



Perry Park Water and Sanitation District
5676 West Red Rock Drive
Larkspur, Colorado 80118
www.ppwsd.org

Work Session – October 26, 2020

Board Members Present

Brian Arthurs
Judy LaCrosse
Jim Maras
Andy Morris
Gary Peterson

Visitors

Tony Lucas

Staff / Consultants in Attendance

Jay Blackburn – TST Infrastructure, LLC
Bill Goetz – TST Infrastructure, LLC
Diana Miller – District Manager
Will Parker – Semocor, Inc.

1.0 Work Session

The work session began at 9:00 at the Waucondah Wastewater Treatment Plant for a tour of the existing infrastructure.

The work session attendees relocated to the District Office to discuss general wastewater treatment, the existing facilities, including the performance and condition of the facilities, and finally a range option options to resolve odor and noise issues.

Following is a copy of the Executive Summary Report for the Waucondah Wastewater Treatment Plant Evaluation.

2.0 Adjournment

The meeting adjourned at 14:11.

Secretary, James Maras

MEMORANDUM

TO: Diana Miller, General Manager
Perry Park Water and Sanitation District

FROM: TST Infrastructure, LLC

CC: TST Infrastructure, LLC File

SUBJECT: Executive Summary Report for Wauconda WWTP Evaluation

DATE: October 23, 2020

As requested by Perry Park Water and Sanitation District (PPWSD), TST has performed an evaluation of the Wauconda Wastewater Treatment Plant (WWTP) to determine the current and future capabilities of the facility. This memo provides an overview of the preliminary results of our evaluation and is intended as basis for discussions at the Board Work Session on October 26th, 2020.

The scope of the evaluation was substantial and generally included the following tasks:

- Review of flow and performance records
- Review of solids and biological loading
- Hydraulic analysis to determine overall and unit process flow capacity
- Analysis of unit process solids and biological load capacity
- Laboratory testing to evaluate the performance of certain unit processes
- Evaluation of unit process compliance with current design standards
- Evaluation of ability to meet effluent limits
- Condition assessment of existing facilities and equipment
- Assessment of operational flexibility
- Evaluation of existing electrical systems
- Evaluation of existing control systems
- Extensive review and discussion with District staff and operations contractor

The evaluation indicated that while the plant has historically been in compliance with the requirements of its discharge permit, certain components do not have adequate capacity at current loading rates and as flows increase, additional components will have inadequate capacity. In addition to capacity limitations, most unit processes require certain upgrades due to age, condition, and operational capability. Finally, the facility lacks redundancy, which increases the risk of a major violation in the event of adverse conditions such as equipment failures.

As shown in Table 1 – Summary of Capacity, existing unit processes were evaluated in terms of capacity at four different flow conditions including current, near-term, permitted, and buildout. Table 1 identifies unit processes with and without adequate capacity at each flow condition. It is important to note that the information presented in Table 1 relates exclusively to capacity and does not necessarily address the overall capability of the unit process based on age and condition. For example, the existing UV

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Disinfection system has adequate capacity under current loading conditions but does not meet all required Colorado Department of Public Health and Environment (CDPHE) criteria due to condition of the existing equipment. Most unit processes, including those identified as having adequate capacity, will require improvements to meet required performance criteria.

Our evaluation of the Waucondah Plant indicates that both immediate and longer-term upgrades are required, and three upgrade options have been developed to describe the range of improvements. Two of the options are based on upgrades and expansion of the existing facility, while the third option is based on complete replacement of the existing facility. In general, upgrades to the existing facility would have a lower up-front cost and would continue to utilize the District's previous infrastructure investments. However, an upgraded facility would have many of the same operational capability disadvantages as the existing facility and could be expected to have a shorter useful life than a new facility. Replacement of the existing facility with a new facility would have a higher initial cost but could provide substantial benefits related to treatment capability, flexibility, and useful life. Three site plan exhibits are provided as attachments to this memo, including an existing facilities site plan, proposed location of improvements for facility upgrades (Option 1 or Option 2), and a potential site layout for a replacement plant (Option 3).

Option 1 was prepared to include improvements necessary to address existing critical deficiencies. If left unaddressed, these critical deficiencies could impact the ability of the WWTP to reliably meet treatment requirements in the near future. The improvements required to resolve these critical deficiencies are identified in Table 2 – Improvements to Address Critical Deficiencies. These improvements would not fully address redundancy requirements for all unit processes and are intended to represent the minimum possible improvements required at this time. Some of the improvements most notably refurbishment of the existing digester, are strictly short-term improvements and additional improvements should be expected in the near future. The estimated cost for minimum improvements is \$3,230,000.

Option 2 would include improvements necessary to address process deficiencies and provide redundancy at permitted discharge conditions. Option 2 is intended to represent longer term improvements than Option 1. As shown in Table 3 – Improvements to Address Process Deficiencies, the estimated project cost for these improvements is \$8,140,000.

Option 3 would consist of replacement of the entire Waucondah WWTP with a new facility, to provide previously described process benefits and operational flexibility. The cost estimate for Option 3 was based on a per unit cost of \$40 per gallon per day of capacity, developed from recent, similar construction in the Front Range area. The estimated cost for a new WWTP with a capacity of 320,000 gpd is \$12,800,000.

As previously stated, the options described above were developed to identify a range of options for consideration and discussion and are not intended to preclude discussion of additional options or phasing. We anticipate that the upcoming workshop may provide additional guidance regarding options to be considered and we expect that some adjustment of options may be desired in the final report.

Waucondah WWTP Evaluation
 Table 1 - Summary of Capacity
 10/23/2020

	At Current Flows and Loading (2020)	Including Near Term Flows and Loading (5-6 Year Projection)	At Current Permitted Flows and Loading (15 Year Projection)	At Buildout Capacity (30+ Year Projection)
Unit Processes with Adequate Capacity	Primary Clarification Rotating Biological Contactors Phosphorus Removal via Alum Secondary Clarification UV Disinfection pH Adjustment @ effluent Hydraulic Flow	Primary Clarification Phosphorus Removal via Alum Secondary Clarification pH Adjustment @ effluent Hydraulic Flow Rotating Biological Contactors	Primary Clarification Secondary Clarification Hydraulic Flow Phosphorus Removal via Alum pH Adjustment @ effluent Rotating Biological Contactors	Phosphorus Removal via Alum pH Adjustment @ effluent
Unit Processes without Adequate Capacity	Grit Removal and Bar Screening Solids Treatment and Disposal Flow Metering/Measurement	Flow Metering/Measurement UV Disinfection Grit Removal and Bar Screening Solids Treatment and Disposal	Flow Metering/Measurement UV Disinfection Grit Removal and Bar Screening Solids Treatment and Disposal	Primary Clarification Secondary Clarification Hydraulic Flow Rotating Biological Contactors Flow Metering/Measurement UV Disinfection Grit Removal and Bar Screening Solids Treatment and Disposal

Table 2 - Improvements to Address Critical Process Deficiencies

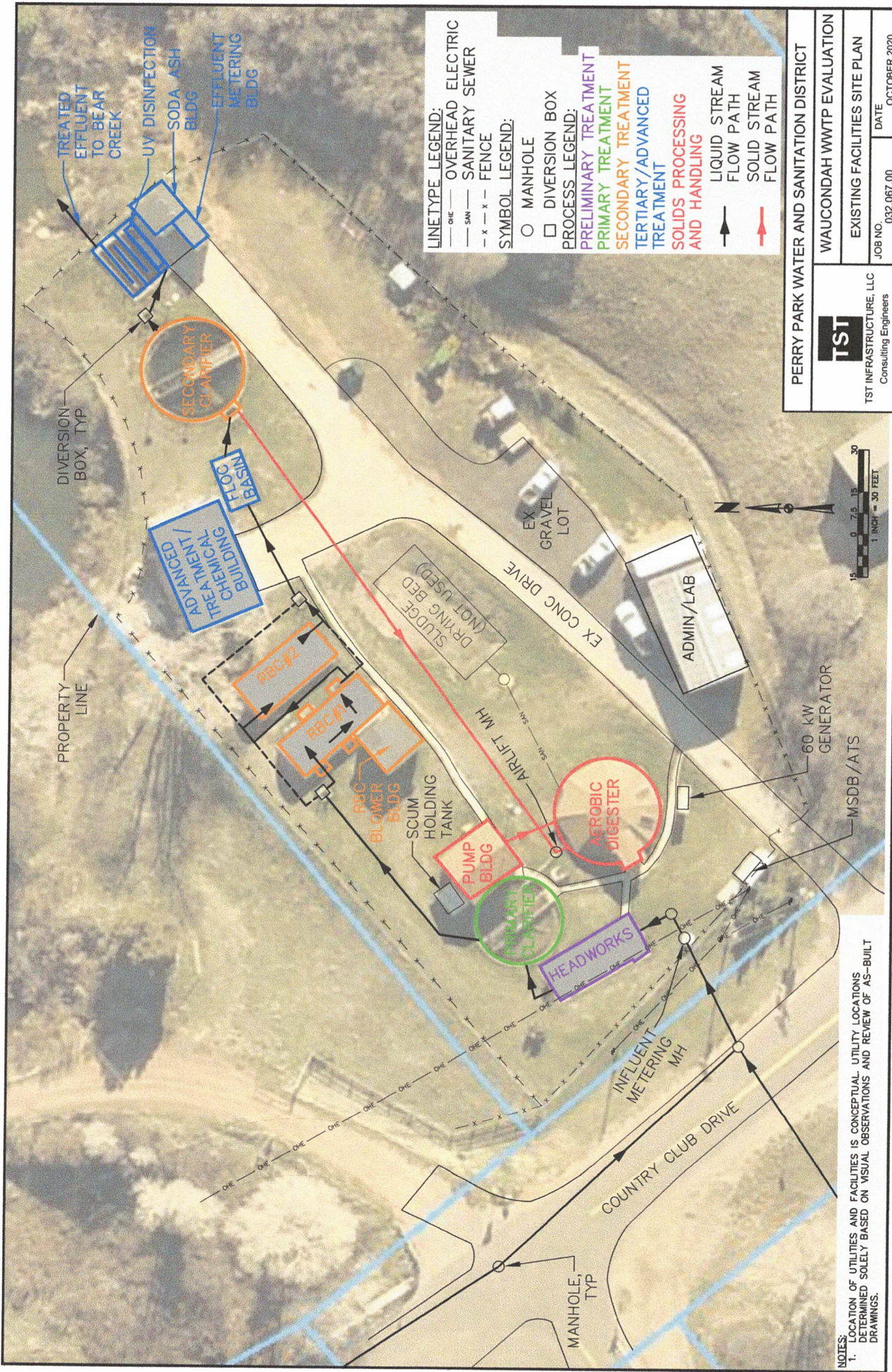
	Cost
Flow Metering Improvement Options	
Replace Influent Flow Meter	\$63,000.00
Replace Effluent Meter	\$22,000.00
Headworks Improvements Option	
Infrared heater at bar screen	\$2,000.00
Odor Control Improvement Options	
Odor Control Option 2a - Carbon Adsorption Scrubber (Ecoverde)	\$43,000.00
Primary Clarifier Improvement Options	
Structural Repairs to Primary Clarifier	\$15,000.00
RBC Improvement Options	
Add Flow Metering, Weirs, and Step Flow @ both RBC's	\$200,000.00
Replace RBC #2 Observation Port Covers	\$2,500.00
Add Soda Ash feed line at RBC inlet for pH control	\$5,000.00
Fix existing air leaks	\$2,500.00
Resolve RBC #1 flooding Issue	\$15,000.00
Provide Spare RBC Drives for both RBC's	\$50,000.00
Replace Grating at Sumps	\$5,000.00
UV Improvement Options	
UV Disinfection Improvement Option 2	\$200,000.00
Digester Improvement Options	
Expand and Refurbish Existing Digester	\$510,000.00
Blower Improvement Options	
Blower Option 3 (UEC Compression PD w/ VFD)	\$227,000.00
Blower Building Improvements - Option 2 (Repair/Improve Ex)	\$113,000.00
Instrumentation and Controls Options	
I&C Improvements - Local monitoring and alarms only	\$390,000.00
Electrical Improvement Options	
Electrical Improvements Options Package 1 - Immediate Needs Only	\$824,500.00
Aesthetic and Health Improvement Options	
Grating at Headworks Channel - Materials and Installation	\$5,000.00
Bird Barriers - Chain Link Fence - Materials and Installation	\$25,000.00
Add row of trees (20' pines) - Materials and Installation	\$500,000.00
Add privacy screen - Materials and Installation	\$2,000.00
Automatic Gate opener - Materials and Installation	\$2,500.00
Subtotal	\$3,224,000.00
Total Cost - Rounded up to Nearest \$10,000	\$3,230,000.00

*All costs include 25% engineering + approvals, 3% admin, and 40% contingency costs.
Additional information for each option to be provided in complete Evaluation Report.*

Table 3 - Improvements to Address Process Deficiencies

Flow Metering Improvement Options	
Replace Influent Flow Meter w/ Redundancy	\$101,000.00
Replace Effluent Meter	\$22,000.00
Headworks Improvement Options	
Aerated Grit Chamber + Headworks Building Installation	\$300,000.00
Odor Control Improvement Options	
Odor Control Option 2a - Carbon Adsorption Scrubber (Ecoverde)	\$43,000.00
Primary Clarifier Improvement Options	
Structural Repairs to Primary Clarifier	\$15,000.00
Replace / Add 2nd clarifier (primary or secondary)	\$750,000.00
Replace primary sludge pumps	\$50,000.00
RBC Improvement Options	
RBC Option 1 - Replace or Add One RBC (Walker Process)	\$1,020,000.00
Add Flow Metering, Weirs, and Step Flow @ both RBC's	\$200,000.00
Replace RBC #2 Observation Port Covers	\$2,500.00
Add Soda Ash feed line at RBC inlet for pH control	\$5,000.00
Fix existing air leaks	\$2,500.00
Replace Grating at Sumps	\$5,000.00
Resolve RBC #1 flooding Issue	\$15,000.00
Replace RBC #1 drive/electrical	\$65,000.00
Provide Spare RBC Drives for both RBC's	\$50,000.00
Secondary Clarifier Improvement Options	
Replace / Add 2nd clarifier (primary or secondary)	\$750,000.00
UV Improvement Options	
UV Disinfection Improvement Option 2	\$200,000.00
Digester Improvement Options	
Construct Aerobic Digester + Aeration Basin for Buildout	\$1,300,000.00
Abandon Existing Aerobic Digester	\$60,000.00
Dewatering unit w/ building	\$430,000.00
Blower Improvement Options	
Blower Option 3 (UEC Compression PD w/ VFD)	\$227,000.00
Blower Building Improvements - Option 1 (Full Replacement)	\$269,000.00
Instrumentation and Controls Options	
I&C Improvements - Remote monitoring, control, and alarms	\$850,000.00
Electrical Improvement Options	
Electrical Improvements Options Package 2 - Ultimate Needs	\$1,338,500.00
Aesthetic and Health Improvement Options	
Bird Barriers - Chain Link Fence - Materials and Installation	\$25,000.00
Add row of trees (20' pines) - Materials and Installation	\$500,000.00
Add privacy screen - Materials and Installation	\$2,000.00
Automatic Gate opener - Materials and Installation	\$2,500.00
Subtotal	\$8,134,000.00
Total Cost - Rounded up to nearest \$10,000	\$8,140,000.00

*All costs include 25% engineering + approvals, 3% admin, and 40% contingency costs.
Additional information for each option to be provided in complete Evaluation Report.*



- LINE TYPE LEGEND:**
- O/E — OVERHEAD ELECTRIC
 - S/W — SANITARY SEWER
 - - - FENCE
- SYMBOL LEGEND:**
- MANHOLE
 - DIVERSION BOX
- PROCESS LEGEND:**
- PRELIMINARY TREATMENT
 - PRIMARY TREATMENT
 - SECONDARY TREATMENT
 - TERTIARY/ADVANCED TREATMENT
 - SOLIDS PROCESSING AND HANDLING
 - LIQUID STREAM FLOW PATH
 - SOLID STREAM FLOW PATH

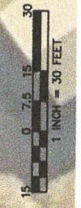
PERRY PARK WATER AND SANITATION DISTRICT

TST
TST INFRASTRUCTURE, LLC
Consulting Engineers

WAUCONDAH WWTP EVALUATION

EXISTING FACILITIES SITE PLAN

JOB NO. 032.067.00 DATE OCTOBER 2020

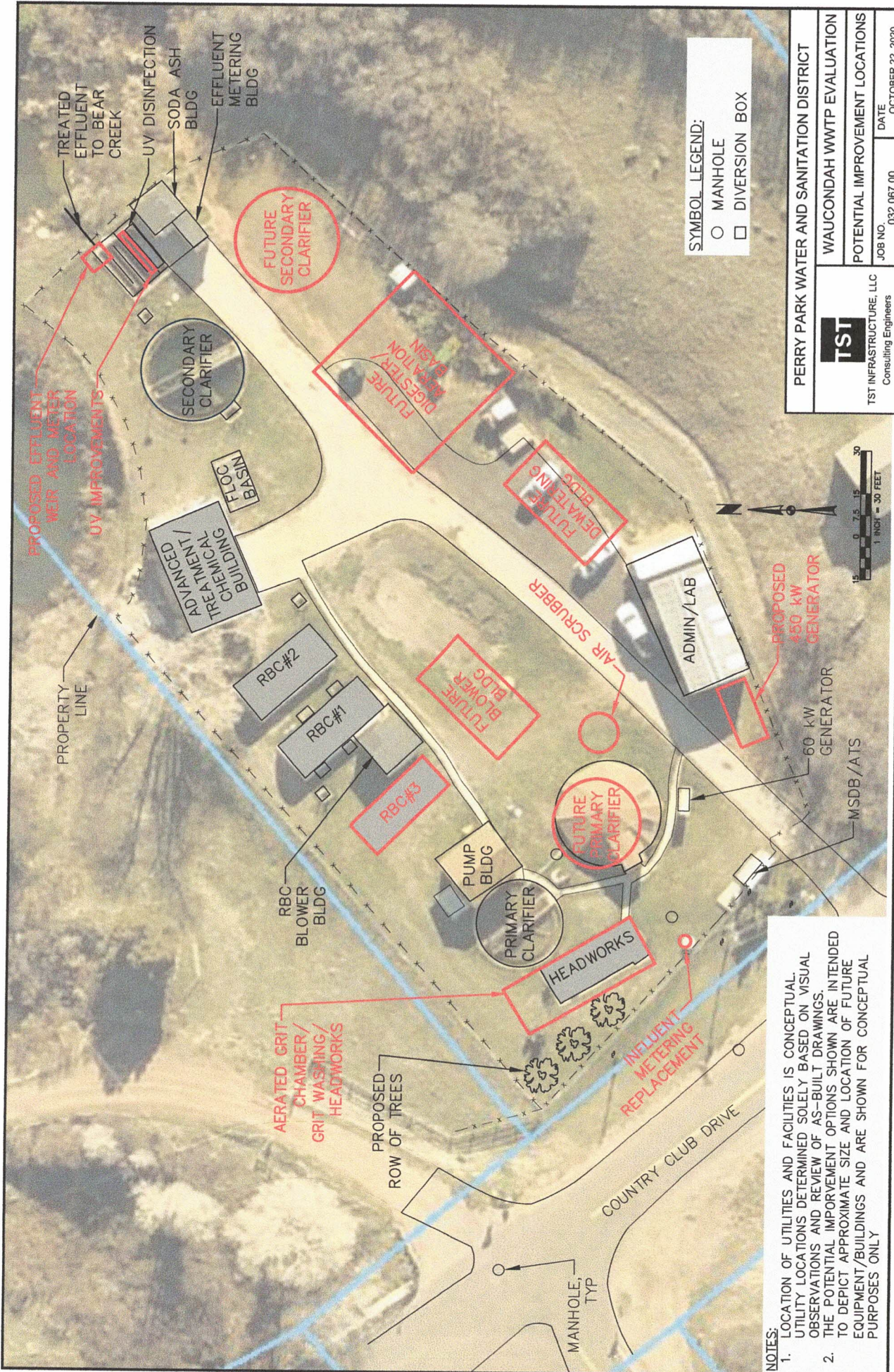


60 KW GENERATOR

MSDB/ATS

NOTES:

1. LOCATION OF UTILITIES AND FACILITIES IS CONCEPTUAL. UTILITY LOCATIONS DETERMINED SOLELY BASED ON VISUAL OBSERVATIONS AND REVIEW OF AS-BUILT DRAWINGS.

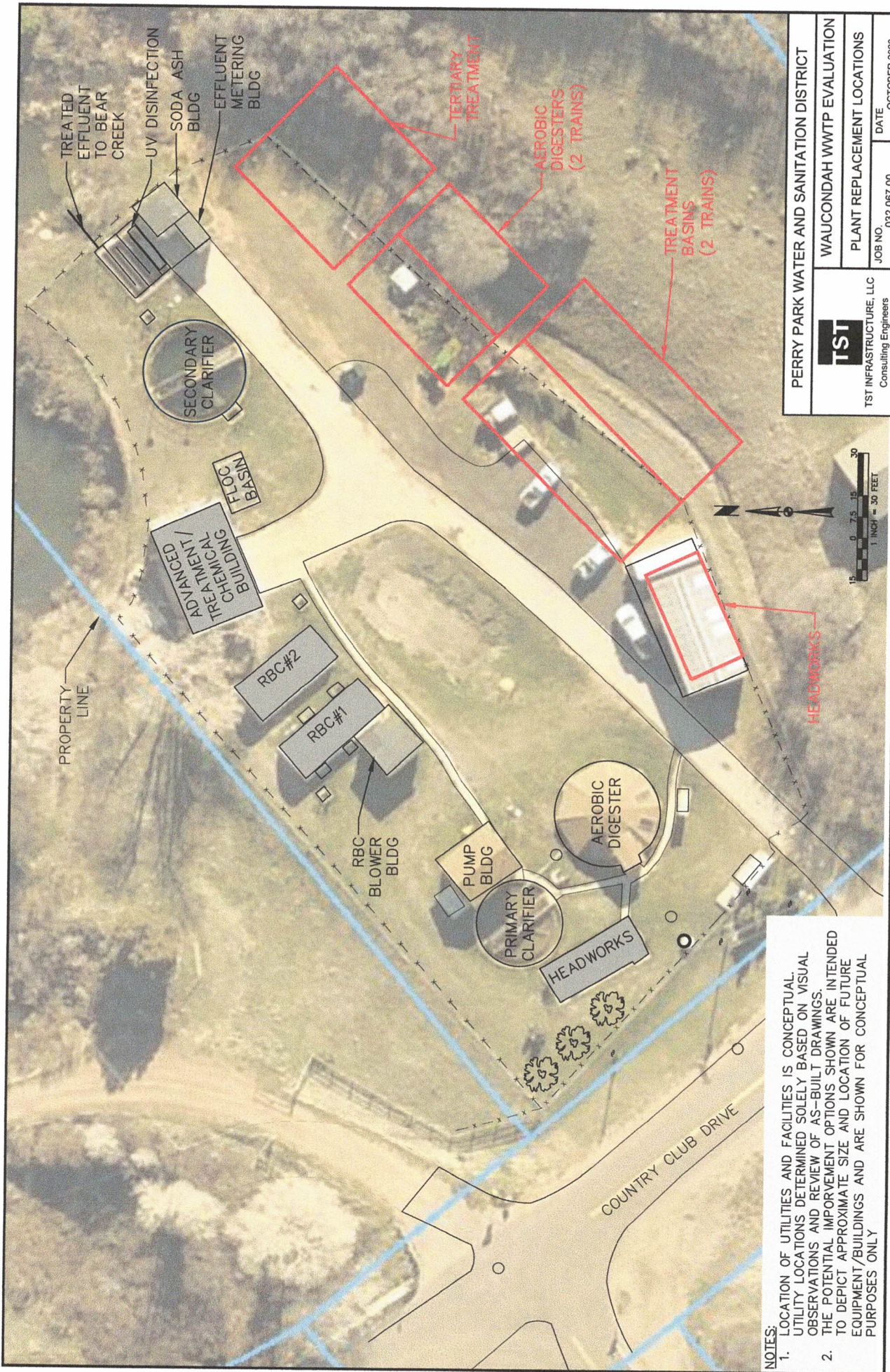


SYMBOL LEGEND:
 ○ MANHOLE
 □ DIVERSION BOX

PERRY PARK WATER AND SANITATION DISTRICT	
TST TST INFRASTRUCTURE, LLC Consulting Engineers	WAUCONDAH WWTP EVALUATION
POTENTIAL IMPROVEMENT LOCATIONS	POTENTIAL IMPROVEMENT LOCATIONS
JOB NO. 032.067.00	DATE OCTOBER 22, 2020

NOTES:

1. LOCATION OF UTILITIES AND FACILITIES IS CONCEPTUAL. UTILITY LOCATIONS DETERMINED SOLELY BASED ON VISUAL OBSERVATIONS AND REVIEW OF AS-BUILT DRAWINGS.
2. THE POTENTIAL IMPROVEMENT OPTIONS SHOWN ARE INTENDED TO DEPICT APPROXIMATE SIZE AND LOCATION OF FUTURE EQUIPMENT/BUILDINGS AND ARE SHOWN FOR CONCEPTUAL PURPOSES ONLY.



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PERRY PARK WATER AND SANITATION DISTRICT 	
WALCONDAH WWTP EVALUATION TST INFRASTRUCTURE, LLC Consulting Engineers	
PLANT REPLACEMENT LOCATIONS JOB NO. 032.067.00	DATE OCTOBER 2020