

BROWNSVILLE PUBLIC UTILITIES BOARD SOUTH WASTEWATER TREATMENT PLANT IMPROVEMENTS SWWTP CHLORINE CONTACT BASINS GATE REPLACEMENT BID B002-23 100% DESIGN



BROWNSVILLE PUBLIC UTILITIES BOARD



800 N. Shoreline, Suite 1600N Corpus Christi, Texas 78401 Phone – (361) 561–6500 Web – www.freese.com



MAY 2021

SHT. DESCRIPTION No.

GENERAL

COVER G-1 – INDEX OF DRAWINGS G-2 – GENERAL NOTES AND STANDARD SYMBOLS

CIVIL

C—1 — PARTIAL SITE PLAN

MECHANICAL

M-1 - CHLORINE CONTACT BASINS PLAN, SECTION AND DETAIL

STRUCTURAL

S-1 - STRUCTURAL NOTES S-2 - CHLORINE CONTACT BASIN STRUCTURAL PLAN, SECTION AND DETAIL S-3 - STRUCTURAL DETAILS

ELECTRICAL

E-1	_	LEGEND I
E-2		LEGEND II
E-3	—	PARTIAL SITE PLAN
E-4	—	EFFLUENT ELECTRICAL BUILDING
E-5	_	CHLORINE CONTACT BASIN PLAN
E-6		DIAGRAMS AND DUCT BANK DETAILS
E-7		DETAILS I
E-8		DETAILS II

PROCESS AND INSTRUMENTATION

PI-1 - LEGEND I PI-2 - LOOP DIAGRAMS

Designed by: JC	SWWTP CHLORINE CONTACT	lexas Registered Engineering Firm F-2144	
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		FREESE	221 }).
Checked Dv:		Image: Solution of the second seco	ter
		800 N. Shoreline, Suite 1600N	nent BROWNSVILL
Approved by:		Corpus Christi, Texas 78401 (956) 983-6215 (956) 983-6215	PUBLIC UTILITIES B(
Project #: BPU20604		Fox - (361) 561-6501 Fax - (361) 561-6501 FAX: (956) 983-6220	20

GENERAL NOTES

- 1. THE FOLLOWING NOTES ARE GENERAL AND APPLY TO ALL SHEETS OF THESE CONTRACT DOCUMENTS AS IF THEY WERE WRITTEN IN THEIR ENTIRETY ON EACH SHEET.
- 2. THESE SHEETS DEPICT APPROXIMATE LOCATIONS OF UTILITIES. OTHER UTILITIES MAY EXIST AND ARE NOT SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY LOCATIONS AND SIZES OF ALL UTILITIES. THE INFORMATION ON THESE SHEETS IS NOT GUARANTEED TO BE COMPLETE OR ACCURATE AND IS FURNISHED FOR GENERAL INFORMATION ONLY.
- 3. CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING PIPE, STRUCTURES, EQUIPMENT, ETC. AS REQUIRED AND SHALL PROVIDE ALL FITTINGS, ADAPTERS AND APPURTENANCES REQUIRED TO MAKE THE CONNECTIONS. PROVIDE ALL SUPPORTS REQUIRED FOR A RIGID INSTALLATION AND TO HAVE A COMPLETE AND WORKING SYSTEM.
- 4. ALL PENETRATIONS (EXISTING AND PROPOSED) OF THE WALLS SHALL BE SEALED PER TYPICAL/STANDARD DETAILS OR AS DIRECTED BY ENGINEER.
- 5. THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS IN THE VICINITY OF ANY OVERHEAD ELECTRIC LINES. CONTRACTOR SHALL ABIDE BY 2017 NATIONAL ELECTRIC CODE AND ANY REQUIREMENT BY OWNER OF ELECTRIC LINES.
- 6. PROVIDE ALL SHEETING/SHORING REQUIRED TO PROTECT EXIST. STRUCTURES, PIPES AND FACILITIES.
- 7. AT LOCATIONS WHERE NEW PIPES, FITTINGS AND/OR STRUCTURES ARE ADJACENT TO EXIST. PIPES, FITTINGS, AND /OR STRUCTURES EXISTING THRUST BLOCKING SHALL BE REMOVED AND REPLACED.
- 8. WHERE EXIST. PIPES, VALVES ETC. ARE NOTED FOR REUSE : ALLOW OWNER TO EXAMINE ITEMS PRIOR TO REINSTALLING.
- 9. BEFORE BEGINNING CONSTRUCTION NOTIFY ENGINEER OF ANY DISCREPANCIES OR CONFLICTS FOUND IN DRAWINGS AND/OR FIELD DIMENSIONS.
- 10. CONTRACTOR SHALL VERIFY LOCATION OF ALL ARCHITECTURAL, MECHANICAL AND ELECTRICAL ITEMS BEFORE PLACING ANY STRUCTURAL STEEL OR CONCRETE. ALSO, STRUCTURAL DIMENSIONS AND OPENINGS CONTROLLED BY ARCHITECTURAL, MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
- 11. STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON COMPLETED STRUCTURES. DURING CONSTRUCTION, STRUCTURES SHALL BE PROTECTED BY BRACING OR WHATEVER MEANS REQUIRED WHEREVER EXCESSIVE CONSTRUCTION LOADS OCCUR.
- 12. MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENING, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS SHALL BE PROVIDED PRIOR TO CASTING CONCRETE.
- 13. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. CONTRACTOR SHALL NOTIFY ENGINEER IF THERE IS A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND EXISTING CONSTRUCTION BEFORE PROCEEDING WITH WORK.
- 14. THE CONTRACTOR SHALL CONTACT THE PROPER UTILITY REPRESENTATIVE FOR QUESTIONS AND/OR COORDINATION OF CONSTRUCTION RELATED TO EXISTING UTILITIES.
- 15. THE LEGEND PROVIDED ON THIS SHEET, AND OTHERS IN THE DRAWINGS ARE STANDARD LEGENDS, THEREFORE NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.

CODE	DESCRIPTION
т	YPE OF OPERATOR
E	ELECTRIC
EH	ELECTRIC HYDRAULIC
EZ	ELECTRIC WITH POSITIONER
Н	HYDRAULIC
Р	PNEUMATIC
PZ	PNEUMATIC WITH POSITIONER
М	MANUAL
CODE	DESCRIPTION
Т	YPE OF GATE
SLU	SLUICE GATE

GENERAL NOTE:

1. THIS IS A STANDARD LEGEND THEREFORE, NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.





WSE	WATER SURFACE ELEVATION	
	FLOW ARROW	
>	DIRECTION OF FLOW	
	GATE	
	NEW EQUIPMENT, PIPING, OR STRUCTURES	
	FUTURE EQUIPMENT, PIPING, OR STRUCTURES	
	EXISTING EQUIPMENT, PIPING, OR STRUCTURES	
	ITEMS TO BE DEMOLISHED OR ABANDONED IN PLACE	
	CENTERLINE	
//	BREAK LINE	
o	HANDRAIL	
—×——×——×— OR — *——* —— * —	FENCE	S
240	EXISTING GRADE CONTOUR	
240	FINISH GRADE CONTOUR	4
3:1	SLOPE (3 HORIZ. TO 1 VERT.)	
———— G ————	GAS	4
———— E ————	ELECTRICAL POWER	
OHE	OVERHEAD ELECTRICAL LINE	
4	CONCRETE - SECTION	
	SAND OR GROUT - SECTION	$\left[\right]$
	GRAVEL	
	CHECKERED PLATE	

OPENING OR DEPRESSION IN SLAB OR WALL

GATE/VALVE INDEX

TIES BOARD Texos Registered Engineering Firm F-2144Public Utilities BoardCONTACT CONTACTTexos Registered Engineering Firm F-2144CONTACT CONTACTTexos Registered Engineering Firm F-2144ACEMENTTexos Registered Engineering Firm F-2144CONTACT CONTACTTexos Registered Engineering Firm F-2144ACEMENTTexos Registered EngineBOO N. Shoreline, Suite 1600N Corpus Christi, Texos 78401Phone - (361) 561-6500Texos 78401 Texos 78401TD. SYMBOLSFox - (361) 561-6501Fox - (361) 561-6501FAX: (956) 983-6215FAX: (956) 983-6220
ITIES BOARD Freese and Nichols, Inc. Texas Registered Engineering Firm F-2144 CONTACT Texas Registered Engineering Firm F-2144 CONTACT Texas Registered Engineering Firm F-2144 ACEMENT Machine Firm F-2144 TD. SYMBOLS Firm F-6500 Machine Firm F-200 Firm F-6500 Firm F-6500 Machine Firm F-200 Firm F-750 Machine Firm F-750 Machine Firm F-750 Firm F-750
ITIES BOARD CONTACT CONTACT ACEMENTFreese and Nichols, Inc. Texas Registered Engineering Firm F-2144CONTACT ACEMENTEach Segment of Nichols, Inc. TOTO N Shoreline, Suite 1600N Sonus Christi, Texas 78401 Phone - (361) 561-6500 Fax - (361) 561-6501
ITIES BOARD CONTACT ACEMENT TD. SYMBOLS
BEROWNSVILLE PUBLIC UTIL SWWTP CHLORINE BASINS GATE REPL, GENERAL GENERAL
Dote: 4/20/21 No. ISSUE No. ISSUE ISSUE ISSUE
SCALE: SHOWN Designed by: JC Drown by: JD Checked by: . Approved by: . Project #: BPU206





NOTES BY SYMBOL "

- 1. DEMO EXISTING GATES.
- 2. 316 SS STEM
- 3. SS PEDESTAL
- 4. 316L SS FRAME ASSEMBLY
- 5. 5'-0" x 5'-0" OPENING ALLOWS FLOW TO BASINS 1 AND 2.
- 6. 4'-0" x 4'-0" OPENING ALLOWS FLOW TO BASIN 3.
- 7. ELECTRIC ACTUATORS.

	SCALE: SHOWN Date: 4/20/21 NO. ISSUE	BY	BROWNSVILLE PUBLIC UTILITIES BOARD	Freese and Nichols, Inc. Texas Reaistered Enaineerina Firm F-2144	THE OF THE	Public Utilities Board	•
•	Designed by: JC		SWWTP CHLORINE CONTACT			1425 Robinhood Drive	
SH	Drown by: MGA		RASINS GATE REPLACEMENT	FREESE		Drownsville, Lexas / 8321 1 800 860 2022));));
EET	Checked by:				JASON COCKLIN	Water and Wastewater	
-	Approved by: .			800 N. Shoreline, Suite 1600N Corpus Christi, Texas 78401	On CENSEO CENSE	Engineering Department (956) 983-6215	PUBLIC UTILITIES BOARD
	Project #: BPU20604		CHLURINE CUNIACI GALES	Phone - (361) 561-6500 Fax - (361) 561-6501	1/1 / ONAL (5.021	FAX: (956) 983-6220	

1.	<u>NERAL</u> :	<u>PC</u>	<u>)ST-INSTA</u>
	CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE 2018 INTERNATIONAL BUILDING CODE, INCLUDING LOCAL SUPPLEMENTS, EXCEPT WHERE APPLICABLE CODES OR THE CONTRACT DOCUMENTS ARE MORE RESTRICTIVE.	1.	INSTALL IN INSTRUCTIO
2.	DESIGN IS IN ACCORDANCE WITH 2018 INTERNATIONAL BUILDING CODE, LOCAL AMENDMENTS, AND APPLICABLE CODE REFERENCED STANDARDS.	2.	INSTRUCTIO OR OSHA I APPLICABLE
3.	 PRIOR TO FABRICATION OR CONSTRUCTION: A. VERIFY DIMENSIONS AND LOCATIONS OF ALL OPENINGS, DEPRESSIONS, OFFSETS, SLEEVES, CURBS, PADS, INSERTS, EQUIPMENT REQUIREMENTS, ETCETERA. B. REVIEW OTHER DISCIPLINE DRAWINGS FOR SIZE AND LOCATION OF ALL OPENINGS, DEPRESSIONS, OFFSETS, SLEEVES, CURBS, PADS, INSERTS, EQUIPMENT REQUIREMENTS, ETCETERA, WHICH ARE NOT SHOWN ON STRUCTURAL DRAWINGS 	3.	ADHESIVE A CERTIFIED OR APPROV
	 STRUCTURAL DRAWINGS. C. FIELD VERIFY ALL EXISTING CONDITIONS, INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. D. NOTIFY OWNERS REPRESENTATIVE OF ANY DISCREPANCIES BETWEEN DISCIPLINES, CONSTRUCTABILITY ISSUES, OR EXISTING CONDITIONS. 	4. 5.	ANCHOR D HOLES SHA TOLERANCE DIAMETER I
4.	THE STRUCTURE IS DESIGNED FOR STABILITY IN THE FINAL CONDITION ONLY. PROVIDE TEMPORARY BRACING AND SHORING AS REQUIRED FOR STABILITY DURING CONSTRUCTION.	6.	USE CARE EXISTING R
5.	PLANS, SECTIONS, AND DETAILS ARE NOT TO BE SCALED FOR DETERMINATION OF QUANTITIES, LENGTHS, OR FIT OF MATERIALS.		PRIOR TO LOCATIONS
6.	THE GENERAL NOTES AND TYPICAL DETAILS ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS TO THE CONTRARY.	7.	ADHESIVE / OR GALVAN OTHERWISE A. ADHI PUBI
<u>CO</u>	<u>NCRETE</u>		ANC B. PRIC BE (
1.	CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST EDITIONS OF ACI 301 AND ACI 318.		WITH C. VERI D. INST
2.	ALL DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS, UNLESS NOTED OTHERWISE, SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL (ACI SP-66), LATEST EDITION.		MAN HOR E. INST
3.	CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH IS 4000 PSI,		G. TIGH
4.	ALL REINFORCING SHALL BE IN ACCORDANCE WITH ASTM A615, GRADE 60, DEFORMED.		F TC I. CON
5.	CONCRETE CLEAR COVER OVER REINFORCING SHALL BE AS LISTED BELOW, UNLESS OTHERWISE NOTED. A. CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3" B. ALL OTHER: 2" C. SEE DRAWINGS FOR EXCEPTIONS	<u>ST</u> 1.	RUCTURAL ALL STRUC ACCORDANC ANSI/AISC
6.	ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" INSIDE FORMS OR TOOLED TO 3/4" RADIUS ON SLABS UNLESS OTHERWISE NOTED.	2.	STEEL MAT OTHERWISE
7.	THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ALL FORMING, TEMPORARY BRACING AND SHORING.		A. W–S B. CHAI C. PLAT
8.	CONDUITS AND PIPING EMBEDDED IN CONCRETE SHALL BE SPACED A MINIMUM OF FOUR DIAMETERS AND THE OUTSIDE DIAMETER SHALL BE LESS THAN 30% OF THE MEMBER THICKNESS PLACED BETWEEN LAYERS OF REINFORCING.		D. PIPE E. HSS: F. HEAI G. DEFC
~	UNLESS NOTED OTHERWISE, HOOKS SHOWN ON DRAWINGS SHALL BE ASSUMED TO BE STANDARD HOOKS PER ACI 318.		H. ANC
9.			

TALLED ANCHORS (EXPANSION OR ADHESIVE)

IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION FIONS (MPII), BUT NOT LESS THAN THAT INDICATED BELOW.

TIONS BELOW ARE NOT INTENDED TO CONFLICT WITH APPLICABLE SAFETY A REGULATIONS OR TO RELIEVE CONTRACTOR OF COMPLIANCE WITH ALL BLE SAFETY AND OSHA REGULATIONS. IN CASE OF CONFLICT WITH SAFETY A REGULATIONS, CONTACT THE ENGINEER FOR GUIDANCE BEFORE DING WITH FABRICATION OR CONSTRUCTION.

E ANCHORS SHALL ONLY BE INSTALLED BY CONSTRUCTION PERSONNEL D UNDER ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION PROGRAM ROVED EQUAL. SUBMIT CERTIFICATIONS AS RECORD DATA.

DIAMETER AND EMBEDMENT SHALL BE AS INDICATED.

HALL BE DRILLED USING ROTARY HAMMER DRILLS WITH ANSI MATCHED CE CARBIDE-TIPPED DRILL BITS. DRILL BIT DIAMETER SHALL MATCH R RECOMMENDED BY MANUFACTURER. DRILL HOLES USING HILTI SAFESET OGY OR APPROVED EQUAL.

E AND CAUTION WHEN INSTALLING TO AVOID CUTTING OR DAMAGING REINFORCING STEEL. FIELD VERIFY EXISTING REINFORCING LOCATIONS D FABRICATION OR CONSTRUCTION, AND THEN COORDINATE REBAR IS WITH SHOP DRAWINGS.

<u>E ANCHORS</u> SHALL BE DEFORMED REINFORCING BARS (ASTM A615, GR 60) ANIZED THREADED ROD (ASTM F1554 GRADE 55, S-1) UNLESS SE NOTED, AND AS NOTED BELOW:

DHESIVE SHALL BE HILTI HIT-RE 500 V3 OR AN APPROVED EQUAL. SUBMIT JBLISHED COMPARISONS BETWEEN EACH SPECIFIED AND EACH ALTERNATE ICHOR.

RIOR TO INSTALLATION: ALL DEFORMED BARS AND THREADED ROD SHALL CLEAN, FREE OF OIL, GREASE, OR OTHER RESIDUE, IN ACCORDANCE TH MPII.

RIFY HOLE IS CLEAR OF DUST AND DEBRIS. STALL ADHESIVE STARTING AT BACK OF HOLE. AS REQUIRED BY MPII, USE NUFACTURER SUPPLIED PISTON PLUG INJECTION SYSTEM FOR ALL ORIZONTAL AND VERTICALLY INCLINED HOLES.

STALL ANCHOR BY SIMULTANEOUSLY TWISTING AND INSERTING INTO HOLE. LOW ANCHOR TO SET REQUIRED TIME. DO NOT DISTURB.

GHTEN NUT. DO NOT OVER-TORQUE.

NCRETE TEMPERATURE RANGE AT TIME OF INSTALLATION SHALL BE: 41DEG TO 104DEG F.

ONCRETE MOISTURE CONDITION AT TIME OF INSTALLATION: DRY.

AL STEEL

JCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN NCE WITH THE AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", C 360, LATEST EDITION.

ATERIAL SHALL BE IN ACCORDANCE WITH THE FOLLOWING UNLESS NOTED SE: -SHAPE & CHANNELS: ASTM A992 HANNELS & ANGLES: ASTM A36 ATES, MISC.: ASTM A36 PES: ASTM A53, TYPE E OR S, GRADE B SS: ASTM A500, GRADE C FADED STUDS: AWS D1.1, TYPE B FORMED BAR ANCHOR: AWS D1.1, TYPE C HCHOR RODS: ASTM F1554, GRADE 55, S-1 WELDABLE

		<i>\\</i>			RROWNSVIIIF		PUBLIC UTILITIES BOARD	
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Freese and Nichols, Inc. Texas Registered Engineering Firm F-2144						800 N. Shoreline, Suite 1600N	Uorpus Unristi, lexas 70401 Dharad - 7361) 561-6500	Fax - (361) 561-6501
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SCALE: SHOWN Date: 4/20/21	Designed by: SRT	Drown by: ZM		hedred his			Approved by:	Project #: BPU20604
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- BY LOCAL OR STATE CODES, OR OSHA REQUIREMENTS, OR 8'-0" CENTERS, WHICHEVER IS LEAST. GUARDRAIL POSTS AT STAIRS SHALL BE SPACED AS REQUIRED TO PRODUCE WITH UNIFORM SPACING BETWEEN POSTS.
- 2. PROVIDE EXPANSION JOINTS AT MAXIMUM 30'-0" INTERVALS OR AS RECOMMENDED BY MANUFACTURER, WHICHEVER IS LESSER ALONG RAILS AND TOE BOARDS.
- 3. NOTCH TOE BOARD AT GUARDRAIL POSTS TO CLEAR POST BASE PLATE.











	ABBREVIATIONS		ABBREVIATIONS	PLAN SYMBOL	DESCRIPTION	PLAN SYMBOL		DESCRIPTION
AC	ALTERNATING CURRENT	NC or N.C.	NORMALLY CLOSED		LIGHTING FIXTURE		JUNCTION BOX	
AF AFD	AMP FRAME ADJUSTABLE FREQUENCY DRIVE	NF NO or N.O.	NON-FUSED NORMALLY OPEN OR NUMBER		"A" - FIXTURE TYPE "b" - SWITCH NUMBER	PB	PULL BOX	
AFF	ABOVE FINISHED FLOOR OR GRADE	NO.					TERMINAL CABINET	
AGSB	ABOVE GROUND SPLICE BOX	OHE	OVERHEAD ELECTRIC		"A" - FIXTURE TYPE			
AIC AL OR ALUM	AMPERES INTERRUPTING CAPACITY ALUMINUM	OL OLX	OVERLOAD OVERLOAD CONTROL RELAY	XQ	CEILING MOUNTED EXIT SIGN			
AMP OR A	AMPERE	P	POLE		"X" - FIXTURE TYPE		PHOTOCELL	
ATS	AUTOMATIC TRANSFER SWITCH	PC	PHOTOCELL	× ⊢⊗⊥	WALL MOUNTED EXIT SIGN		PREWIRED	
AUTO AUX	AUTOMATIC AUXILIARY	PCC PFCC	PUMP CONTROL CONSOLE POWER FACTOR CORRECTION CAPACITOR		"X" - FIXTURE TYPE		MANHOLE	
AWG	AMERICAN WIRE GAUGE	PFR	PHASE FAILURE RELAY	FACP	FIRE ALARM CONTROL PANEL		UTILITY METER	
CB	CIRCUIT BREAKER	PL.	PLATE	F	MANUAL PULL STATION	М	MOTORIZED LOUVER	
C/C CHH	CENTER TO CENTER COMMUNICATION MANHOLE/HANDHOLE	PLC PoE	PROGRAMMABLE LOGIC CONTROLLER POWER OVER ETHERNET	X	CEILING MOUNTED STROBE	11	INDICATES THAT ALL I	ELECTRICAL EQUIPMENT AND
CKT		PPR	PHASE PROTECTIVE RELAY	<u>х</u>	WALL MOUNTED STROBE	DAMP	IN WHICH THIS NOTA	TION APPEARS SHALL BE OF
CONT.	CONTINUATION	PR.	PAIR OR PAIR CABLE	(2)	SMOKE DETECTOR			
CP	CONTROL PANEL CONTROL POWER TRANSFORMER	PT PTT	POTENTIAL TRANSFORMER PUSH TO TEST TYPE		HEAT DETECTOR		INDICATES THAT ALL I	ELECTRICAL EQUIPMENT AND MATERIALS TE ROOM OR AREA IN WHICH THIS
CR	CONTROL RELAY	PVC OTV	POLYVINYL CHLORIDE		HORN		NOTATION APPEARS	SHALL BE OF NEMA 4 CONSTRUCTION
CT	CURRENT TRANSFORMER	RC	REMOTE CONTROL		COMBINATION STROBE/HORN			
DC	DIRECT CURRENT	RCP REC.	RELAY CONTROL PANEL CIRCUIT RECLOSURE				MATERIALS INSTALLE	D WITHIN THE ROOM OR AREA
DI	DOOR INTERLOCK DIAMETER	RECP	RECEPTACLES				NEMA 4X CONSTRUC	TION APPEARS SHALL BE OF TION UNLESS OTHERWISE NOTED
DN	DOWN DIFFERENTIAL DESSLIDE	RTD	RESISTANCE TEMPERATURE DETECTOR					
DWG	DRAWING	SC	REMOTE TERMINAL UNIT SURGE CAPACITOR	o		CLASS I, DIV.1,	INDICATES THAT ALL I	HE ROOM OR AREA IN WHICH THIS
EC EHH	EMPTY CONDUIT ELECTRICAL MANHOLE	SCH SCTB	SCHEMATIC SHORT CIRCUIT TERMINAL BLOCK		CONDUIT, EXPOSED/SURFACE MOUNTED, TURNING DOWN	GROUP D	NOTATION APPEARS	SHALL CONFORM TO N.E.C REQUIREMENTS
ELEC	ELECTRICAL	SEC	SECONDS OR SECONDARY		CONDUIT STUBBED OUT AND CAPPED			
EM	EMERGENCY	SHLD. OR SH SHT	SHIELD OR SHIELDED SHEET	OHE	OVERHEAD ELECTRIC LINE	ONE-LINE OR	ΡΙΔΝ	DESCRIPTION
EMH EO	ELECTRICAL MANHOLE/HANDHOLE ELECTRICALLY OPERATED	SN OR S/N	SOLID NEUTRAL	— — — — UGE —	UNDERGROUND ELECTRIC LINE			
ETM	ELAPSED TIME METER	SSRVS	SOLID-STATE REDUCED VOLTAGE STARTER	OHP	- OVERHEAD PRIMARY LINE		🖂 OR 🗖	PANEL
EXIST.	EXISTING	SS ST	STAINLESS STEEL STARTER	— — — — UGP —	- UNDERGROUND PRIMARY LINE			
FBO FO	FURNISHED BY OTHERS FIBER OPTIC	STA. STC	STATION SIGNAL TERMINATION CABINET	——————————————————————————————————————	- OVERHEAD SECONDARY LINE			MOTOR, NUMBER DESIGNATES HORSEPOWER
FRP FT	FIBERGLASS REINFORCED POLYESTER FEET	SV SV	SOLENOID VALVE	— — — — UGS —	- UNDERGROUND SECONDARY LINE		-	VOLTMETER (WITH SWITCH IF 3-PHASE)
FU	FUSE	SWGR	SWITCH SWITCHGEAR	—— онс ——	- OVERHEAD COMMUNICATION LINE			
GA.	GAUGE	Sz# TC	MOTOR STARTER WITH SIZE TERMINATION CABINET OR TRAY CABLE	— — — — UGC —	- UNDERGROUND COMMUNICATION LINE		-	AMMETER (WITH SWITCH IF 3-PHASE)
GCP GEN	GENERATOR CONTROL PANEL GENERATOR	TEL	TELEPHONE TIME DELAY ON OPENING	—— ОНГО ——	- OVERHEAD FIBER OPTIC LINE]		METER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	TR.	TRIAD	— — — — UGFO —	- UNDERGROUND FIBER OPTIC LINE]		₩ WM - WATTMETER WHM - WATTHOUR METER
GFS	GROUND FAULT SENSING	TW	TEMPERATURE SWITCH TWISTED		FLEXIBLE METAL CONDUIT			WHDM - WATTHOUR DEMAND METER WHDR - WATTHOUR DEMAND RECORDER
GRS	GALVANIZED RIGID STEEL	TYP	TYPICAL		HEAT TRACE			PF - POWER FACTOR METER
HH HP	HANDHOLE HORSEPOWER	UPS		<u> </u>	— DENOTES A QUANTITY OF TWO (2) 3" CONDUITS			TRANSDUCER
НТ НТР	HEIGHT HEAT TRACE RANEL	V	VOLTS	2 (3 #3/0, #2G., 3"C.)	EACH CONTAINING THREE (3) NO. 3/0 AWG CONDUCTORS AND ONE (1) NO.2 AWG GROUND CONDUCTOR			AX - CURRENT TRANSDUCER WX - WATT TRANSDUCER
HTR	HEATER	VAR. VFD	VARIABLE VARIABLE FREQUENCY DRIVE	2.2/5//45	DENOTES A QUANTITY OF TWO (2) INSTRUMENT CABLES.			
ID	INTERNAL DIAMETER	VFI	VACUUM FAULT INTERUPTER	2-2/C#16	EACH CONSISTS OF TWO (2) NO.16 AWG CONDUCTORS			RELAY, NO. AS INDICATED 25 - SYNCHRONISM CHECK RELAY
IMH INST	INSTRUMENT MANHOLE INSTRUMENT	W	WITH, WIRE OR WATT	3-4"C.	THREE (3) 4" CONDUITS			27 - UNDER VOLTAGE RELAY 38 - BEARING PROTECTIVE DEVICE
IRP	INTERPOSING RELAY PANEL	WR	WEATHERPROOF WEATHER RESISTANT	MC1-XXX	CABLE TAG FOUR (4) #14 CONTROL OR POWER			40 - LOSS OF EXCITATION RELAY
KAIC	KILO AMPERE INTERRUPTING CAPACITY	XFMR XMTR	TRANSFORMER TRANSMITTER	(2 #14 SPARE)	CONDUCTORS IN A 3/4" CONDUIT. TWO (2) OF THE FOUR (4)			42 - RUNNING CONTACTOR/PILOT RELAY 46 - REVERSE PHASE/PHASE BALANCE/CURRENT RELAY
KVA KW	KILOVOLT-AMPERE KILOWATT	ХР	EXPLOSION PROOF		HOMERUN, CIRCUITS 1 AND 3 RUN TO RANELLA			47 - PHASE SEQUENCE VOLTAGE RELAY
LA	LIGHTNING ARRESTER			- LA-1,3	2 #12, #12G., 3/4"C. UNLESS NOTED OTHERWISE			50 - INSTANTANEOUS OVERCURRENT RELAY
LED	LIGHT EMITTING DIODE	Г	NOTE	\$h	SINGLE POLE SWITCH LEG SHALL CONTROL LIGHT			50G - INSTANTANEOUS GROUND 51 - TIME OVER CURRENT RELAY, GROUNDING RESISTOR TYPE
LP	LIGHTING PANEL LONG, SHORT, INSTANTANEOUS		THIS IS A STANDARD LEGEND. THEREFORE,	Ψΰ	FIXTURES WITH "b" - DESIGNATION			51N - TIME OVERCURRENT RELAY, RESIDUAL TYPE 51V - TIME OVERCURRENT RELAY WITH VOLTAGE RESTRAINT
LSIG LTG/LTNG	LONG, SHORT, INSTANTANEOUS, GROUND LIGHTS/LIGHTING		NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.					59 - OVER VOLTAGE RELAY
MBFV	MOTOR OPERATED BUTTERFLY VALVE	L		\$Xc	"c" - INDICATES NOMBER OF POLE "c" - INDICATES SWITCH SHALL CONTROL LIGHT			62 - TIME DELAY RELAY
MCC	MAIN CIRCOTT BREAKER MOTOR CONTROL CENTER		- NUMBER		FIXTURES WITH "c" DESIGNATION			63 - OVER PRESSURE RELAY 67 - AC DIRECTIONAL OVERCURRENT RELAY
MCP MFR	MOTOR CIRCUIT PROTECTOR MANUFACTURER		X	\$M	MANUAL MOTOR STARTER /DISCONNECT			83 - AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
MFR'S MH	MANUFACTURER'S MANHOLE			\$3	3 WAY SWITCH			87 - DIFFERENTIAL PROTECTIVE RELAY
ML	MULTILIN			\$4	4 WAY SWITCH			G - SUFFIX INDICATES "BUS"
MOV	MOTOR OPERATED VALVE		WHERE DRAWN	\$D D	DIMMER LIGHTING CONTROL SWITCH	11		GF - GROUND FAULT IR - INTERPOSING RELAY
MPR MR	MOTOR PROTECTION RELAY MULTIRATIO			\$tm TM	TIME SWITCH			PFR - PHASE FAILURE, PHASE REVERSAL, UNDERVOLTAGE,
MTD MTG	MOUNTED		RE: X/X-XX	*	DUPLEX RECEPTACLE, 20A, 120V, 2P, 3W			ST - SHUNT TRIP
MTS	MANUAL TRANSFER SWITCH	REF		Ê ^{(™})	"GFI" OR "GF" - GROUND FAULT INTERRUPTER TYPE			T - SUFFIX INDICATES "TRANSFORMER" TRP CAP - CAPACITOR TRIP
L			NUMBER					X - SUFFIX INDICATES "AUXILIARY"
				⊎ _F				
				0		4		
				8		4		
				┣		J		

	SCALE: SHOWN Dote: 4/20/21	NO. ISSUE	BROWNSVILLE PUBLIC UTILITIES BOARD	Freese and Nichols, Inc. Texas Reaistered Enaineerina Firm F-2144	Public Utilities Board	•••
	Designed by: JTV		SWWTP CHLORINE CONTACT		1425 Robinhood Drive	
SH E C	Drown by: JLF		BACINC CATE BEDI ACEMENT		© ★ Brownsville, 1 exas / 8521	
IEE PF					CHACEK 1-800-869-2922	•
et 1	Checked by: JWIVI		ELECTRICAL		11 。 Mater and Wastewater	BROWNSVILLE
-	Approved by: .			BOU N. Shoreline, Suite 1500N Corpus Christi, Texas 78401	(056) 983-6215	PUBLIC UTILITIES BOARD
	Project #: BPU20604			Fax - (361) 561-6501	05/18/2021 FAX: (956) 983-6220	

ONE-LINE OR	PLAN	DESCRIPTION	ONE-LINE OR	PLAN	DESCRIPTION		E DARD
CONTROL DIAGRAM		AC INDUSTRIAL			TIMING RELAY		
	-	CONTROL RELAY COIL, # - NUMBER AS INDICATED			RANGE AS NOTED, SET POINT AS NOTED #-NUMBER AS INDICATED	▼ TELEPHONE	
(M#)	-	MOTOR STARTER COIL, # - NUMBER AS INDICATED			TDD-TIME DELAY AFTER DE-ENERGIZATION-OFF DELAY TDE-TIME DELAY AFTER ENERGIZATION-ON DELAY	▼ COMBINATION TELEPHONE/DATA	••••••••••••••••••••••••••••••••••••••
•(*	-	SPECIAL CAPACITOR X SC - SURGE CAPACITOR		-	NOTC-NORMALLY OPEN, TIMED CLOSING WHEN ENERGIZED	FLOOR MOUNTED DATA OUTLET	BLIC
<u> </u>		PF - POWER FACTOR CORRECTION CAPACITOR			NCTO-NORMALLY CLOSED, TIMED OPENING WHEN ENERGIZED	FLOOR MOUNTED TELEPHONE OUTLET	Pu
<u> </u>	-	PUSH BUTTON, MOMENTARY CONTACT, SPRING RETURN, NORMALLY CLOSED			NOTO-NORMALLY OPEN, TIMED OPENING WHEN DE-ENERGIZED	POKE-THRU DEVICE COMBINATION POWER/DATA/VOICE OUTLET	d 521 er ent
	-	PUSH BUTTON, MOMENTARY CONTACT, SPRING RETURN,			NCTC-NORMALLY CLOSED, TIMED CLOSING WHEN DE-ENERGIZED	FLOOR COMBINATION POWER/DATA/VOICE OUTLET	es Boar od Dri -2922 -2922 astewat epartm 6215 83.623
				(¥##)	FIELD INSTRUMENT TAG NO OR LOOP NO AS INDICATED	廿 CATV	: Utilitic obinhc (00-869 and W(and W(56) 983 56) 983 (066) 0
	-	EMERGENCY STOP PUSH BUTTON WITH RED MUSHROOM HEAD OPERATOR (MAINTAINED CONTACT)	* -##	<u>* * * * * * * * * * * * * * * * * * * </u>	 ₩ - INDICATES INSTRUMENT TYPE DEFINED ON LOOP SHEETS ## - INDICATES LOOP NO. 	* SECURITY CAMERA * F - FIXED Z DAN/THIT/ZOONA	Public 1425 R Brownsy 1-8 Water Engined (9 ⁵
OFF ON			1		LIQUID LEVEL (FLOAT) SWITCH	SECURITY DEVICE	
	-	OFF/ON SELECTOR SWITCH		•	NORMALLY CLOSED, OPENS ON FALLING LEVEL	SEC - SECURITY PANEL MAG - MAGNETIC LOCK	
		3 POSITION SELECTOR SWITCH, MAINTAINED CONTACT		OR	NORMALLY OPEN, CLOSES ON FALLING LEVEL	CR - CARD READERS DR - REMOTE DOOR RELEASE	L. PEC DVAL
		POSITION TOP MIDDLE BOTTOM		8	NORMALLY CLOSED, OPENS ON RISING LEVEL	## MD - MOTION DETECTOR SK - SECURITY KEYPAD	
в		A X O O			NORMALLY OPEN, CLOSES ON RISING LEVEL	ES - ELECTRIC STRIKE DS - DOOR SWITCH NOTE: THIS IS A STANDARD LEGEND. THEREFORE,	
A C		B 0 0 0	─		PRESSURE OR VACUUM SWITCH NORMALLY OPEN, CLOSES ON RISING PRESSURE	IC - INTERCOM STATION SB - SECURITY PANIC BUTTON NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.	
	-	(A/B/C)		PS	NORMALLY CLOSED, OPENS ON RISING PRESSURE		
		HOA - HAND/OFF/AUTO HOR - HAND/OFF/REMOTE		OR	NORMALLY OPEN, CLOSES ON DROPPING PRESSURE	CONTROL DIAGRAM PLAN DESCRIPTION	Nichols Nichols NICA Suite Saite Saite
		LOR - LOCAL/OFF/REMOTE OCS - OPEN/CLOSE/STOP		8	NORMALLY CLOSED, OPENS ON DROPPING PRESSURE	- CONDUCTORS OR CONDUITS CROSSING PATHS BUT NOT CONNECTED	e and ed Eng S61, Te, 7561-
L OOX		OOA - ON/OFF/AUTO			TEMPERATURE SWITCH OR THERMOSTAT	- CONDUCTORS ELECTRICALLY CONNECTED	Frees egister us Chrid
		NOTE: 2 POSITION MULTI-CONTACT SWITCH		T	NORMALLY OPEN, CLOSES ON RISING TEMPERATURE	- INDICATES LIMITS OF EQUIPMENT OR WIRING ENCLOSURE	Bhonn Rex as R
		FOLLOWS SAME CONVENTION		OR TS	NORMALLY OPEN, CLOSES ON DROPPING TEMPERATURE		
		INDICATING LAMP, COLOR INDICATED * R - RED		OR	NORMALLY CLOSED, OPENS ON RISING TEMPERATURE	- LIGHTNING ARRESTER	
PTT 💥	-	G - GREEN B - BLUE		<u>×</u>	NORMALLY CLOSED, OPENS ON DROPPING TEMPERATURE	$ \odot_{\rm G}$ GROUND ROD	
		W - WHITE A - AMBER	─	FS	FLOW SWITCH (AIR, WATER, ETC.) NORMALLY OPEN, CLOSES ON INCREASED FLOW	Image: Second	E N OAR
		PTT - PUSH TO TEST		OR Ø	NORMALLY CLOSED, OPENS ON INCREASED FLOW	30A ELISE AMPERE RATING AS NOTED	
谷 52	-	MEDIUM VOLTAGE DRAWOUT TYPE					
¥				[75]	NORMALLY OPEN		
°) AF °) A AT) P	СВ	LOW VOLTAGE CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE NOTED	<u> </u>	OR	NORMALLY OPEN - HELD CLOSED	INDUCTOR	
0, 0, .		A - AMP TRIP, P - POLES		8	NORMALLY CLOSED	- CONTACT, NORMALLY OPEN (NO)	
•) MCP		MOTOR CIRCUIT PROTECTOR			NORMALLY CLOSED - HELD OPEN		
ON MCD		COMBINATION MOTOR CIRCUIT PROTECTOR AND MAGNETIC MOTOR		TQ			NSV NSV NSV
) MCF ۲ *		STARTER, FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE NOTED: * FVR - FULL VOLTAGE REVERSING		8	TORQUE SWITCH NORMALLT CLOSED, OPENS ON HIGH TORQUE	OVERLOAD CONTACT	ASI ASI
रू Sz#	×	RVNR - FULL VOLTAGE, NON REVERSING RVNR - REDUCED VOLTAGE NON-REVERSING		[T]	TRANSFORMER RATINGS AND CONNECTIONS AS NOTED	- OR - K# - KIRK KEY INTERLOCK	
L K		2S2W - TWO SPEED, ONE WINDING 2S2W - TWO SPEED, TWO WINDING S7# - NEMA SIZE OF STARTER	,Ť			- MECHANICAL INTERLOCK	
°/			+CT'S	-	CURRENT TRANSFORMER # - QUANTITY	o - TERMINAL	
<u>/*</u>		* AMPERE RATING NOTED			A - RATIO		
~,		FUSIBLE DISCONNECT SWITCH, 600 VOLT, 3 POLE, AMPERE RATING AND FUSE SIZE AS NOTED		-	POTENTIAL TRANSFORMER # - QUANTITY	- NODE	
		★ AMPERE RATING NOTED ★ FUSE RATING			GROUND CURRENT SENSOR TRANSFORMER	TB - TERMINAL OR TEST BLOCK	
<< >>	-	DRAWOUT TYPE EQUIPMENT OR DEVICE		-	# - QUANTITY A - RATIO	OR OR	
	-	MEDIUM VOLTAGE CABLE TERMINATION		-	CONTROL TRANSFORMER	- I OCATED AT SCADA RTU	
	-			-	CONTROL POWER TRANSFORMER). ISSL
	-	MEDIUM VOLTAGE FUSED AIK INTERRUPTER SWITCH				LOCATED REMOTE	
	-	FUSED CONTACTOR DRAWOUT TYPE		-		LOCATED AT MOTOR	/20/21
	-	VACUUM CONTACTOR	#A <u>ATS-1</u>		TRANSFER SWITCH ATS - AUTOMATIC TRANSFER SWITCH	–ملککم - FUSED SWITCH/FUSED CUTOUT	ote: 4/
	-	SPEED POTENTIOMETER		-	INTIS - MANUAL TRANSFER SWITCH "N" - INDICATES NORMAL SOURCE		
					#A - INDICATES STANDBY SOURCE #A - INDICATES CONTINUOUS CURRENT RATING		SHOWN SHOWN Y: JLF by: JM by: .
			<u>مرکر</u> م	-	MOTOR OVERLOAD OVERLOAD RELAY HEATER		CALE: S esigned pproved pproved

SHEET

E-2

OF



GENERAL NOTES:

1. INSTALL PULL STRING FOR ALL SPARE CONDUIT.

NOTES BY SYMBOL "

1. ROUTE CONDUIT PARALLEL TO EXISTING DUCT BANK.

2. PROVIDE TRAFFIC RATED PULL BOX. PROVIDE BOLLARDS PER STRUCTURAL DRAWINGS. RE: 6/E-7.



10'

SCALE IN FEET



GENERAL NOTES:

NOTES BY SYMBOL "

1	2	3	4	5	6
A			А	А	А
	-			В	
			D		В
В			D	С	
	A			D	С
		A	С	E	
				F	
С			D	G	D
				5	
			E	Н (1)	

MOTOR CONTROL CENTER 5 (MCC5)

1. CONDUIT ROUTING SHALL NOT INTERFERE WITH REMOVAL OF MECHANICAL EQUIPMENT.

2. STUB UP CONDUIT 12" AFG WITH PULL STRING AND CAP.

1. MCC5 IS EXISTING SQUARE D MODEL 5 CONTROL CENTER. REMOVE EXISTING SPARE BREAKER AND UTILIZE BUCKET IN SPACE 5H. COORDINATE ALL DOWN TIME WITH OWNER TWO WEEKS MINIMUM PRIOR TO SHUTDOWN.

2. TERMINAL PANEL NO.2 IS EXISTING. UTILIZE 24VDC SIGNAL FROM EXISTING I/O MODULES. IF CHOSEN VAM DOES NOT USE 24VDC, INSTALL INTERPOSING RELAYS TO SUPPLY REQUIRED VOLTAGE.

3. ROUTE CONDUIT ALONG CEILING.

4. PROVIDE NEMA 1 ENCLOSURE. ENCLOSURE SHALL BE MADE OF PAINTED STEEL. MATCH COLOR OF EXISTING PULL BOX.

5. MATCH HEIGHT OF CONDUIT WALL PENETRATION WITH EXISTING PENETRATION. STUB SPARE CONDUIT THROUGH WALL. RE: 2/E-7 FOR DETAIL.

	SCALE: SHOWN Date: 4/20/21	NO. ISSUE	BROWNSVILLE PUBLIC UTILITIES BOARD	Freese and Nichols, Inc. Texas Reaistered Enaineering Firm F-2144	Public Utilities Board	••••
	Designed by: JTV		SWWTP CHLORINE CONTACT		1425 Robinhood Drive	
SH E C	Drawn by: JLF		BACINC CATE DEDIACEMENT		Brownsville, 1 exas /8521))
HE DF					1-800-869-2922	•••
Ē					VVater and Wastewater	
т 4			ELECIRICAL	800 N Shoreline Suite 1600N	Fupineering Department	BROWNSVILLE
•	Approved by: .			Corpus Christi, Texas 78401	(956) 983-6215	PUBLIC UTILITIES BOARD
	Project #: BPU20604			Fax - (361) 561-6501	021 FAX: (956) 983-6220	

0 1' 2'

1/4"=1'-0



GENERAL NOTES:

1. CONDUIT ROUTING SHALL NOT INTERFERE WITH REMOVAL OF MECHANICAL EQUIPMENT AND RAILING.

NOTES BY SYMBOL "

1. ROUTE CONDUITS UNDER EXISTING GRATING TO MINIMIZE TRIP HAZARDS.

2. USE LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LFMC) TO CONNECT TO VALVE ACTUATOR MOTOR (VAM).

3. INSTALL EQUIPMENT RACK. INSTALL FUSED DISCONNECTS, GUTTER, AND JUNCTION BOX. RACK AND ALL ELECTRICAL EQUIPMENT SHALL BE NEMA 4X, 316 STAINLESS STEEL. RACK LOCATION SHALL ALLOW ENOUGH ROOM TO REMOVE HAND RAILS.

CONTROLS J-BOX	Summer of the second
GUTTER	
	abain in
2 VAM DISCONNECT RACK - NOT TO SCALE	
	0 1' 2' 4' 8' 1/4"=1'-0"







			INTERCONNECTION DIAC
LOOP	EQUIPMENT DESCRIPTION		FIELD DEVIC
100	SLUICE GATE VALVE ACTUATOR MOTOR 100	VAM-100	VAM-100-01C 12 #14, #14G., 1"C. 4 #14 SPARE
104	SLUICE GATE VALVE ACTUATOR MOTOR 104	VAM-104	VAM-104-01C CC 12 #14, #14G., 1"C. JL 4 #14 SPARE CC
105	SLUICE GATE VALVE ACTUATOR MOTOR 105	VAM-105	VAM-105-01C 12 #14, #14G., 1"C. 4 #14 SPARE



1	SG-01P	4"C.
2	SPARE	4"C.
3	SPARE	4"C.
4	SPARE	4"C.



POWER DUCT BANK DETAIL NOT TO SCALE

GENERAL NOTES:

- 1. EXISTING EQUIPMENT, BREAKERS, FEEDERS, ETC IS SHOWN WITH LIGHT LINES.
- 2. NEW WORK IS INDICATED BY DARK LINES.
- 3. DUCT BANKS SHALL BE SEPARATED BY 12" MINIMUM.



12
(3)(4)

1	SG-01C	2"C.
2	SPARE	2"C.
3	SPARE	2"C.
4	SPARE	2"C.

CONTROLS DUCT BANK DETAIL

NOT TO SCALE

3

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	SCALF: SHOWN Date: 4/20/21	BROWNSVILLE PLIRLIC LITILITIES ROARD	Freese and Nichols, Inc.	Public Iffilities Board	
			Texas Registered Engineering Firm F-2144		
	Designed by: JTV			1425 Robinhood Drive	
[Brownewille Texas 78521	
C	Drown by: JLF				
)F				1-800-869-2922	•
- L				• VVater and Wastemater	
Ē					
)			800 N. Shoreline, Suite 1600N	Engineering Department	B K O W N S V I L L E
	Approved by: .		Corpus Christi, Texas 78401	(056) 983-6215	PUBLIC UTILITIES BOARD
			Phone = (361) 361-6500		
	Project #: BPU20604		Fax - (361) 561-6501	021 FAX: (956) 983-6220	





NOT TO SCALE











WALL MOUNTED CONDUIT RACK



NOT TO SCALE

BOLLARD DETAIL

NOT TO SCALE

	SCALE: SHOWN Date: 4/20/2	21 NO. ISSUE	BΥ	BROWNSVILLE PUBLIC UTILITIES BOARD	Freese and Nichols, Inc. Texas Reaistered Enaineerina Firm F-2144	T TAKE OF THE	Public Utilities Board	·
	Designed by: JTV			SWWTP CHLORINE CONTACT			1425 Robinhood Drive	
SH	Drawn by: JLF			BACINIC CATE BEDI ACEMENT			brownsville, 1 exas / 8521	
IE)F						CODY L PFCHACEK	I-800-869-2922	•
E'							Water and Wastewater	
Г				ELECIRICAL		24% 137811 °C		RROWNSVILLE
7	Approved by: .				800 N. Shoreline, Suite 1600N Corpus Christi, Texas 78401	A TO SEASE O	Engineering Department	PURITC ITTIFE BOARD
					Phone - (361) 561-6500		c129-589 (9c9)	
	Project #: BPU20604			UCIAIC3 I	Fax - (361) 561-6501	05/18/2021	FAX: (956) 983-6220	



NO.1 GENERAL NOTES:

- 1. ALL MEMBERS SHOWN AND REQUIRED CONNECTING HARDWARE SHALL BE STAINLESS STEEL. 2. MEMBERS ARE INDICATED BY UNISTRUT PART NUMBERS. PROVIDE ALL MEMBERS AND CONNECTING HARDWARE
- BY UNISTRUT OR APPROVED EQUAL.
- 3. SLOPE SLAB-ON-GRADE TO DRAIN. 4. RACKS SHALL BE GROUNDED PER THE NATIONAL ELECTRICAL CODE. PROVIDE AS A MINIMUM ONE 3/4"x10'-0"
- COPPER CLAD GROUND ROD ON EACH SIDE OF THE ELECTRICAL EQUIPMENT RACK. 5. ELECTRICAL EQUIPMENT RACK SHALL BE A MINIMUM OF 36" WIDE. ARRANGE THE EQUIPMENT TO ALLOW FOR
- THE INSTALLATION OF FUTURE EQUIPMENT IN ADDITION TO WHAT IS SHOWN.



•			•		BPOWNSVIIIE		PUBLIC UTILITIES BOARD	
Public Utilities Board	1425 Robinhood Drive	brownsville, 1 exas / 8521	1-800-869-2922	Water and Wastewater		Engineering Department	(956) 983-6215	FAX: (956) 983-6220
			CODY I PECHACEK		137811 ° 4	Mar " Line Co " SV		05/18/2021
Freese and Nichols, Inc. Texns Revistered Envineating Firm F-2144						800 N. Shoreline, Suite 1600N	Corpus Christi, Texas 78401	Fax = (361) 561 - 6501
BROWNSVILLE PUBLIC UTILITIES BOARD	SWWTP CHLORINE CONTACT	BACINIC CATE BEDI ACEMENT			ELECIRICAL			UEIAILS II
BX								
NO. ISSUE								-
)ate: 4/20/21								1
SCALE: SHOWN [Designed by: JTV	Drawn bv: JLF			Checked by: J VVIVI		Approved by: .	Project #: BPU20604
	[SH C	IE IE	Ē	T	3		

	ABBREVIATIONS	INS	TRUMENT	IDENTIFICATION			LINE TYPES	NOTE:
ABBR	DESCRIPTION	PRIM				SYMBOL	DESCRIPTION	THIS IS A STANDARD LEGEND. THEREFORE
AS	AIR SUPPLY		NORMALLY		NORMALLY		INSTRUMENT SUPPLY OR SOLENOID OPERATED VALVE (1)	BE USED ON THIS PROJECT.
DCU	DISTRIBUTED CONTROL UNIT	A	CESSIBLE TO		ACCESSIBLE TO		UNDEFINED SIGNAL	
ES	ELECTRIC SUPPLY		FERATOR (2)		OF ENATOR (2)	//	PNEUMATIC SIGNAL (2)	EXVIDI
FOC	FIBER OPTIC CABLE	DISCRETE	\bigcirc		\square			
FREQ	FREQUENCY	INSTRUMENTS	\bigcirc					
HDC	HISTORICAL DATA COLLECTION						HYDRAULIC SIGNAL	FIRST LETTER
MC	MOTOR CONTROLLER	SHARED DISPLAY SHARED CONTROL	$\left(\right)$			<u> </u>	CAPILLARY TUBE	SUCCEEDING LETTERS
ORP	OXYGEN REDUCTION POTENTIAL					_~~~	ELECTROMAGNETIC OR SONIC, SIGNAL (GUIDED) (3)	THE TOTAL NUMBER C
PE	PRESSURE SENSOR	COMPUTER	\bigcirc		\square			VARIES FROM 1 TO A)
PIT	PRESSURE INDICATOR TRANSMITTER	FUNCTION					ELECTROMAGNETIC OR SONIC, SIGNAL (NOT GUIDED) (3)	(A)
PLC PS	PROGRAMMABLE LOGIC CONTROLLER POWER SUPPLY	PROGRAMMABLE	\square				INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)	UNIT NUMBER (USED)
PSH	PRESSURE SWITCH HIGH	LOGIC CONTROL				→	MECHANICAL LINK	WITH THE SAME WXX
PSL DW/	PRESSURE SWITCH LOW			\bigcirc	$\bigcirc \bigcirc$	— ———— ———	PNEUMATIC BINARY SIGNAL (ON-OFF)	LOOP NUMBER (XX)
RIO	REMOTE INPUT OUTPUT							
RTU	REMOTE TERMINAL UNIT						ELECTRIC BINARY SIGNAL (ON-OFF)	
SE	SPEED SENSOR SPEED INDICATE CONTROL STATION			INSTRUMENT WITH	SHARING COMMON	— — — A —	ELECTRIC ANALOG SIGNAL	
SL	SLUDGE			LONG TAG NUMBERS	HOUSING	- -	NON-CONNECTING LINES	DENOTES WHETHER IN
SP VED	SET POINT VARIABLE EREQUENCY DRIVE		\succ			Ť Ť Ť		
SS	SOFT STARTER		\mathcal{Q}	12		│	CONNECTING LINES	
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER			PANEL MOUNTED				
TORB		F	ILOT LIGHT	PATCHBOARD POINT	FLUSING DEVICE			SIGNAL.
				12			PROCESS SYMBOLS	
Г	IAND SWITCH ABBREVIATIONS		Ŕ			SYMBOL	DESCRIPTION	
ABBR	DESCRIPTION		\checkmark				CHECK VALVE	
		- RES	ET FOR LATCH-		UNDEFINED			
L/R	LOCAL/REMOTE	TYI	PE ACTUATOR	DIAPHRAGM SEAL	INTERLOCK LOGIC		BUTTERFLY VALVE	
H/O/S	HAND/OFF/SCADA						SLIDE GATE	
		(1) ABBREVIATIONS OF T	HE USER'S CHOI(NSOLE NO 2) CC	CE SUCH AS IP1 (INSTRU	MENT PANEL NO.1), F NO 3) FTC MAY	\bowtie	GATE VALVE	PIPE MATERIAL DI-DOO
A/H	AUTO/HAND	BE USED WHEN IT IS N	NECESSARY TO SP	PECIFY INSTRUMENT OR	FUNCTION	181	BALL VALVE	PIPE DIAMETER
L/O/R		LOCATION.						
	LOCAL/AUTO OPEN/CLOSE/STOP	(2) NORMALLY INACCESS	BIBLE OR BEHIND	-THE-PANEL DEVICES OF	R FUNCTIONS MAY			
0/0/A	ON/OFF/AUTO	BE DEPICTED BY USIN	G THE SAME SYN	IBOLS BUT WITH DASHE	D HORIZONTAL		PRIMARY ELEMENT	GENER/
L/C		BARS, I.E.					VENTURI FLOW METER	(1) THE FOLLOWING ABBREVIATIONS AF
N/B	NORMAL/BYPASS		\rightarrow				REDUCER OR INCREASER	SUPPLIES.
			/					
								HS - HYDRAULIC SUPPLY - OPT
						\square	MOTOR	IA - INSTRUMENT AIR - OPT
	INTERNATIONAL SO	CIETY OF AUTOMATIO	N TABLE			· · · · · · · · · · · · · · · · · · ·		NS - NITROGEN SUPPLY
						M	MOTOR-ARROW DENOTES VARIABLE SPEED	SS - STEAM SUPPLY
	FIRST LETTER (S)		SUCCEEDING	G LETTERS				ES - ELECTRIC SUPPLY
	PROCESS OR	READOUT OR					AIR RELEASE VALVE	GS - GAS SUPPLY
	NITIATING VARIABLE MODIFIER	PASSIVE FUNCTION	OUTPUT F		MODIFIER			
A ANA	ALYSIS (+)						SOLENOID OPERATED VALVE	100-PSIG AIR SUPPLY: ES-24DC, A 24
B BUR				ICE (+) USE	ERS CHOICE (+)			
D USE	R'S CHOICE (+) DIEEERENTIAL		CONTROL				MOTOR OPERATED VALVE	(2) THE PNEUMATIC SIGNAL SYMBOL AF
E VOL		SENSOR (PRIMARY ELEMENT)						BY A NOTE ON THE SIGNAL SYMBOL
F FLO	W RATE RATIO (FRACTION)						MIXER	
G USE	R'S CHOICE (+)	GLASS, VIEWING DEVICE						RADIATION AND LIGHT.
H HAN	ID			HIG	iΗ		SUMP PUMP	
I CUR	RENT (ELECTRICAL)	INDICATE						`
J POV	VER SCAN					())	PUMP	
K TIM	E, TIME SCHEDULE TIME RATE OF CHANGE		CONTROL S	IATION	A/			—
L LEVI						$\left(\right) \left(\circ \right)$	BLOWER	
N LISE								
O USE	RS CHOICE (+)						METERING PUMP	
P PRE	SSURE. VACUUM	POINT (TEST) CONNECTION						
Q QUA	ANTITY INTEGRATE, TOTALIZE						SUBMERSIBLE PUMP	
R RAD	DIATION	RECORD						
S SPEI	ED, FREQUENCY SAFETY		SWITCH			I Y		
T TEN	1PERATURE		TRANSMIT			5		
U MUI		MULTIFUNCTION	MULTIFUN	CTION MU	ILTIFUNCTION (+)		VERTICAL TURBINE PUMP	
V VIBF			VALVE, DAN	VIPER, LOUVER				
V WEI								
	LASSIFIED (+) X AXIS NT_STATE OR DRESENCE V AVIS				CLASSIFIED (+)			
Z POS	ITION, DIMENSION Z AXIS		DRIVFR AC	TUATOR.				
	,		UNCLASSIFI	ED FINAL				
(+) W	HEN USED, EXPLANATION IS SHOWN ADJACENT TO INST	RUMENT SYMBOL. SEE ABBREVIA	TIONS AND LETT	ER SYMBOLS.				

	ABBREVIATIO	NS] [INSTRUMENT I	DENTIFICAT	ON		LINE TYPES	NOTE:
ABBR	DE	SCRIPTION	╡┟────				SYMBOL	DESCRIPTION	THIS IS A STANDARD LEGEN
AS	AIR SUPPLY			NORMALLY		NORMALLY		INSTRUMENT SUPPLY OR SOLENOID OPERATED VALVE (1)	BE USED ON THIS PROJECT.
DCU	DISTRIBUTED CONTRO	LUNIT		ACCESSIBLE TO OPERATOR (2)		ACCESSIBLE TO OPERATOR (2)	<i>—/ / / </i>	UNDEFINED SIGNAL	
ES FOC	ELECTRIC SUPPLY FIBER OPTIC CABLE						<u></u> //	PNEUMATIC SIGNAL (2)	
FOM	FIBER OPTIC MODEM		DISCRETE					ELECTRIC SIGNAL	SYMBOL
HDC	HISTORICAL DATA COL	LECTION						HYDRAULIC SIGNAL	FIRST LI
I/O	INPUT/OUTPUT		SHARED DISPLAY						
ORP	OXYGEN REDUCTION F	POTENTIAL	SHARED CONTROL						
OWS	OPERATOR WORK STA	TION	COMPUTER					ELECTROMAGNETIC OR SONIC, SIGNAL (GUIDED) (3)	- THE TO
PIT	PRESSURE INDICATOR	TRANSMITTER	FUNCTION				~ ~	ELECTROMAGNETIC OR SONIC, SIGNAL (NOT GUIDED) (3)	
PLC PS	PROGRAMMABLE LOG POWER SUPPLY	IC CONTROLLER	PROGRAMMABLE					INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)	
PSH	PRESSURE SWITCH HIG	ίΗ	LOGIC CONTROL				→	MECHANICAL LINK	
PSL PW	PROCESS WATER	/V			\bigcirc	\sim	~~ ~~	PNEUMATIC BINARY SIGNAL (ON-OFF)	
RIO	REMOTE INPUT OUTPU	JT						ELECTRIC BINARY SIGNAL (ON-OFF)	AREA N
SE	SPEED SENSOR					INSTRUMENTS	— — — A —	ELECTRIC ANALOG SIGNAL	
SIK SI	SPEED INDICATE CONT	ROL STATION			LONG TAG NUME	ERS SHARING COMMON		NON-CONNECTING LINES	
SP	SET POINT			<u>`~'</u>		<u>^</u>	<u>ון</u> זיזד		
VFD SS	SOFT STARTER	DRIVE			$\left \begin{array}{c} \left\langle 12 \right\rangle \right $	$\langle \mathfrak{P} \rangle$		CONNECTING LINES	
SSRVS	SOLID STATE REDUCED	VOLTAGE STARTER			PANFI MOUNT				
IURB	TURBIDITY			PILOT LIGHT	PATCHBOARD PC	INT FLUSING DEVICE			AN AN SIGNAL
					12			PROCESS SYMBOLS	
HAN	ID SWITCH ABBRE	VIATIONS	ור	\land			SYMBOL	DESCRIPTION	
ABBR	DE	SCRIPTION		· ·				CHECK VALVE	
H/O/A	HAND/OFF/AUTO			RESET FOR LATCH-	DIAPHRAGM SE	AL UNDEFINED		BUTTERFLY VALVE	SYMBOL
L/R H/O/S	LOCAL/REMOTE			TYPE ACTUATOR				SLIDE GATE	х-хх
0/C	OPEN/CLOSE		(1) ABBREVIATION	NS OF THE USER'S CHOIC	CE SUCH AS IP1 (IN	STRUMENT PANEL NO.1),			
L/O/C	LOCAL/OFF/COMPUTE	R	IC2 (INSTRUME	ENT CONSOLE NO.2), CC	3 (COMPUTER CON PECIEV INSTRUMEN	SOLE NO.3), ETC., MAY T OR FUNCTION			
L/O/R	LOCAL/OFF/REMOTE		LOCATION.					BALL VALVE	L
L/A	LOCAL/AUTO		(2) NORMALLY IN	ACCESSIBLE OR BEHIND	-THE-PANEL DEVIC	S OR FUNCTIONS MAY	K:X	PLUG VALVE	[
0/0/A	ON/OFF/AUTO		BE DEPICTED B	Y USING THE SAME SYN	1BOLS BUT WITH D	ASHED HORIZONTAL		PRIMARY ELEMENT	
L/C	LOCAL/COMPUTER		BARS, I.E.	ı			X	VENTURI FLOW METER	(1) THE FOLLOWING ABB
N/ B	NORWAL/BIFA55			$\langle - \rangle$			OR 🕞	REDUCER OR INCREASER	SUPPLIES.
								ELECTROMAGNETIC FLOW METER	AS - AIR SUPPLY
									HS - HYDRAULIO
	INI						μ Υ	MOTOR	NS - NITROGEN SUPPI
	IIN	TERNATIONAL SU					M	MOTOR-ARROW DENOTES VARIABLE SPEED	PA - PLANT AIR SS - STEAM SLIPPLY
	FIRST LETTER (S)			SUCCEEDING	i LETTERS		Υ		ES - ELECTRIC SUPPLY
PRO	OCESS OR							AIR RELEASE VALVE	WS - WATER SUPPLY GS - GAS SUPPLY
LETTER INITIA	TING VARIABLE	MODIFIER	PASSIVE FUNCTION	OUTPUT F	UNCTION	MODIFIER			
A ANALYSIS	S (+)							SOLENOID OPERATED VALVE	100-PSIG AIR SUPPLY
C USER'S C	HOICE (+)				ICE (+)	USERS CHUICE (+)			
D USER'S C	CHOICE (+)	DIFFERENTIAL					K K	MOTOR OPERATED VALVE	SIGNAL MEDIUM. IF A
E VOLTAGE	E		SENSOR (PRIMARY ELEM	1ENT)			\square		BY A NOTE ON THE SI
F FLOW RA		RATIO (FRACTION)		-			<u> </u>		ELECTROMAGNETIC P
G USER'S C			GLASS, VIEWING DEVICE			Нідн	M	SUMP PUMP	RADIATION AND LIGH
I CURRENT	T (ELECTRICAL)		INDICATE						L
J POWER		SCAN					())	PUMP	
K TIME, TIN	ME SCHEDULE	TIME RATE OF CHANGE		CONTROL S	TATION				
L LEVEL			LIGHT				(f(o))	BLOWER	
N USERS CH					ICF (+)	USERS CHOICE (+)			
O USERS CH	HOICE (+)		ORIFICE, RESTRICTION					METERING PUMP	
P PRESSUR	RE, VACUUM		POINT (TEST) CONNECTION	ON					
Q QUANTIT	ТҮ	INTEGRATE, TOTALIZE							
R RADIATIO			RECORD				0		
S SPEED, F T TEMPERA	ATURE	SAFEIY		SWIICH TRANSMIT					
U MULTIVA	ARIABLE		MULTIFUNCTION	MULTIFUNC	CTION	MULTIFUNCTION (+)		VERTICAL TURBINE PUMP	
V VIBRATIC	ON MECH. ANALYSIS			VALVE, DAN	APER, LOUVER	. ,			
W WEIGHT,	, FORCE		WELL						
X UNCLASS	SIFIED (+)	X AXIS	UNCLASSIFIED	UNCLASSIFI	ED (+)	UNCLASSIFIED (+)]
T EVENT, S	N. DIMENSION			DRIVER AC	TUATOR				
				UNCLASSIFI	ED FINAL				
I				CONTROLE					

ND. THEREFORE, NOT ALL OF THIS INFORMATION MAY

EXAMPLE SIGNALS

DESCRIPTION

TAL NUMBER OF UNITS PER SET (Y FROM 1 TO A)

UMBER (USED WHEN THERE ARE MULTIPLE UNITS HE SAME WXX DESIGNATIONS)

L SYSTEM I/O INTERFACE. DIRECTION OF TRIANGLE TES WHETHER INPUT OR OUTPUT.

DENOTES SIGNAL TYPE. THE LETTER "A" DENOTES ALOG SIGNAL. THE LETTER "D" DENOTES A DISCRETE

PIPING LABELS DESCRIPTION

IATERIAL DI-DOCTILE IRON

GENERAL NOTES

REVIATIONS ARE SUGGESTED TO DENOTE THE TYPES OF SE DESIGNATIONS MAY ALSO BE APPLIED TO PURGE FLUID

C SUPPLY - OPTION INT AIR - OPTION עוכ

1AY BE ADDED TO THE INSTRUMENT SUPPLY LINE, E.G, AS-100, (: ES-24DC, A 24-VOLT DIRECT CURRENT POWER SUPPLY.

NAL SYMBOL APPLIES TO A SIGNAL USING ANY GAS AS THE A GAS OTHER THAN AIR IS USED, THE GAS MAY BE IDENTIFIED GNAL SYMBOL OR OTHERWISE.

PHENOMENA INCLUDE HEAT, RADIO WAVES, NUCLEAR

tilities Board	inhood Drive	C, 1 EXAS /0.241		a wastewater BROWNSVILLE	983-6215 PUBLIC UTILITIES BOARD	56) 983-6220
lnc. Firm F-2144				「23811 % Water and		FAX: (956
OARD Freese and Nichols, Texas Registered Engineering E	ACT				800 N. Shoreline, Suite Hor Corpus Christi, Texas 78401 Dhaad 7561 Eet EED	Fax = (361) 561 - 6501
BROWNSVILLE PUBLIC UTILITIES BO	SWWTP CHLORINE CONT	RASINS CATE REDIACEM		PROCESS & INSTRUMENTATION		LEGENUI
NO. ISSUE BY						
SCALE: SHOWN Date: 4/20/21	Designed by: CLP	Drawn by: JLF		Checked by: JVVIVI	Approved by: .	Project #: BPU20604
	F	SH D	IEF	T	L	



	SCALE: SHOWN	Date: 4/20/21	NO. ISSUE	BY	BROWNSVILLE PUBLIC UTILITIES BOARD	Freese and Nichols, Inc. Texas Reaistered Enaineerina Firm F-2144	LAF OF TANK	Public Utilities Board	•
F	Designed by: CLP				SWWTP CHLORINE CONTACT			1425 Robinhood Drive	
OF	Drown by: JLF				BASINS GATE REPLACEMENT			1-800-869-2922))··
-2	Checked by: JWM				PROCESS & INSTRUMENTATION		900 E. FUINCE	Water and Wastewater	B P O W N S V I I F
2	Approved by: .					800 N. Shoreline, Suite 1600N Corpus Christi, Texas 78401	A & LENSEO & X	Engineering Department (956) 983-6215	PUBLIC UTILITIES BOARD
	Project #: BPU2060	34			LUUP DIAGRAMS	Fax - (361) 561-6501	5-18-2021	FAX: (956) 983-6220	