August 26, 2020

Mr. John Armstrong
City of Riviera Beach Utility Special District
600 W. Blue Heron Blvd.
Riviera Beach, FL 33404

RE: **Water Treatment Plant and Utility System Chemical Feed System Improvements Design-Building Services Design Build Package No. 2**

Dear Mr. Armstrong:

At the request of the District, we have assembled this proposal for the WTP Improvements Design Build Package No. 2. The work included in this proposal is based on the Design Criteria Technical Memorandum No. 1 dated June 1, 2020 prepared by Brown and Caldwell and titled Chemical Feed Systems Design Criteria as clarified herein. The following scopes are included in this proposal.

Item 1a – Electrical Relocation and Improvements
Item 1b – Standalone Lime System
Item 1c – Recarbonation System

The aforementioned items are considered critical to the continued operation of the facility for the production of potable water for distribution.

The electrical equipment currently located in the North Chemical Building shall be relocated to another building under proposed Item 1a. The North Chemical Building is structurally compromised, and the equipment must be relocated to another building for safety of the facility and its employees. The scope of 1a also includes the electrical improvements to accommodate the proposed Standalone Lime System (Item 1b) and the Recarbonation System (Item 1c).

The Standalone Lime System (Item 1b) has been identified as a critical infrastructure improvement by the Design Criteria team. The proposed lime system will provide two new lime silo/slaker units, similar to those shown in Figure 3-1 of the Design Criteria Technical Memorandum No. 1. Each unit will contain the components necessary to act as a standalone system: quicklime storage, feeder, grit removal, slaker, slurry holding tank, slurry pump, and controls. The slurry pump will maintain slurry in suspension at the manufacturer's recommended minimum velocity within a loop passing over all three lime softening units. Dosing assemblies would control the flow of slurry from the loop to each lime softening unit. This proposed lime system will replace the existing aging system in the South Chemical Building as well as the failed system in the North Chemical Building. The proposed system will provide automation and flow pacing capabilities not available in the current system. The standalone system shall be substantially constructed September 15, 2020.

Currently disinfection at the WTP is provided by a gaseous chlorine system located in the North Chemical Building and an anhydrous ammonia system with rotameters located on the second floor of the South Chemical Building. RBUSD has decided to replace gaseous chlorine with sodium hypochlorite. The use of chlorine gaseous chlorine works to reduce pH while sodium hypochlorite will increase pH. Additionally, having the flexibility to soften at higher pH levels is desirable. Thus, it has been decided to utilize a recarbonation system to control and reduce the pH of the treated water. Item 1c will be to provide a recarbonation system. The main system will be located adjacent to the new lime system. New Yard Piping, Chemical Injectors and ancillary recarbonation systems (Pressure Feed Panels, pH probes, etc.) will also be installed to provide a system to reduce the pH as desired. The recarbonation system will provide carbon dioxide to the injection points summarized in Table 3-7. Due to the effluent pipe constraints the dosage will likely be flow paced instead of pH based. The feed system will be appropriately manifolded to allow for a backup feed to any CO2 Injection point desired if the primary feeder is disabled.

The storage tank, chiller, evaporator, feed panel and ancillary equipment and controls will be located adjacent to the new lime silos. The solution pressure feed panels will be located on the second floor in the ammoniator room as shown in Attachment B, Figure B-6. pH probes will be located as required throughout the WTP in order to provide pH samples for process control for the above listed injection points. Table 3-8 summarizes the recarbonation system equipment for pH control to meet a target pH of 8.5 after lime softening. Minimum tank capacity is based on the average dosage shown in Section 3.2 and should be confirmed by the design engineer based on the anticipated average lime dosage and sodium hypochlorite dosage.

SCOPE OF WORK

RFQ Number 999-20-2 included Technical Memorandum No. 1 for Design-Build Criteria for Chemical Feed System Improvements. The scope of work is based on Design Build Package No. 2 in Technical Memorandum No. 1 of RFQ Number 999-20-2 as clarified and modified herein. Those work areas are defined in sections 3.3.2, 3.5 and 6 of the RFQ Technical Memorandum.
Scope of work shall include the following work areas:

1a. Electrical Improvements/Relocation of Electrical Equipment from N. Chemical Building (Section 6 Tech Memo)
1b. Standalone Lime Storage and Feed System (Section 3.3.2 Tech Memo)
1c. Recarbonation System (Section 3.5 Tech Memo)

Task 1 – Data Collection and Surveys

1. Receive NTP.
2. Review As-Built drawings and specifications.
3. Review of historic water quality data and monthly operating reports.
4. Conduct field visits and topographic surveys for use in the design.
5. Attend Project Kickoff Meeting.
6. Coordinate with existing plant SCADA, confirming available I/O.
7. Provide location of necessary boring(s) for the structural design of the equipment concrete pad for CO2 & Lime.
8. Provide soil boring(s) and Geotech report.
9. Review geotechnical report.

Task 2 – Preliminary Design
Services to be provided by CGA, HEE, and LYE

1. Provide Preliminary Design Drawings.
2. Provide the required number of sets of plans for Owner review. shall be provided in both AutoCAD and PDF format.
3. Attend Preliminary Design Review meeting.

Task 3 – 90% Design

1. Provide 90% Design Drawings.
2. Provide the required number of sets of plans for Owner review. Plans shall be provided in both AutoCAD and PDF format.
3. Prepare and submit applicable permit applications with signed and sealed drawings.
4. Prepare and submit all related Building Department permit applications (e.g. electrical, mechanical, structural etc.) and signed and sealed drawings.
5. Shop drawing review and approval.
6. Attend 90% Design Review Meeting.
7. Provide written response to 90% Design Comments.

Task 4 – 100% Design

1. Procurement of Equipment

2. Prepare 100% design drawings.
3. Provide the required number of sets of plans for Owner review. Plans shall be provided in both AutoCAD and PDF format.

Task 5 – Pre-Construction Services

1. Attend Pre-Construction Meeting.
2. Forward all shop drawings, product data submittals, and technical manual to Owner for review and comment.

Task 6 – Construction Services

1. Procurement of Equipment and Materials.
2. Construction Coordination, RFI's.
3. Provide Inspection Services during construction to certify the work was constructed in substantial conformance with the design.
4. Provide assistance during start-up and testing of the new equipment.
5. Provide PLC Programming Off Site.
6. Provide PLC Programming On Site, Loop Check and Testing.
7. SCADA Programming.

Task 7 – Project Close Out

1. Prepare final Record Drawings.
2. Prepare permit close out submittal packages to the permitting agencies. When possible, provide computer print-out from permitting agency as evidence the permits have been properly closed. Technical manual review and approval.
3. Prepare Project Close-out Documentation Package.

Item 1a. Electrical Improvements/Relocation of Electrical Equipment from N. Chemical Building

The CONTRACTOR shall design, furnish and perform work for the removal of the existing MCC No. 3 located in the North Chemical Building – Electrical Room and all the existing electrical loads associated with MCC No. 3 that shall be relocated to a new MCC or new distribution panel at the Air Stripping Building – Electrical Room.

The existing PLC panel in North Chemical Building shall also be removed and all signals associated with MCC No. 3 shall be relocated to other existing or new PLC/RIO panels. The existing electrical service, ATS, and MCC No. 5 located at the Air Stripping Building do not have enough capacity and shall be upgraded where applicable to include the relocated electrical loads. A new mini-power zone shall be designed at the existing lift station located near North Chemical Building to supply 208V power to the existing lift station control panel.

New electrical equipment shall accommodate future loads from a stand-alone lime storage and feed system based on the draft design criteria for Consent Order related improvements. Improvements shall include required raceways, wiring and connections for the stand-alone system.

Item 1a Assumptions

1) Design documents are limited to Preliminary drawings, 90% drawings (building permit set), 100% drawings (final design plans), and Record Drawings (as-built plan set including any revisions during construction).
2) GPR Survey of conduit routing is included to try and minimize the impact of unknown utility conflicts.
3) CONTRACTOR will perform services to coordinate team efforts with the Owner/Design Criteria Engineer including

engage in internal progress meetings; coordination with sub-consultants, staff meetings; coordination with the Owner; budget control and invoice processing; responding to Owner/Design Criteria Engineer comments; provide supporting documentation for design and permitting; and quality control review of design; overall coordination to keep the Owner aware of the project's progress, budget, schedule and critical design decisions.

4) Geotechnical Services are not included under this proposal.
5) Accurate Record Drawings of the work locations shall be provided by the Owner, in AutoCAD format.
6) Scope of work is based on relocation of electrical equipment into the existing Air Stripper Electrical Building. It is the understanding of the Design Criteria Engineer, the DISTRICT and the CONTRACTOR that the elevation of the existing building is satisfactory to accommodate the scope of this work and does not require any special modifications to the existing building or the equipment within to meet flood plain elevation requirements.
7) Progress meeting attendance is anticipated at one per month for the duration of the project.
8) Underground power and control ductbanks consist of direct bury conduits (no concrete, no rebar).
9) Electrical power conduits shall be 24" minimum cover in roadway.
10) Asphalt patching is included at all conduit routing.
11) Due to the additional heat loads in the air stripper electrical building, we have included a new packaged wall hung HVAC unit.
12) We have not included any utility relocations for existing utilities interfering with proposed new utility and trench routing. We have included exploratory excavation for proposed routing to identify potential conflicts.
13) We have included asphalt patching at conduit routing through existing asphalt (no overlay).
14) Lightning Protection for New Lime Silos are included in this scope of work.

Item 1b. Standalone Lime Storage and Feed System

The CONTRACTOR shall design, furnish and install a new standalone lime feed system. The proposed standalone lime feed system shall include two silo/slaker units to be located north of the existing North Chemical Building. The proposed location will allow for easy access and delivery to the lime feed system. The proposed standalone system as furnished by RDP Technologies, Inc. consists essentially of (2) bulk lime storage silo, (2) lime feeders, (2) lime slakers, (2) slurry aging tank, (1) fine grit classifier, (2) slurry pumps and (1) delivery system, (2) system control panels and lime truck unloading panels, and (2) air compressors. The system shall be capable of controlled delivery of slaked lime to the three existing lime softening units.

The feed system shall be controlled in proportion to flow at an operator selected dose required to meet target pH. The settled water pH in each softening unit shall be continuously monitored and reported locally and remotely via the SCADA system. The system will operate with the use of a slurry pump through a common, continuous 4-inch PVC and XLPE industrial hose transitions feed loop system. The system control panel will include a human-machine graphical interface for use in controlling and accessing information regarding the system. The panel will include an Allen-Bradley CompactLogix programmable controller, which can be connected to the WTP wide control and monitoring system.

CONTRACTOR shall design and construct the equipment concrete pad where the proposed standalone lime storage and feed system will be located.

CONTRACTOR shall provide all signage and labels for the piping, storage tanks, pump and fill connections, including NFPA, DOT UN #, Content Label, and GHS labeling.

The selected lime system, RDP TEKKEM SLAKING SYSTEM, was selected based on best value, single supplier system responsibility, and owner/design criteria engineer preference. The RDP TEKKEM SLAKING SYSTEM is an automated batch process that provides continuous delivery of lime.

Item 1b Assumptions and General Notes:

1. Work includes site prep for new concrete slab on grade. No utilities are shown in this area and therefore we have not

included any relocation of existing utilities.

2. Concrete foundation for New Lime Storage and Feed system is estimated at 20' x 50'.
3. Exploratory excavation to identify conflicts in proposed pipe routing.
4. Lime feed piping shall be buried schedule 80 PVC with hand holes and camlock fitting hoses at bends for service, cleaning, flushing and maintenance.
5. Aluminum stair and platform to access lime slaker (mid-level platform).
6. Access ladders to top of lime silo.
7. Pipe bollards at new lime facility (qty 10)
8. Finishes: Equipment and silo shall be factory primed with Sherwin-Williams epoxy primer and field painted with compatible finish coating.
9. This scope of work includes the infrastructure and infrastructure design needed to add additional redundancy for storage and slaking in the future.
10. The purchase of lime for startup and testing is excluded from the cost of this proposal. The City of Riviera Beach currently has an agreement in place to purchase lime from a lime supplier and purchase of chemical by the Design Build Entity is not required or included.
11. Design Build Entity will perform disinfection and bacteriological testing for all potable water piping as required by the Health Department.
12. Soil report for new work areas was not available and we have limited soil improvements for new foundation and slabs on grade to 1' below existing grade.
13. We have not included any utility relocations for existing utilities interfering with proposed new utility and trench routing. We have included exploratory excavation for proposed routing to identify potential conflicts.
14. We have included 2400sf of sod restoration to stabilize and restore sod adjacent to the pipe trenches only.
15. We have not included any storm drainage improvements in our proposal, based on the understanding that the improvements will minimally impact the impervious area of the site and grade changes are not part of our approach.
16. Modifications to the existing surface water management system and lime sludge processing system is not anticipated in this contract. Therefore, this scope of work does not include engineering services or construction services associated with the modifications of those existing systems.
17. Historic water quality data and monthly operating reports shall be provided by the Owner. It is anticipated that, at a minimum, this information will be provided from January 2018 to August 2020.

Item 1c Recarbonation System

The CONTRACTOR shall design, furnish and install a new CO2 injection system to help to control and reduce the pH levels. The CO2 system will inject liquid carbonic acid, produced on-site, to lower the pH of the finished water to meet a target pH of 8.5 as included in the Design Criteria. The proposed CO2 system shall include a 26 tons CO2 vertical storage system capable of storage a minimum of 30 days, carbonic acid feed system with a rate of 40 lb/hr for each softener unit, booster pump with a carrier water required of 40 gpm at a minimum carrier water pressure of 65 psi, online pH monitoring at softener's effluent to provide 90 seconds after carbonic acid injection, yard piping, all structural, electrical, instrumentation and control work associates with the new system It is estimated that a total of 70 lbs/hr would be needed for the 14 MGD plant. For CONTRACTOR shall design, design and construct the equipment concrete pad were the proposed standalone lime feed system will be located. Each psf feed system will be located in the ground next to each softener unit. The CONTRACTOR shall provide all signage and labels for the piping, storage tanks, pump and fill connections.

Item 1c Assumptions and General Notes:

1. Permitting duration is assumed to be 60 days.

2. CO2 Storage Tank and Lime Storage System are assumed to be in the same location. Re-locating the CO2 system to a different location than the lime system will result in additional design and construction costs.
3. Accurate Record Drawings of the work locations shall be provided by the Owner, in AutoCAD format.
4. CO2 Tank shall be installed and anchored on (1) 16' x 16' slab.
5. (3) CO2 Solution Feed Pumps and Panels shall be provided at each softener as shown on the proposed site plan.
6. CO2 Tank shall be vertical to minimize footprint.
7. Pipe bollards will be provided at the CO2 Tank
8. Painting is limited to the ~65' of ½" PVC sample piping at each injection point.
9. CO2 gas piping shall be 1" 316 stainless steel direct bury from CO2 tank to the solution panels located at each Treatment Unit.
10. CO2 solution feed piping from feed panel to injection point shall be 2" 316ss piping.
11. CO2 above ground piping at the CO2 tank shall be 316ss.
12. Carrier water piping shall be 2" PVC connected to existing 12" PW line using a tapping saddle and backflow preventer.
13. CO2 vaporizer piping shall be insulated.
14. CO2 tank shall be 26 ton Vertical tank
15. CO2 feed system includes three (3) Skid mounted, Goulds eSV Carrier Water Pumps with isolation valves and control panels.
16. Electrical and PSF Panels shall be NEMA 4x 304 ss
17. CO2 System Feed Panels:
    a. Three 52 lb/hr PSF Carbonic Acid feed panels – 24/45/52 gpm clean carrier water at a DP of 55 psig required - 120 volt.
    b. Automatic pH Controlled
18. Soil report for new work areas was not available at the time of GMP development, and therefore, we have limited soil improvements for new foundation and slabs on grade to 1' below existing grade.
19. We have not included any utility relocations for existing utilities interfering with proposed new utility and trench routing. We have included exploratory excavation for proposed routing to identify potential conflicts.
20. We have included 2400sf of sod restoration to stabilize and restore sod adjacent to the pipe trenches only.
21. We have not included any storm drainage improvements in our proposal, based on the understanding that the improvements will minimally impact the impervious area of the site and grade changes are not part of our approach.
22. Modifications to the existing surface water management system and lime sludge processing system is not anticipated in the project. Therefore, this scope of work does not include engineering services associated with the modifications of those existing systems.
23. Lightning protection for New CO2 Tank included in this scope of work.
24. Dedicated Owner Allowances have been established for the following items cannot be accurately quantified or determined at this time:
    a. Permitting Fees – Permitting fees for construction permits shall be paid via a dedicated allowance
    b. FPL Allowance
    c. Asphalt Paving Allowance
    d. Testing Allowance
    e. Chemical Purchase Allowance
    f. Unforeseen Conditions Allowance
    g. Seacoast Lime System Investigation Allowance
25. Historic water quality data and monthly operating reports shall be provided by the Owner. It is anticipated that, at a minimum, this information will be provided from January 2018 to August 2020.
26. The proposed CO2 injection system capacity has been estimated based on the following water quality parameters that must be verified based on the review of the historic water quality and monthly operating report data.

a. Initial pH = 10.0
b. Maximum Alkalinity = 45 mg/L
c. Total Dissolved Solids (TDS) = 200 mg/L
d. Water Temperature = < 25°C

General Notes:
The proposal is based on substantial construction of the work items in 385 Calendar Days from NTP for the Lime System and Re-carbonation System and 485 for all defined sitework improvements. Duration is based on 7-day review of submittals and design drawings by the owner/design criteria engineer.

The price breakdown of the work defined is listed below:

Item 1a Construction	1,153,340.00
Item 1b Construction	2,933,720.00
Item 1c Construction	1,402,994.00
Engineering	765,300.00
Allowances	375,000.00
	6,630,354.00

Attachment A summarizes the bid estimate for your review and information. If you have any questions, please contact me at your earliest convenience.

Respectfully,

Cardinal Contractors, Inc.

Michael Brandao
Vice President

Encl/ Attachment A – Price Estimate Sheet
Attachment B – Preliminary Drawing Set
Attachment C – RDP Proposal
Attachment D – TOMCO Proposal
Attachment E – Technical Memorandum Design Criteria Document

cc: Jonathan Batista, Riviera Beach

ATTACHMENT A - PRICE ESTIMATE SHEET
8/26/2020 PROPOSAL LETTER

CARDINAL CONTRACTORS, INC. 8/25/2020
CITY OF RIVIERA BEACH UTILITY DISTRICT REV 0
CHEMICAL FEED SYSTEM IMPROVEMENTS DESIGN CRITERIA PACKAGE 2

6,630,354.00

BI	ID	DESCRIPTION	UNIT	QTY		EXT. PRICE
			-			
Bid Item 1		**General Conditions**	-			
	01700	PURCHASING COSTS	HR	200		12,220.00
	01701	PROJECT MANAGER (PM III)	HR	700		101,584.00
	01702	SUPERINTENDENT	HR	1000		95,470.00
	01703	PROJECT ENGINEER	HR	750		45,825.00
	01516	SCHEDULING (PM I)	HR	180		17,184.60
	01705	GENERAL SUPERINTENDENT	HR	180		22,455.00
	01804	PERMIT APPLICATION & COORDINATION	HR	24		3,788.64
			-			
			-		**Bid Item Total:**	**298,527.24**
			-			
Bid Item 2		**Sitework**	-			
	01508.01	MOBILIZATION / DEMOBILIZATION	LS	1		11,304.50
	01508.02	UNLOADING OF MATERIAL	LS	1		3,864.00
	01501	DUMPSTERS & WASTE HAULING	MON	10		9,487.50
	01505	PURCHASE OFFICE SUPPLIES	MON	14		2,576.00
	01506	FINAL CLEANING	DAYS	8		8,243.20
	01507	HOUSEKEEPING - TRAILER & SITE	MO	12		5,088.89
			-			-
	01519	PROJECT SURVEY & LAYOUT	LS	1		9,343.75
	01521	TEMP FENCES - CONSTRUCTION	LS	1		3,369.16
	01616	FIELD OFFICE TRAILER	MO	10		4,499.69
	01618	CONTAINER RENTAL	MO	10		4,239.92
			-			-
	02002.01	SUBSURFACE EXPLORATION (POTHOLE)	LS	3		7,758.05
	02002.02	GROUND PENETRATING RADAR	DAY	2		6,210.00
	02002.03	SOFT DIGS / HYDRO EXCAVATION	LS	1		7,590.00
	02101.01	EXCAVATION (CO2 Tank Foundation)	LS	1		2,706.71
	02101.01	EXCAVATION (Electrical Ductbanks)	LS	1		5,555.98
	02101.01	EXCAVATION (Silo Foundation)	LS	1		4,134.80
	02101.02	EXCAVATION (Solution Feed Foundation)	LS	1		1,765.61
	02106.01	BACKFILL & COMPACT (CO2 Foundation)	LS	1		2,112.30
	02106.01	BACKFILL & COMPACT (Electrical Ductbanks)	LS	1		1,496.22
	02106.01	BACKFILL & COMPACT (Silo Foundation)	LS	1		4,752.49
	02106.02	BACKFILL & COMPACT (Solution Feed Foundation)	LS	1		3,312.21
	02132	EROSION & SEDIMENT CONTROL	LS	1		2,103.86
	02133	SILT FENCE	LF	400		1,857.76
	02229	SAW CUTTING ASPHALT	LF	2104		4,839.20
	02230	ASPHALT PAVING REMOVAL	SF	5470		4,025.00
	02235	CONCRETE DRIVEWAY	SF	1200		17,125.80
	02600.01	ASPHALT PAVING PATCH REPAIR	SF	2400		23,460.00
	02750	SODDING	LS	1		7,584.64
	01512	PUNCHLIST	DAYS	10		10,304.00
			-			
			-		**Bid Item Total:**	**180,711.23**
			-			
Bid Item 3		**Concrete**	-			
	03311.01	FOUNDATION - CO2 TANK	CY	13		11,005.82
	03311.02	FOUNDATION - LIME SILOS	CY	75		59,693.19
	03311.03	FOUNDATION - SOLUTION FEED	CY	8		8,228.33
	03311.04	FOUNDATION - ELEVATED PIPE SUPPORTS	CY	60		32,805.00
	03721.02	PRECAST CHEMICAL TRENCH HS 20	LF	80		18,568.66
	03398	MISC CONCRETE PADS	CY	7		3,591.00
			-			
			-		**Bid Item Total:**	**133,892.00**
			-			
Bid Item 5		**Metals**	-			
	05510.01	SILO ALUM STAIR & PLATFORM	EA	2		27,519.52

6,630,354.00

BI	ID	DESCRIPTION	UNIT	QTY		EXT. PRICE
			-			
	05535.01	PIPE BOLLARDS	EA	12		4,969.28
	05550	ELEVATED PIPE SUPPORTS	LOT	1		83,409.50
	05558	ANCHOR BOLTS	LOT	1		6,235.30
			-		**Bid Item Total:**	**122,133.60**
			-			
Bid Item 9		**Coatings & Painting**	-			
	09900.01	PIPE COATINGS	LS	1		7,753.98
	09900.02	FINISH COAT SILOS	LS	1		63,606.40
			-			
			-		**Bid Item Total:**	**71,360.38**
			-			
Bid Item 11		**Process Equipmnet & Special Construction**	-			
	11310.01	FRP PACKAGE PUMP STATION	LS	1		29,788.17
	11370	CO2 SYSTEM EQUIPMENT (PURCHASE)	LS	1		781,367.50
	11370.01	CO2 SYSTEM EQUIPMENT (INSTALL)	CR-5	10		18,729.55
	13200	LIME SYSTEM (PURCHASE)	LS	1		1,729,761.00
	13200.01	LIME SYSTEM INSTALL (SILO)	CR-5	14		26,221.37
	13200.02	LIME SYSTEM INSTALL (EQUIPMENT)	CR-5	12		22,475.46
			-			-
	13900.01	STARTUP & TESTING OF LIME	F2	80		7,942.40
	13900.02	STARTUP & TESTING OF CO2 SYSTEM	F2	80		7,942.40
	13900.03	STARTUP & TESTING OF ELECTRICAL EQUIPMENT	F2	16		1,588.48
	13900.04	FIELD CHECKOUT / LOOP CHECKS	F2	40		3,971.20
			-			
			-		**Bid Item Total:**	**2,629,787.53**
			-			
Bid Item 15		**Mechanical**	-			
	15001	UNLOAD & DISTRIBUTE PIPE	CR-5	2		3,745.91
	15002.001	UNISTRUT CHANNEL FRP/SST-1 5/8"	LF	270		4,295.37
	15002.002	UNISTRUT PIPE CLAMPS FRP/SST - 1/2"	EA	48		425.99
	15002.006	UNISTRUT PIPE CLAMPS FRP/SST - 1"	EA	41		402.53
	15002.007	UNISTRUT PIPE CLAMPS FRP/SST - 2"	EA	37		363.37
	15002.010	UNISTRUT PIPE CLAMPS FRP/SST - 4"	EA	230		2,724.61
	15002.013	UNISTRUT Z FITTING FRP/SST	EA	348		6,748.74
	15002.014	UNISTRUT BASE FITTING FRP/SST	EA	32		2,440.22
	15002.015	UNISTRUT CHANNEL SPRING NUTS FRP/SST	EA	406		1,072.84
	15002.19	VERTICAL SUPPORTS - 4"	EA	4		1,151.74
	15002.67	CLEVIS HANGER ASSY FRP/SST - 1"	EA	10		1,643.47
	15002.70	CLEVIS HANGER ASSY FRP/SST - 2"	EA	4		657.39
	15002.73	CLEVIS HANGER (Detail 10) FRP - 4"	EA	18		2,354.76
	15002	PIPE SUPPORTS (LABOR)	CR-3	35		6,831.22
	15004	BEDDING 57 STONE	TON	40		1,472.55
	15004	BEDDING SAND	TON	22		520.65
	15004	BEDDING 57 STONE	TON	22		809.90
	15006.001	NUTS, BOLTS, GASKETS - 1/2"- 1"	EA	17		1,044.91
	15006.01	NUTS, BOLTS, GASKETS - 2"- 3"	EA	23		1,413.71
	15006.02	NUTS, BOLTS, GASKETS - 4"	EA	12		2,989.80
	15013	DISINFECTION & TESTING	LF	3400		2,235.12
	15013	DISINFECTION & TESTING (LABOR)	CR-3	56		13,430.30
	15019.01	SPECIALTIES/ DBL STRAP TAP SADDLE 20x2	EA	2		854.60
	15019.01	SPECIALTIES/ SST CAMLOCK MALEx HOSE- 4"	EA	70		13,805.14
	15019.01	SPECIALTIES/ CI FLOOR DRAIN ASSY- 4"	EA	2		749.42
	15019.02	SPECIALTIES/ DBL STRAP TAP SADDLE 24x2	EA	2		1,117.56
	15019.02	SPECIALTIES/ SST CAMLOCK FEMALEx NPT- 4"	EA	70		16,566.17
	15019.02	SPECIALTIES/ CI CLEAN-OT ADAPT & PLUG	EA	2		460.17
	15019.03	SPECIALTIES / CO2 Signage	LS	1		821.73
	15019.03	SPECIALTIES/ DBL STRAP TAP SADDLE 36x2	EA	2		1,643.47

6,630,354.00

BI	ID	DESCRIPTION	UNIT	QTY	EXT. PRICE
			-		
	15019.03	SPECIALTIES/ FERNCO COUPLING- 4"	EA	8	473.32
	15019.04	SPECIALTIES/ SAF-T-FLO INJECTOR- 2"	EA	3	10,649.68
	15019.04	SPECIALTIES/ SAF-T-FLO INJECTOR- 1"	EA	3	2,366.60
	15019.04	SPECIALTIES/ FERNCO COUPLING- 6"	EA	3	256.38
	15020.101	DIP - MJ/PUSH-ON JOINT 4"	LF	280	16,566.17
	15020.117	DIP - MJ/PUSH-ON - 90 BEND 4"	EA	5	361.56
	15020.133	DIP - MJ/PUSH-ON - TEE 4"	EA	3	354.99
	15020.181	DIP - MJ/PUSH-ON - CONC/ECC RED 4X3	EA	4	447.02
	15020.275	DIP - MJ/PUSH-ON - SLEEVE - 6"	EA	1	164.35
	15020.291	DIP - MJXMJ/FLG CONNECT PIECE - 4"	EA	3	631.09
	15021.102	DIP - FLG - 90, 45, 22.5 BEND 4"	EA	4	578.50
	15034.12	DI TAPPING SLEEVE& VALVE ASSY- 8" x 4"	EA	1	1,577.73
	15034.12	DI TAPPING SLEEVE& VALVE ASSY- 12" x 4"	EA	1	1,577.73
	15035.02	MEGALUGS- 4"	EA	14	901.94
	15035.02	MEGALUGS TANDEM- 4"	EA	13	837.51
	15052.001	SST 316 SEAMLESS TUBING - 1/2"	LF	160	1,262.18
	15052.002	SST 316 UNION TEE - 1/2"	EA	6	386.54
	15052.003	SST 316 UNION ELBOW - 1/2"	EA	22	1,041.30
	15052.004	SST 316 TUBE UNION - 1/2"	EA	6	205.10
	15052.005	SST 316 MALE CONNECTOR - 1/2"	EA	8	199.85
	15052.006	SST 316 TUBE BALL VALVE - 1/2"	EA	6	1,774.95
	15052.01	SST 316 SCH40/ 80 PIPE - 1"	LF	600	15,777.30
	15052.011	SST 150/3000 # SOC WLD 90 BEND - 1"	EA	18	922.03
	15052.013	SST 150/3000 # SOC WLD TEE - 1"	EA	5	273.14
	15052.014	SST 150/3000 # SOC WLD COUPLING - 1"	EA	25	1,087.32
	15052.015	SST 150/3000 # SOC WLD FLG - 1"	EA	5	276.10
	15052.02	SST 316 SCH 40/80 PIPE - 2"	LF	280	12,884.80
	15052.021	SST 150/3000 # SOC WLD 90 BEND - 2"	EA	24	1,703.95
	15052.023	SST 150/3000 # SOC WLD TEE - 2"	EA	3	295.82
	15052.023	SST 150/3000 # SOC WLD UNION - 2"	EA	2	328.69
	15052.025	SST 150/3000 # SOC WLD COUPLING - 2"	EA	5	315.55
	15052.026	SST 150/3000 # SOC WLD FLANGE - 2"	EA	10	788.87
	15052.03	SST 316 SCH 40 PIPE- 1"	LF	160	2,524.37
	15052.030	SST 316 SCH 80 THD NIPPLES - 1"	EA	24	504.87
	15052.030	SST 316 SCH 40 THD NIPPLES - 1"	EA	16	336.58
	15052.14	SST 316 #150 THD 22.5,45,90 - 1"	EA	16	410.42
	15052.25	SST 316 #150 THD TEE - 1"	EA	4	143.84
	15052.36	SST 316 #150 THD COUPLING - 1"	EA	4	95.14
	15052.46	SST 316 #150 THD CAP - 1"	EA	2	31.55
	15052.57	SST 316 150/3000 # THD UNION - 1"	EA	1	160.83
	15052.57	SST 316 #150 THD UNION - 1"	EA	4	253.75
	15066.04	PVC SDR-35 SEWER PIPE- 4"	LF	200	1,051.82
	15066.041	PVC SDR-35 90 ELL GxG- 4"	EA	2	99.92
	15066.042	PVC SDR-35 45 ELL GxG- 4"	EA	8	368.14
	15066.043	PVC SDR-35 WYE GxGxG - 4"	EA	4	489.10
	15067.03	CPVC SCH 80 PIPE - 1"	LF	60	533.27
	15067.06	PVC SCH 80 PIPE- 2"	LF	240	1,416.80
	15067.06	PVC SCH 80 PIPE- 2"	LF	80	472.26
	15067.09	CPVC SCH 80 PIPE - 4"	LF	1260	43,072.03
	15067.10	CPVC SCH 80 PIPE - 6"	LF	40	3,155.46
	15067.14	CPVC SCH 80 BEND,45,90 - 1"	EA	24	406.74
	15067.17	PVC SCH 80 ,45,90 BEND- 2"	EA	18	127.56
	15067.17	PVC SCH 80 ,45,90 BEND- 2"	EA	8	56.70
	15067.20	CPVC SCH 80 ,45,90 - 4"	EA	4	289.25
	15067.200	PVC SCH 80 SWB PIPE - 1"	LF	360	918.24
	15067.202	SCH80 PVC SW FITTING - 22.5,45,90 - 1"	EA	66	621.31
	15067.205	SCH80 PVC SW FITTING - TEES & WYES - 1"	EA	6	1,304.63
	15067.21	CPVC SCH 80 BEND 45,90 - 6"	EA	6	1,577.73

6,630,354.00

BI	ID	DESCRIPTION	UNIT	QTY		EXT. PRICE
			-			
	15067.212	SCH80 PVC SW FITTING - MALE/FEMALE ADAPTERS - 1"	EA	12		221.51
	15067.220	SCH80 PVC SW FITTING - FLANGES - 1"	EA	12		357.67
	15067.222	SCH80 PVC SW FITTING - UNIONS COUPLINGS - 1"	EA	12		138.05
	15067.234	SCH80 PVC SW VALVE - BALL VALVE - 1"	EA	9		1,668.45
	15067.32	CPVC SCH 80 TEE - 6"	EA	1		447.02
	15067.336	SCH80 CPVC SW VALVE - BALL CHECK VALVE - 1"	EA	6		670.54
	15067.42	CPVC SCH 80 COUPLING - 4"	EA	4		473.32
	15067.49	PVC SCH 80 CAP - 2"	EA	2		31.39
	15067.57	CPVC SCH 80 UNION - 1"	EA	3		140.62
	15067.60	PVC SCH 80 UNION - 2"	EA	3		97.78
	15067.60	PVC SCH 80 UNION - 2"	EA	2		65.19
	15067.63	CPVC SCH 80 UNION - 4"	EA	3		887.47
	15067.73	CPVC SCH 80 M/F ADAPTOR- 4"	EA	70		7,362.74
	15067.80	PVC SCH 80 M ADAPTOR - 2"	EA	6		116.90
	15067.80	PVC SCH 80 M ADAPTOR - 2"	EA	4		77.94
	15067.90	PVC SCH 80 VAN-STONE FLG - 2"	EA	9		163.06
	15067.90	PVC SCH 80 VAN-STONE FLG - 2"	EA	4		72.47
	15067.93	CPVC SCH 80 VAN-STONE FLG - 4"	EA	10		2,484.92
	15070.050	COPPER PIPE, BURIED, 0.5"-1"	LF	20		157.77
	15070.052	COPPER PIPE, BURIED, 2"-3"	LF	60		2,208.82
	15070.057	COPPER FITTINGS, SOLDER, .05"-1"	EA	8		189.33
	15070.058	COPPER FITTINGS, SOLDER, 2"-3"	EA	12		473.32
	15080	HOSE & NOZZLE ASSY	EA	2		420.73
	15080.04	HOSE / CUT TO LENGTH- 4"	LF	300		10,255.25
	15080.041	HOSE / CLAMPS- 4"	EA	70		2,392.89
	15081	HOSE RACK & SIGN ASSY	EA	2		623.20
	15093.04	PRESSURE GAUGE ASSY - 1/2"	EA	3		729.70
	15093.04	PRESSURE GAUGE ASSY - 1/2"	EA	2		486.47
	15096	PIPE IDENTIFICATION	LS	1		197.22
	15096	PIPE IDENTIFICATION	LS	1		1,577.73
	15096	PIPE IDENTIFICATION	LS	1		197.22
	15104.021	HOSE BIB ASSEMBLY - 3/4"	EA	2		486.47
	15104.03	SST 316 THD BALL VALVE NPT- 1"	EA	4		867.75
	15104.03	PVC BALL VALVE - 1"	EA	3		556.15
	15104.03	SST 316 THD BALL VALVE NPT- 1"	EA	4		657.39
	15104.03	BRONZE BALL VALVE - 1"	EA	2		276.10
	15104.04	BRONZE BALL VALVE - 2"	EA	2		512.76
	15104.05	PVC BALL VALVE - 2"	EA	5		640.96
	15104.08	PVC BALL VALVE - 4"	EA	3		3,155.46
	15119.01	SAFETY RELEASE VALVE NPT- 1"	EA	1		525.91
	15119.01	AIR REGULATOR NPT- 1"	EA	2		-
	15119.02	AIR FILTER NPT - 1"	EA	2		-
	15119.03	AIR AUTO CONDENSATE NPT - 1"	EA	2		-
	15119.04	BRONZE PRESSURE REGULATOR VALVE- 2"	EA	3		3,100.24
	15126	PLASTIC VALVE BOX	EA	1		164.35
	15141.04	BACKFLOW PREVENTER - 4"	EA	2		10,255.25
	15199	MECHANICAL PVF LABOR	CR-3	444.58		86,771.71
			-			
	15600	HVAC	LS	1		16,568.80
			-			
			-		**Bid Item Total:**	**392,409.70**
			-			
Bid Item 16		**Electrical**	-			
	16100.01	ELECTRICAL SUBCONTRACTORS - ITEM 1A	LS	1		862,016.84
	16100.02	ELECTRICAL SUBCONTRACTORS - ITEM 1B	LS	1		58,671.34
	16100.03	ELECTRICAL SUBCONTRACTORS - ITEM 1C	LS	1		158,849.20
	16101	ELECTRICAL COORDINATION STUDY	LS	1		13,900.00
			-			

6,630,354.00

BI	ID	DESCRIPTION	UNIT	QTY		EXT. PRICE
			-			
			-		**Bid Item Total:**	**1,093,437.38**
			-			
Bid Item 17		**Instrumentation & Controls**	-			
	17000.01	INSTRUMENTATION & CONTROLS	LS	1		347,314.30
	17000.02	INSTRUMENTATION & CONTROLS - STARTUP SERVICES	HR	40		6,672.00
	17000.03	INSTRUMENTATION (INSTALLATION)	CR-3	72.6		15,756.92
	17000	PLC PROGRAMMING OFFITE	LS	1		15,336.44
	17001	PLC PROGRAMMING ONSITE / TESTING	LS	1		25,785.92
	17002	SCADA PROGRAMMING	LS	1		15,028.64
			-			
			-		**Bid Item Total:**	**425,894.22**
			-			
Bid Item 41		**Material Processing & Handling Equipment**				
	01634	BACKHOE	MON	9		18,663.75
	01645	ARTICULATING FORKLIFT	MON	4		16,917.60
	01633	MINI EXCAVATOR	MON	12		27,883.80
	01611.01	PLATE COMPACTOR	MON	2		1,575.00
	01630	CRANE	HR	100		29,925.00
	01611.02	4" DEISEL DEWATERING PUMP W/ HOSES	MON	3		7,166.25
	01611.03	SCAFFOLDING	LS	1		1,916.25
	01514.01	SAFETY EQUIPMENT	LS	1		3,029.25
	01514.02	SAFETY	MH	43		6,791.94
	01518	MISC TOOLS & EQUIPMENT	LS	1		8,529.50
	01666	EQUIPMENT FUEL	LS	1		861.00
			-			
			-		**Bid Item Total:**	**123,259.34**
Bid Item 50		**Engineering Services**	-			
	01904	ENGINEERING	LS	1		694,549.00
			-			
			-		**Bid Item Total:**	**694,549.00**
			-			
Bid Item 99		**Owner Allowances**	-			
	99010	PERMIT ALLOWANCE	LS	1		100,000.00
	99020	FPL ALLOWANCE	LS	1		50,000.00
	99030	ASPHALT PAVING ALLOWANCE	LS	1		60,000.00
	99040	TESTING ALLOWANCE	LS	1		10,000.00
	99050	CHEMICAL PURCHASE ALLOWANCE	LS	1		70,000.00
	99060	UNFORESEEN CONDITIONS ALLOWANCE	LS	1		60,000.00
	99070	SEACOAST LIME SYSTEM INVESTIGATION	LS	1		25,000.00
					Bid Item Total:	**375,000.00**
Bid Item 100		**Bond & Insurance**	-			
	01804	SURETY BOND, INSURANCES & CERTIFICATIONS	LS	1		89,392.39
					Bid Item Total:	**89,392.39**
					Grand Totals:	**6,630,354.00**

ATTACHMENT B - DRAWINGS

8/26/2020 PROPOSAL LETTER


GRAPHIC SCALE
0 10 20 40
(IN FEET)
1"=20'
FLORIDA EAST COAST RAILROAD
ROW / PROPERTY LINE
GATE
WORK AREA 1:
RETROFIT EXISTING LIME SLURRY DELIVERY SYSTEM
RETROFIT EXISTING LIME SYSTEM:
PROPOSED SLURRY TANK (DIMENSIONS TBD)
PROPOSED CO2
shaded area denotes traffic rated trench
GRIT BUCKET
GRIT CLASSIFIER
PROPOSED LIME FEED SYSTEM
BOLLARD (TYP.)
SILO 2
SILO 1
co2 piping
elevated lime piping / hose
proposed asphalt concrete drive for unloading of chemical
AMMONIA TANKS
SOFTENER UNIT No. 1 3.5 MGD
CHEMICAL FEED AND STORAGE BUILDING No. 1
SOFTENER UNIT No. 2 6.5 MGD
SOFTENER UNIT No. 3 7.5 MGD
CHEMICAL FEED AERATION AND SLUDGE DEWATERING BUILDING
WELL No. 5
MAINTENANCE SHOP
SOFTENER UNIT No. 1:
PROPOSED CO2 INJECTION FEED SYSTEM A
SOFTENER UNIT No. 2:
PROPOSED CO2 INJECTION FEED SYSTEM B
SOFTENER UNIT No. 3:
PROPOSED CO2 INJECTION FEED SYSTEM C
WELL No. 4
PUMP STATION No. 1
SLUDGE THICKENER TANK
LABORATORY AND PROCESS CONTROL BUILDING
FILTER BUILDING FILTER No. 1 TO No. 8
FILTER BUILDING FILTER No. 9 TO No. 16
TRANSFORMER VAULT
EMERGENCY GENERATOR AND ELECTRICAL MCC ROOM
WATER STORAGE TANK AND AIR STRIPPER SYSTEM
WORK AREA 2:
ELECTRICAL SYSTEM MODIFICATION
VALVE PIT No. 1
ADMINISTRATIVE BUILDING
WEST BLUE HERON BLVD
ROW / PROPERTY LINE

NOTES:
1. LOCATION OF PROPOSED LIME FEED SYSTEM, CO2 STORAGE TANK AND INJECTION FEED PADS ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY.
2. THE LOCATION OF EXISTING PIPING AND APPURTENANCES WILL BE EVALUATED DURING DETAILED DESIGN, TO DETERMINE THE PROPOSED LOCATION OF THE EQUIPMENT PAD.

811 KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG
It's fast. It's free. It's the law.
www.callsunshine.com

CONCEPTUAL

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS
Certificate of Authorization 514

WATER TREATMENT PLANT IMPROVEMENTS
RIVIERA BEACH UTILITY DISTRICT

RIVIERA BEACH, FLORIDA

PROPOSED SITE PLAN

DATE: 03-20-2020

SCALE 1" = 20'

PROJECT No 20-3546

SHEET EX-1

File Name: P:\Projects\2020\203546 Riviera Beach WTP Improvements (DB)\CADD Files\Drawings\20-3546 - Riviera Beach WTP Proposed.dwg - (Plotted by: Lee Rowbotham on Thursday, April 9, 2020 5:31:11 PM)


GRAPHIC SCALE
0 10 20 40
(IN FEET)
1"=20'
FLORIDA EAST COAST RAILROAD
ROW / PROPERTY LINE
GATE
WORK AREA 1:
RETROFIT EXISTING LIME SLURRY DELIVERY SYSTEM
RETROFIT EXISTING LIME SYSTEM:
PROPOSED SLURRY TANK (DIMENSIONS TBD)
PROPOSED CO2 STORAGE SYSTEM
GRIT BUCKET
GRIT CLASSIFIER
PROPOSED LIME FEED SYSTEM
BOLLARD (TYP.)
SILO 2
SILO 1
AMMONIA TANKS
SOFTENER UNIT No. 1 3.5 MGD
SOFTENER UNIT No. 2 6.5 MGD
SOFTENER UNIT No. 3 7.5 MGD
CHEMICAL FEED AND STORAGE BUILDING No. 1
CHEMICAL FEED AERATION AND SLUDGE DEWATERING BUILDING
WELL No. 5
MAINTENANCE SHOP
SOFTENER UNIT No. 1: PROPOSED CO2 INJECTION FEED SYSTEM A
SOFTENER UNIT No. 2: PROPOSED CO2 INJECTION FEED SYSTEM B
SOFTENER UNIT No. 3: PROPOSED CO2 INJECTION FEED SYSTEM C
WELL No. 4
PUMP STATION No. 1
SLUDGE THICKENER TANK
LABORATORY AND PROCESS CONTROL BUILDING
FILTER BUILDING FILTER No. 1 TO No. 8
FILTER BUILDING FILTER No. 9 TO No. 16
WATER STORAGE TANK AND AIR STRIPPER SYSTEM
EMERGENCY GENERATOR AND ELECTRICAL MCC ROOM
TRANSFORMER VAULT
VALVE PIT No. 1
WORK AREA 2: ELECTRICAL SYSTEM MODIFICATION
ACCESS AND DELIVERY PLAN BASED ON A CHEMICAL DELIVERY TRUCK
ADMINISTRATIVE BUILDING
WEST BLUE HERON BLVD
7.51
33.01
2.99
25.49
0.00
2.99
12.50
CHEMICAL DELIVERY TRUCK
feet
Tractor Width : 8.01
Trailer Width : 8.01
Tractor Track : 8.01
Trailer Track : 8.01
Lock to Lock Time : 6.0
Steering Angle : 20.3
Articulating Angle : 70.0
NOTES:
1. LOCATION OF PROPOSED LIME FEED SYSTEM, CO2 STORAGE TANK AND INJECTION FEED PADS ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY.
2. THE LOCATION OF EXISTING PIPING AND APPURTENANCES WILL BE EVALUATED DURING DETAILED DESIGN, TO DETERMINE THE PROPOSED LOCATION OF THE EQUIPMENT PAD.
KNOW WHAT'S BELOW
ALWAYS CALL 811
BEFORE YOU DIG
It's fast. It's free. It's the law.
www.callsunshine.com
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NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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Certificate of Authorization 514

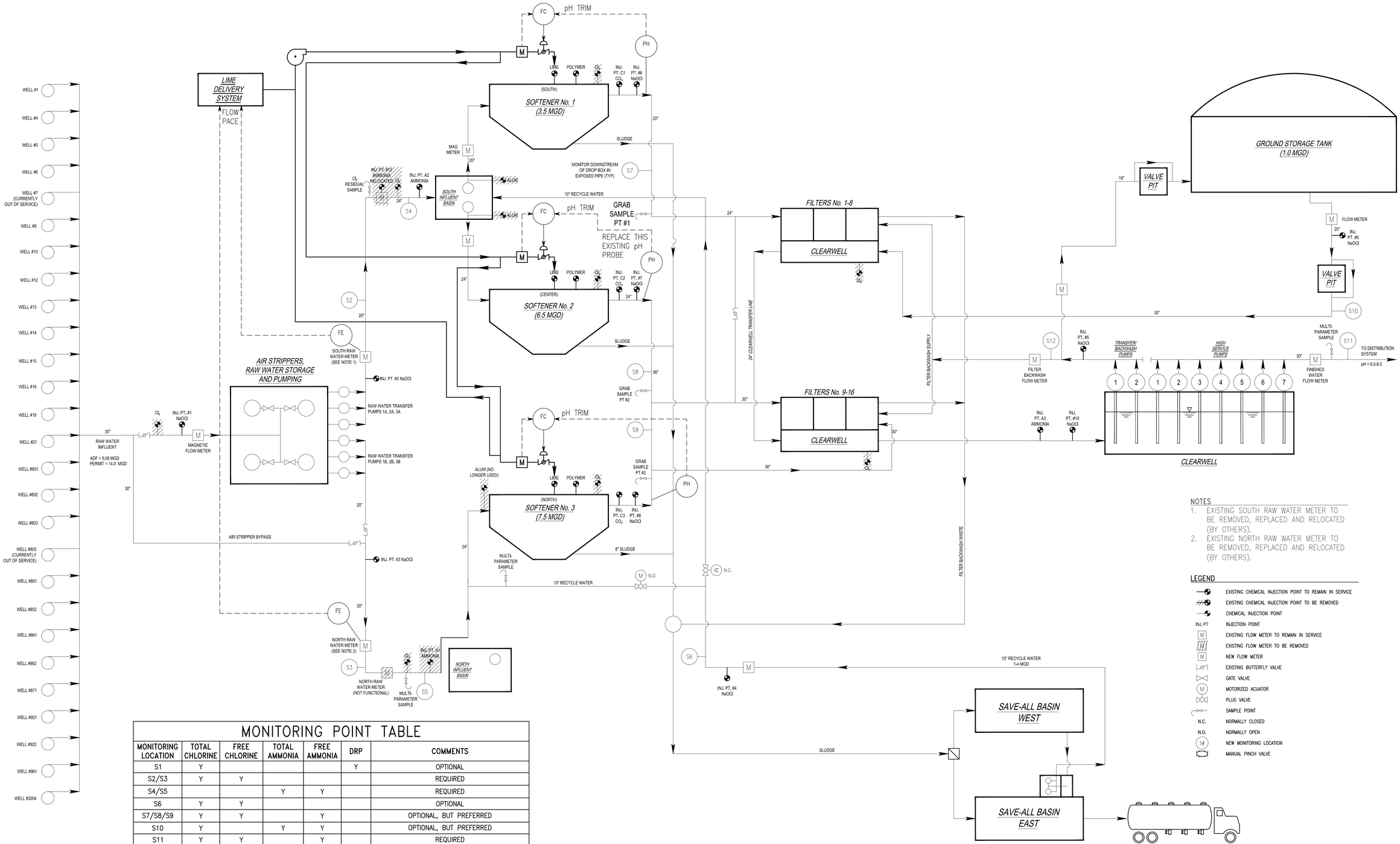
WATER TREATMENT PLANT IMPROVEMENTS
RIVIERA BEACH UTILITY DISTRICT

RIVIERA BEACH, FLORIDA

ACCESS AND CHEMICAL DELIVERY PLAN

DATE: 03-20-2020

SCALE 1" = 20'
PROJECT No 20-3546
SHEET EX-3



MONITORING POINT TABLE

MONITORING LOCATION	TOTAL CHLORINE	FREE CHLORINE	TOTAL AMMONIA	FREE AMMONIA	DRP	COMMENTS
S1	Y				Y	OPTIONAL
S2/S3	Y	Y				REQUIRED
S4/S5			Y	Y		REQUIRED
S6	Y	Y				OPTIONAL
S7/S8/S9	Y	Y		Y		OPTIONAL, BUT PREFERRED
S10	Y		Y	Y		OPTIONAL, BUT PREFERRED
S11	Y	Y		Y		REQUIRED
12		Y				OPTIONAL, BUT PREFERRED

NOTES

1. EXISTING SOUTH RAW WATER METER TO BE REMOVED, REPLACED AND RELOCATED (BY OTHERS).
2. EXISTING NORTH RAW WATER METER TO BE REMOVED, REPLACED AND RELOCATED (BY OTHERS).

LEGEND

- EXISTING CHEMICAL INJECTION POINT TO REMAIN IN SERVICE
- EXISTING CHEMICAL INJECTION POINT TO BE REMOVED
- CHEMICAL INJECTION POINT
- INJ. PT — INJECTION POINT
- EXISTING FLOW METER TO REMAIN IN SERVICE
- EXISTING FLOW METER TO BE REMOVED
- NEW FLOW METER
- EXISTING BUTTERFLY VALVE
- GATE VALVE
- MOTORIZED ACUATOR
- PLUG VALVE
- SAMPLE POINT
- N.C. — NORMALLY CLOSED
- N.O. — NORMALLY OPEN
- NEW MONITORING LOCATION
- MANUAL PINCH VALVE

CONCEPTUAL

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
–	–	-	–				

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS℠
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

WATER TREATMENT PLANT IMPROVEMENTS
RIVIERA BEACH UTILTY DISTRICT

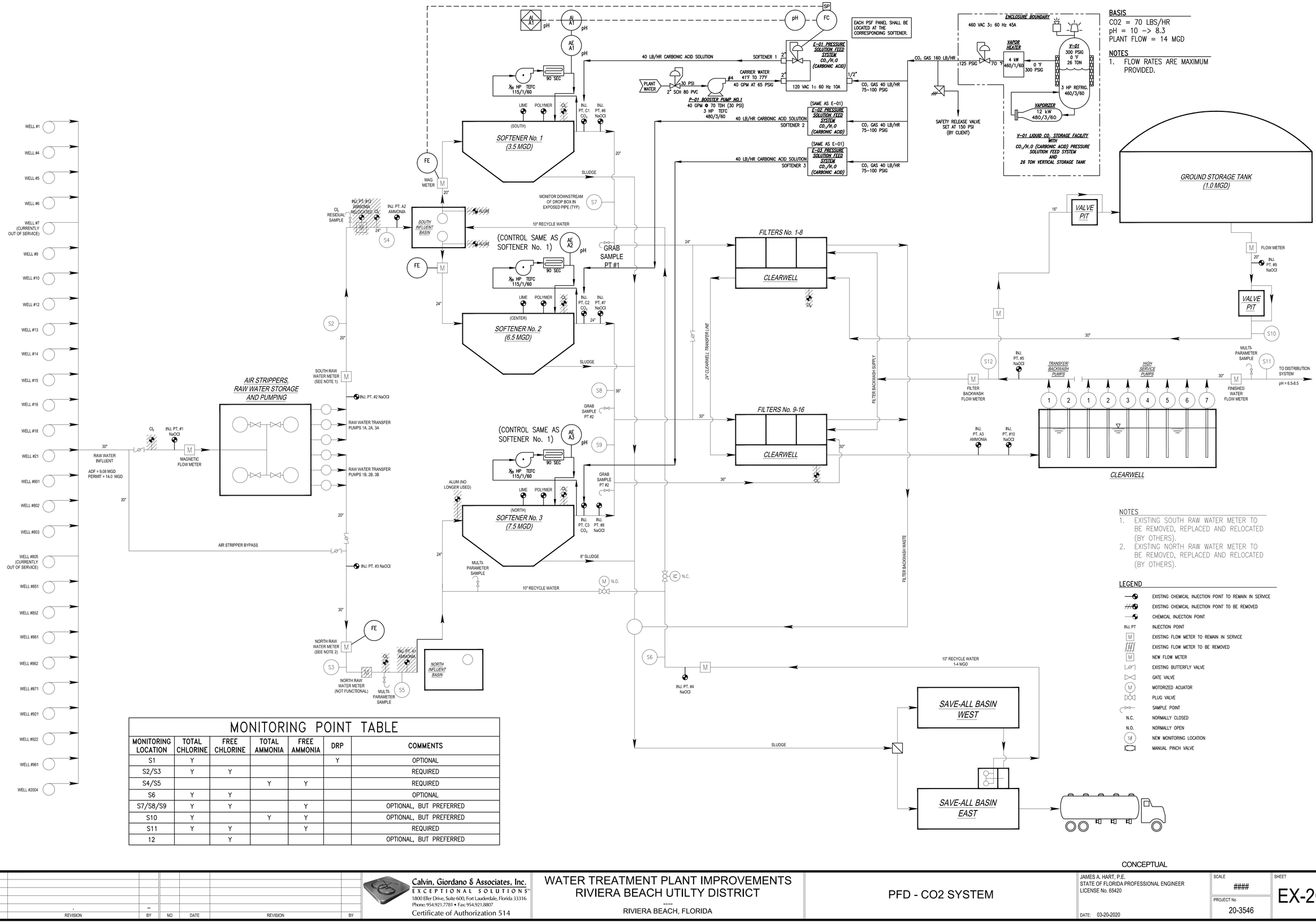
RIVIERA BEACH, FLORIDA

PFD - RDP SYSTEM

JAMES A. HART, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65420
DATE: 03-20-2020

SCALE: ####
PROJECT No: 20-3546

SHEET: EX-2A



BASIS

CO2 = 70 LBS/HR
pH = 10 –> 8.3
PLANT FLOW = 14 MGD

NOTES

1. FLOW RATES ARE MAXIMUM PROVIDED.

MONITORING POINT TABLE

MONITORING LOCATION	TOTAL CHLORINE	FREE CHLORINE	TOTAL AMMONIA	FREE AMMONIA	DRP	COMMENTS
S1	Y				Y	OPTIONAL
S2/S3	Y	Y				REQUIRED
S4/S5			Y	Y		REQUIRED
S6	Y	Y				OPTIONAL
S7/S8/S9	Y	Y		Y		OPTIONAL, BUT PREFERRED
S10	Y		Y	Y		OPTIONAL, BUT PREFERRED
S11	Y	Y		Y		REQUIRED
12		Y				OPTIONAL, BUT PREFERRED

NOTES

1. EXISTING SOUTH RAW WATER METER TO BE REMOVED, REPLACED AND RELOCATED (BY OTHERS).
2. EXISTING NORTH RAW WATER METER TO BE REMOVED, REPLACED AND RELOCATED (BY OTHERS).

LEGEND

- EXISTING CHEMICAL INJECTION POINT TO REMAIN IN SERVICE
- EXISTING CHEMICAL INJECTION POINT TO BE REMOVED
- CHEMICAL INJECTION POINT
- INJ. PT — INJECTION POINT
- EXISTING FLOW METER TO REMAIN IN SERVICE
- EXISTING FLOW METER TO BE REMOVED
- NEW FLOW METER
- EXISTING BUTTERFLY VALVE
- GATE VALVE
- MOTORIZED ACUATOR
- PLUG VALVE
- SAMPLE POINT
- N.C. — NORMALLY CLOSED
- N.O. — NORMALLY OPEN
- NEW MONITORING LOCATION
- MANUAL PINCH VALVE

CONCEPTUAL

NO	DATE	REVISION	BY
–	–	-	–

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS℠
1800 Eller Drive, Suite 600, Fort Lauderdale, Florida 33316
Phone: 954.921.7781 • Fax: 954.921.8807
Certificate of Authorization 514

WATER TREATMENT PLANT IMPROVEMENTS
RIVIERA BEACH UTILTY DISTRICT

RIVIERA BEACH, FLORIDA

PFD - CO2 SYSTEM

JAMES A. HART, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65420
DATE: 03-20-2020

SCALE: ####
PROJECT No: 20-3546

SHEET: EX-2C

File Name: \\tlfls01\project\Projects\2020\203546 Riviera Beach Wtp Improvements (dib)\cadd Files\Drawings\20-3546 – PFD.dwg – (Plotted by: James Hart on Monday, March 30, 2020 5:44:20 PM)

NOT IN SCOPE

(DIMENSIONS TBD)

ROW / PROPERTY LINE

GATE

GATE

NEW ⌀4" LIME SLURRY CPVC PIPE TO SOFTENER #3

PIPE SUPPORT @7' MAX. SPACING

SOFTENER UNIT No. 2 6.5 MGD

SOFTENER UNIT No. 3 7.5 MGD

CHEMICAL FEED AND STORAGE BUILDING No. 1

SOFTENER UNIT No. 2: PROPOSED CO2 INJECTION FEED SYSTEM B

WATER STORAGE

TEMPORARY LIME SLURRY SUPPLY LINE TO SOFTENER #3

SCALE 3/16" = 1'-0"

PROPOSED LAYOUT
TEMPORARY LIME SLURRY LINE
TO SOFTENER #3

Primoris Services Corporation
Cardinal Contractors

PROJECT NAME: WATER TREATMENT PLANT IMPROVEMENTS
OWNER NAME: CITY OF RIVIERA BEACH
PROJECT ADDRESS: 600 W BLUE HERON BLVD RIVIERA BEACH, FLORIDA

DATE:	APRIL 2020
SCALE:	NOTED
DRAWN:	C.C.I.
JOB:	-
SHEET:	CC-3

ELECTRICAL PLAN/LAYOUT

SYMBOL	DESCRIPTION
TTC	TELEPHONE TERMINAL CABINET
	TERMINAL JUNCTION BOX
	ELECTRICAL EQUIPMENT
X	CEILING MOUNTED DOWNLIGHT LUMINAIRE – SEE SCHEDULE FOR TYPE
X	FLOURESCENT LUMINAIRE, SURFACE OR LAY IN TYPE SEE SCHEDULE FOR TYPE
X	LUMINAIRE AND POLE – SEE SCHEDULE FOR TYPE
X	WALL MOUNTED LUMINAIRE – SEE SCHEDULE FOR TYPE
X	FLOOD LIGHTS – AIM IN THE DIRECTION SHOWN SEE SCHEDULE FOR TYPE
X	EXIT LIGHTS – SOLID SECTION IS DIRECTION OF FACE SEE SCHEDULE FOR TYPE
X	EMERGENCY LIGHT WITH BATTERY PACK SEE SCHEDULE FOR TYPE
	LIGHTING FIXTURE POWER AND SWITCHING LEGEND
X Y Z (TYP)	X=FIXTURE TYPE Y=PANEL–CIRCUIT BRKR Z=SWITCH IF NO Z INDICATED, CONNECT DIRECTLY TO CIRCUIT BREAKER.
[B2]	CONDUIT/CONDUCTOR – REFER TO CIRCUIT SCHEDULE
LPA–2	HOME RUN – PANEL AND CIRCUIT NUMBER SHOWN
	EXPOSED CONDUIT AND CONDUCTORS*
	UNDERGROUND CONDUIT AND CONDUCTORS* NOTE: * ALL UNMARKED CONDUIT RUNS CONSIST OF 2#12, 1#12G IN 3/4"C.
YCX	YARD CONDUIT. REFER TO YARD CONDUIT SCHEDULE
	DIRECT BURIED CONDUIT
	CONDUIT, STUBBED AND CAPPED AS SHOWN
G	GROUND WIRE, 4/O UNLESS OTHERWISE NOTED
	6 FOOT GROUND WIRE PIGTAIL, 4/O UNLESS OTHERWISE NOTED
	GROUND ROD – 5/8" x 20' COPPER CLAD UNLESS OTHERWISE NOTED
	GROUND TEST WELL, SEE DETAIL
S	WALL SWITCH: 2- DOUBLE POLE, 3- THREE WAY, 4- FOUR WAY, P- PILOT LIGHT, K- KEY OPERATED, D- DIMMER, WP-WEATHERPROOF, CRE- CORROSION RESISTANT
	CONVENIENCE RECEPTACLE – 20A DUPLEX UNLESS SPECIFIED OTHERWISE WP-WEATHERPROOF, C- CLOCK HANGER, TL- TWIST LOCK, CRE-CORROSION RESISTANT, GFI-GROUND FAULT INTERRUPTER
	CONVENIENCE RECEPTACLE – 20A QUADROPLEX UNLESS SPECIFIED OTHERWISE
	CONVENIENCE RECEPTACLE – 20A DUPLEX UNLESS SPECIFIED OTHERWISE. LOCATED ABOVE COUNTER TOP GFI-GROUND FAULT INTERRUPTER
	CONVENIENCE RECEPTACLE – 20A DUPLEX UNLESS SPECIFIED OTHERWISE. MOUNTED FLUSH IN FLOOR.
30	RECEPTACLE, SPECIAL PURPOSE – AMPERAGE AS INDICATED.
	TELEPHONE/DATA RECEPTACLE (OUTLET BOX, 18" AFF) W – WALL MOUNTED, 54" AFF
	TELEPHONE/DATA RECEPTACLE MOUNTED FLUSH IN FLOOR
J	JUNCTION BOX NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. 4X = NEMA 4X SS
F	FIRE ALARM PULL STATION
F	FIRE ALARM HORN/STROBE LIGHT
F	FIRE ALARM STROBE LIGHT
FACP	FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL
	CAMERA FIXED TYPE UNLESS OTHERWISE NOTED (PTZ = PAN–TILT–ZOOM TYPE)

SYMBOL	DESCRIPTION
SD	FIRE ALARM SMOKE DETECTOR EC– MOUNTED TO EXPOSED CEILING H– HARSH ENVIROMENT RATED
HD	FIRE ALARM HEAT DETECTOR EC– MOUNTED TO EXPOSED CEILING
BD R	BEAM DETECTOR, T=TRANSMITTER, R=RECEIVER
SD D	DUCT SMOKE DETECTOR
RTU	REMOTE TEST UNIT
CR	SECURITY CARD READER

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
A	AMMETER, AMPERE
AC	ALTERNATING CURRENT
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AS	AMMETER SWITCH, AMPERE SENSOR
ASU	AIR SUPPLY UNIT
ATS	AUTOMATIC TRANSFER SWITCH
BC	BYPASS CONTACTOR
BRKR	BREAKER
C	CONDUIT, CONTACTOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CMS	COMBINATION MOTOR STARTER
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CRE	CORROSION RESISTANT
CT	CURRENT TRANSFORMER
DC	DIRECT CURRENT
DIV	DIVISION
DP	DISTRIBUTION PANEL (480V)
EF	EXHAUST FAN
EG	ELECTRICAL GROUND
ETM	ELAPSED TIME METER
EXST	EXISTING
FDR	FEEDER
F, FU	FUSE
FI	FLOW INDICATOR
FLR	FLOOR
FLUOR	FLUORESCENT
FM	FLOW METER
FO	FIBER OPTIC
FS	FLOAT SWITCH, FLOW SWITCH
FT	FLOW TRANSMITTER
FUT	FUTURE
FVNR	FULL VOLTAGE NON–REVERSING STARTER
G	GREEN, GROUND
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GFR	GROUND FAULT RELAY
GND	GROUND
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND/OFF/AUTO
HOR	HAND/OFF/REMOTE
HPS	HIGH PRESSURE SODIUM
HVAC	HEATING, VENTILATING & AIR CONDITIONING
IC	INTERRUPTING CAPACITY
I & C	INSTRUMENTATION AND CONTROL
IMH	INSTRUMENTATION MANHOLE
INST	INSTANTANEOUS
IP	INSTRUMENT PANEL (PANELBOARD)
J, J–BOX	JUNCTION BOX
K	KEY INTERLOCK
KK	KIRK KEY INTERLOCK
LA	LIGHTNING ARRESTER
LC	LIGHTING CONTACTOR
LP	LIGHTING PANEL (PANELBOARD)
LR	LOCAL/REMOTE, LATCHING RELAY
LS	LIMIT SWITCH
LT FLEX	LIQUID TIGHT FLEX CONDUIT
LTG	LIGHTING
M	MAGNETIC CONTACTOR COIL OR MOTOR
MA	MILLIAMPS

ABBREVIATIONS	DESCRIPTION
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MERC	MERCURY VAPOR
MH	MOTOR HEATER, MANHOLE
MLO	MAIN LUGS ONLY
MPZ	MINI POWER ZONE
MPR	MOTOR PROTECTION RELAY
MS	MOTOR STARTER
MSC	MANUFACTURER SUPPLIED CABLE
MT	MOUNT
MTD	MOTOR TEMPERATURE DETECTOR
N	NEUTRAL
NC	NORMALLY CLOSED
NEMA	NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION
NO	NORMALLY OPEN
NP	NAMEPLATE
NTS	NOT TO SCALE
OL	OVERLOAD RELAY
OLM	OPTICAL LINK MODULE
P	POLE
PB	PULL BOX
PC	PHOTOCELL
PH	PHASE
PM	PHASE MONITOR,POWER METER
PNL	PANEL
PP	POWER PANEL (480VAC)
PR	PAIR
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE CONDUIT
RCPT	RECEPTACLE
RMS	ROOT MEAN SQUARE
RS	RIGID STEEL CONDUIT
RGS	RIGID GALVANIZED STEEL CONDUIT
RTU	REMOTE TELEMETRY UNIT
SC	SURGE CAPACITOR
SF	SUPPLY FAN
SH	SPACE HEATER
S/N	SOLID NEUTRAL
SPD	SPEED
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
SS	STAINLESS STEEL
SV	SOLENOID VALVE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
T	THERMOSTAT
TB	TERMINAL BOARD
TDR	TIME DELAY RELAY
TJB	TERMINAL JUNCTION BOX
TS	THERMAL SWITCH
TSP	TWISTED SHIELDED PAIR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UPS	UNINTERRUPTIBLE POWER SUPPLY
UVR	UNDER VOLTAGE RELAY
V	VOLTMETER, VOLT
VFD	VARIABLE FREQUENCY DRIVE
VS	VOLTMETER SWITCH
W	WATT
WHD	WATTHOUR DEMAND METER
WP	WEATHERPROOF
XFMR	TRANSFORMER

ONE LINE DIAGRAMS, RISER DIAGRAMS AND SCHEMATICS

SYMBOL	DESCRIPTION
5	MOTOR, SQUIRREL CAGE INDUCTION UNLESS OTHERWISE NOTED – HORSEPOWER INDICATED
	OVERLOAD RELAY HEATER
1	MAGNETIC STARTER WITH NEMA SIZE INDICATED
M	MOTOR CIRCUIT PROTECTOR, MAGNETIC, 3 POLE UNLESS INDICATED OTHERWISE.
400	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
400 225	FUSED SWITCH, SWITCH AND FUSE CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
100	SWITCH – CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
400 600	DRAWOUT CIRCUIT BREAKER, LOW VOLTAGE 600= FRAME RATING, 400=TRIP SETTING
400 600	DRAWOUT CIRCUIT BREAKER, MEDIUM VOLTAGE 600= FRAME RATING, 400=TRIP SETTING
600 400	DRAWOUT FUSED SWITCH, LOW OR MEDIUM VOLTAGE 600= FRAME RATING, 400=FUSE RATING
(3)	CURRENT TRANSFORMER, NUMBER OF WINDINGS INDICATED
480–120 /208V 3ø	TRANSFORMER, VOLTAGES, PHASE AND 15 KVA, RATING INDICATED AS APPLICABLE K-4 RATED
	LIGHTNING ARRESTER
	CAPACITOR OR SURGE CAPACITOR
M	UTILITY METER
G	GENERATOR
X 0–600V	METER SCALE RANGE SHOWN IF REQUIRED A - AMPS PM - PHASE MONITOR V - VOLTS P - POWER METER
	FUSE
TVSS OR SPD	TRANSIENT VOLTAGE SURGE SUPPRESSION (OR) SURGE PROTECTION DEVICE
	GROUND
CPT 120V	CONTROL TRANSFORMER
GFR	GROUND FAULT RELAY WITH C.T.
	PUSH–BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
	PUSH–BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
	PUSH BUTTON SWITCH, MAINTAINED CONTACTS WITH MECHANICAL INTERLOCK
	REMOTE DEVICE
A	INDICATING LIGHT – LETTER INDICATES COLOR A - AMBER G - GREEN B - BLUE R - RED C - CLEAR W - WHITE
A	PUSH TO TEST AND CONNECT INDICATING LIGHT SCHEMATIC DIAGRAMS ONLY A - AMBER G - GREEN B - BLUE R - RED C - CLEAR W - WHITE
PHASE SHIFT XFMR VFD-XXXX	18–PULSE VFD
VFD-XXXX	6–PULSE VFD

SYMBOL	DESCRIPTION
S M	MANUAL MOTOR STARTER SWITCH, NEMA 4X UNLESS OTHERWISE NOTED. NUMBER OF POLES AS REQUIRED
PB 4X	PUSH–BUTTON STATION, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. 4X = NEMA 4X 316 STAINLESS STEEL ENCLOSURE. SEE CONTROL DIAGRAMS FOR TYPE PUSH BUTTON REQUIRED
30 4X	NONFUSED DISCONNECT SWITCH, SIZE INDICATED, 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, 4X = NEMA 4X 316 STAINLESS STEEL
F 40 60 4X	FUSED DISCONNECT SWITCH, SIZE INDICATED (60 = SWITCH RATING: 40 = FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, 4X = NEMA 4X 316 STAINLESS STEEL
LC 30 4X	LIGHTING CONTACTOR, CURRENT RATING INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM FOR NUMBER OF POLES. 4X = NEMA 4X 316 STAINLESS STEEL
2 4X	MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE, UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM. 4X = NEMA 4X 316 STAINLESS STEEL
2 4X	COMBINATION (FUSE OR CIRCUIT BREAKER AS INDICATED). MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL SCHEMATIC DIAGRAM. 4X = NEMA 4X 316 STAINLESS STEEL
	ELECTRIC RESISTANCE HEATER
ETM	ELAPSED TIME METER
CRX	CONTACT – NORMALLY OPEN WITH COIL INDICATED
CRX	CONTACT – NORMALLY CLOSED WITH COIL INDICATED
CRX	CONTROL RELAY, X=SEQUENTIAL NUMBER
LRX (L)	LATCHING RELAY, X=SEQUENTIAL NUMBER L - LATCH, U - UNLATCH
TDX NOTC	TIME DELAY RELAY, X=SEQUENTIAL NUMBER NOTC=NORMALLY OPEN TIMED CLOSED NOTO=NORMALLY OPEN TIMED OPEN AFTER CLOSE NCTO=NORMALLY CLOSED TIMED OPEN NCTC=NORMALLY CLOSED TIMED CLOSED AFTER OPEN
	TEMPERATURE
	OPENS ON RISING TEMPERATURE, CLOSES ON FALLING TEMPERATURE
	CLOSES ON RISING TEMPERATURE, OPENS ON FALLING TEMPERATURE
H O A XOO OOX	SELECTOR SWITCH: MAINTAINED CONTACT WITH CONTACT POSITION INDICATED, CHART IDENTIFIES OPERATION

	POSITION		
CKT.	HAND	OFF	AUTO
1	X	O	O
2	O	O	X

X - CLOSED CONTACT
O - OPEN CONTACT

GENERAL

SYMBOL	DESCRIPTION
	CONNECTION POINT TO EQUIPMENT SPECIFIED, FURNISHED AND INSTALLED UNDER OTHER SECTIONS. RACEWAY, CONDUCTOR AND CONNECTION IN THIS SECTION.
1"C,2#12,1#12G 1"C,1–25/C TYPE 1	INDICATES RACEWAY AND CIRCUIT CONDUCTORS. FIRST NUMBER IS RACEWAY SIZE. THE FOLLOWING NUMBERS ARE THE CONDUCTOR QUANTITIES, SIZES, AND TYPES.
	DEMOLITION TO BE REMOVED OR DELETED

LINE WEIGHT

NEW — EXISTING

NOTE:
THIS IS A STANDARD LEGEND SHEET. SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT BE UTILIZED ON PROJECT.

X / YY	DETAIL CALL–OUT. X = DETAIL NUMBER YY = SHEET NUMBER

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LICENSE NO: EB 0006877

PRELIMINARY PLANS FOR REVIEW

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
–	–	.	–				

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Certificate of Authorization 514

RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

ELECTRICAL LEGEND AND SYMBOLS

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: **E-1**

GENERAL NOTES

1. THE SCOPE OF ELECTRICAL WORK SHALL CONSIST PRIMARILY OF THE FOLLOWING:

   A. ALL WORK AS SHOWN ON DRAWINGS.

2. CONTRACTOR SHALL COORDINATE WITH THE INSTRUMENTATION CONTRACTOR/SUPPLIER FOR POWER AND SIGNAL REQUIREMENTS FOR ALL DEVICES TO BE CONNECTED. CONTRACTOR SHALL ADJUST CONDUIT AND CABLE AS PER INSTRUMENTATION REQUIREMENTS TO MATCH THE EQUIPMENT PROVIDED. COORDINATION SHALL BE COMPLETED BEFORE CONDUIT AND CABLE ARE INSTALLED.

3. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TO INSTALL THE ELECTRICAL SYSTEMS AS INDICATED ON THE DRAWINGS. ITEMS NOT SHOWN BUT NECESSARY FOR COMPLETION OF THE WORK SHALL BE INCLUDED.

4. THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NFPA 70), ELECTRICAL SAFETY IN THE WORKPLACE (NFPA 70E), PALM BEACH COUNTY CODES, AND 2017 FLORIDA BUILDING CODE WITH AMENDMENTS.

5. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE ENGINEER AND OWNER.

6. THE CONTRACTOR SHALL BEFORE SUBMITTING HIS BID, VISIT THE SITE OF THE PROJECT AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS. NO ALLOWANCE WILL BE MADE FOR EXISTING CONDITIONS OR FAILURE OF THE CONTRACTOR TO OBSERVE THEM.

7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH ALL LOCAL UTILITIES, INCLUDING THE POWER AND TELEPHONE UTILITIES TO MEET ALL OF THEIR INSTALLATION REQUIREMENTS. ALL FEES, LABOR, EQUIPMENT OR MATERIALS NECESSARY TO MEET THESE REQUIREMENTS ARE TO BE INCLUDED IN THE BID. THE CONTRACTOR SHALL OBTAIN, DELIVER AND INSTALL ALL CONDUITS, PULL-BOXES AND EQUIPMENT AS REQUIRED BY THE UTILITIES TO THEIR SPECIFICATIONS. PROVIDE TEMPORARY POWER AND TELEPHONE AS PER SPECIFICATION.
   POWER UTILITY REPRESENTATIVE: MELISSA ROETTGER (561) 640-2577

8. ALL EQUIPMENT AND MATERIAL SHALL BE NEW, UNUSED, AND U.L. LISTED.

9. THE CONTRACTOR IS RESPONSIBLE TO TEST ALL SYSTEMS INSTALLED OR MODIFIED UNDER THIS PROJECT AND IS RESPONSIBLE TO REPAIR OR REPLACE ALL DEFECTIVE WORK TO THE SATISFACTION OF THE ENGINEER AND OWNER.

10. ALL EQUIPMENT FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE OR AS OTHERWISE NOTED.

11. ALL CONDUCTORS SHALL BE COPPER. NO ALUMINUM ALLOWED UNLESS SPECIFICALLY INDICATED ON DRAWINGS. ALL CONDUCTORS SHALL BE THHN/THWN, EXCEPT FOR SIZE NO.6 AND LARGER, WITH XHHW INSULATION. FOR VFD OUTPUT CONDUCTORS, USE VFD POWER CABLE.

12. ALL YARD CONDUITS (YC) SHALL BE INSTALLED CONCRETE ENCASED AS PER DETAILS. ALL UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40. ALL EXPOSED CONDUITS SHALL BE RIGID ALUMINUM, EXCEPT INSIDE FLUORIDE CONTAINMENT WALL SHALL BE PVC SCHEDULE 80.

13. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL ELECTRICAL & CONTROL EQUIPMENT AND MATERIAL.

14. ALL CONTROL PANELS SHALL BE CONSTRUCTED BY A UL 508A APPROVED PANEL VENDOR AND SHALL BEAR A UL 508A LABEL ON THE PANEL.

15. THE DRAWINGS ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF CONDUIT RUNS. THESE ARE TO BE COORDINATED WITH THE OTHER TRADES SO THAT CONFLICTS ARE AVOIDED PRIOR TO INSTALLATIONS.

16. ALL LOCATIONS OF EQUIPMENT, PANELS, CONDUITS ETC. ARE SHOWN FOR ILLUSTRATION PURPOSES. CONTRACTOR SHALL VERIFY AND COORDINATE EXACT LOCATION AND SIZE WITH ALL SUBCONTRACTORS AND EQUIPMENT SUPPLIERS PRIOR TO ANY INSTALLATION AND THEN INSTALL AS SUCH WITH CORRESPONDING CONDUIT STUB-UPS.

17. SEE OTHER DISCIPLINE DRAWINGS FOR COORDINATION OF ALL EQUIPMENT LOCATIONS. ANY CONFLICTS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION AND MOVEMENT OF CONDUITS OR OTHER ELECTRICAL EQUIPMENT SHALL BE ACCOMPLISHED WITHOUT ANY ADDITIONAL COST TO THE OWNER.

18. LOCATIONS OF MANHOLES, HANDHOLES AND PULL BOXES ARE APPROXIMATE. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH EXISTING AND NEW PIPING OR CONDUIT AND ADJUST ACCORDINGLY.

19. NOT ALL CONDUITS SHOWN ON RISER AND ONE-LINE DIAGRAMS ARE SHOWN ON BUILDING LAYOUTS. CONTRACTOR SHALL SUPPLY ALL CONDUITS AND CABLES AS SHOWN ON RISER AND ONE-LINE DIAGRAMS.

20. ALL CIRCUITS SHALL BE IDENTIFIED IN JUNCTION BOXES, PULL BOXES, CONTROL PANELS, PANELBOARDS, LIGHTING POLES, CONTROLLERS AND SERVICE POINTS. IDENTIFICATION SHALL MATCH PANELBOARD SCHEDULES.

21. INSTRUMENTATION WIRING IS COMPRISED OF LOW VOLTAGE DC SIGNALS SUCH AS A 4-20MA CURRENT LOOP, TELEPHONE/INTERCOM, PROFIBUS COPPER CABLE AND OTHER COMMUNICATION, AND FIRE ALARM COMMUNICATION WIRING. POWER CONDUIT AND WIRING SHALL ONLY CROSS INSTRUMENTATION CONDUIT PERPENDICULARLY AT RIGHT ANGLES WITH A MINIMUM OF 6" VERTICAL SEPARATION.

22. CONDUCTOR PULLING TENSIONS SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION. CONTRACTOR SHALL INSTALL PULL BOXES TO MEET MANUFACTURER'S REQUIREMENTS.

23. MINIMUM HORIZONTAL DISTANCE ALLOWED BETWEEN POWER CONDUITS AND INSTRUMENTATION CONDUITS SHALL BE:

VOLTAGE	DISTANCE
480V	2 FT
120V	1 FT

24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONDUIT AND WIRING INSTALLATION FOR ALL VENDOR PROVIDED EQUIPMENT (PACKAGED SYSTEMS) AND OWNER FURNISHED EQUIPMENT (OFE). IF THE SHOP DRAWINGS DIFFER FROM THE DESIGNED FACILITIES, THE CONTRACTOR SHALL REDESIGN THE FACILITIES AND SUBMIT THE REVISED DESIGN FOR THE ENGINEER'S APPROVAL ALONG WITH THE SHOP DRAWINGS. THERE SHALL BE NO ADDITIONAL COST TO THE OWNER FOR THE REDESIGN NOR FOR ANY ADDITIONAL CONDUITS AND WIRING. DURING SUBMITTAL THE CONTRACTOR SHALL VERIFY ALL SUPPLIED BREAKER SIZES FOR ALL PACKAGED SYSTEMS SUCH AS HVAC, EXHAUST FANS, ETC., AND MODIFY ALL BREAKERS IN MCC'S AND PANELBOARDS ACCORDINGLY WITHOUT ANY ADDITIONAL COST TO THE OWNER.

25. ALL EXCAVATIONS FOR CONDUITS, HANDHOLES, MANHOLES AND PULLBOXES NEAR EXISTING PIPING, CONDUIT AND EQUIPMENT SHALL BE HAND EXCAVATED AND COORDINATED WITH PLANT MANAGER.

26. MINIMUM DEPTH FROM TOP OF DUCTBANKS OR CONDUITS TO FINISHED GRADE SHALL BE 24" UNLESS OTHERWISE NOTED.

27. COLORED WARNING TAPE 6" WIDE SHALL BE INSTALLED 6" BELOW FINISHED GRADE AND ALSO 12" ABOVE CONDUIT(S) DIRECTLY ABOVE ALL UNDERGROUND YARD CONDUITS ACCORDING TO THE FOLLOWING SCHEDULE:
   POWER: RED
   ALL OTHER CONDUITS: GREEN

28. CONTRACTOR SHALL RESTORE SIDEWALKS, ROADWAYS, SOD, SPRINKLER SYSTEM PIPING, FLOOR ETC. TO MATCH EXISTING, AFTER THE COMPLETION OF THE CONDUIT AND PULLBOX INSTALLATION.

29. ALL EQUIPMENT GROUND WIRE SIZED PER NEC SHALL BE PULLED IN ALL ELECTRICAL CONDUITS, POWER AND CONTROL, WHETHER OR NOT INDICATED ON THE PLANS.

30. ALL ENCLOSURES, TJB, WIREWAY, PULL BOXES ETC. SHALL CONTAIN A GROUNDING BUS. CONNECT ALL RACEWAY BONDS TO THIS BUS VIA GROUNDING BUSHING AND EXTEND BONDING JUMPER FROM THIS BUS TO THE ENCLOSURE.

31. ALL DUCTBANKS SHALL CARRY A MINIMUM #4/0 AWG BARE TINNED COPPER GROUND WIRE, OVER THE ENTIRE LENGTH, WHICH SHALL BE CONNECTED TO THE SITE GROUNDING GRID AND GROUND RODS LOCATED CONNECTING MANHOLES, HANDHOLES OR PULL BOXES.

32. ALL CONDUITS PENETRATING RATED FIRE WALLS OR RATED FIRE FLOORS SHALL BE INSTALLED WITH U.L. APPROVED DEVICES TO MAINTAIN THE FIRE RATING OF THE WALL OR FLOOR PENETRATED.

33. GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH NEC, ARTICLE 250. THE GROUNDING SYSTEM TEST SHALL NOT EXCEED A 48 HOUR SPAN DRY RESISTANCE OF 10 OHMS. ADDITIONAL GROUNDING TO MEET THIS REQUIREMENT SHALL BE INSTALLED AT NO EXTRA COST. GROUNDING AND BONDING CONNECTIONS SHALL NOT BE PAINTED. ALL GROUNDING CONNECTIONS SHALL BE EXOTHERMIC UNLESS SPECIFICALLY INDICATED OTHERWISE.

34. ELECTRICAL PULL BOXES SHALL BE SUPPLIED WITH A STEEL TRAFFIC-RATED COVER MARKED "ELECTRICAL" OR "COMMUNICATION".

35. PRIMARY STRUCTURE OR BUILDING GROUNDING SHALL BE AN EMBEDDED GRID OF MINIMUM #4/0 AWG BARE COPPER WIRE INSTALLED IN THE FOUNDATION AND AROUND THE STRUCTURE OR BUILDING PERIMETER, MINIMUM 30" BELOW FINISHED GRADE TO FORM A COMPLETE LOOP. SECONDARY GROUND CONNECTIONS TO ALL METAL EQUIPMENT, HAND RAILS, STRUCTURAL STEEL, CONCRETE PADS, REBAR, ETC. SHALL HAVE A MINIMUM #4 STRANDED BARE COPPER CONDUCTOR BONDED USING APPROVED LUGS OR EXOTHERMIC CONNECTIONS. ALL EQUIPMENT GROUNDING CONDUCTORS PENETRATING CONCRETE SLABS OR FINISHED GRADE SHALL HAVE A 72" CONDUCTOR PIGTAIL AT EACH LOCATION FOR CONNECTION TO EQUIPMENT.

36. ALL MATERIAL IN DESIGNATED CORROSIVE AREAS SHALL BE NEMA 4X 316 STAINLESS STEEL OR NON-METALLIC.

37. ALL OUTDOOR LIGHTING FIXTURE ENCLOSURES SHALL BE OF COPPER-FREE ALUMINUM CONSTRUCTION.

38. CONTRACTOR SHALL BALANCE PANELBOARD LOADS (WITHIN 5%) AT THE END OF THE PROJECT.

39. ALL REFERENCES TO SS OR STAINLESS STEEL MEAN 316 STAINLESS STEEL.

40. ALL VERTICAL CONDUIT PENETRATIONS FROM CONCRETE SLAB SHALL HAVE A MAINTENANCE PAD TO PREVENT CORROSION.

41. NO CONDUIT SHALL PENETRATE AN OUTDOOR ELECTRICAL PANEL FROM THE TOP. FOR OUTDOOR PANELS, ALL CONDUIT PENETRATIONS SHALL BE FROM BOTTOM OR SIDE WITH APPROVED RAINTIGHT HUBS.

42. ALL SPARE CONDUITS SHALL BE SEALED WITH A CAP AT BOTH ENDS AND A PULL STRING INSTALLED WITH IDENTIFICATION ON BOTH ENDS, WHETHER INDICATED OR NOT ON DRAWINGS.

43. PROVIDE CONDUIT DUCT SEAL AT ALL CONDUIT ENDS.

44. FLEXIBLE CONDUITS SHALL BE USED TO TERMINATE ALL MOTORS, OTHER VIBRATING EQUIPMENT, AND FREQUENTLY REMOVED EQUIPMENT AND SHALL BE BETWEEN 18" AND 3' IN LENGTH.

45. NO EXPOSED CONDUIT SHALL BE INSTALLED AS A TRIPPING HAZARD. EXPOSED CONDUIT THAT CANNOT AVOID BEING INSTALLED ON WALKING PATH SHALL HAVE ALUMINUM RAMP COVER AS SHOWN ON DETAIL.

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PRELIMINARY PLANS FOR REVIEW

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
–	–	.	–				

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

ELECTRICAL GENERAL NOTES

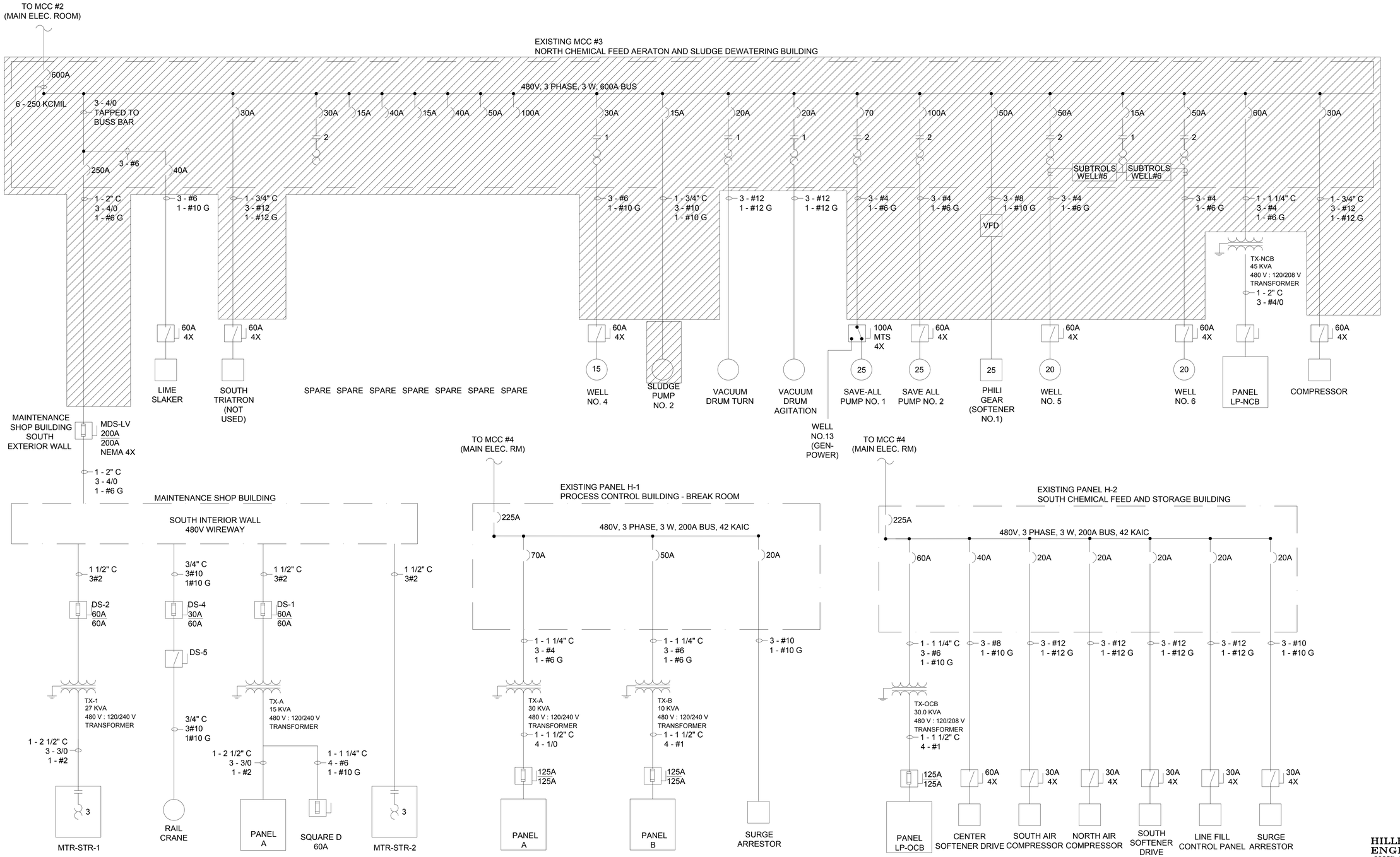
THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

PROJECT No: 11-4416.35

SHEET: **E-2**



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LICENSE NO: EB 0006877

PRELIMINARY PLANS FOR REVIEW

NO	DATE	REVISION	BY
–	–	–	–

NO	DATE	REVISION	BY

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EXCEPTIONAL SOLUTIONS
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Phone: 561.684.6161 • Fax: 561.684.6360
Certificate of Authorization 514

RIVIERA BEACH LIME IMPROVEMENTS

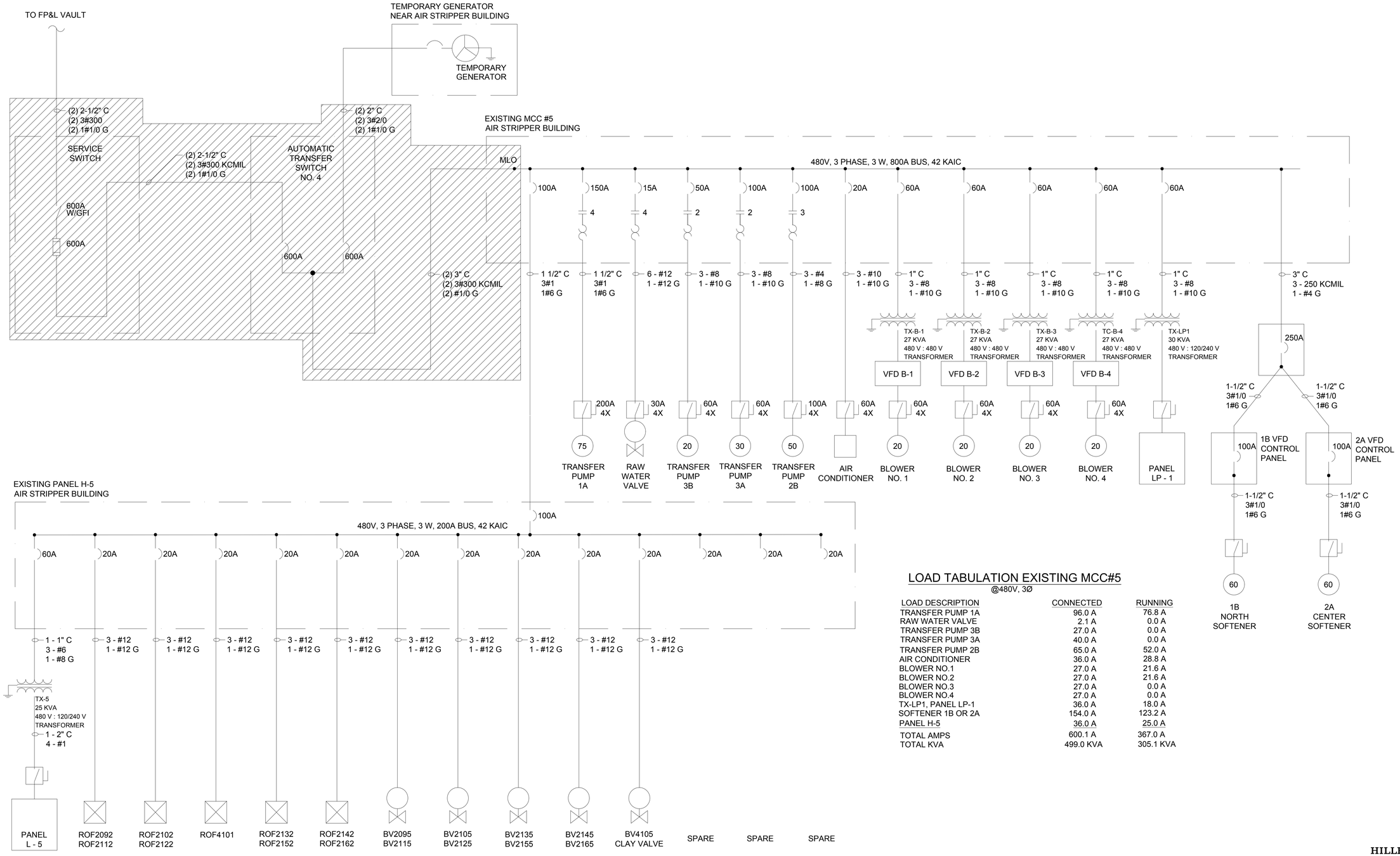
PALM BEACH COUNTY, FLORIDA

ELECTRICAL ONE LINE DIAGRAM - SHEET 1

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: E-3

File Name: E:\PROJECTS\CG\cgxx – Riviera Beach Wtp\DWG\Electrical\CGXXE03.dwg – (Plotted by: Win, Thein on Thursday, April 9, 2020 11:11:25 AM)



LOAD TABULATION EXISTING MCC#5

@480V, 3Ø

LOAD DESCRIPTION	CONNECTED	RUNNING
TRANSFER PUMP 1A	96.0 A	76.8 A
RAW WATER VALVE	2.1 A	0.0 A
TRANSFER PUMP 3B	27.0 A	0.0 A
TRANSFER PUMP 3A	40.0 A	0.0 A
TRANSFER PUMP 2B	65.0 A	52.0 A
AIR CONDITIONER	36.0 A	28.8 A
BLOWER NO.1	27.0 A	21.6 A
BLOWER NO.2	27.0 A	21.6 A
BLOWER NO.3	27.0 A	0.0 A
BLOWER NO.4	27.0 A	0.0 A
TX-LP1, PANEL LP-1	36.0 A	18.0 A
SOFTENER 1B OR 2A	154.0 A	123.2 A
PANEL H-5	36.0 A	25.0 A
TOTAL AMPS	600.1 A	367.0 A
TOTAL KVA	499.0 KVA	305.1 KVA

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

PRELIMINARY PLANS FOR REVIEW

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
–	–	.	–				

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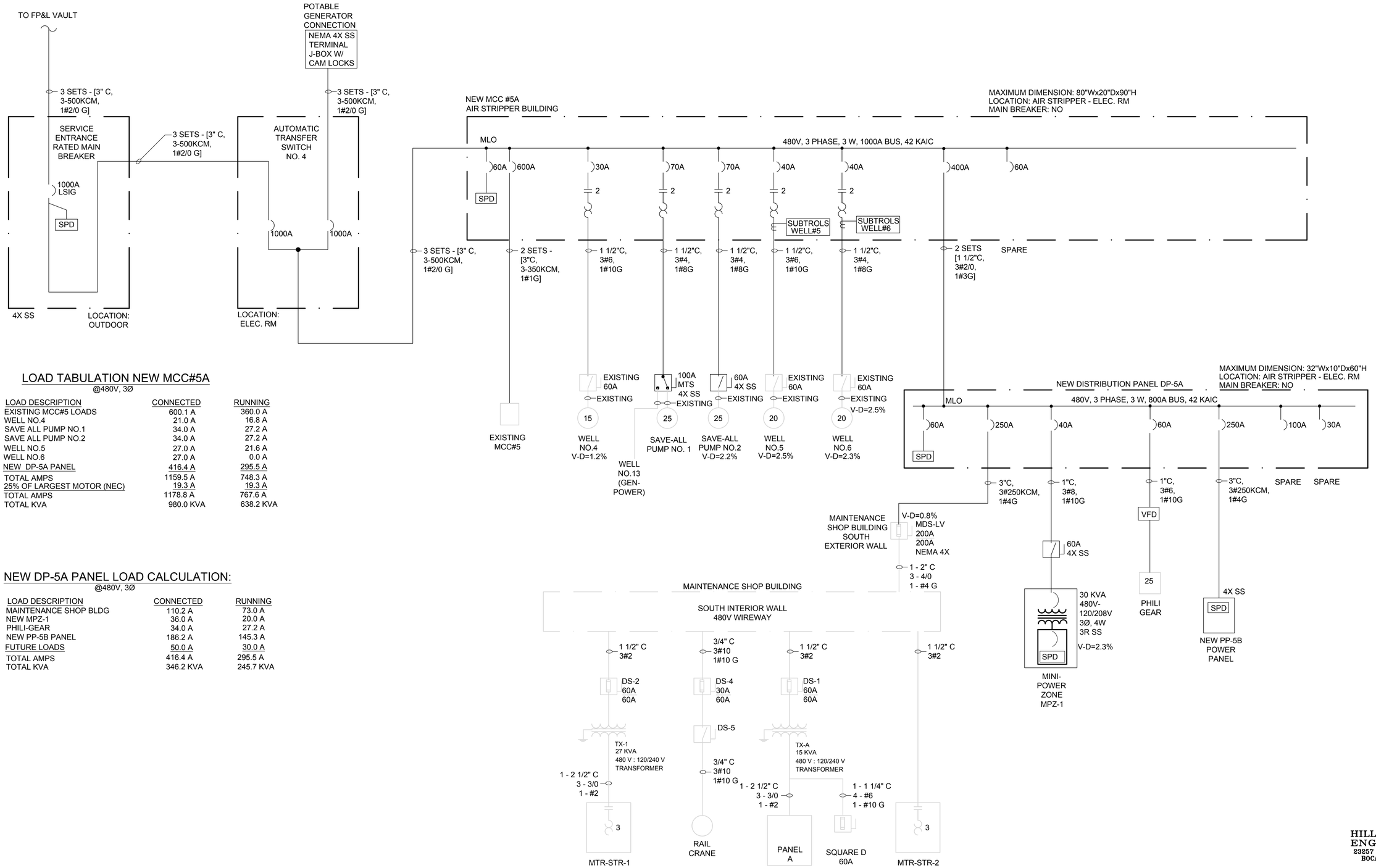
RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

ELECTRICAL ONE LINE DIAGRAM - SHEET 2

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: **E-4**



LOAD TABULATION NEW MCC#5A

@480V, 3Ø

LOAD DESCRIPTION	CONNECTED	RUNNING
EXISTING MCC#5 LOADS	600.1 A	360.0 A
WELL NO.4	21.0 A	16.8 A
SAVE ALL PUMP NO.1	34.0 A	27.2 A
SAVE ALL PUMP NO.2	34.0 A	27.2 A
WELL NO.5	27.0 A	21.6 A
WELL NO.6	27.0 A	0.0 A
NEW DP-5A PANEL	416.4 A	295.5 A
TOTAL AMPS	1159.5 A	748.3 A
25% OF LARGEST MOTOR (NEC)	19.3 A	19.3 A
TOTAL AMPS	1178.8 A	767.6 A
TOTAL KVA	980.0 KVA	638.2 KVA

NEW DP-5A PANEL LOAD CALCULATION:

@480V, 3Ø

LOAD DESCRIPTION	CONNECTED	RUNNING
MAINTENANCE SHOP BLDG	110.2 A	73.0 A
NEW MPZ-1	36.0 A	20.0 A
PHILI-GEAR	34.0 A	27.2 A
NEW PP-5B PANEL	186.2 A	145.3 A
FUTURE LOADS	50.0 A	30.0 A
TOTAL AMPS	416.4 A	295.5 A
TOTAL KVA	346.2 KVA	245.7 KVA

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PRELIMINARY PLANS FOR REVIEW

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

MODIFIED ONE LINE DIAGRAM

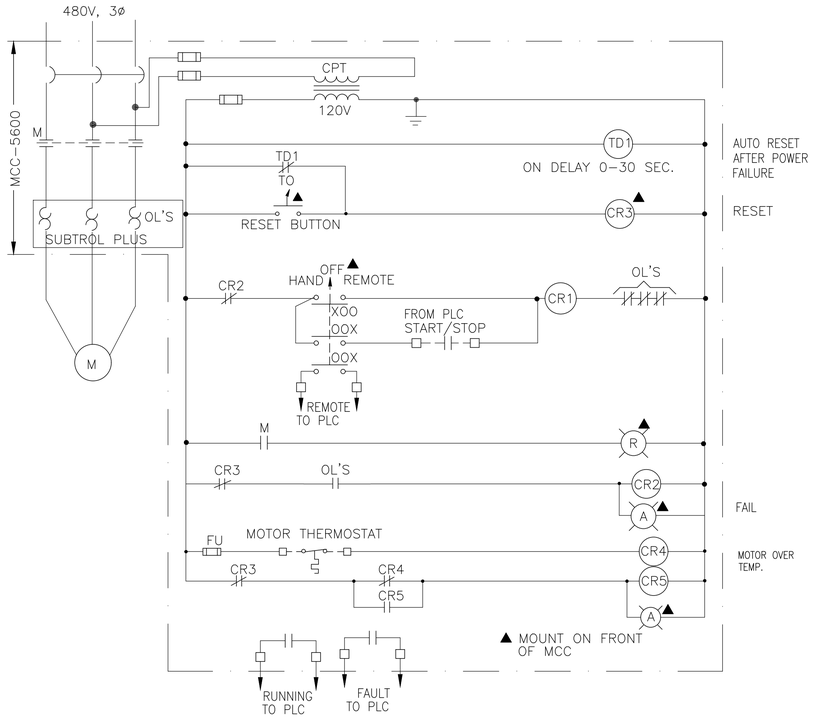
THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

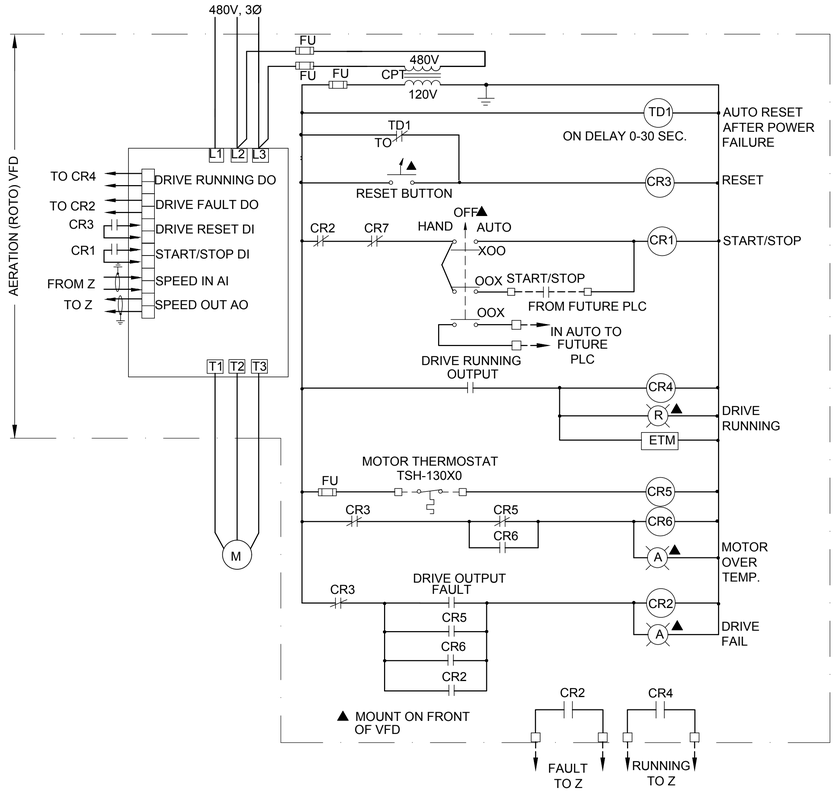
PROJECT No: 11-4416.35

SHEET: **E-5**



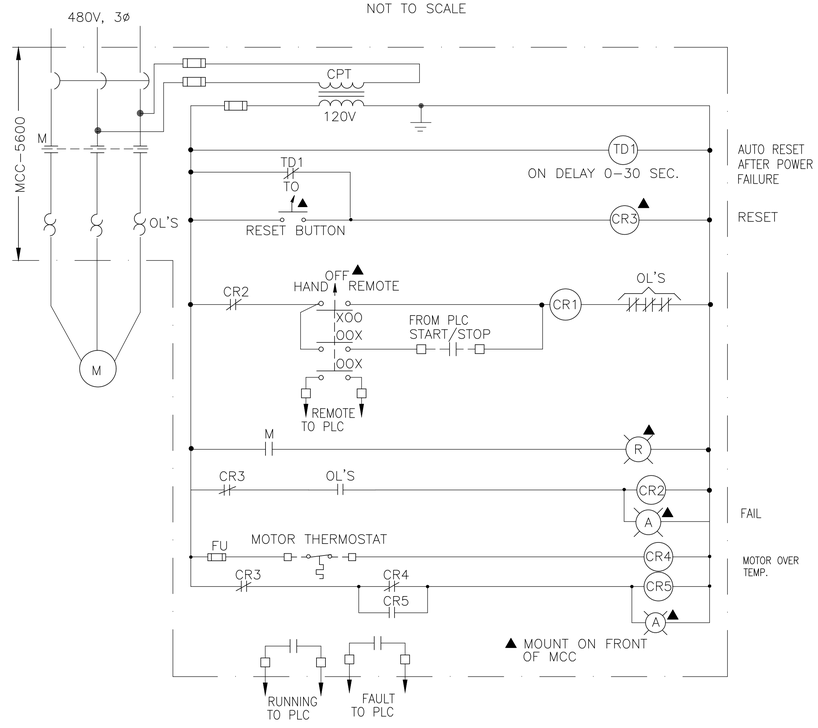
TYPICAL WELL PUMP STARTER SCHEMATIC

NOT TO SCALE



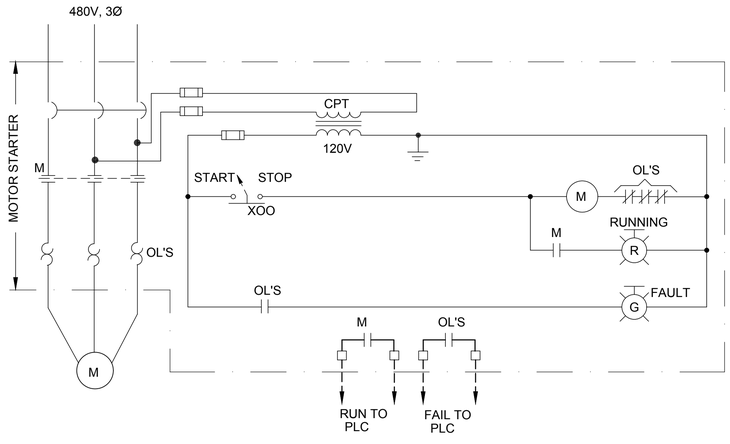
PHILI DRIVE VFD CONTROL SCHEMATIC

NOT TO SCALE



TYPICAL SAVE ALL PUMP STARTER SCHEMATIC

NOT TO SCALE



TEMPORARY LIME SLURRY MIXER WIRING SCHEMATIC

NOT TO SCALE

TEMPORARY LIME SLURRY PUMP WIRING SCHEMATIC

NOT TO SCALE

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

SCHEMATIC DIAGRAMS

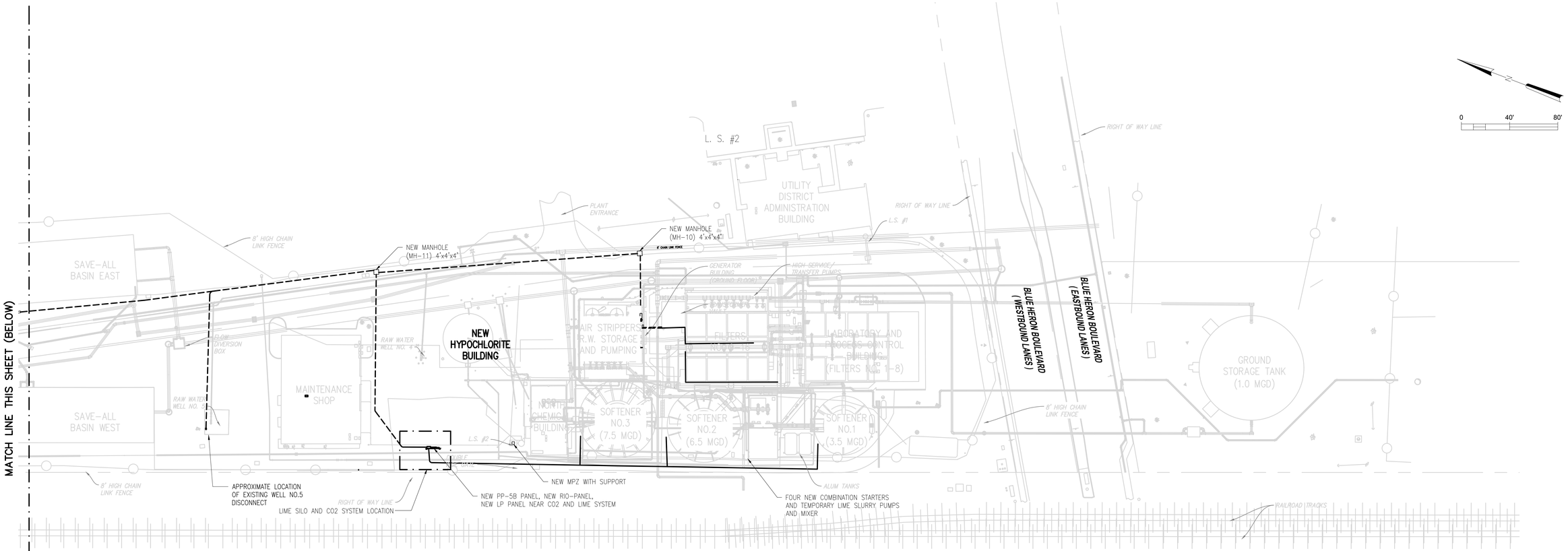
THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

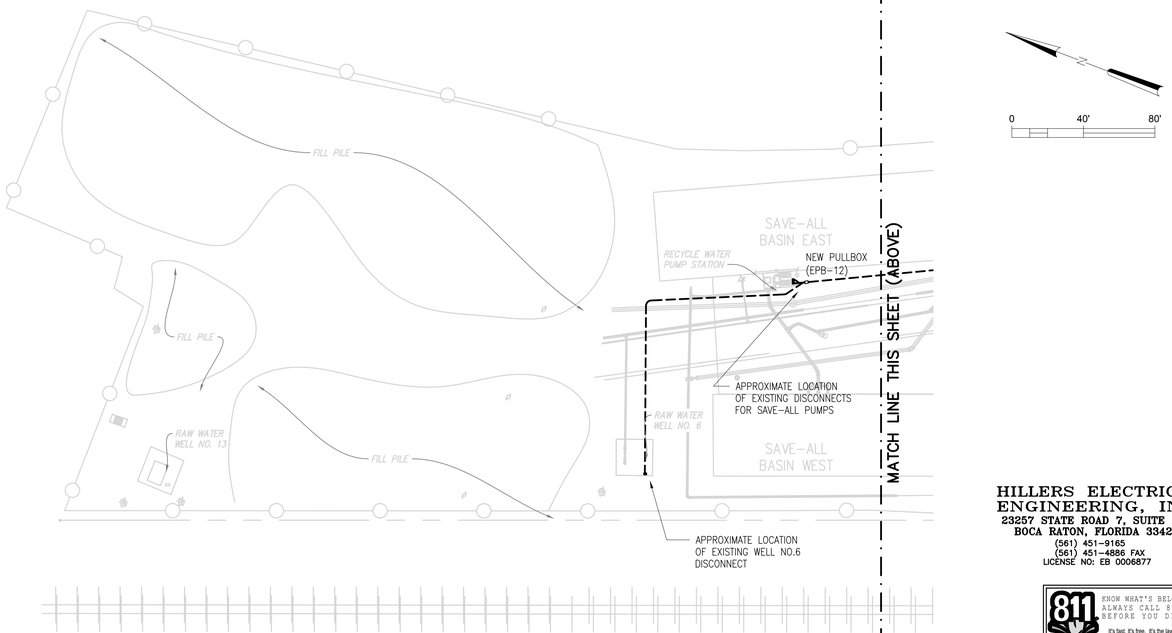
PROJECT No: 11-4416.35

SHEET: **E-6**



ELECTRICAL OVERALL SITE PLAN
1" = 40'

ENLARGED VIEW OF SAVE-ALL PUMPS
1" = 10'



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RIVIERA BEACH LIME IMPROVEMENTS

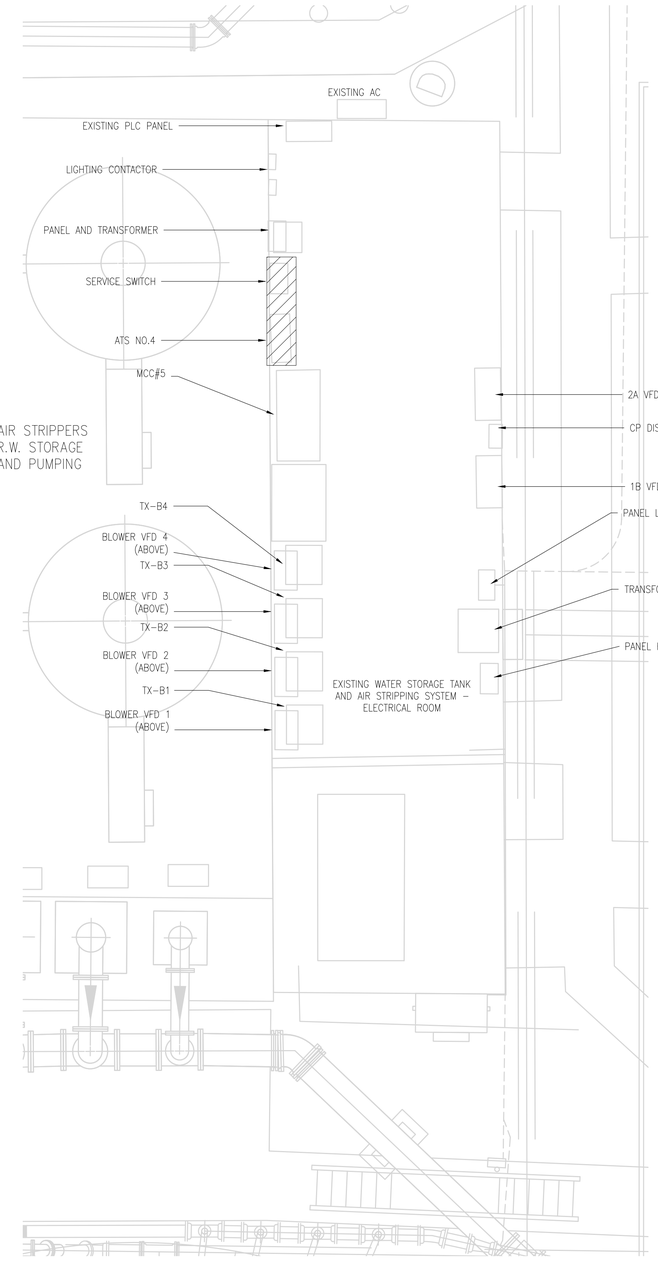
PALM BEACH COUNTY, FLORIDA

ELECTRICAL SITE PLAN

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

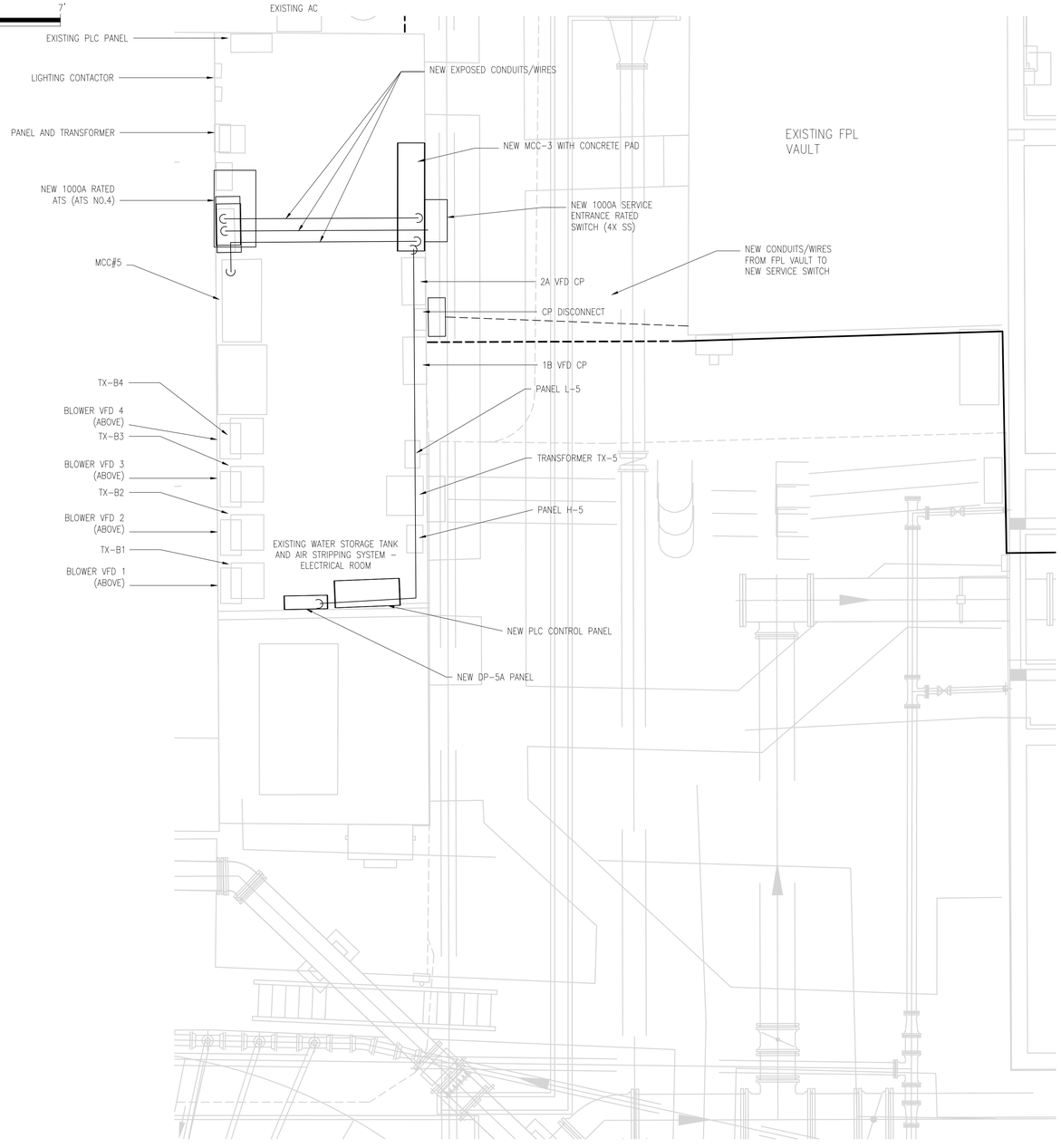
SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: **E-7**

File Name: E:\PROJECTS\CG\cgxx - Riviera Beach Wtp\DWG\Electrical\CGXXE07.dwg - (Plotted by: Win, Thein on Thursday, April 9, 2020 11:11:43 AM)



EXISTING AIR STRIPPING SYSTEM – ELECTRICAL DEMOLITION
1/4" = 1'-0"

1/4"=1'-0"



EXISTING AIR STRIPPING SYSTEM – PROPOSED ELECTRICAL LAYOUT
1/4" = 1'-0"

1/4"=1'-0"

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FOR REVIEW**

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

**AIR STRIPPER BUILDING -
ELECTRICAL PLAN**

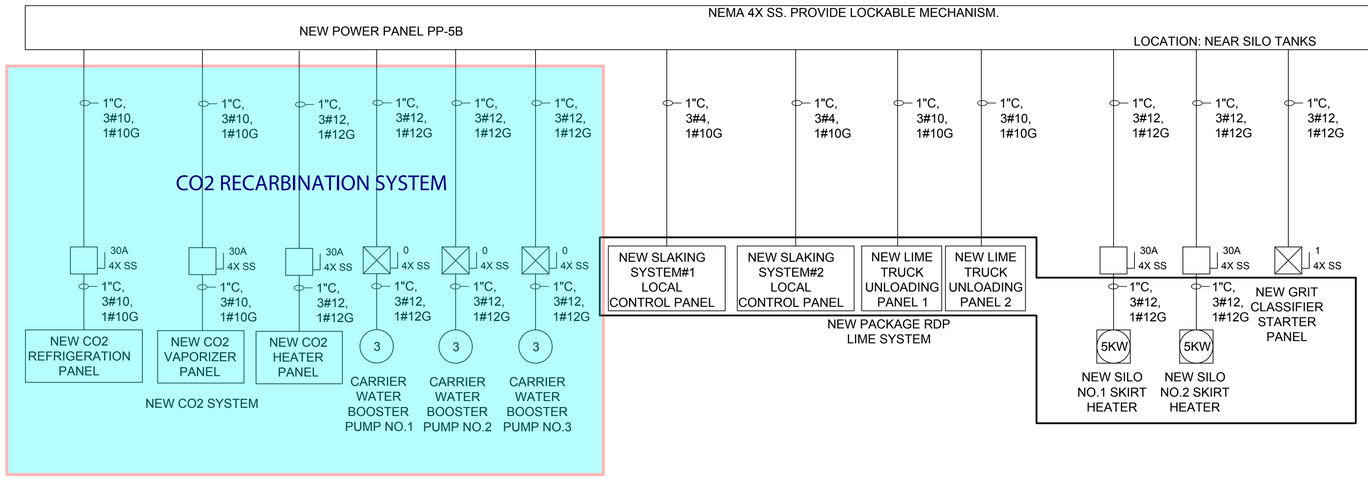
THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

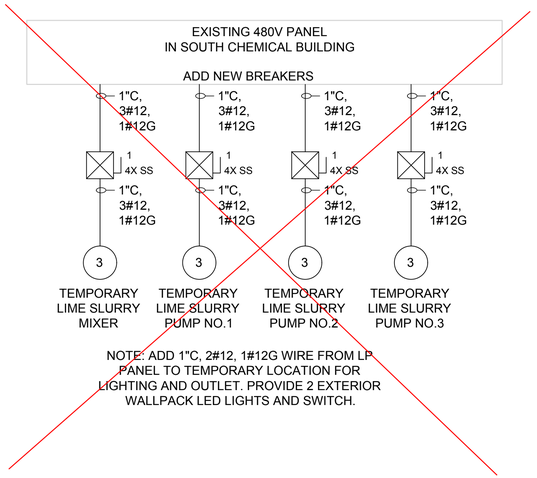
DATE: 3/6/2020

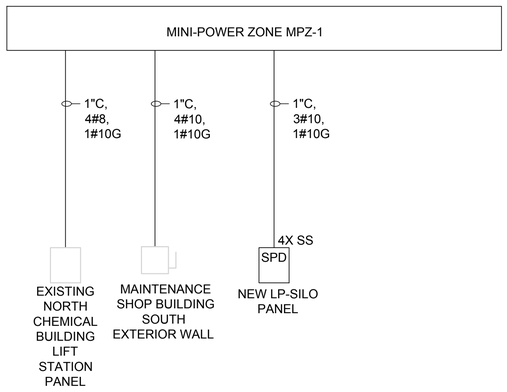
SCALE: AS SHOWN

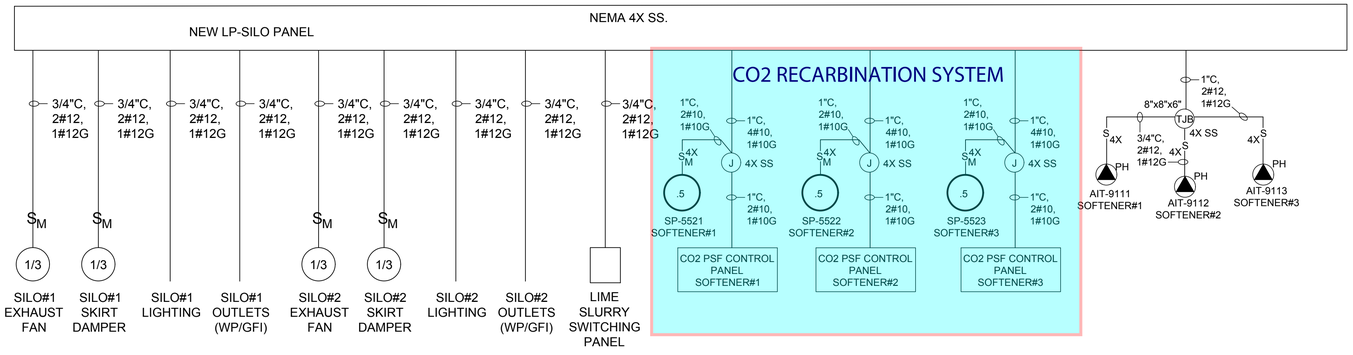
PROJECT No: 11-4416.35

SHEET: **E-8**

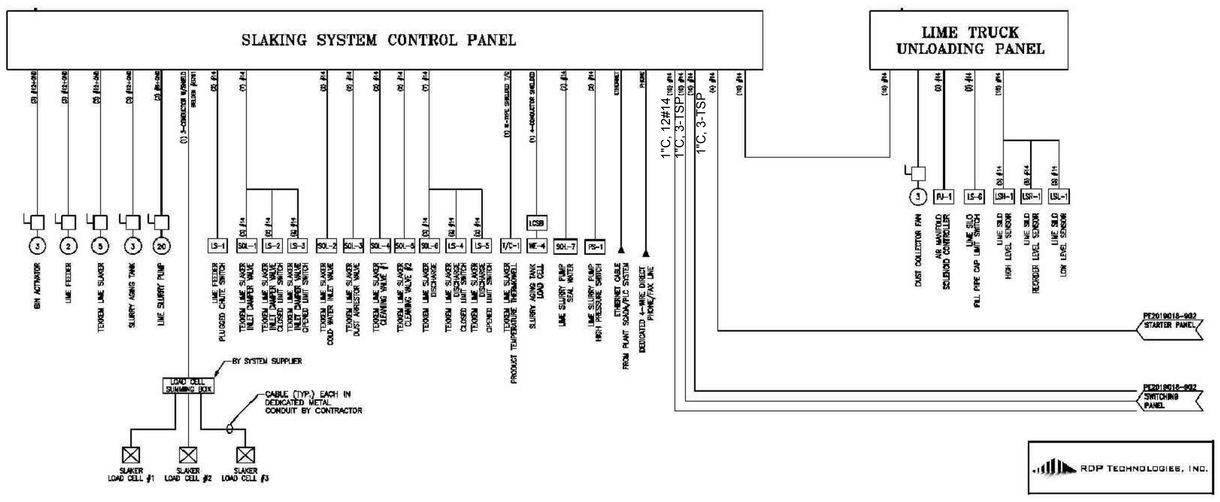








SEE RDP ELECTRICAL DRAWINGS FOR ADDITIONAL CONDUITS/WIRES.



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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

RISER DIAGRAMS - SHEET 1

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

PROJECT No: 11-4416.35

SHEET: **E-9**

CIRCUIT SCHEDULE CONTROL, INSTRUMENTATION	
CKT I.D.	CONDUIT AND CONDUCTOR SIZE
[A1]	[3/4 "C, 2#14, 1#14G]
[B1]	[3/4 "C, 3#14, 1#14G]
[C1]	[3/4 "C, 4#14, 1#14G]
[D1]	[3/4 "C, 5#14, 1#14G]
[E1]	[3/4 "C, 6#14, 1#14G]
[F1]	[3/4 "C, 7#14, 1#14G]
[G1]	[3/4 "C, 9#14, 1#14G]
[H1]	[1"C, 11#14, 1#14G]
[J1]	[1"C, 20#14, 1#14G]
[K1]	[1 1/4"C, 30#14, 1#14G]
[L1]	[1 1/4"C, 12/C TYPE 1]
[M1]	[1 1/2 "C, 19/C TYPE 1]
[N1]	[2"C, 25/C TYPE 1]
[P1]	[2"C, 37/C TYPE 1]
[Q1]	[2"C, 6 – TYPE B, TW SHLD PR]
[R1]	[3/4 "C, 1–TYPE B, TW SHLD PR]
[S1]	[3/4 "C, 2–TYPE B, TW SHLD PR]
[T1]	[1"C, 3– TYPE B TW SHLD PR]
[U1]	[1 1/4 "C, 4–TYPE B, TW SHLD PR]
[V1]	[1 1/2 "C, 8–TYPE B, TW SHLD PR]
[W1]	[1"C, MODBUS CABLE, BELDEN 8777 OR EQUAL]
[X1]	[1 1/2 "C, 5–TYPE B1]
[Y1]	[3/4 "C, 1 TYPE JX SHLD EXTENSION CABLE]
[Z1]	[2 "C, 15–TYPE B, TW SHLD PR]

TW SHLD PR – TWISTED SHEILDED PAIR
JX – TYPE J THERMOCOUPLE

CIRCUIT SCHEDULE 1PH, 2W		
CKT I.D.	CONDUIT AND CONDUCTOR SIZE	CKT AMPS
[A2]	[3/4 "C, 2#14, 1#14G]	15
[B2]	[3/4 "C, 2#12, 1#12G]	20
[C2]	[3/4 "C, 2#10, 1#10G]	30
[D2]	[3/4 "C, 2#8, 1#10G]	40
[E2]	[3/4 "C, 2#6, 1#10G]	50
[F2]	[1"C, 2#4, 1#10G]	60
[G2]	[1"C, 2#4, 1#8G]	70
[H2]	[1 1/4 "C, 2#3, 1#8G]	80
[J2]	[1 1/4 "C, 2#2, 1#8G]	90
[K2]	[1 1/4 "C, 2#1, 1#8G]	100
[L2]	[1 1/2 "C, 2#1/O, 1#6G]	150
[M2]	[1 1/2 "C, 2#2/O, 1#6G]	175
[N2]	[2"C, 2#3/O, 1#6G]	200
[P2]	[2"C, 2#4/O, 1#4G]	225
[Q2]	[2 1/2 "C, 2–250KCMIL, 1#4G]	250
[R2]	[2 1/2 "C, 2–350KCMIL, 1#4G]	300
[S2]		
[T2]		
[U2]		
[V2]		
[W2]		
[X2]		
[Y2]		
[Z2]		

CIRCUIT SCHEDULE 3PH, 3W OR 1PH, 3W		
CKT I.D.	CONDUIT AND CONDUCTOR SIZE	CKT AMPS
[A3]	[3/4 "C, 3#12, 1#12G]	20
[B3]	[3/4 "C, 3#10, 1#10G]	30
[C3]	[1"C, 3#8, 1#8G]	40
[D3]	[1"C, 3#6, 1#6G]	50
[E3]	[1 1/4 "C, 3#4, 1#4G]	60
[F3]	[1 1/4 "C, 3#4, 1#4G]	70
[G3]	[1 1/4 "C, 3#3, 1#3G]	80
[H3]	[1 1/2 "C, 3#2, 1#2G]	90
[J3]	[1 1/2 "C, 3#2, 1#2G]	100
[K3]	[1 1/2 "C, 3# 1/O, 1#1/O G]	150
[L3]	[2"C, 3#2/O, 1#1/O G]	175
[M3]	[2"C, 3#3/O, 1#1/O G]	200
[N3]	[2 1/2 "C, 3#4/O, 1#1/O G]	225
[P3]	[2 1/2 "C, 3–250KCMIL, 1#1/O G]	250
[Q3]	[3"C, 3–350KCMIL, 1#2/O G]	300
[R3]	2 EA.[2 "C, 3–3/O, 1#3G]	400
[S3]	2 EA.[2 1/2 "C, 3–250KCMIL, 1#2G]	500
[T3]	2 EA.[3"C, 3–350KCMIL, 1#1G]	600
[U3]	2 EA.[3 1/2"C, 3–500KCMIL, 1#1/0G]	700
[V3]	3 EA.[3"C, 3–350KCMIL, 1#1/0G]	800
[W3]	3 EA.[3 1/2"C, 3–500KCMIL,1#250KCMILG]	1000
[X3]	4 EA.[3"C, 3–350KCMIL, 1#3/0G]	1200
[Y3]	5 EA.[3 1/2"C, 3–500KCMIL, 1#4/0G]	1600
[Z3]	6 EA.[3 1/2"C,3–500KCMIL,1–250KCMILG]	2000

[A] [1"C, I&C SUPPLIED CABLE, 1#14G]

[B] [2"C, 1#14G, FOR FIBER OPTIC CABLE] COORDINATE MINIMUM BENDING RADIUS WITH MANUFACTURER. FIBER OPTIC CABLE FURNISHED UNDER SPECIFICATION 17000, INSTALLED BY ELECTRICAL CONTRACTOR AND TESTED BY I&C CONTRACTOR.

[Y] [1"C, CAT 6 CABLE]

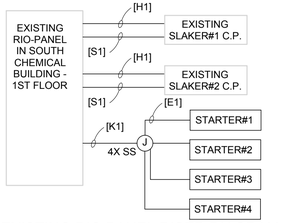
[C] [2"C W/ PULL STRING]

[D] [1"C W/ PULL STRING]

[E] [1"C, 1#14G, FOR FIBER OPTIC CABLE] COORDINATE MINIMUM BENDING RADIUS WITH MANUFACTURER. FIBER OPTIC CABLE FURNISHED UNDER SPECIFICATION 17000, INSTALLED BY ELECTRICAL CONTRACTOR AND TESTED BY I&C CONTRACTOR.

[F] [3/4"C, MSC], MSC = MANUFACTURER SUPPLIED CABLE

[G] [1"C, MSC], MSC = MANUFACTURER SUPPLIED CABLE



EXISTING RIO PANEL RISER DIAGRAM
NOT TO SCALE

ELECTRICAL NOTES

NEW LIGHTING CIRCUIT AND NEW LIGHT FIXTURES, SWITCHES, ETC.

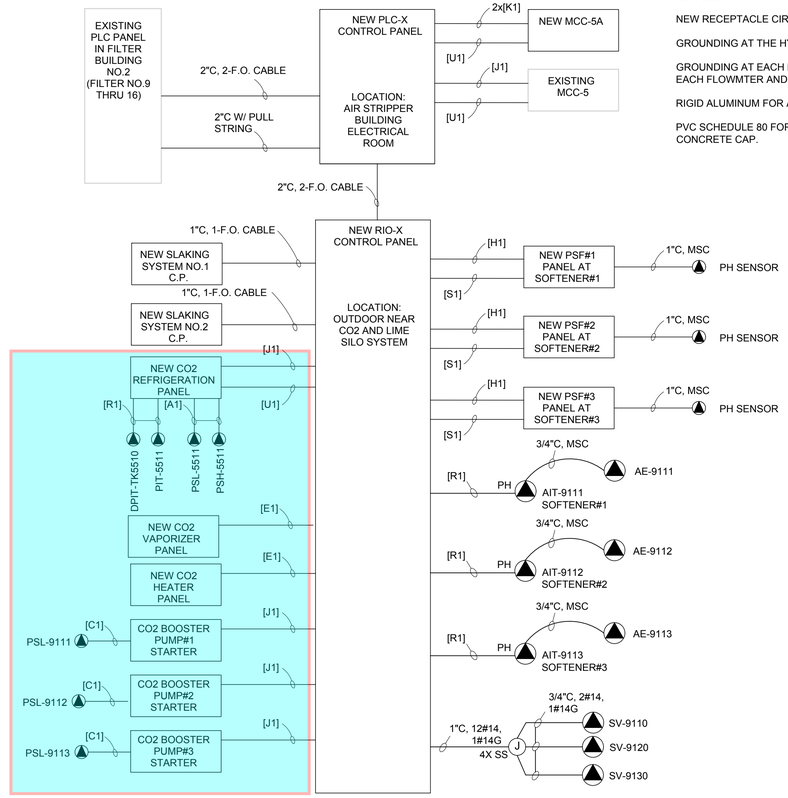
NEW RECEPTACLE CIRCUIT AND NEW OUTLETS, WP COVERS, ETC.

GROUNDING AT THE HYPO. TANKS

GROUNDING AT EACH MAGNETIC FLOWMETER (ONE GROUND ROD AT EACH FLOWMTER AND BONDING JUMPER)

RIGID ALUMINUM FOR ALL EXPOSED CONDUITS.

PVC SCHEDULE 80 FOR ALL UNDERGROUND CONDUITS WITH CONCRETE CAP.



CO2 RECARBINATION SYSTEM

NEW PLC AND RIO PANEL RISER DIAGRAM
NOT TO SCALE

LUMINAIRE SCHEDULE							
TYPE	VOLTS	DESCRIPTION	MANUFACTURER	CATALOG NO	LAMPS	MOUNTING	REMARKS
1	120	D–SERIES, SIZE 1, TYPE 3 MEDIUM W/ PHOTOCELL AND MOTION SENSOR	LITHONIA LIGHTING	DSX1 LED–P3–40K–T3M–120 RPA–PIRH–DDBXD	30 LEDS 102 WATTS	POLE	MOUNT 25' AFF. SINGLE HEAD SEE LIGHT POLE DETAIL. FULL CUT–OFF TYPE.
2	120	DUST AND MOISTURE TIGHT LED. 4'X1'.	LITHONIA LIGHTING	VAP–4000LM–FST–MD–120–35K–80CRI	4000 LUM. 33 WATTS	SURFACE	SUITABLE FOR DAMP LOCATION
3	120	D–SERIES, SIZE 1, WALL LUMINAIRE TYPE 3M, 120V, PE, MOTION SENSOR	LITHONIA LIGHTING	DSXW1LED–10–700–40K, T3M –120–RE–PIR1FC3V–BBW	26 WATTS	SURFACE	MOUNT ABOVE DOOR OR 10" AFG. FULL CUT–OFF TYPE.

6 – TYPE 2 FIXTURES WITH LIGHT SWITCH, RECEPTACLES (WP/GFI) CIRCUITS IN AIR STRIPPING ELECTRICAL ROOM
2 – TYPE 3 LIGHT FIXTURE FOR TEMPORARY LIME SLURRY AREA
3 – TYPE 1 LIGHT FIXTURE WITH POLES NEAR CO2 TANKS AND SILO.
8 – TYPE 3 LIGHT FIXTURE FOR CO2 TANKS AND SILO ABOVE DOORS AND SILO WALLS.

PROVIDE AND INSTALL NEW LIGHTNING PROTECTION AND GROUND GRID FOR CO2 TANK AND LIME SILO TANKS AREA.

PROVIDE TWO NEMA 4X STAINLESS STEEL JUNCTION BOXES (MINIMUM 24"W x 12"D x 24"H) AT AIR STRIPPING BUILDING FOR CONDUIT/WIRE PULLING.

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451–9165
(561) 451–4886 FAX
LICENSE NO: EB 0006877

PRELIMINARY PLANS
FOR REVIEW

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
–	–	.	–				

Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS
560 Village Boulevard • Suite 340 • West Palm Beach, FL 33409
Phone: 561.684.6161 • Fax: 561.684.6360
Certificate of Authorization 514

RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

RISER DIAGRAMS - SHEET 2

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: E-10

NEW MINI-POWER CENTER SCHEDULE "MPZ-1"

BUS AMPS A	BUS AMPS B	BUS AMPS C	LOAD	POLES	AMPS	BUS A B C	AMPS	POLES	LOAD	BUS AMPS A	BUS AMPS B	BUS AMPS C
–			SPARE	1	20	1 – 2	20	1	SPARE	–		
	–		SPARE	1	20	3 – 4	20	1	SPARE		–	
		–	SPARE	1	20	5 – 6	20	1	SPARE			–
–			SPARE	1	20	7 – 8	20	1	SPARE	–		
	–		SPARE	1	20	9 – 10	20	1	SPARE		–	
		–	SPARE	1	20	11 – 12	20	1	SPARE			–
–			LIFT STATION LCP	3	40	13 – 14	30	3	SILO LP PANEL			
	–		SPARE			15 – 16						
		–	SPARE			17 – 18						
–			MAINTENANCE BUILDING D/S	3	30	19 – 20	20	3	SPD			
	–		SPARE			21 – 22					–	
		–	SPACE			23 – 24						

TOTAL AMPS: BUS A_-___ BUS B_-___ BUS C_-___ CONNECTED KVA_-___

RATED VOLTAGE: ■ 120/208 ☐ 120/240 3 PHASE, 4 WIRE		BRANCH POLES ☐ 12 ☐ 20 ■ 24 ☐ 42	
RATED AMPS: ■ 100 ☐ 225 ☐ 400 ☐ _____	CABINET: ■ SURFACE ☐ FLUSH		
NEUTRAL BUS ■ 100% ☐ 150% ☐ 200%	■ GROUND BUS	■ HINGED DOOR	☐ KEYED DOOR LATCH — LOCATION: OUTDOOR NEAR LIFT STATION
■ CIRCUIT BREAKER (BOLT-IN) BRANCH DEVICES	■ SPD	ENCLOSURE TYPE ☐ NEMA 1 ☐ NEMA 3R ■ NEMA 3R 316 SS	
MAIN 40 PRIMARY/60 SECONDARY AMPS ■ BREAKER	☐ _____ TO BE GFI BREAKERS		
PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF ____10,000 AMPS SYMMETRICAL.			
APPROVED MF'RS. EATON, SQUARE D, GE.	COPPER BUSSES	MAIN LUGS _____ SETS SIZE: _____	

NEW PANELBOARD SCHEDULE "LP-SCB1"

BUS AMPS A	BUS AMPS B	BUS AMPS C	LOAD	POLES	AMPS	BUS A B C	AMPS	POLES	LOAD	BUS AMPS A	BUS AMPS B	BUS AMPS C
-			SPARE	1	20	1 – 2	20	1	SPARE	-		
	-		SPARE	1	20	3 – 4	20	1	SPARE		-	
		-	SPARE	1	20	5 – 6	20	1	SPARE			-
-			SPARE	1	20	7 – 8	20	1	SPARE	-		
	-		SPARE	1	20	9 – 10	20	1	SPARE		-	
		-	SPARE	1	20	11 – 12	20	1	SPARE			-
-			SPARE	1	20	13 – 14	20	1	SPARE	-		
	-		SPARE	1	20	15 – 16	20	3	SPD		-	
		-	SPARE	1	20	17 – 18						-
-			SPARE	1	20	19 – 20				-		

TOTAL CONNECTED AMPS: BUS A-____ BUS B-____ BUS C-____ CONNECTED Kva_-____
TOTAL RUNNING AMPS: BUS A_-___ BUS B-___ BUS C-___ CONNECTED Kva_-___

RATED VOLTAGE: ■ 120/208 ☐ 480 3 PHASE, 4 WIRE		BRANCH POLES ☐ 12 ■ 20 ☐ 30 ☐ 42	
RATED AMPS: ■100 ☐ 225 ☐ 400 ☐ _____	CABINET: ■ SURFACE ☐ FLUSH		
NEUTRAL BUS ■ 100% ☐ 150% ☐ 200%	■ GROUND BUS	■ HINGED DOOR ■ KEYED DOOR LATCH	LOCATION: OUTDOOR NEAR CO2 AND SILO
■ CIRCUIT BREAKER (BOLT-IN) BRANCH DEVICES	■ SPD	ENCLOSURE TYPE ☐ NEMA 1 ☐ NEMA 3R ■ NEMA 4X STAINLESS STEEL	
☐ MAIN LUGS ONLY MAIN 30 AMPS ■ BREAKER	☐ _____ TO BE GFI BREAKERS		
PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF ___10,000 AMPS SYMMETRICAL.			
APPROVED MF'RS. EATON, SQUARE D, GE.	COPPER BUSSES		

NEW 480V PANEL "PP-5B" SCHEDULE

BUS AMPS A	BUS AMPS B	BUS AMPS C	LOAD	POLES	AMPS	BUS A B C	AMPS	POLES	LOAD	BUS AMPS A	BUS AMPS B	BUS AMPS C
–			NEW CO2 REFRIGERATION PANEL	3	30	1 – 2	20	3	GRIT CLASSIFIER STARTER	–		
	–					3 – 4					–	
		–				5 – 6						–
–			SLAKING SYSTEM NO.1 LCP	3	80	7 – 8	30	3	NEW CO2 VAPORIZER PANEL	–		
	–					9 – 10					–	
		–				11 – 12						–
–			SLAKING SYSTEM NO.2 LCP	3	80	13 – 14	20	3	NEW CO2 HEATER PANEL			
	–					15 – 16						
		–				17 – 18						
			NEW LIME TRUCK UNLOADING PANEL 1	3	30	19 – 20	20	3	CO2 BOOSTER PUMP NO.1			
						21 – 22						
						23 – 24						
			SILO NO.1 SKIRT HEATER	3	20	25 – 26	20	3	CO2 BOOSTER PUMP NO.2			
						27 – 28						
						29 – 30						
			SILO NO.2 SKIRT HEATER	3	20	31 – 32	20	3	CO2 BOOSTER PUMP NO.3			
						33 – 34						
						35 – 36						
			NEW LIME TRUCK UNLOADING PANEL 2	3	20	37 – 38	30	3	SPD			
						39 – 40						
						41 – 42						

TOTAL CONNECTED AMPS: BUS A_111.1_ BUS B_111.1_ BUS C_111.1_ CONNECTED Kva_92.4_
TOTAL RUNNING AMPS: BUS A_88.9_ BUS B_88.9_ BUS C_88.9_ CONNECTED Kva_73.9_

RATED VOLTAGE: ☐ 120/240 ■ 480 3 PHASE, 3 WIRE		BRANCH POLES ☐ 12 ☐ 20 ☐ 24 ■ 42	
RATED AMPS: ☐ 100 ☐ 225 ■ 400 ☐ _____	CABINET: ■ SURFACE ☐ FLUSH		
NEUTRAL BUS ☐ 100% ☐ 150% ☐ 200%	■ GROUND BUS	■ HINGED DOOR ☐ KEYED DOOR LATCH	LOCATION: OUTDOOR CO2 AND SILO
■ CIRCUIT BREAKER (BOLT-IN) BRANCH DEVICES	■ SPD	ENCLOSURE TYPE ☐ NEMA 1 ☐ NEMA 3R ■ NEMA 4X 316 SS	
☐ MAIN LUGS ONLY MAIN 250A_____ AMPS	■ BREAKER	☐ _____ TO BE GFI BREAKERS	
PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF ____42,000 AMPS SYMMETRICAL.			
APPROVED MF'RS. EATON, SQUARE D, GE.	COPPER BUSSES	MAIN LUGS _____ SETS SIZE: _____	

PRELIMINARY PLANS
FOR REVIEW

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
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LICENSE NO: EB 0006877

NO	DATE	REVISION	BY
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Phone: 561.684.6161 • Fax: 561.684.6360
Certificate of Authorization 514

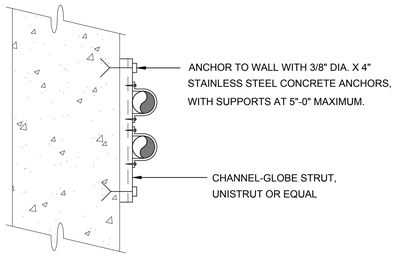
RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

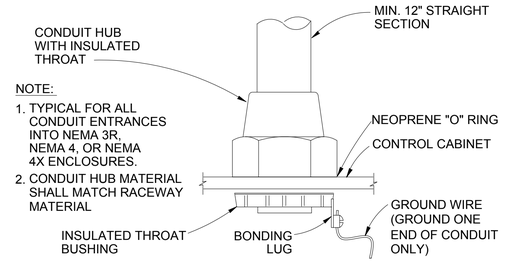
SCHEDULES

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

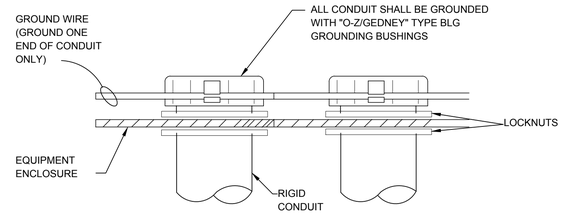
SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: E-11



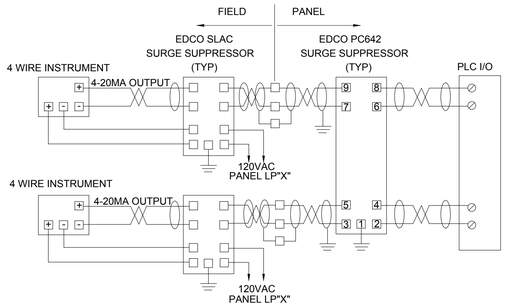
1 TYP **CONDUIT SUPPORT**
NOT TO SCALE



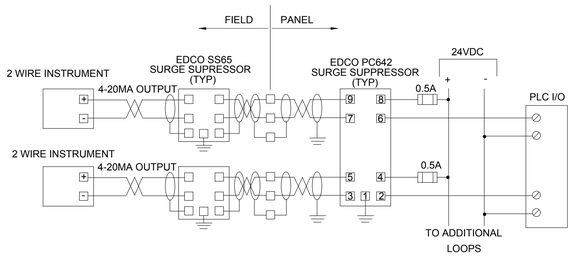
2 TYP **CONDUIT HUB**
NOT TO SCALE



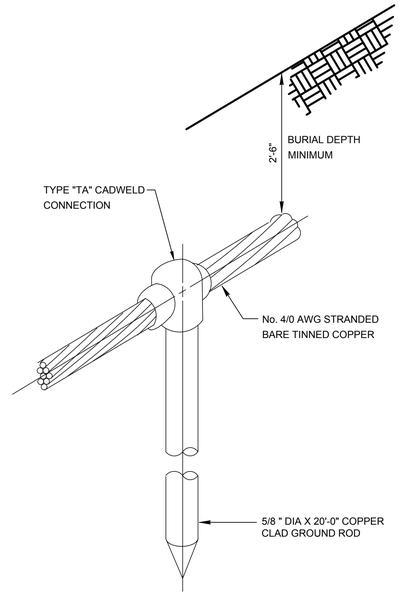
3 TYP **CONDUIT GROUNDING**
NOT TO SCALE



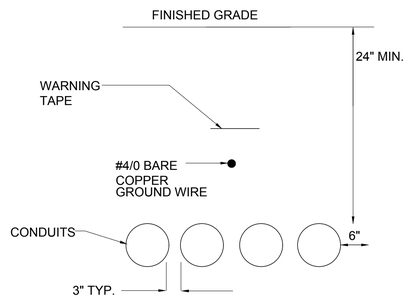
4 TYP **TYPICAL 4 WIRE INSTRUMENT ISOLATOR**
NOT TO SCALE



5 TYP **TYPICAL 2 WIRE INSTRUMENT ISOLATOR**
NOT TO SCALE

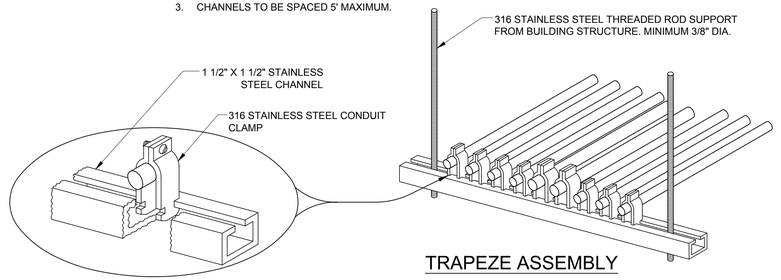


6 TYP **GROUND ROD DETAIL**
NOT TO SCALE

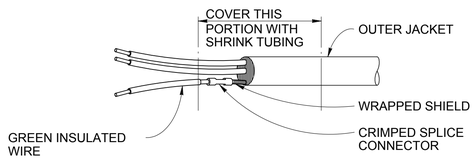


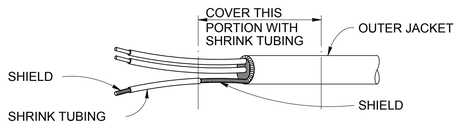
8 TYP **DIRECT BURIED 4-WAY DUCTBANK DETAIL**
NOT TO SCALE

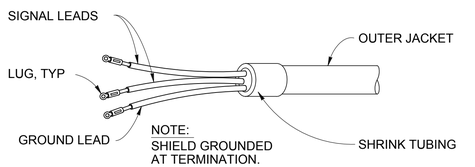
NOTES:
1. THIS DETAIL TYPICAL FOR BOTH VERTICAL AND HORIZONTAL MOUNTING
2. CHANNEL AND ALL SUPPORT DEVICES TO BE 316 STAINLESS STEEL.
3. CHANNELS TO BE SPACED 5' MAXIMUM.



7 TYP **CONDUIT PIPE STRAP MOUNTING DETAILS**







9 TYP **TERMINATION OF SHIELDED CONTROL CABLE**
NOT TO SCALE

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PRELIMINARY PLANS FOR REVIEW

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
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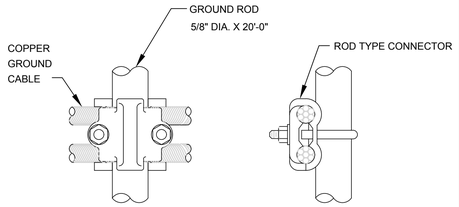
RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

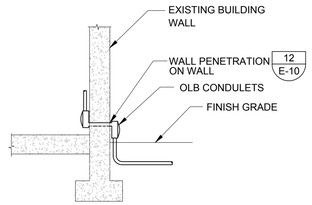
ELECTRICAL DETAILS SHEET 1

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

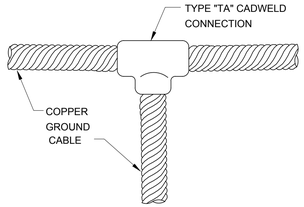
SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: E-12



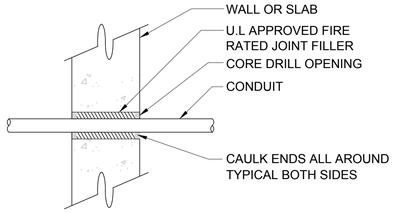
10 TYP — CABLE TO ROD CONNECTION
NOT TO SCALE



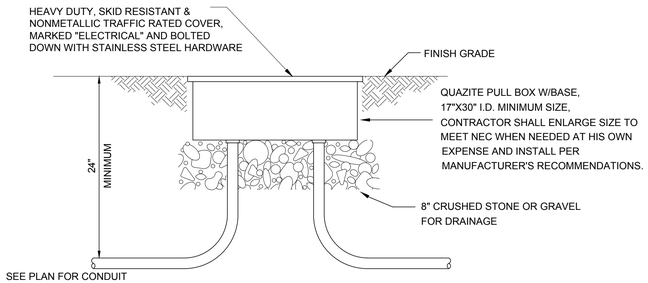
11 TYP — CONDUIT ENTRANCE
NOT TO SCALE



13 TYP — GROUND CABLE CONNECTION
NOT TO SCALE

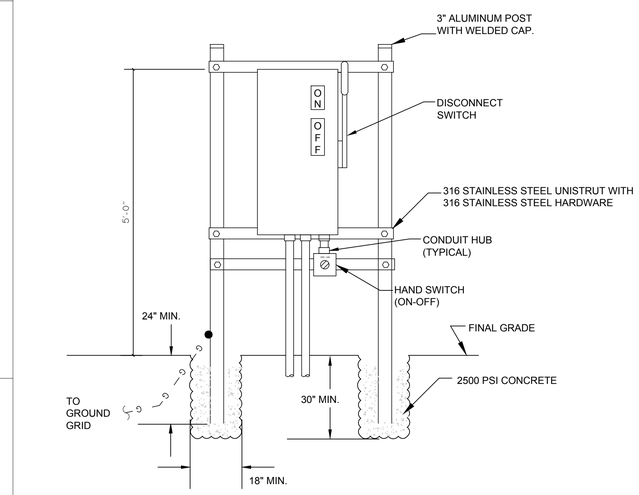


17 TYP — CONDUIT PENETRATION AT WALL OR SLAB
NOT TO SCALE

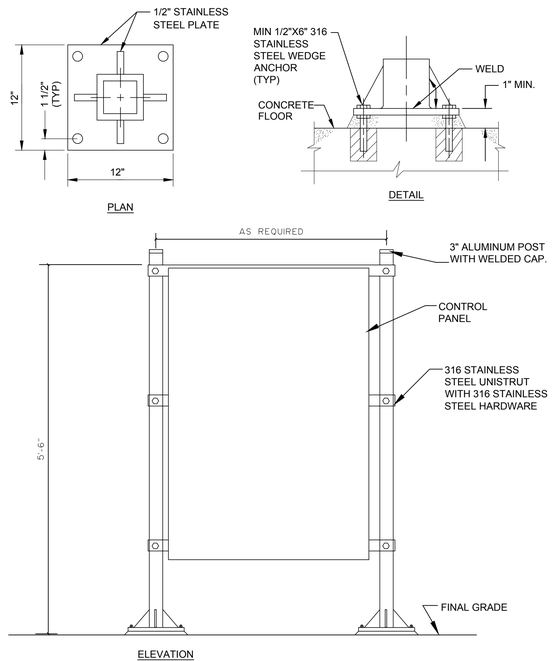


NOTE: PULL BOX SHALL COMPLY WITH NEC ARTICLE 314.30

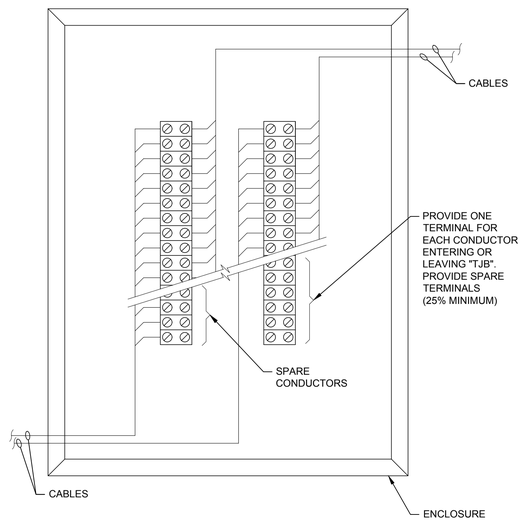
12 TYP — ELECTRICAL PULL BOX DETAIL
NOT TO SCALE



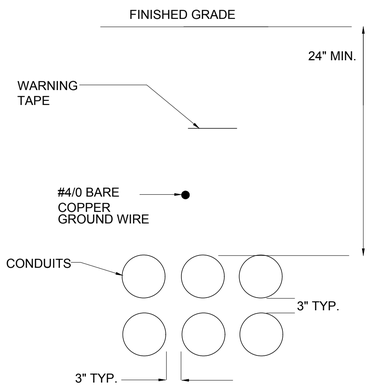
17 TYP — DISCONNECT SWITCH PEDESTAL ON GRADE
NOT TO SCALE



15 TYP — CONTROL PANEL PEDESTAL ON SLAB
NOT TO SCALE



16 TYP — TERMINAL JUNCTION BOX (TJB)
NOT TO SCALE



18 TYP — DIRECT BURIED 6-WAY DUCTBANK DETAIL
NOT TO SCALE

NOTES FOR ALL DUCTBANK DETAILS

1. FOR DUCTBANKS WITH CONDUIT QUANTITY DIFFERENT THAN THE DUCTBANK DETAILS SHOWN, ARRANGE THE DUCTBANK WITH THE COMBINATION OF APPROPRIATE DUCTBANK DETAILS.

HILLERS ELECTRICAL ENGINEERING, INC.
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LICENSE NO: EB 0006877

PRELIMINARY PLANS FOR REVIEW

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

ELECTRICAL DETAILS SHEET 2

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

PROJECT No: 11-4416.35

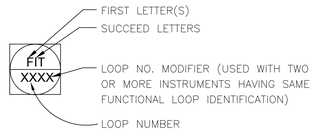
SHEET: **E-13**

File Name: E:\PROJECTS\CG\cgxx – Riviera Beach Wtp\DWG\Electrical\CGXXE13.dwg – (Plotted by: Win, Thein on Thursday, April 9, 2020 11:12:09 AM)

IDENTIFICATION LETTERS

	FIRST LETTER		SUCCEEDING LETTER		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM	USER'S CHOICE	USER'S CHOICE
B	BURNER, COMBUSTION		USER'S CHOICE		
C	CONDUCTIVITY			CONTROL	(CLOSED)
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE (EMF)		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	GAUGE		GLASS, VIEWING DEVICE		
H	HAND (MANUAL)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE	MOMENTARY			MIDDLE INTERMEDIATE
N	USER'S CHOICE	(NORMALLY)	USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		(OPEN)
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TORQUE, TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL	UNCLASSIFIED	
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED		UNCLASSIFIED
Y	EVENT, STATE, OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

INSTRUMENT IDENTIFICATION




FIELD MOUNTED INSTRUMENT


REAR OF PANEL MOUNTED INSTRUMENT


FRONT OF PANEL MOUNTED INSTRUMENT

MOTOR STATUS/CONTROL WITH INTERLOCKS (OFTEN LOCATED IN MCC)

PLC (PROGRAMMABLE LOGIC CONTROLLER)

HMI


ALARM ANNUNCIATOR OR STATUS INDICATING LIGHT

TIMER

NOTES:

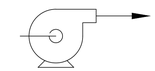
1. COMPONENTS AND PANELS SHOWN WITH A DIAMOND (◆) ARE TO BE PROVIDED UNDER SECTION "INSTRUMENTATION & CONTROLS".
2. COMPONENTS AND PANELS SHOWN WITH A DOUBLE ASTERISK (**) ARE TO BE PROVIDED AS PART OF A PACKAGED OR MECHANICAL SYSTEM.
3. COMPONENTS AND PANELS SHOWN WITH A TRIANGLE (▲) ARE EXISTING.
4. COMPONENTS AND PANELS SHOWN WITH A HEXAGON (⬣) ARE EXISTING TO BE MODIFIED AND/OR RELOCATED.
5. COMPONENTS AND PANELS SHOWN WITH A SQUARE (■) ARE FUTURE.
6. DURING SHOP DRAWING PREPARATION, THE CONTRACTOR SHALL FIELD VERIFY ALL THE EXISTING ANALOG AND DISCRETE POINTS FOR DETAILED INTERFACE AND INCLUDE IT AS PART OF SUBMITTAL.
7. THE SINGLE INSTRUMENT & CONTROL SUPPLIER SHALL HAVE A U.L. APPROVED SHOP.
8. ALL PROCESS TUBING AND ISOLATION VALVES SHALL BE 1/4"– 316 S.S., UNLESS OTHERWISE NOTED ON OTHER DRAWINGS.
9. ALL CONTROL PANELS SHALL BE FURNISHED AND INSTALLED WITH A 1P–15A CIRCUIT BREAKER.
10. SEE MECHANICAL PLANS AND SPECIFICATIONS FOR EQUIPMENT NUMBERS.
11. NO ELECTRICAL CONDUITS, INSTRUMENTS, OR PANEL SHALL BE MOUNTED ON HANDRAIL.

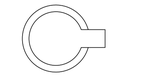
INSTRUMENT ABBREVIATION

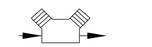
ACC	ACCELATOR
AT	AUTO–TEST
BFP	BELT FILTER PRESS
CL2	CHLORINE
CLW	CLEARWELL
COM	COMMON
COND	CONDUCTIVITY
CP	CONTROL PANEL
DI, AI	DISCRETE INPUT, ANALOG INPUT
DO, AO	DISCRETE OUTPUT, ANALOG OUTPUT
D.O.	DISSOLVED OXYGEN
DR	DISTANCE RELAY
EFFL	EFFLUENT
EP	ELECTRICAL PANEL
ES	EMERGENCY STOP
ETM	ELAPSED TIME METER
FD	CHEMICAL FEEDER
FIL	FILTER
FIS	FLOW INDICATING SWITCH
FRS	FORWARD–REVERSE–STOP
GEN	GENERATOR
HLO	HIGH–LOW–OFF
HLOR	HIGH–LOW–OFF–REMOTE
HOA	HAND–OFF–AUTO
HOR	HAND–OFF–REMOTE
HOTC	HAND–OFF–TIMER–COMPUTER
H/L	HIGH/LOW
HSP	HIGH SERVICE PUMP
IND	INDICATION
INFL	INFLUENT
JP	JOCKEY PUMP
LOR	LOCAL–OFF–REMOTE
LOS	LOCK–OUT–STOP
LPU	LINE PROTECTION UNIT
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
ME	MISCELLANEOUS EQUIPMENT
M.G.	MILLION GALLON
MOA	MANUAL–OFF–AUTO
MOV	MOTOR OPERATED VALVE
OCA	OPEN–CLOSE–AUTO
OC	OPEN–CLOSE
OO	ON–OFF
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN–STOP–CLOSE
OSCR	OPEN–STOP–CLOSE–REMOTE
PAFM	POWER APPLIED FOR MOVEMENT
PRES	PRESSURE
PH	HYDROGEN ION CONCENTRATION
RES	RESTORE
REF	REFERENCE
RF	RF (ADMITTANCE) LEVEL MONITOR
RIP	REMOTE I/O PANEL
R/L	REMOTE/LOCAL
RSP	REMOTE SETPOINT
SA	SURGE ARRESTER
SEC	SECONDARY
SL	SLAKER
SF	SONIC FLOWMETER
SP	SETPOINT
SS	START/STOP
ST	STEP
STOR	STORAGE
SUS	SUSPENDED SOLIDS
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
TD	THERMAL DISPERSION
TP	TRANSFER PUMP
TURB	TURBIDITY
VFD	VARIABLE FREQUENCY DRIVE

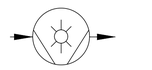
INSTRUMENTATION LEGEND

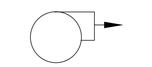
PUMPS & COMPRESSORS

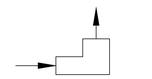

CENTRIFUGAL PUMP


CENTRIFUGAL PUMP (WET PIT)

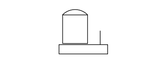

COMPRESSOR


VACUUM PUMP


BLOWER/FAN


METERING PUMP


PROGRESSING CAVITY PUMP


SUMP PUMP

INSTRUMENT LINE SYMBOLS

PRIMARY PROCESS FLOW

FUTURE PRIMARY PROCESS FLOW

SECONDARY PROCESS FLOW, CONNECTION TO PROCESS FLOW, MECHANICAL LINK OR INSTRUMENT SUPPLY

ELECTRICAL SIGNAL (DISCRETE)

ELECTRICAL SIGNAL (ANALOG)

PNEUMATIC SIGNAL

FIBER OPTIC

DEVICENET

PROCESS OR SIGNAL CONTINUED SOMEWHERE ELSE (X=1,2,3,...)

ACTUATOR OR OPERATORS

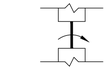
SOLENOID VALVE

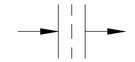
MOTOR

HYDRAULIC

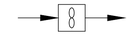
PNEUMATIC

PRIMARY ELEMENTS


WEIR


ORIFICE PLATE

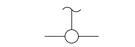

VENTURI


PROPELLER METER


ROTAMETER


ELECTROMAGNETIC FLOWMETER


LEVEL (BUBBLE TUBE)

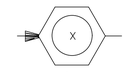

LEVEL (FLOAT)


LEVEL (ULTRASONIC)

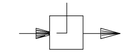

ULTRASONIC FLOWMETER (IN–LINE MAGNETIC)

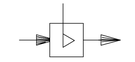
RF ADMITTANCE

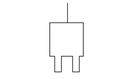

PARSHALL FLUME

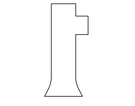


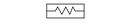
DENSITY METER
(X: N = NUCLEAR
O = OPTICAL
U = ULTRASONIC)


PITOT–STATIC


VORTEX METER


SUSPENDED SOLIDS


PROPELLER PUMP


HEAT EXCHANGER

VALVES & GATES

BUTTERFLY

GATE

CHECK

BALL

GLOBE

DIAPHRAGM

PLUG

3–WAY VALVE

CULVERT GATE

PRESSURE REGULATING VALVE

ELECTRICAL DEVICES

DISCONNECT

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

INSTRUMENTATION LEGEND AND SYMBOLS

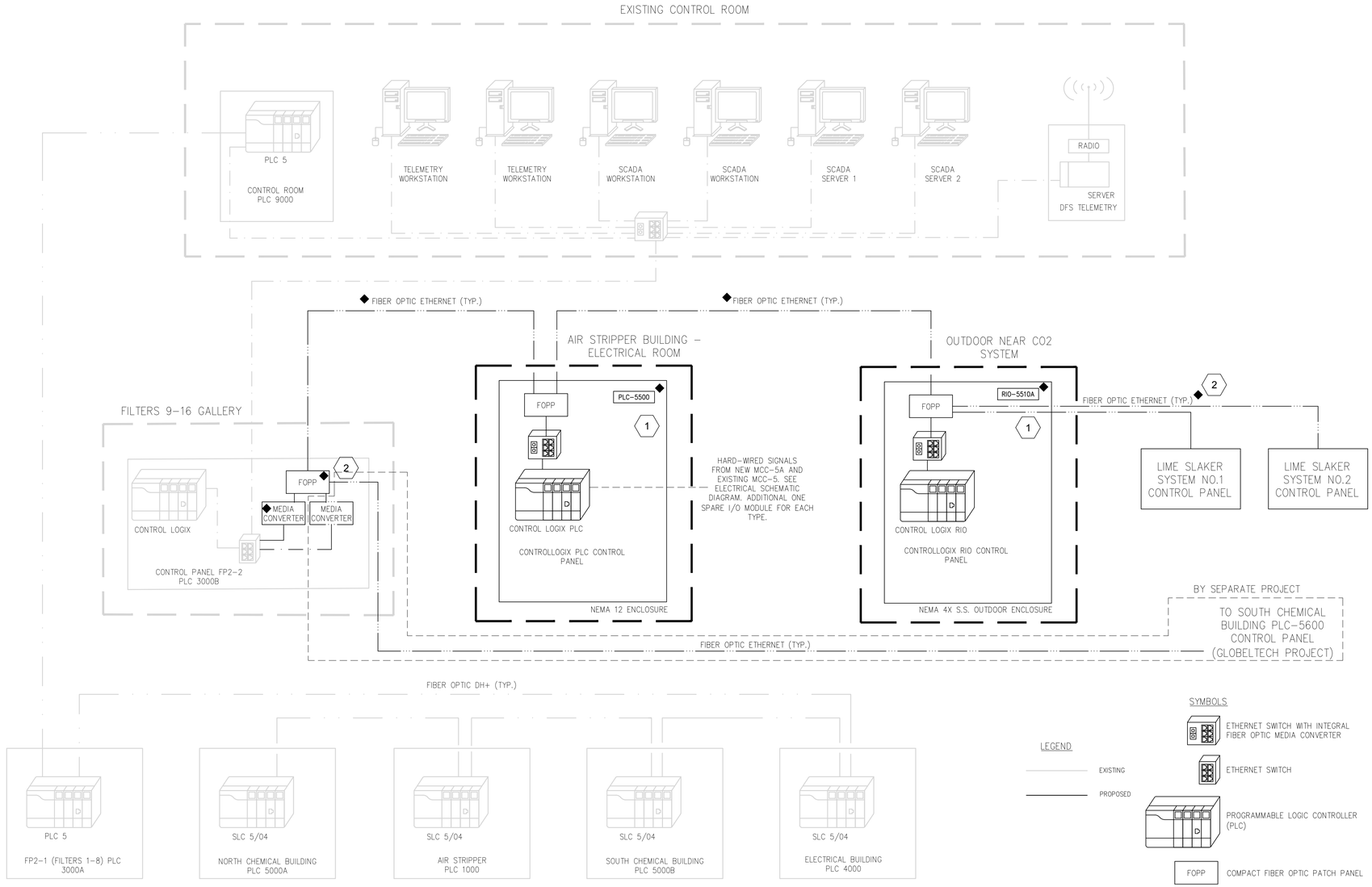
THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

PROJECT No: 11-4416.35

SHEET: I-1



KEYED NOTES:

1. CONTRACTOR SHALL FURNISH AND INSTALL NEW PLC PANEL (PLC-5500) AND RIO PANEL (RIO-5510A) AS SHOWN ON DRAWINGS. NEW PLC AND RIO SYSTEM SHALL BE ALLEN-BRADLEY CONTROLOGIX FAMILY AND I/O MODULE SHALL MATCH THE EXISTING. PROVIDE I/O FOR ALL SIGNAL SHOWN ON I&C DRAWINGS AND ELECTRICAL DRAWINGS. EACH NEW PLC PANEL OR RIO PANEL SHALL HAVE ADDITIONAL ONE I/O MODULE OF EACH TYPE AND ADDITIONAL 25 PERCENT SPARE POINTS PLUS 25 PERCENT CAPACITY FOR FUTURE EXPANSION. PROVIDE NEW PLC AND RIO PANEL WITH ALL NECESSARY POWER SUPPLIES, ANALOG AND DIGITAL INPUT AND OUTPUT CARDS, SURGE SUPPRESSION, TERMINAL STRIPS, INTERPOSING RELAYS, FIBER OPTIC PATCH PANEL, MEDIA CONVERTERS, ETHERNET SWITCH, PATCH CABLES, UPS, ETC. AS SHOWN ON DRAWINGS AND AS NEEDED FOR A COMPLETE AND FUNCTIONAL PLC AND RIO SYSTEM IN PLACE.
2. CONTRACTOR SHALL MODIFY THE EXISTING FILTER PLC PANEL AND FURNISH AND INSTALL NEW COMPONENTS TO EXTEND FILTER OPTIC COMMUNICATION TO NEW PLC AND RIO PANELS. MAKE ALL NECESSARY CONNECTIONS, TERMINATIONS, MODIFICATIONS, ETC. FOR A COMPLETE AND WORKING SYSTEM IN PLACE. FURNISH AND INSTALL NEW FIBER OPTIC CABLES, ETHERNET CABLES, POWER SUPPLIES, ETC.

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NO	DATE	REVISION	BY	NO	DATE	REVISION	BY
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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

COMMUNICATION BLOCK DIAGRAM

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: I-2

EXISTING SCADA

SLAKER FEEDER IN HAND MODE — YI SLK10A

SLAKER REMOTE FEED RATE SETPOINT — FRC SLK10

SLAKER FEEDER IN HAND MODE — YI SLK20A

SLAKER REMOTE FEED RATE SETPOINT — FRC SLK20

EXISTING RIO PANEL
(SOUTH CHEMICAL BUILDING - 1ST FLOOR)

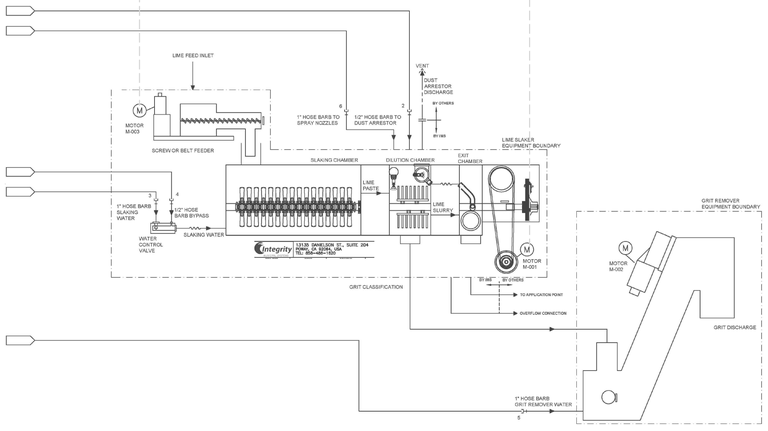
ADD NEW I/O POINTS AS NEEDED.

YI SLK10A — FRC SLK10 — A

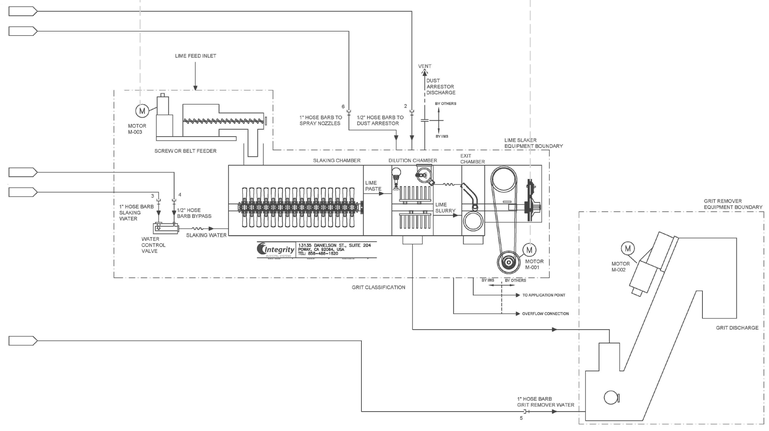
YI SLK20A — FRC SLK20 — A

EXISTING LIME SLAKER#1 CONTROL PANEL
(SLAKER MANUFACTURER TO MODIFY THE EXISTING PANELS)

EXISTING LIME SLAKER#2 CONTROL PANEL
(SLAKER MANUFACTURER TO MODIFY THE EXISTING PANELS)



EXISTING LIME SLAKER NO.1 SYSTEM



EXISTING LIME SLAKER NO.2 SYSTEM

P&ID - EXISTING LIME SLAKER SYSTEM
NOT TO SCALE

PRELIMINARY PLANS FOR REVIEW

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

P&ID - EXISTING LIME SLAKER SYSTEM

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

PROJECT No: 11-4416.35

SHEET: I-3

* LIME TRUCK UNLOADING PANEL

CONTROL POWER: ON-OFF (HS LTUP), ON (YL LTUP)

LIME SILO LEVEL STATUS: HIGH (YL LTUP), LOW (YL LTUP)

DUST COLLECTOR: MAN-OFF-AUTO (HS LTUP), ON (HS LTUP), FAULT (YL LTUP)

CONTROL STATUS

* SLAKING SYSTEM CONTROL PANEL

(TYPICAL OF TWO LIME SLAKER SYSTEM CONTROL PANELS)

POWER ON (HS SSCP)

CALIBRATION RESET (HS SSCP)

HORN SILENCE (HS SSCP)

RESET (HS SSCP)

EMERGENCY STOP (HS SSCP)

BATCH START (HS SSCP)

BATCH STOP (HS SSCP)

LIME SILO LEVEL (LI)

SLAKING TEMPERATURE CONTROLLER (INSIDE PANEL)

SLAKER WEIGHT INDICATING CONTROLLER (INSIDE PANEL)

AGING TANK WEIGHT INDICATING CONTROLLER (INSIDE PANEL)

HUMAN-MACHINE-INTERFACE (HMI)

SYSTEM AUTO CONTROLS: MAN-OFF-AUTO (PB SSCP), AUTO START (PB SSCP), MAN-OFF-SINGLE-MULTIPLE (PB SSCP), AUTO STOP (PB SSCP), RESIDUAL BUILDUP (AL SSCP)

TEKKEM SLAKER MIXER: ON (PB M), OFF (PB M), STATUS (YL M)

TEKKEM SLAKER INLET DAMPER VALVE: OPEN (PB V1), CLOSE (PB V1), STATUS (YL V1)

TEKKEM SLAKER DISCHARGE VALVE: OPEN (PB V6), CLOSE (PB V6), STATUS (YL V6)

TEKKEM SLAKER: FAULT (TAH TC), TEMPERATURE (TI TC)

TEKKEM SLAKER: FAULT (WAH WE), WEIGHT (WI WE)

FINE GRIT CLASSIFIER: ON (PB M), OFF (PB M), STATUS (YL M)

SLURRY AGING TANK MIXER: MAN-OFF-AUTO (PB M), ON (PB M), FAULT (YL M)

SLURRY AGING TANK: FAULT (WAH WE), WEIGHT (WI WE)

SLURRY LOOP PUMP: MAN-OFF-AUTO (PB M), STATUS (YL M), START (PB M), STOP (PB M)

SLURRY PUMP HIGH PRESSURE: FAULT (YL *)

BIN ACTIVATOR: ON (PB M), OFF (PB M), STATUS (YL M)

LIME FEEDER: ON (PB M), OFF (PB M), STATUS (YL M)

SLAKER FEED WATER VALVE: OPEN (PB V2), CLOSE (PB V2), STATUS (YL V2)

SLAKER WATER CLEANING VALVE #1: OPEN (PB V3), CLOSE (PB V3), STATUS (YL V3)

SLAKER WATER CLEANING VALVE #2: OPEN (PB V4), CLOSE (PB V4), STATUS (YL V4)

SLAKER DUST ARRESTOR VALVE: OPEN (PB V5), CLOSE (PB V5), STATUS (YL V5)

PUMP SEAL WATER VALVE: OPEN (PB V7), CLOSE (PB V7), STATUS (YL V7)

SOFTENER NO.1 DOSING ASSEMBLY: FLOW RATE (FI *), % OPEN (ZI *)

SOFTENER NO.2 DOSING ASSEMBLY: FLOW RATE (FI *), % OPEN (ZI *)

SOFTENER NO.3 DOSING ASSEMBLY: FLOW RATE (FI *), % OPEN (ZI *)

DUST COLLECTOR

LE/LIT SILO100

LIME STORAGE SILO

LSH

LSR

LSL

BIN ACTIVATOR

LIME FEEDER

LIME CHUTE (BY RDP)

1" TUBING (BY CONTRACTOR)

TEKKEM LIME SLAKER

V1 V2 V3 V4 V5 V6

SERVICE WATER (NOT BY RDP)

3" TUBING

3/8" TUBING (BY CONTRACTOR)

NOT BY RDP COMPRESSED AIR

1" TUBING (BY CONTRACTOR)

SLURRY AGING TANK

SERVICE WATER (NOT BY RDP)

SERVICE WATER (NOT BY RDP)

LIME SLURRY PUMP

PE2019018-904 LIME SLURRY LOOP

PE2019018-904 FINE GRIT CLASSIFIER

PE2019018-904 LIME SLURRY LOOP

MOTOR CONTROL CENTER (MCC) (NOT BY RDP)

(3)

NOTE: DEVICES MARKED WITH AN ASTERICK (*) INDICATES EQUIPMENT SUPPLIED BY RDP

TYPICAL FOR ONE SILO SYSTEM AND THERE WILL BE TWO SYSTEMS.

NOTE: THIS DRAWING REPRESENTS EACH OF TWO IDENTICAL SLAKING SYSTEMS

SEE NOTES ON DWG PE2019018-900

Revisions	Date

RDP TECHNOLOGIES, INC.

RDP–TEKKEM Slaking System P & ID

Riviera Beach, FL

Drawn: MJM | Appr.

Scale: None | Dwg.: PE2019018-903 | Date: 3-24-20

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NO	DATE	REVISION	BY

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

RDP LIME SYSTEM

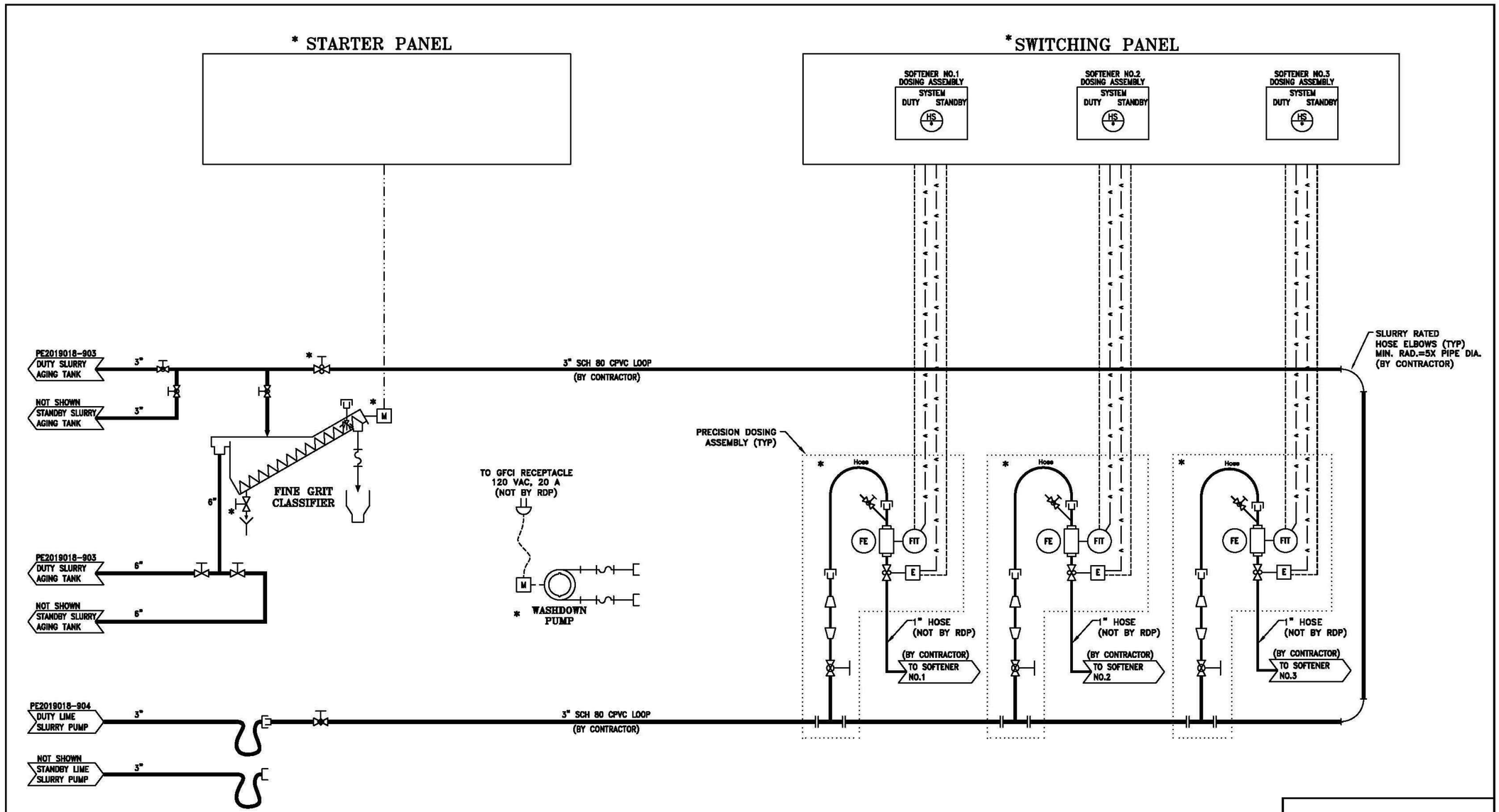
THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722

DATE: 3/6/2020

SCALE: AS SHOWN

PROJECT No: 11-4416.35

SHEET: I-5



NOTE: DEVICES MARKED WITH AN ASTERICK (*) INDICATES EQUIPMENT SUPPLIED BY RDP

SEE NOTES ON DWG PE2019018-900

Revisions	Date

RDP TECHNOLOGIES, INC.

RDP–TEKKEM Slaking System
P & ID

Riviera Beach, FL

Drawn	Appr.
MJM	

Scale	Dwg.	Date
None	PE2019018-904	3-24-20

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

LIME SLURRY LOOP FEED SYSTEM

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE	SHEET
AS SHOWN	I-6
PROJECT No	
11-4416.35	

EXISTING SCADA

NEW RIO-5510A PANEL ◆
(OUTDOOR NEAR CO2 SYSTEM)

C02 TANK LEVEL	C02 VAPORIZER HIGH TEMPERATURE ALARM	C02 VAPORIZER ON/OFF STATUS	C02 VAPOR HEATER HIGH TEMPERATURE ALARM	C02 VAPOR HEATER ON/OFF STATUS	C02 TANK LOW PRESSURE ALARM	C02 TANK HIGH PRESSURE ALARM	C02 TANK DISCHARGE PRESSURE	PH AT SOFTENER NO.1	PH AT SOFTENER NO.2	PH AT SOFTENER NO.3	BOOSTER PUMP#X START/STOP	BOOSTER PUMP#X IN AUTO	BOOSTER PUMP#X RUNNING	BOOSTER PUMP#X FAILED	LOW PRESSURE ACTIVE BOOSTER PUMP#X	PSF PANEL#X SOLENOID VALVE CONTROL
LI TK5510	TAH VP5510	QI VP5510	TAH VH5510	QI VH5510	PAL TK5510	PAH TK5510	PI TK5510	AI 9111	AI 9112	AI 9113	HS BP91X0	QI-A BP91X0	QI-B BP91X0	QA BP91X0	PSL BP91X0	SV BP91X0

(X=1,2,3)

PROVIDE AND INSTALL INTERPOSING RELAYS IN PLC/RIO PANEL FOR SOLENOID VALVE CONTROL.

BOOSTER ** PUMP STARTER#X (X=1,2,3)

H-O-A HS 91X0 | RUNNING QIL 91X0 | RESET HS 91X0 | GENERAL FAULT QAL 91X0

STARTER ON PUMP SKID BY SUPPLIER **

120V AIT 9111 / AE 9111 pH FOR SOFTENER#1

120V AIT 9112 / AE 9112 pH FOR SOFTENER#2

120V AIT 9113 / AE 9113 pH FOR SOFTENER#3

** CARBON DIOXIDE SYSTEM REFRIGERATION PANEL

** CARBON DIOXIDE SYSTEM VAPORIZATION PANEL

** CARBON DIOXIDE SYSTEM HEATER PANEL

** CARBON DIOXIDE SYSTEM REFRIGERATION PANEL

WIRING TO THE EQUIPMENT WITHIN THE STORAGE TANK CONTROL ENCLOSURE IS NOT SHOWN FOR CLARITY (TYP.)

PRESSURE RELIEF VALVE

DPIT TK5510 **

VERTICAL CARBON DIOXIDE STORAGE TANK

TK-5510

VAPORIZER

VAPOR HEATER

REFRIGERATION UNIT

PSL 5511 **

PSH 5511 **

PIT 5511 **

CARBON DIOXIDE GAS

I-8

CARBON DIOXIDE PSF PANELS

PI 91X0A ** | PI 91X0B ** | PSL 91X0 **

120V SV 91X0 SV 2" 2"

PLANT WATER

CARRIER WATER BOOSTER ** PUMP NO.X CWBP-91X0 X=1,2,3

NOTE: THREE BOOSTER PUMPS SETUP.

HILLERS ELECTRICAL ENGINEERING, INC.
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PRELIMINARY PLANS FOR REVIEW

NO	DATE	REVISION	BY	NO	DATE	REVISION	BY

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

P&ID - CARBON DIOXIDE SYSTEM

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: I-7

EXISTING SCADA

NEW RIO-5510A PANEL (OUTDOOR NEAR CO2 SYSTEM)

PFS#3	PFS#3	PFS#3	PFS#3
CARRIER WATER PRESSURE LOW ALARM	OPERATING INDICATION	INJECTION PH INDICATION	CO2 FLOW RATE FEEDBACK
PAL PF5523	QI PF5523	AI PF5523	FI PF5523

PFS#2	PFS#2	PFS#2	PFS#2
CARRIER WATER PRESSURE LOW ALARM	OPERATING INDICATION	INJECTION PH INDICATION	CO2 FLOW RATE FEEDBACK
PAL PF5522	QI PF5522	AI PF5522	FI PF5522

PFS#1	PFS#1	PFS#1	PFS#1
CARRIER WATER PRESSURE LOW ALARM	OPERATING INDICATION	INJECTION PH INDICATION	CO2 FLOW RATE FEEDBACK
PAL PF5521	QI PF5521	AI PF5521	FI PF5521

A

A

PRESSURE SOLUTION FEED PANEL No. 3 (PSF-3)

HAND-OFF-AUTO HS 5523B

CONTROL POTENTIOMETER HK 5523B

SYSTEM OPERATING QA 5523

pH DISPLAY/ CONTROLLER AIT 5523

FLOW DISPLAY/ CONTROLLER FIC 5523

LOW WATER PRESSURE PAL 5523

FIT 5523

FC 5523

PSL 5523

PROVIDED BY CARBON DIOXIDE SYSTEM MANUFACTURER

INSTRUMENT CABLE FURNISHED BY VENDOR & INSTALLED BY CONTRACTOR.

AE 5523

pH PROBE ASSEMBLY PANEL No. 3

X-X pH SAMPLE POINT No. 3

D PROVIDED BY CARBON DIOXIDE SYSTEM MANUFACTURER AT EXISTING SOFTENER NO.3

A

A

PRESSURE SOLUTION FEED PANEL No. 2 (PSF-2)

HAND-OFF-AUTO HS 5522B

CONTROL POTENTIOMETER HK 5522B

SYSTEM OPERATING QA 5522

pH DISPLAY/ CONTROLLER AIT 5522

FLOW DISPLAY/ CONTROLLER FIC 5522

LOW WATER PRESSURE PAL 5522

FIT 5511

FC 5511

PSL 5511

PROVIDED BY CARBON DIOXIDE SYSTEM MANUFACTURER

INSTRUMENT CABLE FURNISHED BY VENDOR. CONTRACTOR TO COORDINATE pH PROBE EXTENSION CABLE SPECIFICATIONS WITH CARBON DIOXIDE SYSTEM VENDOR. CONTRACTOR TO FURNISH AND INSTALL EXTENSION CABLE.

AE 5511

pH PROBE ASSEMBLY PANEL No. 2

X-X pH SAMPLE POINT No. 2

D PROVIDED BY CARBON DIOXIDE SYSTEM MANUFACTURER AT EXISTING SOFTENER NO.2

A

A

PRESSURE SOLUTION FEED PANEL No. 1 (PSF-1)

HAND-OFF-AUTO HS 5521B

CONTROL POTENTIOMETER HK 5521B

SYSTEM OPERATING QA 5521

pH DISPLAY/ CONTROLLER AIT 5521

FLOW DISPLAY/ CONTROLLER FIC 5521

LOW WATER PRESSURE PAL 5521

FIT 5521

FC 5521

PSL 5521

PROVIDED BY CARBON DIOXIDE SYSTEM MANUFACTURER

PH PROBE WILL BE INSTALLED NEAR WALKWAY OF SOFTENER UNIT AND PSF SKID WILL BE INSTALLED AT THE GROUND LEVEL. PROVIDE A MINIMUM OF 75 FEET OF PH SENSOR CABLE FOR EACH INSTALLATION.

PROVIDE AND INSTALL SUNSHIELD AND MOUNTING STAND ON HANDRAIL. TYPICAL OF THREE.

AE 5521

pH PROBE ASSEMBLY PANEL No. 1

X-X pH SAMPLE POINT No. 1

D PROVIDED BY CARBON DIOXIDE SYSTEM MANUFACTURER AT EXISTING SOFTENER NO.1

I-10 INJECTION POINT SOFTENER NO. 3

I-10 INJECTION POINT SOFTENER No. 2

I-10 INJECTION POINT SOFTENER No. 1

CARBON DIOXIDE GAS I-08

PLANT WATER

FIELD PIPING BY CONTRACTOR (TYP.)

PLANT WATER

LEGEND

FIELD PIPING BY CONTRACTOR

PROVIDED BY CARBON DIOXIDE SYSTEM MANUFACTURER

PRELIMINARY PLANS FOR REVIEW

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

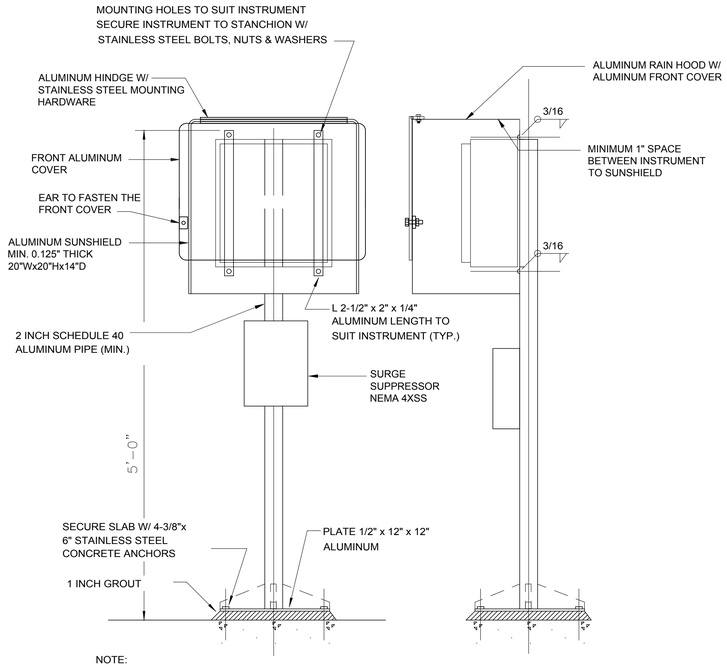
PRESSURE SOLUTION FEED SYSTEMS

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN

PROJECT No: 11-4416.35

SHEET: I-8

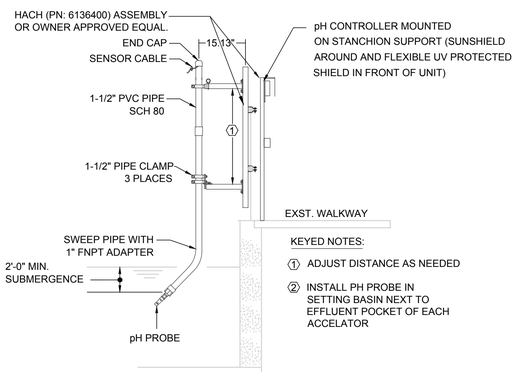


NOTE:
1. ALL EXPOSED EDGES TO BE GROUND SMOOTH AND BURR FREE.
2. PAINT ALL ALUMINUM IN CONTACT WITH CONCRETE WITH TWO COATS OF BITUMASTIC PAINT.
3. PROVIDE SPD FOR ALL FIELD INSTRUMENTS.

1 VAR.

STANCHION SUPPORT FOR CASE MOUNTED INSTRUMENTS

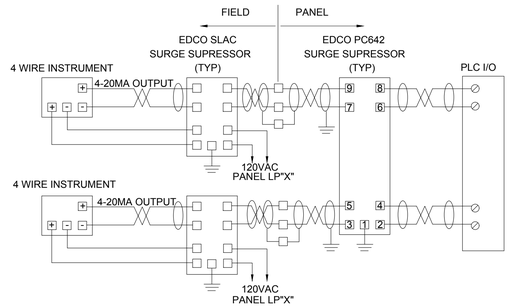
NOT TO SCALE



2 VAR.

SUBMERSION pH PROBE MOUNTING DETAIL

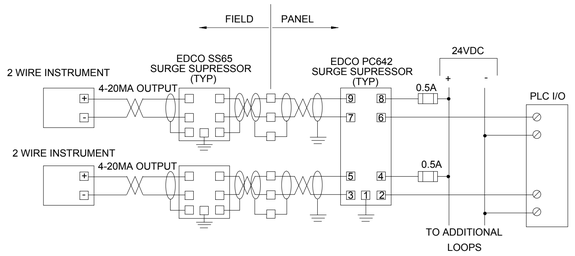
NOT TO SCALE



3 VAR.

TYPICAL 4 WIRE INSTRUMENT ISOLATOR

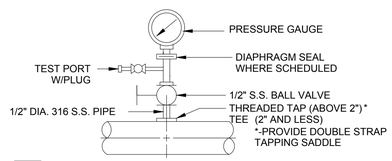
NOT TO SCALE



4 VAR.

TYPICAL 2 WIRE INSTRUMENT ISOLATOR

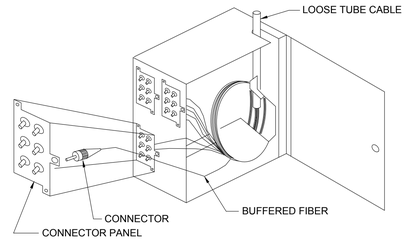
NOT TO SCALE



5 VAR.

PRESSURE GAUGE, INSTRUMENT OR SWITCH

NOT TO SCALE



6 VAR.

FIBER OPTIC PATCH PANEL DETAILS

NOT TO SCALE

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RIVIERA BEACH LIME IMPROVEMENTS

PALM BEACH COUNTY, FLORIDA

INSTRUMENTATION DETAILS

THEIN WIN, P.E.
STATE OF FLORIDA PROFESSIONAL ENGINEER
LICENSE No. 65722
DATE: 3/6/2020

SCALE: AS SHOWN
PROJECT No: 11-4416.35
SHEET: I-9

RDP TEKKEM™ SLAKING SYSTEM

TECHNICAL PROPOSAL

FOR

PROJECT NUMBER 153934

And

April 15, 2019

TABLE OF CONTENTS

EXECUTIVE SUMMARY

A. This proposal includes a complete lime slaking system which consists essentially of a Bulk Lime Storage Silos, Lime Feeders, Lime Slakers, Slurry Aging Tanks, Fine Grit Classifier, Slurry Pump and Delivery System, System Control Panels, Lime Truck Unloading Panels and Performance Test. Certain items are excluded from this proposal. These items are listed in Section 3 of this proposal.

B. The Tekkem™ Slaking system is a fully automatic low maintenance method of slaking lime. The Tekkem™ Slaker is protected by U.S. patent #5,746,983, 7,416,673, 8,133,401, 9,023,312, 9,650,293 and 9,688,547. The system will operate at extremely high temperatures and produce a constant slurry using fully automatic operation and control. As part of the Performance Test, Section 2 part 3.03, a 72-hour performance will be conducted.

C. The Slaker and slurry aging tanks are in contact with water. These tanks will be provided in 304 stainless steel.

D. The Bulk Lime Storage Silos will have a bottom skirt to enclose the equipment. The skirt interior will be provided with lights, heater, ventilation fan and motorized damper.

E. The System Control Panel will include a human-machine graphical interface for use in controlling and accessing information regarding the system. The panel will include an Allen-Bradley CompactLogix programmable controller, which can be connected to a plant wide control and monitoring system. The panel will include a modem that would allow RDP to modify or adjust the operation of the system from our facility in Pennsylvania.

F. The panels will include all required motor starters for the equipment furnished. Both panels will be U.L. listed and approved.

G. This proposal includes description of materials, construction details, programing and drawings that involve extensive experience, design, knowledge as well as time to prepare. RDP's proposals represent a considerable amount of investment in developing RDP's intellectual property. The contents of this proposal are offered exclusively for your evaluation of our system. The details of RDP's intellectual property, methods and trade craft techniques shall not be shared with third parties, including our competitors and shall not be used on other projects. The recipient, by accepting this material acknowledges such confidential status and agrees to retain this document and the contents, within its own organization, and further agrees not to reproduce or disclose to third parties, or allow this material to be used by anyone for any other project, without written permission from an officer of RDP Technologies, Inc.

PART 1 GENERAL

1.01 WORK OF THIS SECTION

A. The WORK of this Section includes providing a complete lime slaking system. The system will include the Lime Storage Silos, Lime Feeders, Lime Slakers, Slurry Aging Tanks, Fine Grit Classifier, Slurry Pumps and Delivery System and complete electrical controls and instrumentation as described herein.

B. The Tekkem™ Slaking System is furnished by RDP Technologies, Inc. who shall be responsible for the overall performance of the System and all components. The Process is covered under U.S. Patents 5,746,983, 7,416,673, 8,133,401 B2, 9,023,312 B2 and other U.S. Patents and Patent Pending. As such, a License Agreement shall be provided to the Owner, after receipt of final payment to RDP Technologies. The License Agreement shall be provided without charge to the owner.

C. The WORK also requires that one System Supplier be made responsible for furnishing the WORK of this Section, but without altering or modifying the CONTRACTOR'S responsibilities under the Contract Documents.

D. The WORK also includes coordination of design, assembly, testing and installation.

1.02 RELATED SECTIONS

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, will also apply to the extent required for proper performance of this WORK.

1. Section 03001: Concrete
2. Section 15050: Basic Mechanical Materials
3. Section 15140: Supports, Anchors and Seals
4. Division 16: Electrical

1.03 CODES

A. The WORK of this Section will comply with the current editions of the following codes:

1. Uniform Building Code
2. National Electrical Code

1.04 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

1. Commercial Standards:

ASTM A 36	Specification for Structural Steel
ASTM A 283	Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars
AISI 8620	Alloy Steel, Hot Rolled and Cold Finished
ASTM A48	Iron Castings
SSPC-SP No. 6	Commercial Blast Cleaning
ANSI/ASME B20.1	Safety Standards for Conveyors and Related Equipment

2. System Supplier's Standards:

Conveyor Equipment System Suppliers Association (CEMA) standards

American Gear System Suppliers Association (AGMA) standards

Institute of Electrical and Electronics Engineers (IEEE) standards

National Electrical System Supplier's Association (NEMA)

3. The following service factors will be applied:

Pumps	1.0
Mixers	1.25

4. Bearings, unless otherwise noted or required, will have a minimum L-10 of 5 years or 20,000 hours. Continuos service equipment units (pumps, mixers, etc.) will have a bearing life of 60,000 hours (L-10).

1.05 SHOP DRAWINGS AND SAMPLES

A. The following will be submitted:

1. Catalog cut sheets containing descriptive information and drawings of equipment and their components.

2. Submittal drawings including capacities and sizes, anchor bolt plan, parts nomenclature, material list and outline dimensions.

3. Drive and motor sizes and specifications.

4. Design loading to be transmitted to foundation or supports.

5. Electrical drawings including panel arrangement drawings, catalog cuts, wiring diagrams, and a P&ID diagram for the entire system.

6. Electronic or hard copies of the system PLC program will not be provided as it embodies the proprietary control features which are patented.

1.06 OWNER'S MANUAL

A. The following will be included in the OWNER'S MANUAL in compliance with the specifications: Three copies of operation and maintenance manuals will be provided.

1. Technical manuals and spare parts lists.

2. Instructions for field procedures for erection, adjustments, inspection, and testing.

3. Certification that the equipment complies with requirements.

1.07 SERVICES OF SYSTEM SUPPLIER

A. An authorized service representative of the System Supplier will visit the site and provide the following services. A total of 10 days of field service will be provided as described herein.

1. Installation of the equipment for two [2] day.

2. Inspection, checking, and adjusting the equipment for two [2] days.

3. Startup and field testing for proper operation six [6] days.

1.08 SYSTEM SUPPLIER

A. The System Supplier will have a minimum of (20) batch type Slakers that utilize a load cell based direct weight measurement operating system and the requirements of this specification. The Slaker manufacturer will provide written list of contact names at both the Engineer and the Owner of each of the 20 installations. The lime slaking system and all related controls described in this section will be the product of a single System Supplier and will be as manufactured by RDP Technologies, Inc. No alternates will be accepted or considered.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN

A. The Slakers utilize direct weight measurement. The Slakers will be sized to allow the solid-liquid phase slaking reaction to run until the slaking reaction is complete and the slaking temperature is reached. The slaking temperature is defined as the point in time when the temperature is no longer increasing, without drowning the reaction by premature or excessive water addition, and is at least 5 minutes after the end of lime addition.

B. The Slakers will be capable of processing the specified quantity of quicklime and designed to operate within 5° F of a predetermined temperature set point, which is selected from within the range 185° - 195° F, automatically adjusting to changes in the initial water temperature and variations in lime quality, without operator input.

C. After the slaking reaction is completed, the Slaker will dilute the slurry to a predetermined concentration set point, selected within the range of 10% to 20%, utilizing the direct weight measurement of lime and water via the load cells. The slurry concentration will be within + or – 0.5% point of the set point (i.e. 9.5% - 10.5% for a 10% slurry concentration setting).

D. Continuous Slakers will not be accepted as meeting the design requirement. Slakers that control operation by monitoring power draw, level sensors, integral auxiliary water heaters and manual operator adjustment will also not be accepted.

E. The Lime Slaking System will be designed to receive minus 1/4” ground quicklime, delivered by bulk pneumatic trucks and shall store the quicklime in the Bulk Storage Silos. The minimum available calcium oxide content will be 93%. The system will discharge the quicklime at a controlled rate without bridging, clogging or flooding of the lime Slaker. The Slakers will control the reaction of quicklime and water in order to provide a hydrated lime slurry at the specified

concentration and quantity. The Slurry Aging Tanks will store the hydrated lime slurry for pumping by the lime slurry pumps.

F. The Bulk Lime Storage Silos will be designed to store the volume of lime specified. The System Supplier will demonstrate by submission of calculations that the silo meets the required capacity.

G. The Slurry Aging Tank swill provide the specified storage volume. The System Supplier will demonstrate by submission of calculations that the slurry tank meets the required capacity.

2.02 EQUIPMENT SCHEDULE

A. Two (2) Storage Silos will be designed for local Seismic and wind velocity with and a roof load of 30 pounds per square foot for storage of free-flowing quicklime at a compacted bulk density of 65 pounds per cubic foot in accordance with ANSI/ASCE 7088. Total approximate usable storage capacity of each Silo will be 90 tons of quicklime based on an aerated density of 55 pounds per cubic foot bulk density. Design for working pressure of 0.25 psi and 0.03-psi vacuum. The silo will be 14 feet in diameter with an overall height as shown on the contract drawings. A pulse-jet type Dust Collector will be provided for mounting on top of the silo. The collector will have a filter area of no less than 340 square feet of polyester filter media and provided with a 3 HP motor. The bottom of the Silo will be fitted with a 6-foot diameter Bin Activator having a 3 HP motor.

B. Two (2) Lime Feeders will each be capable of providing a minimum of 5,200 pounds per hour of quicklime to the Lime Slaker. The Feeder's construction will be carbon steel. The motor will be 2 HP.

C. Two (2) Lime Slaker will each be capable of slaking 1,000 pounds per hour of hydrated lime at a 10% hydrated lime concentration and 2,000 pounds per hour at a 20% concentration. The Slakers construction will be 304 Stainless Steel with a 2-B finish. The slaker mixer motor will be 5 HP. Slaker components will require 15 CFM at 90-PSI plant air and an 85 GPM water supply.

D. Two (2) Slurry Aging Tank will store 1,000 gallons of lime slurry. The tank's construction will be 304 Stainless Steel with a 2-B finish. The Mixer motor will be 3 HP.

E. One (1) Fine Grit Classifier will be provided to separate grit form the slurry loop. Wetted components will be 304 SST. The Classifier will be provided with a 1 HP motor.

F. The Lime Slurry Pumps will be capable of pumping 10% to 20% lime slurry at a rate of 120 gallons per minute at 85 TDH. The pump motor will be 15 HP. The

Lime Delivery System will be designed to dose 1,320 pounds per hour of hydrated lime at a 10 % slurry concentration.

G. Protective coatings for equipment will be as described above and described further. Motors, reducers, bearings, etc. incorporated into the equipment will be provided with the manufacturers standard coating system.

2.03 LIME STORAGE SILOS

A. The Lime Storage Silos will be one piece, welded commercial quality steel construction, and skirt supported. The overall height will be as shown on the drawings. Storage silo to be of all welded construction. All Silo accessories will be mounted by the CONTRACTOR. The accessories will be wired by the ELECTRICAL CONTRACTOR to ensure compliance with local codes for wiring, conduit and distribution.

The foundation anchors will be the epoxy type whose size will be recommended by the System Supplier and supplied by the CONTRACTOR.

The Silo exterior and skirt area will be sandblasted to SSPC-SP 6 followed by one coat of Sherwin-Williams epoxy primer at 2.0 to 2.5 mils D.F.T. The interior of the Silo will be mill finished; without sandblasting or painting.

B. A mill finish aluminum access ladder, cage and landing platform(s) will be included for access to the top of the silo from the grade. Ladder and cage will be in accordance with OSHA. Provide aluminum grating on the landing platform. The ladder will be shipped loose and installed by the CONTRACTOR.

C. The top of the silo will include a center flanged opening for the target box, no smaller than 14 inches O.D., and a hillside flange for the dust collector. A PVR valve and 20 inch diameter manway will be provided. The perimeter of the Silo will be provided with a 42” high, two-rail, aluminum, mill finished handrail. The railing will be bolted to the Silo and include a 4” high aluminum kick plate. The handrail will be shipped loose and installed by the CONTRACTOR.

D. The top of the silo will have a slope of 10^{o} and will be covered with a non-skid surface.

E. Three bin level indicators will be provided and will be located next to the ladder; high, reorder and low levels. The storage capacity between the reorder and the high levels will be adequate to store a 25-ton delivery. Bin level indicators will be operated on 120 volt single phase power. Provide flange openings, gaskets, and zinc plated fasteners as well as interior protection shields constructed of carbon steel. The indicators will be shipped loose and installed by the CONTRACTOR.

F. The skirted portion of each Storage Silo will have the following accessories:

1. One (1) 5 kW unit heater rated at 400 CFM and 17,100 BTU per hour with one (1) SPST built-in thermostat for a temperature range of 45° to 90°F. The heater will be horizontally mounted with mounting hardware and will be 480 volt, 3 phase, 60 Hz.

2. One (1) motorized damper, aluminum frame, with overall 23 inch square opening and suitable for 115 volts, 1 phase, 60 Hz. Interlock the motorized damper with the shutter mounted exhaust fan.

3. One (1) painted steel bird screen for the motorized damper opening.

4. One (1) shutter mounted exhaust fan rated at 1625 CFM (free air) with 18-inch diameter aluminum fan blades protected by a guard with silver metallic vinyl finish. The fan will be mounted in a 19-inch square opening. The separate wall mounted SPDT thermostat will be suitable for 115 volt, 1 phase, 60 Hz service.

5. One (1) double door opening at each level, each door will be 3 feet wide by 6 feet 8 inches high.

6. Three (3) 100 watt incandescent light fixtures, wall mounted, vapor tight.

7. The Storage Silos will be provided with an equipment platform integral to the skirt. The grating will be provided as rectangular bar type IB8 by IKG.

8. One (1) Air Compressor will be provided, of the two stage design, and will operate on 460 VAC 3 phase with a 5 HP motor. The unit will have a splash lubricated cast iron compressor and a finned intercooler, a safety relief valve and pressure control, pressure switch and a filter regulator. The compressors capacity will be 14 CFM at 175 psi, with an 80 gallon vertical receiver, as provided by Ingersoll Rand. An Automatic Programmable Electric Drain Valve will be provided for each receiver that will operate on 120 VAC, for field connection the compressor receiver. A refrigerated dryer will provided for each compressor, 1/2 HP, R-22 with an integral re-heater to produce a 38º F pressure dew point, and will have a capacity of 25 CFM at 120 psi. The dryers will operate on 120 VAC, as provided by Ingersoll Rand.

9. Power required for all silo skirt accessories will be provided by the MCC.

All of the above will be shipped loose for installation and wiring by the ELECTRICAL CONTRACTOR.

G. The storage silo fill pipe will be a 4 inch, Schedule 40 steel with 90^{o}, 4 foot radius long sweep elbows. The storage fill pipe will be at the target box on top of the bin. The storage bin fill pipe will be located no further than 4 feet from the unloading control panel. The fill line will be provided with a dust cap and limit switch assembly to control the operation of the dust collector. The limit switch will be NEMA 4.

H. A special inlet target box will be mounted on top of the silo and will reduce the velocity of the lime being conveyed and allow it to drop into the storage silo in an even pattern. A removable cap will be provided on the target box to provide access for cleaning of the conveying pipe and will have a removable top lid. The target box will be minimum 1'-2" diameter x 2'-2" high. The fill pipe and target box will be shipped loose and installed by the CONTRACTOR.

I. A complete pulse-jet bin vent filter will be furnished as shown on the plans/or listed in the equipment schedule. The system will contain product within the bin or silo while discharging air displaced by product filing the storage device. The filter system will operate at an air-to-media ratio of 3:1. The model number shall indicate the quantity of filter cartridges. The filter will be provided either as an insertable model for minimum headroom applications or as a plenum model.

The Torit Bin Vent will be furnished complete with filter cartridges, cleaning system hardware, installation and maintenance manual and replacement parts list.

The Torit Bin Vent will be bolted and welded construction using 12 gauge HRS complete with pulse jet pipework, ¾” diaphragm valves and blowpipes, pilot solenoid valves, 4” square x 3/16” wall tubing compressed air manifold, venturis to enhance cleaning, and a top service door with prop brackets and safety latch. Filter replacement shall be performed without tools. The compressed air connection shall be 1” NPT for attachment of clean and dry compressed air at 90-100 PSIG and at a temperature not exceeding 150°F.

Filter cartridges shall be supplied per the attached specification. The filter cartridges will be preassembled in a vertical configuration, serviced from outside on the top of the unit and on the clean side of the filter.

Product entrained in the storage container while filling will enter at the bottom of the tilter and collect on the outside surface of the filter cartridge. Clean air will pass through the filter media and escape through the back of the filter or through an optional exhaust fan.

The collector cleaning system will be controlled by a solid state printed circuit cleaning control.

The cleaning control will progressively energize pilot solenoid valves, which cause the corresponding diaphragm valve to send a pulse of 90-100 PSIG supply compressed air into the blowpipe. The pulse will be discharged from the air manifold through the diaphragm valves, through the blowpipe, into the filter venturis, and into the filter cartridge, discharging product from the media surface. Product will fall into the storage container.

The collector will be a Torit Model TBV pulse-jet bin vent filter as manufactured by Donaldson Company, Inc.

The Dust Collector and gaskets will be shipped loose. Installation and air supply shall be provided by the CONTRACTOR.

J. One Bin Activator of the vibrating type will be provided and mounted on the opening of the storage silo. The bin activator shall eliminate bridging, jamming, segregation, ratholing, and will insure a positive continuous flow of chemicals on a first-in, first-out basis. The bin activator will have a minimum 8-inch diameter plain opening at the discharge.

The Bin Activator will have a gyrated type hopper with eccentric weights mounted so that vibration is applied perpendicular to the channel flow.

The vibrating bottom will be hung from the bin with rubber-bushed steel hangers and connected to the bins with reinforced butyl sleeve so that no vibrations are transmitted to the bin.

Vibration will be generated by a motor-driven eccentric type oil lubricated gyrator. Motor enclosures shall be TENV. The bin activator will run continuously during the feed cycle. The discharge spout shall be fitted with a flex connection suitable for connection to the screw feeder. The activator will be provided with manufacturer's standard shop finish paint.

The Bin Activator and gaskets will be shipped loose to be installed by the CONTRACTOR.

2.04 LIME FEEDERS

A. The Lime Feeder equipment includes all equipment, supports and appurtenances necessary for the operation of the Feeder. The Feeder will be shipped loose and installed by the CONTRACTOR. This includes, but is not limited to, the Drive Unit, Inlet Flexible Connector, Maintenance Gate, Discharge Chute and supports.

B. The Lime Feeders will be designed to convey capacity specified in Part 2.02 and installed as shown on the drawings.

C. The screws will be a minimum of 6 inches in diameter mounted in a fully enclosed casing. The screw, casing and all materials will be as specified in Part 2.02.

D. Tail bearings will be of the flanged external ball bearing type with grease fitting. Provide external lip type plate seal.

E. The Feeders discharge chute will isolate the screw feeder from the slaker and load cell assembly. The cover of the Feeder will also be provided with a plug switch to detect a plugged condition and stop the Feeder.

F. The Feeders will include a motor, which will be directly connected to the speed reducer. The speed reducer will be directly connected to the feeder screw. The drive will SEW Euro drive's standard F series. The motor horsepower will be the minimum size specified in Part 2.02.

G. All steelwork will be sandblasted to SSPC-SP6, followed by one coat of Tnemec 66-1211 Epoxy Primer at 3.0 to 5.0 mils D.F.T. Intermediate and finish painting shall be done in the field by the CONTRACTOR.

2.05 TEKKEM LIME SLAKER ASSEMBLIES

A. The Slaker tanks will be sized to provide the capacity specified in Part 2.02 and as shown on the drawings. The Slakers will be shipped loose and installed by the CONTRACTOR. The tank will be self supporting on the load cell assembly and will be shipped complete with all accessories specified. Materials of construction will be as specified in Part 2.02. All connections to the Slakers will be as specified by the System Supplier in order to allow for the load cell system to operate properly.

1. The tanks will include a Bray Series 30 cast iron, air operated inlet damper butterfly valve, which will automatically open and close upon the start and completion of the lime addition cycle. The inlet damper will be controlled by an air operated control valve. The inlet damper will be installed and tested by the System Supplier prior to shipment.

2. The tanks will be furnished with an access opening located on top of the unit. The access opening will be complete with a cover, which will fit securely over the opening. The cover will be gasketed to contain steam and dust.

3. The bottom of the tanks will include a Bray Series 30 cast iron; air operated discharge butterfly valve, which will automatically control the draining of the tank. A separate drain opening will be provided for maintenance and cleaning of the tank.

4. The tanks will include a dust arrestor, which will be located either externally on the tank wall or internally directly beneath the access opening. The dust arrestor will have a minimum 3" opening to remove the dust from the tank. The dust arrestor will include two separate spray nozzles to quench the steam and remove the dust from the tank. The dust arrestor will be provided with a solenoid valve, which will automatically control the operation of the unit.

5. The tanks will include a wash down system consisting of multiple spray nozzles, which will clean the inside of the tank both during water addition for the initial slaking step and the dilution step as part of each batch of lime slurry produced.

B. The tanks will include a mixer assembly, which will be mounted and tested by the System Supplier prior to shipment. The mixer assembly will be SEW Eurodrive's standard SA series and consist of a motor directly connected to a right angle speed reducer. The speed reducer will be oil lubricated and directly connected to the mixer shaft assembly.

C. The tanks will be mounted on a special Kistler Morse LD3 series load cell assembly, which will weigh the tank contents and control the operation of the slaking and dilution process. The assembly will consist of three load cells as part of the support assembly. The System Supplier will make all final adjustments to the weighing assembly prior to the system being placed in to operation.

D. The tanks will include a temperature sensor consisting of a type K thermocouple assembly installed in a stainless steel thermowell located at the bottom of the tank. The temperature sensor will provide a continuous indication of the slaker temperature, which will be used to automatically adjust the slaker operation in order to maintain a constant slaking temperature.

E. The Slaker will be provided with a Washdown Pump. The Washdown Pump is provided for periodic maintenance cleaning of Slaker, Slurry Aging Tank and Fine Grit Classifier. Maintenance cleaning will be a manual process, requiring the Operator to add the required chemicals and initiate the acid cleaning routine via the System Control Panel. The pump will be provided with a 1/2 HP motor and will provide 8 GPM at a 20 psig. The pump will be provided with a 120 volt plug and caddy to move the pump from each piece of equipment when cleaning.

F. The solenoid valves air operators for the devices described above will be shipped loose for mounting by the CONTRACTOR to a mounting frame provided by the System Supplier. The frame shall be located above the Slaker such that electrical devices will be isolated from the slaking operation. The CONTRACTOR shall also provide and install Stainless Steel piping and flexible tubing from these

devices to the manifolds and valves located at the Slaker. The water and air supply piping will be provided by the CONTRACTOR.

2.06 FINE GRIT CLASSIFIER

A. The hopper and trough of the unit shall be fabricated of 10 gauge, 304 SST and configured as shown on the drawings. An overflow and weir shall be provided for overflow and return to the Aging Tanks. An adjustable baffle shall also be provided to adjust the settling area and the grit size removal.

B. The auger shall be of the sectional flight type 3/16 inch thick, 304 SST. The flighting shall be half pitch. The flights shall be 5 inches in diameter and directly connected to the drive unit.

C. The trough shall be 10 gauge, 304 SST. A trough cover shall be provided at the incline of the unit and shall be 14 gauge also 304 SST.

D. The conveyor shall be supported by steelwork of angle construction, made of 304 SST as shown on the drawing.

E. The conveyor shall be provided with a flange-mounted gearmotor. The motor shall be 480 volt, 3 phase.

2.07 SLURRY AGING TANKS

A. The Slurry Aging Tanks will be provided to store and age the lime slurry as required. The tanks will be shipped loose and installed by the CONTRACTOR. The slurry tanks will be sized to provide the capacity specified in Part 2.02 and as shown on the drawings. Materials of construction will be as specified in part 2.02

1. The tank will be furnished with an access cover located on top of the unit. The cover will be gasketed to contain steam and dust.

2. The bottom of the tank will include a flange connection for the slurry pump. A separate drain opening will be provided for maintenance and cleaning of the tank.

B. The tanks will include a mixer assembly, which will be mounted and tested by the System Supplier prior to shipment. The mixer assembly will consist of a motor directly connected to a speed reducer. The drive will be the APD-Series provided by Cleveland Mixer with a helical reducer and Marathon motor. The motor horsepower will be the minimum size specified in Part 2.02.

C. The tanks will be provided with a single Kistler Morse LD3 series load cell, which will monitor the tank weight and provide a continuous level signal. The System Supplier will make all final adjustments to the monitoring components prior to the system being placed in to operation.

2.08 SLURRY PUMP AND SLURRY DELIVERY SYSTEM

A. Two (2) Lime Delivery Systems will be provided each to deliver up to 1,320 pounds per hour of calcium hydroxide to the Softeners 1, 2 and 3 basin. The System will operate through a common, continuous 3" feed loop being pumped at a rate of 120 GPM from which either RDPrecision Dosing Assemblies will draw from. The system will consist of the following:

1. One (1) slurry pump mounted adjacent to each Slurry Aging Tank will be provided. Each pump will be capable of pumping 120 GPM at 85 ft. TDH. The pump will be a Weir Horizontal Rubber Lined Slurry Pump. The pumps will be powered by a 15 HP, 480 V, 3 phase motor through a V-Belt drive. The pump seals will require seal water.

B. Atop each Softener one (1) RDPrecision Dosing Assemblies will be provided and each consists of the following.

1. One (1) 1" Badger Meter, M Series non-contacting flow meter. The flow meter will be the wafer type and provide a 4-20mA signal back to the Slaking System Control Panel.

2. One (1) 1" electrically actuated pinch valve. The valve will be an RDP series CER to infinitely adjust or shut off the flow of lime to the mixer basin. The valve will receive a 4-20 mA signal from the Slaking System Control Panel. The valve will be provided with an integral base, which will anchor directly to the mixer basin wall.

C. The CONTRACTOR shall be responsible for providing and installing the 3" CPVC slurry loop piping and Goodyear XLPE industrial hose transitions and installing only the pumps and Lime Delivery Assembly.

D. The System Supplier will provide a Lime Delivery Assembly mounted at the delivery point. The slurry piping and valving not described above, from the Pump to the Lime Delivery Assembly shall be provided by the CONTRACTOR.

2.09 SLAKING SYSTEM CONTROL PANELS

A. A single control panel will be furnished to control the operation of each slaking system. The panels will be manufactured in a UL approved shop. The panel will

be inspected, approved and labeled prior to shipment in accordance with UL 508 requirements. The panels will be shipped loose and installed by the CONTRACTOR.

B. The panels will be a single NEMA 4X, 304 stainless steel enclosure and will be provided to control all motors, valves, switches and control functions for the Lime Slaking System equipment and provide proper interlocking of the equipment.

C. The control panels will provide the following functions:

1. On/off control and starter for each electric motor
2. Slaker Temperature set point and actual temperature
3. Status of all valves, motors and electrical devices

D. A Human-Machine-Interface (HMI) will be mounted on the face of the control panel. The HMI will be an Allen-Bradley Panelview Series 7. The System PLC will be the Allen Bradley CompactLogix processor, programmed using ladder logic. Equipment control, both automatic and manual, will be via the HMI and PLC. In the Manual Mode, each piece of equipment will be independently controlled without interlocks to other equipment (except personnel and equipment safety). In the Automatic mode, each piece of equipment will be interlocked for completely automated slaking routines.

E. Each Panel will be provided with a Fiber Optic Patch Panel.

F. A separate Switching Panel will be provided to alternate control of the common Dosing Assemblies to the active/operating Slaking System Panel.

G. A modem to allow remote access to the PLC, via a telephone line, will be provided.

2.10 LIME TRUCK UNLOADING CONTROL PANELS

A. Two (2) Lime Truck Unloading Panels (LTUP) will be provided, to control the operation of the lime truck unloading system and provide proper interlocking of the equipment. The control panel will be manufactured and assembled in a UL registered shop. All components (relays, breakers, pilot devices etc.), wiring and labeling will be the System Suppliers standard to meet UL requirements. These components may or may not be in accordance with the GENERAL ELECTRICAL requirements of these specifications. Prior to shipment, all control panels will be inspected, approved and labeled in accordance with UL 508A requirements. The control panel will be furnished by the System Supplier and installed by the CONTRACTOR.

B. The Lime Truck Unloading Panels (LTUP) will provide the following functions:

1. Hand-Off-Auto control of the dust collector fan motor.

2. Level indication and alarm.

C. The lime filling station is utilized to facilitate the loading of lime into the silo. An independent contractor shall deliver lime from a bulk truck that utilizes its own pneumatic delivering system. The truck will connect to the "EVER-TITE" cast iron adapter on the fill pipe. When the cap is removed from the fill pipe it will initiate the operation of the dust collector.

D. The removal of the cap on the fill pipe moves the limit switch, which initiates the operation of the dust collector. The dust collector fan will continue to run as long as the fill pipe cap is removed. After the truck has delivered the entire load of lime, the driver will remove the hose from the fill pipe. Replacement of the cap initiates the shutdown sequence.

E. The power source to the truck unloading panel will be 480 volt, 30 amp, 3 phase, 60 Hz. The control panel will have the following minimum features in addition to the previously described functions and controls:

1. Wall mount NEMA 4X, 304 stainless steel enclosure with integral safety disconnect switch.

2. Motor Starter for the Dust Collector Fan.

PART 3 EXECUTION

3.01 INSTALLATION

A. All sections and loose items will be match-marked prior to shipping.

B. Installation will be in accordance with the System Supplier's installation requirements.

3.02 FIELD TESTS

A. The equipment will be field tested after installation to demonstrate satisfactory operation without causing excessive noise, vibration, and overheating. The field testing will be performed by an experienced field representative of the System Supplier of each major item of equipment, who will certify the installation and

will confirm in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation.

3.03 PERFORMANCE TEST

A. The Lime Slaking System shall be capable of running, fully automatic, demonstrating the ability of the Slaker to allow the solid-liquid phased slaking reaction to run until completion, at a predetermined temperature, and then dilute to a predetermined slurry concentration, as defined in 2.01 Basis of Design. The Slaking System shall be tested over a three (3) day period, running 72 continuous hours without any adjustments made by operating personnel, demonstrating the ability to meet the requirements of these specifications. During the 72 hour performance test the Slaking Temperature Set Point and the Slurry Concentration Set Point will be varied each day to demonstrate the Systems ability to adjust to input variable changes.

Number Of Batches	Slaking Temp Set Point	Slurry Concentration Set Point
2	185-F	20%
2	190-F	15%
2	195-F	10%

B. If the system fails to perform as described in the specifications, the CONTRACTOR will have (4) weeks to make corrections and demonstrate compliance. If after that time the systems cannot perform, the CONTRACTOR shall within (3) months remove the failed System and provide a System that meet the requirements of the specifications at no additional cost to the OWNER.

The current budget pricing for the equipment materials and services proposed is about $_____.

Pricing is based upon the following Terms and Conditions. Additionally, exclusions include, but are not limited to, the following:

- Offloading of equipment
- Installation
- Anchor bolts
- Disconnect switches
- Wiring, conduit and connections including field wiring terminations at RDP Panels
- Arc Flash Analysis, PPE requirements and labeling of RDP Panels
- Pneumatic fill and vent pipe supports except at Storage Silo
- Lightning Protection
- Silo skirt area insulation if required
- Foundations and foundation design
- Initial chemicals and lime
- Initial lubricants
- Extended grease lines
- Wall closures including Silo Skirt openings
- Platforms and stairs except at the Silo Slaking levels
- Compressed air piping, including filters, lubricators and regulators
- Water supply and water piping
- Slurry piping, valves and strainers from the Slaker to the Slurry Aging Tank
- Slurry loop piping, hoses and manual isolation valves
- Heat tracing for slurry loop pipe/hose and enclosures for Dosing Assemblies
- Taxes of any type
- Bonds or cost for Bonds
- Intermediate or finish painting
- Painting over galvanized or stainless steel equipment
- Laboratory testing during performance testing

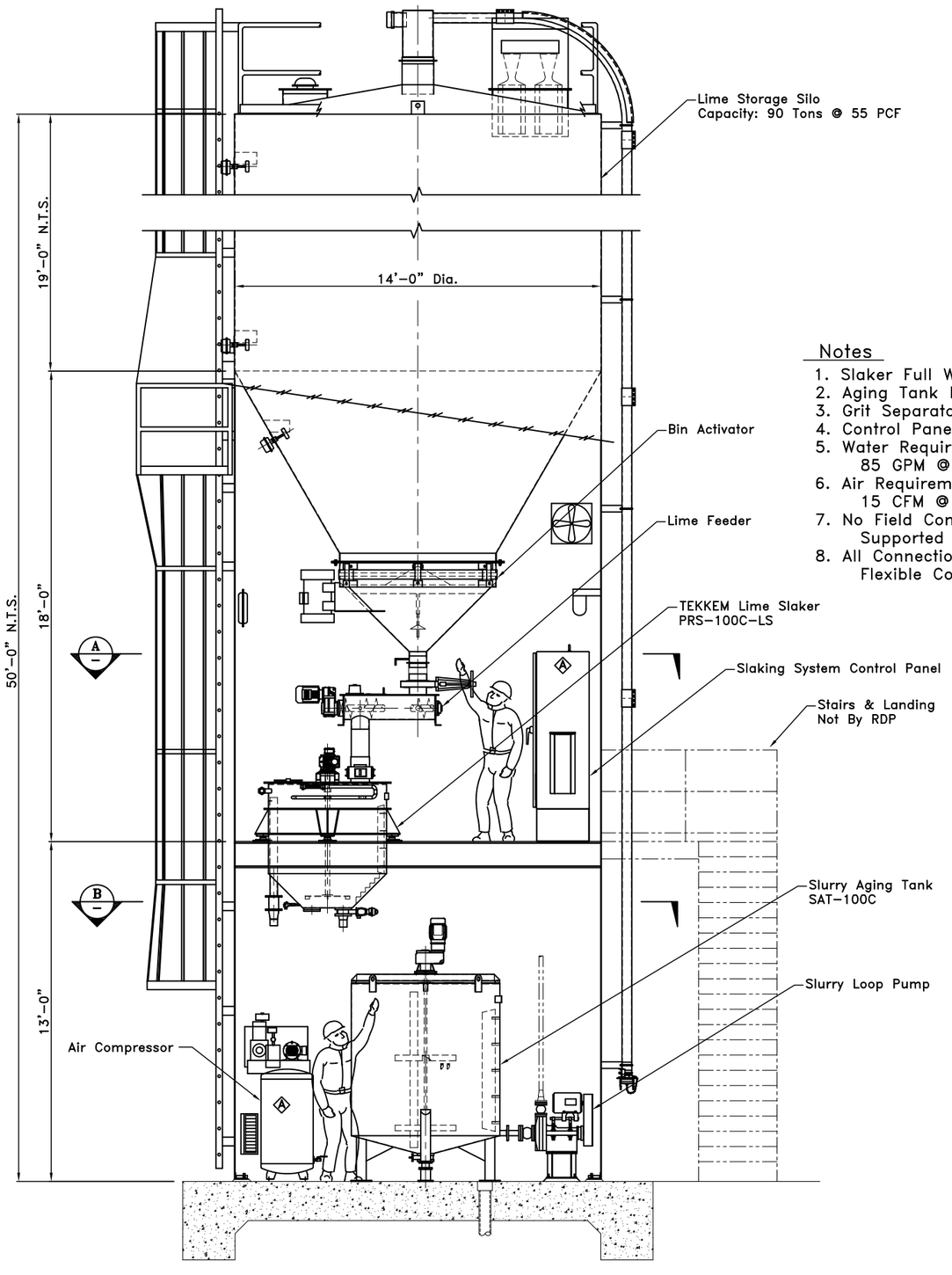
All pricing is based on F.O.B. Destination, with freight included and prepaid.

Pricing is based upon the following payment terms:

20% of contract with delivery of shop drawing submittals
95% of contract upon delivery
97.5% of contract upon installation
100% of contract upon completion of the Performance Test

Shipments will be made in accordance with the proposal schedule. Partial shipments, billings and payments will be required in accordance with the proposed delivery schedule. In the event that there is no appropriate on site storage RDP will be paid for

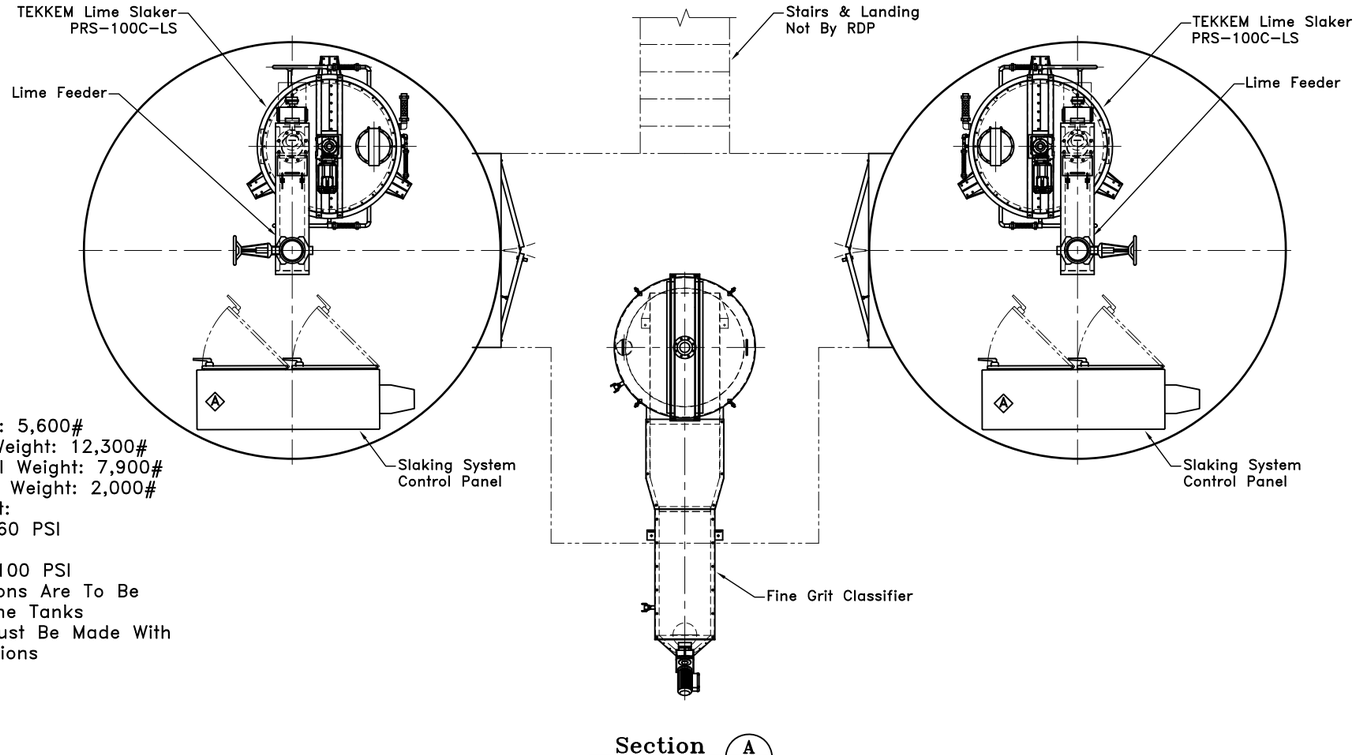
materials stored off site. 100% of the contract will be paid upon completion of the Performance Test or within 180 days after shipment, whichever occurs first.



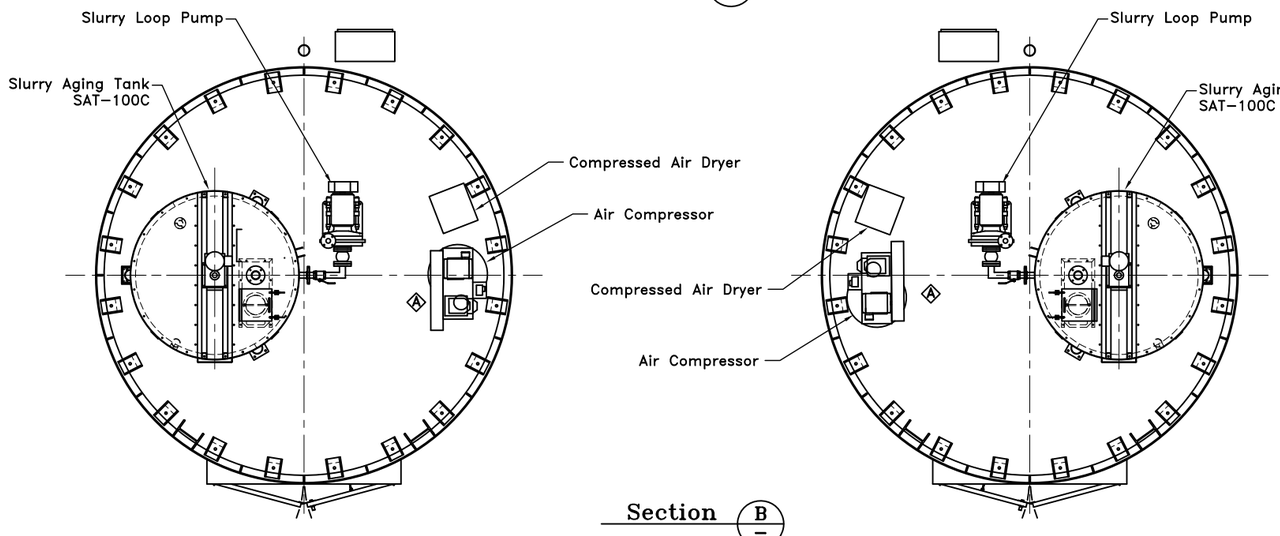
Note: See Plan Views For Proper Orientation Of Equipment

Notes

1. Slaker Full Weight: 5,600#
2. Aging Tank Full Weight: 12,300#
3. Grit Separator Full Weight: 7,900#
4. Control Panel Full Weight: 2,000#
5. Water Requirement:
   85 GPM @ 40-60 PSI
6. Air Requirement:
   15 CFM @ 90-100 PSI
7. No Field Connections Are To Be Supported By The Tanks
8. All Connections Must Be Made With Flexible Connections



Section A



Section B

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Revisions	Date
A Larger Panel, Add Compressor	4-15-20

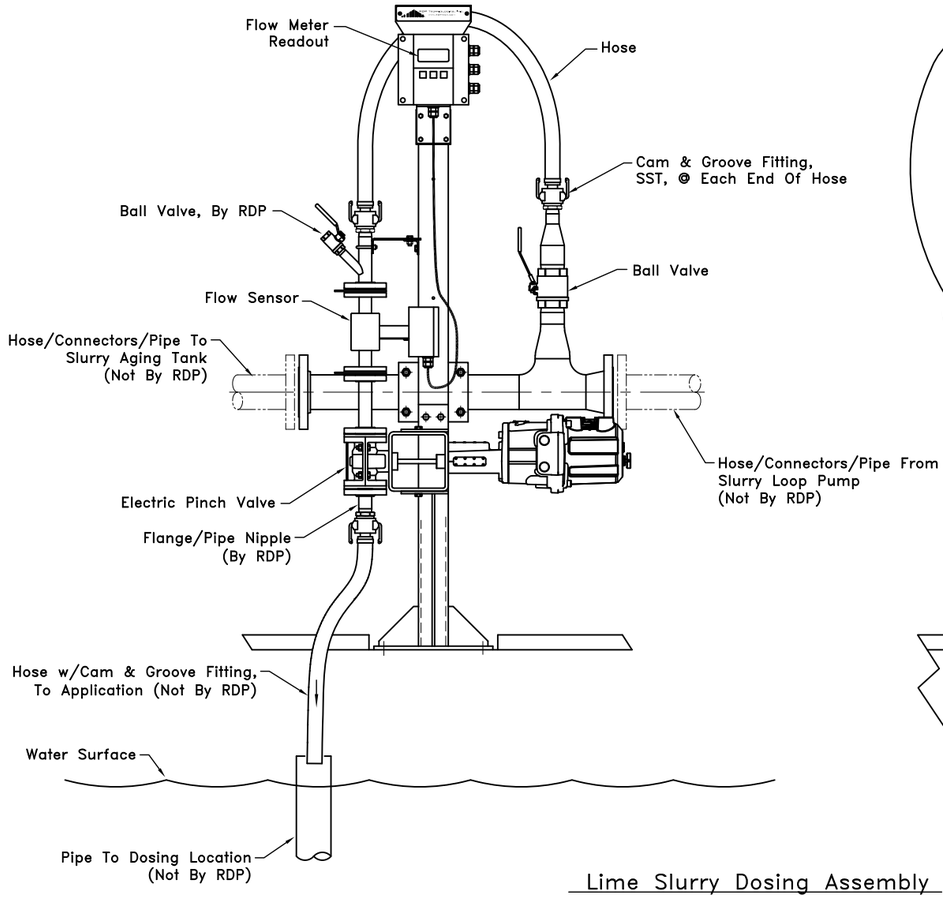
RDP TECHNOLOGIES, INC.

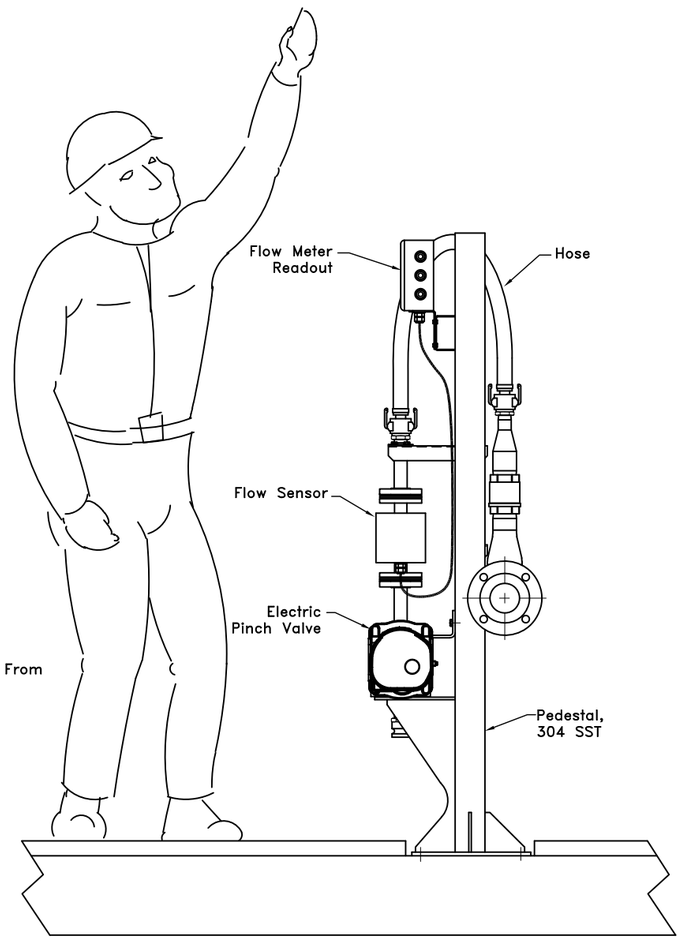
RDP-TEKKEM Slaking System

Riviera Beach, FL

Drawn	Appr.
MJM	

Scale	Dwg.	Date
3/8"=1'-0"	PE2019018-500	3-11-20





Lime Slurry Dosing Assembly
Typical Of Three (3)

	Revisions	Date
A	Release Revision	4-15-20

RDP TECHNOLOGIES, INC.

Lime Slurry Dosing Assembly

Riviera, Beach, FL

Drawn	Appr.	Scale	Dwg.	Date
MJM		1 1/2"=1'-0	PE2019018-501	3-11-20

INSTRUMENT SYMBOLS

- M — MOTOR, 480 VAC, 3 PHASE
- PANEL MOUNTED STATUS LIGHT
- PANEL MOUNTED OPERATOR DEVICE
- FIELD MOUNTED EQUIPMENT

ABBREVIATIONS

AL	ALARM PILOT LIGHT
FE	FLOW METER
FI	FLOW INDICATOR
FIT	FLOW INDICATING TRANSMITTER
HS	HAND SWITCH
JB	JUNCTION BOX
LS	LIMIT SWITCH
M#	MOTOR NUMBER
PB	PUSH BUTTON
PS	PRESSURE SWITCH
PV	PINCH VALVE
RA	RADAR LEVEL PROBE
SOL	SOLENOID
TAH	TEMPERATURE ALARM
TC	TEMPERATURE PROBE
TI	TEMPERATURE INDICATOR
UL	ULTRASONIC LEVEL PROBE
V#	VALVE NUMBER
WAH	WEIGHT ALARM
WE	LOAD CELL WEIGHT SENSOR
WI	WEIGHT INDICATOR
YL	STATUS PILOT LIGHT
ZI	POSITION INDICATOR
H-O-A	HAND-OFF-AUTO
M-O-A	MANUAL-OFF-AUTO
O-C-A	OPEN-CLOSE-AUTO
O-O-A	ON-OFF-AUTO
O-O/A	OFF-ON/AUTO

PRIMARY ELEMENT & FITTING SYMBOLS

- AIR DRIER
- ROTAMETER
- FLANGED CONNECTION
- BASKET STRAINER
- SPRAY NOZZLE
- ORIFICE PLATE
- WYE STRAINER
- QUICK DISCONNECT
- FLOOR DRAIN
- V — VENT TO ATMOSPHERE
- AIR GAP
- REDUCER
- EDUCTOR
- RUPTURE DISK
- AD — AUTOMATIC DRAIN VALVE
- FLOW METER
- PRESSURE SENSOR
- LOAD CELL
- ULTRASONIC LEVEL SENSOR
- FLEX CONNECTOR, RUBBER HOSE
- FLEX CONNECTOR, STEEL BRAIDED
- FLEX CONNECTOR, EXPANSION JOINT
- FILTER
- FILTER\REGULATOR\LUBRICATOR
- FILTER\REGULATOR
- FLOOR TRENCH
- RADAR LEVEL PROBE
- PULSATION DAMPENER

VALVE SYMBOLS

- BUTTERFLY VALVE
- GATE VALVE
- K — KNIFE GATE VALVE
- PINCH VALVE
- BALL VALVE
- PLUG VALVE
- GLOBE VALVE
- THREE WAY VALVE
- FOUR WAY VALVE
- CHECK VALVE
- PRESSURE/VACUUM RELIEF VALVE
- FLOAT VALVE

MATERIAL HANDLING EQUIPMENT SYMBOLS

- M — BIN ACTIVATOR W/ MAINTENANCE GATE
- COLLECTION BIN
- TANK
- M — SCREW CONVEYOR
- GRIT CART

MECHANICAL EQUIPMENT SYMBOLS

- CENTRIFUGAL PUMP
- CHEMICAL FEED PUMP
- HOSE PUMP
- PISTON PUMP
- POSITIVE DISPLACEMENT PUMP
- EMERGENCY SHOWER AND EYEWASH
- M — MIXER
- HEAT EXCHANGER
- WATER SOFTENER
- PACKAGED AIR COMPRESSOR
- SPACE HEATER
- MOTORIZED DAMPER
- LIGHT
- VENTILATION FAN
- THERMOSTAT
- DUPLEX RECEPTACLE
- HOSE BIB
- HAMMERTEK ELBOW

VALVE ACTUATORS

- MANUAL
- LEVER
- E — ELECTRIC MOTOR
- P — PNEUMATIC
- S — SOLENOID
- CYLINDER OR PISTON

P & ID LINE LEGEND

- PRIMARY PROCESS FLOW
- SECONDARY PROCESS FLOW
- 480 VAC, 3 PHASE, 60 HZ POWER WIRING
- 120 VAC CONTROL
- ANALOG SIGNAL WIRING
- K-TYPE SHIELDED THERMOCOUPLE EXTENSION CABLE CONSISTING OF INDIVIDUAL RED AND YELLOW #16 CONDUCTORS SHIELDED W/ YELLOW PVC JACKET

GENERAL NOTES

1. ALL CONTROL PANEL'S SERVICE POWER WILL BE 480 VAC AND 3-PHASE FROM BREAKER OR POWER PANEL.
2. ALL LOCAL DISCONNECTS, WHICH MAY OR MAY NOT BE REQUIRED BY A GOVERNING CODE, ARE NOT FURNISHED BY RDP. COSTS SHALL BE THE RESPONSIBILITY OF OTHERS IF INSTALLED OPTIONALLY OR PER REQUIREMENT.
3. ALL JUNCTION BOXES, WHICH MAY OR MAY NOT BE REQUIRED BY A GOVERNING CODE, ARE NOT FURNISHED BY RDP. COSTS SHALL BE THE RESPONSIBILITY OF OTHERS IF INSTALLED OPTIONALLY OR PER REQUIREMENT.
4. DRAWINGS PE2019018-900 THOUGH 904 ARE FOR WIRING SIZING PURPOSES ONLY. THE CONDUIT FOR THE WIRING SHOWN SHALL BE SIZED AND PROVIDED BY THE CONTRACTOR PER LOCAL CODES AND THE ELECTRICAL DIVISION OF THE BID DOCUMENTS.
5. ALL THERMOCOUPLE WIRING MUST BE CONTINUOUS K-TYPE SHIELDED THERMOCOUPLE WIRE WITH RED AND YELLOW #16 CONDUCTORS IN AN OVERALL YELLOW PVC JACKET. TO MAINTAIN THE "COLD JUNCTION," DO NOT USE MALE/FEMALE CONNECTORS. WIRES MUST OVERLAP WITHIN A SPLICE OR WIRE NUTS MUST BE USED. K-TYPE THERMOCOUPLE TERMINAL BLOCKS MAY BE USED IF APPLICABLE.
6. THE POWER FEEDERS TO THE PANELS ARE SIZED ACCORDING TO THE NATIONAL ELECTRIC CODE (NEC) WIRE TYPE RHW, THHW, THW, THWN, XHHW RATED AT AS FOLLOWS:

   NOT MORE THAN (3) INSULATED CONDUCTORS IN RACEWAY DIRECTLY BURIED
   RATED 0-2000 VOLTS
   75 DEGREES CELCIUS

   IF DIFFERENT CABLE TYPES OR TRANMISSION IS REQUIRED, THEN CABLE SIZES MUST BE RESIZED.
7. ADDITIONAL CONDUCTORS TO BE PULLED AS SPARES PER THE BID DOCUMENTS ARE NOT SHOWN. THE CONTRACTOR SHALL MAKE PROVISIONS TO PULL SPARE CONDUCTORS AS REQUIRED BY THE BID DOCUMENTS.

ONE LINE DIAGRAM LEGEND

- X — MOTOR, 480 VAC, 3 PHASE
- X — MOTOR, 480 VAC, 3 PHASE, VARIABLE SPEED
- CONTRACTOR FURNISHED LOCAL MOTOR DISCONNECT
- UNIT HEATER
- LOAD CELL
- CON — CONTROLLER
- LSH — LEVEL SWITCH HIGH
- LSR — LEVEL SWITCH REORDER
- LSL — LEVEL SWITCH LOW
- FIT — INDICATING TRANSMITTER
- LCSB — LOAD CELL SUMMING BOX
- SOL — SOLENOID
- LS — LIMIT SWITCH
- T/C — TEMPERATURE CONTROL THERMOCOUPLE
- UL — ULTRASONIC LEVEL PROBE
- PJ — PULSE JET CONTROLLER
- PS — PRESSURE SWITCH
- PV — PINCH VALVE
- FM — FLOW METER

Revisions	Date
4 Release Revision	4-15-20

RDP TECHNOLOGIES, INC.

RDP-TEKKEM Slaking System
Legends And Notes
Riviera Beach, FL

Drawn	Appr.
MJM	

Scale	Dwg.	Date
None	PE2019018-900	3-24-20

MOTOR CONTROL CENTER (MCC)
(NOT BY RDP)

480 VAC 80 AMP 3-POLE — (3) #6 + GND

480 VAC 20 AMP 3-POLE — (3) #10+GND — 5 KW 3.5A — SILO SKIRT HEATER

120 VAC 20 AMP 1-POLE — (2) #12+GND — 1/3 — SILO SKIRT DAMPER

120 VAC 20 AMP 1-POLE — (2) #12+GND — 1/3 — SILO SKIRT EXHAUST FAN

120 VAC 15 AMP 1-POLE — (2) #12+GND — SILO SKIRT LIGHTS

480 VAC 10 AMP 3-POLE — (3) #12+GND — 5 — AIR COMPRESSOR (4)

120 VAC 5 AMP 1-POLE — (2) #14 — 1/2 — AIR DRYER (4)

120 VAC 1.5 AMP 1-POLE — (2) #12+GND — AD-1 — AUTO-DRAIN (4)

480 VAC 30 AMP 3-POLE — (3) #8 + GND

MATCHLINE
SEE DWG PE2019018-902 FOR CONTINUATION

SLAKING SYSTEM CONTROL PANEL

- (3) #12+GND — 3 — BIN ACTIVATOR
- (3) #12+GND — 2 — LIME FEEDER
- (3) #12+GND — 5 — TEKKEM LIME SLAKER
- (3) #12+GND — 3 — SLURRY AGING TANK
- (3) #8+GND — 15 — LIME SLURRY PUMP (4)
- (1) 3-CONDUCTOR W/SHIELD BELDEN #8791
- (2) #14 — LS-1 — LIME FEEDER PLUGGED CHUTE SWITCH
- (7) #14 — SOL-1 — TEKKEM LIME SLAKER INLET DAMPER VALVE
- (3) #14 — LS-2 — TEKKEM LIME SLAKER INLET DAMPER VALVE CLOSED LIMIT SWITCH
- (2) #14 — LS-3 — TEKKEM LIME SLAKER INLET DAMPER VALVE OPENED LIMIT SWITCH
- (2) #14 — SOL-2 — TEKKEM LIME SLAKER COLD WATER INLET VALVE
- (2) #14 — SOL-3 — TEKKEM LIME SLAKER DUST ARRESTOR VALVE
- (2) #14 — SOL-4 — TEKKEM LIME SLAKER CLEANING VALVE #1
- (2) #14 — SOL-5 — TEKKEM LIME SLAKER CLEANING VALVE #2
- (7) #14 — SOL-6 — TEKKEM LIME SLAKER DISCHARGE
- (1) K-TYPE SHIELDED T/C — LS-4 — TEKKEM LIME SLAKER DISCHARGE CLOSED LIMIT SWITCH
- (1) 4-CONDUCTOR SHIELDED — LS-5 — TEKKEM LIME SLAKER DISCHARGE OPENED LIMIT SWITCH
- (2) #14 — T/C-1 — TEKKEM LIME SLAKER PRODUCT TEMPERATURE THERMOWELL
- (2) #14 — LCSB — WE-4 — SLURRY AGING TANK LOAD CELL
- (2) #14 — SOL-7 — LIME SLURRY PUMP SEAL WATER
- ETHERNET — PS-1 — LIME SLURRY PUMP HIGH PRESSURE SWITCH
- ETHERNET — ETHERNET CABLE FROM PLANT SCADA/PLC SYSTEM
- PHONE — DEDICATED 4-WIRE DIRECT PHONE/FAX LINE
- (12) #14 — PE2019018-902 STARTER PANEL
- (3) 2-COND. SHIELDED — PE2019018-902 SWITCHING PANEL
- (3) 3-COND. SHIELDED
- (4) #14
- (10) #14

BY SYSTEM SUPPLIER

LOAD CELL SUMMING BOX

CABLE (TYP.) EACH IN DEDICATED METAL CONDUIT BY CONTRACTOR

- SLAKER LOAD CELL #1
- SLAKER LOAD CELL #2
- SLAKER LOAD CELL #3

LIME TRUCK UNLOADING PANEL

- (10) #14 — 3 — DUST COLLECTOR FAN
- (2) #14 — PJ-1 — AIR MANIFOLD SOLENOID CONTROLLER
- (2) #14 — LS-6 — LIME SILO FILL PIPE CAP LIMIT SWITCH
- (15) #14 — (5) #14 — LSH-1 — LIME SILO HIGH LEVEL SENSOR
- (5) #14 — LSR-1 — LIME SILO REORDER LEVEL SENSOR
- (5) #14 — LSL-1 — LIME SILO LOW LEVEL SENSOR

NOTE: CONDUIT, WIRING, AND DISCONNECTS BY CONTRACTOR

NOTE: THIS DRAWING REPRESENTS EACH OF TWO IDENTICAL SLAKING SYSTEMS

SEE NOTES ON DWG PE2019018-900

	Revisions	Date
(4)	Add Comp. Air Components, 15 Was 20	4-15-20

RDP TECHNOLOGIES, INC.

RDP-TEKKEM Slaking System One-Line Diagram

Riviera Beach, FL

Drawn	Appr.
MJM	

Scale	Dwg.	Date
None	PE2019018-901	3-24-20

MATCHLINE
SEE DWG PE2019018-901
FOR CONTINUATION

480 VAC
15 AMP
3-POLE

MOTOR CONTROL CENTER (MCC)
(NOT BY RDP)

(3) #8 + GND

STARTER PANEL

(4) #14
(4) #14
(3) #12+GND

1

FINE GRIT CLASSIFIER

PE2019018-901
DUTY SLAKING
SYSTEM PANEL

NOT SHOWN
STANDBY SLAKING
SYSTEM PANEL

SWITCHING PANEL

(12) #14
(3) 2-COND. SHIELDED
(3) 3-COND. SHIELDED

(12) #14
(3) 2-COND. SHIELDED
(3) 3-COND. SHIELDED

(2) #14	(2) #14	(2) #14	(2) #14	(2) #14	(2) #14
(1) 2-COND. SHIELDED	(1) 3-COND. SHIELDED	(1) 2-COND. SHIELDED	(1) 3-COND. SHIELDED	(1) 2-COND. SHIELDED	(1) 3-COND. SHIELDED
PV-1	FM-1	PV-2	FM-2	PV-3	FM-3
BASIN NO.1 DUTY DOSING STAND PINCH VALVE NO.1	BASIN NO.1 DUTY DOSING STAND FLOW METER NO.1	BASIN NO.2 DUTY DOSING STAND PINCH VALVE NO.2	BASIN NO.2 DUTY DOSING STAND FLOW METER NO.2	BASIN NO.3 DUTY DOSING STAND PINCH VALVE NO.3	BASIN NO.3 DUTY DOSING STAND FLOW METER NO.3

PE2019018-901
DUTY SLAKING
SYSTEM PANEL

NOT SHOWN
STANDBY SLAKING
SYSTEM PANEL

TO GFCI RECEPTACLE
120 VAC, 20 A
(NOT BY RDP)

(3) #12+GND

.5

WASHDOWN PUMP

NOTE: CONDUIT, WIRING, AND DISCONNECTS
BY CONTRACTOR

SEE NOTES ON DWG PE2019018-900

Revisions	Date
Release Revision	4-15-20

RDP TECHNOLOGIES, INC.

RDP-TEKKEM Slaking System
One-Line Diagram

Riviera Beach, FL

Drawn	Appr.
MJM	

Scale	Dwg.	Date
None	PE2019018-902	3-24-20

* LIME TRUCK UNLOADING PANEL

CONTROL POWER — ON-OFF (HS LTUP), ON (YL LTUP)

LIME SILO LEVEL STATUS — HIGH (YL LTUP), LOW (YL LTUP)

DUST COLLECTOR — MAN-OFF-AUTO (HS LTUP), ON (HS LTUP), FAULT (YL LTUP)

CONTROL STATUS

* SLAKING SYSTEM CONTROL PANEL

POWER ON (HS SSCP)

CALIBRATION RESET (HS SSCP)

HORN SILENCE (HS SSCP)

EMERGENCY STOP (HS SSCP)

RESET (HS SSCP)

BATCH START (HS SSCP)

BATCH STOP (HS SSCP)

LIME SILO LEVEL (LI *)

SLAKING TEMPERATURE CONTROLLER (INSIDE PANEL)

SLAKER WEIGHT INDICATING CONTROLLER (INSIDE PANEL)

AGING TANK WEIGHT INDICATING CONTROLLER (INSIDE PANEL)

HUMAN-MACHINE-INTERFACE (HMI)

SYSTEM AUTO CONTROLS
- MAN-OFF-AUTO (PB SSCP)
- AUTO START (PB SSCP)
- MAN-OFF-SINGLE-MULTIPLE (PB SSCP)
- AUTO STOP (PB SSCP)
- RESIDUAL BUILDUP (AL SSCP)

TEKKEM SLAKER MIXER — ON (PB M), OFF (PB M), STATUS (YL M)

TEKKEM SLAKER INLET DAMPER VALVE — OPEN (PB V1), CLOSE (PB V1), STATUS (YL V1)

TEKKEM SLAKER DISCHARGE VALVE — OPEN (PB V6), CLOSE (PB V6), STATUS (YL V6)

TEKKEM SLAKER — FAULT (TAH TC), TEMPERATURE (TI TC)

TEKKEM SLAKER — FAULT (WAH WE), WEIGHT (WI WE)

FINE GRIT CLASSIFIER — ON (PB M), OFF (PB M), STATUS (YL M)

SLURRY AGING TANK MIXER — MAN-OFF-AUTO, ON (PB M), FAULT (YL M)

SLURRY AGING TANK — FAULT (WAH WE), WEIGHT (WI WE)

SLURRY LOOP PUMP — MAN-OFF-AUTO, STATUS (YL M), START (PB M), STOP (PB M)

SLURRY PUMP HIGH PRESSURE — FAULT (YL *)

BIN ACTIVATOR — ON (PB M), OFF (PB M), STATUS (YL M)

LIME FEEDER — ON (PB M), OFF (PB M), STATUS (YL M)

SLAKER FEED WATER VALVE — OPEN (PB V2), CLOSE (PB V2), STATUS (YL V2)

SLAKER WATER VALVE #1 — OPEN (PB V3), CLOSE (PB V3), STATUS (YL V3)

SLAKER WATER VALVE #2 — OPEN (PB V4), CLOSE (PB V4), STATUS (YL V4)

SLAKER ARRESTOR DUST VALVE — OPEN (PB V5), CLOSE (PB V5), STATUS (YL V5)

PUMP SEAL WATER VALVE — OPEN (PB V7), CLOSE (PB V7), STATUS (YL V7)

SOFTENER NO.1 DOSING ASSEMBLY — FLOW RATE (FI *), % OPEN (ZI *)

SOFTENER NO.2 DOSING ASSEMBLY — FLOW RATE (FI *), % OPEN (ZI *)

SOFTENER NO.3 DOSING ASSEMBLY — FLOW RATE (FI *), % OPEN (ZI *)

DUST COLLECTOR

LIME STORAGE SILO

BIN ACTIVATOR

LIME FEEDER

LIME CHUTE (BY RDP)

TEKKEM LIME SLAKER

SERVICE WATER (NOT BY RDP)

1" TUBING (BY CONTRACTOR)

3/8" TUBING (BY CONTRACTOR)

1" TUBING (BY CONTRACTOR)

3/8" TUBING (BY CONTRACTOR)

SLURRY AGING TANK

SERVICE WATER (NOT BY RDP)

SERVICE WATER (NOT BY RDP)

LIME SLURRY PUMP

PE2019018-904 LIME SLURRY LOOP

PE2019018-904 FINE GRIT CLASSIFIER

PE2019018-904 LIME SLURRY LOOP

MOTOR CONTROL CENTER (MCC) (NOT BY RDP)

(3)

NOTE: DEVICES MARKED WITH AN ASTERICK (*) INDICATES EQUIPMENT SUPPLIED BY RDP

NOTE: THIS DRAWING REPRESENTS EACH OF TWO IDENTICAL SLAKING SYSTEMS

SEE NOTES ON DWG PE2019018-900

Revisions	Date
Add Compressed Air Components	4-15-20

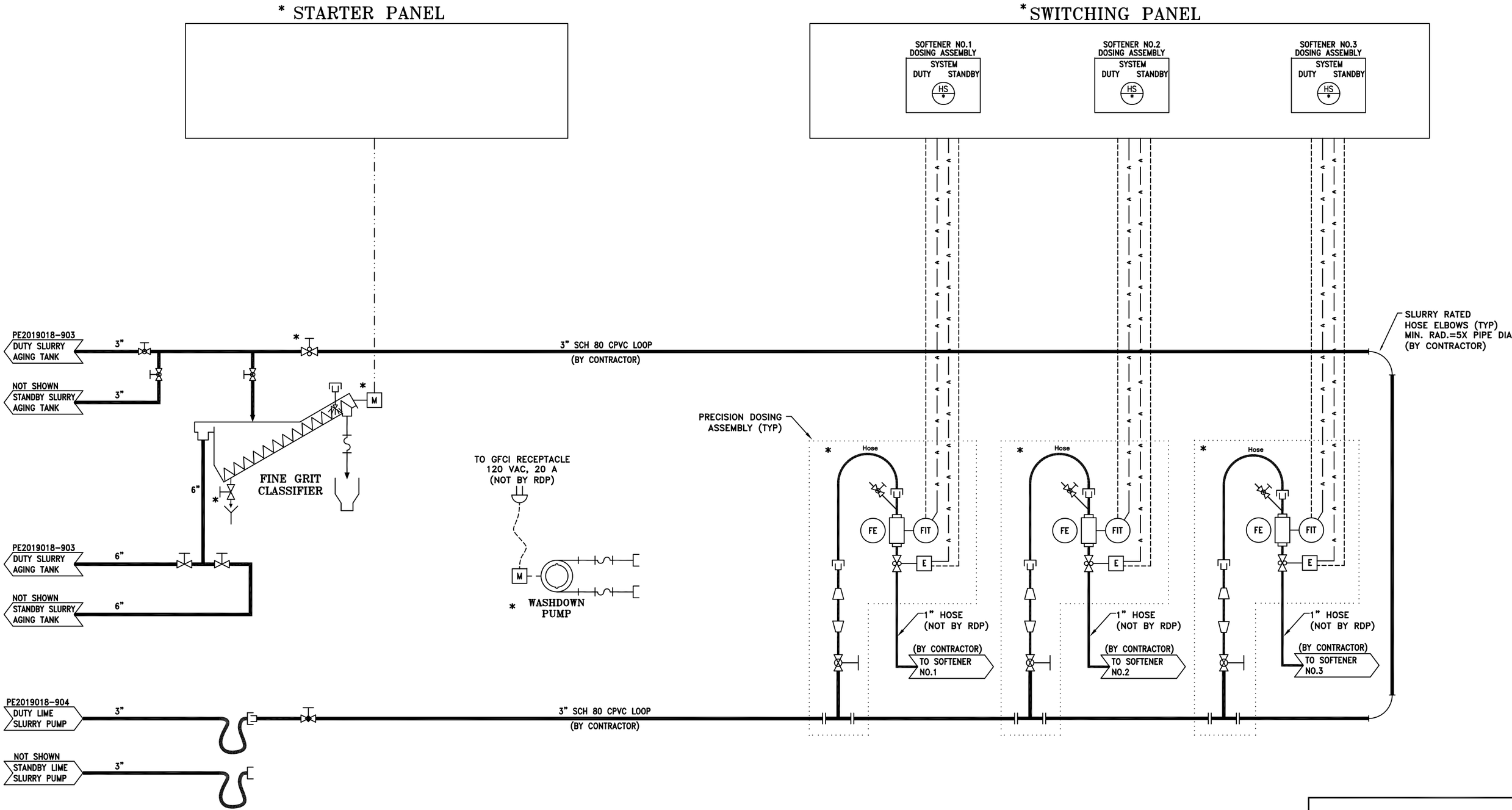
RDP TECHNOLOGIES, INC.

RDP-TEKKEM Slaking System P & ID

Riviera Beach, FL

Drawn	Appr.
MJM	

Scale	Dwg.	Date
None	PE2019018-903	3-24-20



NOTE: DEVICES MARKED WITH AN ASTERICK (*) INDICATES EQUIPMENT SUPPLIED BY RDP

SEE NOTES ON DWG PE2019018-900

	Revisions	Date
A	Release Revision	4-15-20

RDP TECHNOLOGIES, INC.

RDP-TEKKEM Slaking System
P & ID

Riviera Beach, FL

Drawn	Appr.	
MJM		
Scale	Dwg.	Date
None	PE2019018-904	3-24-20

TERMS AND CONDITIONS

This proposal and any resulting contract will be subject to the following terms and conditions except as otherwise agreed to by an officer of the company or in RDP's letter acknowledgment acceptance of a contract. Commencement of the work will not constitute acceptance by RDP of additional or different terms and conditions. The pricing and project schedule is based on many factors and should be considered valid for 30 days. After 30 days, the pricing and/or the project schedule may need to be revised to reflect changes in RDP's costs and availability of our production capabilities.

1. Delivery
   a. Unless otherwise specified, delivery will be made F.O.B. point(s) of shipment with freight allowed to designated job site based on said job site being accessible by common carrier.

   b. Shipment may commence eight (8) weeks after drawing approval and will be complete twenty (20) weeks after receipt of final drawing approval, consummation of all technical/commercial details and/or release for fabrication.

   c. RDP will not, in any event, by contract or otherwise, be liable for delays in performance caused by any factor beyond RDP's control such as, but not limited to; (1) acts of governmental authorities, (2) acts of God, (3) casualty, (4) civil disturbance, (5) insurrection, (6) labor strikes or disputes, (7) inability to obtain materials, (8) delay in consulting engineer's approval of submittal data and drawings, and/or (9) delays by transportation carriers.

   d. CONTRACTOR must accept shipment when RDP advises equipment is ready for shipment in accordance with the contract schedule. If buyer cannot accept shipment, we will attempt to provide for storage at an additional charge.

   e. In the event the contract shipping date is extended by acts of buyer including, but not limited to, unreasonable delays in approval of submittal drawings, escalation of the selling price at the rate of 1.5% per month for each month or partial month of delay, will be applied.

2. Prices
   Prices specified herein do not include any sales, use, excise, occupational or similar taxes and/or license fees in connection with the engineering, manufacturing, sale or delivery of the equipment. Such taxes and fees will be paid by the buyer directly to the taxing and/or licensing authorities or the buyer will submit to RDP a proper tax exemption certificate acceptable to such authorities.

3. Terms of Payment
   Unless otherwise specified in this scope letter, terms of payment will be 100% of invoice, net thirty (30) days from the date of shipment. Overdue invoices will be subject to 1.5% per month finance charges.

4. Field Service
   (Start-Up and Instructions)
   a. If job site field service is included in RDP's prices, it will be so stated in this quotation and the number of days and trips included will be so specified. In the event the Buyer requires such services for additional days or trips, RDP will invoice the Buyer at a rate of $1,285.00 for each additional day plus travel and lodging expenses incurred by the service personnel during such additional days.

   b. The per diem rate is subject to change to the rate in effect at the time such service is furnished.

c. The Buyer is to indemnify and hold RDP Technologies, Inc. harmless from and against all suits, legal expenses, claims, judgments for personal injury to or death of our or your employee(s) or third parties or from damage to property resulting from any act of our employee(s) or agents while at the job site except if such injury, death or property damage is directly caused by the sole negligence of RDP's employee(s) or agent, but in no event will RDP be liable for indirect or consequential damages.

5. Safety

The equipment covered in this proposal will be designed in accordance with RDP's engineering standards and interpretation of the requirements of the Occupational Safety and Health Act of 1970.

6. Shortages

(Manufacturing Discrepancies)

a. Notify the RDP Technologies, Inc. immediately upon discovery of any apparent manufacturing discrepancies or material shortages.

b. Fabricated steel parts and assemblies furnished by RDP are manufactured in accordance with acceptable shop practices and standards of the industry. However, some misfits and imperfect work may arise. In such cases, the American Institute of Steel Construction "Code of Standard Practice, Section 5-150" is to be understood to apply to erection of this equipment. It reads as follows: "Correction of minor misfits and a reasonable amount of cutting and reaming are considered a part of erection. Any error in shop work which prevents the proper assembling and fitting of parts by the moderate use of drift pins or a moderate amount of reaming, chipping or cutting, should be immediately reported to the fabricator so that he may either correct the error or approve the method of correction that is to be used."

7. Backcharge Policy

No backcharges will be allowed without prior approval from RDP. Written authority must be given in the form of a purchase order. Authority will be issued when the extent of such modifications and the price for performing these modifications have been agreed upon between the contracting parties.

8. Title: Lien Rights

The equipment will remain personal property of RDP regardless of how affixed to any realty or structure until the price (including any notes given therefore) of the equipment has been fully paid in cash. RDP will, in the event of the Buyer's default, have the right to repossess such equipment.

9. Order Cancellation

The Buyer may cancel this order at any time but only on terms which will save RDP Technologies, Inc. harmless from all loss.

10. Limitation of Liability

a. RDP will not be liable under any Contract, or otherwise, for consequential or economic damages such as, but not limited to: (1) loss of use of property, (2) damage to property, (3) increased costs of operations, (4) loss of capacity, (5) loss of profits, (6) fines, (7) penalties, and/or (8) liquidated damages arising in connection with the delivery, sale or use of or inability to use the equipment covered by this order.

b. RDP's liability under any Contract or otherwise, will not (in the aggregate) exceed the Contract value.

11. Changes

Additional engineering work may be required based upon reasonable errors and omissions by third parties. RDP has estimated the cost and bid for this project with the assumption that the plans and specifications are complete and current. Any additional drafting time will be billed at a rate of $285/hr., engineering time will be billed at $425/hr., and project management time at $585/hr.

This proposal may be changed or revoked and withdrawn by the RDP Technologies, Inc. at any time upon written notice to the Buyer.

12. Disputes

Any controversy or claim arising out of or relating to this contract, or breach thereof, will be settled by arbitration administered by the American Arbitration Association under its Construction Industry Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. The arbitration will be held in Montgomery County, Pennsylvania.

13. Exclusive Warranty

RDP's Warranty is for workmanship and materials. RDP will provide parts only. Labor is specifically excluded. Furthermore, RDP does not warrant that its' goods or services will accomplish any particular result. All other warranties, expressed or implied, are excluded from the contract.

14. License Agreement

A. RDP Technologies, Inc. hereinafter designated as the "COMPANY", has obtained, and is the sole owner of U.S. Patents 5,013,458; 5,229,011, 5,346,616, 5,401,402, 5,405,536, 5,433,84, 5,186,840, 5,746,983, 7,416,673, 8,133,401, 9,023,312, 9,650,293, 9,688,547 and other Patents Pending relating to apparatus, processes (including the process steps identified in Paragraph G4), and manufacturing techniques for waste sludge treatment and/or Pasteurization, and lime slaking and has filed related divisional and continuation patent applications covering the apparatus and process (all hereinafter referred to as the "Patent Rights").

B. The COMPANY hereby grants to the City of Riviera Beach, FL, hereinafter referred to as the "OWNER", a non-assignable, nontransferable, non-exclusive, paid-up license to use (but not any right to make or sell), in the geographic area represented by the boundaries of the OWNER, the equipment sold by the COMPANY for use of the OWNER.

C. This License Agreement shall apply to the System and equipment to which the COMPANY has said Patent Rights therein, include equipment sold by the COMPANY to or for the benefit of the OWNER in connection with the sales agreement governing the sale of equipment of the COMPANY for use by the OWNER.

D. The COMPANY and the OWNER desire to operate the equipment to comply with the environmental control standards set forth by the U.S. EPA. Any use under this License Agreement of the System to which the Patent Rights pertain is to be commensurated with the capacity for which the equipment is designed. For use of the COMPANY System covered by the Patent Rights at more than one (1) location within the OWNER, an additional license will be required for each additional location.

E. The term of the license will commence upon receipt and acceptance of a Purchase Order by the COMPANY and will be in effect through Construction and Final completion of the Contract. The License will renew at that time provided full and final payment, minus any agreed upon penalties that are part of the performance requirements, by the OWNER for all equipment sold under this Agreement by the COMPANY for use by the OWNER under Paragraph C hereof and continue through the life of said Patent Rights for no additional monetary consideration beyond said full and final payment. The parties hereto agree that an unlicensed use of the said Patent Rights, including any equipment, apparatus, or processes covered thereunder, without final payment may occur during a start-up period, but no longer than six (6) months. If payment has not been made in this timeframe a penalty of $1,000.00 per day will be assessed for every day in operation without being provided a License.

F. The License to use the Patent Rights thereunder is personal to the OWNER and the OWNER will not transfer, sublease, assign, or deliver the apparatus or such license relating to the apparatus or process of the COMPANY'S Patent rights to another without the prior written consent of the COMPANY.