRAL AVE
FAITH HOMES RD
FOOTE RD
TAYLOR RD
ZEERING RD
FOY AVE
W MONTE VISTA AVE
W MONTE VISTA AVE
PROPOSED PUMP STATION
W TUOLUMNE RD

LEGEND

- KEYES CSD SERVICE AREA BOUNDARY
- CITY OF CERES SERVICE AREA BOUNDARY
- MPTCSD SERVICE AREA
- PROPOSED MPTCSD LIFT STATION
- EXISTING KEYES CSD LIFT STATION
- PROPOSED 4" FORCE MAIN
- EXISTING SEWER PIPELINE
- ROADWAYS

NORTH

SCALE IN FEET

0 3,000 FT

FIGURE 4-6
PROPOSED MPTCSD TO KEYES CSD CONSOLIDATION FORCE MAIN ALIGNMENT

The force main is assumed to be installed within the existing right-of-way using mainly conventional pipe trenching methods. Directional drilling or trenchless construction (i.e. bore and jack) may be required under major traffic routes, railroads, canals, or other waterways.

Consolidation with the Keys CSD will require a startup connection fee as well as a monthly discharge fee based on the metered flows discharged into the system. The startup connection and monthly discharge fee will be agreed upon by both the Key CSD and the City of Turlock. This Alternative is consistent with RWQCB policies that encourage consolidation with a larger utility whenever feasible. This alternative will require that the MPTCSD authority expand their services to include sewer service in order to remain independent.

The Keyes CSD lift station is currently being upgraded. With the addition of these upgrades, the Keyes CSD pumping capacity will accommodate the additional wastewater flows provided by the MPTCSD. The Keyes CSD is currently experiencing excessive odor at the transition point from their force main to their gravity system that directs the Districts wastewater to the City of Turlock. To reduce the odor, the District has determined that the addition of oxygen via a Anue Water Technologies' Forse 2 system at the Keyes CSD lift station would reduce this problem. For this reason, this Alternative will include the addition of a new Anue Water Technologies' FORSe 2 system. The proposed oxygenation system will require additional site improvements such as a new concrete masonry unit (CMU) building.

4.5.2. Reliability

Consolidation with the nearby Keyes CSD would reduce MPTCSD maintenance responsibilities and increase overall system reliability. Gravity fed sewer collection systems, if designed and constructed correctly, have minimal maintenance requirements. Maintenance required on the proposed sewer collection system would include primarily annual hydro flushing to remove grease, rags and other built up material within the pipelines. The pumps used to pump the MPTCSD wastewater to the neighboring Keyes CSD have long service lives and can be increased with proper annual maintenance. Proposed annual maintenance on the pump station would include cleaning, flushing and regulatory maintenance. The required maintenance on the proposed system would be spelled out in the new MPTCSD sewer services and a contract worker would be appointed this responsibility.

To increase reliability, the proposed pump station would be equipped with an emergency generator that would power the system during outages to the grid, as well as two chopper pumps, one active and one redundant, each capable to meet the estimated peaks flows. The pump station would be housed in a secure building and fitted with instrumentation and controls to remotely monitor the station to ensure optimal functionality.

4.5.3. Capital Costs

The capital construction costs associated with consolidation to the Keyes CSD will include a startup connection fee imposed by the District, construction of the gravity collection system within the MPTCSD, a lift station to convey the MPTCSD wastewater to the neighboring District and a force main to physically transport the waste to the Keyes CSD lift station. The District would charge a startup connection fee of $3,050 per household. The estimated capital construction cost for the gravity sewer collection network was determined using the unit costs of $155 per LF of 6" gravity pipeline and $8,400 per manhole. A unit

cost of $140 per LF of force main was incorporated into this Report to estimate the capital construction costs associated with the force main. The estimated cost to furnish and install the new pump station is approximately $180,000. The pump station will be equipped with a SCADA system for remote monitoring of the pump station. The SCADA system is estimated to cost $60,000. A cost of $12,000 per connection has been included in this alternative to remove/dispose of the existing septic systems and construct a new sewer lateral out of each property. New laterals must be replaced simultaneously with the sewer systems upgrades. The proposed Anue Water Technologies' FORSe 2 system is estimated to cost approximately $660,600. This cost includes equipment procurement, estimated tax, shipping, startup supervision, installation, and the construction of a new CMU building to mount and protect the proposed equipment. Mobilization, demobilization and bonding costs are estimated to be approximately 10% of the total capital construction costs.

Estimated capital costs for this Alternative are shown in Table 4-9. Only developed parcels are used in this estimate. Undeveloped parcels will be required to connect to the proposed sewer collection and disposal system as they develop. Table 4-9 also includes costs associated with engineering, environmental documentation, construction management and a contingency fund.

Table 4-9 Alternative IV: Capital Construction Costs

Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization, Demobilization, Bonds, Etc.	1	LS	$900,000	$900,000
2	6" Gravity Sewer Collection	3,800	LF	$155	$589,000
3	4" Force Main	41,200	LF	$140	$5,768,000
4	Manholes	10	EA	$8,400	$84,000
5	Lift Stations	1	EA	$180,000	$180,000
6	SCADA Controls	1	EA	$60,000	$60,000
7	Connection Fee	53	EA	$3,050	$161,650
8	Existing Septic Tank Destroy/Removal, New Sewer Lateral Addition	53	EA	$12,000	$636,000
9	Anue Water Technologies FORSe 2 Oxygenation System	1	EA	$660,600	$660,600
				Subtotal	**$9,039,250**
Contingency		10%	of Subtotal		$903,925
Engineering, Environmental, Construction Adm. (25%)		25%	of Subtotal		$2,259,813
				Total	**$12,202,988**
				Total Construction Cost per Active Connection [(1)]	**$230,245**

Note:
[(1)] $12,202,988 / 53 Active Connections = $230,245 per Active Connection

4.5.4. O&M Costs

The Keyes CSD has voiced their unwillingness to take on the maintenance responsibilities of the new interconnection infrastructure. For this reason, the annual O&M costs for this Alternative include administrative costs, preventive/corrective maintenance on the sewer collection system, preventive/corrective maintenance to the pump station, a monthly discharge fee paid to the Keyes CSD and a capital reserve to fund the replacement of short-lived assets. The costs associated with producing and distributing monthly bills is included in the administrative costs line item and has been estimated to be approximately $5,000. Preventive/corrective maintenance on the sewer collection system includes a cost of $1000 to fund annual hydro flushing and a cost of $180,000 has been distributed across 20 years to fund the replacement of various parts such as valves, pipelines and other apparatus associated with the collection system. Preventive/corrective maintenance to the pump station include annual cleaning, flushing and regulatory maintenance. Annual maintenance on the pumping station has been estimated to be $10,500. A monthly discharge fee of $64.23 would be paid to the District for providing sewer service to the MPTCSD. This is the same flat rate that the Keyes CSD residents pay per month. A capital reserve has been incorporated into this Alternative to fund the replacement of the $50,000 pumps, included in the new MPTCSD lift station, after its service life had been reached. The proposed pumps have been estimated to have a service life of approximately 10 years and for this reason, an annual cost of $5,000 has been included in this Alternative.

The total annual estimated O&M costs were divided by the number of active service connection to determine the total annual cost per connection. For Alternative IV, it is assumed that the annual O&M costs will be shared among developed parcels, 53 units. Table 4-10 displays the annual operation and maintenance fees associated with Alternative IV.

Table 4-10 Alternative IV: Annual O&M Costs

Item	Cost
Administrative Costs	$ 5,000
Sewer Collection System	$ 10,000
Pumping Stations	$ 10,500
Discharge Fee	$ 40,850
Capital Reserve	$ 5,000
Total Annual O&M Cost	**$ 71,350**
Total Annual O&M Cost per Active Connection [(1)]	**$1,346.23**
Sewer Rate per Month [(2)]	**$ 112.19**

Note:

[(1)] $71,350 / 53 Active connections = $1,346.23

[(2)] $1,346.23 / 12 Months = $112.19

4.5.5. Community Issues/Environmental Impacts

The improvements proposed in Alternative IV will require community coordination and assessment of environmental impacts. The community impacts included, but are not limited to, traffic disruptions and temporary shutdowns during construction tie in.

Environmental impacts will be thoroughly assessed in a MND. The MND will address roadway disruptions cause by the construction of both the gravity and force main pipelines, impacts due to the construction of the pump station, the placement of the emergency generator, odor control and permitting/regulations for crossing canals and major roadways.

4.5.6. Contractual Issues

The MPTCSD will enter into a sewer service agreement with the Keyes CSD to accept the MPTCSD wastewater. The Keyes CSD has an agreement with the City of Turlock that limits the volume and quality of wastewater discharged to the City of Turlock. Approval from both entities may be required before discharge can be approved.

4.6. Alternative V: Wastewater Consolidation with the Stanislaus County Public Safety Center

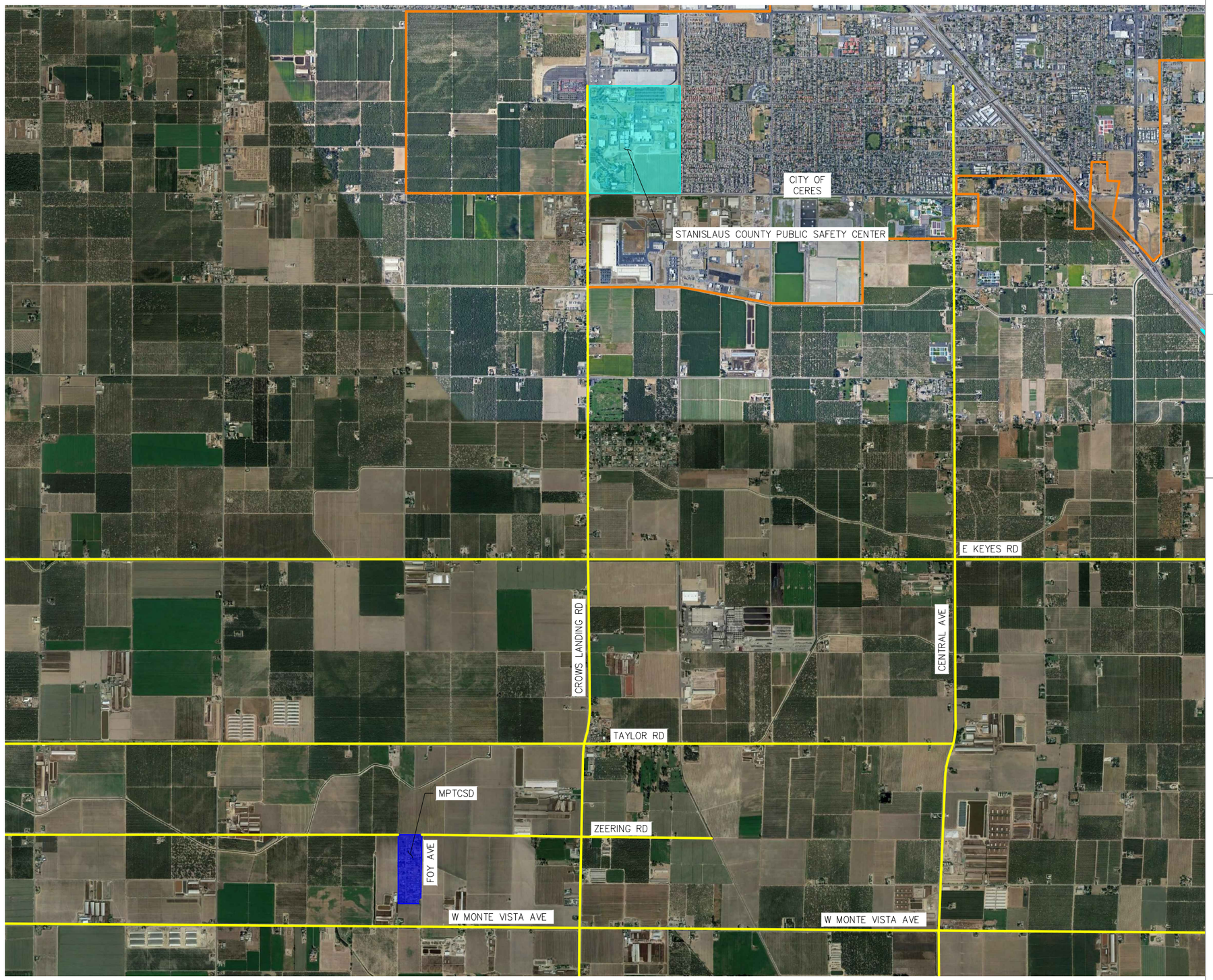
Alternative V proposes consolidation with the Stanislaus County Public Safety Center (SCPSC). The SCPSC is located at the intersection of Crows Landing Rd and W. Service Rd approximately 4.5 miles north of the MPTCSD. More specifically, the SCPSC is located at 200 Hackett Rd, Modesto, CA 95358. Figure 4-7 displays the SCPSC general location in relation to the MPTCSD. The SCPSC currently has a massive screening issue, as the SCPSC collects all of the wastewater from the SCPSC and the surrounding prisons. The SCPSC sewer collection system consists of two primary comminutors, a larger final comminutor and a single main lift station, equipped with two 500 gpm submersible pumps, that collects all of the shredded wastewater and directs it to the City of Modesto Sutter WWTP for ultimate treatment and disposal. Figure 4-8 displays the existing SCPSC sewer collection system layout. As the prison facilities flush a ton of thin plastics sheets, toothbrushes, and large objects, the SCPSC experiences frequent clogging within all three of their comminutors. As a repercussion of the comminutors clogging, the SCPSC must physically remove the accumulated solids and dispose of them manually at the City of Modesto's WWTP. As the facility is receiving more inorganic solids than expected and due to the frequent clogging of the comminutors allowing solids to bypass the grinding systems, the main lift station accumulates a thick film of solids within the top few feet of the lift station. As the submersible pump located at the bottom of the lift station is unable to break up the large solids film to conveyed them to the City of Modesto's WWTP, the solids must be physically removed via a vacuum truck once a month. The vacuumed solids are then delivered to the City of Modesto WWTP directly for disposal. The City of Modesto has expressed that they are nearing the end of accepting the SCPSC solid waste as it is a nuisance to dispose of. If a resolution is not found in the near future, the SCPSC will be left without means of proper disposal.

Based on the information stated above, the SCPSC has voiced that for consolidation to be feasible, a new screening facility would need to be constructed onsite that is capable of replacing both of the existing primary comminutors. The proposed new screening facility would consist of the addition of a new auger screen coupled with a washer/compactor capable of handling the system peak demand, 500 gpm. The new screening facility would be housed in a secure building located along Hackett Rd just east of the intersection of Crows Landing Rd and Hackett Rd. The proposed location, with additional proposed piping improvements, can be seen in Figure 4-9. The new screening facility was proposed by AM Consulting Engineers and approved by Black Water Engineering, SCPSC appointed project engineers. The SCPSC expressed that they do not have the manpower to operate the proposed new screening facility and that if this screening infrastructure was installed, the County would require the City of Modesto take control over the PSC lift station and new screening facility. The SCPSC would not permit the MPTCSD to hire a contract operator to operate and maintain the proposed screening facility due to the inability of a contract operator to tend to frequent night alarms. The City of Modesto will not willingly agree to take over the proposed new infrastructure and as a repercussion, would need to be mandated if the alternative is proven feasible. If the City of Modesto does not accept the operation of the lift station and new screening facility, the SCPSC would deny consolidation with MPTCSD.

Alternative V assumes that the City of Modesto would agree to operate and maintain the proposed new screening facility and SCPSC lift station for a monthly fee. Alternative V includes the construction of a

MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY



LEGEND

- CITY OF CERES SERVICE AREA BOUNDARY
- MPTCSD SERVICE AREA
- SCPSC LOCATION
- ROADWAYS

NORTH

SCALE IN FEET

0 3,000 FT

FIGURE 4-7
SCPSC GENERAL LOCATION

MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

- 10" GRAVITY PIPELINE
- 8" FORCE MAIN
- 6" GRAVITY PIPELINE
- SCPSC MAIN LIFT STATION
- SCPSC PRIMARY COMMINUTOR
- MAJOR ROADWAYS

NORTH

SCALE IN FEET

0 75 FT

FIGURE 4-8
SCPSC EXISTING SEWER INFRASTRUCTURE

MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

- 10" GRAVITY PIPELINE
- 8" FORCE MAIN
- 6" GRAVITY PIPELINE
- 4" MPTCSD FORCE MAIN
- SCPSC MAIN LIFT STATION
- SCPSC PRIMARY COMMINUTOR
- SCPSC NEW SCREENING FACILITY
- MAJOR ROADWAYS

NORTH

SCALE IN FEET

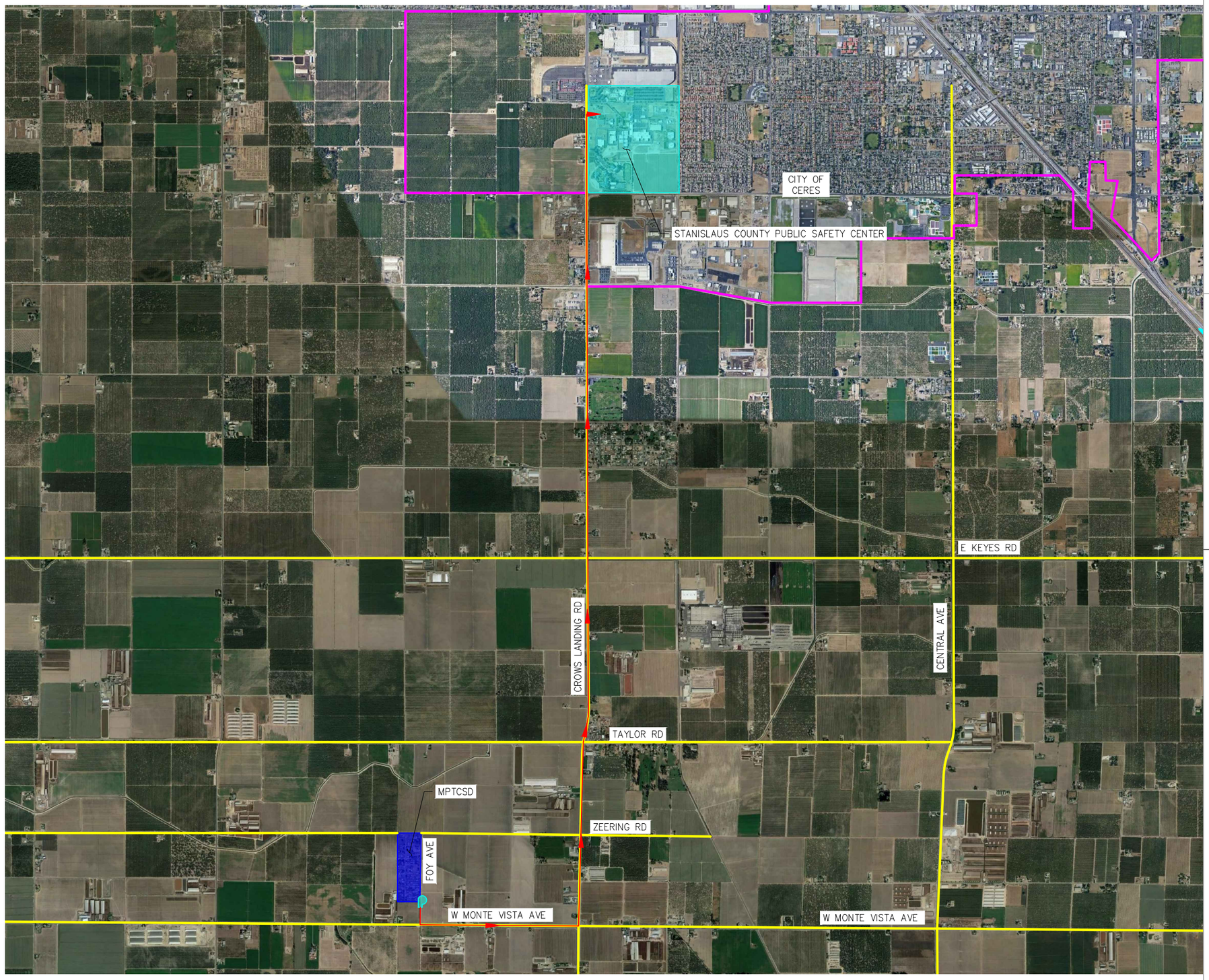
0 75 FT

FIGURE 4-9
SCPSC PROPOSED SCREENING FACILITY LOCATION AND COLLECTION SYSTEM IMPROVEMENTS

community wide sewer collection system within the MPCTSD, a centralized lift station within the MPTCSD, a force main to physically connect the MPTCSD to the SCPSC, a new screening facility and replacement of the two existing submersible pumps at the SCPSC main lift station.

The MPTCSD gravity sewer collection would be the same as Alternative's 2, 3 and 4 and would consist of a network of conventional gravity sewer mains and manholes. Wastewater will flow by gravity from the individual properties into the sewer mains and be collected at a single lift station at the southeast corner of the MPTCSD. The lift station would be equipped with two chopper pumps to chop up solids prior to discharging into the force main. This will reduce overall maintenance costs and clogging issues within the force main. The lift station would be equipped with SCADA monitoring sensors to allow operators to remotely monitoring and control the facility. Float switches would also be installed so that the lift station would function automatically. The MPTCSD lift station would discharge into an approximately 6-mile long 4" force main that would direct the community's wastewater directly into the new screening facility at the SCPSC. The force main is assumed to be installed within the existing right-of-way using mostly conventional pipe trenching methods. Directional drilling or trenchless construction (i.e. bore and jack) may be required under major traffic routes, canals, or other waterways. The force main will be installed to maintain a minimum cover of at least 3 feet following the natural contouring of the ground. The proposed alignment for the force main can be observed in Figure 4-10.

Discharging into the SCPSC and ultimately into the City of Modesto Sutter WWTP would require a startup connection fee and a monthly discharge fee for connecting to the system. Alternative V is consistent with RWQCB policies that encourage consolidation with a larger utility whenever feasible. This alternative would require that the MPTCSD authority expand their services to include sewer service in order to remain independent from the City of Modesto.



MONTEREY PARK TRACT

SEWER COLLECTION AND TREATMENT IMPROVEMENTS
FEASIBILITY STUDY

LEGEND

- CITY OF CERES SERVICE AREA BOUNDARY
- MPTCSD SERVICE AREA
- SCPSC LOCATION
- 4" FORCE MAIN
- ROADWAYS
- PROPOSED MPTCSD LIFT STATION

NORTH

SCALE IN FEET

0 3,000 FT

FIGURE 4-10
MPTCSD FORCE MAIN ALIGNMENT TO SCPSC

4.6.2. Reliability

A community wide gravity sewer collection system that discharges into a municipal WWTP is a sustainable treatment and disposal method that offers more affordable sewer rates for the residents, as well as ensures proper operations and maintenance is performed to allow the system to operate at its optimal potential and continuously meet the prescribed waste discharge standards. New gravity sewer collection systems, if designed correctly, require little maintenance and are very sustainable if route maintenance is performed. Annually, sewer collection systems should be thoroughly cleaned via hydro flushing to remove grease and other built-up materials within the pipelines.

Utilizing a pump station equipped with redundant pumps, SCADA controls and an emergency generator is a economical way to sustainably convey the community's raw wastewater. At a minimum, the pumping station would have one pump to accommodate peaks flows and a redundant pump in case of mechanical failure. Instrumentation and controls to enable remote monitoring of the facility and a building to house the electrical and mechanical equipment will also be installed.

The new screening facility being installed at the SCPSC shall be designed with simplicity and sustainability in mind. As it is known that the SCPSC experiences a large influx of solids, the proposed screening facility will be a robust designed capable of handling large solids. The facility will be equipped with a manual bypass bar screen that will be utilized if the auger screen and/or washer/compactor is down for maintenance or momentarily out of operation. The screening facility will be designed to utilize SCADA monitoring to ensure continuous operation is achieved.

4.6.3. Capital Costs

Capital costs for consolidation with the SCPSC include startup connection fees imposed by the City of Modesto, construction of a new gravity collection system within the MPTCSD, a centralized lift station that would provide sufficient head to convey the generated waste, via a 4" force main, to the SCPSC, replacement of the two existing 500 gpm submersible pumps at the SCPSC main lift station and the construction of a new screening facility. The City of Modesto would charge a startup connection fee of $2,400 per connection. The estimated cost for the gravity sewer collection system was approximately $155 LF and $8,400 per manhole, while the estimated cost for the force main was approximately $140 LF. The estimated capital cost to construct the proposed new centralized pump station is approximately $180,000 based on the head required to convey the community's wastewater, construction of the new lift station with wet well and possible land acquisition. A cost of $120,000 has been included in this alternative to fund the replacement of both of the existing submersible pumps at the SCPSC lift station. This cost includes furnish and installation costs. The new screening facility is estimated to cost approximately $420,000. The new auger screen, washer/compactor and bypass screen are estimated to cost approximately $210,000 based on previous project quotes and the growing costs regarding this infrastructure. It is estimated to cost approximately $210,000 to construct the concrete channels for the auger and bypass screen, foundation for the building and construction of the new CMU building. The building will be surrounded by a fence and equipped with surveillance equipment. A cost of $12,000 per connection has been included in this alternative to remove/dispose of the existing septic systems and construct a new sewer lateral out of each property. New laterals must be replaced simultaneously with the sewer systems upgrades. An estimated cost of $60,000 has also been included in this alternative to

provide SCADA controls. Mobilization, demobilization and bonding costs are estimated to be approximately 10% of the total capital construction costs.

Estimated capital costs for this Alternative are shown in Table 4-11. Only developed parcels are used in this estimate. Undeveloped parcels will be required to connect to the proposed sewer collection and disposal system as they develop. Table 4-11 also includes costs associated with engineering, environmental documentation, construction management and a contingency fund.

Table 4-11 Alternative V: Capital Construction Costs

Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	Mobilization, Demobilization, Bonds, Etc.	1	LS	$710,000	$710,000
2	6" Gravity Sewer Collection	3,800	LF	$155	$589,000
3	4" Force Main	30,000	LF	$140	$4,200,000
4	Manholes	10	EA	$8,400	$84,000
5	Lift Stations	1	EA	$180,000	$180,000
6	SCADA Controls	1	LS	$60,000	$60,000
7	Connection Fee	53	EA	$2,400	$127,200
8	Existing Septic Tank Destroy/Removal, New Sewer Lateral Addition	53	EA	$12,000	$636,000
9	Screening Facility	1	LS	$420,000	$420,000
10	SCPSC Lift Station Submersible Pump Replacement w/ Installation	2	EA	$60,000	$120,000
				Subtotal	**$7,126,200**
Contingency		10%	of Subtotal		$712,620
Engineering, Environmental, Construction Adm. (25%)		25%	of Subtotal		$1,781,550
				Total	**$9,620,370**
				Total Construction Cost per Active Connection [(1)]	**$181,516**

Note:
[(1)] $9,620,370 / 53 Active Connections = $181,516 per Active Connection

4.6.4. O&M Costs

Annual O&M costs in this alternative will include administrative costs, preventive/corrective maintenance on the sewer collection system, preventive/corrective maintenance to the MPTCSD pump station, preventive/corrective maintenance on the new screening facility, preventive/corrective maintenance on the SCPSC main lift station, a monthly discharge fee charged by the City of Modesto and a capital reserve to fund the replacement of short-lived assets. Administrative costs include the costs associated to produce and mail monthly bills. Preventive/corrective maintenance on the collection system include the costs required to hydroflush the gravity collection system and a reserve to fund the replacement of valves, pipelines and other aspects of the force main and gravity system that can unexpectedly fail at any time. A cost of $1000 has been included in this section to fund yearly hydro flushing and a cost of $180,000 has

been distributed across 20 years to fund the replacement of various parts of the collection system. Preventive/corrective maintenance to the pump station include annual cleaning, flushing and regulatory maintenance. A cost of $10,500 has been estimated for this. It has been estimated that the new screening facility will require approximately 4 hours of attention per week. At a rate of $120 per hour, an annual cost of 23,040 has been included in this alternative. As the SCPSC requires that the City of Modesto also operate and maintain the SCPSC main lift station, a cost of approximately 10,500 has been included in perform preventive/corrective maintenance on the lift station. A monthly discharge fee would be paid to the City of Modesto for treatment and disposal. The discharge fee is approximately $50 per month per household. A capital reserve has been included in this section to fund the replacement of the MPTCSD pump station after its live expectancy, 10 years. This section includes a $5,000 annual capital reserve to replace a $50,000 pump after 10 years.

The total O&M costs are divided by the number of users in the system to determine the total annual cost per active connection. For Alternative V, it is assumed that the annual O&M costs will be shared among developed parcels. Table 4-12 displays the annual operation and maintenance fees associated with Alternative V.

Table 4-12 Alternative V: Annual O&M Costs

Item	Cost
Administrative Costs	$ 5,000
Sewer Collection System	$ 10,000
MPTCSD Pumping Stations	$ 10,500
Screening Facility Operation/Maintenance	$ 23,040
SCPSC Lift Station Operation/Maintenance	$ 10,500
Discharge Fee	$ 31,800
Capital Reserve	$ 5,000
Total Annual O&M Cost	**$ 95,840**
Total Annual O&M Cost per Active Connection [(1)]	**$ 1,808.30**
Sewer Rate per Month [(2)]	**$ 150.69**

Note:

[(1)] $71,350 / 53 Active connections = $1,346.23

[(2)] $1,808.30 / 12 Months = $150.69

4.6.5. Disposal

Proposed wastewater consolidation with the SCPSC will direct the MPTCSD raw wastewater to the City of Modesto Sutter WWTP, where it will be screened and pretreated prior to being discharged into the City of Modesto Jennings WWTP for ultimate treatment and disposal. The City of Modesto currently utilizes three disposal methods. The three area as follows:

1. 2,500 acres of agricultural ranch land
2. San Joaquin River
3. Stored in City ponds

4.6.6. Community Issues/Environmental Impacts

Construction of a community sewer collection system and consolidation force main will likely produce temporary disruptions on traffic. Alternative V will likely encounter the following environmental issues which will carefully be addressed in the Mitigated Negative Declaration (MND):

- Roadway disruptions during construction of force mains. Traffic will likely be rerouted and access to individual homes constrained for short periods. Careful noticing will be required.
- Pump stations and standby power facilities may require visual mitigation depending upon location.
- Odor control facilities may be required at the pump station.
- Disposal method for screenings.
- Permitting and regulatory requirements for crossing canals and waterways may be required.

4.6.7. Contractual Issues

The MPTCSD will enter into a sewer service agreement with the City of Modesto to accept the discharge of wastewater generated from the community. The City of Modesto also has an agreement with the City of Turlock to allow discharge of the treated effluent wastewater to the Turlock WWTP. Approval from both entities may be required before discharge can be approved.

4.7. Summary

Table 4-13 provides a summary of the capital construction and O&M costs of the three alternatives. Table 4-14 provides a summary of advantages and disadvantages of the three alternatives.

Table 4-13 Summary of Alternatives

	Alternative I	Alternative II	Alternative III	Alternative IV	Alternative V
Capital Costs					
Capital Construction	$4,908,858	$9,373,698	$4,882,348	$12,202,988	$9,620,370
Capital Costs per Active Connection	$92,620	$176,862	$92,120	$230,245	$181,516
Operation and Maintenance Costs					
Annual O&M Costs	$51,000	$68,024	$44,500	$71,350	$95,840
Annual O&M Costs per Active Connection	$962	$1,283	$840	$1,346	$1,808
Monthly O&M Costs per Active Connection	$80.19	$106.96	$69.97	$112.19	$150.69

Table 4-14 Summary of Alternatives: Advantages and Disadvantages

	Advantages	Disadvantages
Alternative I	●Avoid costly and disruptive construction of a community-wide collection system ● Homeowners can maintain their independence from a community system.	● Onsite systems require constant oversight for operation and maintenance. ● Small lot sizes could pose an impediment to adding treatment onsite and/or limit construction of new leach fields. ● The RWQCB may not be willing to permit onsite systems.
Alternative II	● Use of a municipal wastewater system provides greater flexibility in utilizing and protecting the community's groundwater supply. ● Overall operation and maintenance of the system is provided by a municipality to ensure routine maintenance is being performed.	● Extensive infrastructure is required for the new sewer collection system, pumping station, and force mains. ● The cost to construct the sewer system that will transport the wastewater from the community to the City of Ceres will have high capital and maintenance costs.
Alternative III	● Use of a municipal wastewater system provides greater flexibility in utilizing and protecting the community's groundwater supply.	● Extensive infrastructure is required for the new sewer collection system.

Table 4-14 Summary of Alternatives: Advantages and Disadvantages

	Advantages	Disadvantages
	● Overall operation and maintenance of the system is provided by a contract worker to ensure routine maintenance is being performed. ● The MPTCSD will maintain their independence from a municipality. ● Beneficial reuse can be used for agriculture in the area to benefit the farmers and landowners.	● Extensive amount of land is required to construct the wastewater treatment unit and the disposal leach field. ● Nearby residence my disapprove of the construction of the treatment unit.
Alternative IV	● Use of a municipal wastewater system provides greater flexibility in utilizing and protecting the community's groundwater supply. ● Overall operation and maintenance of the system is provided by a municipality to ensure routine maintenance is being performed.	● Extensive infrastructure is required for the new sewer collection system, pumping station, aeration system and force mains. ● The cost to construct the sewer system that will transport the wastewater from the community to the Keyes CSD will have high capital and maintenance costs.
Alternative V	● Use of a municipal wastewater system provides greater flexibility in utilizing and protecting the community's groundwater supply. ● Overall operation and maintenance of the system is provided by a municipality to ensure routine maintenance is being performed.	● Extensive infrastructure is required for the new sewer collection system, lift stations, screening facility and force mains. ● The cost to construct the sewer system that will transport the wastewater from the community to the SCPSC will have high capital and maintenance costs. ● Assumes that the City of Modesto would agree to operate/maintain the new screening facility and SCPSC lift station. ● Screening facilities have high maintenance and disposal requirements.

CHAPTER 5 ALTERNATIVE EVALUATION

5.1. Alternative Comparison

The five alternatives presented in this Study are considered to be the most feasible alternatives to provide the MPTCSD with proper wastewater treatment and disposal that meets current standards and regulations. This Chapter provides an evaluation of all five alternatives and provides a recommendation based on the findings of the comparison. The evaluation criteria used to evaluate the alternatives includes reliability, complexity, and life-cycle costs.

5.1.1. Reliability

Reliability refers to the ability of a particular alternative to provide reliable wastewater treatment and disposal in terms of quantity and quality. The new advanced OWTS proposed for Alternative I would be designed and constructed to treat the municipal wastewater generated from the MPTCSD to standards set by governing agencies. Alternative I would produce effluent with a total nitrogen concentration below the required 10 mg/l MCL. The groundwater quality would be tested and would be expected to be in compliance with the total nitrogen MCL.

Alternative II will provide the community with a sewer collection system that would be monitored by the new wastewater department to ensure constant inspections and maintenance are completed in a timely manner. The City of Ceres would provide proper treatment and disposal of the wastewater generated from the MPTCSD. This alternative would provide the community with the most reliable means of wastewater treatment and disposal.

Alternative III will provide a level of reliability comparable to that of Alternative II, except the MPTCSD would have to monitor the treatment and disposal of the community's wastewater. Alternative III would provide treatment of the community's wastewater within the community's boundary using trusted and tested treatment and disposal methods. Just like Alternative I, Alternative III would reduce the concentration of total nitrogen within the treated wastewater effluent below the 10 mg/l MCL. The disposal method for this alternative may need to be relocated in the future to ensure proper percolation of the wastewater through the soil after a certain amount of time to maximize reliability.

Alternative IV will provide the MPTCSD with a reliable means of sewer collection and disposal. The new sewer infrastructure would be monitored by the new wastewater department, via a contract operator. This will guarantee that the proposed new system will receive constant inspections and maintenance. The Keyes CSD and ultimately the City of Turlock will be responsible for treatment and disposal. This alternative, much like alternatives II and V, would provide the community with the most reliable means of wastewater treatment and disposal.

Alternative V consists of consolidating with a neighboring County facility, SCPSC, that currently discharges into the City of Modesto's WWTP's for ultimate treatment and disposal. This alternative resolves existing issues that the SCPSC sewer system has and provides reliable means of dispose for the MPTCSD

wastewater. This alternative is has high maintenance requirements but much like alternatives II and V, would provide the community with the most reliable means of wastewater treatment and disposal.

5.1.2. Complexity

Complexity refers to operational requirements of each alternative. The MPTCSD is a small community with limited resources. Construction of new advanced OWTS would be simple to construct but difficult to maintain. Coordination with each individual homeowner would need to be incorporated into the operation and maintenance scope to ensure the new treatment systems are continuously functioning at optimal performance. New monitoring systems would be equipped to each OWTS and monitored by the homeowner.

Alternative II will require minimal maintenance per year. The only maintenance that would be required for the sewer system would be annual pumping and removal of scum from within the sewer pipelines and pumping station. To conduct this yearly maintenance on the sewer collection system and pumping station, costly equipment such as a vacuum truck and a hydro flusher would be required. To reduce the cost of the maintenance, this yearly maintenance would be outsourced to a reliable entity.

Alternative III would require complex operational requirements. A part-time operator would be required to operate the wastewater treatment unit. The operator would be taught by Orenco how to operate the unit free of charge. The operator would have lifetime access to Orenco's technical support in cases where problems arise that were not part of the training. The unit would need to be continuously monitored to ensure the unit is functioning properly and the media does not reach breakthrough. The new centralized leach field would require monitoring to ensure that the wastewater is appropriately percolating through the soil and buildup of the effluent wastewater is not occurring. This alternative would transition the responsibility of monitoring and maintaining the treatment system to the MPTCSD.

Alternative IV is an intrinsic, self-sustaining sewer collection and disposal system that includes common wastewater infrastructure well known throughout the industry. Alternative IV sewer collection system would require annual maintenance, such as hydro flushing to ensure sanitary sewer build up and ultimately overflows do not occur. The proposed lift station would be equipped with float sensors and SCADA monitoring to provide a self-operating system and would only require annual maintenance. The proposed oxygenation system requires minimal attention from a contract operator. The oxygenation system would discharge quantities of oxygen to reduce odors and corrosion due to hydrogen sulfide gases.

Alternative V, much like alternatives II and IV, consist of wastewater consolidation infrastructure that would physically connect the MPTCSD to a municipality. The proposed sewer collection system does not have any daily operational requirements. The sewer collection system would only need to be hydro flushed annually to reduce buildup and the avoid sanitary sewer overflows. The proposed lift station would be equipped with SCADA monitoring controls to allow the contractor operator to monitor the system remotely. The proposed new screening facility, if properly designed, would function on its own and would require approximately 4 hours of attention a week from a contract operator. The screenings would need to be routinely removed and disposed over per the SWRCB requirements. The proposed screening infrastructure and disposal of sewer screening is a very common operation and is well known throughout the industry.

5.1.3. Life Cycle Cost

Life cycle cost refers to the sum of the capital construction costs and recurring O&M costs over the full life span of the feasible alternatives presented. Capital construction costs for Alternative I include the cost of new Orenco Advantex AX20-RT/AX25-RT advanced OWTS, replacement of the existing septic systems, and construction of new leach fields that meet current standards. Initial costs for Alternative II include those associated with construction of a 3,800-foot-long gravity sewer system, a pump station, and a 27,000-foot-long force main that will deliver the wastewater from the MPTCSD to the City of Ceres WWTP. Capital construction costs for Alternative III include the cost of constructing a 3,800-foot-long gravity sewer system, furnishing/installing new Orenco AdvanTex AX-Max centralized wastewater treatment units, new Xerxes septic tanks, and constructing a new centralized leach field that meets current standards. Alternative IV consists of the construction of a 3,800 LF gravity sewer collections system, a centralized lift station, approximately 41,200 LF of 4" force main and the addition of an oxygenation system at the Keyes CSD lift station to reduce odors and corrosion due to hydrogen sulfide gases. Alternative V capital improvements include the addition of a new gravity sewer collection system within the MPTCSD, a new lift station to pump the collected community's waste to the SCPSC, approximately 30,000 LF of 4" force main and the construction of a new screening facility at the SCPSC.

Annual O&M costs refer to the recurring cost to operate and maintain each of the feasible alternatives presented. Typical recurring O&M costs are labor, equipment repairs, sampling, electricity, reporting, and a capital improvement reserve. The operation and maintenance costs for Alternative I were estimated based on administration costs, annual O&M costs for the OWTS and a capital reserve. O&M costs for Alternative II include administrative costs, preventive/corrective maintenance on the sewer collection system, preventive/corrective maintenance to the pump station, a monthly discharge fee charged by the City of Ceres and a capital reserve to fund the replacement of short-lived assets. The O&M costs for Alternative III include administrative costs, preventive/corrective maintenance of the sewer collection system, annual O&M costs associated with the centralized treatment facility and a capital reserve to fund the replacement of short-lived assets. Annual O&M costs for Alternative IV include administrative costs, preventive/corrective maintenance of the sewer collection system, preventive/corrective maintenance of the community's lift station, a monthly discharge fee by the Keyes CSD and a capital reserve to fund the replacement of short-lived assets. Alternative V include administrative costs, preventive/corrective maintenance on the gravity sewer collection system, preventive/corrective maintenance to the new MPTCSD pump station, operations/maintenance of the proposed screening facility, operations/maintenance of the SCPSC lift station, a monthly discharge fee charged by the City of Modesto and a capital reserve to fund the replacement of short-lived assets.

Table 5-1 shows a comparison of the life-cycle cost for all feasible alternatives presented. The comparison is made for a 20-year and 30-year life and uses a 2.5 percent discount rate. The life-cycle costs are expressed in 2021 US dollars.

Table 5-1 Life-Cycle Costs Comparison

	Alternative I	Alternative II	Alternative III	Alternative IV	Alternative V
Capital Construction	$4,908,858	$9,373,698	$4,882,348	$12,202,988	$9,620,370
O&M Cost (20-yr)	$795,047	$1,060,437	$693,718	$1,112,291	$1,494,065
O&M Cost (30-yr)	$1,067,445	$1,423,762	$931,398	$1,493,382	$2,005,959
20-yr Life-Cycle	**$5,703,905**	**$10,434,135**	**$5,576,065**	**$13,315,279**	**$11,114,435**
30-yr Life-Cycle	**$5,976,303**	**$10,797,460**	**$5,813,746**	**$13,696,370**	**$11,626,329**

The lowest life-cycle cost to construct one of the feasible alternatives and maintain treatment and disposal of the MPTCSD wastewater for 20 years is Alternative III. For a 20-year life cycle, Alternative II is approximately 87 percent higher than Alternative III, Alternative I is approximately 2 percent higher than Alternative III, Alternative IV is approximately 139 percent high than Alternative III and Alternative V is approximately 99 percent higher than Alternative III.

The lowest life-cycle cost to construct one of the treatment Alternatives and maintain treatment and disposal of the community's wastewater for 30 years is Alternative III. For a 30-year life cycle, Alternative II is approximately 85 percent higher than Alternative III, and Alternative I is approximately 3 percent higher than Alternative III, Alternative IV is approximately 136 percent high than Alternative III and Alternative V is approximately 99 percent higher than Alternative III.

5.2. Recommended Alternative

Alternative III is recommended based on the evaluation and comparison of alternatives presented in this Study. Alternative III is recommended for the following reasons:

- It will provide supplemental treatment for the wastewater generated from the MPTCSD utilizing only a part time operator that will be trained by the Orenco company free of charge.
- Maintenance can be performed easily at a centralized location.
- It will provide the MPTCSD with a reliable treatment method that meets current standards and regulations set by governing agencies.
- Will divert the treatment from the stringent regulations that are growing for the use of septic systems to a more permanent treatment method.
- It is the most cost-effective option to treat and dispose of the community's wastewater.
- It would transition the responsibility of maintaining the treatment systems from individual homeowner to the MPTCSD.

5.3. Recommended Next Steps

The recommended next step towards implementing Alternative III would be to seek approval from MPTCSD's Board of Directors to implement the recommended alternative. Once approved, the preparation of the environmental and financial packages would begin. Ultimately, MPTCSD would receive grant funding to complete the construction of the sewer collection system and the treatment/disposal of the centralized WWTP.

In the meantime, the MPTCSD should continue monitoring and utilizing their individual septic tanks. If an abundance of septic systems begin to fail, the governing agency should implement the recommended alternative as quick as possible to avoid costly charges and contamination of the groundwater.

Appendix A –
MPTCSD Existing Septic System Survey

Monterey Park Tract
Septic Tank Survey Results
2017

Self-Help Enterprises
Maria Salazar
Report Completed November 2018

Table of Contents

Introduction:

Monterey Park Tract is located southwest of Ceres in central Stanislaus County. The Median Household Income for the area is $30,000, as determined by the 2017 Median Household Income Survey conducted by Rural Community Assistance Corporation. Wastewater disposal in Monterey Park Tract is by individual onsite septic systems.

Purpose:

In October-December of 2017, staff members of Self-Help Enterprises conducted a Septic Tank Survey to identify septic system performance, community data and septic system and sewer system preferences.

Methodology:

In October, with the approval of the Monterey Park Tract Community Services District (MPT CSD), Self-Help Enterprises provided surveys in Spanish and English to the 54 property owners and/or tenants. The MPT CSD and Self Help Enterprises conducted septic tank survey that included questions about each resident's septic disposal system. The questions asked about pumping frequency, grey water disposal, number of people living in the household and other issues (see attached survey form). Self-Help Enterprises conducted three separate mailings, one door-to-door outreach day and compiled the data. The main findings of the survey are included below under "Survey Results".

Survey Results:

Survey results documented that about 12 % of all surveyed systems had pumped their tanks at least one time in the past 3 years, with one resident reporting yearly scheduled pumping. Based on the information obtained residents paid an average of $300.00 to pump their septic tank. Forty-five percent of the area systems surveyed are running their grey water in their septic tanks, with only 6% of those surveyed running it into their lawns. This may lead to residents overloading their septic system.

The survey has identified that the entire community of Monterey Park Tract that is currently unconnected to sewer, with the nearest public sewer system five miles away in the City of Ceres. The results show that out of 33 surveyed residents/properties, only 30% prefer public sewer to a septic tank system. However, at the December 2017 Monterey Park Tract Community Services District board meeting, after presenting the septic survey results a majority of the community favored moving forward with the planning study project. Community members voiced support because although many property owners did not want to be forced to connect, they did not want to deprive their neighbors from the option or information to result from the study. With the community support, the Monterey Park Tract CSD board voted in favor of moving forward with the planning project.

Based on the needs and wants of the community a future project can provide the area with a sanitary sewer disposal system. There would be approximately 51 residential connections with approximately 3 vacant lots.

Septic Tank Survey Results

Overall – Based on 33 septic tank surveys

Calculations

There are approximately 51 residential connections and 3 lots that are currently vacant. Out of the 54 residential properties contacted, we had 33 survey responses, with 21 residents/property owners we were unable to contact. Overall, we had a 60% response rate.

System preference- Which do you prefer?

Total - Based on 60% response rate

1. Public Sewer 10/33= .30 = **30 %**
2. Septic Tank 23/33 = 0.696 = **70 %**

Has the septic disposal system ever given you any problems?

Total - Based on 48% response rate

1. Yes 2/16= .125 = **12.5%**
2. No 14/16 = .875= **87.5 %**

In the last 3 years how many times has your septic tank been pumped?

Total - Based on 42% response rate

1. 0 times 9/14 = 0.64 = **64%**
2. 1 time - 4/14= .285 = **28.5%**
3. Unkown- 1/14= .07= **7%**

Where does your septic water go?

Total - Based on 55% response rate

1. Leachline 9/18= .50= **50%**
2. Seepage pit/both 4/18= .22= **22%**
3. Don't know 5/18= .28= **28%**

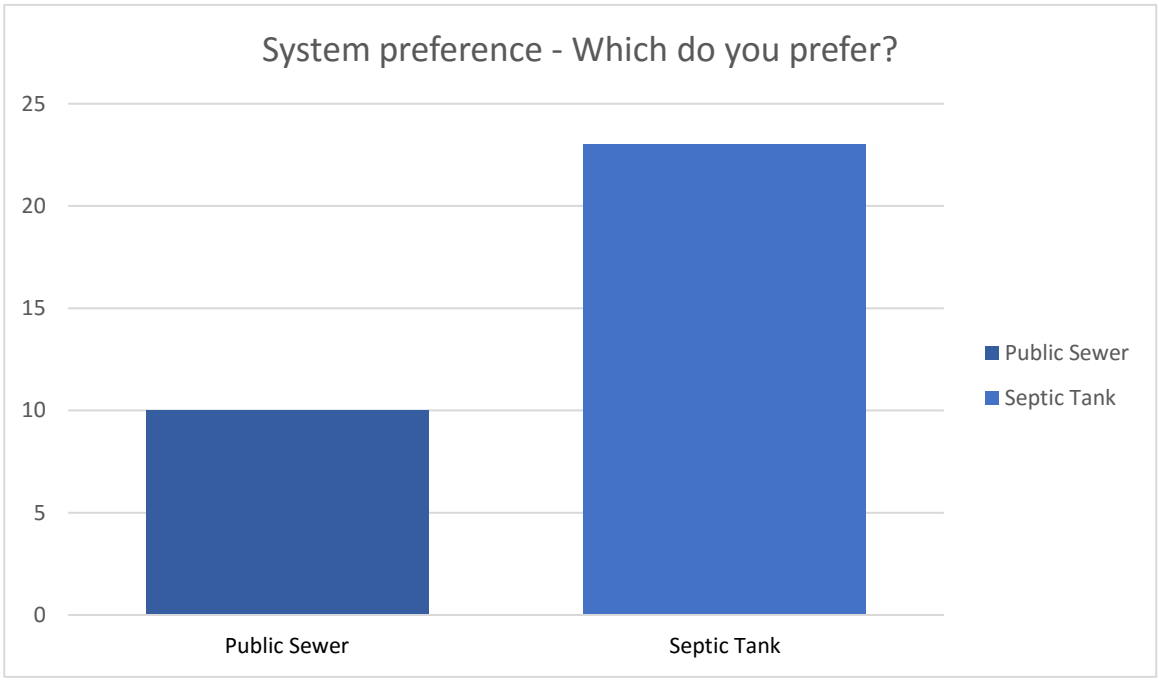
Greywater disposal?

Total - Based on a 55% response rate

1. Septic Tank 15/18= .83= **83%**
2. Yard 2/18= 0.11 = **11%**
3. Unknown 1/18= .06= **6%**

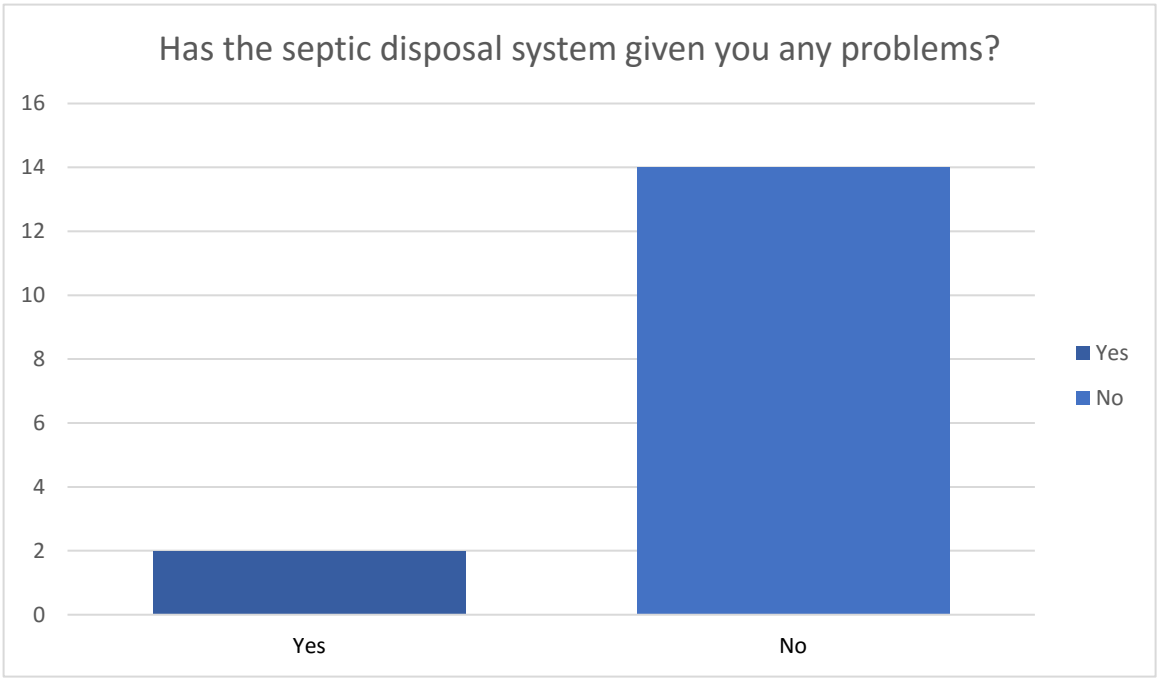
System preference - Which do you, prefer?

Answer	#	%
Public Sewer	10	30 %
Septic Tank	23	70 %



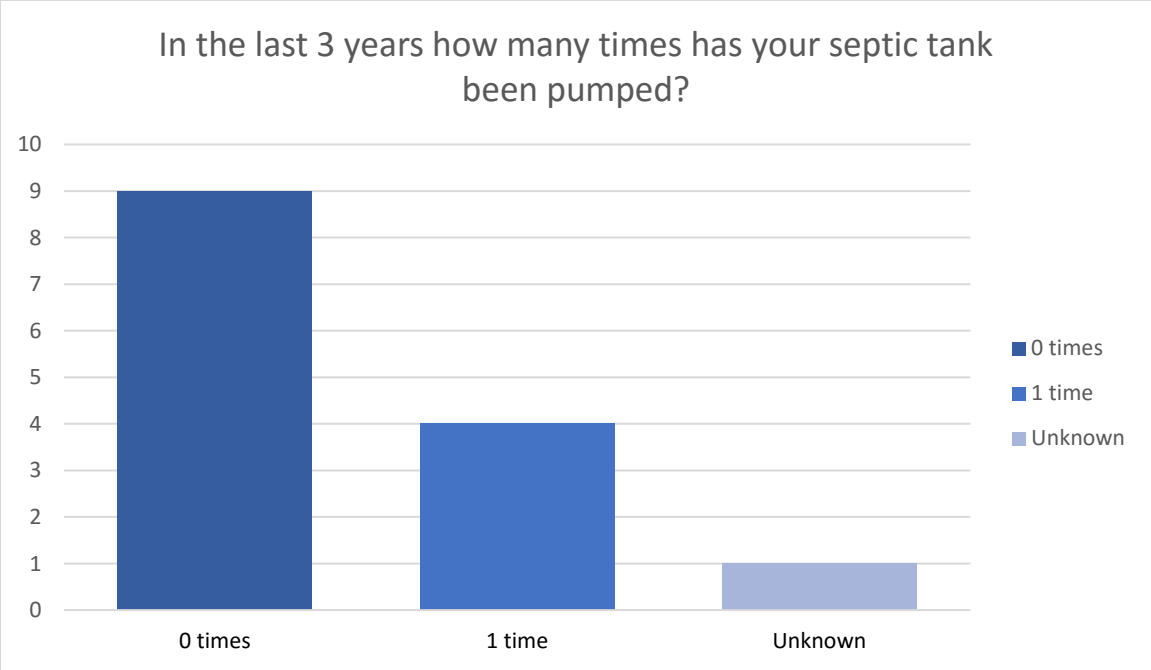
Has the septic disposal system ever given you any problems?

Answer	#	%
Yes	2	12.5 %
No	14	87.5 %



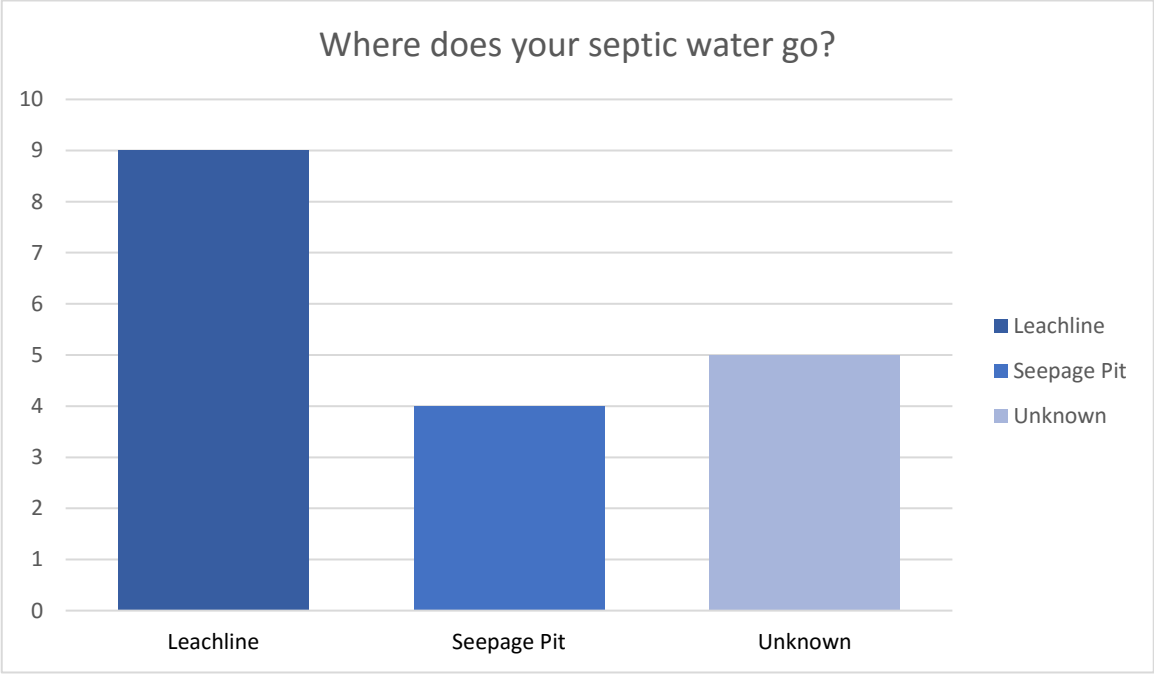
In the last 3 years how many times has your septic tank been pumped?

Answer	#	%
0 times	9	64 %
1 time	4	28.5 %
I don't know	1	7%



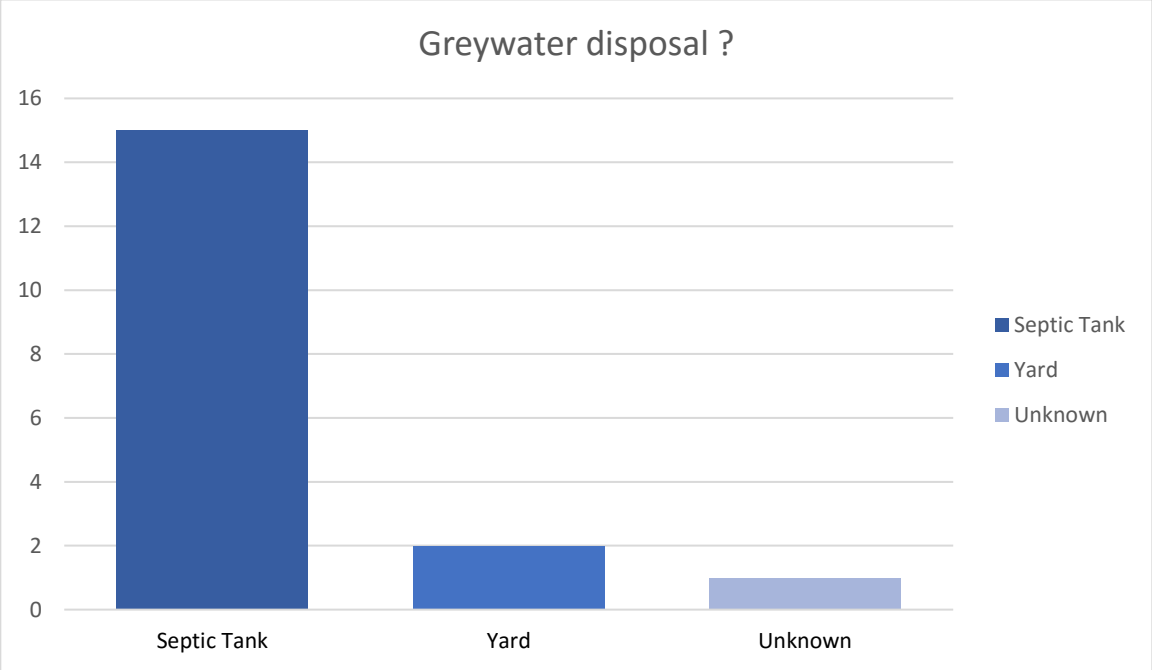
Where does your septic water go?

Answer	#	%
Leach line	9	50 %
Seepage pit/both	4	22 %
Unknown	5	28 %



Greywater disposal?

Answer	#	%
Septic tank	15	83%
Yard	2	11%
Unknown	1	6 %



Appendix B –
City of Turlock Consolidation Denial

Brandon.Cauble@am-ce.com

From: David Huff <DHuff@turlock.ca.us>
Sent: Friday, January 29, 2021 3:22 PM
To: Brandon.Cauble@am-ce.com
Subject: RE: Monterey Park Tract Community Services District - Wastewater Consolidation

Thank you, Brandon.

Unfortunately, Turlock has decided not to move forward with this project.

Respectfully,

David Huff
Water Quality Control Division Manager
City of Turlock
E: dhuff@turlock.ca.us
O: 209 668 5451
C: 209 535 0287
F: 209 668 5569

From: Brandon.Cauble@am-ce.com [mailto:Brandon.Cauble@am-ce.com]
Sent: Thursday, January 28, 2021 3:09 PM
To: David Huff
Cc: alfonso.manrique@am-ce.com
Subject: RE: Monterey Park Tract Community Services District - Wastewater Consolidation

Good Afternoon Davis,

I hope all is well.

I wanted to touch base with you regarding my previous emails.

The District is wanting to move forward with this Project and cannot until we meet to discuss possible consolidation.

I would like to take this time to request a few days your are available next week to have a very brief meeting about the proposed Project.

Please let me know if you have any questions.

Thank you,

Brandon Cauble, EIT
Assistant Engineer

Appendix C –
Wastewater Treatment Technology Brochures

ZCL | XERXES®

making a lasting difference®

Fiberglass Storage Tanks

for Water Applications

Fiberglass Water and Wastewater Tanks

One Company. Two Trusted Brands

Xerxes® and ZCL® are widely recognized and well-respected brands that are part of the ZCL Composites Inc. group of companies. For more than three decades, ZCL, a publicly traded company, has manufactured underground and aboveground storage tanks for a wide range of liquid storage applications. Our growth has climbed steadily as fiberglass has increasingly become the preferred material of tank construction.

We fabricate products from manufacturing facilities strategically located throughout North America. Xerxes, with its distinct red product color, is our U.S. brand, while ZCL with a well-established green product, is our Canadian brand. With both brands, customers can be confident that they selected the highest-quality storage tank available that is designed and manufactured by a team of experienced professionals dedicated to providing products that "make a lasting difference."

Experience Matters

Like most market leaders, our decades-deep track record of innovation and product performance separates us from competitors. With more than 200,000 storage tanks installed in North America, we have a significant base of satisfied customers who continue to specify the Xerxes and ZCL brands. Today, we are North America's largest manufacturer of underground storage tanks, and we provide products for many of the world's largest corporations as well as individual property owners needing bulk liquid storage.

The Xerxes and ZCL brands are most widely known for safely storing motor fuels and other petroleum products at thousands of retail, government and commercial fueling facilities throughout North America and the world. In this highly regulated industry, structurally strong, corrosion-resistant, product-tight tanks with a proven tank record are the only option most customers consider. Increasingly, agencies and individuals all over the U.S. and Canada place a greater significance on our water resources, and simultaneously the quality of our water-storage infrastructure.

At Xerxes and ZCL, we have applied years of experience fabricating petroleum tanks to designing tanks and accessories specifically for the extensive water and wastewater industry. We start with the same design fundamentals that go into manufacturing fuel tanks — material that provides long-term corrosion resistance, leak-free design and a robust structure. We then design accessories that address the unique needs of the water industry. The result is a continually evolving range of innovative products.

ZCL | XERXES®

making a lasting difference®

Fiberglass Storage Tanks

for Water Applications

Fiberglass Water and Wastewater Tanks

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AdvanTex® Treatment Systems

AX-Max™

Manufactured by **Orenco Systems®, Inc.**

This full-sized AdvanTex® AX-Max™ wastewater system was installed at a 50-site campground in the LaPine State Park, LaPine, Oregon, to handle design flows of 7,500 gpd (28.4 m^3/day).

Decentralized Wastewater Treatment for Commercial Properties and Communities

Applications:

- Municipal systems
- Subdivisions, apartments
- Golf course developments, resorts
- Manufactured home parks
- Parks, RV parks, campgrounds
- Schools, churches, businesses
- Rest areas, truck stops

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AdvanTex® AX-Max™ Treatment System

Reliable, Energy-Efficient Wastewater Treatment.

This array of AX-Max units provides wastewater treatment for a large resort and camping area in New Zealand.

Anywhere!

For more than a decade, Orenco's AdvanTex® Treatment Systems have been providing reliable, energy-efficient wastewater treatment inside and outside the urban core. AdvanTex textile filter technology has been winning awards and coming out on top in field trials and demo projects, all over the world.

Orenco's newest product in the AdvanTex line is the AX-Max™: a completely-integrated, fully-plumbed, and compact wastewater treatment plant that's ideal for commercial properties and communities. It's also ideal for projects with strict discharge limits, limited budgets, and part-time operators.

A Sustainable Solution for Wastewater Treatment

Like all AdvanTex Treatment Systems, the AX-Max is a recirculating media filter that produces outstanding effluent quality suitable for re-use, with significant nutrient-removal. AX-Max systems are highly energy efficient, using less than 2 kWh per 1000 treated gallons (3.785 m^3). And they require minimal O&M compared to conventional technologies. Consequently, AdvanTex can earn LEED credits for your projects.

Full-sized AX-Max units can be configured as a plug & play wastewater treatment system capable of handling up to 15,000 gpd (56.8 m^3/day) design flow when receiving primary-treated effluent. Alternately, a similar unit can be configured as a 5,000 gpd (18.9 m^3/day) system capable of processing raw sewage.

AdvanTex® AX-Max™ Treatment System

Units range from 14'-42'. This 21' unit is ideal for lower flows.

Set, Plumb, Wire, and Go

The AX-Max is pre-plumbed and easy to install, so AX-Max projects can meet the tightest deadlines. The entire system — including treatment, recirculation, and discharge — is built inside an insulated fiberglass tank that ranges from 14'-42' (4.3-12.8 m) in length. AX-Max's can be installed above-ground — for maximum versatility in temporary or variable-flow situations — or in-ground. They can also be installed individually or in multi-tank arrays, treating up to 1 MGD (3,800 m^3/day).

For Every Climate and Condition

The AX-Max provides excellent treatment anywhere. AX-Max systems have been installed in-ground at Malibu's famous beach parks, the Boy Scout's National Jamboree site in West Virginia, and New Zealand's resort at Glendhu Bay. Two more were recently installed in-ground in Soyo, Africa, to serve a new hospital. Other AX-Max systems have been installed above-ground on top of Alaska's frozen tundra and St. Lucia's volcanic rock. Still more have been installed above-ground in mining camps from Alberta to Texas and, in the Midwest, at a U.S. Department of Defense demo site.

Benefits

- Containerized, fully-plumbed
- Capable of meeting stringent effluent limits
  ~ Re-use quality effluent
  ~ Significant reductions in ammonia, total nitrogen
- Portable, versatile, and compact
- Above-ground or in-ground installation
- Easy to set
- Simple to operate
- Low energy usage; <2 kWh per 1000 treated gal. (<2 kWh per 3.785 m^3)

Textile Treatment Media

The treatment medium is a uniform, engineered textile. AdvanTex textile is easy to clean and allows loading rates as high as 50 gpd/ft^2 (2000 L/day/m^2).

Effluent Distribution

High-quality, low horsepower pumps micro-dose the treatment media at regular intervals, and proprietary spin nozzles efficiently distribute the effluent, optimizing treatment.

Telemetry Controls

Orenco's telemetry-enabled control panels use a dedicated phone line or ethernet connection, ensuring 24/7 monitoring and real-time remote control.

AdvanTex® AX-Max™ Treatment System

Carefully Engineered by Orenco

Orenco Systems has been researching, designing, manufacturing, and selling leading-edge products for small-scale wastewater treatment systems since 1981. The company has grown to become an industry leader, with about 250 employees and 300 points of distribution in North America, Australasia, Europe, Africa, and Southwest Asia. Our systems have been installed in more than 60 countries around the world.

Orenco maintains an environmental lab and employs dozens of civil, electrical, mechanical, and manufacturing engineers, as well as wastewater treatment system operators. Orenco's technologies are based on sound scientific principles of chemistry, biology, mechanical structure, and hydraulics. As a result, our research appears in numerous publications and our engineers are regularly asked to give workshops and trainings.

Orenco Systems®
Incorporated

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Project Summary

Point Dume State Beach and Preserve, Southern California

In spring, 2011, Los Angeles County needed to quickly upgrade restrooms at Malibu's Point Dume State Beach in time for the long — and busy — Memorial Day weekend. The county's engineer specified three AX-Max's, one for each restroom, and the units were installed in a matter of days. Each unit was custom-painted to blend into the surrounding sand or asphalt. After disinfection, the treated effluent is dispersed right into the sand. Point Dume is part of a large-scale upgrade of L.A. County beach parks, virtually all of which include AdvanTex Treatment Systems of various sizes and configurations.

Fully Supported by Orenco

AdvanTex Treatment Systems are part of a comprehensive program that includes ...

- Designer, installer, and operator training
- Design assistance, technical specifications, and plan reviews
- Installation and operation manuals
- Lifetime technical support

Distributed by:

Technical Data Sheet

AdvanTex® AX-Max Treatment Systems

Orenco Systems®
Incorporated
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+1 541-459-4449

Applications

Orenco's AdvanTex® AX-Max is a complete, fully-plumbed, AdvanTex Wastewater Treatment Plant for residential, commercial, municipal, and mobile applications with medium-to-large-flows and permits requiring secondary treatment or better. It can be used as a stand-alone unit or in multi-unit arrays under adverse conditions in a wide range of environments.

The AX-Max is ideal for:

- Small sites and poor soils
- At-grade or above-grade installations
- Mobile and temporary installations
- Disaster response sanitation
- Remote locations
- Extreme hot or cold climates

General

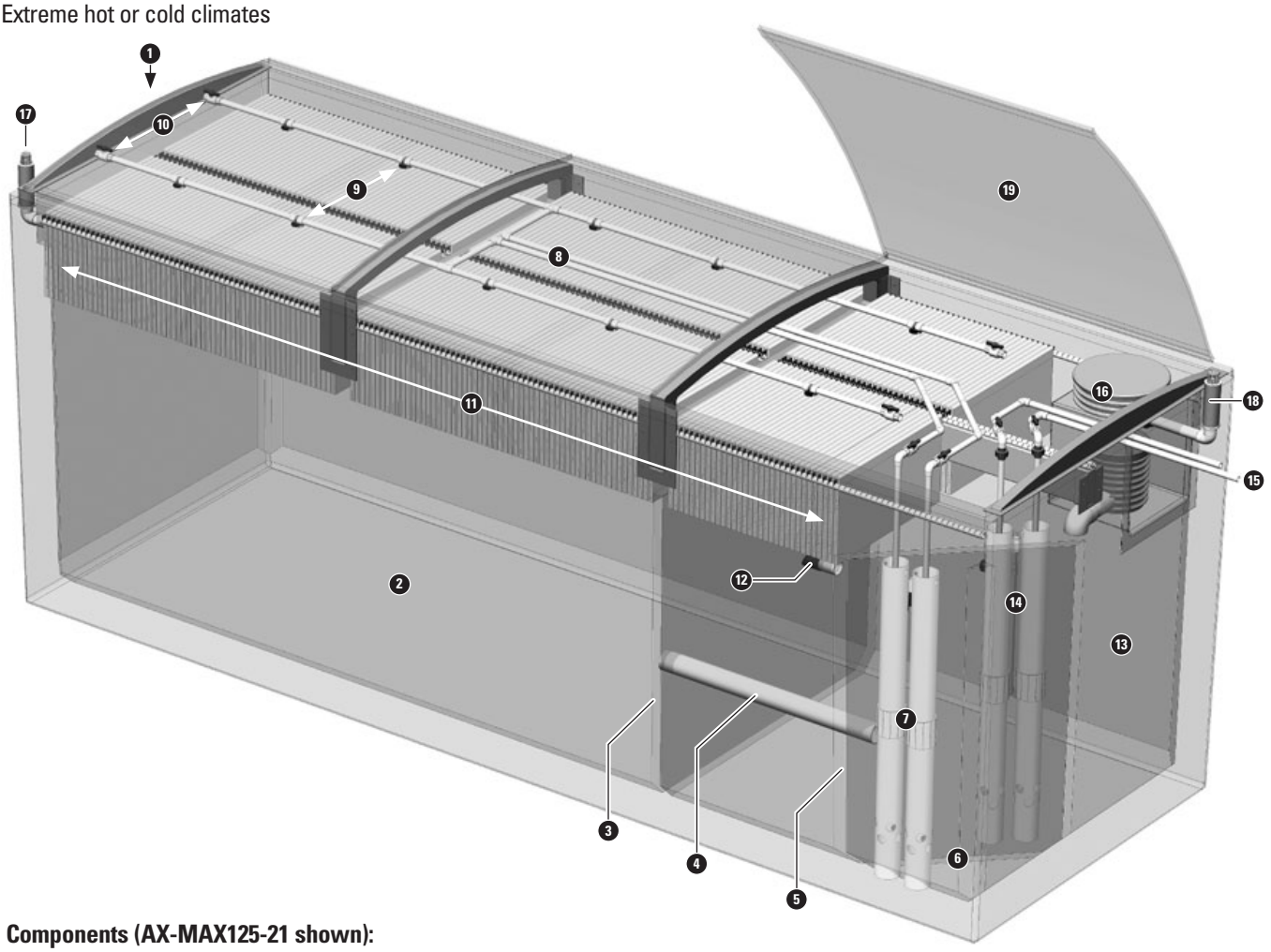
The AX-Max is a modular system that can be preceded by primary treatment or configured to incorporate primary, secondary, and tertiary wastewater treatment before reuse or dispersal.

The heart of the AX-Max system is the AdvanTex Recirculating Treatment Tank, a sturdy, watertight, corrosion-proof fiberglass tank that includes the same dependable, textile treatment media found in all AdvanTex products.

Standard Models

AX-MAX100-14, AX-MAX150-21, AX-MAX200-28, AX-MAX250-35, AX-MAX300-42 (Standard models without pump systems.)

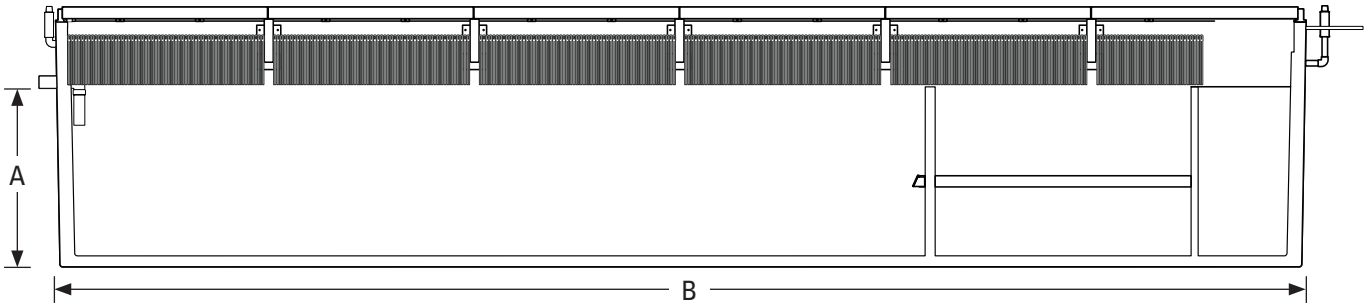
AX-MAX075-14, AX-MAX125-21, AX-MAX175-28, AX-MAX225-35, AX-MAX275-42 (Standard models with pump systems.)



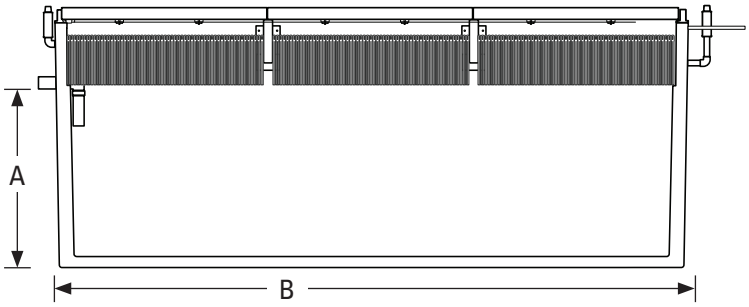
Components (AX-MAX125-21 shown):

1. Inlet, not shown
2. Recirc-blend chamber
3. Tank baffle
4. Recirc-transfer line
5. Recirc-pump chamber baffle
6. Recirc-pump chamber
7. Recirc pumping assembly
8. Distribution manifold
9. Spray nozzles
10. Lateral ball valves
11. AdvanTex textile media
12. Recirc-return valve
13. Recirc-filtrate chamber
14. Discharge pumping assembly
15. Outlet, discharge
16. Vent fan assembly
17. Air inlet
18. Air outlet
19. Hinged lid, typical

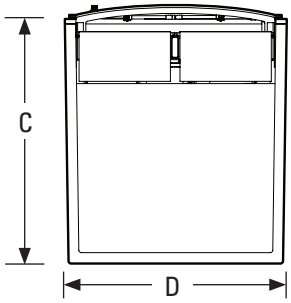
AdvanTex® AX-Max



AdvanTex AX-MAX275-42, side view



AdvanTex AX-MAX150-21, side view



AdvanTex AX-MAX, end view (all models)

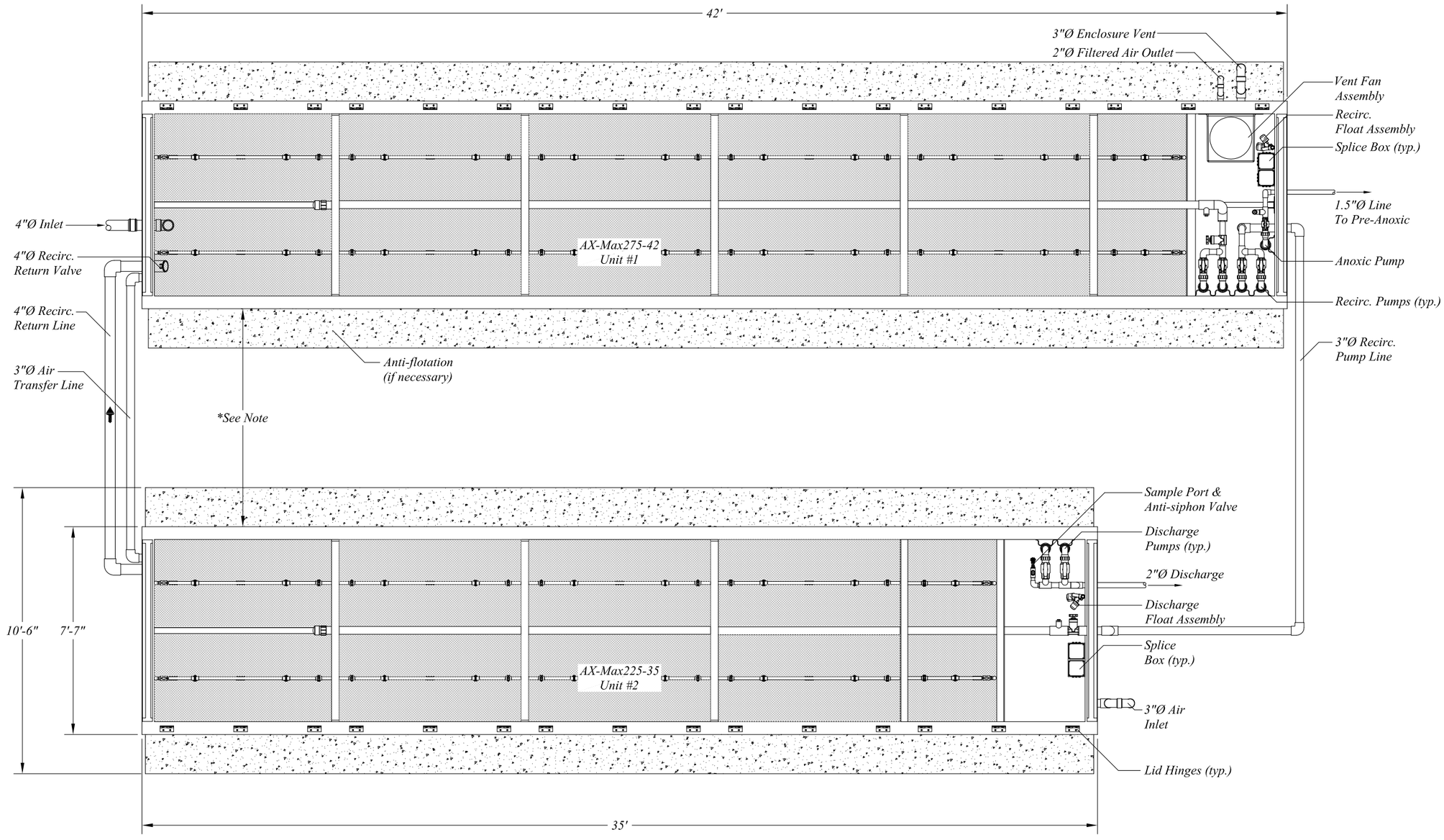
Specifications

Nominal Dimensions*

Model	**AX-MAX100-14**	**AX-MAX150-21**	**AX-MAX200-28**	**AX-MAX250-35**	**AX-MAX300-42**
A, ft (m)	variable	variable	variable	variable	variable
B, ft (m)	14.0 (4.2)	21.0 (6.4)	28.0 (8.5)	35.0 (10.7)	42.0 (12.8)
C, ft (m)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)
D, ft (m)	7.5 (2.3)	7.5 (2.3)	7.5 (2.3)	7.5 (2.3)	7.5 (2.3)
Footprint, ft^2 (m^2)	112.0 (10.4)	168.0 (15.6)	224.0 (20.8)	280.0 (26.0)	336.0 (31.2)
Model	**AX-MAX075-14**	**AX-MAX125-21**	**AX-MAX175-28**	**AX-MAX225-35**	**AX-MAX275-42**
A, ft (m)	5.7 (1.7)	5.7 (1.7)	5.7 (1.7)	5.7 (1.7)	5.7 (1.7)
B, ft (m)	14.0 (4.2)	21.0 (6.4)	28.0 (8.5)	35.0 (10.7)	42.0 (12.8)
C, ft (m)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)
D, ft (m)	7.5 (2.3)	7.5 (2.3)	7.5 (2.3)	7.5 (2.3)	7.5 (2.3)
Footprint, ft^2 (m^2)	112.0 (10.4)	168.0 (15.6)	224.0 (20.8)	280.0 (26.0)	336.0 (31.2)

**See AdvanTex® AX-Max Treatment System drawings for exact dimensions and specific treatment configurations.*

Note: Spacing between AX-Max units is dependent on desired bury depth. Consult Orenco Engineering for details.



Customer Approval

Signature: _____ Date: _____

Customer Name: _____

By this signature, Customer indicates that they have reviewed this Proposed System Configuration Drawing and found that it meets all of the designer's functional requirements and/or specifications.

Orenco SYSTEMS

Disclaimer: This Proposed System Configuration Drawing is provided solely as a design aid and illustrates one possible configuration of a system that would comply with Orenco's design criteria for the requirements and/or specifications that have been communicated to Orenco (based on third-party standards testing protocols and performance reports, as applicable). Design decisions, including the actual layout and configuration of the system and its viability for the project, are at the sole discretion of the systems's designer.

AdvanTex AX-MAX500
Pump Discharge
Plan View

Drawn By: BAS		Scale: 1" = 4'-0"	
Reviewed By: SH		Sheet: 1 OF 3	
File Name: AX-MAX500-1.DWG	Rev: 2.0	Date: 10/09/2017	

AdvanTex® Treatment Systems

AX-RT™

Manufactured by Orenco Systems®, Inc.

A number of vacation homes along beautiful Smith Mountain Lake in Virginia treat their wastewater – and protect the lake – with AdvanTex® AX-RT Treatment Systems.

Dependable, Affordable Treatment For Residential & Small Commercial Wastewater

Applications:

- 1-6 bedroom homes
- Small commercial properties
- New construction, repairs
- Tight lots, other site constraints
- Poor soils, shallow bury
- Stringent permit requirements
- Nitrogen reduction, disinfection
- Surface discharge

Orenco Systems®, Inc.
814 Airway Avenue, Sutherlin, Oregon, USA 97479
Toll-Free: 800-348-9843 • +1-541-459-4449 • www.orenco.com

AdvanTex® – AX-RT Treatment System

Dependable, Affordable Wastewater Treatment, Anywhere!

The AdvanTex® AX-RT Wastewater Treatment System is the latest residential (and small commercial) treatment system in Orenco's AdvanTex line.

AdvanTex systems consistently produce clear, odorless effluent ... effluent that meets the most stringent permit limits and is ideal for subsurface irrigation and other water-saving uses. That's one reason why AdvanTex won the Water Environment Federation's "2011 Innovative Technology Award." It also won for its low power costs and low operating & maintenance costs. Plus AdvanTex is easy to install, too. Here's why:

Pre-Plumbed Treatment System Saves On Excavation, Installation, O&M

The AX-RT is a compact "plug and play" wastewater treatment system. It can be shallowly buried and installed right behind a septic tank, as easily as a septic tank, so contractors can schedule more jobs in a single day.

The AX-RT unit includes the following functional areas of the treatment process:

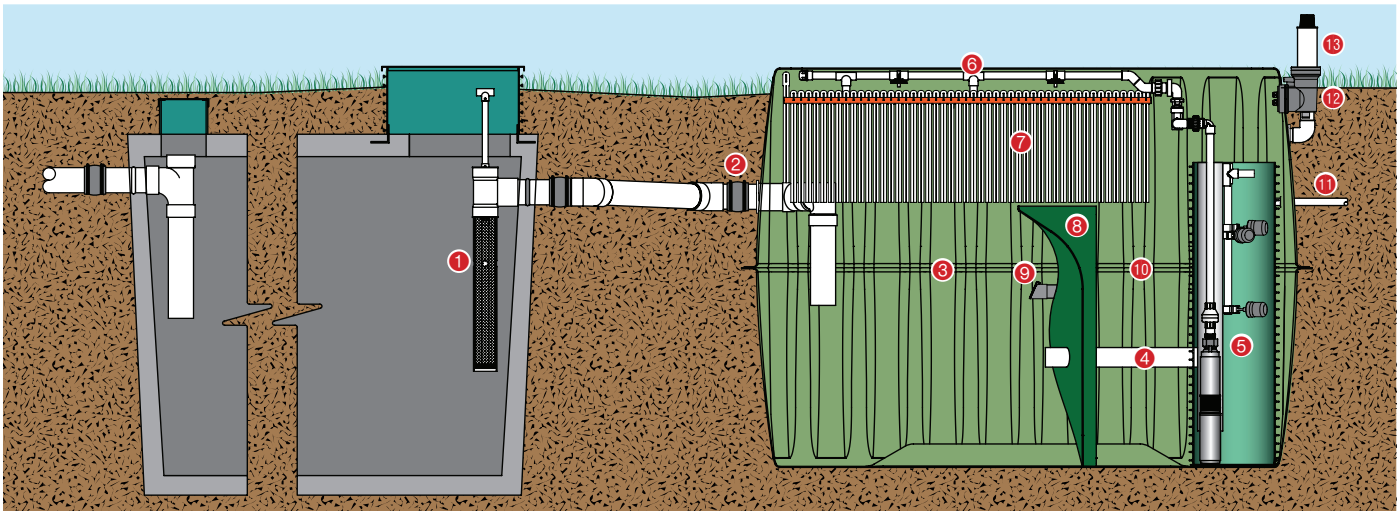
1. Textile media for advanced treatment
2. Recirculation/blending chamber
3. Gravity or pump discharge to final dispersal
4. Optional Orenco UV unit when disinfection is required

This simple design fits on the smallest lots and reduces costs for excavation, installation, and O&M. That means property owners can buy AdvanTex quality at a competitive price.

Since 2003, more than 100 AdvanTex systems have been installed in Sunset Bay, a lakefront subdivision in northeast Tennessee. The last 8 have been AX-RTs and according to Arthur Helms, Helms Construction, the RT's are "a lot easier to install." Says Helms, "This one only has a few connections, so you can't hardly screw it up." Even better, Helms says that the RT "saves about 8 hours labor and saves on fittings ... I make more money with the RT. I can do it and go on to the next one."

Components

1. *Biotube® effluent filter*
2. *Inlet*
3. *Treatment tank – recirc/blend chamber*
4. *Recirc transfer line*
5. *Recirc pumping system (discharge pumping system not visible)*
6. *Manifold and spin nozzles*
7. *Textile treatment media*
8. *Tank baffle*
9. *Recirc return valve*
10. *Treatment tank – recirc/filtrate chamber*
11. *Outlet*
12. *Splice box*
13. *Passive air vent*
14. *Control panel (not shown)*



The AX-RT is a completely prepackaged "plug & play" wastewater treatment system that can be quickly installed right behind an existing (or new) watertight septic tank.

AdvanTex® – AX-RT Treatment System

Low Power Costs, Low Maintenance Costs

No blowers. No odors. The AX-RT is passively vented and uses only $2-$3 per month in electricity.[1] Other products can use anywhere from ten to twenty times more! AX-RT customers also have low lifetime costs. The AX-RT is easily maintainable with an annual service call, thanks to its accessible, cleanable filters and media. And the AX-RT's high-quality, high-head pumps last 20 years or more!

Homeowner Nancy Smith was the first person to receive a $400 cash incentive from Energy Trust of Oregon for buying an energy-efficient wastewater system: an AX-RT. Smith's drainfield failed the day before Thanksgiving and she immediately started researching replacement systems. "My determining factor was the electric use," said Smith. "Incomes are going down, expenses are going up ... I have to know going forward what things are going to cost." Smith chose the AX-RT because the annual electricity cost averages $30; other systems can run as high as $500 or more.

Consistent, Reliable Performance

Stringent testing programs consistently show that AdvanTex Treatment Systems produce effluent with BOD_5/TSS at or below 10 mg/L and nitrogen reduction of 60-70+%. In fact, the Maryland Department of the Environment has rated AdvanTex as tops among all "Best Available Technologies" for nitrogen-reduction.[2]

[1] *Assumes national avg. electricity costs of $0.10 per kWh and 3-4 occupants*

[2] *http://www.mde.state.md.us/programs/Water/BayRestorationFund/OnsiteDisposalSystems/Pages/water/cbwrf/osds/brf_bat.aspx*

The AdvanTex Advantage:

- Reliable, reputable
- Clear, re-usable effluent
- No noise or odors
- Complete "plug & play" package
- Easy to install and maintain
- Energy efficient
- Competitively priced

Textile Treatment Media

Spin nozzles microdose wastewater effluent onto highly absorbent textile filters at regular intervals, optimizing treatment.

Ultraviolet Disinfection

Our optional UV unit reduces bacteria by 99.999%, allowing wastewater re-use for irrigation, toilet flushing, etc. It uses no chemicals and has no moving parts. The UV unit is protected in its own chamber inside the AX-RT and just needs a lamp replacement every other year.

Smart Controls

The AX-RT comes standard with Orenco's Veri-Comm™ remote telemetry control panel and monitoring system. That means service providers can oversee the system, from office or home. (Non-telemetry "smart" controls also available.)

AdvanTex® - AX-RT Treatment System

Carefully Engineered by Orenco

Orenco Systems has been researching, designing, manufacturing, and selling leading-edge products for decentralized wastewater treatment systems since 1981. The company has grown to become an industry leader, with about 250 employees and more than 300 points of distribution in North America, Australasia, Europe, Africa, and Southwest Asia. Our systems have been installed in more than 60 countries around the world.

AdvanTex® Treatment System AXN Models meet the requirements of NSF-ANSI Standard 40 for Class I Systems.

Powered by Franklin Electric

Orenco Systems®
Incorporated

Changing the Way the World Does Wastewater®

814 Airway Avenue
Sutherlin, OR 97479
U.S.A.

T • 541-459-4449
800-348-9843

F • 541-459-2884

www.orenco.com
www.orenco.com/sales/choose_a_system/

ABR-ATX-AXRT-1
Rev. 1.0, © 03/12
Orenco Systems®, Inc.

Use the AX-RT for Applications Like These ...

Small Lots

Last year, Mike Madson, a septic system installer in Oregon, replaced a failing system along the beautiful North Umpqua River with an AX-RT. "That particular situation was really, really confining," says Madson. "There was a high bank to the river about 25 feet away and roots everywhere; we had to get things in there in compact fashion. We even had to add a drainfield to the site; the old one was bootlegged in, cedar trees had grown into it, and the leach line was plugged up." The AX-RT incorporates the recirc and discharge processes right within the RT unit, so its smaller footprint made this installation possible.

Nitrogen Reduction

Bob Johnson of Atlantic Solutions has sold (and services) more than 100 AX-RTs, mostly in Maryland, for the state's aggressive nutrient-reduction program. Maryland requires Total Nitrogen of less than 20 mg/L to protect the Chesapeake Bay. After a year of testing 12 RTs under Maryland's BAT (Best Available Technologies) Program, Johnson reports that TN averaged just 14.6 mg/L, while BOD_5/TSS averaged <5 mg/L. Says Johnson, "When you look at life cycle costs and percent of nitrogen reduction, the AX-RT costs less than other technologies for every pound of nitrogen removed."

Strict Permit Limits, Including Surface Discharge

Photo courtesy of Kevin Davidson

Kevin Davidson, an engineer with Agri-Waste Technology, designed the first AX-RT in North Carolina to replace a failing system under North Carolina's "Surface Discharge" permit. According to Davidson, the property had poor soil conditions, plus there was no room for a new drainfield. The state allowed the AX-RT for surface discharge because it produces such outstanding effluent that it could meet the required permit limits. And, with UV disinfection, it could meet the limit for fecals, too. Consequently, treated and disinfected effluent could then be discharged to a ditch.

Davidson was able to use the existing septic tank, and the RT's configuration eliminated the need for a discharge tank, separate UV basin, and several risers and lids, reducing costs. On the O&M side, he appreciates having the UV sensors integrated into the control panel, especially the one that allows the service provider to know the bulb is working, without having to pull it out. Says Davidson, "I think the RT is the best unit, when you look at aesthetics, installation cost, ability to treat waste, and support from Orenco. Compared to other technologies, I would grade Orenco at the top."

Distributed by:

AX20RT Treatment System - Pump Discharge

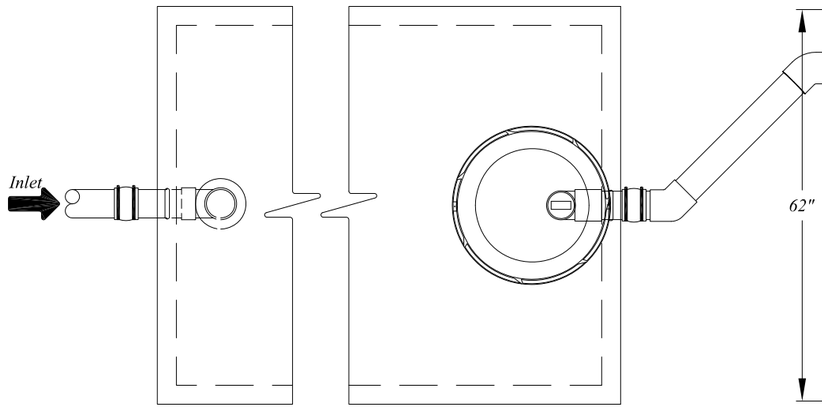
Filter Tank Dry Weight: 900 lbs

Design Notes

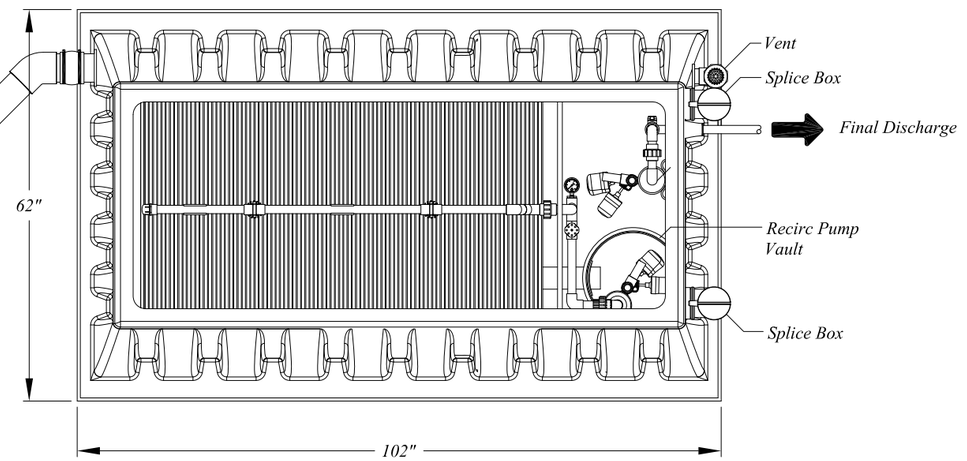
For residential strength waste up to 4 bedrooms.

Installation to be performed by an AdvanTex Authorized Installer only.

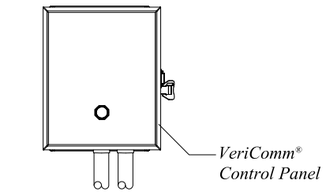
Start-up and service to be performed by an AdvanTex Authorized Service Provider only.



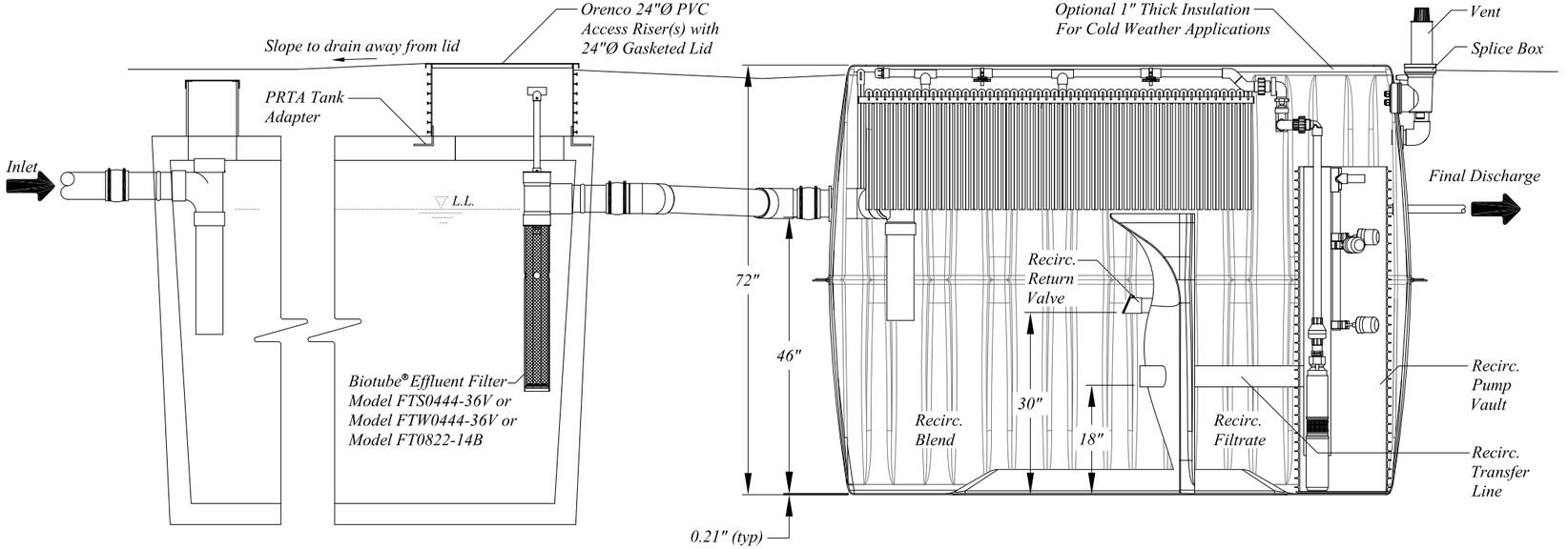
1000 gal. Primary Tank - Top View



AX20 800 gal. Recirc. Tank - Top View

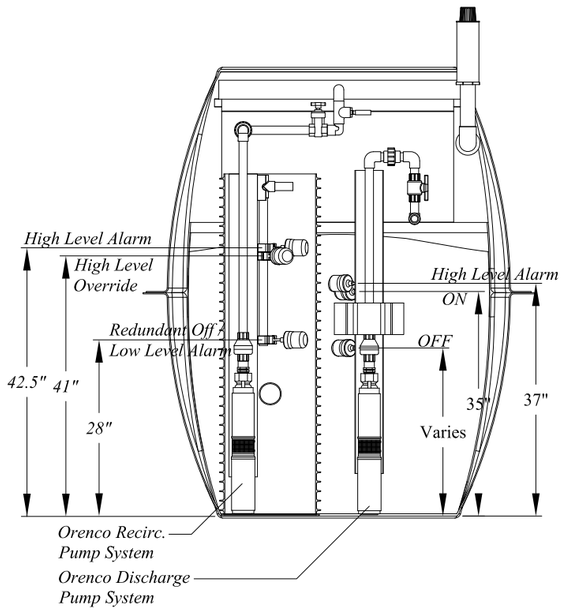


Control Panel Detail
Not To Scale



1000 gal. Primary Tank - Side View

AX20 800 gal. Recirc. Tank - Side View



Discharge Chamber - End View

PRODUCT CONFIGURATION DRAWINGS

Orenco Systems® Incorporated
Changing the Way the World Does Wastewater®

Drawn By: BEN SMITH	Project: AX20RT Mode 1B	Scale: 1" = 2'-0"	
Drawn For:		Sheet: 1 OF 1	
	Title: NDW-ATX-RT-STD-03	Rev: A-07	Date: 4/22/2013

Technical Data Sheet

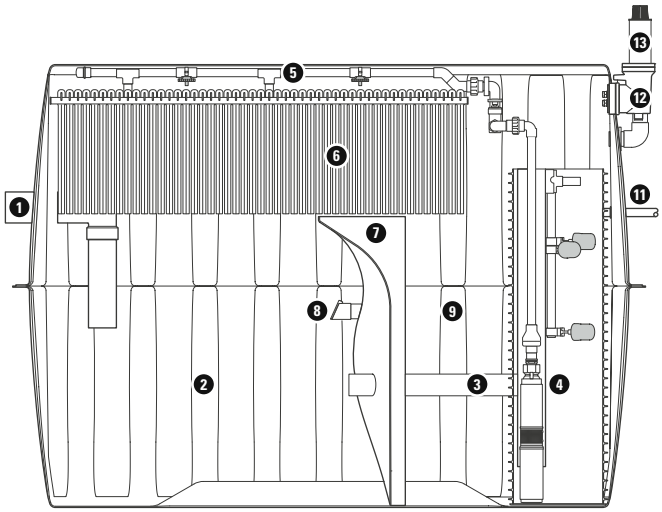
AdvanTex® AX-RT Treatment Systems

Orenco Systems® Incorporated
800-348-9843

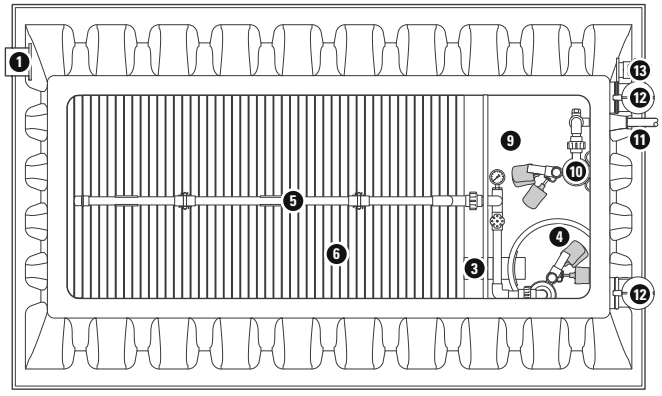
Applications

Orenco's AdvanTex® AX-RT Treatment System is a single, complete, self-contained module that treats septic tank effluent to better than secondary standards with nitrogen reduction before discharging it by means of pump or gravity. The AX-RT Treatment System is ideal for:

- Repairs and retrofits
- Small sites and poor soils
- Sites that require shallow bury



AdvanTex AX-RT side view (AX20-RT pump discharge model shown)



AdvanTex AX-RT top view (AX20-RT pump discharge model shown)

AdvanTex® Treatment System AX-RTN Models meet the requirements of NSF/ANSI Standard 40 for Class I Systems.

General

Following a septic tank equipped with a Biotube® effluent filter, the AdvanTex AX-RT unit eliminates the need for separate recirc, treatment, and discharge tanks by performing all functions within a single module. It also reduces the number of risers and lids needed in the treatment train. For sites requiring antibuoyancy measures, Orenco offers antifloatation kits with turnbuckles.

The heart of the system is the AdvanTex Recirculating Treatment Tank, a sturdy, watertight, corrosion-proof fiberglass tank that includes the same dependable, textile treatment media found in all AdvanTex products.

Standard Models

AX20RT-MODE1A, AX20RT-MODE1B/10, AX20RT-MODE1B/30
AX25RT-MODE1A, AX25RT-MODE1B/10, AX25RT-MODE1B/30

Physical Specifications

Nominal Dimensions*		
Length, in. (mm)		102 (2591)
Width, in. (mm)		62 (1575)
Height, in. (mm)		72 (1829)
Overall unit footprint, ft^2 (m^2)		44 (4.11)
Visible footprint after installation, ft^2 (m^2)		20 (1.86)
Dry Weight	**AX20-RT**	**AX25-RT**
Gravity discharge model, lb (kg)	900 (390)	925 (420)
Pump discharge model, lb (kg)	940 (408)	965 (438)

Components

1. Inlet
2. Treatment tank — recirc/blend chamber
3. Recirc transfer line
4. Recirc pumping system
5. Manifold and spin nozzles
6. Treatment media
7. Tank baffle
8. Recirc return valve
9. Treatment tank — recirc/filtrate chamber
10. Discharge pumping system (pump discharge only)
11. Outlet
12. Splice box
13. Passive air vent
14. Biotube® Effluent Filter** (in septic tank, not shown)
15. Control panel (not shown)

**See specific AdvanTex® AX-RT Treatment System drawings for exact dimensions.*
***Not to be sold individually in the state of Georgia.*

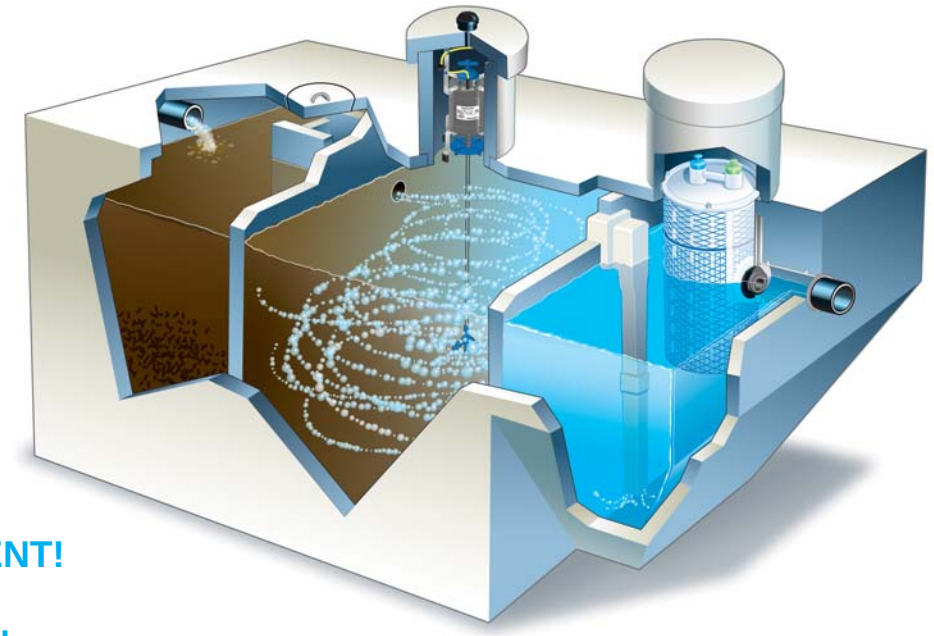
SINGULAIR® TNT®
THE PRECAST CONCRETE ADVANCED TREATMENT UNIT

NITROGEN REDUCING WASTEWATER TREATMENT SYSTEM
ACCOMPLISHES NITRIFICATION AND DENITRIFICATION
GREATER THAN 68% REDUCTION IN TOTAL NITROGEN

If regulations in your area are demanding nutrient reduction for onsite treatment and disposal systems, install a Singulair Model TNT! Total Nitrogen Treatment you can rely on from the leader in advanced treatment unit technology.

NSF STANDARD 245 CERTIFIED PERFORMANCE
AFFORDABLE DOMESTIC WASTEWATER TREATMENT
COMPLIES WITH THE MOST STRINGENT EFFLUENT CRITERIA

The Singulair Model TNT system biologically oxidizes nitrogen compounds without requiring complicated and expensive equipment. Designed to be easily operated and maintained, the TNT system does not require the addition of chemicals or the recirculation of effluent. The Singulair TNT blows away the competition!



PERFORMANCE THAT PROTECTS THE ENVIRONMENT!
7 mg/L NITRATE
12 mg/L TOTAL NITROGEN
4 mg/L $CBOD_5$
9 mg/L TSS

SINGULAIR® TNT FEATURES

- Precast concrete tank
- Lowest electrical usage
- Surge flows equalized
- No chemicals to add
- Lifetime warranty and exchange
- Sold and serviced by local distributors
- Made in the U.S.A.

norweco®

Engineering the future of water and wastewater treatment

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TELEPHONE (419) 668-4471
FAX (419) 663-5440
www.norweco.com

Appendix D –
Orenco Individual Septic Systems Estimate

Cost Estimating Worksheet

Project: Monterey Park Tract
Location:
Notes: Individual Treatment Option - AX20RT at home, AX25RT at Church and Comm. Center 9/17/2019

GP	Qty	Item	Description		Sale Price
1			**Individual Treatment Units - 47 Residential, 2 Comm.**	**$**	**528,840.00**
	49	RO1000S	1,000gal Roth Septic Tank		
	2	RO1500S	1,500gal Roth Septic Tank		
	47	AX20RTPack	AdvanTex AX20RT Packages		
	2	AX25RTPack	AdvanTex AX25RT Packages		
	49	MVP-AX201B	MVP Control Panel, AdvanTex System with Discharge Pump		
		Notes:			
1			*****Optional*** Anti-Flotation Equipment**	**$**	**24,097.50**
	51	AX20RT-AF	Anti-Flotation Equipment for AX20/25RT Unit		
		Notes:	*Depends on bury depth, depth to groundwater, site drainage etc.*		
10			**Delivery**	**$**	**14,025.00**
	51	Delivery	Delivery of Roth 1000/1500 Gallon Tank		
	51	Delivery	Delivery of AX20/25RT Package		
		Notes:			
			Subtotal, All Materials (tax not included)	**$**	**566,962.50**

**** This is a preliminary cost estimate only, based off plans and specifications that exist at the date listed above. This should not be considered a final price, nor materials list. PACE Supply will produce a final quote once final plans and specifications have been received, and that document will supersede anything listed on this document.*

Appendix E –
Orenco Centralized Treatment Cost Estimate

Cost Estimating Worksheet

Project: Monterey Park Tract
Location:
Notes: Gravity Collection to Xerxes Septic and EQ Tanks to AXMAX500 Treatment Unit 9/8/2021

GP	Qty	Item	Description		Sale Price
1			**Xerxes Fiberglass Septic and EQ Tanks**	**$**	**172,550.00**
	2	X20000	20,000gal Xerxes Septic Tank		
	1	X10000	10,000gal Xerxes Septic Tank		
	7	Access24	Access Riser Package, 24"		
	2	Access30	Access Riser Package, 30"		
	1	EF12D	Effluent Filter, 12" Duplex Units		
	1	PP50DAX	Orenco Pumping Package, 50gpm, Duplex		
		Notes:			
2			**AdvanTex AXMAX500 Treatment Package**	**$**	**249,442.50**
	1	AXMAX250-42	AXMAX unit with 250sq.ft. of media, 42' long		
	1	AXMAX250-35	AXMAX unit with 250sq.ft. of media, 35' long		
	1	TCOM-C	TCOM Control Panel		
	1	Startup	Startup Services		
		Notes:			
3			*****Optional*** Anti-Flotation Equipment**	**$**	**72,225.00**
	2	AF-X20000	Anti-Flotation Equipment for 20,000gal Xerxes Tank		
	1	AF-X10000	Anti-Flotation Equipment for 10,000gal Xerxes Tank		
	1	AF-AXMAX-42	Anti-Flotation Equipment for 42' MAX		
	1	AF-AXMAX-35	Anti-Flotation Equipment for 35' MAX		
		Notes:	*Depends on bury depth, depth to groundwater, site drainage etc.*		
10			**Delivery**	**$**	**17,880.00**
	2	Delivery	Delivery of Xerxes Tank		
	2	Delivery	Delivery of AXMAX Equipment		
		Notes:			
			Subtotal, All Materials (tax not included)	**$**	**512,097.50**

**** This is a preliminary cost estimate only, based off plans and specifications that exist at the date listed above. This should not be considered a final price, nor materials list. PACE Supply will produce a final quote once final plans and specifications have been received, and that document will supersede anything listed on this document.*