CITY OF THORNE BAY, ALASKA

WATER TREATMENT PLANT IMPROVEMENTS

NOVEMBER 2018

CITY OF THORNE BAY
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CITY OF THORNE BAY, AK

IN COOPERATION WITH THE
STATE OF ALASKA
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

VILLAGE SAFE WATER

VILLAGE SAFE
WATER PROGRAM

LOCATION MAP

SHEET INDEX

PROJECT NUMBER (CONSULTANT) 50093-01 (VSW) 17-VSW-KTB-009-00
PROJECT NUMBER (FEDERAL) 17-VSW-KTB-009-00
VSW PROJECT ENGINEER DOUG POAGE, P.E.
ONSITE CONSTRUCTION MANAGER ______
FINAL DESIGN (DATE) ______
ADEC APPROVAL (DATE) ______
CONSTRUCTION PERIOD (FROM) ______
AS-BUILTS (DATE) ______

DOWL
WWW.DOWL.COM
3535 College Road, Suite 100
Fairbanks, Alaska 99709
907-374-0275

CONSULTANT

EDC, INC.
213 W. FIREWEED LANE
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(907) 276-7933
LICENSE NO. AECC705

SUBCONSULTANT

Project Status:
FINAL BID SET
Date:
NOVEMBER 2018

FINAL BID SET

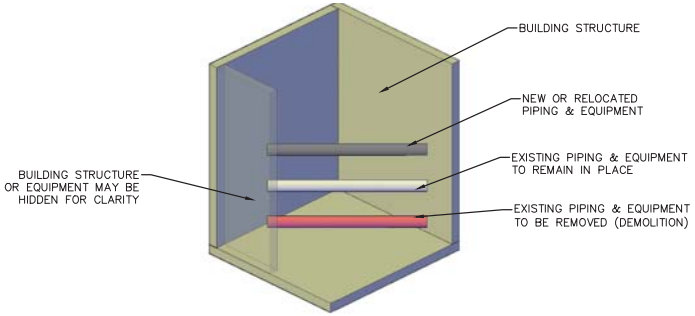
GENERAL NOTES:

1. THE LOCATION OF EXISTING UTILITIES SHOWN IS APPROXIMATE AND THE CONTRACTOR SHALL FIELD VERIFY PRIOR TO CONSTRUCTION. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEANS TO PROTECT EXISTING UTILITIES.
2. WHERE CONDITIONS ARE ENCOUNTERED WHICH APPEAR DIFFERENT FROM THOSE INDICATED ON THE PLANS OR IN THE SPECIFICATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO THE PERFORMANCE OF WORK.
3. CONSTRUCTION SAFETY AND SANITATION FACILITIES SHALL BE PROVIDED BY THE CONTRACTOR AND MAINTAINED PER THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
4. THE CONTRACTOR SHALL PROTECT ADJACENT PRIVATE AND PUBLIC PROPERTY FROM DAMAGE DURING CONSTRUCTION. ANY DISTURBED PROPERTY OR SECTION CORNERS ARE TO BE RESET BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF ALASKA AT THE CONTRACTORS EXPENSE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ANY AND ALL UTILITIES IN THE AREA PRIOR TO BEGINNING ANY WORK ON THIS PROJECT.
6. THE CONTRACTOR SHALL REPLACE EXISTING FENCING AND ROADSIDE APPURTENANCES DISPLACED OR DAMAGED BY CONSTRUCTION.
7. ALL AREAS OF DISTURBANCE SHALL BE RECLAIMED TO A CONDITION THAT IS EQUAL TO OR BETTER THAN THE ORIGINAL. TOPSOIL IS TO BE SALVAGED AND REPLACED.
8. ANY REMOVED STRUCTURES SHALL BE DISPOSED OF OFF THE SITE IN A LAWFUL MANNER.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL, USING WATER OR OTHER METHODS APPROVED BY THE ENGINEER.
10. CONTRACTOR SHALL PROVIDE A SET OF AS-BUILT DRAWINGS PRIOR TO THE FINAL ACCEPTANCE AND FINAL PAYMENT.
11. THE CONTRACTOR SHALL COMPLY WITH ALL CONDITIONS IDENTIFIED IN THE OWNER OBTAINED PERMITTING, IF APPLICABLE, SEE THE PROJECT SPECIFICATIONS FOR ADDITIONAL DETAILS.
12. ALL ABANDONED PIPES AND VALVES SHALL BE EITHER REMOVED COMPLETELY, OR PLUGGED WITH CONCRETE AND ALL VALVE BOXES SHALL BE REMOVED.
13. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH 18 ALASKA ADMINISTRATIVE CODE 72, WATER QUALITY STANDARDS, AS AMENDED APRIL 6, 2018.
14. ALL COMPONENTS IN DIRECT CONTACT WITH UNTREATED OR TREATED WATER SHALL MEET THE REQUIREMENTS OF THE "REDUCTION IN LEAD IN DRINKING WATER ACT".
15. ALL COMPONENTS IN DIRECT CONTACT WITH UNTREATED OR TREATED WATER SHALL BE CERTIFIED BY ANSI TO ANSI/NFS STANDARD 61, OR AN ENGINEER APPROVED EQUIVALENT.

VICINITY MAP

THORNE BAY, AK

GENERAL PIPING ISOMETRIC LEGEND



GENERAL PROJECT LEGEND

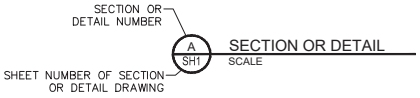
EXISTING ITEMS

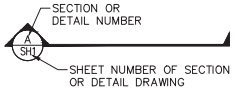
- EXISTING BUILDING OUTLINE
- EXISTING EDGE OF GRAVEL
- DEMOLITION
- EXISTING STRUCTURE
- EXISTING EDGE OF BEDROCK
- D — EXISTING DRAIN LINE
- EXISTING MANHOLE
- W — EXISTING WATER LINE
- EXISTING WATER VALVE (OPEN)
- EXISTING WATER VALVE (NORM. CLOSED)
- EXISTING GRAVEL HATCH
- DEMOLITION
- EXISTING PIPING & STRUCTURE
- EXISTING HIDDEN PIPING AND/OR EQUIPMENT
- EXISTING CENTERLINE

PROPOSED ITEMS

- PROPOSED BUILDING OUTLINE
- PROPOSED EDGE OF CONCRETE
- PROPOSED CONCRETE HATCH
- PROPOSED EDGE OF GRAVEL
- PROPOSED GRAVEL HATCH
- E — PROPOSED ELECTRIC LINE
- D — PROPOSED DRAIN LINE
- PROPOSED DRAIN CLEANOUT
- PROPOSED DRAINAGE SWALE
- PROPOSED EQUIPMENT
- PROPOSED PIPING
- PROPOSED HIDDEN PIPING AND/OR EQUIPMENT
- PROPOSED CENTERLINE

DETAIL AND SECTION DESIGNATION





COMMON ABBREVIATIONS

ABAND.	ABANDON IN-PLACE	EL.	ELEVATION	NF	NANOFILTRATION
BH	BOREHOLES	EX.	EXISTING	NW	NORTHWEST
C	COMMUNICATION	FFE	FINISHED FLOOR ELEVATION	O.D.	OUTSIDE DIAMETER
C.B.	CATCH BASIN	FG	FINISHED GRADE	S	SOUTH OR SEWER
CL	CENTERLINE	FL	FLOWLINE	S=	SLOPE
CL	CLASS	FT	FEET	SD	STORM DRAIN
CONC	CONCRETE	HDPE	HIGH DENSITY POLYTHENE	SE	SOUTHEAST
CS	CARBON STEEL	I.E.	INVERT ELEVATION	SF	SQUARE FEET
CY	CUBIC YARDS	INV.	INVERT	S.S.	STAINLESS STEEL
DEMO	DEMOLITION	INV. EL.	INVERT ELEVATION	STA.	STATION
DIA.	DIAMETER	LF	LINEAL FEET	STL	STEEL
D.I.	DUCTILE IRON PIPE	MECH	MECHANICAL	SW	SOUTHWEST
E	EAST / EASTING	MH	MANHOLE	SY	SQUARE YARD
EG	EXISTING GRADE	MIN.	MINIMUM	TYP.	TYPICAL
EL.	ELEVATION	N	NORTH / NORTHING	TOS	TOP OF SLAB
ELEC./E	ELECTRICAL	NE	NORTHEAST	@	AT

FINAL BID SET

APPROVED FOR CONSTRUCTION

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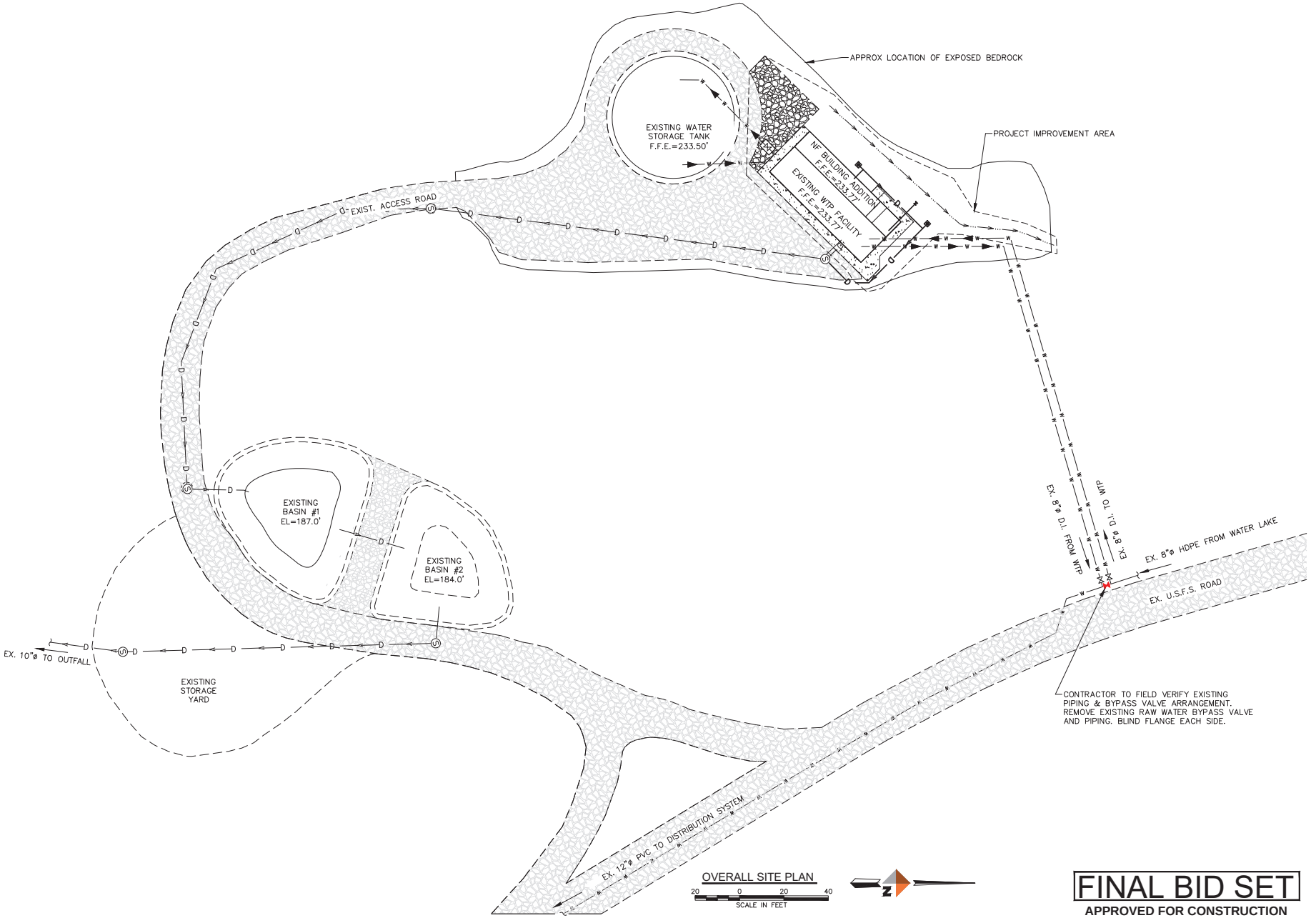
WTP IMPROVEMENTS
GENERAL NOTES, LEGEND AND ABBREVIATIONS

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. G01
SHEET 1 OF 71



FINAL BID SET

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WTP IMPROVEMENTS
OVERALL SITE PLAN

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. G02

SHEET 2 OF 71

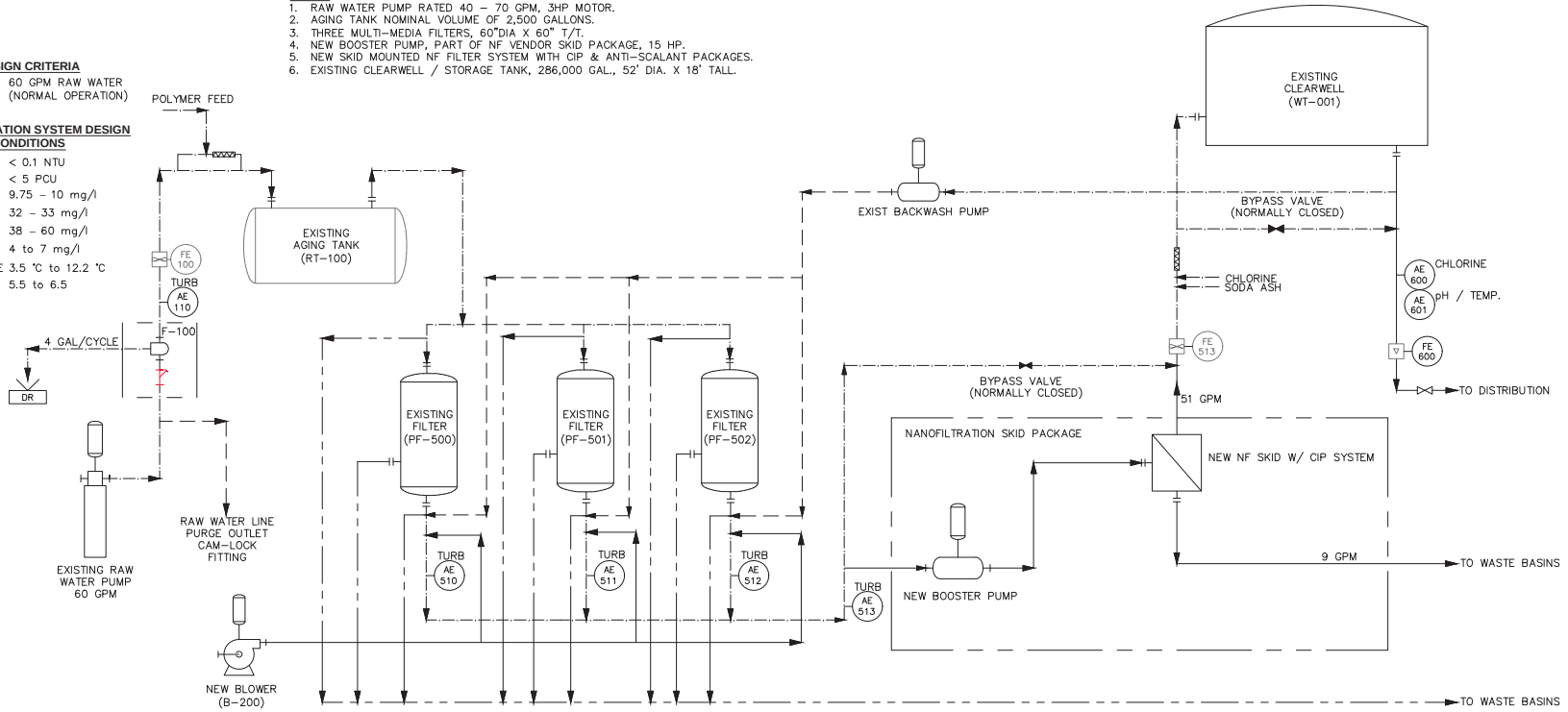
NOTES:
1. RAW WATER PUMP RATED 40 – 70 GPM, 3HP MOTOR.
2. AGING TANK NOMINAL VOLUME OF 2,500 GALLONS.
3. THREE MULTI–MEDIA FILTERS, 60"DIA X 60" T/T.
4. NEW BOOSTER PUMP, PART OF NF VENDOR SKID PACKAGE, 15 HP.
5. NEW SKID MOUNTED NF FILTER SYSTEM WITH CIP & ANTI–SCALANT PACKAGES.
6. EXISTING CLEARWELL / STORAGE TANK, 286,000 GAL., 52' DIA. X 18' TALL.

DESIGN CRITERIA

DESIGN FLOW	60 GPM RAW WATER (NORMAL OPERATION)

NANOFILTRATION SYSTEM DESIGN CONDITIONS

TURBIDITY	< 0.1 NTU
COLOR	< 5 PCU
HARDNESS	9.75 – 10 mg/l
ALKALINITY	32 – 33 mg/l
TDS	38 – 60 mg/l
TOC	4 to 7 mg/l
TEMPERATURE	3.5 °C to 12.2 °C
pH	5.5 to 6.5



OPERATIONAL DESCRIPTION:

WATER SOURCE: RAW WATER FROM WATER LAKE RESERVOIR IS PUMPED VIA AN EXISTING SUBMERSIBLE PUMP WITH CLEANABLE SCREEN HUNG BELOW THE DOCK FROM WATER LAKE THROUGH APPROXIMATELY 2,400 FEET OF 8"PIPE TO THE WATER TREATMENT PLANT.

RAW WATER TRANSMISSION LINE PURGING: THE 8"HDPE RAW WATER LINE NEEDS TO BE PURGED PERIODICALLY (TWICE A YEAR) TO REMOVE DEPOSITED ALGAE AND PLANT MATTER THAT ACCUMULATES IN THE LINE. A TRAILER–MOUNTED ENGINE POWERED SELF–PRIMING PUMP IS HOOKED UP TO A BRANCH TEE IN THE 8"HDPE TRANSMISSION LINE. A 6–IN SUCTION LINE IS SET ON THE DOCK AND CONNECTED TO THE PUMP. THIS PORTABLE PUMP DELIVERS 750 GPM AT 80 FT OF HEAD TO THE RAW WATER LINE. PURGING WATER AT 750 GPM (ABOUT 6 FT/S VELOCITY) IS PUMPED FROM WATER LAKE THROUGH THE LINE TO A DISCHARGE POINT AT THE WATER TREATMENT PLANT.

TRANSMISSION LINE AIR RELEASE / VACUUM BREAKERS: THE RAW WATER TRANSMISSION LINE HAS A HORIZONTAL SECTION AT ITS HIGH POINT. AT EACH END OF THIS HORIZONTAL LINE ARE TWO AIR RELEASE / VACUUM BREAKER VALVES IN ORDER TO PURGE THE LINE OF AIR DURING STARTUP, OPERATIONS, AND TO ALLOW AIR INTO THE TRANSMISSION LINE WHILE IT IS BEING DRAINED.

DEER CREEK BRIDGE CROSSING: THE RAW WATER LINE CROSSES OVER A STEEL TRUSS BRIDGE SPANNING DEER CREEK. A PORTABLE ELECTRIC SUMP PUMP IS HANGING ON THE BRIDGE IN CASE THE WATER LAKE RESERVOIR IS NOT AVAILABLE. THE PORTABLE PUMP WOULD BE LOWERED INTO DEER CREEK AND USED TO PUMP WATER TO THE WATER TREATMENT PLANT IN EMERGENCY CASES ONLY.

WATER TREATMENT PLANT PURGING VALVES: TWO 6" VALVES IN THE WTP, ONE ON THE DOWNSTREAM END OF THE TEE RUN OF THE RAW WATER LINE AND THE OTHER ON THE TEE BRANCH, ARE USED TO ALLOW PURGING OF THE RAW WATER LINE WHEN THE PURGING OPERATION IS UNDERWAY. THE DOWNSTREAM VALVE IS CLOSED, THE BRANCH VALVE IS OPENED, AND THE NEW SCREEN IS ISOLATED WITH TWO NEW 3" VALVES TO ALLOW APPROXIMATELY 750 GPM OF MIXED AIR, WATER, AND PIPELINE SEDIMENT TO BE PUMPED THROUGH THE PIPELINE AND TO THE DISPOSAL FIELD.

COAGULANT INJECTION AND STATIC MIXER: THIS STEP IS THE BEGINNING OF THE WATER TREATMENT PROCESS. A COAGULANT POLYMER IS INJECTED INTO THE RAW WATER AT THE INITIAL STATIC MIXER. THE COAGULANT IS FED INTO THE INJECTION POINT NEAT BY A CHEMICAL FEED PUMP. A RAW WATER INLET FLOW METER REPORTS THE FLOW RATE AND CAN BE USED TO PACE THE CHEMICAL FEED PUMP. A STREAMING CURRENT DETECTOR CAN ALSO BE USED TO ADJUST COAGULANT FEED RATES BY OPTIMIZING THE NET CHARGE ON THE COATED COLLOIDAL MATERIAL (MAINLY COLOR, TURBIDITY, AND COAGULANTS) IN THE WATER. THE STATIC MIXER CREATES STRONG EDDY CURRENTS, THOROUGHLY MIXING COLLOIDAL CONTAMINANTS AND COAGULANT.

REACTION / AGING TANK: A 2,500 GALLON BAFFLED REACTION TANK PROVIDES RESIDENCE TIME FOR THE COAGULATION PROCESS TO TAKE PLACE. AT 60 GALLONS PER MINUTE FLOW RATE, THE TANK PROVIDES 41 MINUTES OF RESIDENCE TIME, WHICH JAR TESTS HAVE SHOWN TO BE ADEQUATE TIME TO FORM FLOC THAT IS LARGE ENOUGH TO BE FILTERED. A COMBINATION AIR RELEASE / VACUUM BREAKER VALVE PROVIDES FOR THE VENTING OF AIR OUT OF THE TANK AND ADMITTANCE OF AIR INTO THE TANK WHEN IT IS DRAINED DOWN FOR CLEANING.

PRESSURE FILTRATION: FLOC–LADEN WATER ENTERS THE PRESSURE FILTERS WHICH ARE NORMALLY ON–LINE IN PARALLEL. THE HEAD SPACE IN THE FILTER VESSELS ABOVE THE FILTER MEDIA PROVIDES AN ADDITIONAL 7 MINUTES OF RESIDENCE TIME FOR FLOC FORMATION. FLOC–LADEN WATER FLOWS THROUGH LAYERED FILTER MEDIA, ANTHRACITE, QUARTZ SAND, GARNET, AND GRAVEL UNDERBED LAYERS BEFORE IT EXITS THE FILTER VESSEL THROUGH THE UNDERDRAIN SCREENS. FILTERED WATER FLOWS THROUGH A FLOW CONTROL VALVE WHICH MAINTAINS A CONSTANT RATE OF 20 GPM THROUGH THE FILTER MEDIA IN EACH VESSEL. A VARIABLE AREA FLOWMETER IS USED TO MANUALLY MONITOR FLOW AND SET THE FLOW RATE. FILTERED WATER THEN FLOWS TO THE NF SKID FOR FURTHER TREATMENT TO REMOVE ORGANICS. A TURBIDIMETER MONITORS TURBIDITY OF THE FILTERED WATER FROM EACH FILTER VESSEL AND THE COMBINED FILTERED WATER STREAM. A FILTERED WATER FLOW METER IS PROVIDED TO RECORD THE AMOUNT OF FILTERED WATER PRODUCED, AS WELL AS THE TOTAL FLOW RATE.

PRESSURE FILTER CLEANING: WHEN THE PRESSURE FILTERS ARE FULL OF CONTAMINANTS (EITHER HIGH DIFFERENTIAL PRESSURE OR TURBIDITY BREAKTHROUGH) THE FILTRATION OPERATION STOPS AND BACKWASH BEGINS. MOTORIZED VALVES ARE PROVIDED TO ADJUST THE FLOW FOR EACH OF THE FOLLOWING SEQUENCES:
WATER ABOVE THE ANTHRACITE FILTER MEDIA LAYER IS DRAINED DOWN, THE AIR BLOWER STARTS AND RUNS FOR APPROXIMATELY 2 MINUTES, THE BLOWER STOPS, A SLOW FILL AT 75 GPM OF POTABLE WATER FROM STORAGE GENTLY ELIMINATES TRAPPED AIR IN THE FILTER MEDIA AND FILLS THE HEAD SPACE ABOVE THE FILTER MEDIA (ABOUT 3 MINUTES), A CLA–VAL PROVIDES 240 TO 300 GPM OF BACKWASH FLOW (AS DESIRED) THROUGH THE FILTER MEDIA AND OUT OF THE FILTER VESSEL TO WASTE. WHEN THE BACKWASH OPERATION IS COMPLETE, ALL MOTORIZED VALVES ARE CLOSED AND THE FILTER RESTARTS BY FILTERING TO WASTE FOR 10 TO 15 MINUTES TO CONDITION THE MEDIA. AN INDIVIDUAL FILTER VESSEL CAN BE BACKWASHED AND CONDITIONED WHILE THE OTHER TWO FILTER VESSELS ARE ONLINE IN FILTRATION MODE. AFTER CONDITIONING, THE FILTER RETURNS TO NORMAL FILTRATION MODE.

NANOFILTRATION MEMBRANE SKID: THIS PROJECT ADDS A NEW NANOFILTRATION MEMBRANE SKID TO FILTER OUT ADDITIONAL TOC IN THE WATER PRIOR TO CHLORINATION. DETAILS OF THE OPERATION OF THIS SYSTEM ARE PROVIDED IN THE OPERATING MANUAL.

DISINFECTION: A 12.5% SOLUTION OF SODIUM HYPOCHLORITE IS INJECTED AT THE FINAL STATIC MIXER FOR DISINFECTION OF THE FILTERED WATER (1–LOG INACTIVATION OF GIARDIA UNDER THE SWTR). IF DESIRED, A SODA ASH SOLUTION CAN ALSO BE INJECTED FOR INCREASING THE PH OF THE WATER FOR CORROSION CONTROL PURPOSES.

WATER STORAGE AND DISTRIBUTION: TREATED WATER THEN FLOWS INTO A 280,000 GALLON WATER STORAGE TANK. A CIRCULATING PUMP CONSTANTLY CIRCULATES 50–GPM THROUGHOUT THE TANK TO KEEP IT THOROUGHLY MIXED. A NEW WATER LEVEL TRANSMITTER PROVIDES AN INDICATION OF TANK LEVEL AND A SIGNAL TO START OR STOP THE WATER TREATMENT PLANT. WATER FLOWS OUT OF THE STORAGE TANK THROUGH A NEW FLOW METER / TOTALIZER AND INTO THE 8–IN BURIED POTABLE WATER DISTRIBUTION MAIN TO TOWN.

FINAL BID SET
APPROVED FOR CONSTRUCTION

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WTP IMPROVEMENTS
PROCESS FLOW DIAGRAM & DESIGN CRITERIA

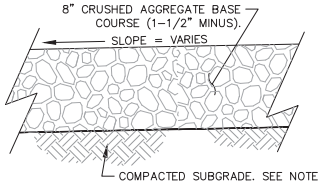
REVISION	BY	DATE
65% REVIEW SET	CN	3–18
95% AGENCY SUBMITTAL	CN	5–18
FINAL BID SET	CN	11–18

Project No. 329.50093.01
Date 2019–01–08
Designed
Drawn
Approved

Sheet No. G03
SHEET 3 OF 71

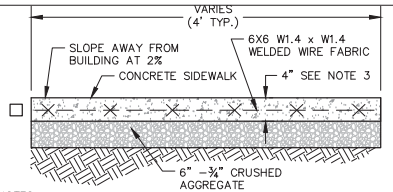
CAUTION ! ! !
EXISTING UTILITIES IN AREA
CONTRACTOR RESPONSIBLE FOR UTILITY LOCATES PRIOR TO AND DURING CONSTRUCTION

NOTES:
1. UTILITIES AND ELEVATIONS SHOWN ARE BASED ON RECORD DRAWINGS.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING UTILITY LOCATIONS AND WATER MAIN CROSSING ELEVATIONS PRIOR TO CONSTRUCTION.



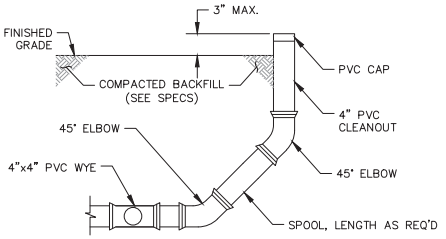
NOTE:
1. PRIOR TO PLACEMENT OF AGGREGATE BASE COURSE, ALL TOPSOIL AND DELETERIOUS MATERIAL SHALL BE REMOVED.
2. COMPACT SUBGRADE OR BASE COURSE TO 95% OF MAXIMUM DRY DENSITY, ±2% OF OPTIMUM MOISTURE CONTENT, PER ASTM D698.

1 / C01 TYPICAL GRAVEL SECTION
NTS

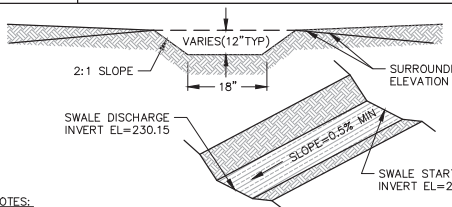


NOTES:
1. COMPACT SUBGRADE OR BASE COURSE TO 95% OF MAXIMUM DRY DENSITY, ±2% OF OPTIMUM MOISTURE CONTENT, PER ASTM D698.
2. CONTRACTION JOINTS SHALL BE PLACED AT 10' MAX INTERVALS AND SHALL HAVE A MINIMUM DEPTH OF 3/4" AND MINIMUM WIDTH OF 1/8".
3. SIDEWALKS IN FRONT ADJACENT TO OVERHEAD DOORS SHALL BE 8" THICK.

2 / C01 TYPICAL SIDEWALK
NTS

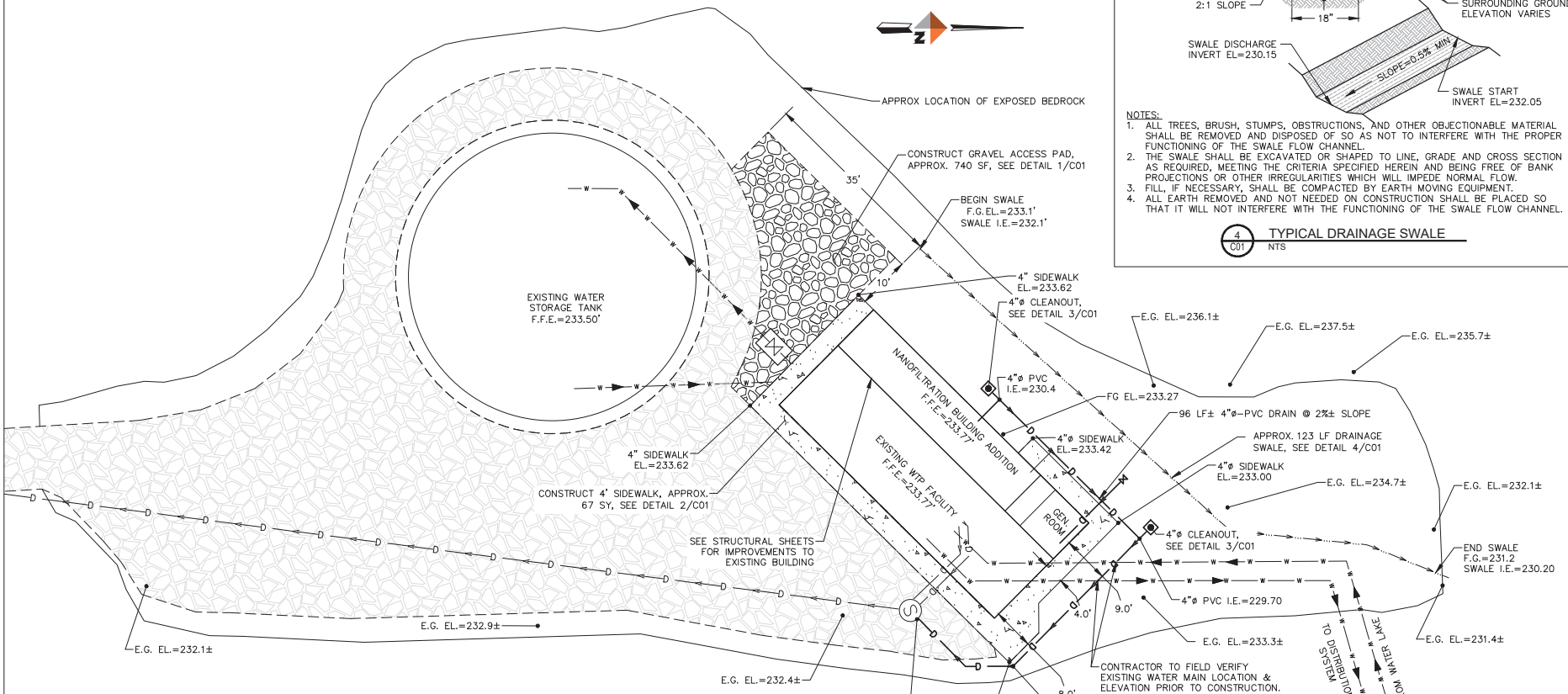


3 / C01 TYPICAL DRAIN CLEAN-OUT
NTS



NOTES:
1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE FLOW CHANNEL.
2. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE AND CROSS SECTION AS REQUIRED, MEETING THE CRITERIA SPECIFIED HEREIN AND BEING FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILL, IF NECESSARY, SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
4. ALL EARTH REMOVED AND NOT NEEDED ON CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE FLOW CHANNEL.

4 / C01 TYPICAL DRAINAGE SWALE
NTS



SITE GRADING PLAN
10 0 10 20
SCALE IN FEET

FINAL BID SET
APPROVED FOR CONSTRUCTION

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CIVIL SITE PLAN

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FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
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Approved

Sheet No. C01
SHEET 4 OF 71

VALVE & INSTRUMENTATION IDENTIFIER LETTERS

FIRST-LETTERS	INDICATING MEASURED OR CONTROLLED VARIABLE	CONTROLLERS			VALVES	READOUT DEVICE		SWITCHES AND ALARM DEVICES			TRANSMITTERS			SOLENOIDS RELAYS COMPUTING DEVICES	PRIMARY ELEMENT	TEST POINT	WELL OR PROBE	VIEWING DEVICE GLASS	SAFETY DEVICE	FINAL ELEMENT
		RECORDING	INDICATING	BLIND		RECORDING	INDICATING	HIGH*	LOW	COMB	RECORDING	INDICATING	BLIND							
A	ANALYSIS	ARC	AIC	AC		AR	AI	ASH	ASL	ASHL	ART	AIT	AT	AY	AE	AP	AW			AV
B	BURNER/ COMBUSTION	BRC	BIC	BC		BR	BI	BSH	BSL	BSHL	BRT	BIT	BT	BY	BE		BW	BG		BZ
C	CONDUCTIVITY / CONTROL		CIC	CC	CV										CE					
D	USER'S CHOICE																			
E	VOLTAGE	ERC	EIC	EC		ER	EI	ESH	ESL	ESHL	ERT	EIT	ET	EY	EE					EZ
F	FLOW RATE	FRC	FIC	FC	FCV FICV	FR	FI	FSH	FSL	FSHL	FRT	FIT	FT	FY	FE	FP		FG		FV
FQ	FLOW QUANTITY	FQRC	FQIC			FQR	FQI	FQSH	FQSL			FQIT	FQT	FQY	FQE					FQV
FF	FLOW RATIO	FFRC	FFIC	FFC		FFR	FFI	FFSH	FFSL						FE					FFV
G	USER'S CHOICE				GV															
H	HAND		HIC	HC	HV					HS										HV
I	CURRENT	IRC	IIC			IR	II	ISH	ISL	ISHL	IRT	IIT	IT	IY	IE					IZ
J	POWER	JRC	JIC	ARC		JR	JI	JSH	JSL	JSHL	JRT	JIT	JT	JY	JE					JV
K	TIME	KRC	KIC	KC	KCV	KR	KI	KSH	KSL	KSHL	KRT	KIT	KT	KY	KE					KV
L	LEVEL	LRC	LIC	LC	LCV	LR	LI	LSH	LSL	LSHL	LRT	LIT	LT	LY	LE		LW	LG		LV
M	MOISTURE/ MOTORIZED						MI						MT						MS	
N	USER'S CHOICE																			
O	USER'S CHOICE																			
P	PRESSURE VACUUM	PRC	PIC	PC	PCV	PR	PI	PSH	PSL	PSHL	PRT	PIT	PT	PY	PE	PTP			PSV PSE	PV
PD	PRESSURE DIFFERENTIAL	PDRC	PDIC	PDC	PDCV	PDR	PDI	PDSH	PDSL		PDRT	PDIT	PDT	PDY	PE	PTP				PDV
Q	QUALITY	QRC	QIC			QR	QI	QSH	QSL	QSHL	QRT	QIT	QT	QY	QE					QZ
R	RADIATION	RRC	RIC	RC		RR	RI	RSH	RSL	RSHL	RRT	RIT	RT	RY	RE		RW			RZ
S	SPEED	SRC	SIC	SC	SCV	SR	SI	SSH	SSL	SSHL	SRT	SIT	ST	SY	SE					SV
T	TEMPERATURE	TRC	TIC	TC	TCV	TR	TI	TSH	TSL	TSHL	TRT	TIT	TT	TY	TE	TP	TW		TSE	TV
T	TEMPERATURE DIFFERENTIAL	TDRC	TDIC	TDC	TDCV	TDR	TDI	TDSH	TDSL		TDRT	TDIT	TDT	TDY	TDE	TDP TP	TDW TW			TDV
U	MULTIVARIABLE					UR	UI							UY						UV
V	MACHINERY VIBRATION ANALYSIS					VR	VI	VSH	VSL	VSHL	VRT	VIT	VT	VY	VE					VZ
W	WEIGHT FORCE	WRC	WIC	WC	WCV	WR	WI	WSH	WSL	WSHL	WRT	WIT	WT	WY	WE					WZ
WD	WEIGHT FORCE DIFFERENTIAL	WDRC	WDIC	WDC	WDCV	WDR	WDI	WDSH	WDSL		WDRT	WDIT	WDT	WDY	WDE WE					WDZ
X	USER'S CHOICE																			
Y	EVENT STATE PRESENCE		YIC	YC		YR	YI	YSH	YSL				YT	YY	YE					YZ
Z	POSITION DIMENSION	ZRC	ZIC	ZC	ZCV	ZR	ZI	ZSH	ZSL	ZSHL	ZRT	ZIT	ZT	ZY	ZE					ZV
ZD	GAUGING DEVIATION	ZDRC	ZDIC	ZDC	ZDCV	ZDR	ZDI	ZDSH	ZDSL		ZDRT	ZDIT	ZDT	ZDY	ZDE					ZDV

NOTE:
THIS TABLE IS NOT ALL-INCLUSIVE

*A, ALARM, THE ANNUNCIATING DEVICE, MAY BE USED IN THE SAME FASHION AS, SWITCH, THE ACTING DEVICE.

** THE LETTERS H AND L MAY BE OMITTED IN THE UNDEFINED CASE.

OTHER POSSIBLE COMBINATIONS:

FO	(RESTRICTION ORIFICE)	PFR	(RATIO)
FRK, HIK	(CONTROL STATIONS)	KQI	(RUNNING TIME INDICATOR)
FX	(ACCESSORIES)	QQI	(INDICATING COUNTER)
TJR	(SCANNING RECORDER)	WKIC	(RATE-OF-WEIGHT-LOSS CONTROLLER)
LLH	(PILOT LIGHT)	HMS	(HAND MOMENTARY SWITCH)

INSTRUMENT/FUNCTION SYMBOLS

	PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR	PRIMARY LOCATION NORMALLY INACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR	AUXILIARY LOCATION NORMALLY INACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	X / XX	X / XX	X / XX	X / XX	X / XX
SHARED DISPLAY, SHARED CONTROL	X / XX	X / XX	X / XX	X / XX	X / XX
PROGRAMMABLE LOGIC CONTROL	X / XX	X / XX	X / XX	X / XX	X / XX

INSTRUMENTATION IDENTIFICATION TABLE

J-1 COMPONENT FUNCTION LETTERS
J-2 COMPONENT TAG NUMBER
J-3 APPLICABLE NOTES
J-4 SYSTEM ACRONYM
J-5 SET-POINT(S)
J-6 FUNCTION (SEE INSTRUMENT/FUNCTION SYMBLOS)

NOTE:
INSTRUMENTATION FUNCTION IDENTIFIERS (J-1) AND FUNCTION SYMBOLS PER ANSI/ISA S5.1.

MISC. DETAILS

SYMBOL	DESCRIPTION
	FLOW ARROW
X/XX X/XX	INSTRUMENTS SHARING COMMON HOUSING
X/XX	DISCRETE HARDWARE INTERLOCK
	GAP
SC XX/YY	SAMPLE CONNECTION
Y X	GRAVITY FLOW OR FREE DRAIN WITH NO POCKETS
S	CHEMICAL SEAL

MISC. DETAILS

SYMBOL	DESCRIPTION
X	P=PURGE OR FLUSHING DEVICE R=RESET FOR LATCH-TYPE ACTUATOR I = INTERLOCK LOGIC
X	S = SOLENOID D = DIGITAL P = PILOT T = TRAP
√	ROOT EXTRACTION
±	BIAS
X	MULTIPLY
>	HIGH SELECTING
<	LOW SELECTING
>	HIGH LIMITING
<	LOW LIMITING
K	PROPORTIONAL
-K	REVERSE PROPORTIONAL
+	SUMMING
÷	DIVIDING
X	PILOT LIGHT X=COLOR R=RED G=GREEN Y=YELLOW

PIPING LINETYPES

SYMBOL	DESCRIPTION
	(NEW) PRIMARY PROCESS FLOW LINE
	(NEW) SECONDARY PROCESS FLOW LINE
	(EXISTING) PRIMARY PROCESS FLOW LINE
	(EXISTING) SECONDARY PROCESS FLOW LINE
	(NEW) EQUIPMENT/PIPING INSTRUMENTS
	(EXISTING) EQUIPMENT/PIPING INSTRUMENT
	JACKETED LINE
	ELECTRIC SIGNAL
	PROCESS AIR OR PNEUMATIC SIGNAL*
	HYDRAULIC SIGNAL
	INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)
	CAPILLARY TUBE
	INSTRUMENT SUPPLY OR CONNECTION TO PROCESS
	ELECTROMAGNETIC OR SONIC SIGNAL** (GUIDED)
	MECHANICAL LINK

MISC. DETAILS

SYMBOL	DESCRIPTION
	SPECIAL PIPING TAG: SP = SPECIALTY PIPING ITEM TP = TIE POINT
X X"-XX	INSULATION AND TRACING: E = ELECTRICAL S = STEAM
X"-XX	INSULATION, THICKNESS AND TYPE: FP = FREEZE PROTECTION HC = HEAT CONSERVATION PP = PERSONNEL PROTECTION
AA BB	PIPING CLASS BREAK OR CHANGE
T	TIE IN

DRAIN CONNECTORS

SYMBOL	DESCRIPTION
X Y Z	OPEN DRAIN X = CONNECTOR NUMBER Y = DESTINATION LINE / SERVICE CODE Z = DRAWING
X Y Z	CLOSED DRAIN X = CONNECTOR NUMBER Y = DESTINATION LINE / SERVICE CODE Z = DRAWING
Y	OPEN DRAIN NO P&ID Y = DESTINATION LINE / SERVICE CODE
Y	CLOSED DRAIN NO P&ID Y = DESTINATION LINE / SERVICE CODE

CONNECTORS AND TIE-IN

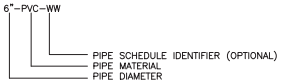
SYMBOL	DESCRIPTION
A B C D	OFF PAGE CONNECTOR A = SERVICE B = CONNECTOR NUMBER C = DRAWING D = ORIGIN OR DESTINATION
A B C D	LINES AND INSTRUMENTS SIGNAL CONNECTOR A = SERVICE B = CONNECTOR NUMBER C = DRAWING D = ORIGIN OR DESTINATION
B D	UTILITY CONNECTOR B = CONNECTOR NUMBER D = ORIGIN OR DESTINATION

NOTES:

* THE PNEUMATIC SIGNAL SYMBOL APPLIES TO A SIGNAL USING ANY GAS AS THE SIGNAL MEDIUM. IF GAS OTHER THAN AIR IS USED, THE GAS MAY BE IDENTIFIED BY A NOTE ON THE SIGNAL SYMBOL OR OTHERWISE.

** ELECTROMAGNETIC PHENOMENA INCLUDE HEAT, RADIO WAVES, NUCLEAR RADIATION, AND LIGHT.

LINE NUMBERING



PIPE SCHEDULE IDENTIFIERS

NUMERIC SERIES	IDENTIFIER	DESCRIPTION
100	RW	RAW WATER
200	PTW	PRE-TREATED WATER
300	BWW	BACKWASH WATER
400	WW	WASTE WATER
500	FW	FILTERED WATER
600	PW	POTABLE WATER

FINAL BID SET
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WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION
LEGEND / INDEX 1

REVISION	BY	DATE
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95% AGENCY SUBMITTAL	CN	5-18
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Approved

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SHEET 5 OF 71

PIPING SYMBOLS

VALVES

SYMBOL	DESCRIPTION
	GATE VALVE
	GLOBE VALVE
	PLUG VALVE
	NEEDLE VALVE
	PINCH VALVE
	CHECK VALVE
	BALL VALVE
	BUTTERFLY VALVE
	ANGLE VALVE
	3-WAY VALVE
	4-WAY VALVE
	KNIFE VALVE
	DIAPHRAGM VALVE
	ROTARY VALVE
	STOP CHECK VALVE

RELIEF VALVES

SYMBOL	DESCRIPTION
	AIR RELEASE VALVE
	RUPTURE DISC FOR PRESSURE RELIEF
	RUPTURE DISC FOR VACUUM RELIEF
	PRESSURE RELIEF VALVE
	VACUUM RELIEF VALVE
	PRESSURE AND VACUUM RELIEF VALVE
P	PILOT OPERATED RELIEF VALVE

SYSTEM FLOW PRIMARY ELEMENTS

SYMBOL	DESCRIPTION
	RESTRICTION ORIFICE
M	MAGNETIC
	TURBINE
	ULTRASONIC
	VORTEX
	PITOT TUBE
	AVERAGING PITOT TUBE
	FLOW NOZZLE
	VENTURI
	WEDGE METER
	FLUME
	WEIR
	POSITIVE DISPLACEMENT
	ORIFICE IN QUICK CHANGE FITTING
	TARGET
XX XXX	ROTAMETER
XX XXX	INTEGRAL VALVE ROTAMETER
	FLOW CONDITIONING DEVICE

PIPE FITTINGS

SYMBOL	DESCRIPTION
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	HOSE
	FLANGE CONNECTION
	BLIND FLANGE
	PLUG
	CAP
	WELDED CONNECTION
	BLANK WITH FLANGES
	CLOSED FIGURE 8 BLIND WITH FLANGES
	OPEN FIGURE 8 BLIND WITH FLANGES
	SPACER WITH FLANGES

SPECIALTY ITEMS

SYMBOL	DESCRIPTION
	CONE STRAINER
	TEMPORARY STRAINER
	T - TYPE STRAINER
	DUPLEX STRAINER
	Y - TYPE STRAINER
	BASKET STRAINER
S	VENT SILENCER
S	INLINE SILENCER
F	FLAME ARRESTOR
D	DETONATION ARRESTOR

SPECIALTY ITEMS CONTINUED

SYMBOL	DESCRIPTION
T	STEAM TRAP
DS	DESUPERHEATER
	FILTER
	BREATHER OR INLET FILTER
	DAMPER
	DIVERTER VALVE
	EXCESS FLOW VALVE
	VENT COVER
	FLEXIBLE HOSE
	PULSATION DAMPER
	EXHAUST HEAD
	EJECTOR / EDUCTOR
RS	REMOVABLE SPOOL
	INLINE MIXER
	EXPANSION JOINT
	DIAPHRAGM ACTUATOR
S	SOLENOID ACTUATOR
M	MOTOR ACTUATOR

EQUIPMENT SYMBOLS

PUMPS

SYMBOL	DESCRIPTION
	HORIZONTAL CENTRIFUGAL PUMP
	VERTICAL INLINE PUMP
	CENTRIFUGAL SUMP PUMP OR WET WELL PUMP
	PROGRESSIVE CAVITY PUMP
	POSITIVE DISPLACEMENT PUMP
	LIQUID RING VACUUM PUMP
	VERTICAL CAN PUMP
	PROGRESSIVE CAVITY OR SCREW PUMP

MIXERS

SYMBOL	DESCRIPTION
	ELECTRIC MOTOR
	TURBINE DRIVE
	DIESEL ENGINE
	AGITATOR OR MIXER

COMPRESSORS & BLOWERS

SYMBOL	DESCRIPTION
	CENTRIFUGAL COMPRESSOR
	RECIPROCATING COMPRESSOR
	SCREW COMPRESSOR
	POSITIVE DISPLACEMENT BLOWER
	CENTRIFUGAL BLOWER

MISCELLANEOUS

SYMBOL	DESCRIPTION
	TANK
	DIAPHRAGM LINED TANK
	PRESSURE VESSELS, VERTICAL (SHOWN) OR HORIZONTAL (TANKS, RECEIVERS, SEPARATORS, SUMPS ETC.)
	PRESSURIZED GAS BOTTLE
	55 GALLON DRUM
	COLLECTION BIN / HOPPER
	CYCLONE SEPARATOR
	COMBINATION EYEWASH STATION

FINAL BID SET

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VILLAGE SAFE WATER

WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION
LEGEND / INDEX 2

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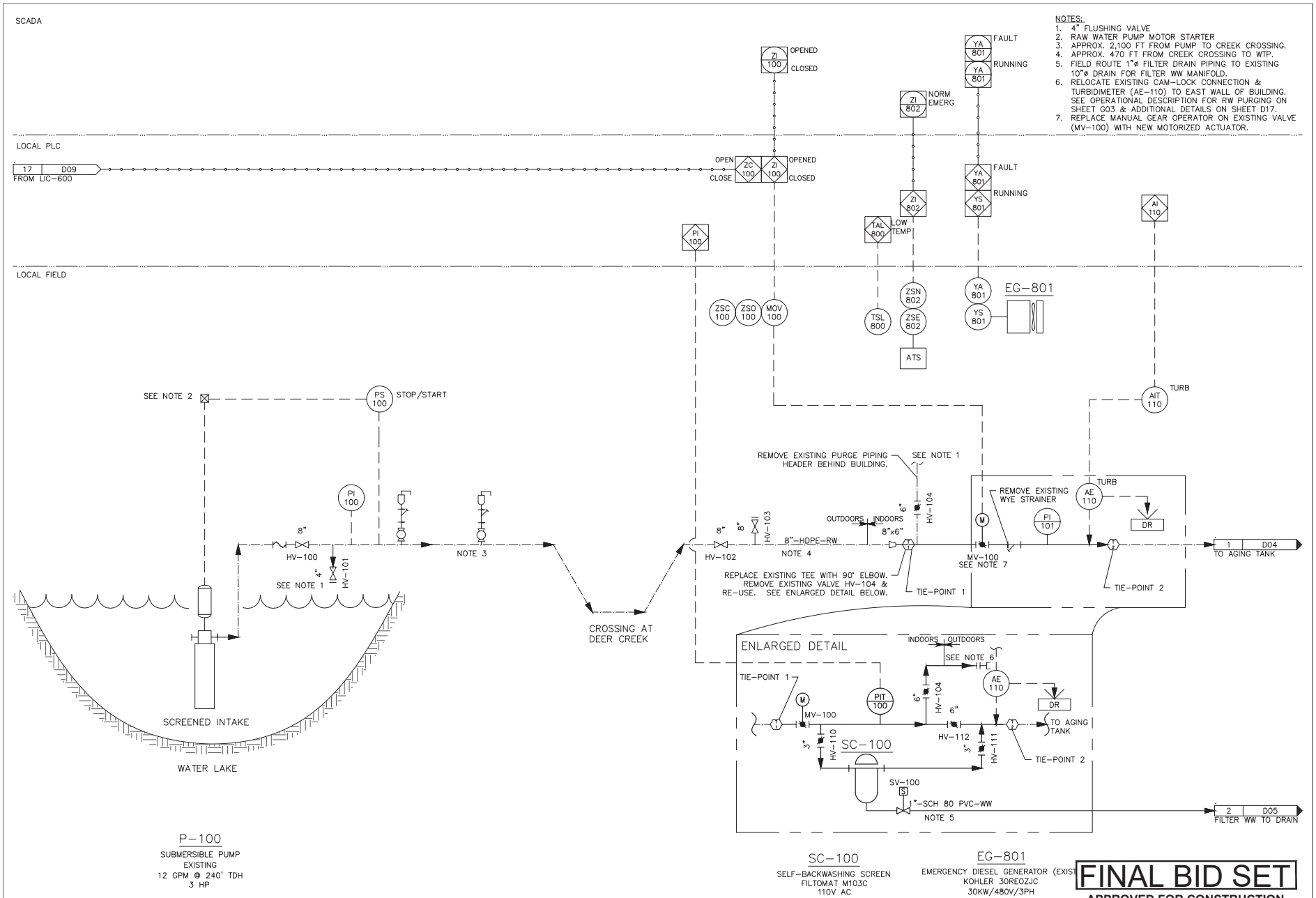
SHEET 6 OF 71



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WTP IMPROVEMENTS PROCESS & INSTRUMENTATION DIAGRAM 1

REVISION	BY	DATE
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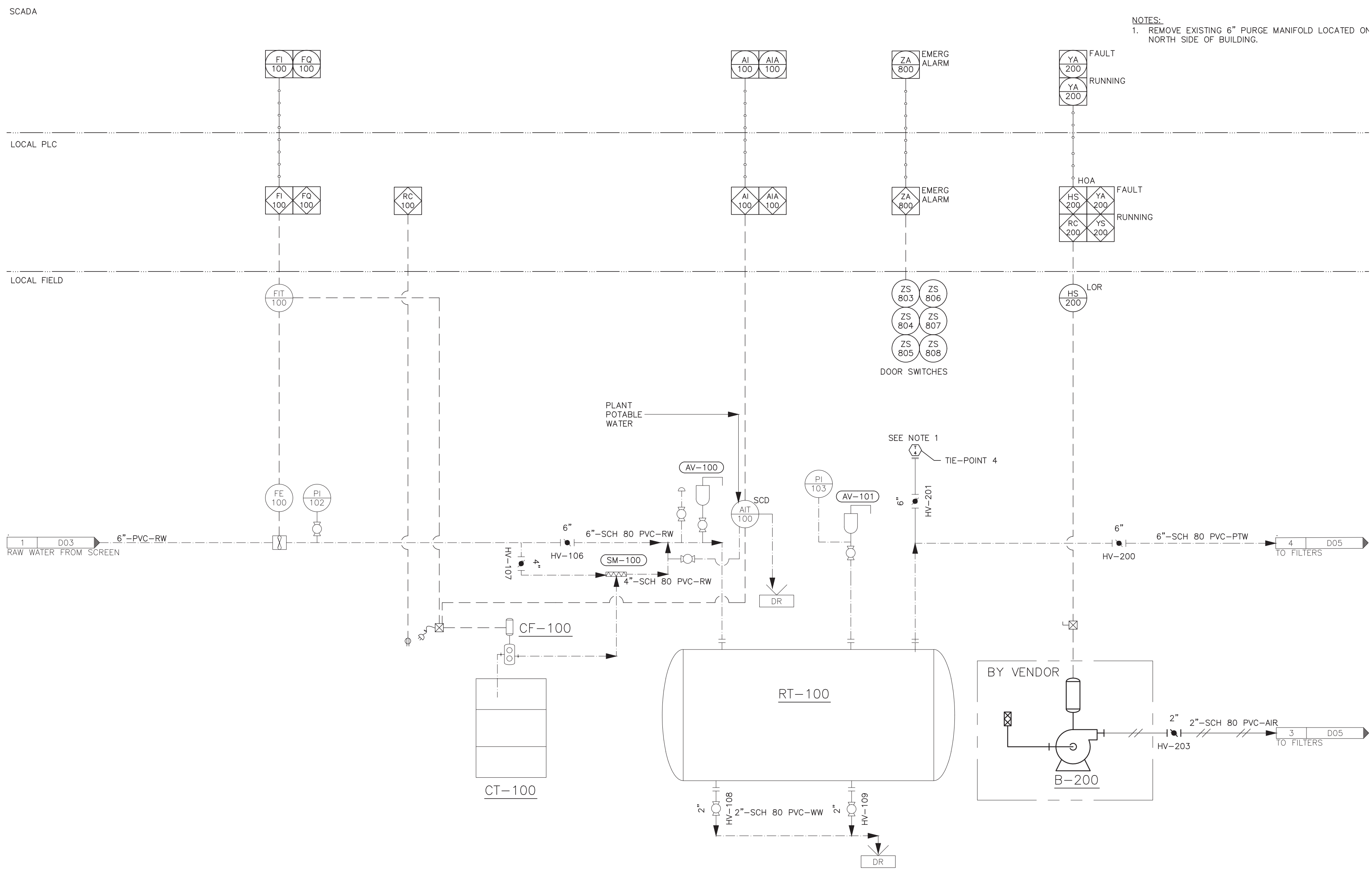
SHEET 07 OF 71



NOTES:
1. REMOVE EXISTING 6" PURGE MANIFOLD LOCATED ON NORTH SIDE OF BUILDING.

CT-100
BULK POLYMER TANK
EXISTING
55 GAL DRUM

CF-100
PERISTALTIC PUMP (EXIST)
MILTON ROY
0.70 GPH @ 175 PSI
115V/60HZ/1PH

RT-100
AGING TANK (EXIST)
2,500 GAL.
6' DIA @T/T

B-200
BACKWASH AIR SCOUR BLOWER
KAESER BB52C
98 CFM @ 6 PSIG
3HP/460V/60HZ/3PH

FINAL BID SET
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WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION
DIAGRAM 2

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
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FINAL BID SET	CN	11-18

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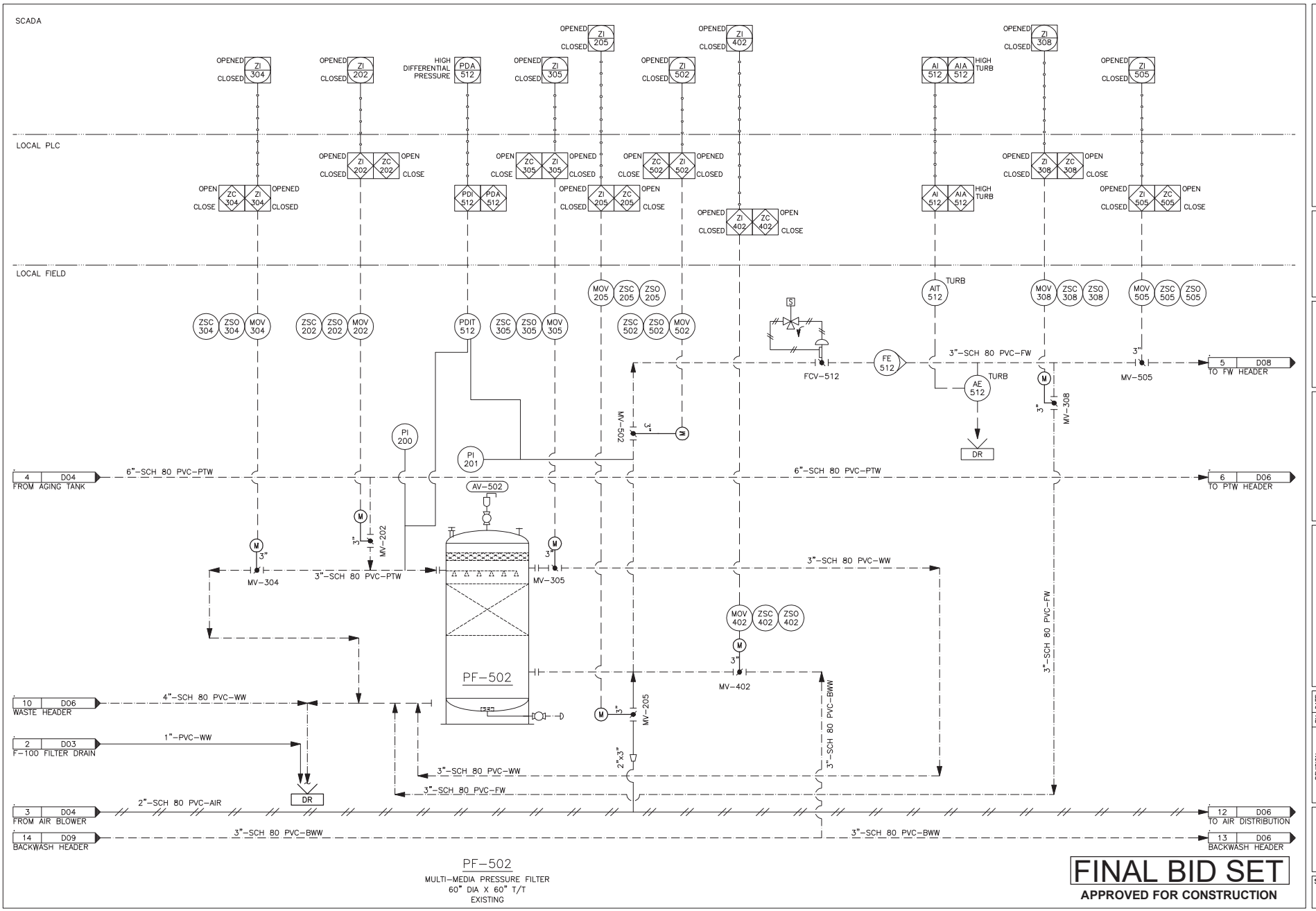
Sheet No. D04
SHEET 08 OF 71



PF-502

MULTI-MEDIA PRESSURE FILTER
60" DIA X 60" T/T
EXISTING

FINAL BID SET

APPROVED FOR CONSTRUCTION

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WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION DIAGRAM 3

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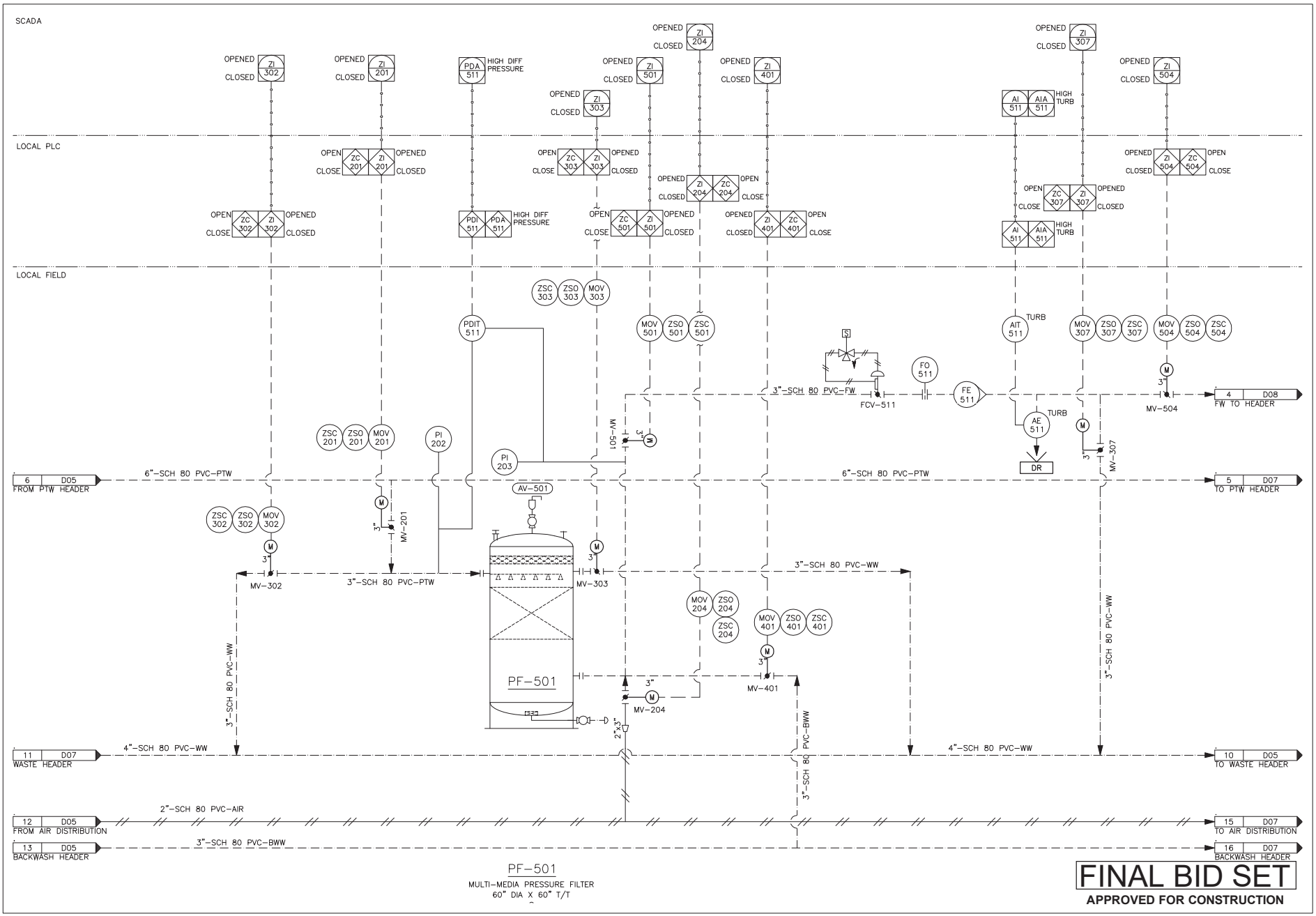

PF-501

MULTI-MEDIA PRESSURE FILTER
60" DIA X 60" T/T

FINAL BID SET

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WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION DIAGRAM 4

REVISION	BY	DATE
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FINAL BID SET	CN	11-18

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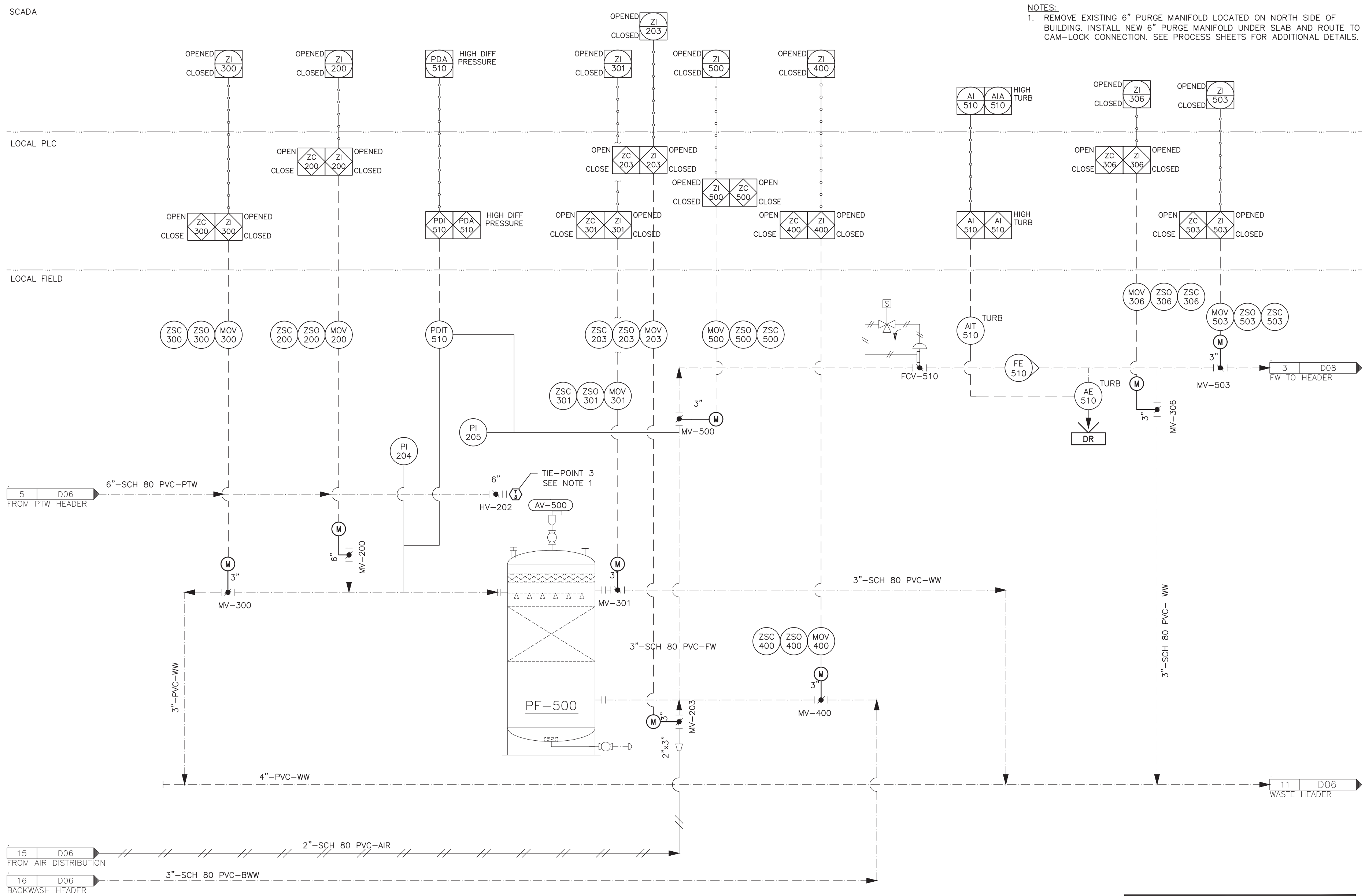
Approved

Sheet No. D06
SHEET 10 OF 71

NOTES:
1. REMOVE EXISTING 6" PURGE MANIFOLD LOCATED ON NORTH SIDE OF BUILDING. INSTALL NEW 6" PURGE MANIFOLD UNDER SLAB AND ROUTE TO CAM-LOCK CONNECTION. SEE PROCESS SHEETS FOR ADDITIONAL DETAILS.



PF-500
MULTI-MEDIA PRESSURE FILTER
60" DIA X 60" T/T

FINAL BID SET
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WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION DIAGRAM 5

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
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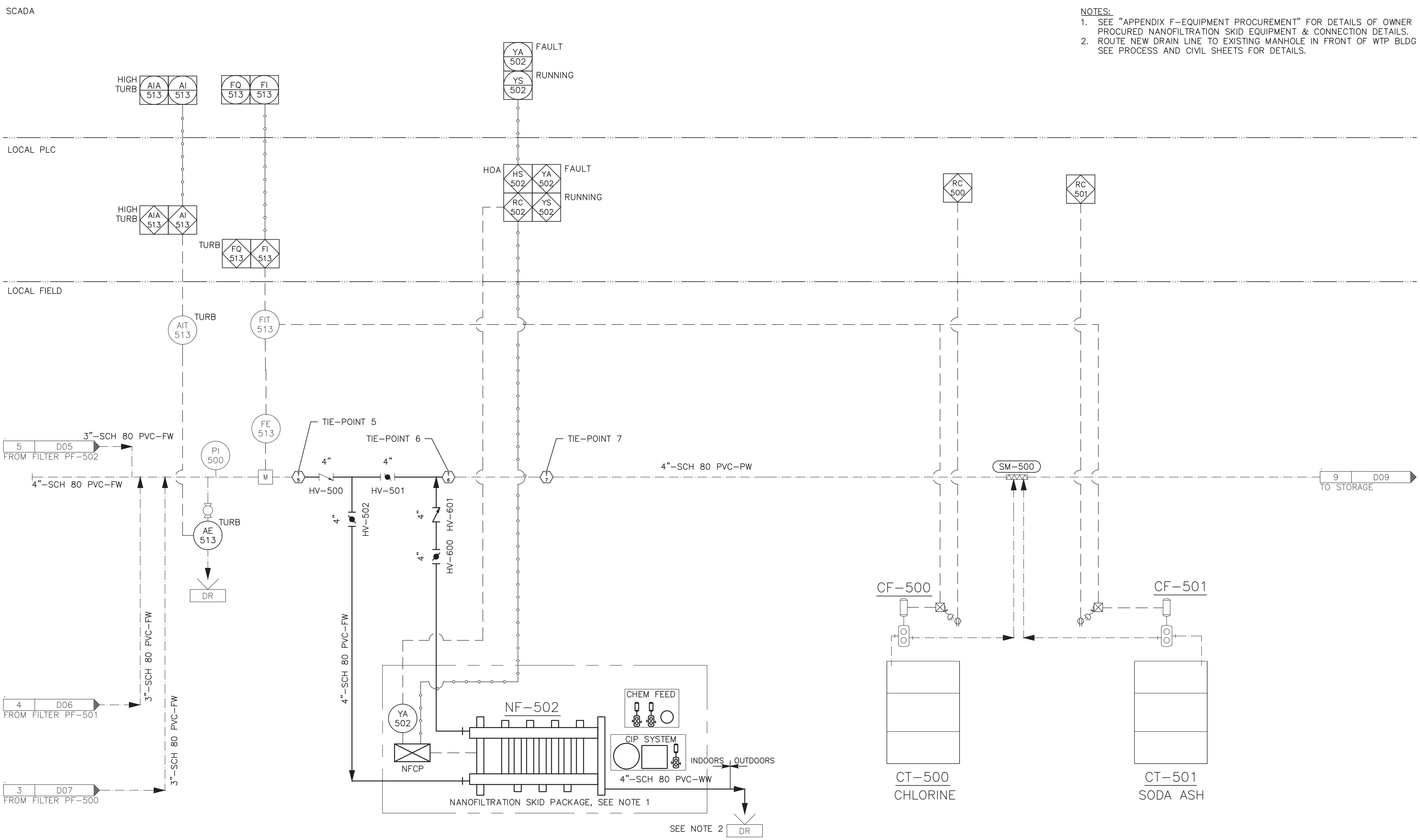
SHEET 11 OF 71

NOTES:
1. SEE "APPENDIX F–EQUIPMENT PROCUREMENT" FOR DETAILS OF OWNER PROCURED NANOFILTRATION SKID EQUIPMENT & CONNECTION DETAILS.
2. ROUTE NEW DRAIN LINE TO EXISTING MANHOLE IN FRONT OF WTP BLDG SEE PROCESS AND CIVIL SHEETS FOR DETAILS.



NF–502
NANOFILTRATION SKID
60 GPM FEED RATE
SEE APPENDIX–F EQUIPMENT PROCUREMENT

CF–500
PERISTALTIC PUMP (EXIST)
BLUE WHITE A1N10V–4T
4.9 GPD @ 0 PSI
115V/60HZ/40W

CF–501
PERISTALTIC PUMP (EXIST)
MILTON ROY
0.18 GPH @ 175 PSI
115V/60HZ/1PH

FINAL BID SET
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WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION DIAGRAM 6

REVISION	BY	DATE
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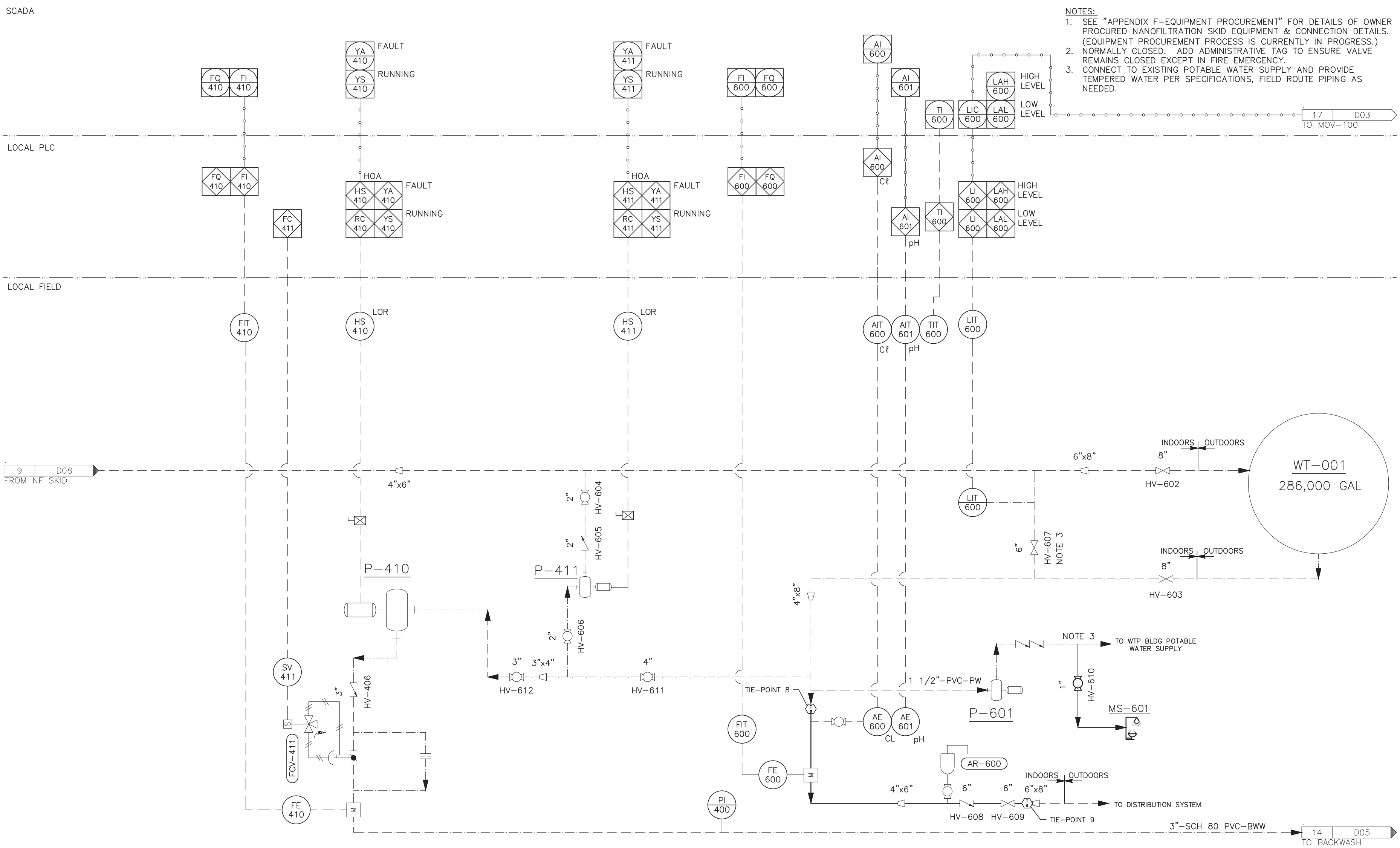
Sheet No. D08
SHEET 12 OF 71

NOTES:
1. SEE "APPENDIX F–EQUIPMENT PROCUREMENT" FOR DETAILS OF OWNER PROCURED NANOFILTRATION SKID EQUIPMENT & CONNECTION DETAILS. (EQUIPMENT PROCUREMENT PROCESS IS CURRENTLY IN PROGRESS.)
2. NORMALLY CLOSED. ADD ADMINISTRATIVE TAG TO ENSURE VALVE REMAINS CLOSED EXCEPT IN FIRE EMERGENCY.
3. CONNECT TO EXISTING POTABLE WATER SUPPLY AND PROVIDE TEMPERED WATER PER SPECIFICATIONS, FIELD ROUTE PIPING AS NEEDED.



P–410	P–411	P–601	MS–601	WT–001
BACKWASH PUMP (EXIST) GOULDS G&L SERIES SSH 300 GPM @ 75' TDH 10HP/460V/3PH/60 HZ	RECIRCULATION PUMP (EXIST) GOULDS G&L SERIES NPE 300 GPM @ 75' TDH 0.5HP/460V/3PH/60HZ	DOMESTIC WATER PUMP (REPLACE EXIST) GOULDS JRD5X 6.4 GPM @ 40 PSI 0.5HP/115V/60HZ	COMBINATION EYEWASH STATION SEE SPECIFICATIONS	TREATED WATER STORAGE 52' DIA X 18' TALL 286,000 GAL.

FINAL BID SET
APPROVED FOR CONSTRUCTION

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WTP IMPROVEMENTS
PROCESS & INSTRUMENTATION DIAGRAM 7

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SHEET 13 OF 71

EXISTING VALVE SCHEDULE

TAG	DESCRIPTION	SIZE	FUNCTION	LOCATION	STATUS	MFR	MODEL	MEDIUM	COMMENT	DWG
AV-100	AIR RELEASE VALVE	1"	COMBINATION AIR RELEASE AND VACUUM	ON TOP OF RW TRANSMISSION LINE INSIDE VACUUM STATION	N/A	CLA-VAL	SERIES 36	RW	–	D04
AV-101	AIR RELEASE VALVE	1"	COMBINATION AIR RELEASE AND VACUUM	ON TOP OF AGING TANK INSIDE FLOCCULATION ROOM	N/A	CLA-VAL	SERIES 36	RW	–	D04
AV-500	AIR RELEASE VALVE	1"	COMBINATION AIR RELEASE AND VACUUM	ON TOP OF FILTER PF-500	N/A	CLA-VAL	SERIES 36	FW	–	D07
AV-501	AIR RELEASE VALVE	1"	COMBINATION AIR RELEASE AND VACUUM	ON TOP OF FILTER PF-501	N/A	CLA-VAL	SERIES 36	FW	–	D06
AV-502	AIR RELEASE VALVE	1"	COMBINATION AIR RELEASE AND VACUUM	ON TOP OF FILTER PF-502	N/A	CLA-VAL	SERIES 36	FW	–	D05
AV-600	AIR RELEASE VALVE	1"	COMBINATION AIR RELEASE AND VACUUM	ON POTABLE WATER LINE TO DISTRIBUTION SYSTEM AFTER MASTER METER	N/A	CLA-VAL	SERIES 36	PW	RELOCATE EXISTING	D09
FCV-411	CONTROL VALVE	3"	COMBINATION RATE OF FLOW CONTROLLER & SOLENOID SHUT-OFF VALVE	ON BACKWASH LINE FROM P-410 TO FILTERS	CONTROL VALVE	CLA-VAL	MODEL 43.01 W/ CLA-VAL MODEL X52E ORIFICE PLATE ASSEMBLY	WW	–	D09
FCV-510	CONTROL VALVE	3"	COMBINATION RATE OF FLOW CONTROLLER. MANUALLY ADJUSTED RATE BASED ON LOCAL FLOW INDICATOR.	ON FILTER DISCHARGE LINE TO NF SKID NEAR MEDIA FILTER PF-500	CONTROL VALVE	CLA-VAL	MODEL 43.01 W/ CLA-VAL MODEL X52E ORIFICE PLATE ASSEMBLY	FW	–	D07
FCV-511	CONTROL VALVE	3"	COMBINATION RATE OF FLOW CONTROLLER. MANUALLY ADJUSTED RATE BASED ON LOCAL FLOW INDICATOR.	ON FILTER DISCHARGE LINE TO NF SKID NEAR MEDIA FILTER PF-501	CONTROL VALVE	CLA-VAL	MODEL 43.01 W/ CLA-VAL MODEL X52E ORIFICE PLATE ASSEMBLY	FW	–	D06
FCV-512	CONTROL VALVE	3"	COMBINATION RATE OF FLOW CONTROLLER. MANUALLY ADJUSTED RATE BASED ON LOCAL FLOW INDICATOR.	ON FILTER DISCHARGE LINE TO NF SKID NEAR MEDIA FILTER PF-502	CONTROL VALVE	CLA-VAL	MODEL 43.01 W/ CLA-VAL MODEL X52E ORIFICE PLATE ASSEMBLY	FW	–	D05
HV-100	GATE VALVE	8"	ISOLATION OF RW SUCTION LINE	NEAR ABOVE GRADE ENCLOSURE AT RW LAKE	NORMALLY OPEN	–	–	RW	–	D03
HV-101	GATE VALVE	4"	ALLOWS FLUSHING OF RW LINE NEAR SOURCE	NEAR ABOVE GRADE ENCLOSURE AT RW LAKE	NORMALLY CLOSED	–	–	RW	–	D03
HV-102	BUTTERFLY VALVE	6"	ALLOWS FLUSHING OF RW LINE	ON RW TEE BRANCH ENTERING THE FACILITY	NORMALLY CLOSED	–	–	RW	RE-LOCATE TO NEW RW PURGE PIPING	D04
HV-106	BUTTERFLY VALVE	6"	ALLOW BYPASS OF POLYMER INJECTION	ON RW LINE UPSTREAM OF AGING TANK IN THE FLOCCULATION ROOM.	NORMALLY OPEN	BRAY	–	RW	–	D04
HV-107	BUTTERFLY VALVE	4"	ALLOW BYPASS OF POLYMER INJECTION	ON RW LINE BYPASS OF STATIC MIXER IN THE FLOCCULATION ROOM.	NORMALLY CLOSED	BRAY	–	RW	–	D04
HV-108	BALL VALVE	2"	LOW-POINT DRAIN VALVE	NEAR AGING TANK	NORMALLY CLOSED	–	–	RW	–	D04
HV-109	BALL VALVE	2"	LOW-POINT DRAIN VALVE	NEAR AGING TANK	NORMALLY CLOSED	–	–	RW	–	D04
HV-200	BUTTERFLY VALVE	6"	HV ON PRE-TREATED WATER FROM AGING TANK TO MEDIA FILTERS	INSIDE LAB ROOM NEAR DOOR	NORMALLY OPEN	BRAY	–	PTW	–	D04
HV-201	BUTTERFLY VALVE	6"	ALLOWS FLUSHING OF PTW LINE IMMEDIATE DOWNSTREAM OF RT-100.	NEAR AGING TANK IN FLOCCULATION ROOM	NORMALLY CLOSED	BRAY	–	PTW	REMOVE PIPING DOWNSTREAM OF VALVE.	D04
HV-202	BUTTERFLY VALVE	6"	ALLOWS FLUSHING OF PTW LINE THROUGH PURGE PIPING AT THE WTP	NEAR NEW WALL OPENING ADJACENT TO FILTER PF-500	NORMALLY CLOSED	BRAY	–	PTW	REMOVE PIPING DOWNSTREAM OF VALVE.	D07
HV-406	CHECK VALVE	3"	PREVENTS BACKWARDS FLOW THROUGH BACKWASH PUMP P-410	NEAR BACKWASH PUMP P-410	N/A	–	–	BWW	–	D09
HV-602	GATE VALVE	8"	HV ALLOWING POTABLE WATER TO ENTER WATER STORAGE TANK	ON POTABLE WATER LINE AFTER CHLORINE INJECTION	NORMALLY OPEN	–	–	PW	–	D09
HV-603	GATE VALVE	8"	ALLOWS WATER FROM STORAGE TANK TO RE-ENTER WTP BLDG AND FLOW TO DISTRIBUTION	ON POTABLE WATER LINE FROM WATER STORAGE TANK TO MASTER METER	NORMALLY OPEN	–	–	PW	–	D09
HV-604	BALL VALVE	3"	HV FOR ISOLATION OF RECIRCULATION PUMP	NEAR RECIRCULATION PUMP P-411	NORMALLY OPEN	–	–	PW	–	D09
HV-605	CHECK VALVE	3"	PREVENT BACKWARDS FLOW THROUGH RECIRCULATION PUMP	NEAR RECIRCULATION PUMP P-411	N/A	–	–	PW	–	D09
HV-606	BALL VALVE	3"	ISOLATION OF RECIRCULATION PUMP	NEAR RECIRCULATION PUMP P-411	NORMALLY OPEN	–	–	PW	–	D09
HV-607	GATE VALVE	6"	ALLOWS BYPASS OF WATER STORAGE TANK	NEAR WEST WALL OF PROCESS ROOM	NORMALLY CLOSED	–	–	PW	–	D09

EXISTING VALVE SCHEDULE (CONTINUED)

TAG	DESCRIPTION	SIZE	FUNCTION	LOCATION	STATUS	MFR	MODEL	MEDIUM	COMMENT	DWG
HV-608	CHECK VALVE	6"	PREVENT BACKWARDS FLOW THROUGH MASTER METER	ON POTABLE WATER LINE DOWNSTREAM OF MASTER METER	N/A	–	–	PW	–	D09
HV-609	GATE VALVE	6"	ISOLATION OF WATER ENTERING DISTRIBUTION SYSTEM	ON POTABLE WATER LINE DOWNSTREAM OF MASTER METER	NORMALLY OPEN	–	–	PW	–	D08
MV-100	BUTTERFLY VALVE	6"	ALLOWS RW TO ENTER TREATMENT PLANT FROM WATER LAKE	ON RW TEE BRANCH ENTERING THE FACILITY TOWARDS THE AGING TANK.	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	RW	REPLACE GEAR OPERATOR W/ MOTORIZED ACTUATOR	D04
MV-200	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON PTW HEADER NEAR FILTER PF-500	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	PTW	REPLACE ACTUATOR	D07
MV-201	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON PTW HEADER NEAR FILTER PF-501	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	PTW	REPLACE ACTUATOR	D06
MV-202	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON PTW HEADER NEAR FILTER PF-502	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	AIR	REPLACE ACTUATOR	D05
MV-203	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON AIR HEADER NEAR FILTER PF-500	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	AIR	REPLACE ACTUATOR	D07
MV-204	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON AIR HEADER NEAR FILTER PF-501	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	AIR	REPLACE ACTUATOR	D06
MV-205	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON AIR HEADER NEAR FILTER PF-502	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	–	REPLACE ACTUATOR	D05
MV-300	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON BACKWASH NEAR FILTER PF-500	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D07
MV-301	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON DRAIN-DOWN NEAR FILTER PF-500	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D07
MV-302	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON BACKWASH NEAR FILTER PF-501	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D06
MV-303	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON DRAIN-DOWN NEAR FILTER PF-501	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D06
MV-304	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON BACKWASH NEAR FILTER PF-502	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D05
MV-305	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON DRAIN-DOWN NEAR FILTER PF-502	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D05
MV-306	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON FILTER TO WASTE NEAR FILTER PF-500 AFTER TURBIDIMETER	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D07
MV-307	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON FILTER TO WASTE NEAR FILTER PF-501 AFTER TURBIDIMETER	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D06
MV-308	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON FILTER TO WASTE NEAR FILTER PF-502 AFTER TURBIDIMETER	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	WW	REPLACE ACTUATOR	D05
MV-400	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON BACKWASH LINE NEAR FILTER PF-500	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	BWW	REPLACE ACTUATOR	D07
MV-401	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON BACKWASH LINE NEAR FILTER PF-501	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	BWW	REPLACE ACTUATOR	D06
MV-402	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON BACKWASH LINE NEAR FILTER PF-502	NORMALLY CLOSED	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	BWW	REPLACE ACTUATOR	D05
MV-500	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON MEDIA FILTER DISCHARGE HEADER NEAR PF-500	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	FW	REPLACE ACTUATOR	D07
MV-501	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON MEDIA FILTER DISCHARGE HEADER NEAR PF-501	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	FW	REPLACE ACTUATOR	D06
MV-502	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON MEDIA FILTER DISCHARGE HEADER NEAR PF-502	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	FW	REPLACE ACTUATOR	D05
MV-503	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON MEDIA FILTER DISCHARGE HEADER NEAR PF-500	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	FW	REPLACE ACTUATOR	D07
MV-504	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON MEDIA FILTER DISCHARGE HEADER NEAR PF-501	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	FW	REPLACE ACTUATOR	D06
MV-505	BUTTERFLY VALVE	3"	LUG TYPE MOTORIZED BUTTERFLY VALVE	ON MEDIA FILTER DISCHARGE HEADER NEAR PF-502	NORMALLY OPEN	BRAY	SERIES 31 W/ SERIES 70 ACTUATOR	FW	REPLACE ACTUATOR	D05
SV-411	SOLENOID VALVE	1"	INTEGRAL TO OPERATION OF FCV-411	NEAR BACKWASH PUMP / WEST WALL OF PROCESS ROOM	NORMALLY CLOSED	CLA-VAL	–	BWW	–	D09

FINAL BID SET

APPROVED FOR CONSTRUCTION

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WTP IMPROVEMENTS

EXISTING VALVE SCHEDULE

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. D10

SHEET 14 OF 71

EXISTING INSTRUMENT SCHEDULE

TAG	DESCRIPTION	FUNCTION	LOCATION	MFR	MODEL	DWG
AIT-100	STREAMING CURRENT DETECTOR	–	–	MILTON ROY	SC5200	D04
FE-510	FLOW INDICATOR	ALLOWS VISUAL OBSERVATION OF FLOW THROUGH FILTER PF-500	ON FILTERED WATER LINE NEAR FILTER PF-500	BLUE WHITE	F452N	D07
FE-511	FLOW INDICATOR	ALLOWS VISUAL OBSERVATION OF FLOW THROUGH FILTER PF-501	ON FILTERED WATER LINE NEAR FILTER PF-501	BLUE WHITE	F452N	D06
FE-512	FLOW INDICATOR	ALLOWS VISUAL OBSERVATION OF FLOW THROUGH FILTER PF-502	ON FILTERED WATER LINE NEAR FILTER PF-502	BLUE WHITE	F452N	D05
FE-100	FLOW METER	PADDLE WHEEL FLOW METER RECORDING INFLUENT FLOWS TO THE WTP	ON RAW WATER LINE IN LAB ROOM	–	–	D04
FE-410	FLOW METER	PADDLE WHEEL FLOW METER RECORDING BACKWASH FLOWS	ON BACKWASH LINE NEAR CHEMICAL STORAGE ROOM IN SW CORNER OF PROCESS ROOM	–	–	D09
FE-513	FLOW METER	PADDLE WHEEL FLOW METER RECORDING FLOWS UPSTREAM OF WATER STORAGE TANK. USED FOR FLOW-PACED CHLORINE AND SODA ASH INJECTION	ON FILTERED WATER LINE NEAR SOUTH WALL OF PROCESS ROOM	–	–	D08
FE-600	FLOW METER	PADDLE WHEEL FLOW METER RECORDING FLOWS TO THE DISTRIBUTION SYSTEM	ON POTABLE WATER LINE NEAR DISCHARGE TO DISTRIBUTION SYSTEM	–	–	D09
PI-100	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	RAW WATER PUMP DISCHARGE	–	–	D03
PI-101	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	RAW WATER INLET LINE	–	–	D03
PI-102	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	SCREENED WATER LINE	–	–	D04
PI-200	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	PF-502 INLET	–	–	D05
PI-201	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	PF-502 OUTLET	–	–	D05
PI-202	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	PF-501 INLET	–	–	D06
PI-203	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	PF-501 OUTLET	–	–	D06
PI-204	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	PF-500 INLET	–	–	D07
PI-205	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	PF-500 OUTLET	–	–	D07
PI-400	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	BACKWASH HEADER	–	–	D08
PI-500	PRESSURE GAUGE	4" DIAMETER FACE, 0-100 PSIG, GLYCERIN FILLED, 1/4: NPT BOTTOM PIPING CONNECTION	FILTERED WATER HEADER TO NF	–	–	D09
SM-100	STATIC MIXER	STATIC INJECTION MIXER FOR IN-LINE MIXING OF POLYMER PRIOR TO RT-1	ON INLET SIDE OF RT-1 LOCATED AT POLYMER INJECTION POINT	WESTFALL	MODEL 2800	D04
SM-500	STATIC MIXER	STATIC INJECTION MIXER FOR IN-LINE MIXING OF CHLORINE & SODA ASH PRIOR TO WT-1	FILTERED WATER LINE TO WATER STORAGE TANK. DOWNSTREAM OF NF RETURN CONNECTION.	WESTFALL	MODEL 2800	D08

EXISTING EQUIPMENT SCHEDULE

TAG	DESCRIPTION	FUNCTION	SYSTEM/LOCATION	MANUFACTURER	MODEL	DWG NUMBER
CF-100	DIAPHRAGM TYPE – POSITIVE DISPLACEMENT PUMP	CHEMICAL FEED PUMP RATE CONTROLLED BY 4-20 mA SIGNAL. 25 mL/hr – 2 L/hr. DIGITAL SETTINGS. MENU CONTROL	FW	LMI	SERIES G MODEL SD2	D04
CF-500	POSITIVE DISPLACEMENT PUMP	CHEMICAL FEED PUMP RATE CONTROLLED BY 4-20 mA SIGNAL FROM FE-513.	FW	LMI	SERIES G MODEL SD2	D08
CF-501	POSITIVE DISPLACEMENT PUMP	CHEMICAL FEED PUMP rate controlled by 4-20 mA SIGNAL FROM FE-513. 75 ML/HR – 3.76 L/HR. DIGITAL SETTINGS. MENU CONTROL. SW CORNER OF WTP IN CHEMICAL STORAGE ROOM.	FW	LMI	SERIES G MODEL SD2	D08
CT-100	BULK POLYMER TANK	CHEMICAL STORAGE TANK, 50 GAL, POLYETHYLENE WITH COVER	RW	–	–	D04
CT-500	CHEMICAL STORAGE TANK	50 GAL, POLYETHYLENE WITH COVER	FW	–	–	D08
CT-501	CHEMICAL STORAGE TANK	50 GAL, POLYETHYLENE WITH COVER	FW	–	–	D08
P-100	SUBMERSIBLE WELL PUMP	PUMPS RAW WATER FROM LAKE TO TREATMENT PLANT	BWW	GRUNDFOS	16S10-10	D03
P-410	BACKWASH PUMP	BACKWASH OF SAND FILTERS	PTW	G&L	5SH2L52D0	D08
P-411	RECIRCULATION PUMP	PROVIDE MIXING AND TURNOVER WITHIN THE WATER STORAGE TANK	PTW	G&L	NPE / 3ST	D08
PF-500	MULTI-MEDIA PRESSURE FILTER	FILTRATION	PTW	–	–	D07
PF-501	MULTI-MEDIA PRESSURE FILTER	FILTRATION	RW	–	–	D06
PF-502	MULTI-MEDIA PRESSURE FILTER	FILTRATION	PW	–	–	D05
RT-100	AGING TANK	PROVIDE RAW WATER CONTACT TIME WITH POLYMER PRIOR TO FILTRATION	RW	–	–	D04
WT-001	TREATED WATER STORAGE	PROVIDES EQUALIZATION BETWEEN TREATED WATER FROM THE PLANT AND POTABLE WATER USED IN THE DISTRIBUTION SYSTEM	PW	–	CUSTOM	D08
MS-600A	EYE WASH STATION	EMERGENCY EYE WASH IN CASE OF CONTACT WITH CHEMICALS NEAR THE AGING TANK	PW	–	–	–
MS-600B	EMERGENCY SHOWER	EMERGENCY SHOWER IN CASE OF CONTACT WITH CHEMICALS NEAR THE AGING TANK	PW	–	–	–

FINAL BID SET

APPROVED FOR CONSTRUCTION

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WTP IMPROVEMENTS
EXISTING INSTRUMENTATION & EQUIP SCHEDULES

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

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Date 2019-01-08
Designed
Drawn
Approved

Sheet No. D11

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NEW INSTRUMENT SCHEDULE

TAG	DESCRIPTION	FUNCTION	MEDIUM	MFR	MODEL	SUPPLIED BY	DWG	SPEC
AE-110	TURBIDITY METER	RAW WATER TURBIDITY SAMPLING DOWNSTREAM OF SCREEN SC-100. RE-USE EXISTING.	RW	HACH	1720E	OWNER	D07	33 09 10
AE-510	TURBIDITY METER	TURBIDITY SAMPLING DOWNSTREAM OF FILTER PF-500	FW	HACH	TU5300	CONTRACTOR	D07	33 09 10
AE-511	TURBIDITY METER	TURBIDITY SAMPLING DOWNSTREAM OF FILTER PF-501	FW	HACH	TU5300	CONTRACTOR	D06	33 09 10
AE-512	TURBIDITY METER	TURBIDITY SAMPLING DOWNSTREAM OF FILTER PF-502	FW	HACH	TU5300	CONTRACTOR	D05	33 09 10
AE-513	TURBIDITY METER	TURBIDITY SAMPLING OF COMBINED MEDIA FILTER DISCHARGE PRIOR TO NF SKID	FW	HACH	TU5300	CONTRACTOR	D08	33 09 10
AE-600	CHLORINE METER / ANALYZER	MEASURE AND REPORT CHLORINE LEVELS TO DISTRIBUTION SYSTEM FOR RECORDING	PW	HACH	CLF10	CONTRACTOR	D05	33 09 10
AE-601	pH METER / ANALYZER	MEASURE AND REPORT pH LEVELS TO DISTRIBUTION SYSTEM FOR RECORDING	PW	HACH	CLF10	CONTRACTOR	D09	33 09 10
PDIT-510	PRESSURE TRANSMITTER	DIFFERENTIAL PRESSURE THROUGH FILTER PF-500 FOR BACKWASH OPERATION CONTROL	FW	ROSEMOUNT	3051	CONTRACTOR	D07	33 09 10
PDIT-511	PRESSURE TRANSMITTER	DIFFERENTIAL PRESSURE THROUGH FILTER PF-501 FOR BACKWASH OPERATION CONTROL	FW	ROSEMOUNT	3051	CONTRACTOR	D08	33 09 10
PDIT-512	PRESSURE TRANSMITTER	DIFFERENTIAL PRESSURE THROUGH FILTER PF-502 FOR BACKWASH OPERATION CONTROL	FW	ROSEMOUNT	3051	CONTRACTOR	D05	33 09 10
PIT-100	PRESSURE TRANSMITTER	PRESSURE IN RAW WATER LINE FOR OPERATION CONTROL	FW	ROSEMOUNT	3052	CONTRACTOR	D03	34 09 10
MOV-100	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-100	RW	BRAY	S70-008	CONTRACTOR	D03	40 11 11
MOV-200	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-200	PTW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-201	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-201	PTW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-202	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-202	PTW	BRAY	S70-006	CONTRACTOR	D05	40 11 11
MOV-203	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-203	PTW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-204	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-204	PTW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-205	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-205	PTW	BRAY	S70-006	CONTRACTOR	D05	40 11 11
MOV-300	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-300	BWW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-301	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-301	BWW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-302	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-302	BWW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-303	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-303	BWW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-304	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-304	BWW	BRAY	S70-006	CONTRACTOR	D05	40 11 11
MOV-305	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-305	BWW	BRAY	S70-006	CONTRACTOR	D05	40 11 11
MOV-306	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-306	BWW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-307	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-307	BWW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-308	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-308	BWW	BRAY	S70-006	CONTRACTOR	D05	40 11 11
MOV-400	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-400	WW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-401	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-400	WW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-402	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-402	WW	BRAY	S70-006	CONTRACTOR	D05	40 11 11
MOV-500	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-500	FW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-501	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-501	FW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-502	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-502	FW	BRAY	S70-006	CONTRACTOR	D05	40 11 11
MOV-503	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-503	FW	BRAY	S70-006	CONTRACTOR	D07	40 11 11
MOV-504	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-504	FW	BRAY	S70-006	CONTRACTOR	D06	40 11 11
MOV-505	MOTORIZED VALVE ACTUATOR	OPEN/CLOSE VALVE MV-505	FW	BRAY	S70-006	CONTRACTOR	D05	40 11 11

NEW VALVE SCHEDULE

TAG	SIZE	DESCRIPTION	FUNCTION	LOCATION	STATUS	MFR	MODEL	MEDIUM	SUPPLIED BY	DWG	SPEC
HV-110	3"	MANUALLY OPERATED LUG TYPE BUTTERFLY VALVE	ISOLATION ENTERING BACKWASHING SCREEN SC-100	NEAR RAW WATER INLET IN WTP PROCESS ROOM	NORMALLY OPEN	-	-	RW	CONTRACTOR	D03	40 11 11
HV-111	3"	MANUALLY OPERATED LUG TYPE BUTTERFLY VALVE	ISOLATION EXITING BACKWASHING SCREEN SC-100	NEAR RAW WATER INLET IN WTP PROCESS ROOM	NORMALLY OPEN	-	-	RW	CONTRACTOR	D03	40 11 11
HV-112	6"	MANUALLY OPERATED LUG TYPE BUTTERFLY VALVE	ALLOWS BYPASS OF SCREEN SC-100	NEAR RAW WATER INLET IN WTP PROCESS ROOM	NORMALLY CLOSED	-	-	RW	CONTRACTOR	D03	40 11 11
HV-203	2"	MANUALLY OPERATED BALL VALVE	ISOLATION LEAVING AIR BLOWER B-200	NEAR BLOWER DISCHARGE IN NANOFILTRATION ROOM	NORMALLY OPEN	-	-	AIR	CONTRACTOR	D04	40 11 11
HV-500	4"	CHECK VALVE	PREVENTS BACKFLOW OF CHLORINATED WATER AFTER THE NF SUPPLY LINE	ON FILTERED WATER LINE AFTER FILTER PF-500	N/A	-	-	FW	CONTRACTOR	D08	40 11 11
HV-501	4"	MANUALLY OPERATED LUG TYPE BUTTERFLY VALVE	ALLOWS BYPASS OF NANOFILTRATION SKID	ON FILTERED WATER LINE AFTER FILTER PF-500	NORMALLY CLOSED	-	-	FW	CONTRACTOR	D08	40 11 11
HV-502	4"	MANUALLY OPERATED LUG TYPE BUTTERFLY VALVE	CONTROLS FLOW TO NANOFILTRATION SUPPLY LINE	ON NANOFILTRATION SUPPLY LINE IN PROCESS ROOM	NORMALLY OPEN	-	-	FW	CONTRACTOR	D08	40 11 11
HV-600	4"	MANUALLY OPERATED LUG TYPE BUTTERFLY VALVE	ISOLATION FROM NANOFILTRATION RETURN LINE	ON NANOFILTRATION RETURN LINE IN PROCESS ROOM	NORMALLY OPEN	-	-	PW	CONTRACTOR	D08	40 11 11
HV-601	4"	CHECK VALVE	PREVENTS BACKFLOW OF CHLORINATED WATER THROUGH THE NANOFILTRATION RETURN LINE	ON NANOFILTRATION RETURN LINE IN PROCESS ROOM	N/A	-	-	PW	CONTRACTOR	D08	40 11 11

NEW EQUIPMENT SCHEDULE

TAG	DESCRIPTION	FUNCTION	MEDIUM	MFR	MODEL	DWG	SUPPLIED BY
B-200	BACKWASH AIR SCOUR BLOWER	PROVIDES AIR FOR IMPROVED BACKWASHING OF THE MULTIMEDIA VESSEL FILTERS.	AIR	KAESER	BB52C	D04	CONTRACTOR
SC-100	SELF-BACKWASHING SCREEN	REMOVES DEBRIS FROM THE RAW WATER SOURCE PRIOR TO TREATMENT	RW	AMIAD/FILTOMAT	M103C	D03	CONTRACTOR
NF-502	NANOFILTRATION SKID & PACKAGE	FILTRATION AND TOC REMOVAL	FW	PURE AQUA	NF-500	D08	OWNER
MS-601	EYE WASH STATION & SHOWER	EMERGENCY EYE WASH IN CASE OF CONTACT WITH CHEMICALS NEAR THE NF SKID	PW	BRADLEY	S19-310PVC	D09	CONTRACTOR
P-601	DOMESTIC WATER PUMP	PROVIDES PRESSURE TO DOMESTIC WATER SUPPLY WITHIN THE TREATMENT PLANT BUILDING	PW	GOULDS	JRD5X	D09	CONTRACTOR

FINAL BID SET

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WTP IMPROVEMENTS

NEW INSTRUMENT, VALVE & EQUIPMENT SCHEDULES

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
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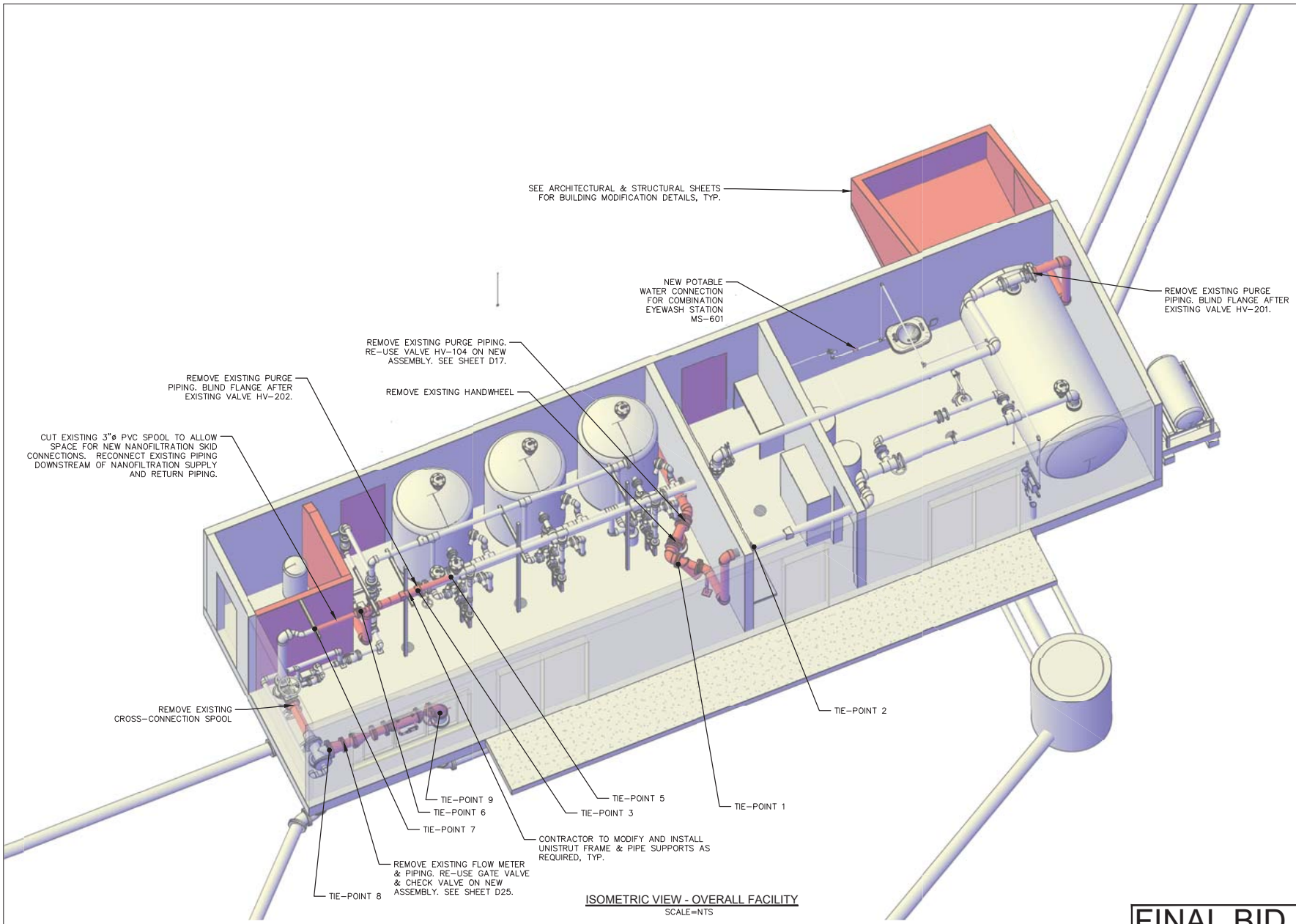
Drawn
Approved

Sheet No. D12

SHEET 16 OF 71



ISOMETRIC VIEW - OVERALL FACILITY
SCALE=NTS

FINAL BID SET
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WTP IMPROVEMENTS
PROCESS MECH.
OVERALL ISOMETRIC DEMOLITION

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

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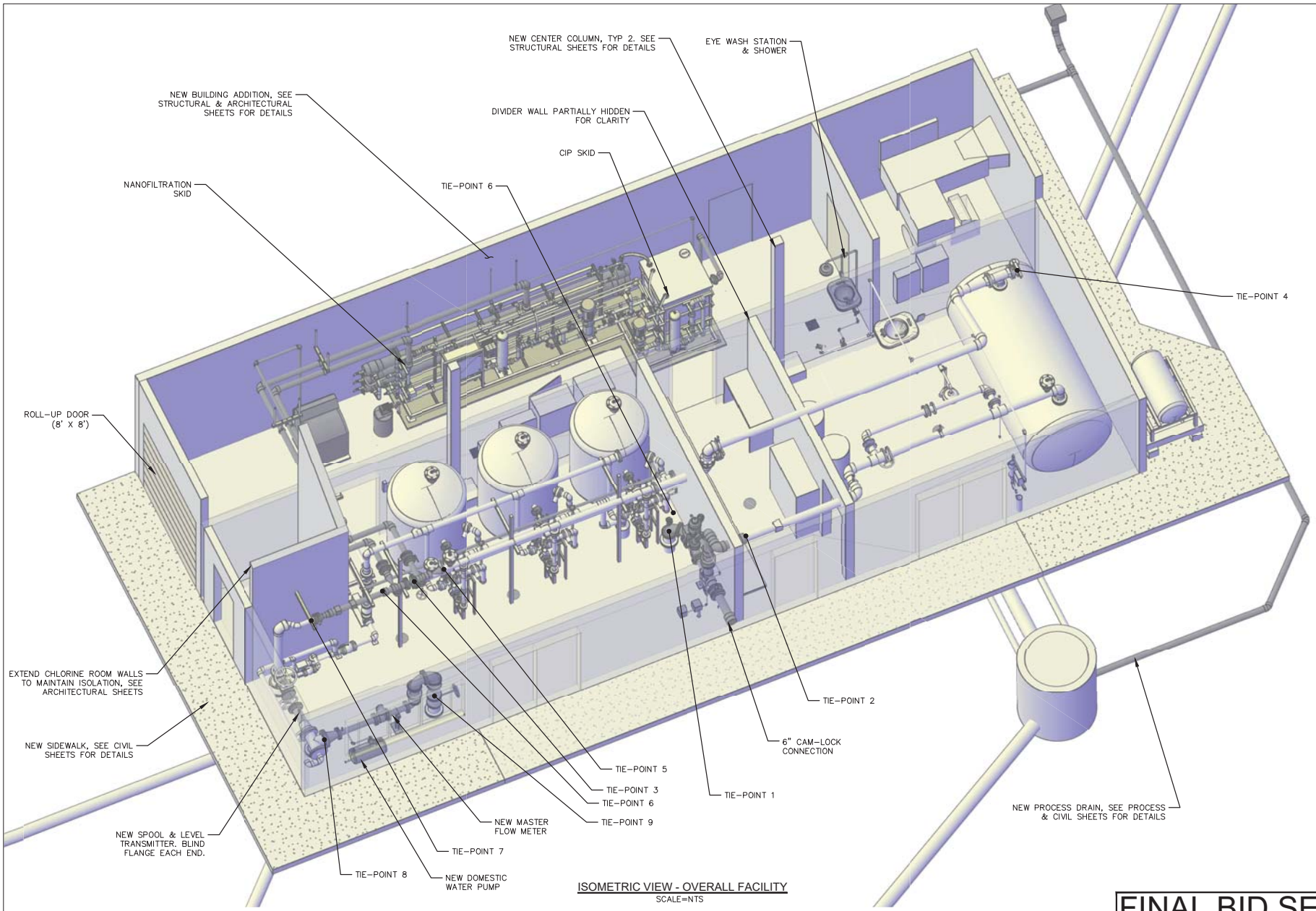
Sheet No. D13
SHEET 17 OF 71



ISOMETRIC VIEW - OVERALL FACILITY
SCALE=NTS

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WTP IMPROVEMENTS
PROCESS MECH.
OVERALL ISOMETRIC

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
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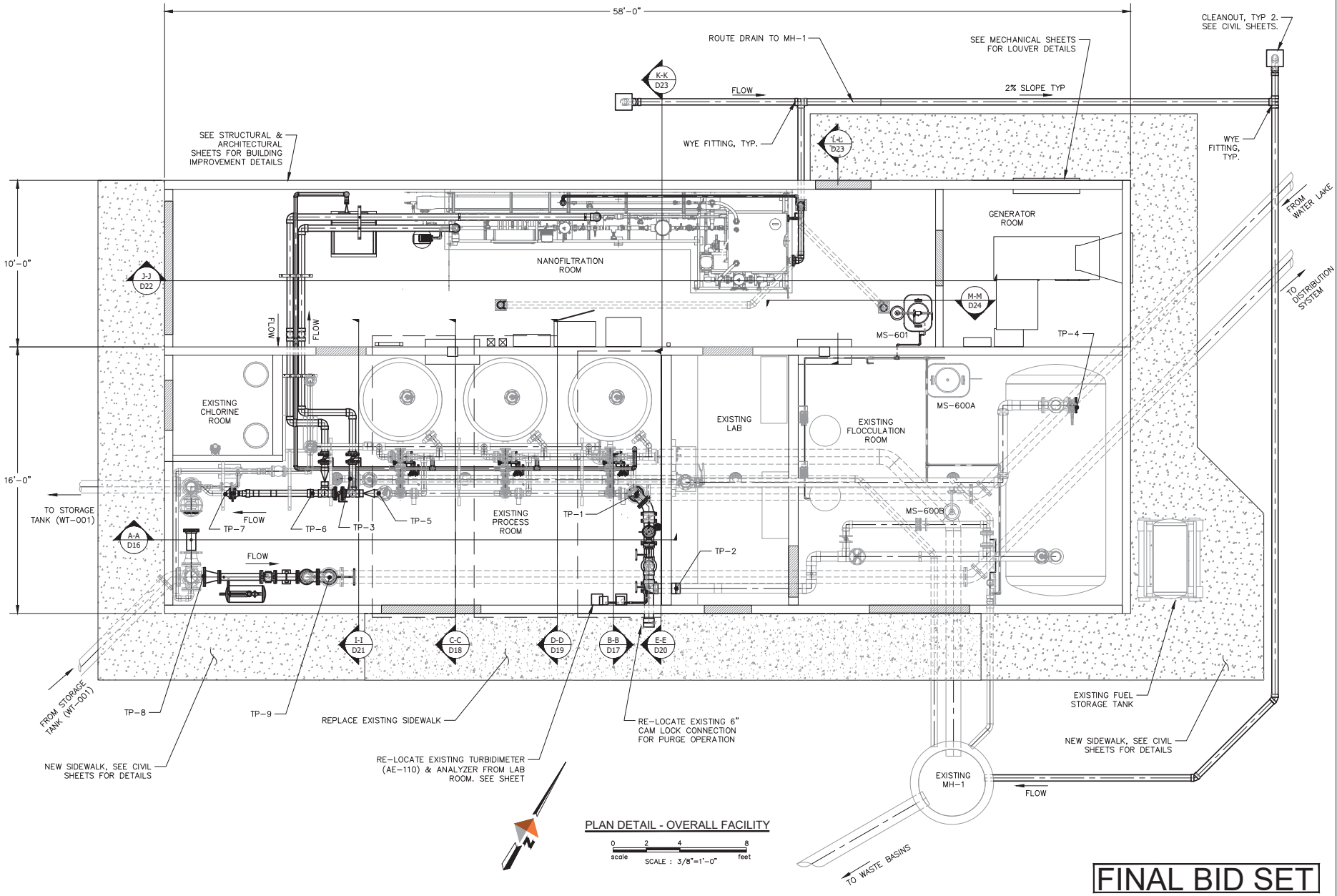
Sheet No. D14
SHEET 18 OF 71



PLAN DETAIL - OVERALL FACILITY

scale 0 2 4 8 feet

SCALE : 3/8"=1'-0"

FINAL BID SET

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WTP IMPROVEMENTS
PROCESS
OVERALL PLAN

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

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Date 2019-01-08
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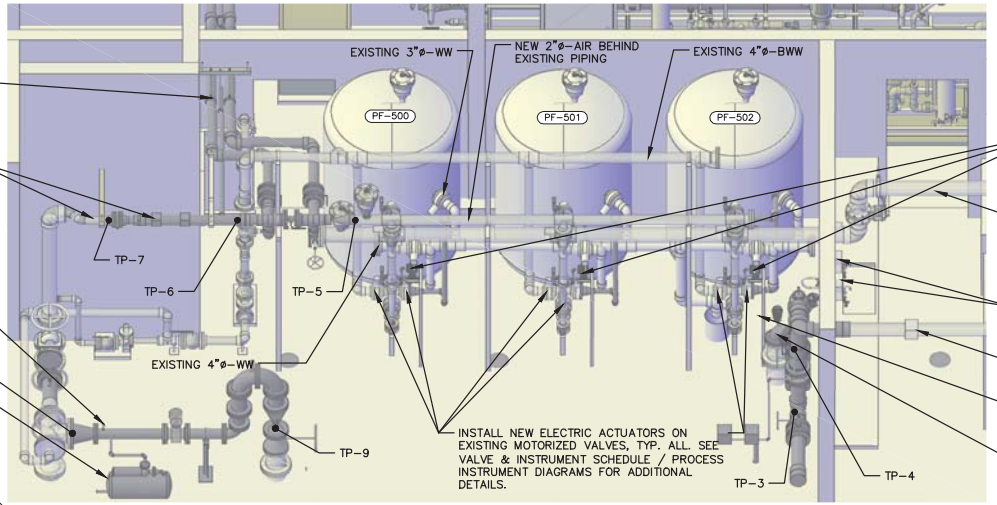
Sheet No. D15

SHEET 19 OF 71



INSTALL PIPE SUPPORTS FOR NEW 4"ø PIPING TO/FROM NF SKID (NF-502) & 2"ø AIR PIPING FROM BLOWER (B-200).

RELOCATE EXISTING 3" & 4" FW PIPING & SUPPORTS AS REQUIRED FOR NF SKID CONNECTION. MAINTAIN SPACING AS REQUIRED FOR FLOW METER FE-513 (5D RUN BEFORE / 2D RUN AFTER)

INSTALL SAMPLE TAP AND ROUTE FLEXIBLE TUBING TO NEW HACH CHLORINE & pH ANALYZER (AE-600 & AE-601)

REPLACE EXISTING DOMESTIC WATER PUMP & TANK SYSTEM (GOULDS MODEL JRD5X). SEE PID'S & SPECIFICATIONS FOR DETAILS.

INSTALL PIPE SUPPORTS FOR NEW 4"ø PIPING TO/FROM NF SKID (NF-502) & 2"ø AIR PIPING FROM BLOWER (B-200). SEE SPECIFICATIONS AND DETAILS ON SHEET D25.

INSTALL NEW ELECTRIC ACTUATORS ON EXISTING MOTORIZED VALVES, TYP. ALL. SEE VALVE & INSTRUMENT SCHEDULE / PROCESS INSTRUMENT DIAGRAMS FOR ADDITIONAL DETAILS.

INSTALL DIFFERENTIAL PRESSURE TRANSMITTER ON UNISTRUT FRAME, TYP. 3. COORDINATE W/ OWNER & ENGINEER TO FIELD VERIFY INSTALLATION LOCATION.

EXISTING 6"ø PTW

EXISTING HACH SC-200 TURBIDIMETERS TO REMAIN IN PLACE (AIT-503/AIT-510 & AIT-511/512)

EXISTING FE-100 ON 6" RW PIPING TO AGING TANK RT-100 TO REMAIN IN PLACE.

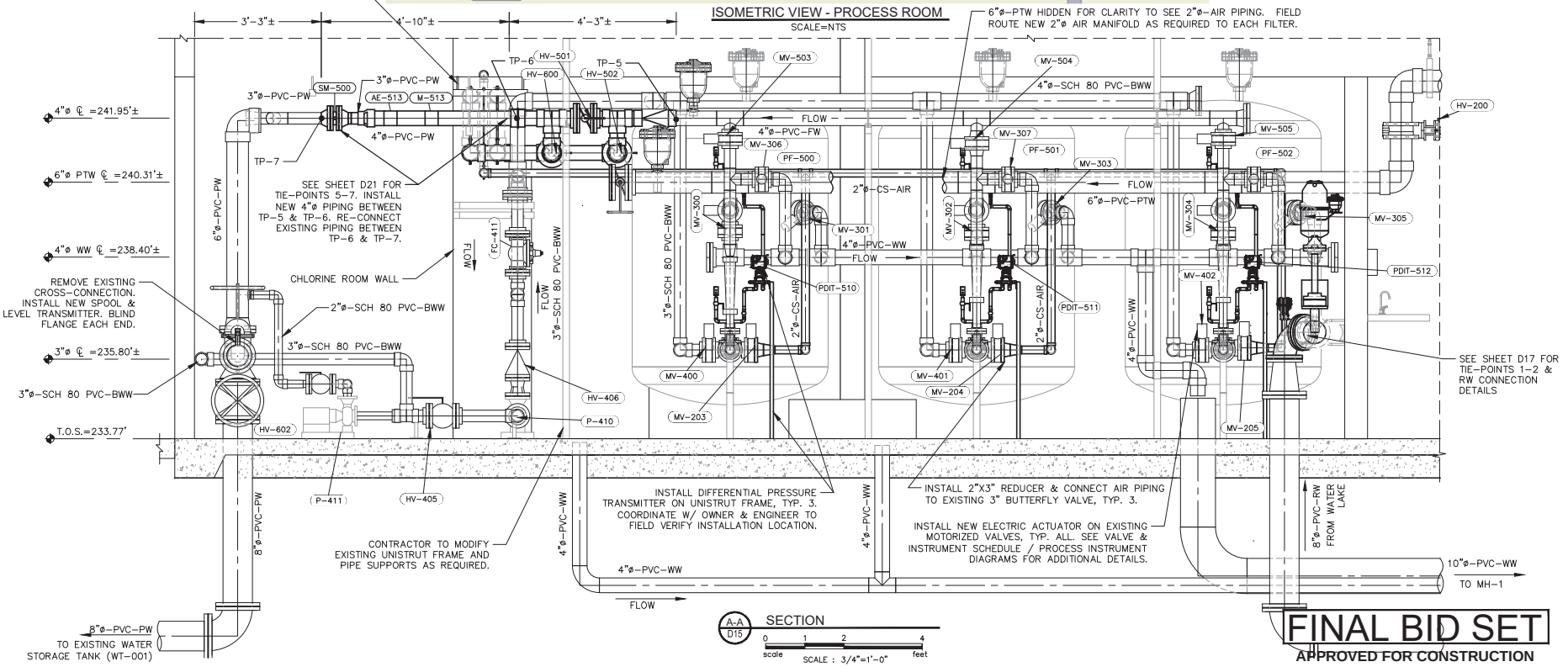
REMOVE & REPLACE EXISTING HANDWHEEL ON 6" HV-105 WITH ELECTRIC ACTUATOR.

REMOVE EXISTING WYE STRAINER & INSTALL NEW SELF BACK-WASHING SCREEN (F-100). SEE SHEET D17 FOR DETAILS.

NOTES:
1. ALL CONCRETE AND EQUIPMENT INSTALLATION WORK SHALL BE COMPLETED BY THE CONTRACTOR.
2. SEE STRUCTURAL SHEETS FOR BUILDING DETAILS.
3. ALL WALL AND FLOOR PIPE PENETRATIONS SHALL BE SEALED TO BE WATER AND AIR TIGHT.

ISOMETRIC VIEW - PROCESS ROOM

SCALE=NTS



SECTION

A-A / D15

0 1 2 4 feet

scale : 3/4"=1'-0"

FINAL BID SET

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WTP IMPROVEMENTS
PROCESS SECTION
PROCESS ROOM

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
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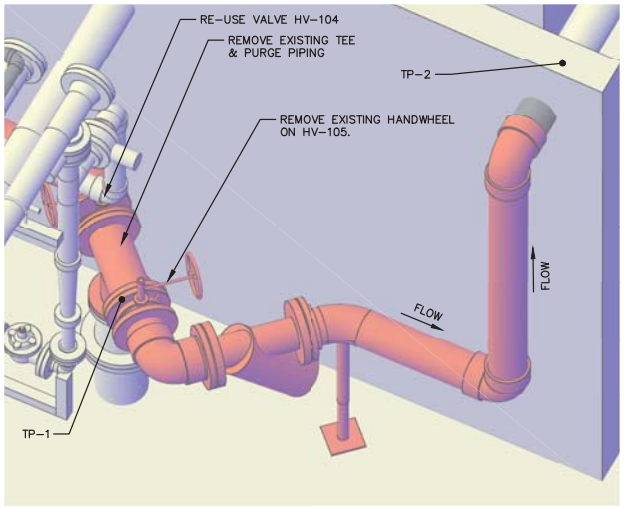
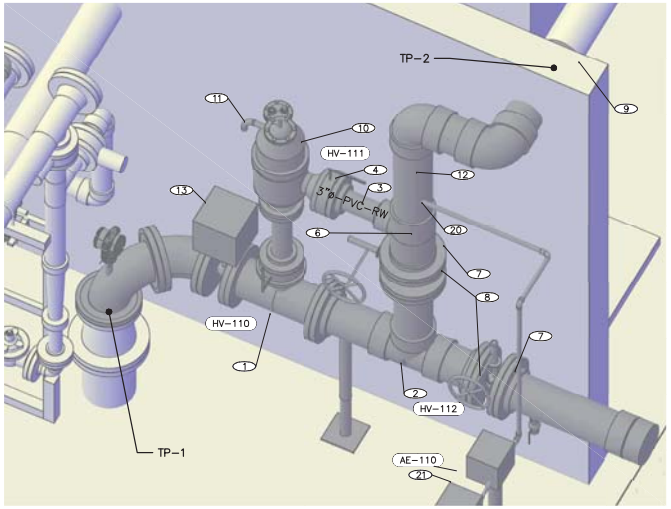
Sheet No. D16

SHEET 20 OF 71



ISOMETRIC VIEW - DEMOLITION - TIE POINTS 1-2
SCALE=NTS

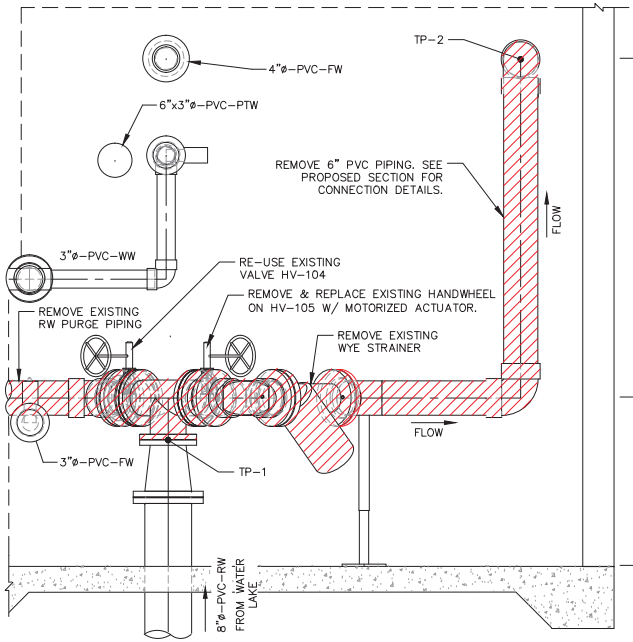


ISOMETRIC VIEW - PROCESS PIPING - TIE POINTS 1-2
SCALE=NTS

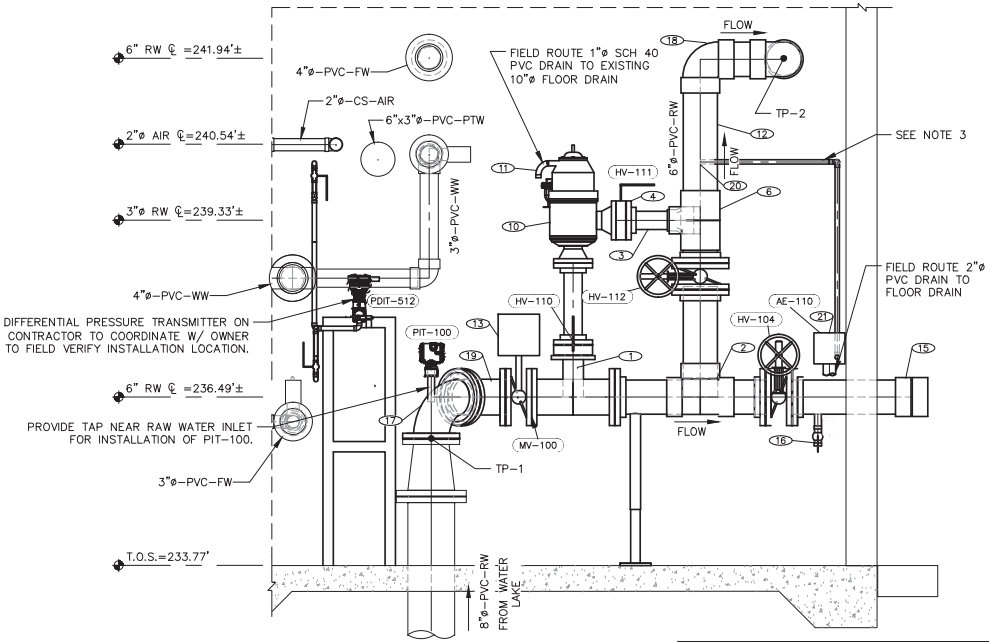
EQUIPMENT & FITTING SCHEDULE

ID	SIZE	DESCRIPTION	COMMENTS
1	6"X3"	TEE	FL x FL, DUCTILE IRON
2	6"X6"	TEE	SCH 80 PVC
3	3"	PVC PIPE	SCH 80 PVC
4	3"	BUTTERFLY VALVE	HV-111 & HV-112
5	3"	90 DEGREE BEND	SCH 80 PVC
6	6"X3"	TEE	SCH 80 PVC
7	6"	FLANGE ADAPTER	SCH 80 PVC
8	6"	BUTTERFLY VALVE	HV-113
9	6"	UNION COUPLING	SCH 80 PVC
10	–	SELF BACKWASHING FILTER	F-100
11	1"	PVC PIPE	SCH 40
12	6"	PVC PIPE	SCH 80 PVC
13	–	ELECTRIC ACTUATOR	HV-105
14	–	PRESSURE TRANSMITTER	PIT-100
15	–	CAM-LOCK	–
16	¾"	BALL VALVE	DRAIN VALVE
17	6"	90 DEGREE BEND	FL x FL
18	6"	90 DEGREE BEND	SCH 80 PVC
19	–	45 DEGREE BEND	FL x FL
20	–	SAMPLE TAP	–
21	–	TURBIDIMETER	RE-USE EXISTING HACH MODEL 1720E

NOTES:
1. PROTECT AND MAINTAIN ALL PIPING AND EQUIPMENT NOT SPECIFICALLY NAMED FOR DEMOLITION.
2. NOT ALL HVAC, ELECTRICAL AND MISC. EQUIPMENT SHOWN IN DRAWINGS.
3. FIELD ROUTE FLEXIBLE TUBING TO TURBIDIMETER (AE-110). INSTALL AE-110 AND NEW TURBIDIMETER INSTRUMENTS ON SOUTHEAST WALL, SEE ELECTRICAL.



B-B / D15 SECTION - TIE POINTS 1-2 (DEMOLITION)
scale 1 0 1 2 feet
SCALE : 1"=1'-0"



B-B / D15 SECTION - TIE POINTS 1-2
scale 1 0 1 2 feet
SCALE : 1"=1'-0"

FINAL BID SET
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WTP IMPROVEMENTS
DEMO & PROCESS
SECTIONS
TIE POINTS 1-2

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
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Sheet No. D17
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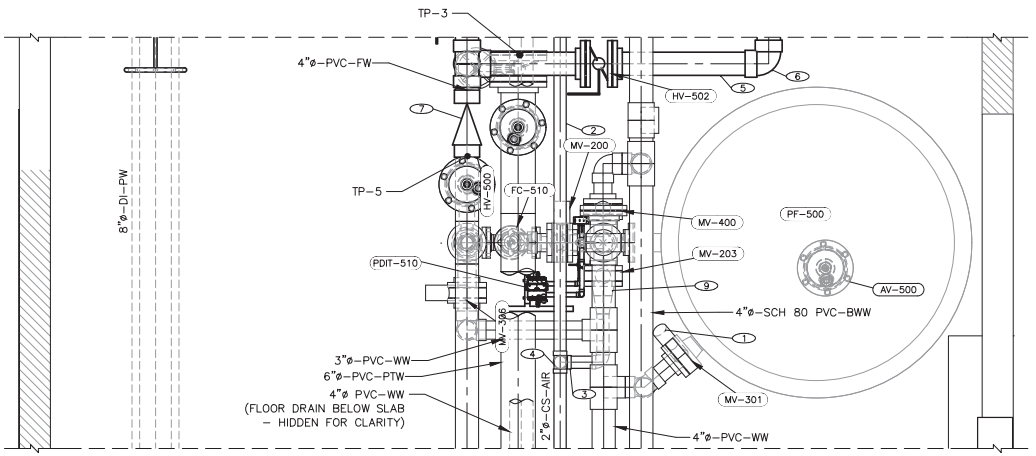
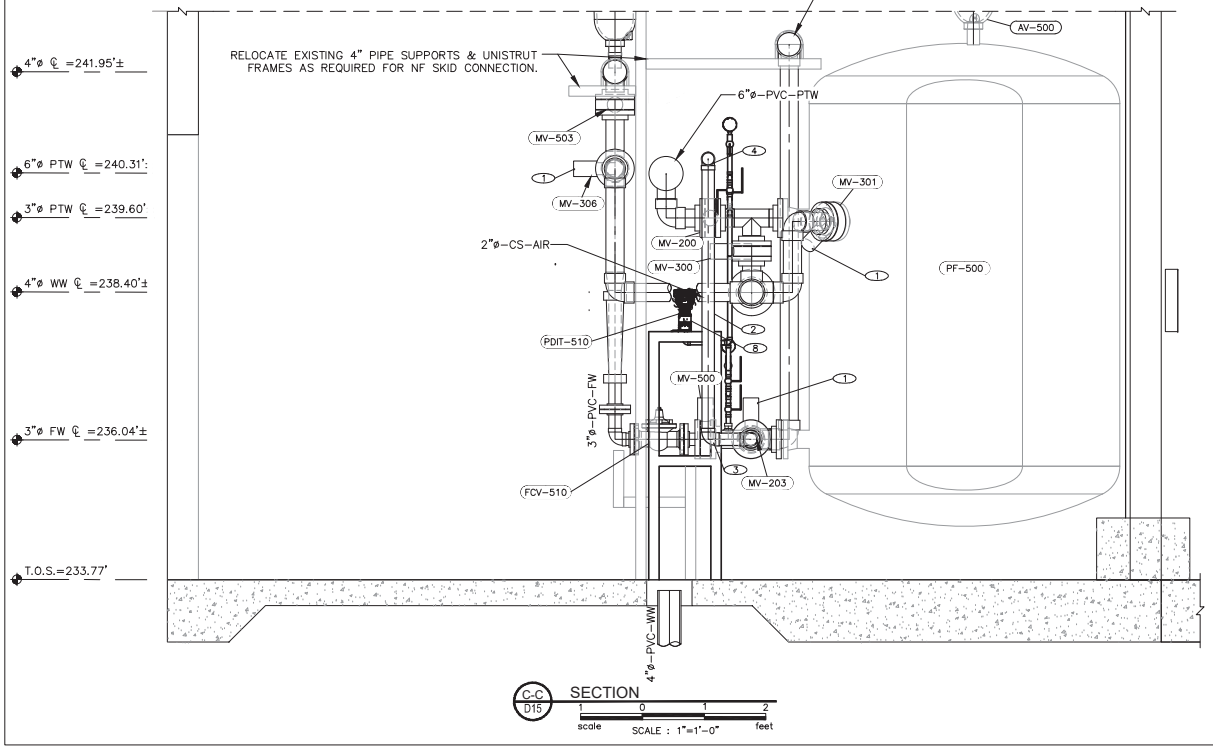


ENLARGED PLAN DETAIL - FILTER PF-500

scale 1 0 1 2 feet
SCALE : 1"=1'-0"

EQUIPMENT & FITTING SCHEDULE			
ID	SIZE	DESCRIPTION	COMMENTS
1	–	MOTORIZED ACTUATOR	SEE NOTE 1
2	2"	CS PIPE	–
3	2"	90 DEGREE BEND	–
4	2"	TEE	–
5	4"	PVC PIPE	–
6	4"	90 DEGREE BEND	–
7	4"	CHECK VALVE	–
8	–	PRESSURE TRANSMITTER	–
9	2"x3"	REDUCER	–
10	–	PIPE SUPPORT	–
11	6"	BLIND FLANGE	–

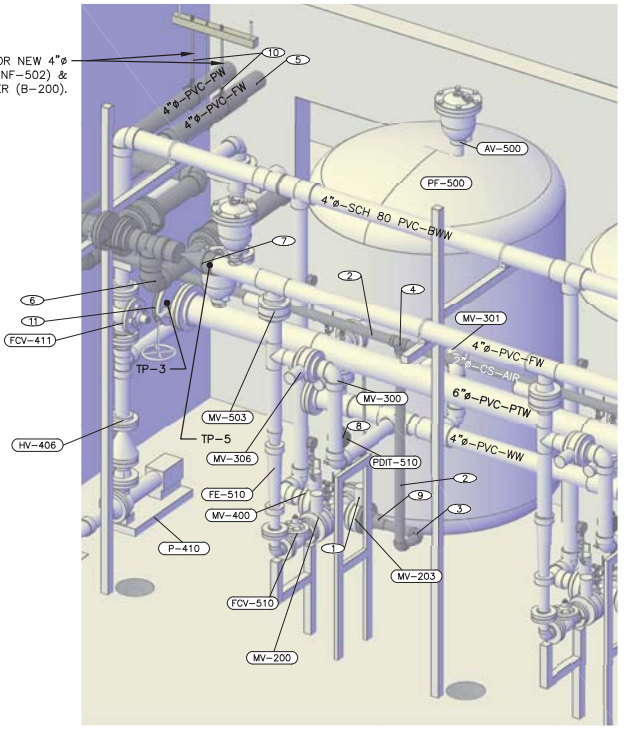
NOTES:
1. INSTALL NEW ELECTRIC ACTUATORS, BRAY SERIES 70 OR APPROVED EQUAL, PER VALVE SCHEDULE ON SHEET D10 & D12. SEE SPECIFICATIONS FOR ADDITIONAL DETAILS.



C-C D15 SECTION

scale 1 0 1 2 feet
SCALE : 1"=1'-0"

INSTALL PIPE SUPPORTS FOR NEW 4"ø PIPING TO/FROM NF SKID (NF-502) & 2"ø AIR PIPING FROM BLOWER (B-200).



ISOMETRIC VIEW - FILTER PF-500
SCALE=NTS

FINAL BID SET
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WTP IMPROVEMENTS
PROCESS
PLAN & SECTION
FILTER PF-500

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
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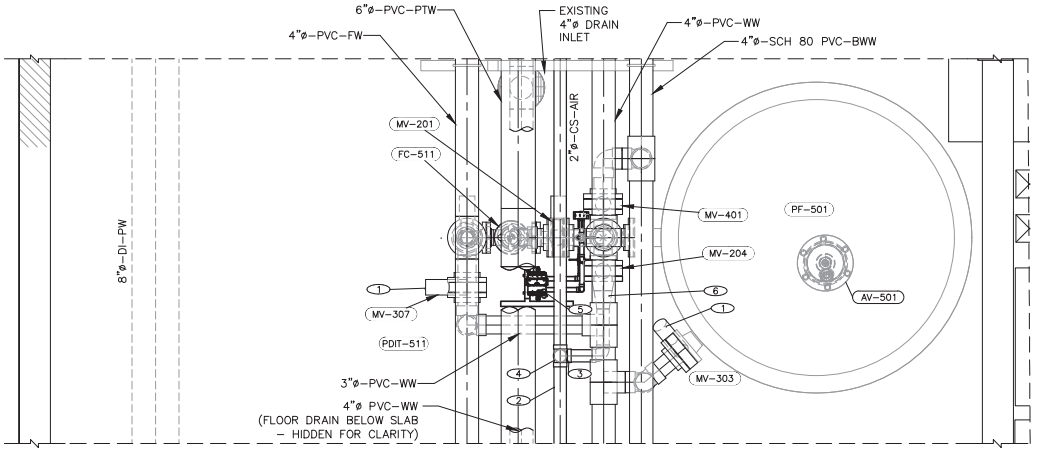
Sheet No. D18
SHEET 22 OF 71



ENLARGED PLAN DETAIL - FILTER PF-501

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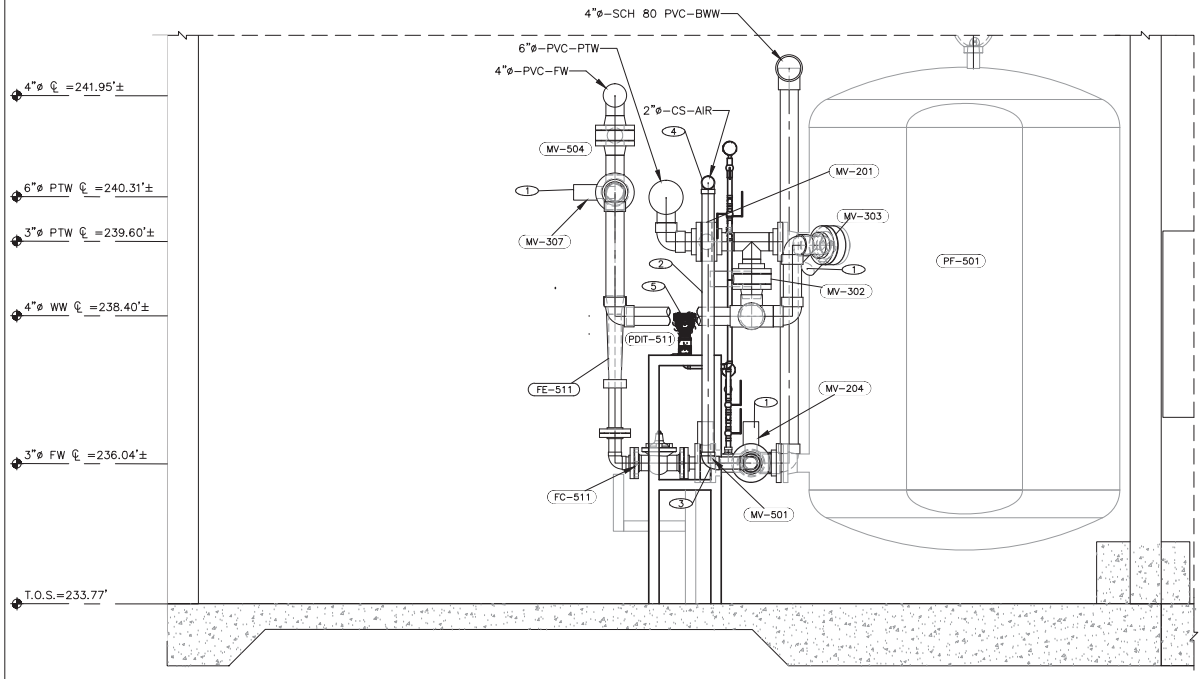


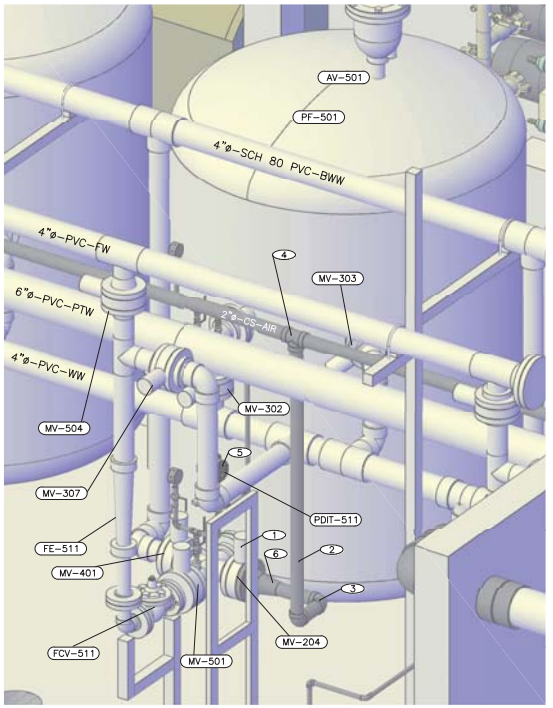
D-D
D15
SECTION

scale 1 0 1 2 feet
SCALE : 1"=1'–0"

EQUIPMENT & FITTING SCHEDULE

ID	SIZE	DESCRIPTION	COMMENTS
1	–	MOTORIZED ACTUATOR	SEE NOTE 1
2	2"	CS PIPE	–
3	2"	90 DEGREE BEND	–
4	2"	TEE	–
5	–	PRESSURE TRANSMITTER	–
6	2"x3"	REDUCER	–

NOTES:
1. REPLACE MOTORIZED ACTUATORS PER VALVE & INSTRUMENT SCHEDULES ON SHEET D10 & D12. SEE SPECIFICATION SECTION 40 11 11 VALVES FOR ADDITIONAL DETAILS.



ISOMETRIC VIEW - FILTER PF-501
SCALE=NTS

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WTP IMPROVEMENTS
PROCESS
PLAN & SECTION
FILTER PF-501

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
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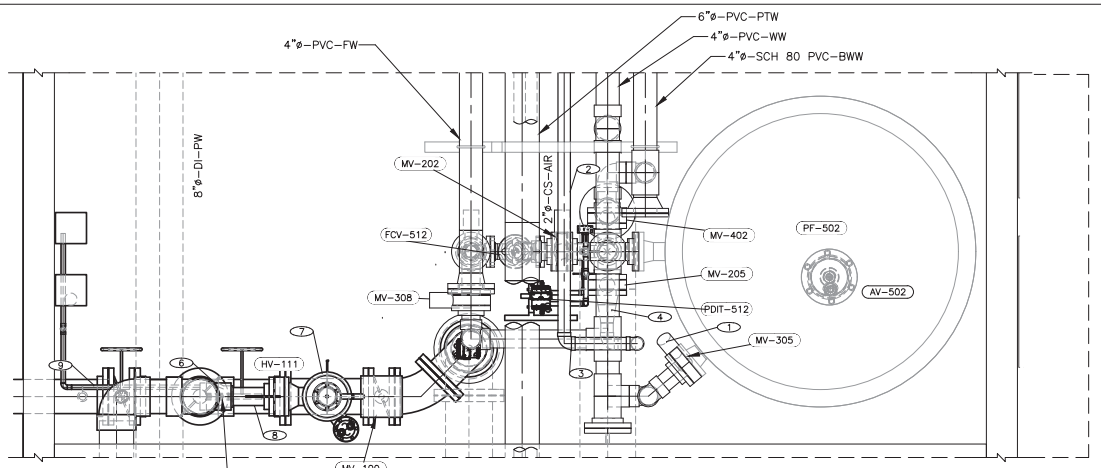
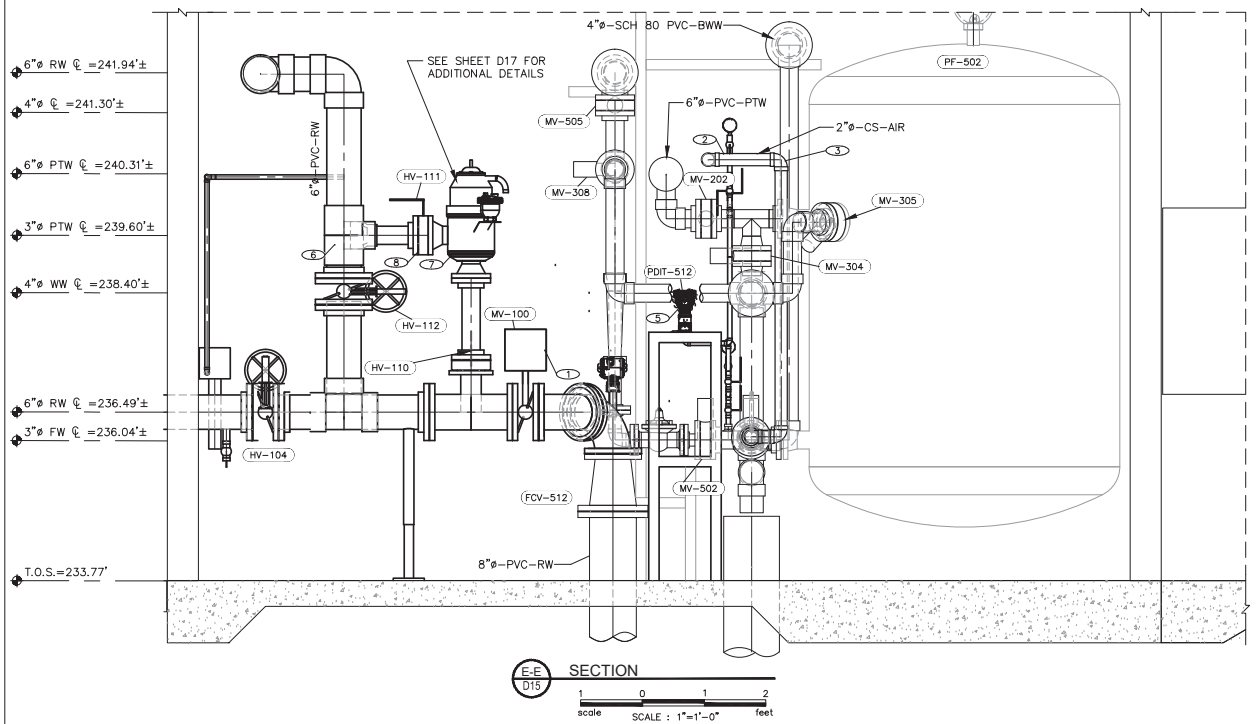
Sheet No. D19
SHEET 23 OF 71



ENLARGED PLAN DETAIL - FILTER PF-502

scale 1 0 1 2 feet
SCALE : 1"=1'-0"



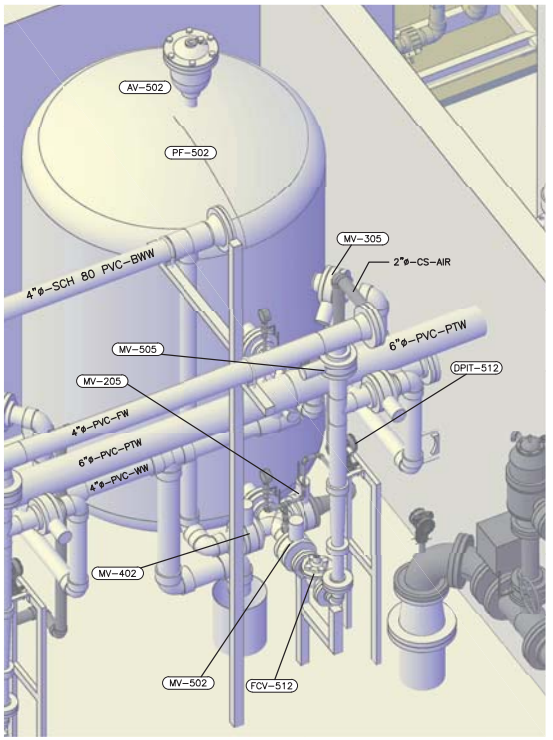
E-E D15 SECTION

scale 1 0 1 2 feet
SCALE : 1"=1'-0"

EQUIPMENT & FITTING SCHEDULE

ID	SIZE	DESCRIPTION	COMMENTS
1	–	MOTORIZED ACTUATOR	SEE NOTE 1
2	2"	CS PIPE	–
3	2"	90 DEGREE BEND	–
4	2"x3"	REDUCER	–
5	–	PRESSURE TRANSMITTER	–
6	3"	PVC PIPE	–
7	3"	SELF BACKWASHING FILTER	F-100
8	3"	BUTTERFLY VALVE	–
9	3"	90 DEGREE BEND	–

NOTES:
1. REPLACE MOTORIZED ACTUATORS PER VALVE & INSTRUMENT SCHEDULES ON SHEET D10 & D12. SEE SPECIFICATION SECTION 40 11 11 VALVES FOR ADDITIONAL DETAILS.



ISOMETRIC VIEW - FILTER PF502
SCALE=NTS

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WTP IMPROVEMENTS
PROCESS
PLAN & SECTION
FILTER PF-502

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

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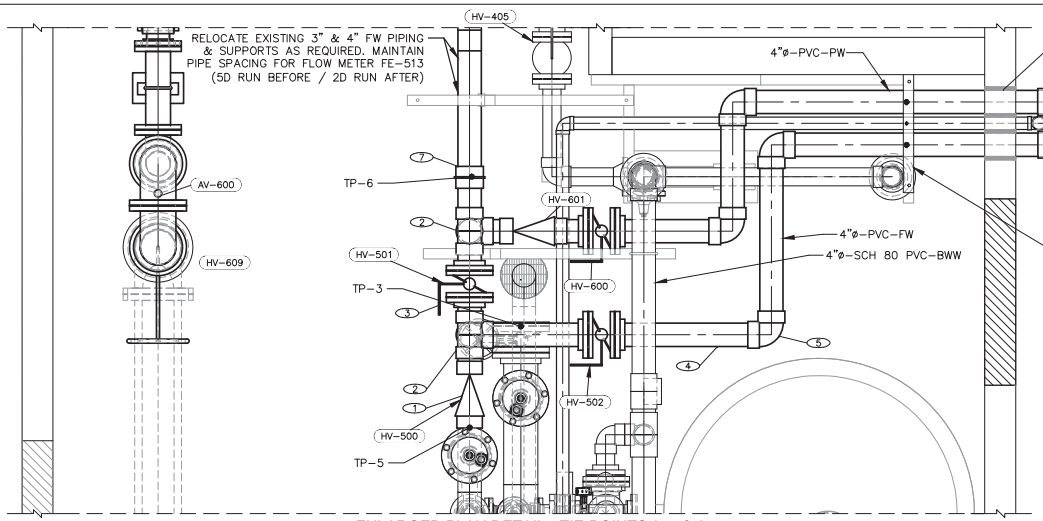
Sheet No. D20
SHEET 24 OF 71



ENLARGED PLAN DETAIL - TIE-POINTS 3, 5 & 6

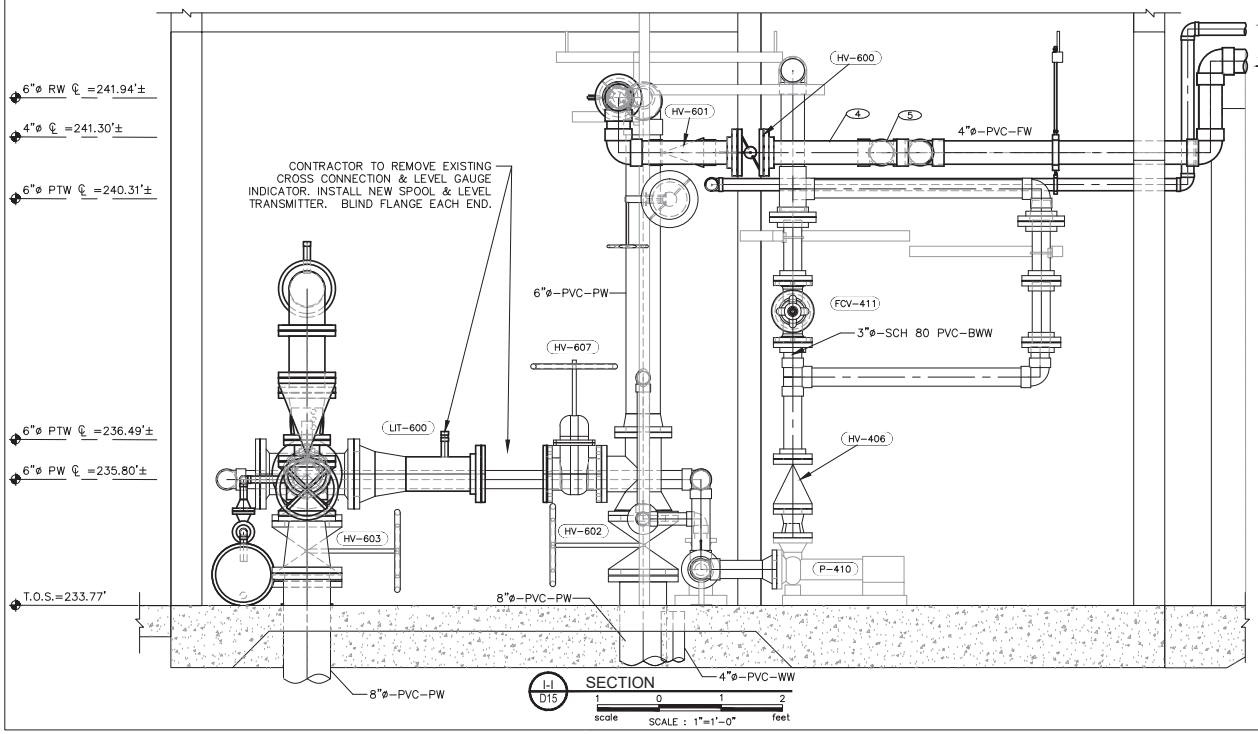
scale 1 0 1 2 feet

SCALE : 1"=1'-0"

EQUIPMENT & FITTING SCHEDULE

ID	SIZE	DESCRIPTION	COMMENTS
1	4"	CHECK VALVE	–
2	4"	TEE	–
3	4"	BUTTERFLY VALVE	–
4	4"	PVC PIPE	SCH 80 PVC
5	4"	90 DEGREE BEEND	–
6	–	WALL PENETRATION	–
7	4"	UNION COUPLING	SCH 80 PVC
8	6"	90 DEGREE BEEND	–
9	6"	PVC PIPE	SCH 80 PVC

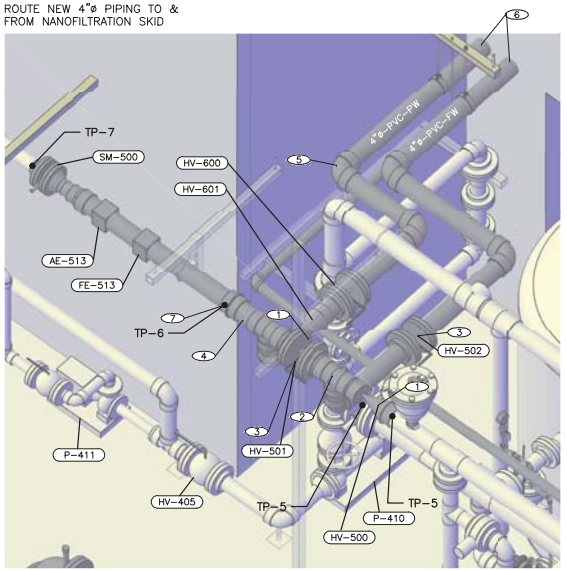
NOTES:
1. ALL CONCRETE AND EQUIPMENT INSTALLATION WORK SHALL BE COMPLETED BY THE CONTRACTOR.
2. SEE STRUCTURAL SHEETS FOR BUILDING DETAILS.
3. ALL FLOOR PIPE PENETRATIONS SHALL BE SEALED TO BE WATER AND AIR TIGHT.



I-I SECTION D15

scale 1 0 1 2 feet

SCALE : 1"=1'-0"



ISOMETRIC VIEW - TIE-POINTS 5-7

SCALE=NTS

FINAL BID SET

APPROVED FOR CONSTRUCTION

CITY OF THORNE BAY
P.O. BOX 191110
THORNE BAY, ALASKA 99919
(907) 828-3380
FAX (907) 828-3374
www.thornebay-ak.gov

VILLAGE SAFE WATER

DOWL
3535 College Road, #110
Fairbanks, Alaska 99709
907-374-0275
AECL848

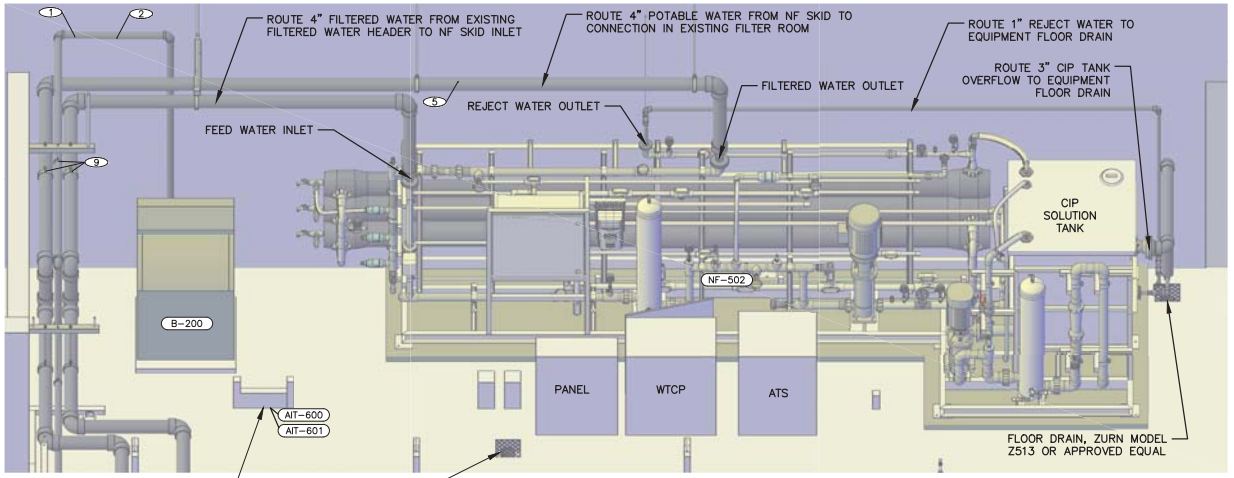
WTP IMPROVEMENTS
PROCESS
PLAN & SECTION
TIE-POINTS 5-7

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. D21

SHEET 25 OF 71

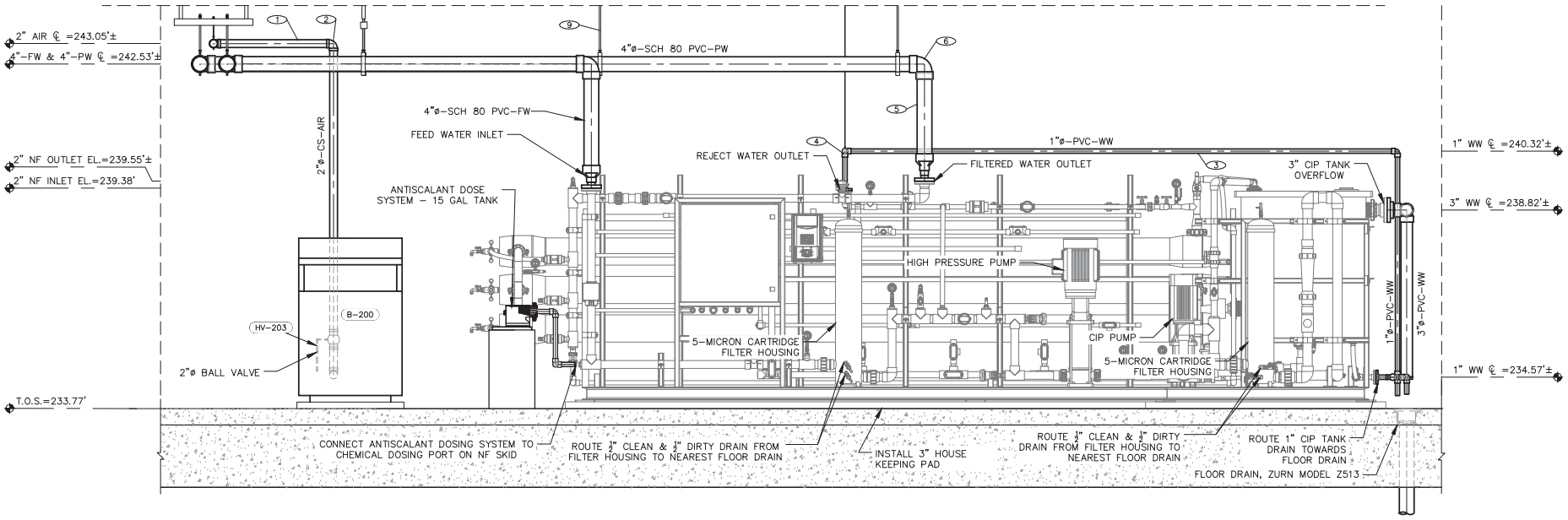


ISOMETRIC VIEW - NANOFILTRATION SKID
SCALE=NTS

EQUIPMENT & FITTING SCHEDULE

ID	SIZE	DESCRIPTION	COMMENTS
1	2"	CS PIPE	–
2	2"	90 DEGREE BEND	–
3	1"	PVC PIPE	–
4	1"	90 DEGREE BEND	–
5	4"	PVC PIPE	–
6	4"	90 DEGREE BEND	–
7	–	NOT USED	–
8	–	NOT USED	–
9	–	PIPE SUPPORT	SEE DETAIL SHEET D25
10	–	FLOOR DRAIN	ZURN MODEL Z513

NOTES:
1. ALL CONCRETE AND EQUIPMENT INSTALLATION WORK SHALL BE COMPLETED BY THE CONTRACTOR.
2. SEE STRUCTURAL SHEETS FOR BUILDING DETAILS.
3. ALL WALL AND FLOOR PIPE PENETRATIONS SHALL BE SEALED TO BE WATER AND AIR TIGHT.
4. COORDINATE PIPING AND PROCESS CONNECTIONS WITH FINAL PURE AQUA, INC. EQUIPMENT SHOP DRAWINGS.
5. MEMBRANES SHALL BE SHIPPED STERILIZED AND THE MEMBRANE SKID SHALL BE TREATED PER AWWA C653.
6. MEMBRANES MUST NOT BE EXPOSED TO CHLORINATED WATER. RINSE SKID PIPING PRIOR TO INSTALLATION.



J-J / D15 SECTION
0 1 2 4 scale feet
SCALE : 3/4"=1'-0"

FINAL BID SET
APPROVED FOR CONSTRUCTION

CITY OF THORNE BAY
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VILLAGE SAFE WATER

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3335 College Road #110
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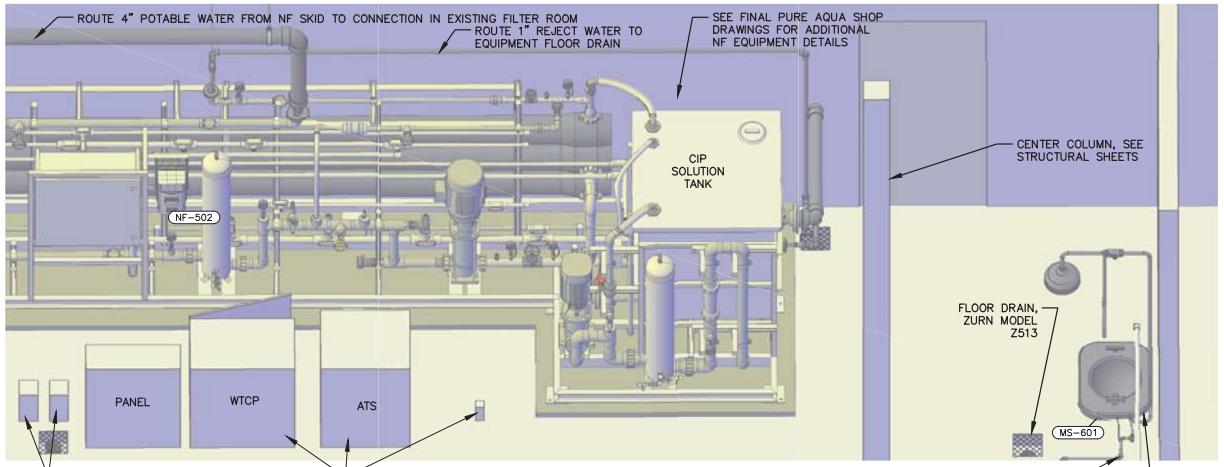
WTP IMPROVEMENTS
PROCESS SECTION
NF SKID

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. D22
SHEET 26 OF 71

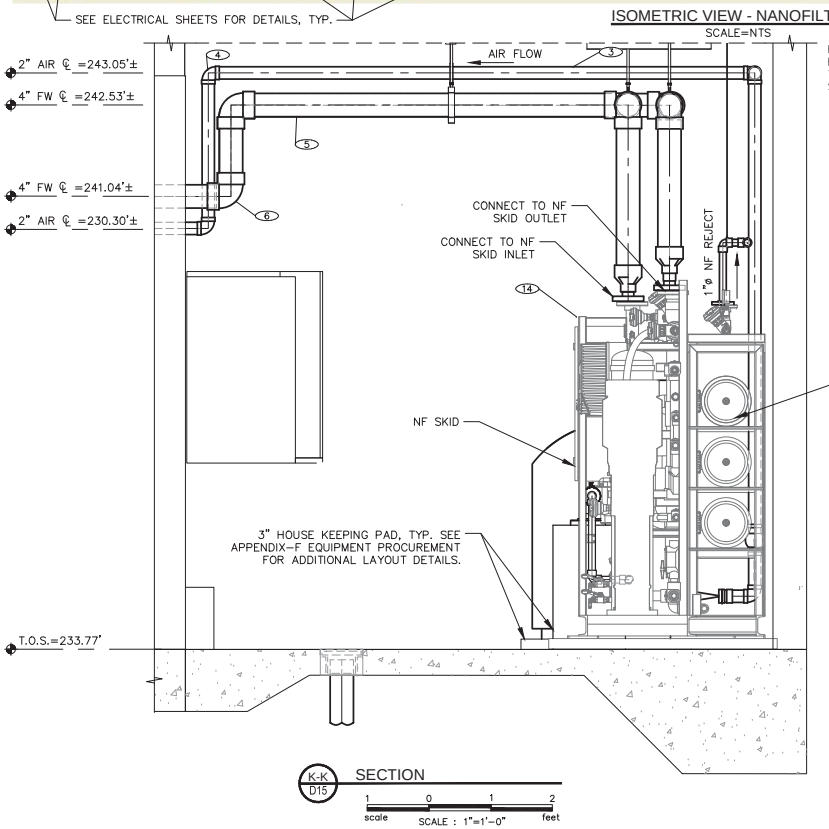


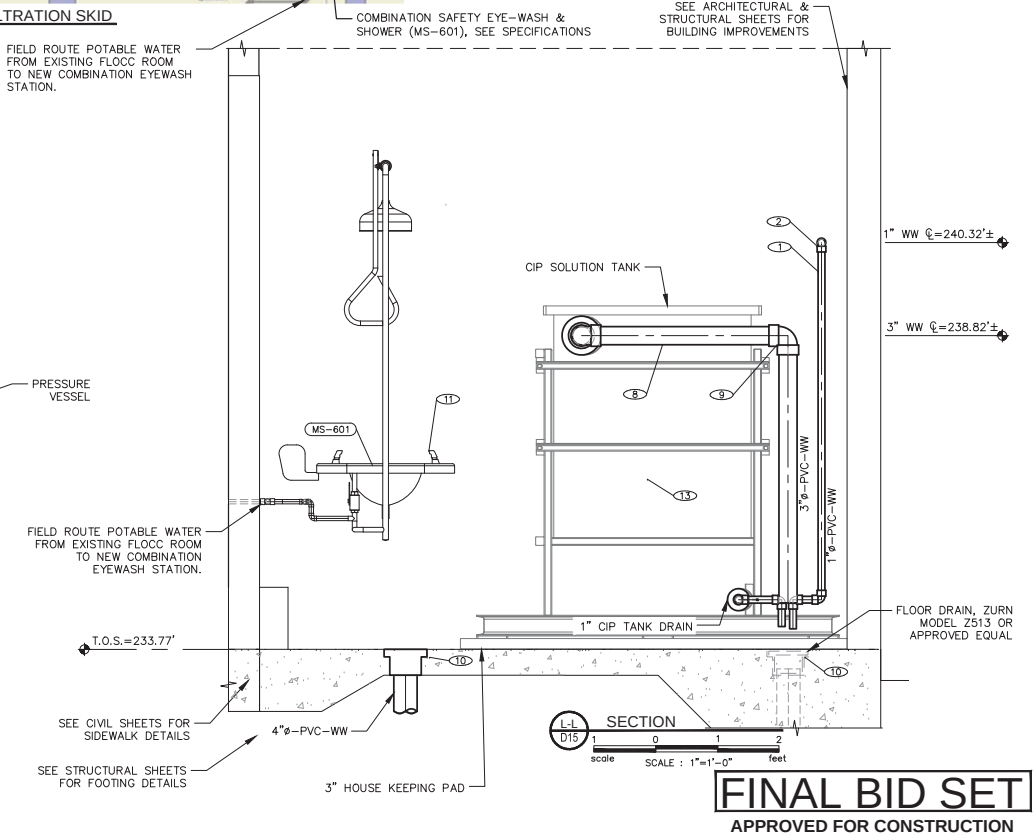
ISOMETRIC VIEW - NANOFILTRATION SKID

SCALE=NTS

EQUIPMENT & FITTING SCHEDULE			
ID	SIZE	DESCRIPTION	COMMENTS
1	1"ø	PVC PIPE	SCH 80 PVC
2	1"ø	90 DEGREE BEND	SCH 80 PVC
3	2"ø	CS PIPE	SCH 10
4	2"ø	90 DEGREE BEND	SCH 10
5	4"ø	PVC PIPE	SCH 80 PVC
6	4"ø	90 DEGREE BEND	SCH 80 PVC
7	–	NOT USED	–
8	3"ø	PVC PIPE	SCH 80 PVC
9	3"ø	90 DEGREE BEND	SCH 80 PVC
10	–	FLOOR DRAIN	ZURN MODEL Z513
11	–	EYE-WASH STATION & SHOWER	MS-601
12	–	NOT USED	–
13	–	CIP SYSTEM ASSEMBLY	SEE APPENDIX F
14	–	NF SKID ASSEMBLY	SEE APPENDIX F
15	–	TYPE 1 FLOOR PENETRATION	SEE DETAIL SHEET D25
16	–	TYPE 2 WALL PENETRATION	SEE DETAIL SHEET D25

NOTES:
1. ALL CONCRETE AND EQUIPMENT INSTALLATION WORK SHALL BE COMPLETED BY THE CONTRACTOR.
2. SEE STRUCTURAL SHEETS FOR BUILDING DETAILS.
3. ALL WALL AND FLOOR PIPE PENETRATIONS SHALL BE SEALED TO BE WATER AND AIR TIGHT.





FINAL BID SET

APPROVED FOR CONSTRUCTION

CITY OF THORNE BAY
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VILLAGE SAFE WATER

DOWL
3535 College Road #110
Fairbanks, Alaska 99709
907-374-0275

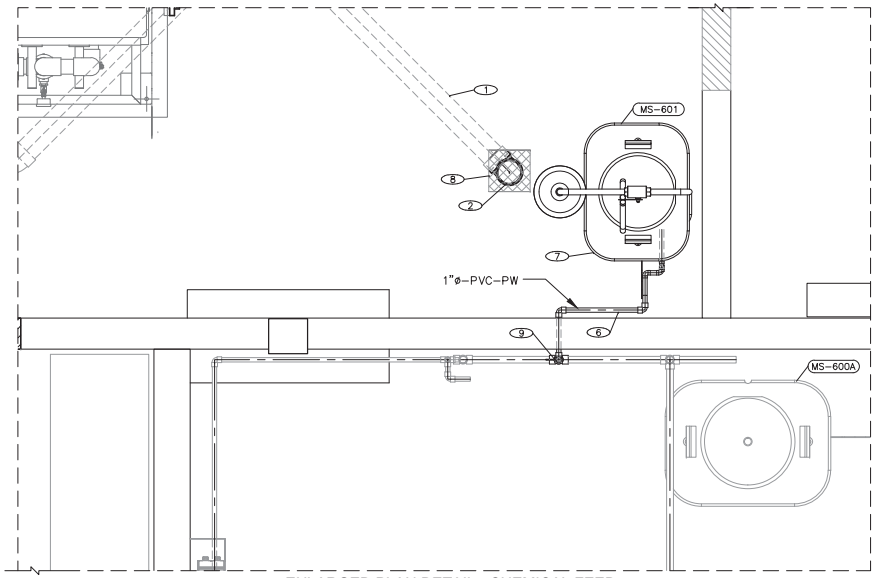
WTP IMPROVEMENTS
PROCESS SECTIONS
NF SKID

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. D23

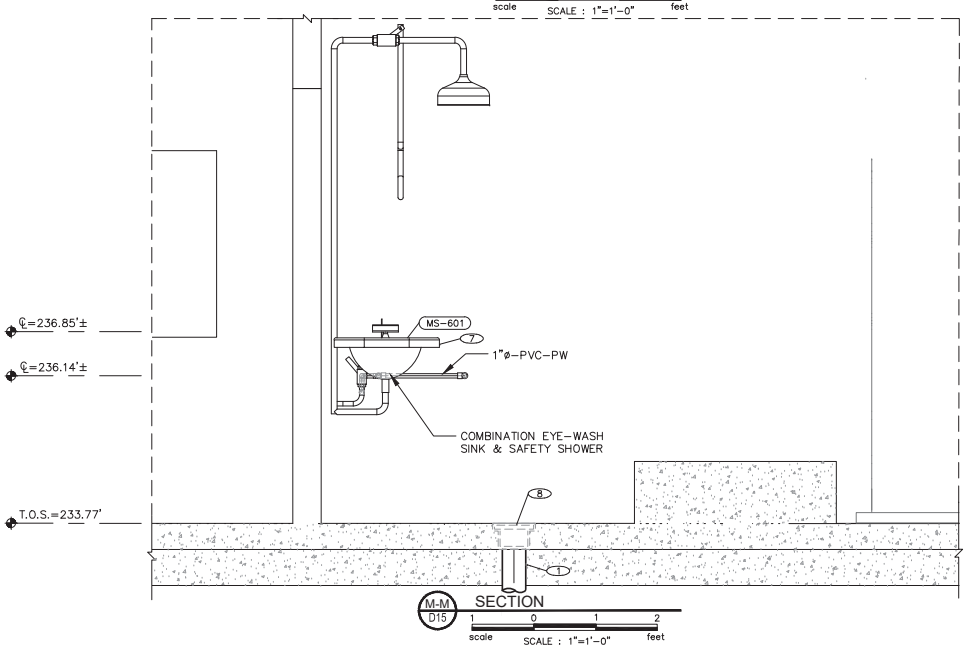
SHEET 27 OF 71



ENLARGED PLAN DETAIL - CHEMICAL FEED

scale 1 0 1 2 feet

SCALE : 1"=1'-0"



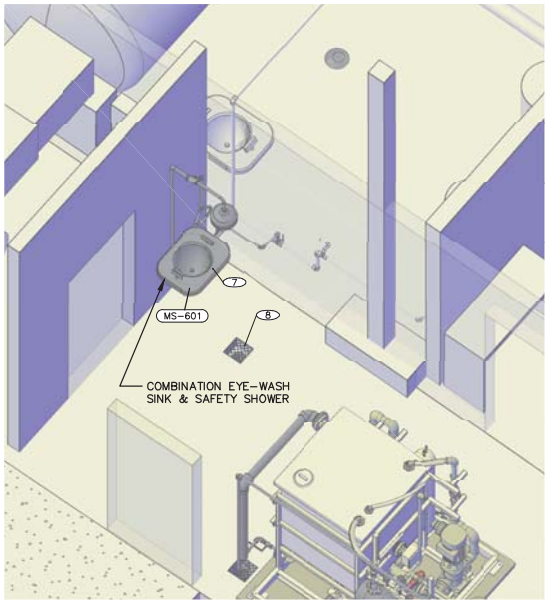
SECTION

scale 1 0 1 2 feet

SCALE : 1"=1'-0"

EQUIPMENT & FITTING SCHEDULE			
ID	SIZE	DESCRIPTION	COMMENTS
1	4"	PVC PIPE	–
2	4"	90 DEGREE BEND	–
3	–	NOT USED	–
4	–	NOT USED	–
5	–	NOT USED	–
6	1"	PVC PIPE	–
7	–	EYEWASH STATION	MS-601
8	–	FLOOR DRAIN	ZURN MODEL 513 OR EQUAL
9	1"	BALL VALVE	HV-610

NOTES:
1. ALL CONCRETE AND EQUIPMENT INSTALLATION WORK SHALL BE COMPLETED BY THE CONTRACTOR.
2. SEE STRUCTURAL SHEETS FOR BUILDING DETAILS.
3. ALL FLOOR PIPE PENETRATIONS SHALL BE SEALED TO BE WATER AND AIR TIGHT.



ISOMETRIC VIEW - CHEMICAL FEED

SCALE=NTS

FINAL BID SET

APPROVED FOR CONSTRUCTION

CITY OF THORNE BAY
P.O. BOX 191110
THORNE BAY, ALASKA 99919
(907) 828-3380
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www.thornebay-ak.gov

VILLAGE SAFE WATER

DOWL
ASCE1848
3535 College Road, #100
Fairbanks, Alaska 99709
907-374-0275
www.dowl.com

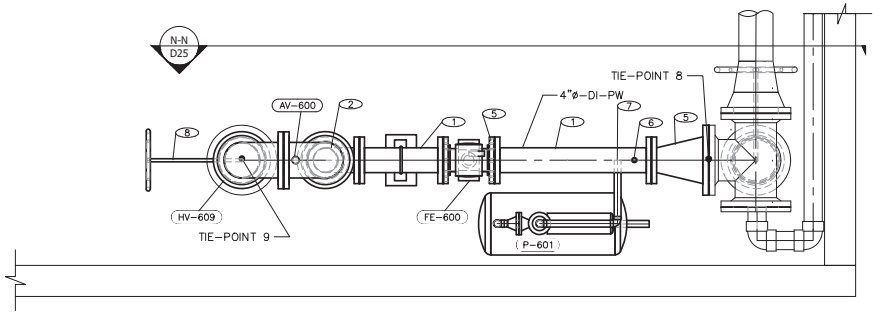
WTP IMPROVEMENTS
PROCESS
PLAN & SECTION
CHEMICAL FEED

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. D24

SHEET 28 OF 71



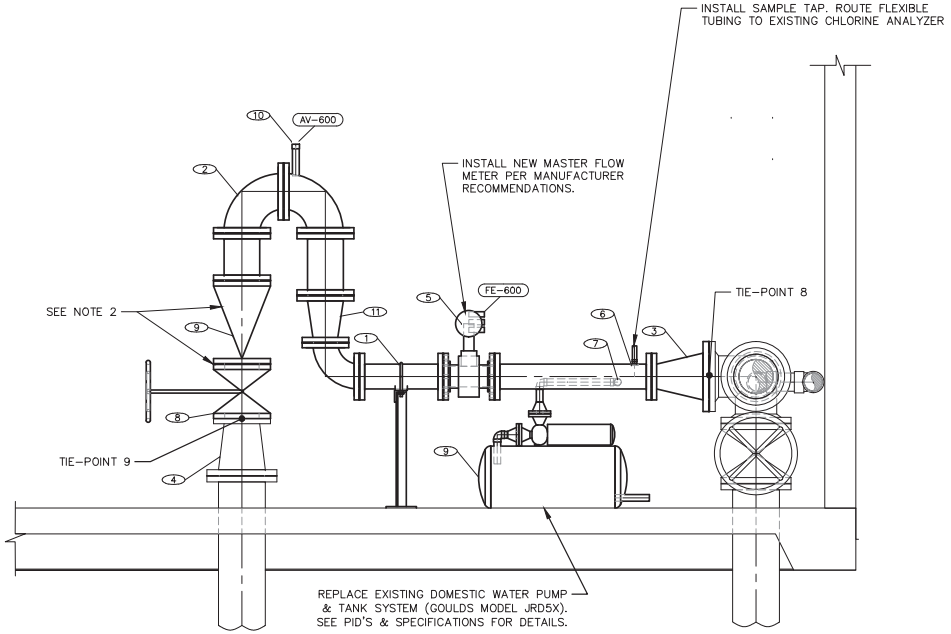
ENLARGED PLAN DETAIL - POTABLE WATER

scale 1 0 1 2 feet

SCALE : 1"=1'-0"

EQUIPMENT & FITTING SCHEDULE			
ID	SIZE	DESCRIPTION	COMMENTS
1	4"	DI PIPE	–
2	4"	90 DEGREE BEND	–
3	8"x4"	CONCENTRIC REDUCER	–
4	8"x6"	CONCENTRIC REDUCER	–
5	4"	FLOW METER	–
6	1"	SAMPLE TAP	CHLORINE, pH & TEMP (AE-600/601; TI-600)
7	–	TAP	–
8	6"	GATE VALVE	RE-USE EXISTING VALVE
9	6"	CHECK VALVE	RE-USE EXISTING VALVE
10	3/4"	AIR RELEASE VALVE	–
11	4"x6"	CONCENTRIC REDUCER	–

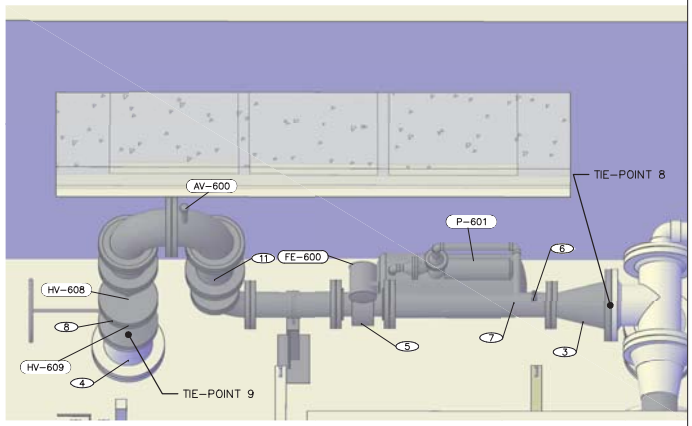
NOTES:
1. INSTALL FLOW METER PER MANUFACTURER'S RECOMMENDATIONS. TYPICAL SPACING INCLUDES 2D STRAIGHT RUN DOWNSTREAM AND 5D STRAIGHT RUN UPSTREAM OF METER.
2. REMOVE & RE-USE EXISTING 6" CHECK VALVE (HV-608) & 6" GATE VALVE (HV-609)



N-N D15 SECTION

scale 1 0 1 2 feet

SCALE : 1"=1'-0"



ISOMETRIC VIEW

SCALE=NTS

FINAL BID SET

APPROVED FOR CONSTRUCTION

CITY OF THORNE BAY
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THORNE BAY, ALASKA 99919
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www.thornebay-ak.gov

VILLAGE SAFE WATER

DOWL
3535 College Road, #110
Fairbanks, Alaska 99709
907-374-0275

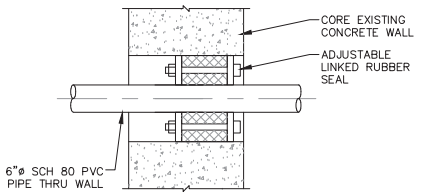
WTP IMPROVEMENTS
PROCESS
PLAN & SECTION
PROCESS ROOM

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

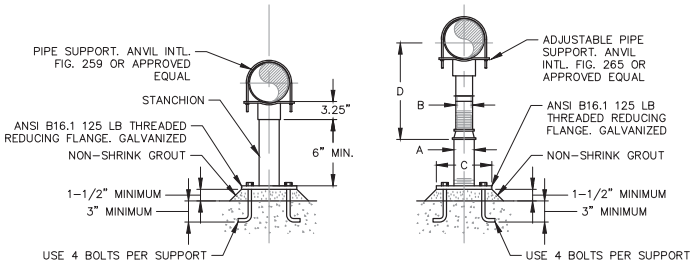
Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
Approved

Sheet No. D25

SHEET 29 OF 71



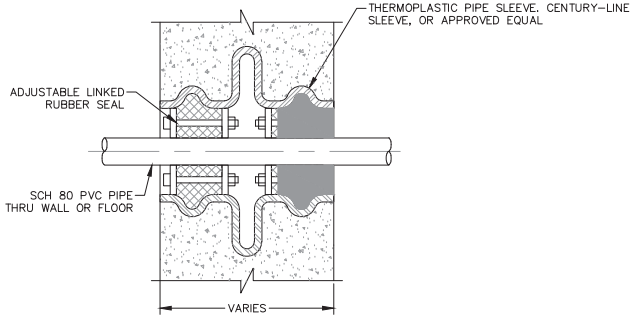
1 D23 TYPE 1 - PIPE PENETRATION (FOR EXISTING CONCRETE WALL)
NTS



FIXED PIPE SADDLE SUPPORT ADJUSTABLE PIPE SADDLE SUPPORT

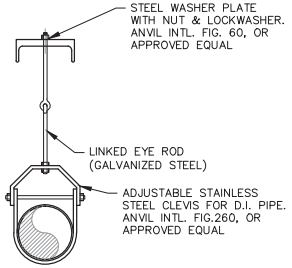
ADJUSTABLE PIPE SUPPORT DIMENSIONS						
PIPE SIZE	A	B	C	D MIN.	D MAX.	ANCHOR BOLT DIA.
4	4"	3"	9"	9-1/2"	14"	5/8"
6	4"	3"	9"	10-3/4"	15-1/4"	5/8"

2 D23 TYPICAL PIPE SADDLE SUPPORT
NTS



NOTES:
1. INSTALL LINK-SEAL CONNECTION PER MANUFACTURER RECOMMENDATIONS. GROUT IN PLACE IF NECESSARY TO PROVIDE A WATER TIGHT SEAL.
2. SLEEVE DIAMETER AS RECOMMENDED BY MECHANICAL SEAL MANUFACTURER.

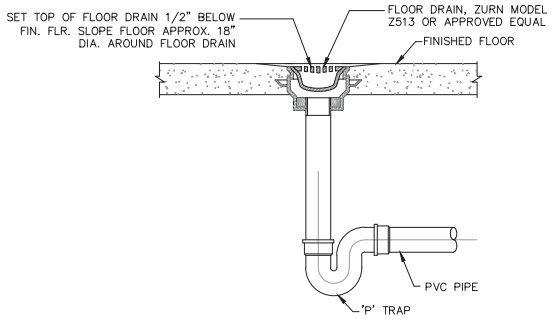
3 D23 TYPE 2 - PIPE PENETRATION (CAST-IN-PLACE)
NTS



PIPE HANGER RODS AND SUPPORT SPACING			
PIPE DIA.	ROD DIA.	MAX. SUPPORT SPACING	WEIGHT LIMIT
(INCHES)	(INCHES)	(FEET)	(LBS)
3/4 & SMALLER	3/8	6	610
1 TO 2	3/8	9	730
2 1/2 TO 3 1/2	1/2	12	1350
4 TO 5	5/8	14	1430
6	3/4	16	1940

NOTES:
1. GALVANIZE ALL PARTS AFTER FABRICATION. SEE PROJECT SPECIFICATIONS.

4 D23 TYPICAL PIPE HANGER
NTS



5 D23 TYPICAL FLOOR DRAIN
NTS

FINAL BID SET
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VILLAGE SAFE WATER

DOWL
3335 College Road, #110
Fairbanks, Alaska 99709
907-374-0275

WTP IMPROVEMENTS
STANDARD DETAILS

REVISION	BY	DATE
85% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-18

Project No. 329.50093.01
Date 2019-01-08
Designed
Drawn
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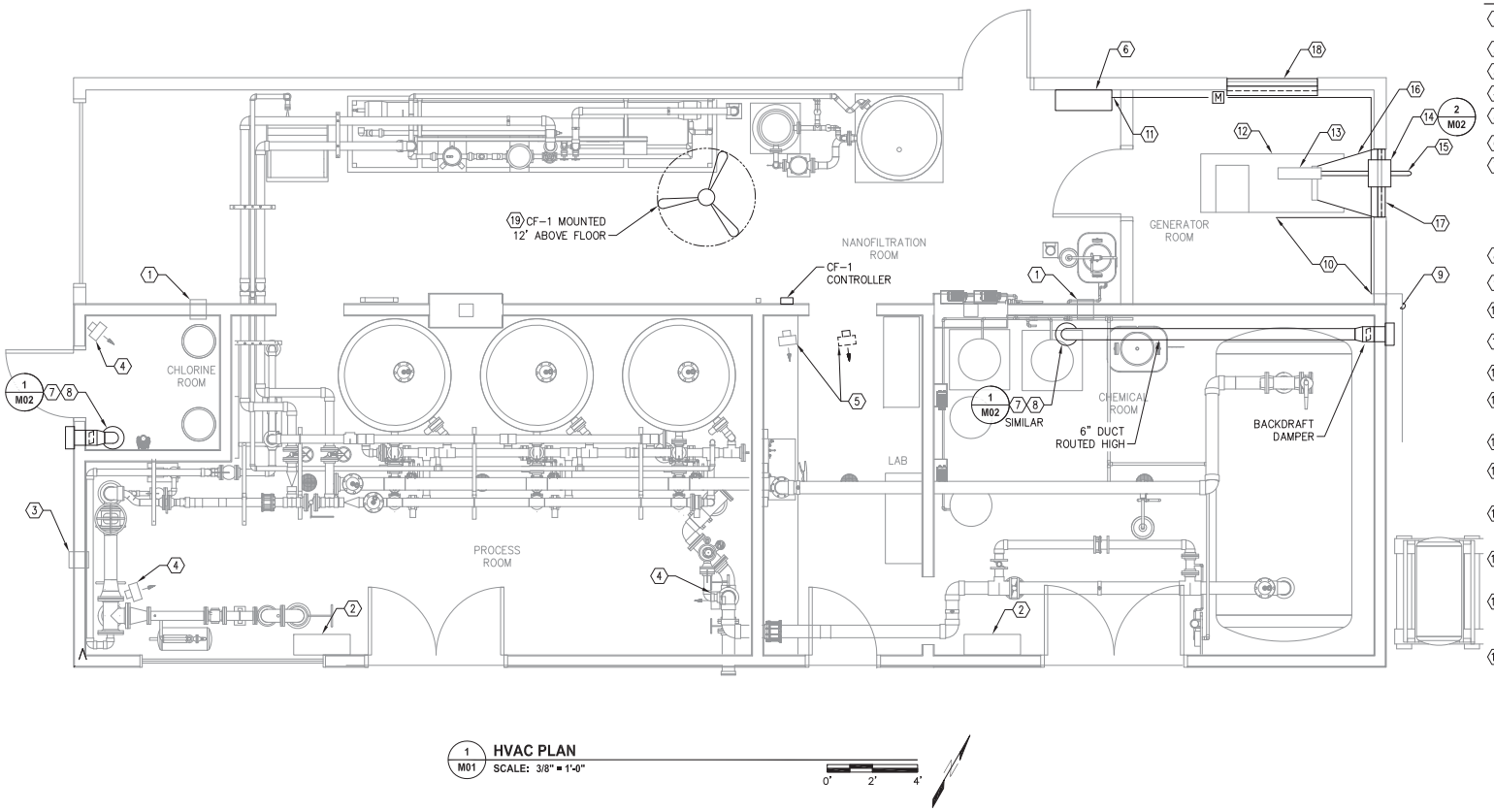
Sheet No. D26
SHEET 30 OF 71



1 M01 **HVAC PLAN**
SCALE: 3/8" = 1'-0"

0' 2' 4'

SHEET NOTES

1. EXISTING EXHAUST FAN. REMOVE AND CLOSE WALL PENETRATION.
2. EXISTING L-73 TOYOSTOVE HEATER TO REMAIN
3. EXISTING THRU-WALL FAN TO REMAIN
4. EXISTING ELECTRIC UNIT HEATER TO REMAIN
5. RELOCATE EXISTING ELECTRIC UNIT HEATER AS SHOWN AND RECONNECT PER ELECTRICAL.
6. NEW TOYOTOMI L-73 TOYOSTOVE HEATER
7. NEW CHEM ROOM EXHAUST FAN – FANTECH FR110 NON-METALLIC FAN HOUSING AND IMPELLER. 150 CFM AT 0.2 INCHES W.C. 80W, 120VAC, SINGLE PHASE. PROVIDE BACKDRAFT DAMPER AT WALL AND WALL EXHAUST HOOD MOUNTED AS HIGH AS POSSIBLE. SEE ELECTRICAL FOR FAN CONTROL.
8. EXTEND INTAKE DUCT TO 24 INCHES ABOVE FLOOR
9. EXISTING FUEL OIL SUPPLY AND RETURN PIPING FROM EXISTING FUEL TANK TO REMAIN
10. CONNECT NEW FUEL OIL SUPPLY AND RETURN PIPING TO GENERATOR SEE DETAIL 3/M02
11. CONNECT NEW FUEL OIL SUPPLY PIPING TO TOYOSTOVE HEATER SEE DETAIL 3/M02
12. REMOVE AND REINSTALL EXISTING GENERATOR SET
13. REINSTALL EXISTING MUFFLER AT 8'0 MIN ABOVE FLOOR. EXTEND EXHAUST PIPE FROM EXISTING ENGINE EXHAUST FLEX AS REQUIRED.
14. EXHAUST PENETRATION THIMBLE SEE DETAIL 2 / DRAWING M02
15. NEW 2" EXHAUST PIPE – SLOPE TOWARD OUTSIDE WALL AND EXTEND 12" PAST WALL SURFACE. TERMINATE IN 45° CUT END
16. CONSTRUCT NEW PLENUM BETWEEN GENERATOR RADIATOR OUTLET AND DAMPER/LOUVER SEE DETAIL 4 / DRAWING M02
17. 3'W X 4'H GRAVITY DAMPER/LOUVER COMBINATION – BOTTOM AT 12" ABOVE FINISHED FLOOR
18. 4'W X 4'H INTAKE LOUVER AND MOTORIZED DAMPER – BOTTOM AT 48" ABOVE FINISHED FLOOR. WIRE TO OPEN WHENEVER GENERATOR RUNS.
19. CF-1 VARIABLE SPEED CIRCULATION FAN WITH WALL CONTROLLER. BIG ASS FANS HAIKU L MODEL 52 INCH DIAMETER. COORDINATE CEILING MOUNT LOCATION WITH LIGHTING FOR FAN BLADE CLEARANCE.

FINAL BID SET
APPROVED FOR CONSTRUCTION

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VILLAGE SAFE WATER

EDC, INC.
213 W. FIREWEED LANE
ANCHORAGE, AK 99503
907.277.1932
LICENSE NO. AECC705

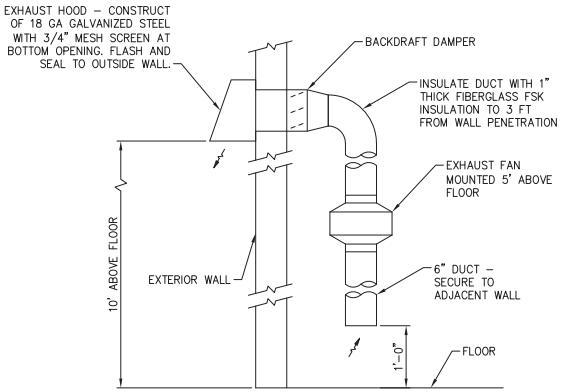
WTP IMPROVEMENTS

HVAC PLAN

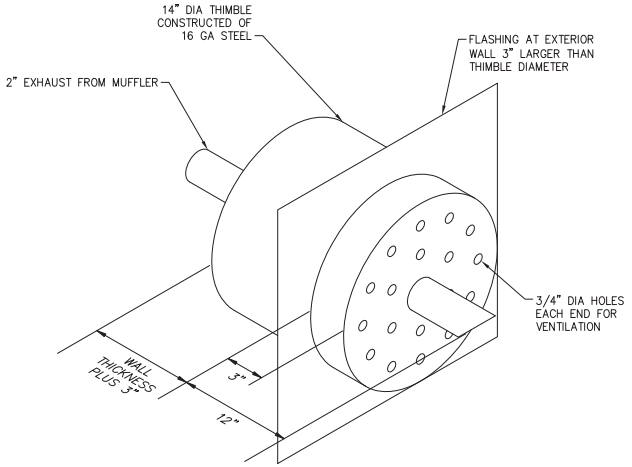
REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
Date 2018-11-30
Designed KLH
Drawn KLH
Approved KLH

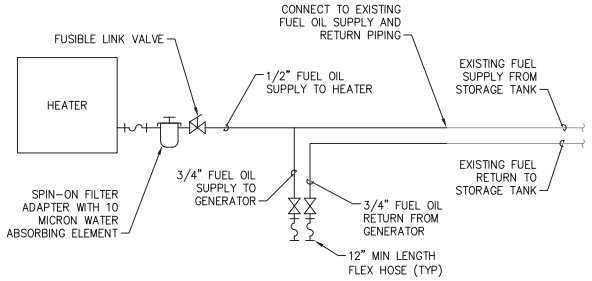
Sheet No. M01
SHEET 31 OF 71



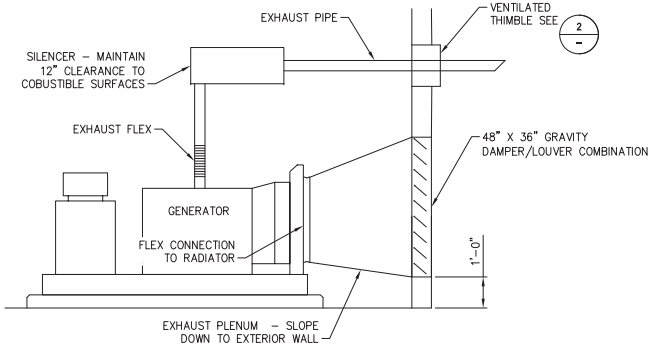
1 / M01 **EXHAUST FAN DETAIL**
SCALE: NTS



2 / M01 **GENERATOR EXHAUST THIMBLE DETAIL**
SCALE: NTS



3 / M01 **FUEL PIPING SCHEMATIC**
SCALE: NTS



NOTE: CONSTRUCT PLENUM OF G90 GALVANIZED STEEL WITH GAUGE PER SMACNA HVAC CONSTRUCTION STANDARDS – METAL & FLEXIBLE.

4 / M01 **GENERATOR EXHAUST PLENUM DETAIL**
SCALE: NTS

FINAL BID SET
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213 W. FIREWEED LANE
ANCHORAGE, AK 99503
(907) 279-2585
LICENSE NO. AECC705

WTP IMPROVEMENTS

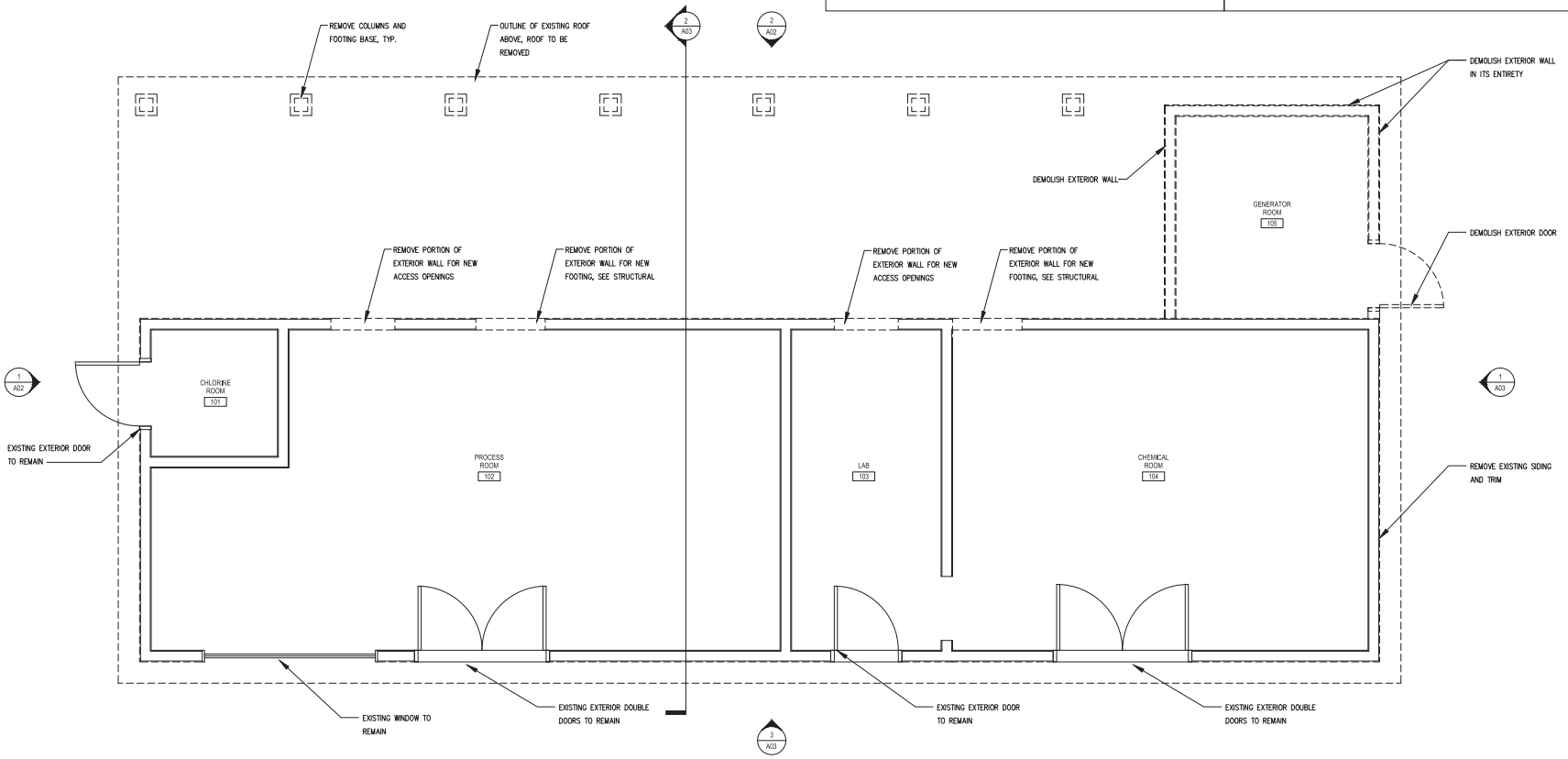
HVAC DETAILS

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
Date 2018-11-30
Designed KLH
Drawn KLH
Approved KLH

Sheet No. M02
SHEET 32 OF 71

GENERAL DEMOLITION NOTES	LEGEND
1. REMOVE EXISTING LIGHT FIXTURES, TYPICAL. COORDINATE WITH ELECTRICAL DRAWINGS. 2. CONTRACTOR TO LOCATE EXISTING UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION. 3. ITEMS SHOWN IN BOLD DASHED LINES ARE TO BE DEMOLISHED, TYPICAL. COORDINATE WITH STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR COMPLETE SCOPE OF DEMOLITION WORK.	EXISTING WALL TO REMAIN WALL TO BE REMOVED, COMPLETE



1 A01 DEMOLITION FLOOR PLAN

SCALE: 3/8" = 1'-0"

N

FINAL BID SET

APPROVED FOR CONSTRUCTION

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WTP IMPROVEMENTS

DEMOLITION FLOOR PLAN

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

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Date 2018-11-30
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Sheet No. A01

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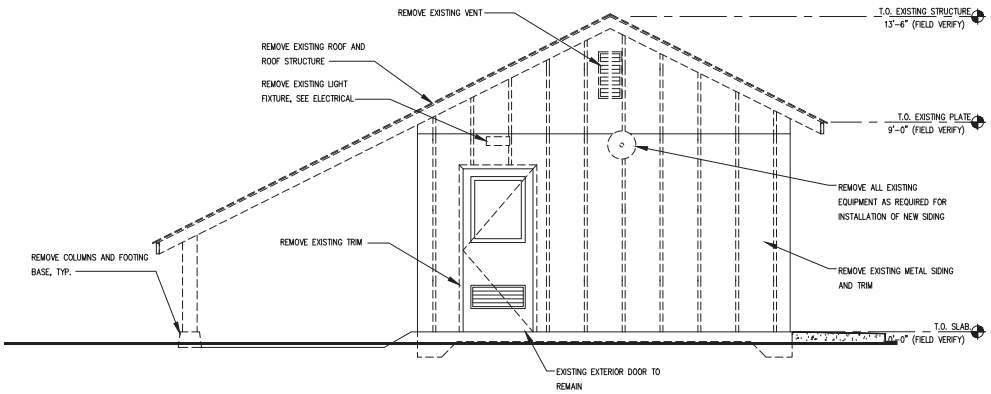
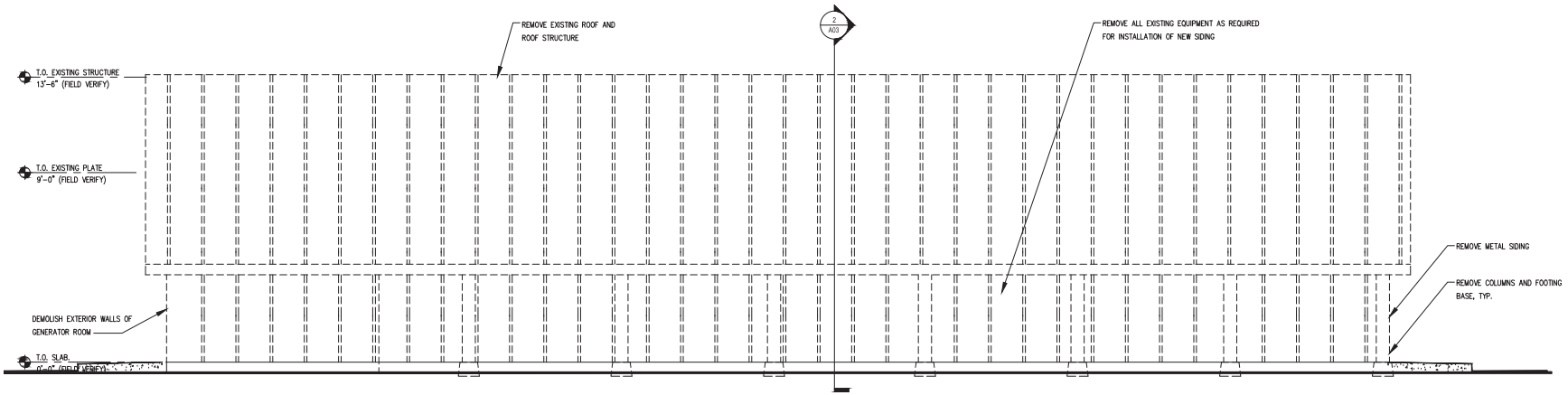


1 A02 WEST ELEVATION - DEMOLITION

SCALE: 3/8" = 1'-0"



2 A02 NORTH ELEVATION - DEMOLITION

SCALE: 3/8" = 1'-0"

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DEMOLITION ELEVATIONS

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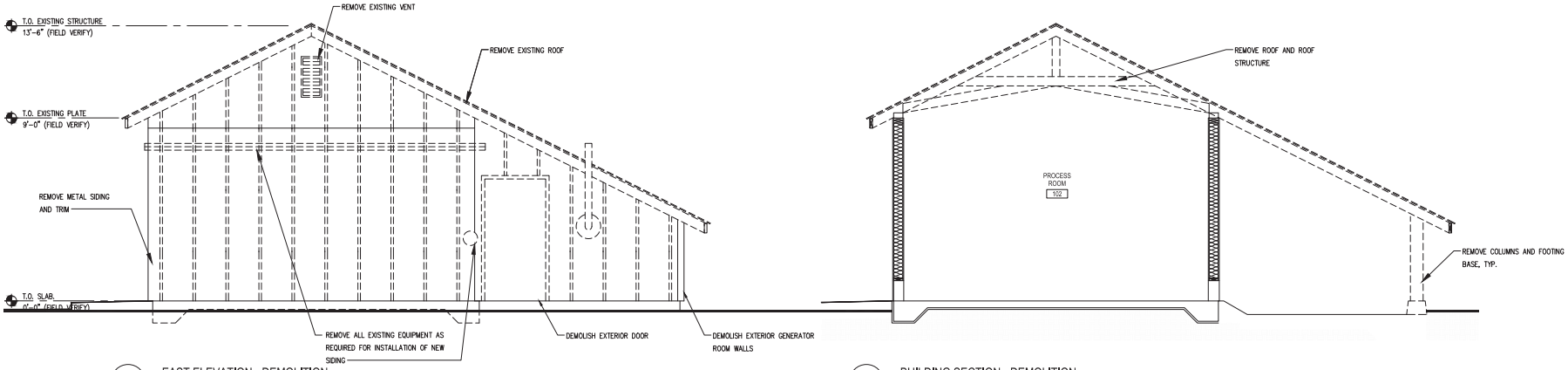
SHEET 34 OF 71

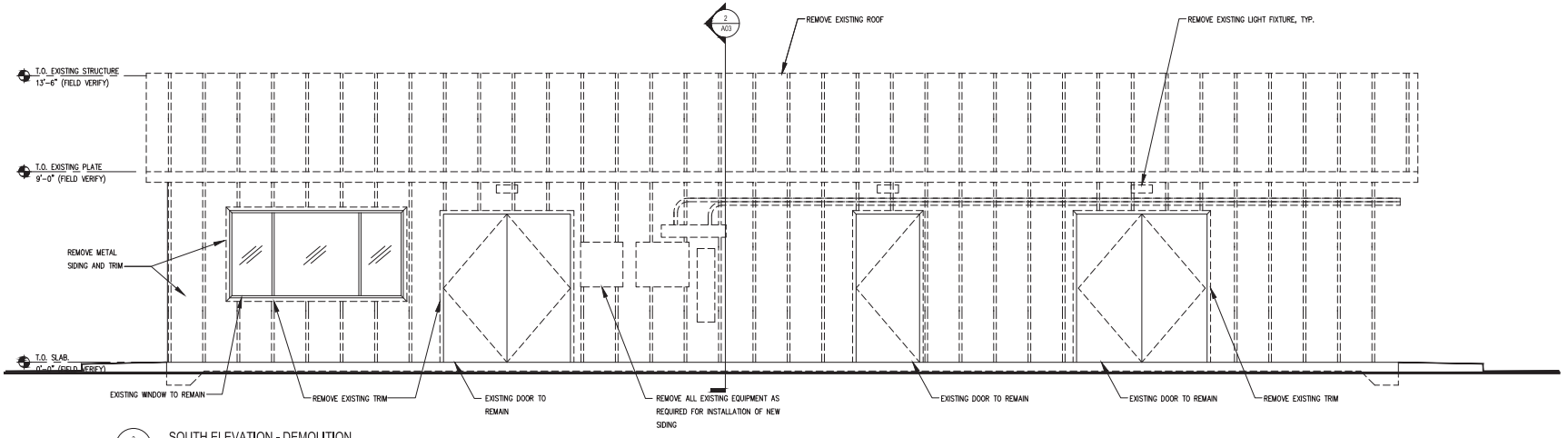


1 A03 EAST ELEVATION - DEMOLITION

SCALE: 3/8" = 1'-0"

2 A03 BUILDING SECTION - DEMOLITION

SCALE: 3/8" = 1'-0"



3 A03 SOUTH ELEVATION - DEMOLITION

SCALE: 3/8" = 1'-0"

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DEMOLITION ELEVATION/SECTION

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CODE INFORMATION

PROJECT DESCRIPTION: NANO FILTRATION ROOM ADDITION TO THE EXISTING WATER TREATMENT PLANT (WTP) WITH A NEW ROOF AND ROOF STRUCTURE.

2012 INTERNATIONAL BUILDING CODE REVIEW

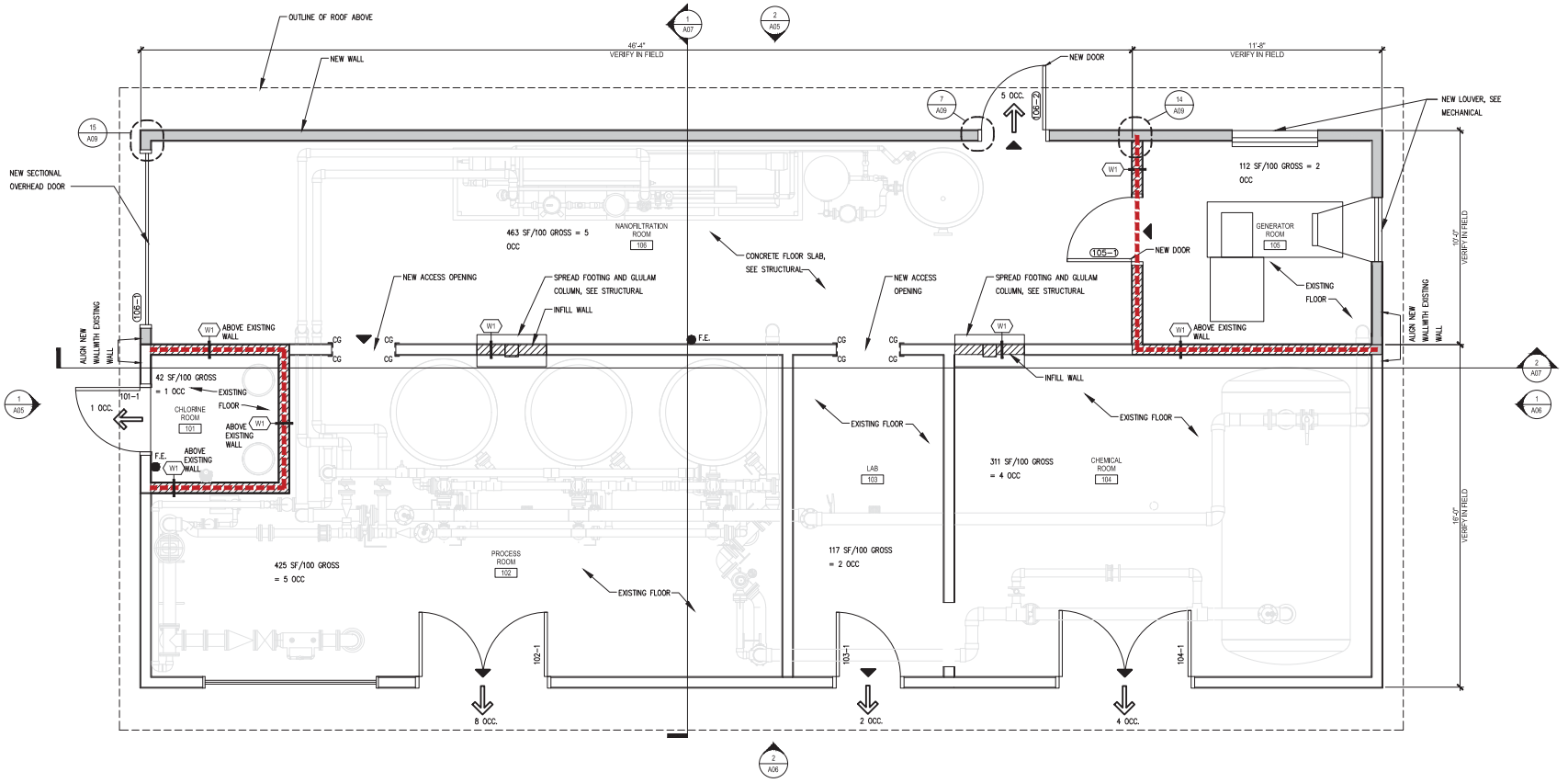
OCCUPANCY GROUP:	F-1	EXIT ACCESS TRAVEL DISTANCE:	300 FT
CONSTRUCTION TYPE:	VB	REQUIRED MEANS OF EGRESS:	2 (5 PROVIDED)
ALLOWABLE AREA:	8500 SF	ACTUAL EGRESS WIDTH:	252"
ACTUAL AREA:	1515 SF	REQUIRED EGRESS WIDTH:	0.2/OCC X 16 OCC = 3.2" < 252"
OCCUPANT LOAD:	16 PERSONS	FIRE EXTINGUISHER	2

GENERAL NOTES

1. SEE SHEET A08 FOR ROOM FINISH AND COLOR SCHEDULES.
2. SEE SHEET A08 FOR DOOR SCHEDULE.

LEGEND

EXISTING DOOR
NEW DOOR
NEW EXTERIOR WALL, SEE A/A07
NEW PARTITION, SEE A08 FOR PARTITION TYPES
EXISTING WALL
CORNER GUARD
ILLUMINATED EXIT SIGN
F.E. FIRE EXTINGUISHER
/ # = # OCC. SQUARE FOOTAGE / ROOM OCCUPANT LOAD (PER IBC TABLE 1004.1.2) = NUMBER OF OCCUPANTS
OCCUPANTS OCCUPANT DISCHARGE
1 HOUR WALL (FULL HEIGHT)



1 A04 FLOOR PLAN
SCALE: 3/8" = 1'-0"

N

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WTP IMPROVEMENTS

FLOOR PLAN

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FINAL BID SET	CN	11-30

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Sheet No. A04
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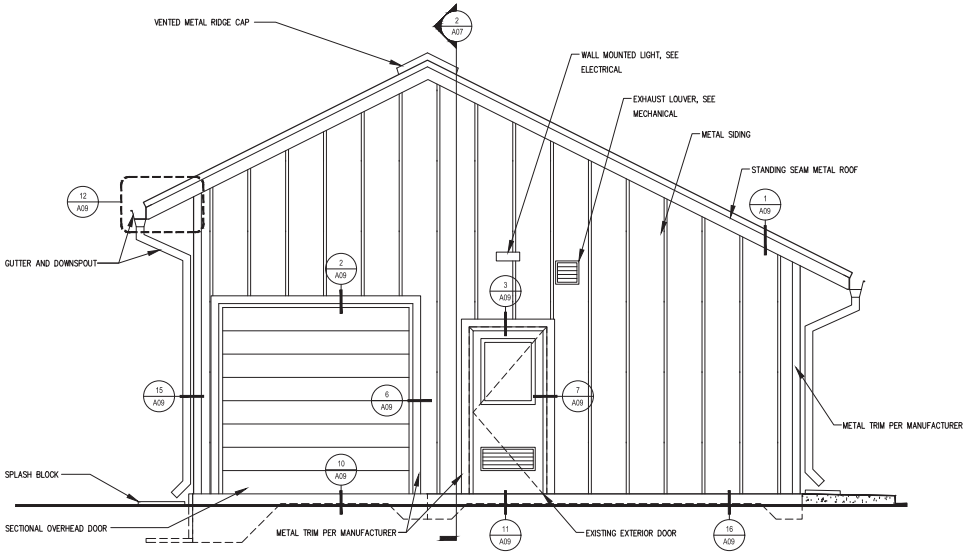
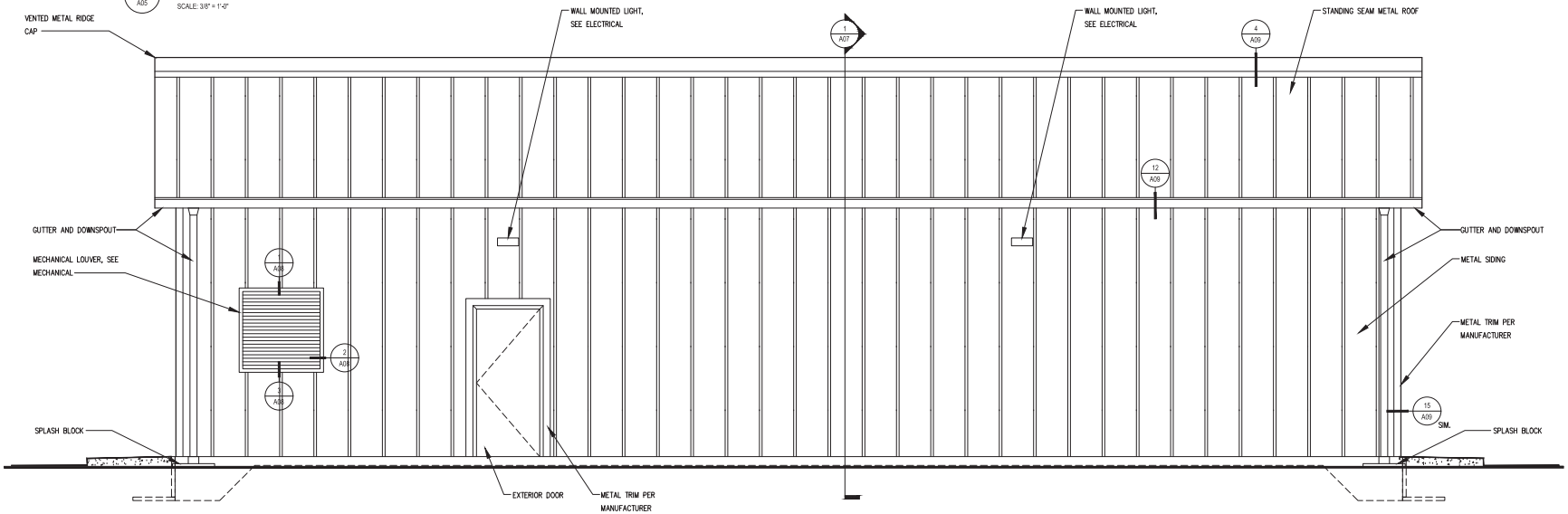


1 A05 WEST ELEVATION

SCALE: 3/8" = 1'-0"



2 A05 NORTH ELEVATION

SCALE: 3/8" = 1'-0"

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WTP IMPROVEMENTS

ELEVATIONS

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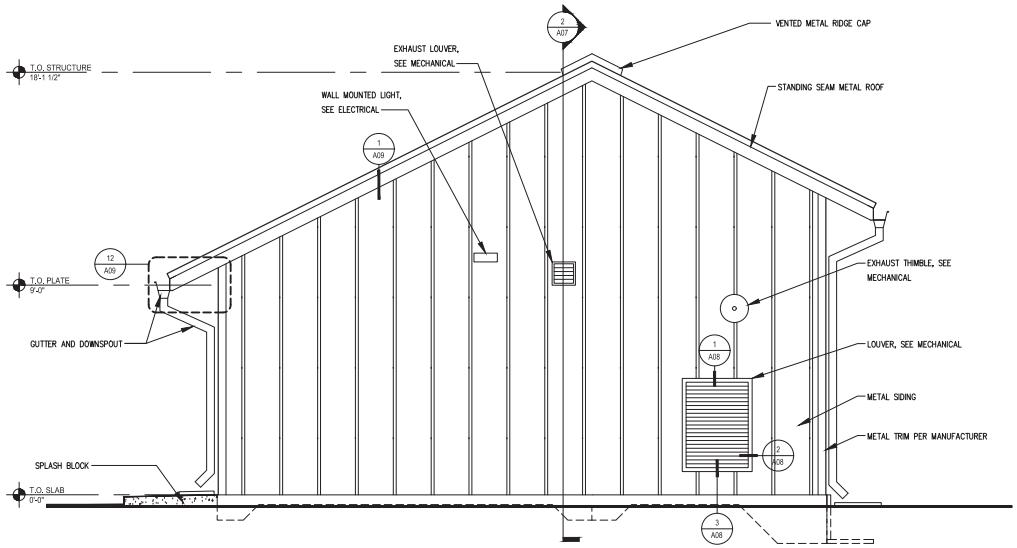
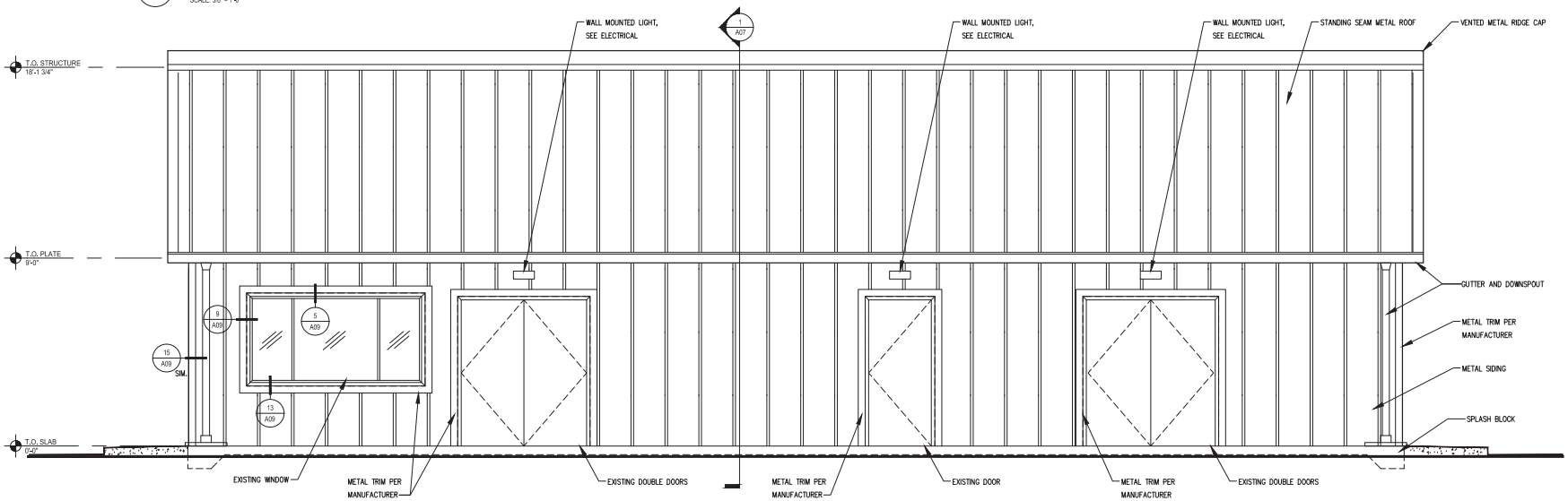
Sheet No. A05

SHEET 37 OF 71



1 A06 EAST ELEVATION

SCALE: 3/8" = 1'-0"



2 A06 SOUTH ELEVATION

SCALE: 3/8" = 1'-0"

FINAL BID SET

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ELEVATIONS

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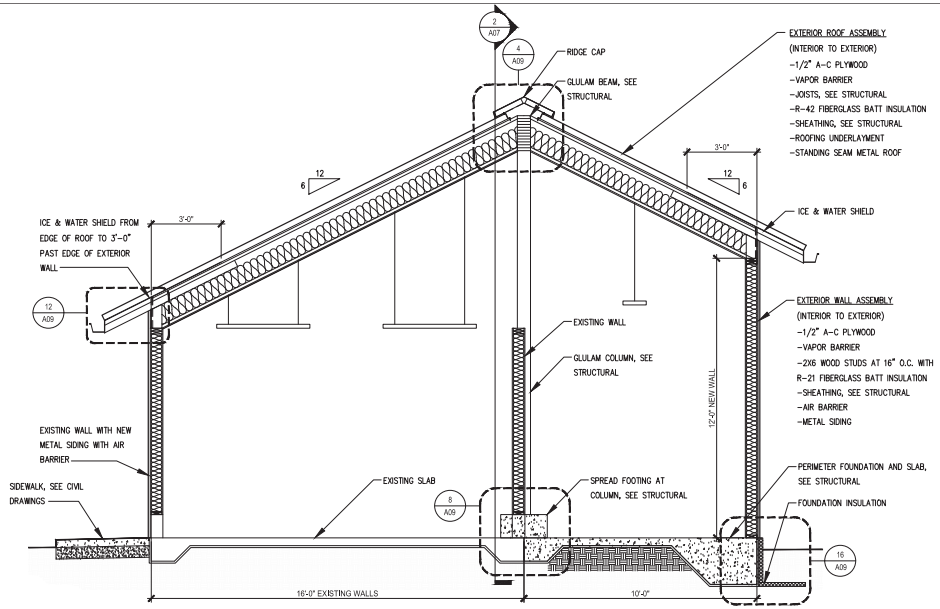
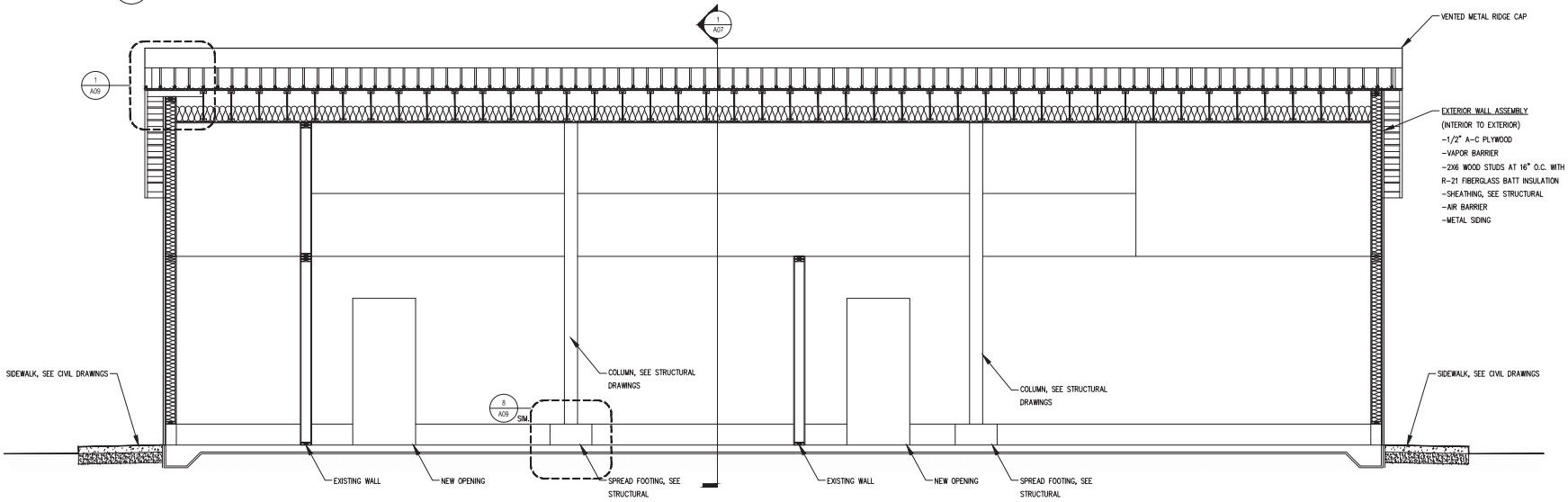
Sheet No. A06

SHEET 38 OF 71



1 A07 BUILDING SECTION

SCALE: 3/8" = 1'-0"



2 A07 BUILDING SECTION

SCALE: 3/8" = 1'-0"

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WTP IMPROVEMENTS

BUILDING SECTIONS

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Date 2018-11-30
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Sheet No. A07

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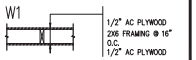
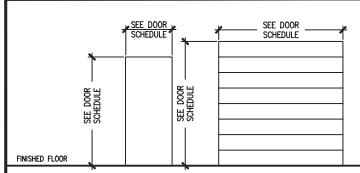
DOOR SCHEDULE

NO.	SIZE	DOOR TYPE	DOOR MAT	DOOR FIN	DOOR GLASS	DOOR COL	FRAME TYPE	FRAME MAT	FRAME FIN	FRAME COL	HW	DETAIL JAMB	DETAIL HEAD	DETAIL SILL	REMARKS
101-1	EXISTING	--	--	PT	-	--	--	--	PT	-	--	-	-	-	-
102-1	EXISTING	--	--	PT	-	--	--	--	PT	-	--	-	-	-	-
103-1	EXISTING	--	--	PT	-	--	--	--	PT	-	--	-	-	-	-
104-1	EXISTING	--	--	PT	-	--	--	--	PT	-	--	-	-	-	-
105-1	3'-0" X 7'-0"	F	HM	PT	-	--	1	HM	PT	-	HW-3	7/A09	3/A09	11/A09	ONE HOUR RATED
106-1	8'-0" X 8'-0"	OH	STL	FF	-	--	2	STL	FF	-	HW-2	6/A09	2/A09	10/A09	-
106-2	3'-0" X 7'-0"	F	IHM	PT	-	--	1	TB	PT	-	HW-1	7/A09	3/A09	11/A09	-

PARTITION TYPES

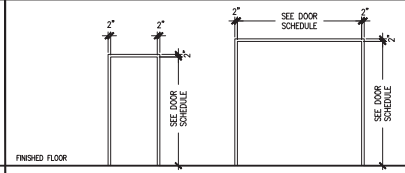


DOOR TYPES



F FLUSH DOOR OH OVERHEAD

FRAME TYPES



1 THERMALLY BROKEN (TB) OR HOLLOW METAL 2 STEEL (STL)

GENERAL NOTES

1. REFER TO WRITTEN SPECIFICATIONS FOR DOOR HARDWARE GROUPS.
2. THE DOOR SWING INDICATED ON THE FLOOR PLAN INDICATES THE HAND OF THE DOOR ONLY. DOORS SHALL SWING TO THE MAXIMUM EXTENT (BEYOND 90°) WHERE NOT OBSTRUCTED BY ADJACENT WALLS.
3. HINGE SIDE OF JAMB SHALL BE 4" FROM PERPENDICULAR WALL UNLESS NOTED OTHERWISE (U.N.O.) ON PLANS.

REMARKS LEGEND

A.

FRAME TYPES LEGEND

HM HOLLOW METAL
IHM INSULATED HOLLOW METAL
TB THERMALLY BROKEN HOLLOW METAL
STL STEEL
PT PAINT
FF FACTORY FINISH

ROOM FINISH SCHEDULE

ROOM NUMBER	ROOM NAME	FLOOR MATERIAL	FLOOR FINISH	FLOOR COLOR	BASE MATERIAL	BASE FINISH	BASE COLOR	NORTH MATERIAL	NORTH FINISH	NORTH COLOR	EAST MATERIAL	EAST FINISH	EAST COLOR	SOUTH MATERIAL	SOUTH FINISH	SOUTH COLOR	WEST MATERIAL	WEST FINISH	WEST COLOR	CEILING MATERIAL	CEILING FINISH	CEILING COLOR	REMARKS
101	CHLORINE ROOM	F1	S	--	B1	--	--	W1/W2	PT	P1	W1/W2	PT	P1	W1/W2	PT	P1	W1/W2	PT	P1	C1	PT	P1	-
102	PROCESS ROOM	F1	S	--	B1	--	--	W1/W2	PT	P1	W1/W2	PT	P1	W2	PT	P1	W1/W2	PT	P1	C1	PT	P1	-
103	LAB	F1	S	--	B1	--	--	W1/W2	PT	P1	W1/W2	PT	P1	W2	PT	P1	W1/W2	PT	P1	C1	PT	P1	-
104	CHEMICAL ROOM	F1	S	--	B1	--	--	W1/W2	PT	P1	W1/W2	PT	P1	W2	PT	P1	W1/W2	PT	P1	C1	PT	P1	-
105	GENERATOR ROOM	F1	S	-	B1	--	-	W1	PT	P1	W1	PT	P1	W1/W2	PT	P1	W1	PT	P1	C1	PT	P1	-
106	NANOFILTRATION ROOM	F1	S	-	B1	--	-	W1	PT	P1	W1	PT	P1	W1/W2	PT	P1	W1	PT	P1	C1	PT	P1	-

ROOM FINISH LEGEND

FLOOR MATERIALS
F1 CONCRETE

BASE MATERIALS
B1 NONE

WALL MATERIALS
W1 A-C PLYWOOD
W2 EXISTING PLYWOOD

CEILING MATERIALS
C1 A-C PLYWOOD

FLOOR FINISHES
S SEALER

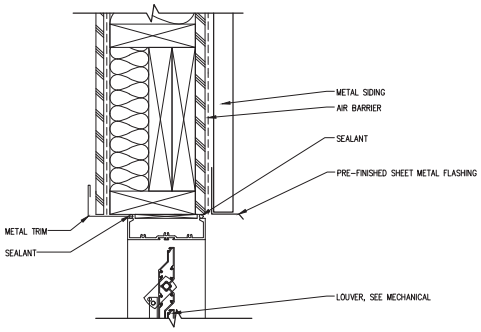
BASE FINISHES
FF FACTORY FINISH

WALL FINISHES
PT PAINT

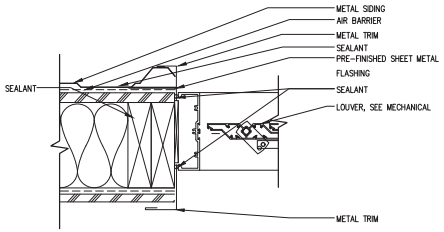
CEILING FINISHES
PT PAINT

INTERIOR COLOR SCHEDULE

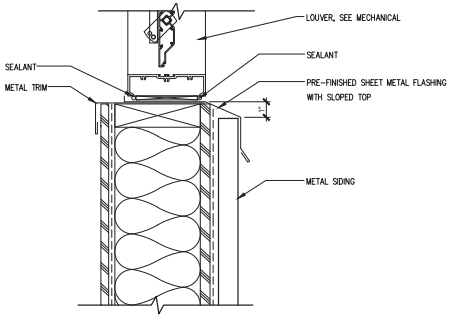
PAINT
P1 MFR/NO. LOCATION



1 A08 LOUVER HEAD DETAIL
SCALE: 3" = 1'-0"



2 A08 LOUVER JAM DETAIL
SCALE: 3" = 1'-0"



3 A08 LOUVER SILL DETAIL
SCALE: 3" = 1'-0"

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DOOR SCHEDULE

REVISION	BY	DATE
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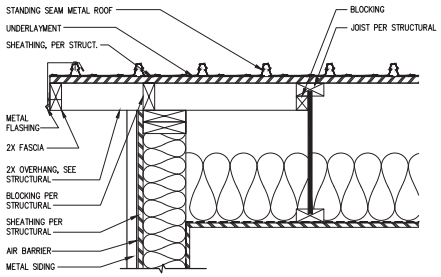
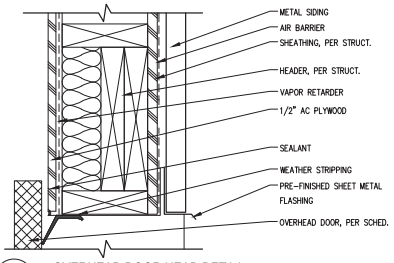


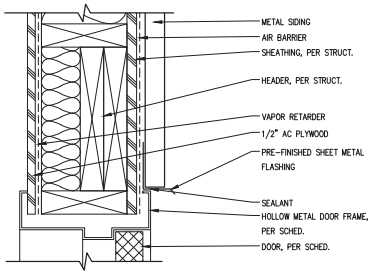
1 / A09 ROOF RAKE EDGE DETAIL

SCALE: 1-1/2" = 1'-0"



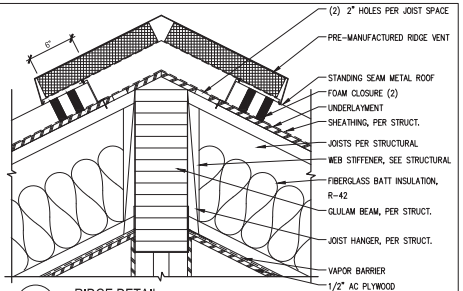
2 / A09 OVERHEAD DOOR HEAD DETAIL

SCALE: 3" = 1'-0"



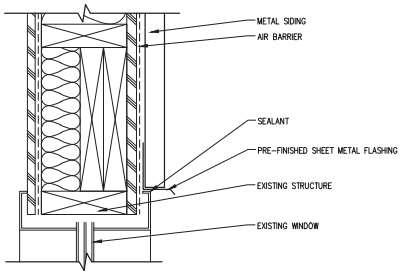
3 / A09 DOOR HEAD DETAIL

SCALE: 3" = 1'-0"



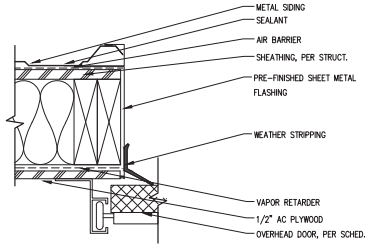
4 / A09 RIDGE DETAIL

SCALE: 1-1/2" = 1'-0"



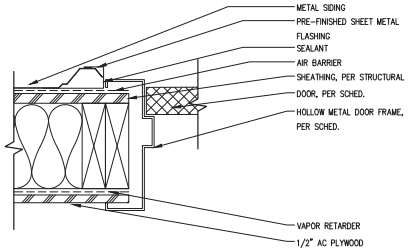
5 / A09 EXISTING WINDOW HEAD TRIM

SCALE: 3" = 1'-0"



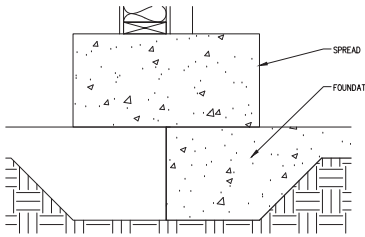
6 / A09 OVERHEAD DOOR JAMB DETAIL

SCALE: 3" = 1'-0"



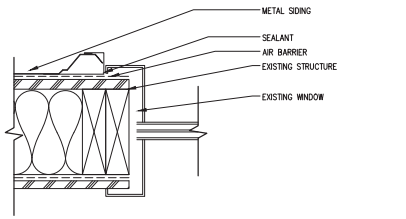
7 / A09 DOOR JAMB DETAIL

SCALE: 3" = 1'-0"



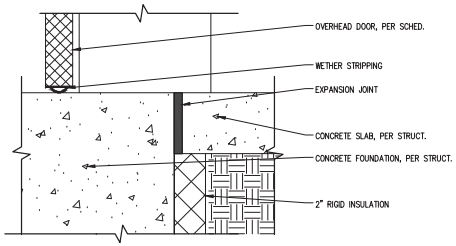
8 / A09 FOUNDATION DETAIL

SCALE: 1-1/2" = 1'-0"



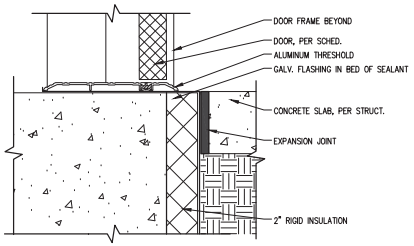
9 / A09 EXISTING WINDOW JAM

SCALE: 3" = 1'-0"



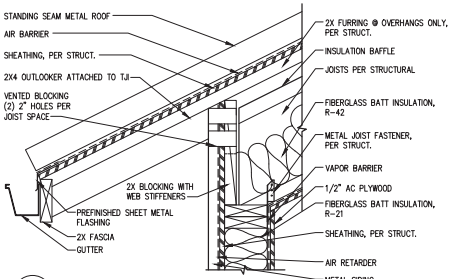
10 / A09 OVERHEAD DOOR THRESHOLD DETAIL

SCALE: 3" = 1'-0"



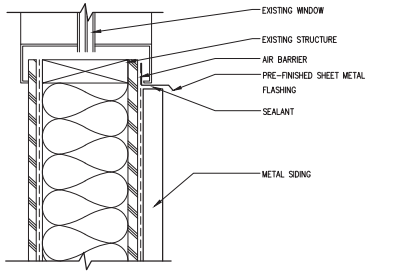
11 / A09 DOOR THRESHOLD DETAIL

SCALE: 3" = 1'-0"



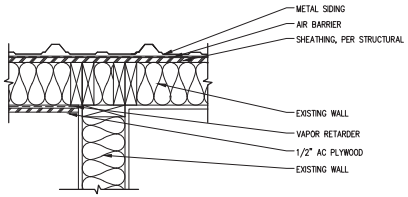
12 / A09 EAVE DETAIL

SCALE: 1-1/2" = 1'-0"



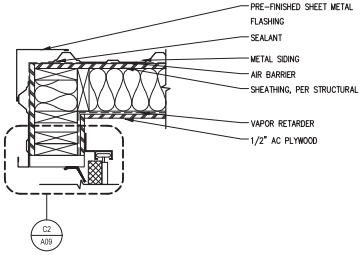
13 / A09 EXISTING WINDOW SILL

SCALE: 3" = 1'-0"



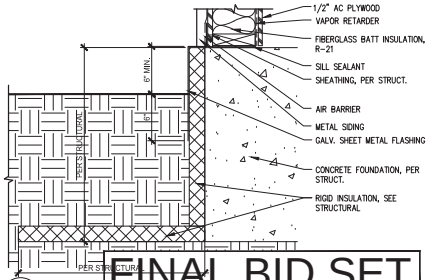
14 / A09 WALL CONNECTION DETAIL

SCALE: 1-1/2" = 1'-0"



15 / A09 CORNER DETAIL

SCALE: 1-1/2" = 1'-0"



16 / A09 FOUNDATION DETAIL

SCALE: 1-1/2" = 1'-0"

FINAL BID SET

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WTP IMPROVEMENTS

DETAILS

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
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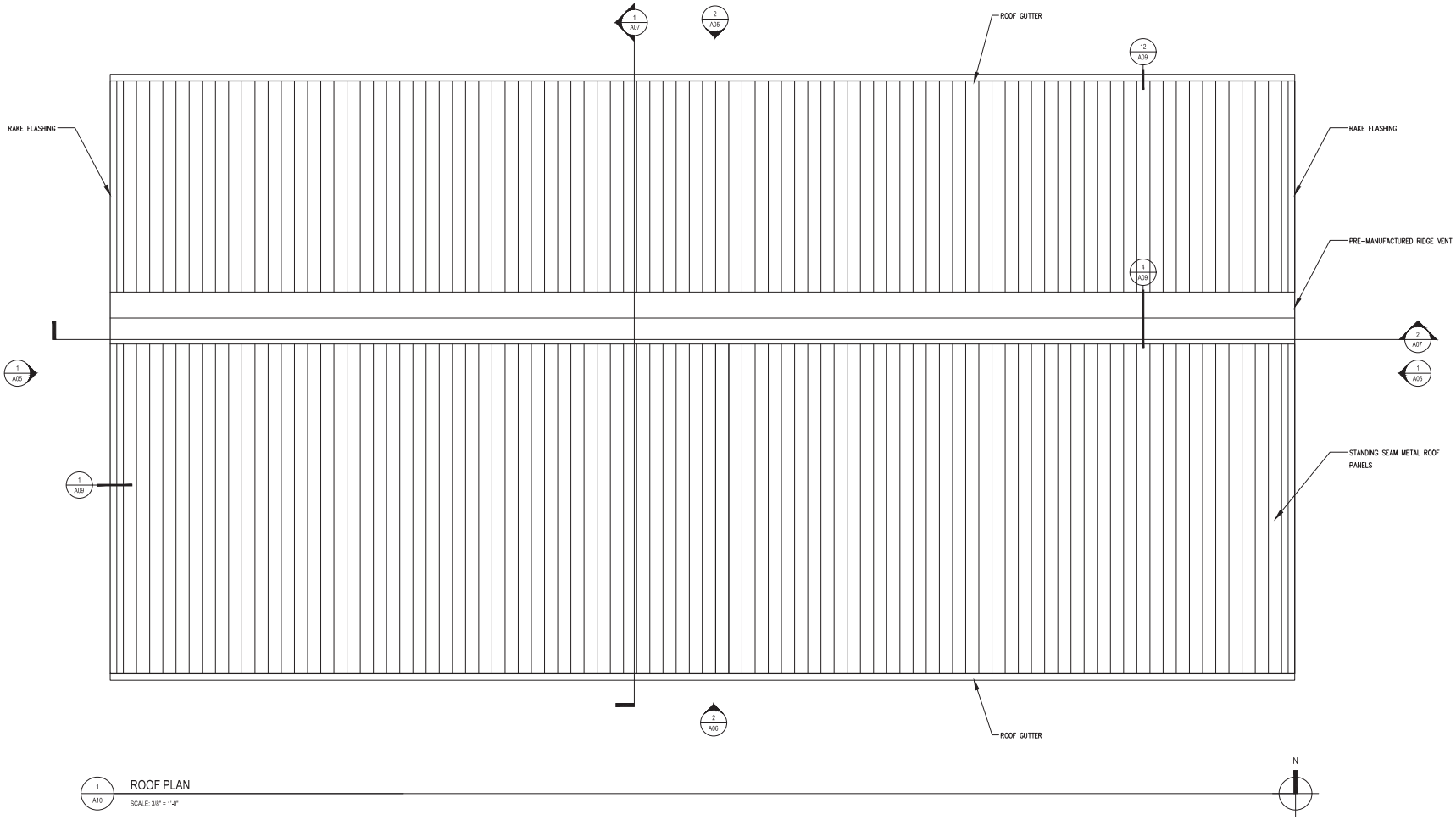
SHEET 41 OF 71



1 A10 ROOF PLAN

SCALE: 3/8" = 1'-0"

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ROOF PLAN

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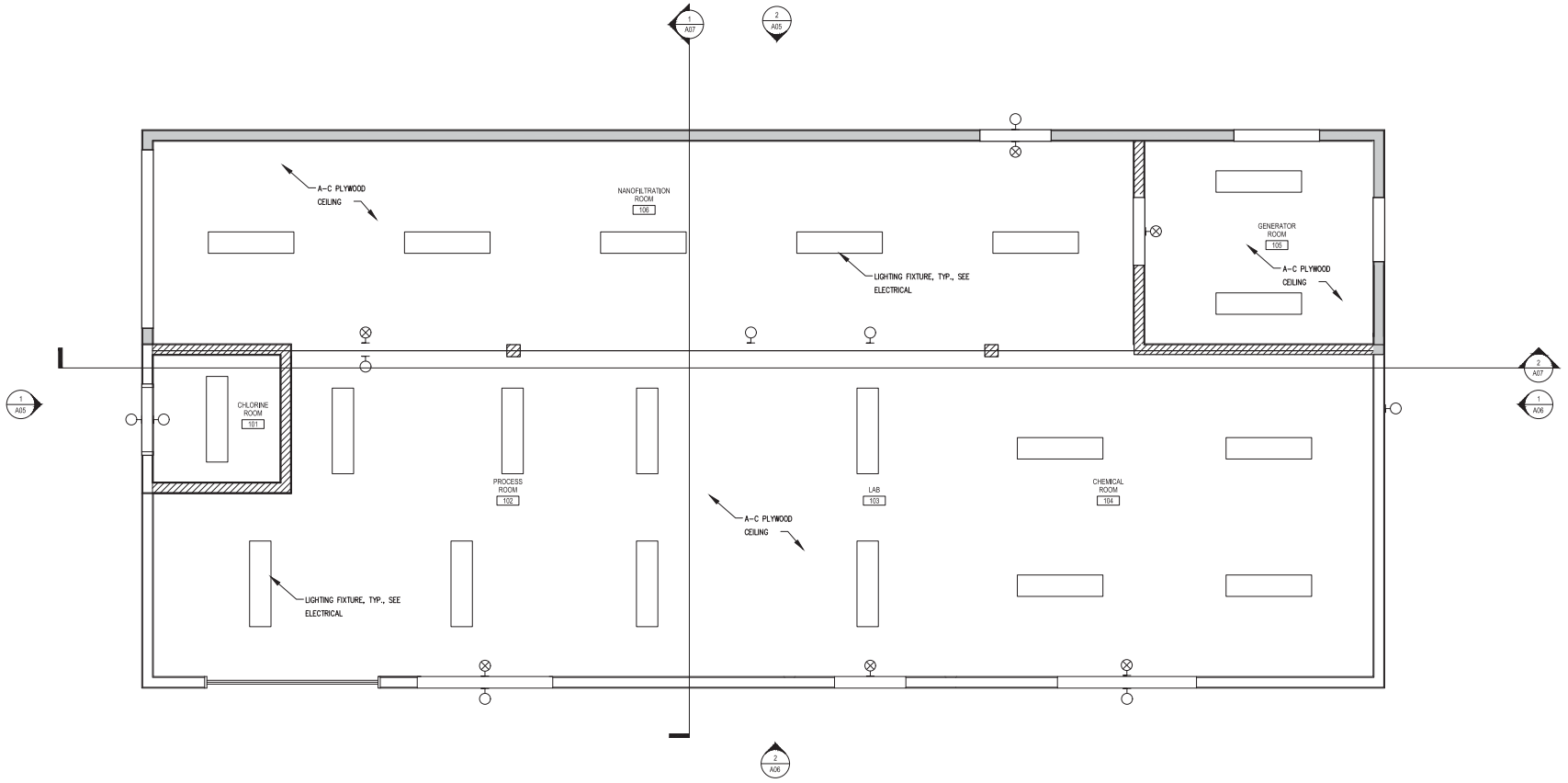
Sheet No. A10

SHEET 42 OF 71

GENERAL NOTES	LEGEND
1. MECHANICAL AND ELECTRICAL WORK IS SHOWN FOR PURPOSES OF COORDINATION ONLY. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR QUANTITY AND LAYOUT OF LIGHTING AND MECHANICAL EQUIPMENT.	LIGHTING FIXTURE, SEE ELECTRICAL DRAWINGS EXIT SIGN, SEE ELECTRICAL DRAWINGS WALL MOUNTED LIGHT, SEE ELECTRICAL DRAWINGS NEW PARTITION, SEE A04 EXIST. WALL



1 A11 REFLECTED CEILING PLAN

SCALE: 3/8" = 1'-0"

N

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REFLECTED CEILING PLAN

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Drawn
Approved

Sheet No. A11

SHEET 43 OF 71

GENERAL STRUCTURAL NOTES

1. APPLICABLE SPECIFICATIONS AND CODES
   CONSTRUCTION AND DESIGN SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE (IBC), 2012 EDITION, WITH THE LATEST EDITION OF THE APPLICABLE SPECIFICATIONS AND THE REQUIREMENTS NOTED AS FOLLOWS.

2. SPECIAL INSPECTIONS
   a. SOILS - TABLE 1705.6 OF THE IBC
   i. PERIODIC INSPECTION OF FOUNDATION SOIL BEARING CAPACITY, DEPTH, FILL MATERIALS CLASSIFICATION AND SUBGRADE PREPARATION AND COMPACTION.
   ii. FULL TIME INSPECTI0N OF ENGINEERED FILL PLACEMENT AND COMPACTION.
   b. CONCRETE - TABLE 1705.3 OF THE IBC
   i. PERIODIC INSPECTION OF REINFORCEMENT BEFORE CONCRETE IS PLACED.
   ii. FULL TIME INSPECTION OF ANCHOR RODS AND OTHER EMBEDDED ITEMS AS IDENTIFIED HEREIN FOR SHEAR WALLS. OTHER ANCHOR RODS REQUIRE PERIODIC INSPECTION PER THE IBC.
   iii. FULL TIME INSPECTION DURING PLACEMENT OF CONCRETE INCLUDING THE TAKING OF TEST SPECIMENS, SLUMP AND AIR CONTENT MEASUREMENT. INSPECTION AND TESTING SHALL BE LIMITED TO STRUCTURAL REINFORCED CONCRETE WITH TESTING FREQUENCY IN ACCORDANCE WITH THE PROJECT TECHNICAL SPECIFICATIONS.
   c. WOOD
   i. PERIODIC INSPECTION OF DIAPHRAGMS AND SHEAR WALLS FOR COMPLIANCE WITH PLANS AND SPECIFICATION REQUIREMENTS. INCLUDED IS THE SHEATHING TYPE AND THICKNESS; VERIFICATION OF FRAMING MEMBERS OF CONSTRUCTED ASSEMBLIES WITHIN THE FIELD AND AT BOUNDARY ELEMENTS; FASTENER TYPE, DIAMETER AND LENGTH; FASTENER SPACING AT INTERMEDIATE SUPPORTS AND AT BOUNDARY ELEMENTS.
   ii. PERIODIC INSPECTION OF HOLD DOWNS AND OTHER LATERAL FORCE RESISTING HARDWARE FOR CORRECT TYPE, FASTENING AND LOCATION.

3. DESIGN LOADS
   a. DESIGN LOADS AND LOAD APPLICATIONS SHALL BE IN ACCORDANCE WITH IBC.
   b. LIVE LOADS
   i. ROOF ---------------------------------- 20 PSF
   c. GROUND SNOW LOAD ---------------------- 114 PSF
   i. DRIFT SURCHARGE LOADS IN ACCORDANCE WITH ASCE 7.
      (a) IMPORTANCE FACTOR --------------- I = 1.1
   ii. SLOPED ROOF SNOW LOAD ------------ 78 PSF
   d. WIND LOADS IN ACCORDANCE WITH CHAPTER 26 OF ASCE 7-10
   i. OCCUPANCY OR RISK CATEGORY ------------ III
   ii. BASIC WIND SPEED (3-SEC GUST) ------------ 150 MPH
   iii. EXPOSURE CATEGORY -------------------- C
   e. SEISMIC LOADS
   i. IMPORTANCE FACTOR ---------------------- I= 1.25
   ii. MAPPED SPECTRAL RESPONSE SS ----------- 0.319
   iii. MAPPED SPECTRAL RESPONSE S1 ------------ 0.284
   iv. SITE CLASS ------------------------------ D
   v. SPECTRAL RESPONSE COEFFICIENT SDS ------- 0.328
   vi. SPECTRAL RESPONSE COEFFICIENT SD1 ------- 0.347
   vii. SEISMIC DESIGN CATEGORY ---------------- D
   viii. BASIC SEISMIC-FORCE-RESISTING SYSTEM ---- TIMBER SHEAR WALLS WITH STRUCTURAL SHEATHING
   ix. DESIGN BASE SHEAR ---------------------- 6.8 KIPS
   x. SEISMIC RESPONSE COEFFICIENT CS --------- .063
   xi. RESPONSE MODIFICATION FACTOR R --------- 6.5
   xii. ANALYSIS PROCEDURE USED --------------- EQUIVALENT LATERAL FORCE PROCEDURE

4. CONSTRUCTION LOADS
   STRUCTURES HAVE BEEN DESIGNED FOR DEAD LOADS AND THE DESIGN LOADS NOTED ABOVE. PROVIDE TEMPORARY BRACING, SHORING OR OTHER SUPPLEMENTAL SUPPORT DURING CONSTRUCTION AS NECESSARY TO PROTECT THE STRUCTURES FROM EXCESSIVE CONSTRUCTION LOADS.

5. FOUNDATIONS
   a. FOUNDATION DESIGN CRITERIA
   i. MAXIMUM ALLOWABLE SOIL BEARING PRESSURE - 2500 PSF
   ii. DESIGN FROST DEPTH BELOW EXTERIOR GRADE - 32 INCHES WITHOUT INSULATION
   b. AVOID EXCESSIVE WETTING OR DRYING OF THE FOUNDATION EXCAVATIONS DURING CONSTRUCTION.

6. CONCRETE
   a. CONCRETE CONSTRUCTION SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318).
   b. DETAILING, FABRICATION AND PLACEMENT OF REINFORCEMENT SHALL CONFORM TO DETAILS AND DETAILING OF CONCRETE REINFORCEMENT (ACI 315).
   c. MATERIALS
   i. CONCRETE
      (a) STRUCTURAL CAST - IN - PLACE --------------- f'c = 4,000 PSI
      (b) EXTERIOR WALKS, CURBS, RAMPS ------------- f'c = 3,000 PSI
   ii. REINFORCING MATERIALS
      (a) REINFORCING BARS ----------------- ASTM A615, GRADE 60
      (b) WELDED WIRE FABRIC --------------- ASTM A185, FURNISH IN SHEETS ONLY
   iii. ANCHOR RODS
      (a) ANCHOR RODS SHALL BE ASTM F1554, GRADE 36 UNLESS NOTED OTHERWISE.
   d. ALL BENT REINFORCING BARS SHALL BE SHOP FABRICATED ONLY. REBENDING OR WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS AUTHORIZED BY ENGINEER.
   e. END HOOKS IN REINFORCING BARS, SHOWN ON THE DRAWINGS BUT NOT DIMENSIONED, SHALL CONFORM TO ACI 318.
   f. CONCRETE COVER OVER REINFORCEMENT SHALL BE 2" CLEAR, EXCEPT FOR THE FOLLOWING, UNLESS OTHERWISE NOTED.
   i. CONCRETE PLACED AGAINST AND PERMANENTLY IN CONTACT WITH EARTH ----------------------- 3" CLEAR
   ii. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH EARTH OR WATER
      (a) BEAMS, COLUMNS ---------------------- 1 ½" CLEAR
      (b) WALLS ------------------------------- 1 ½" CLEAR
      (c) SLABS ------------------------------- ¾" CLEAR
   g. REINFORCEMENT SPLICES NOT PERMITTED EXCEPT AS DETAILED OR AUTHORIZED BY THE ENGINEER. LAP REINFORCING BARS THE FOLLOWING MINIMUMS AT ALL SPLICES, CORNERS AND INTERSECTIONS, UNLESS OTHERWISE INDICATED. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BAR.

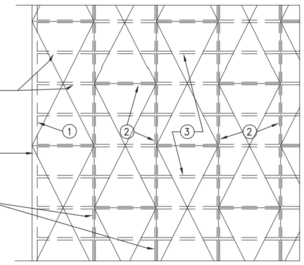
BAR SIZE	REG BARS	TOP BARS
#3	1'-3"	1'-7"
#4	1'-7"	2'-1"
#5	2'-0"	2'-7"
#6	2'-5"	3'-1"
#7	3'-6"	4'-6"
#8	4'-0"	5'-2"
#9	4'-6"	5'-10"
#10	5'-1"	6'-7"

   h. LAP WELDED WIRE FABRIC ONE FULL MESH AT SPLICES.
   i. STAGGER ADJACENT REINFORCEMENT LAP SPLICES IN WALLS 18" MINIMUM.
   j. PROVIDE BAR SUPPORTS TO PROPERLY SECURE AND SUPPORT REINFORCING BARS AND WELDED WIRE FABRIC AT POSITIONS SHOWN ON THE DRAWINGS. IN ADDITION TO NORMAL ACCESSORIES PROVIDE #5 STANDEES AT 36" O.C. TO SUPPORT TOP REINFORCEMENT IN BASE SLABS, AND #3 U OR Z SHAPE SPACERS AT 72" O.C. EACH WAY IN WALLS WITH TWO CURTAINS OF REINFORCEMENT.
   k. DOWELS, PIPES AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION DURING CONCRETE PLACEMENT.
   l. REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE OR METAL PART EMBEDDED IN CONCRETE. PROVIDE 2" CLEARANCE IN ALL CASES UNLESS OTHERWISE INDICATED. NO EMBEDDED ITEM SHALL BE SUSPENDED FROM, SUPPORTED BY, OR BRACED IN PLACE FROM THE STRUCTURAL REINFORCEMENT.
   m. LOCATE CONSTRUCTION JOINTS WHERE SHOWN ON THE DRAWINGS OR AS AUTHORIZED BY THE ENGINEER. SLABS, JOISTS AND BEAMS SHALL NOT HAVE JOINTS IN A HORIZONTAL PLANE EXCEPT WHERE DETAILED ON DRAWINGS.
   n. THOROUGHLY CLEAN ALL KEYWAYS AND CONSTRUCTION JOINTS PRIOR TO PLACING CONCRETE IN ADJACENT POUR.
   o. BEGIN SPACING OF BARS WHICH PARALLEL CONSTRUCTION AND EXPANSION JOINTS 2" CLEAR EACH SIDE OF JOINT.
   p. UNLESS OTHERWISE SHOWN, PLACE 2-#5 (1 EACH FACE) WITH 2'-0" PROJECTIONS AROUND ALL OPENINGS IN CONCRETE WALLS OR SLABS.
   q. CHAMFER ALL EXPOSED CONCRETE EDGES ¾", UNLESS OTHERWISE INDICATED.

7. SLABS ON GRADE
   a. LOCATE WELDED WIRE FABRIC 1 ½" CLEAR FROM TOP OF SLAB.
   b. PROVIDE 1-#4 X 4'-0" PARALLEL TO EDGE OF SLAB OPPOSITE THE END OF ALL DISCONTINUED SLAB JOINTS, AND 1-#4 X 4'-0" DIAGONAL BAR AT ALL REENTRANT CORNERS. PLACE BARS MID-DEPTH IN SLAB AND 2" CLEAR FROM EDGE OR CORNER.
   c. SLOPE BOTTOM SURFACE OF SLABS AS NECESSARY TO MAINTAIN MINIMUM THICKNESS NOTED ON DRAWINGS FOR ALL SLABS WITH SLOPING TOP SURFACE OR DEPRESSION FOR TILE.

8. WOOD FRAMING
   a. WOOD CONSTRUCTION SHALL CONFORM TO IBC .
   b. MATERIALS
   i. STRUCTURAL LUMBER ---------------------------- DOUGLAS FIR
      (a) 2" TO 4" THICK x 4" WIDE ------------------ NO. 2 OR BETTER
      (b) 2" TO 4" THICK X 5" AND WIDER ------------ NO. 2 OR BETTER
   ii. PLYWOOD SHEATHING ------------------------ APA RATED SHEATHING
      (a) WALL SHEATHING ----------------------- 24/0 EXPOSURE 1
      (b) ROOF SHEATHING ----------------------- 20/0 EXPOSURE 1
   iii. MANUFACTURED WOOD PRODUCTS
      (a) I-JOISTS -------------------- TRUS JOIST 560 OR AN APPROVED EQUAL
      (b) RIDGE BOARD ------ TRUS JOIST TIMBERSTRAND OR AN APPROVED EQUAL
      (c) HEADERS WITH SPANS > 3' ---- MICROLLAM LVL (ML) BY TRUS JOIST OR EQUAL
      (d) GLU-LAM BEAMS -------------------------- DF/DF 24F-V4
      (e) GLU-LAM COLUMNS ---------------------- DF GRADE L2
   iv. PRESERVATIVE TREATED WOOD SHALL CONFORM TO THE REQUIREMENTS OF AWPA STANDARD U1 AND M4.
   c. METAL JOIST HANGERS, CLIPS AND HOLD DOWNS TO BE SIMPSON STRONG-TIE OR EQUAL. INSTALL PER MANUFACTURER'S REQUIREMENTS. INCLUDING FASTENER SIZE AND TYPE.

9. STEEL FRAMING
   a. STRUCTURAL STEEL CONSTRUCTION SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL BUILDINGS.
   b. MATERIALS
   i. STRUCTURAL STEEL W SHAPES ------------------ ASTM A992, GRADE 50
   ii. ANCHOR RODS ------------------------------ ASTM F1554
   c. ALL WELDING SHALL CONFORM TO AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE - STEEL (AWS D1.1), AND SHALL BE PERFORMED BY WELDERS QUALIFIED BY THE APPROPRIATE AWS TEST FOR THE WELDING PERFORMED.



(1) BOUNDARY NAILING (B.N.)
(2) PANEL EDGE NAILING (E.N.)
(3) INTERMEDIATE NAILING (FIELD)

NOTE: ALL NAILS SHALL BE "COMMON".

DIAPHRAGM SCHEDULE

LOCATION	SHEATH'G SIZE & PANEL INDEX	GRADE	NAIL SIZE & SPACING B.N.	NAIL SIZE & SPACING E.N.	NAIL SIZE & SPACING FIELD	REMARKS
ROOF	19/32" 20/0	EXP-1	10d@6"	10d@6"	10d@12"	10d COMMON (3" x 0.148")

TYP. PLYWD. DIAPHRAGM PLAN & SCHED.
N.T.S.

FINAL BID SET
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WTP IMPROVEMENTS
GENERAL STRUCTURAL NOTES, DIAPHRAGM PLAN AND SCHEDULE

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

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Date 2018-11-30
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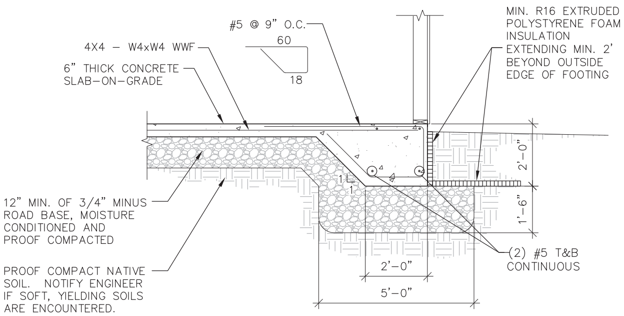
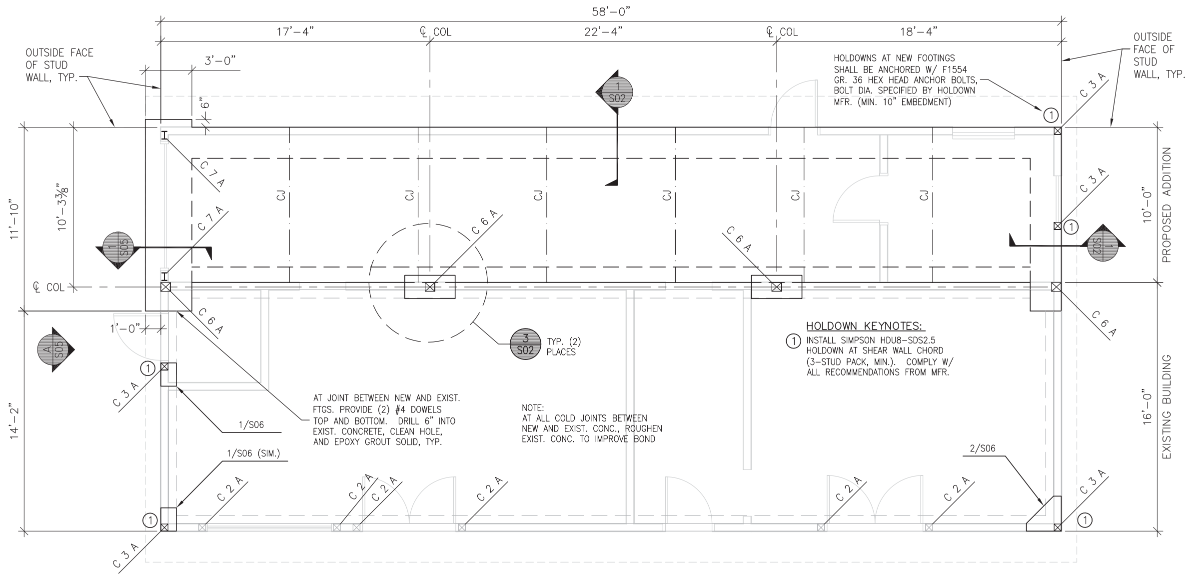
Approved MM/CN

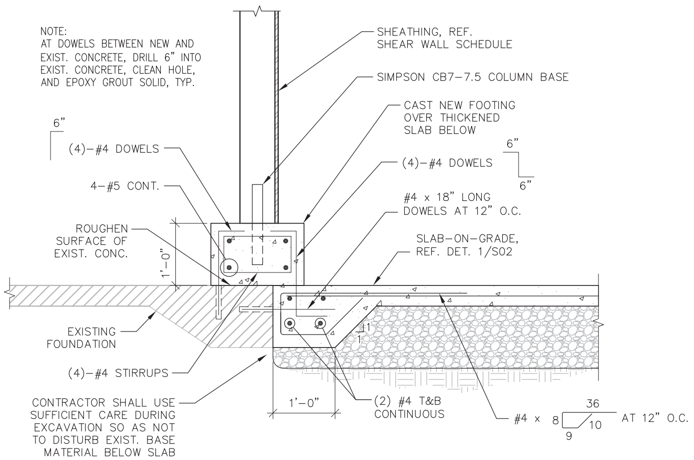
Sheet No. S01
SHEET 44 OF 71



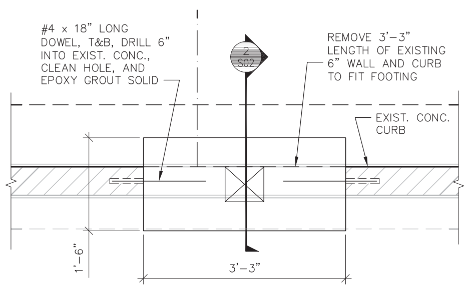
1 S02 **PERIMETER FOUNDATION**
SCALE: 1/2" = 1'-0"



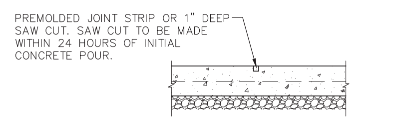
FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



2 S02 **SPREAD FOOTING DETAIL**
SCALE: 1" = 1'-0"



3 S02 **SPREAD FOOTING PLAN**
SCALE: 1" = 1'-0"



CONTROL JOINT (CJ)
SCALE: 1/2" = 1'-0"

NOTE:
CONTROL JOINTS SHALL BE PLACED AT NO MORE THAN 8'–0" INTERVALS IN TRANSVERSE DIRECTION OF CONCRETE SLAB.

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WTP IMPROVEMENTS FOUNDATION PLAN AND DETAILS

REVISION	BY	DATE
65% REVIEW SET	CN	3–18
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Project No. 1529.50093.01
Date 2018–11–30
Designed SA/CB
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Approved MM/CN

FINAL BID SET
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Sheet No. S02
SHEET 45 OF 71

SHEAR WALL SCHEDULE

MK	PLYWOOD SIZE	PANEL NAILING EDGE	PANEL NAILING FIELD	CHORD CONNECTION	ANCHOR BOLTS	REMARKS
SW-1	15/32"	10d@6"O.C.	10d@12"O.C.	REF. PLAN	SEE NOTE 7	NEW WALL
SW-2	1/2" EACH SIDE	10d@6"O.C.	10d@12"O.C.	REF. PLAN	SEE NOTE 8	EXIST. WALL, NOTE 10
SW-3	1/2" EACH SIDE	8d@6"O.C.	8d@12"O.C.	REF. PLAN	1/2"ø@4'O.C.-VER.	EXIST. WALL, NOTES 5 & 6
SW-4	15/32"	10d@6"O.C.	10d@12"O.C.	REF. PLAN	SEE NOTE 9	EXIST. WALL, NOTE 11

NOTES:

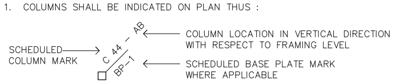
1. ALL NAILS SHALL BE "COMMON" (8d = 2 1/2" x 0.131"ø ; 10d = 3" x 0.148"ø).
2. SILL PLATE ANCHOR BOLT EMBEDMENT INTO FOUNDATION SHALL BE 7" MINIMUM.
3. ALL PLYWOOD PANEL EDGES SHALL BE FULLY BLOCKED, UNLESS OTHERWISE NOTED.
4. ALL ANCH. BOLTS SHALL BE STAINLESS STEEL OR HOT-DIPPED ZINC-COATED GALVANIZED PER ASTM F2329.
5. FIELD VERIFY EXISTING PANEL THICKNESS AND NAILING PATTERN.
6. REPLACE SHEATHING AT (4) GL COLUMNS AND FASTEN TO COLUMNS USING SPECIFIED EDGE NAILING, STAGGERED.
7. 1/2"ø AT CORNERS, EA. SIDE OF OPENINGS, W/ INTERMEDIATE SPACING OF: 4' O.C. @ NORTH WALL, 18" O.C. @ EAST WALL.
8. SUPPLEMENT EXIST. ANCHORS AS NECESSARY W/ NEW ANCHORS. REQUIRED AT CORNERS, EA. SIDE OF OPENINGS, AND 18" O.C. DRILL 6" MIN. INTO EXIST. CONC., CLEAN HOLE, INSTALL 1/2"ø F1554 GR. 36 ALL THREAD W/ SIMPSON AT-XP, 2 1/2" PROJECTION.
9. NEW ANCHORS REQUIRED AT CORNERS, EA. SIDE OF OPENINGS, AND 36" O.C. DRILL 6" MIN. INTO EXIST. CONC., CLEAN HOLE, INSTALL 1/2"ø F1554 GR. 36 ALL THREAD W/ SIMPSON AT-XP, 2 1/2" PROJECTION.
10. EXISTING INTERIOR AND EXTERIOR SHEATHING SHALL REMAIN U.N.O. (THICKNESS AND CONDITION SHALL BE FIELD VERIFIED BY CONTRACTOR – REPLACE IF NECESSARY). ADD NAILING SPECIFIED HEREON TO EXTERIOR AND INTERIOR SHEATHING.
11. EXISTING INTERIOR AND EXTERIOR SHEATHING SHALL BE REMOVED. EXISTING STUDS SHALL REMAIN U.N.O. (CONDITION SHALL BE FIELD VERIFIED BY CONTRACTOR – REPLACE IF NECESSARY).
12. SHEAR WALL ANCHOR SPECIFICATIONS ARE BASED ON THE ASSUMPTION THAT ALL EXIST. AND NEW SILL PLATES HAVE A SPECIFIC GRAVITY OF 0.43 (HEM FIR) OR GREATER, AND ARE IN GOOD CONDITION. CONTRACTOR SHALL VERIFY.

COLUMN SCHEDULE

MARK	MATERIAL	SIZE	BASE PLATE	NOTES
C 2	WOOD	(2) 2 x 6	N / A	
C 3	WOOD	(3) 2 x 6	N / A	
C 6	WOOD / MFR.	6 3/4" x 7 1/2" GL	N / A	
C 7	STEEL	W 6 x 16	REF. 3/S4.1	

SCHEDULE NOTES :

1. COLUMNS SHALL BE INDICATED ON PLAN THUS :

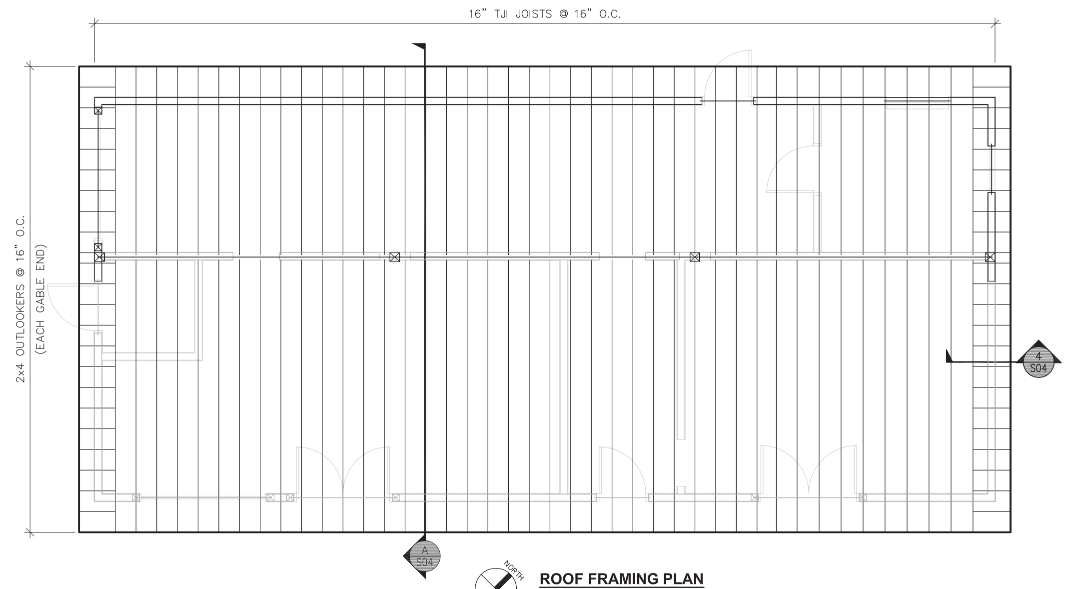


EXAMPLE

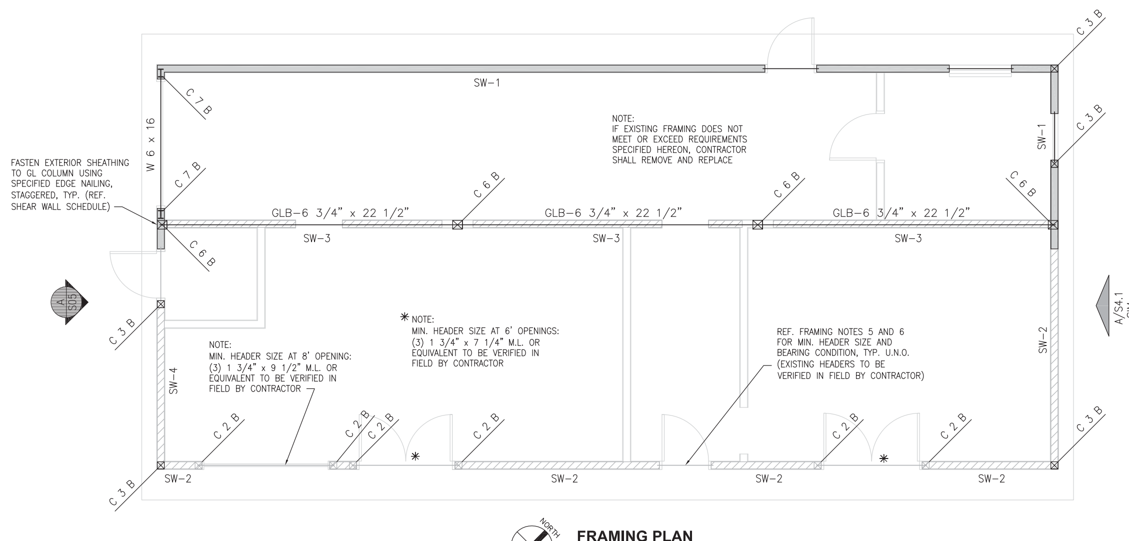
A – COLUMN IS ABOVE FRAMING LEVEL ONLY
B – COLUMN IS BELOW FRAMING LEVEL ONLY
AB – COLUMN OCCURS BOTH ABOVE AND BELOW FRAMING LEVEL BUT IS NOT CONTINUOUS
C – COLUMN IS CONTINUOUS THRU FRAMING LEVEL

FRAMING NOTES:

1. REFER TO SHT. S01 FOR GENERAL NOTES.
2. REFER TO SHTS. S01 AND S04 FOR TYPICAL DETAILS NOT NOTED ON PLAN.
3. ALL ELEVATIONS INDICATED ON PLAN ARE BASED UPON AN ASSUMED DATUM ELEVATION OF 100'-0". REFER TO ARCHITECTURAL DRAWINGS FOR ACTUAL ELEVATION.
4. COLUMNS ARE LOCATED ON WALL CENTERLINES UNLESS DIMENSIONED OTHERWISE ON PLAN OR DETAILS. (COORD. WITH ARCH'L DRAWINGS)
5. [shaded bar] INDICATES THE LOCATION OF A LOAD BEARING STUD FRAMED WALL. LOAD BEARING STUD WALLS SHALL BE 2x6 @ 16" O.C., TYPICAL (COORD. WITH ARCH'L DRAWINGS). PROVIDE (1) TRIMMER FOR SUPPORT AND BEARING OF ALL HEADERS AND BEAMS UNLESS NOTED OTHERWISE. IN ADDITION TO DESIGNATED TRIMMERS, A CONTINUOUS "KINGSTUD" SHALL BE PLACED AT EACH SIDE OF WALL OPENINGS AND EXTEND TO THE PLATE LINE ABOVE.
6. TYPICAL HEADERS SHALL BE (3) 2x6 D.F.#1 (GLUED AND NAILED) UNLESS NOTED OTHERWISE.
7. CONTRACTOR SHALL COORDINATE ALL TOP OF WALL AND BEARING PLATE ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
8. COORDINATE SIZE AND LOCATION OF OPNGS. IN FRAMING WITH ARCHITECTURAL AND MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS.
9. FRAMING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL BRIDGING, BLOCKING, AND ANY ADDITIONAL ACCESSORIES REQUIRED BY MANUFACTURER.
10. ROOF DECK SHALL BE 5/8" PLYWOOD OR O.S.B. NAILED TO FRAMING MEMBERS PER THE DIAPHRAGM SCHEDULE ON SHEET S01.
11. REFER TO ARCHITECTURAL DRAWINGS FOR ROOF SLOPE AND OVERHANG.



ROOF FRAMING PLAN
SCALE: 1/4" = 1'-0"



FRAMING PLAN
SCALE: 1/4" = 1'-0"

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WTP IMPROVEMENTS
FRAMING PLANS

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95% AGENCY SUBMITTAL	CN	5-18
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Sheet No. S03
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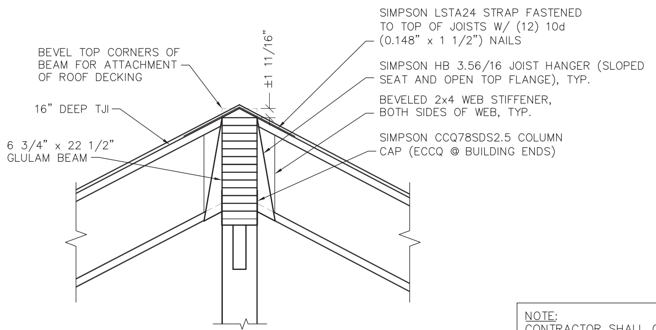
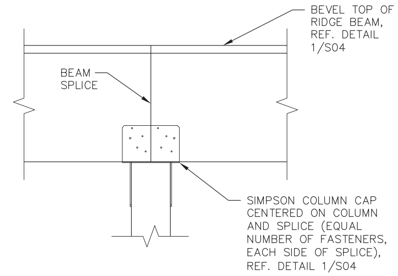
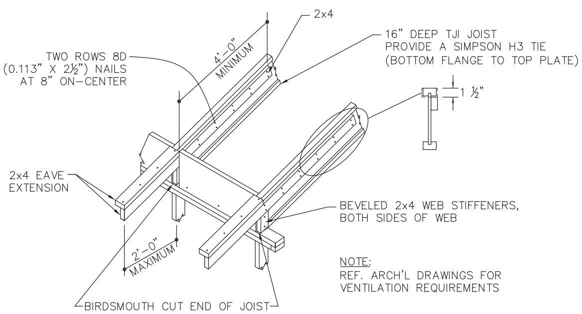


1 S04 RIDGE DETAIL
SCALE: 1" = 1'-0"

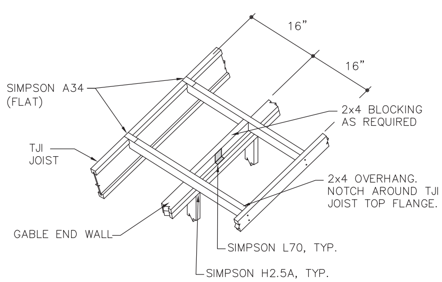
NOTE:
CONTRACTOR SHALL COMPLY W/ ALL INSTRUCTIONS AND RECOMMENDATIONS FROM JOIST MANUFACTURER



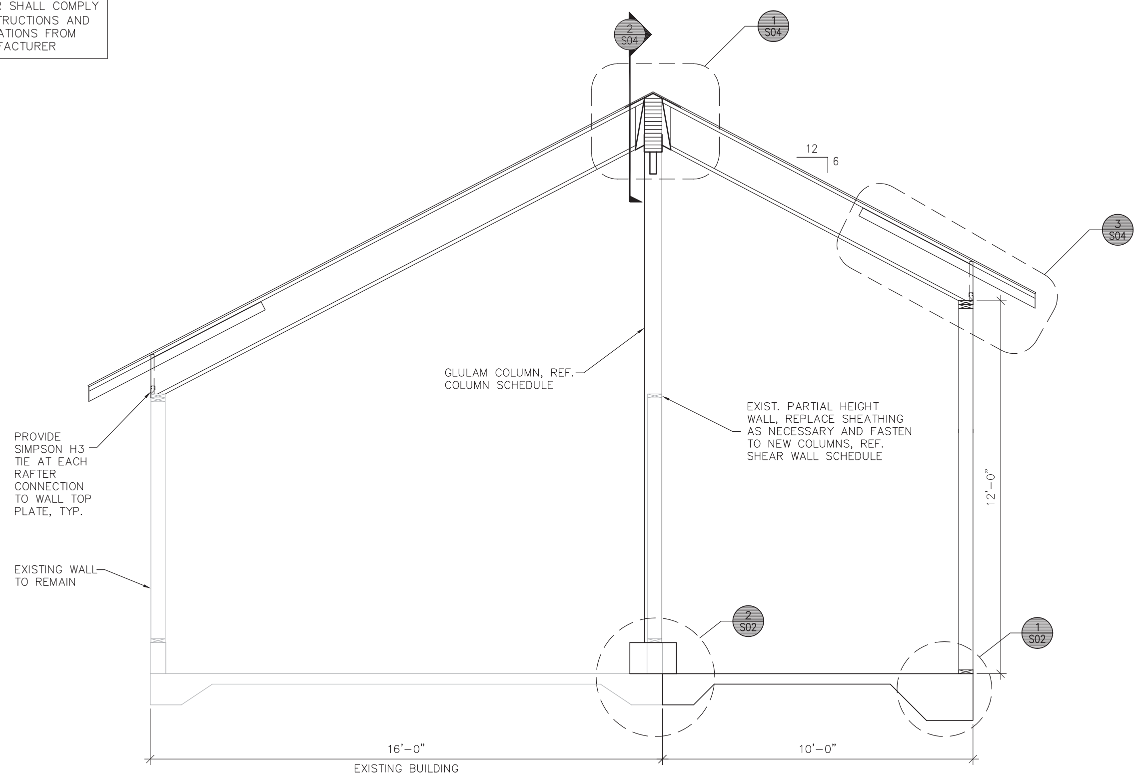
2 S04 RIDGE SPLICE DETAIL
SCALE: 1" = 1'-0"



3 S04 EAVE DETAIL
NOT TO SCALE



4 S04 OUTLOOKER DETAIL
NOT TO SCALE



A S04 BUILDING SECTION
SCALE: 1/2" = 1'-0"

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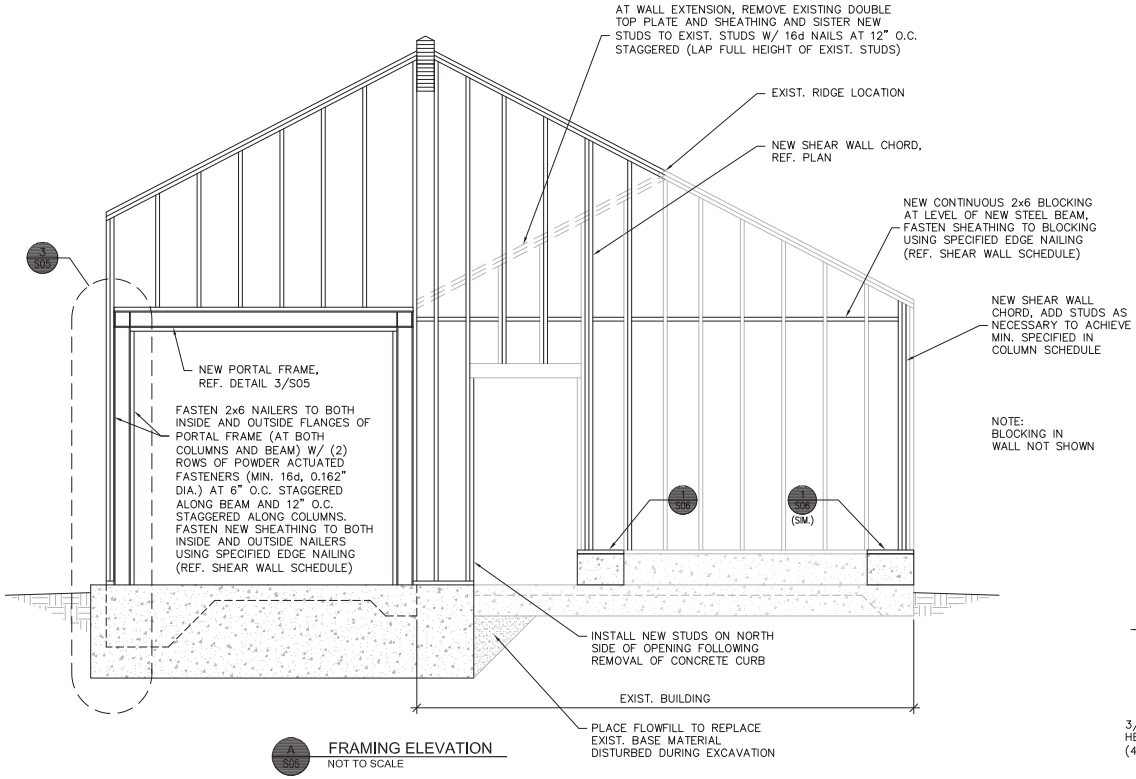
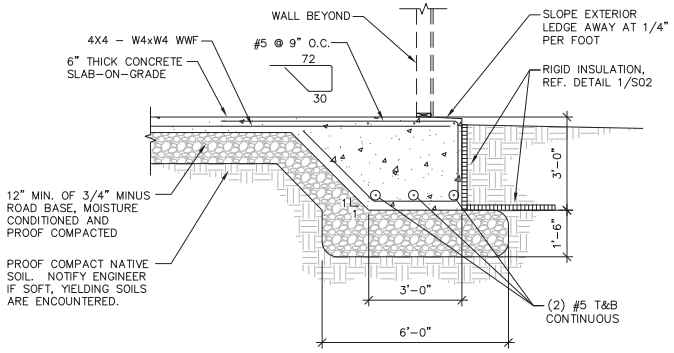
SHEET 47 OF 71



A S05 FRAMING ELEVATION
NOT TO SCALE



1 S06 PERIMETER FOUNDATION
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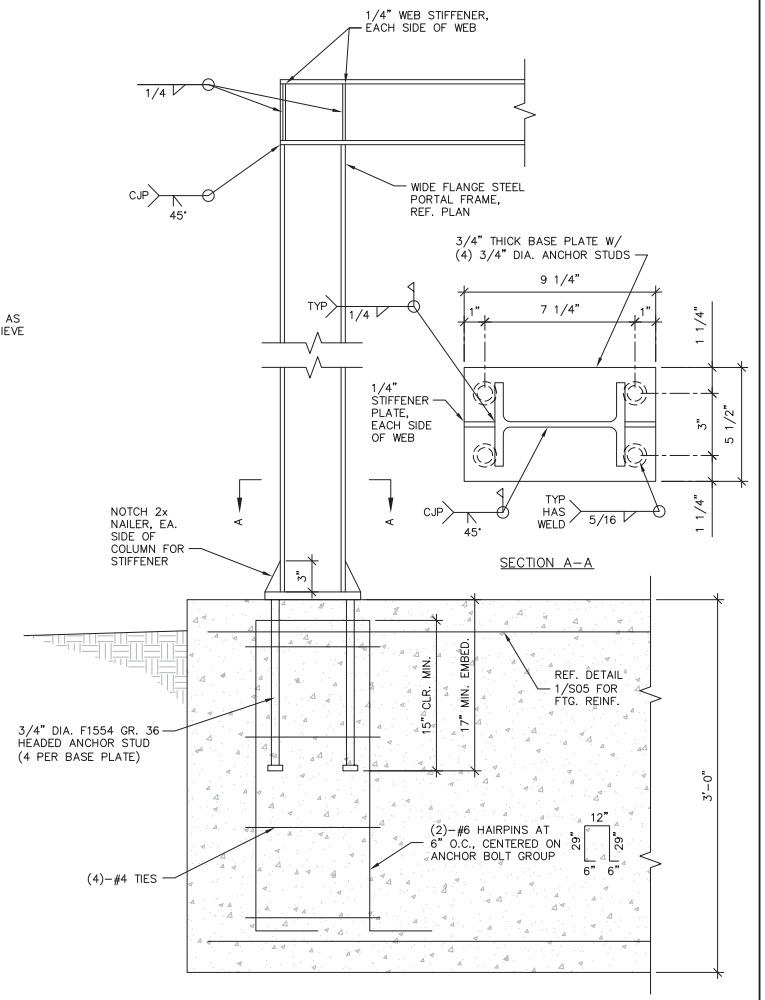

3 S05 PORTAL FRAME DETAIL
NOT TO SCALE

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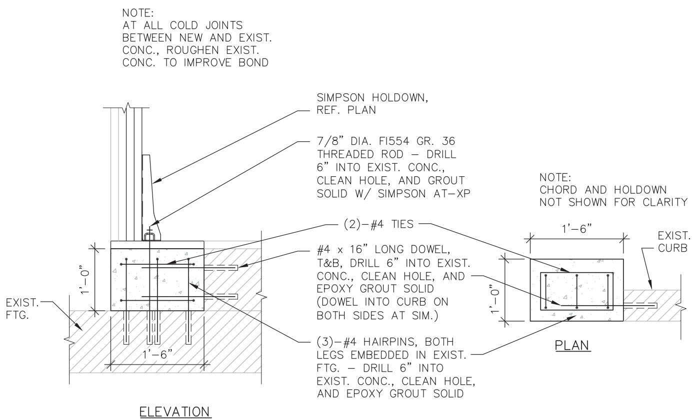
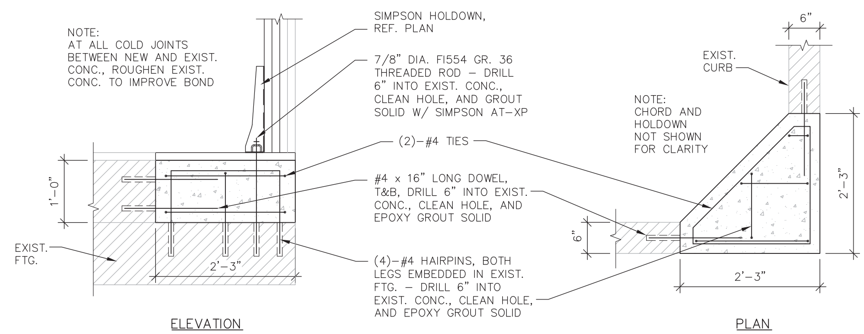


1 S06 **HOLDOWN PILASTER**
NOT TO SCALE



2 S06 **HOLDOWN PILASTER**
NOT TO SCALE

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ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
———	CONDUIT, EXPOSED
- - - -	CONDUIT, UNDERGROUND OR IN CONCRETE
	3/4" X 10' COPPER CLAD STEEL GROUND ROD
	CONDUIT RUN – CHANGE IN ELEVATION
	LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT
	HOME RUN
	HAZARDOUS LOCATION SEAL OFF FITTING
	PANELBOARD
	CONTROL PANEL OR CONTROLLER
	MOLDED CASE CIRCUIT BREAKER, X = AMPERE RATING, Y = NO. OF POLES
	THREE–PHASE MOTOR
	SINGLE–PHASE MOTOR
$\$_T$	MOTOR STARTER–MANUAL
VFD	VARIABLE FREQUENCY DRIVE
	DISCONNECT SWITCH
	MOTOR STARTER/CONTROLLER
	COMBINATION MOTOR STARTER
	JUNCTION BOX OR FITTING
HT	HEAT TRACE POWER JUNCTION
HT	HEAT TRACE END JUNCTION
	120V QUADRUPLEX RECEPTACLE, NEMA 5–20R
	120V DUPLEX GROUND FAULT CIRCUIT INTERRUPTER (GFCI) RECEPTACLE, NEMA 5–20R
	120V DUPLEX RECEPTACLE, NEMA 5–20R
	120V SIMPLEX RECEPTACLE, NEMA 5–20R
	SPECIALTY RECEPTACLE
	TELECOM – DATA OUTLET
	TELECOM – PHONE/DATA OUTLET
	DEMOLITION ZONE
OTHER SYMBOLS AS DEFINED BY NOTE	

ELECTRICAL ABBREVIATIONS

A	AMPERE, ANALOG SIGNAL
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AI	ANALOG INPUT
AO	ANALOG OUTPUT
AP&T	ALASKA POWER AND TELEPHONE
BCU	BARE COPPER
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CP	CONTROL PANEL
CT	CURRENT TRANSFORMER
CU	COPPER
D	DIGITAL SIGNAL
DEG	DEGREES
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
E	EMERGENCY
(E)	EXISTING
FLA	FULL LOAD AMPERES
FVNR	FULL VOLTAGE NON–REVERSING MOTOR CONTROLLER
FVR	FULL VOLTAGE REVERSING MOTOR CONTROLLER
G	GROUND CONDUCTOR
GES	GROUNDING ELECTRODE SYSTEM
GFI	GROUND FAULT INTERRUPTING
GRC	GALVANIZED RIGID (STEEL) CONDUIT
GRD	GROUND
HDPE	HIGH DENSITY POLYETHYLENE CONDUIT
HIM	HUMAN INTERFACE MODULE
HOA	HAND–OFF–AUTO
HOR	HAND–OFF–REMOTE
HP	HORSEPOWER
KVA	KILO–VOLT–AMPERES
LOR	LOCAL–OFF–REMOTE
LTF	LIQUID TIGHT FLEXIBLE CONDUIT (METALLIC)
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MLO	MAIN LUG ONLY
MOV	MOTOR OPERATED VALVE
(N)	NEW
N.I.C.	NOT IN CONTRACT
NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER
OSC	OPEN–STOP–CLOSE
PH	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
POE	POWER OVER ETHERNET
PR	PAIR
PS	POWER SUPPLY
SIG	SIGNAL
SLC	SIGNALING LINE CIRCUIT
TWSH	TWISTED WIRE SHIELDED
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTP	UNSHIELDED TWISTED PAIR
V	VOLTS
VFD	VARIABLE FREQUENCY DRIVE MOTOR CONTROLLER
W	WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
ZS	LIMIT SWITCH

GENERAL NOTES

1. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE AND THE CONTRACT SPECIFICATIONS.
2. MATERIALS AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS, AND SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED. ALL ELECTRICAL EQUIPMENT SHALL INCLUDE THE SEAL OF A NATIONALLY RECOGNIZED TESTING LABORATORY FOR THE PURPOSE FOR WHICH IT IS INSTALLED. SIMILAR ITEMS SHALL BE SUPPLIED BY THE SAME MANUFACTURER THROUGHOUT THE PROJECT.
3. COORDINATE AND PROVIDE EQUIPMENT WITH THE SHORT CIRCUIT CURRENT RATING (SCCR) FOR THE AVAILABLE FAULT CURRENT AT THE POINT OF THE SYSTEM WHERE INSTALLED. PROVIDE ARC FLASH HAZARD WARNING LABELS ON ALL SWITCHBOARDS, PANELBOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, MOTOR CONTROL CENTERS AND SIMILAR EQUIPMENT PER NEC ARTICLE 110.16 AND NFPA 70E.
4. DIMENSIONS OF EQUIPMENT ARE APPROXIMATE. INSTALLATION SHALL BE VERIFIED BASED ON ACTUAL MANUFACTURER'S DATA AND SHOP DRAWINGS.
5. ALL SITE WORK AND UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS. VERIFY ALL INSTALLATIONS PRIOR TO COMMENCEMENT OF WORK. COORDINATE ALL WORK WITH UTILITIES AS REQUIRED.
6. ALL SINGLE–PHASE BRANCH CIRCUITS SHALL BE 3/4"C, 3#12, AND ALL THREE–PHASE BRANCH CIRCUITS SHALL BE 3/4"C, 4#12, UNLESS OTHERWISE NOTED. ALL CIRCUITS SHALL INCLUDE AN EQUIPMENT GROUNDING CONDUCTOR.
7. CONTRACTOR SHALL SUBMIT REQUEST FOR SUBSTITUTION IN WRITING TO THE ENGINEER.
8. PROVIDE SEISMIC SUPPORT AND DESIGN PER IBC REQUIREMENTS.
9. WHERE EXISTING UNDERGROUND UTILITIES ARE SHOWN ON THE PLANS, MULTIPLE PARALLEL LINES MAY BE ENCOUNTERED IN THE SAME TRENCH OR GENERAL AREA. SINGLE LINES WERE SHOWN FOR CLARITY.
10. CALL BEFORE YOU DIG. ALL UTILITIES MAY NOT BE SHOWN IN THE PLANS. THE CONTRACTOR SHALL FIELD LOCATE ALL UTILITIES WITHIN WORK AREA PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY UTILITY CONFLICTS BETWEEN PROPOSED STRUCTURES & UTILITIES. ADJUSTMENTS OF ALL STRUCTURES MAY BE NECESSARY TO AVOID UTILITY CONFLICTS. ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION. HAND DIG WITHIN 36" OF ALL UTILITIES.
11. THIS FACILITY IS REQUIRED TO BE OPERATED CONTINUOUSLY THROUGHOUT THE CONSTRUCTION PERIOD. FACILITY OPERATORS WILL NEED ACCESS AROUND THE DESIGNATED WORK AREAS FOR GENERAL OPERATION PROCEDURES. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER DURING THE CONSTRUCTION PERIOD SO AS TO NOT INTERFERE WITH DAILY PROCEDURES.
12. COORDINATE WITH OWNER BEFORE DISCONNECTION OF EQUIPMENT. DO NOT DISCONNECT EQUIPMENT UNTIL NOTIFICATION TO OWNER HAS BEEN MADE AND APPROVED.

GENERAL DEMOLITION NOTES

THE FOLLOWING NOTES APPLY TO ALL DEMOLITION WORK OF THIS PROJECT UNLESS OTHERWISE NOTED:

1. ALL POWER, CONTROL AND COMMUNICATIONS CONDUCTORS SERVING EQUIPMENT TO BE DEMOLISHED SHALL BE REMOVED IN THEIR ENTIRETY BACK TO THEIR SOURCES.
2. CONDUITS AND RACEWAYS SERVING EQUIPMENT TO BE DEMOLISHED SHALL BE REMOVED IN ALL EXPOSED LOCATIONS. WHERE RACEWAYS PENETRATE WALLS, CEILINGS OR FLOORS THEY SHALL BE CUT FLUSH WITH THE SURFACE AND FINISHED SMOOTH TO MATCH THE EXISTING FINISH SURFACE.
3. RACEWAYS ROUTED BELOW GRADE MAY BE ABANDONED IN PLACE WITH ENDS CUT OFF A MINIMUM OF 12" BELOW GRADE.
4. WHERE POWER CIRCUITS ARE REMOVED FOR DEMOLISHED EQUIPMENT, PROVIDE UPDATED, TYPED PANELBOARD SCHEDULES, MCC LABELS, SWITCHBOARD SCHEDULES, ETC.

CIRCUIT AND DEVICE LEGEND

A–1,a — GROUP OR EQUIPMENT IDENTIFICATION.
"A" DENOTES PANEL NAME
"1" DENOTES CIRCUIT NUMBER
"a" DENOTES SWITCH LEG AS INDICATED.

$\$_{3,a}$ — SWITCH IDENTIFICATION.
"3" DENOTES SWITCH CONFIGURATION
"a" DENOTES SWITCH LEG AS INDICATED.

FIXTURE SCHEDULE

SYMBOL	TYPE	LAMP SIZE	MOUNTING	DESCRIPTION
	F1	31W LED	AS NOTED ON PLANS	ENCLOSED AND GASKETED INDUSTRIAL LINEAR FIXTURE, DAMP LOCATION, SS HARDWARE, 4,000 LUMENS; LITHONIA #FEM–L48–4000LM–LPACL–MD–MVOLT–40K–80CRI
	EX1	69W LED	WALL MOUNT ABOVE DOOR	OUTDOOR WALL PACK, IP65 RATED, 7,561 LUMENS, LITHONIA #CSXW–30C–700–40K–T2M–MVOLT–BBW–DBLXD
	EX2	138W LED	POLE MOUNT	EXTERIOR AREA LIGHT, TYPE 2M DISTRIBUTION; FIXTURE: LITHONIA #DSX1–LED–40C–1000–40K–T2M–MVOLT–MA–DBLXD MAST ARM: LITHONIA #SMAW–T14–US2–5
	EM1	(2)1.5W LED	WALL MOUNT @ 7'–6" AFF	DAMP LOCATION EMERGENCY FIXTURE WITH NI–CAD HIGH–OUTPUT BATTERY; UL924; LITHONIA #ELM2–LED–HO
	EM2	(2)1.5W LED	WALL MOUNT ABOVE DOOR	DAMP LOCATION EXIT SIGN AND EMERGENCY LIGHT WITH NI–CAD HIGH–OUTPUT BATTERY AND REMOTE LAMP; UL 924; LITHONIA #LHQM–LED–R–HO
	EM3	(1)1.5W LED	WALL MOUNT ABOVE DOOR	WEATHER–PROOF REMOTE EMERGENCY LAMP HEAD LITHONIA #ELA QWP L0304

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WTP IMPROVEMENTS
ELECTRICAL LEGEND AND ABBREVIATIONS

REVISION	BY	DATE
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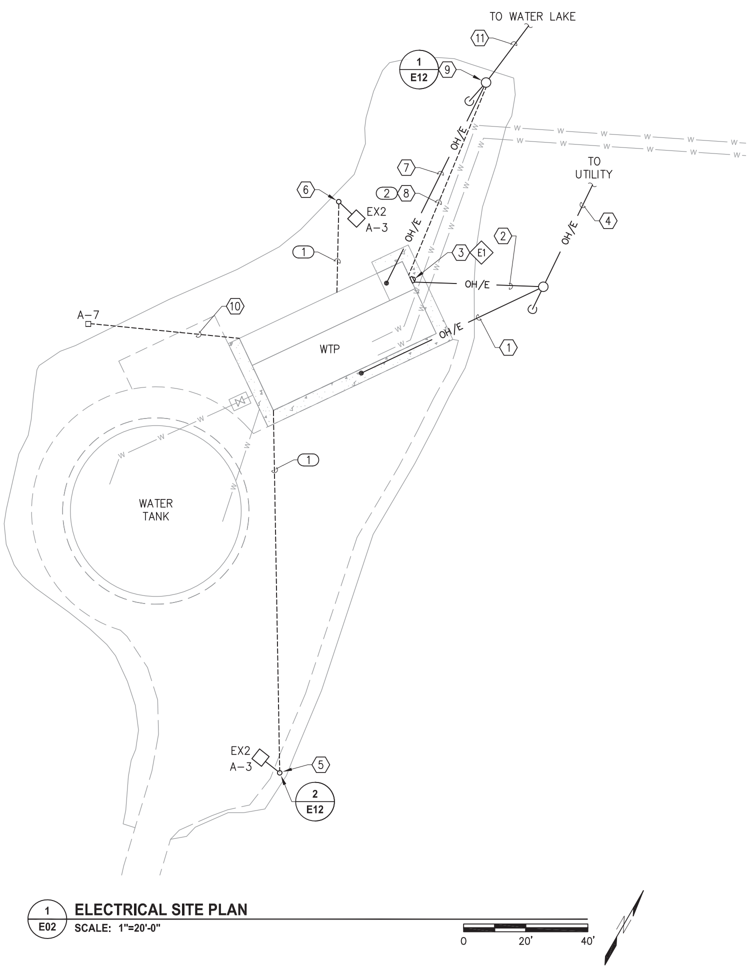

1 E02 **ELECTRICAL SITE PLAN**
SCALE: 1"=20'-0"

0 20' 40'

SHEET NOTES

1. (E) OVERHEAD UTILITY SERVICE DROP TO BE REMOVED BY LOCAL UTILITY, ALASKA POWER AND TELEPHONE, (AP&T). COORDINATE DISCONNECTION WITH AP&T (907)826-3202.
2. (N) OVERHEAD UTILITY SERVICE DROP BY AP&T.
3. NEW ELECTRICAL SERVICE METER/MAIN. INSTALL PER AP&T REQUIREMENTS. COORDINATE WITH UTILITY FOR NEW SERVICE CONNECTION.
4. (E) OVERHEAD UTILITY LINE TO REMAIN.
5. (E) LEANING WOOD POLE WITH NON-FUNCTIONAL AREA LIGHT. REMOVE LIGHT, CONDUIT RISER AND CONDUCTORS TO BELOW GRADE. RE-SET POLE PLUMB. INSTALL (N) FIXTURE AND RE-SERVE WITH (N) CIRCUIT AS SHOWN. FIELD VERIFY POLE DIAMETER AND PROVIDE HARDWARE AS REQUIRED.
6. (E) AREA LIGHT ON WOOD POLE TO BE REPLACED. REMOVE LIGHT, CONDUIT AND CONDUCTORS TO BELOW GRADE. INSTALL (N) FIXTURE ON (E) POLE AND RE-SERVE WITH (N) CIRCUIT AS SHOWN. FIELD VERIFY POLE DIAMETER AND PROVIDE HARDWARE AS REQUIRED.
7. (E) OVERHEAD POWER FEED TO WATER LAKE RAW WATER PUMP HOUSE TO BE REMOVED TO FIRST POLE.
8. UNDERGROUND FEEDER TO RECONNECT TO (E) OVERHEAD LINE TO WATER LAKE RAW WATER PUMP HOUSE.
9. PROVIDE (N) RISER ON (E) POLE. SEE DETAIL 1, SHEET E12.
10. (E) UNDERGROUND CIRCUIT TO KRBD RADIO REPEATER. CIRCUIT DAYLIGHTS ON THE NORTHWEST CORNER OF THE WTP COVERED SHED. REMOVE CIRCUIT BETWEEN ITS SOURCE IN PANELBOARD 'A' (SEE NOTE 13 E03) AND THE LIMITS OF EXCAVATION. COORDINATE OUTAGE W/ OWNER. RE-SERVE CIRCUIT AFTER BUILDING UPGRADES ARE COMPLETE.
11. (E) OVERHEAD POWER LINE TO WATER LAKE RAW WATER PUMP HOUSE

E# SEE E08 FOR ELECTRICAL EQUIPMENT SCHEDULE

CIRCUIT SCHEDULE

TAG	DESCRIPTION
1	3/4"C, 2#12 (H,N) & 1#12 (G)
2	2"C, 3#4 (3H) & 1#6 (G)

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VILLAGE SAFE WATER

EDC, INC.
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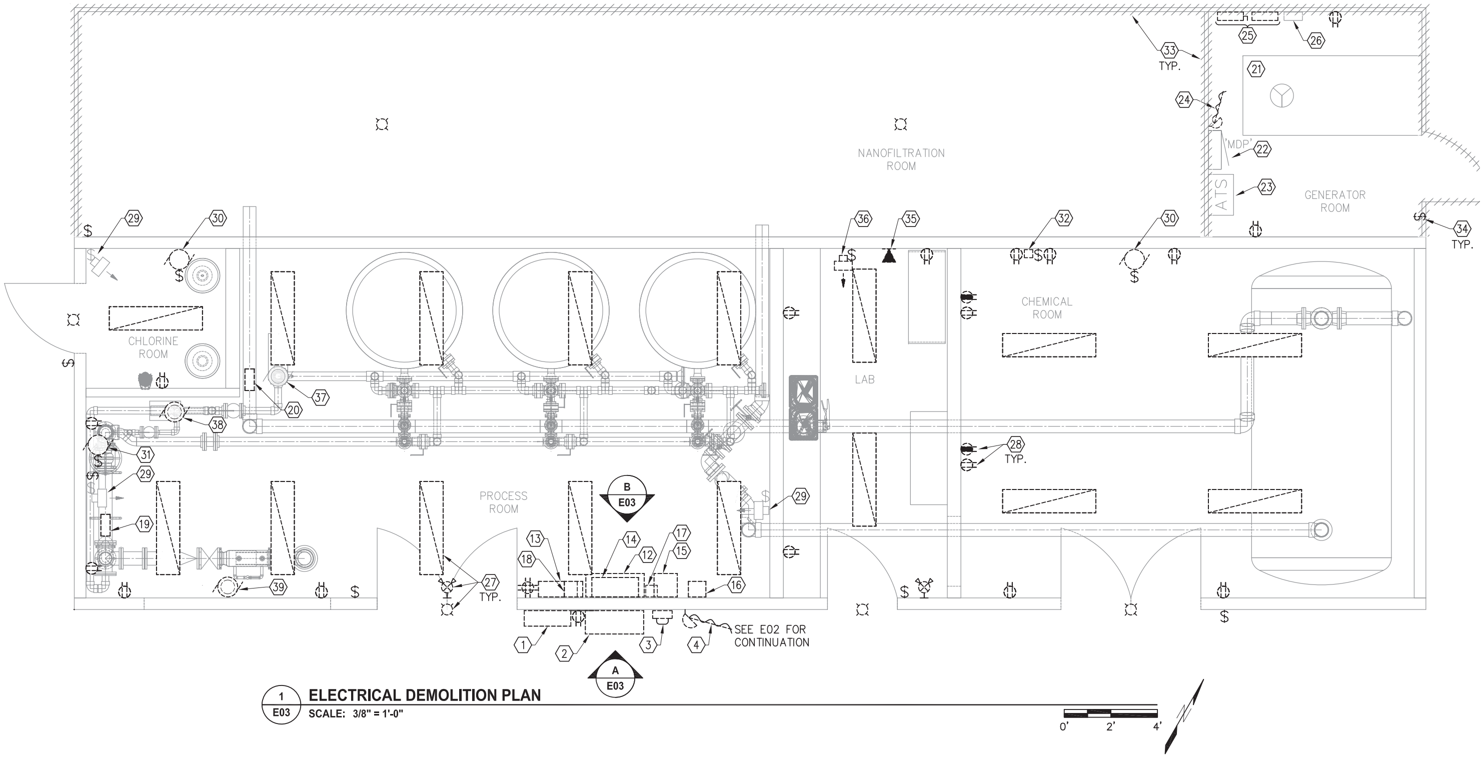
ANCHORAGE, AK 99503
(907) 276-7833
LICENSE NO. AECC705

WTP IMPROVEMENTS
ELECTRICAL SITE PLAN

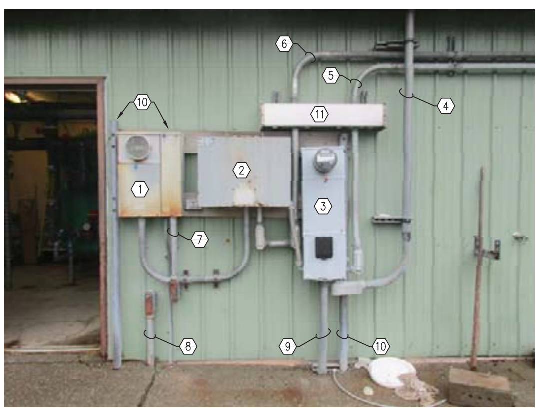
REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50093.01
Date 2018-11-30
Designed JF
Drawn OM
Approved JF

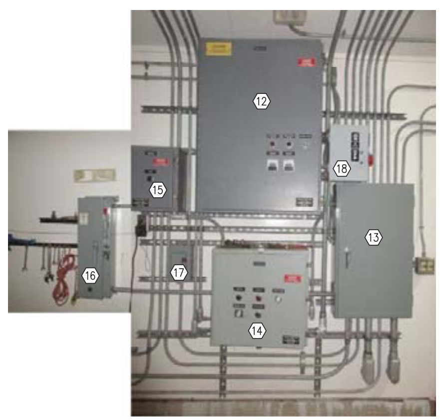
Sheet No. E02



1 E03 **ELECTRICAL DEMOLITION PLAN**
SCALE: 3/8" = 1'-0"



A E03 **ELEVATION "A"**
SCALE: NTS



B E03 **ELEVATION 'B'**
SCALE: NTS

GENERAL DEMOLITION NOTES

1. ALL ELECTRICAL DISTRIBUTION EQUIPMENT, INCLUDING THE SERVICE EQUIPMENT, LIGHTING DISTRIBUTION PANELBOARD AND ALL BRANCH CIRCUITS AND ASSOCIATED CONDUITS, WIREWAYS, FITTINGS AND CONDUCTORS TO BE REMOVED IN THEIR ENTIRETY, UNLESS OTHERWISE NOTED.
2. ALL EXISTING INTERIOR, EXTERIOR AND EMERGENCY LIGHTING FIXTURES AND ASSOCIATED SWITCHES, CONDUIT AND CONDUCTORS TO BE REMOVED IN THEIR ENTIRETY, UON.
3. EQUIPMENT SHOWN IS FOR REFERENCE ONLY AND DOES NOT SHOW ALL DEVICES REQUIRED TO BE REMOVED.
4. FOR EQUIPMENT IDENTIFIED TO BE REMOVED, ALL ASSOCIATED CONDUITS, CONDUCTORS, SWITCHES, RECEPTACLES, INSTRUMENTS, ANNUNCIATING DEVICES, ETC. SHALL ALSO BE REMOVED UON.

SHEET NOTES

1. ABANDONED METERBASE TO BE REMOVED.
2. 30kVA, 480:208Y120V TRANSFORMER TO BE REMOVED.
3. METER/MAIN TO BE REMOVED.
4. SERVICE RISER AND SERVICE DROP TO BE REMOVED. COORDINATE WITH LOCAL UTILITY, AP&T (907)826-3202.
5. FEEDER TO ATS IN GENERATOR ROOM TO BE REMOVED.
6. FEEDER FROM 480V MAIN DISTRIBUTION PANELBOARD 'MDP' IN GENERATOR ROOM TO BE REMOVED.
7. FEEDER TO 208V PANELBOARD TO BE REMOVED.
8. FEEDER TO OUTSIDE AREA LIGHT TO BE REMOVED.
9. GROUNDING ELECTRODE CONDUCTOR TO BE REMOVED.
10. SERVICE EQUIPMENT SUPPORT POSTS AND BOARDS TO BE REMOVED.
11. WIREWAY TO BE REMOVED.
12. VACUUM PUMP STATUS PANEL TO BE REMOVED.
13. 208V, PANELBOARD 'A' TO BE REMOVED.
14. BACKWASH PUMP CONTROL PANEL TO BE REMOVED.
15. CHEMICAL PUMP CONTROL PANEL 'C' TO BE REMOVED.
16. TREATED WATER STORAGE TANK CIRCULATION PUMP STARTER TO BE REMOVED.
17. MANUAL STARTER FOR DOMESTIC WATER PUMP TO BE REMOVED.
18. DISCONNECT TO BE REMOVED.
19. CHLORINE INJECTION PUMP #2 PANEL TO BE REMOVED.
20. BACKWASH PUMP CONTROL VALVE PANEL TO BE REMOVED.
21. 30KW STANDBY GENERATOR TO BE REMOVED AND REINSTALLED. SEE SHEET E04.
22. 480V, MAIN DISTRIBUTION PANEL TO BE REMOVED AND REINSTALLED. SEE SHEET E04.
23. AUTOMATIC TRANSFER SWITCH TO BE REMOVED AND REINSTALLED. SEE SHEET E04.
24. 480V, OVERHEAD FEEDER TO WATER LAKE RAW WATER PUMP TO BE REMOVED.
25. DISCONNECT SWITCH AND 2KW TRANSFORMER FOR BATTERY CHARGER TO BE REMOVED.
26. BATTERY CHARGER TO BE RELOCATED. SEE SHEET E04 FOR NEW LOCATION.
27. LIGHT FIXTURE TO BE REMOVED.
28. RECEPTACLE TO BE REMOVED.
29. UNIT HEATER AND DISCONNECT SWITCH TO REMAIN. RECONNECT AS SHOWN ON SHEET E04.
30. EXHAUST FAN TO BE REMOVED.
31. EXHAUST FAN, EF-2 AND DISCONNECT SWITCH TO REMAIN. RECONNECT AS SHOWN ON SHEET E04.
32. EXHAUST FAN TIMER TO BE REMOVED.
33. WALL BEING DEMOLISHED.
34. SWITCH TO BE REMOVED.
35. TELEPHONE OUTLET TO BE REMOVED.
36. UNIT HEATER AND DISCONNECT SWITCH TO BE RELOCATED TO ACCOMMODATE NEW DOORWAY. SEE SHEET E04.
37. BACKWASH PUMP TO REMAIN. RECONNECT PER SHEET E04.
38. RECIRCULATION PUMP TO REMAIN. RECONNECT PER SHEET E04.
39. DOMESTIC WATER PUMP. TANK AND SWITCH TO BE REMOVED.

FINAL BID SET
APPROVED FOR CONSTRUCTION

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WTP IMPROVEMENTS
ELECTRICAL DEMOLITION PLAN

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

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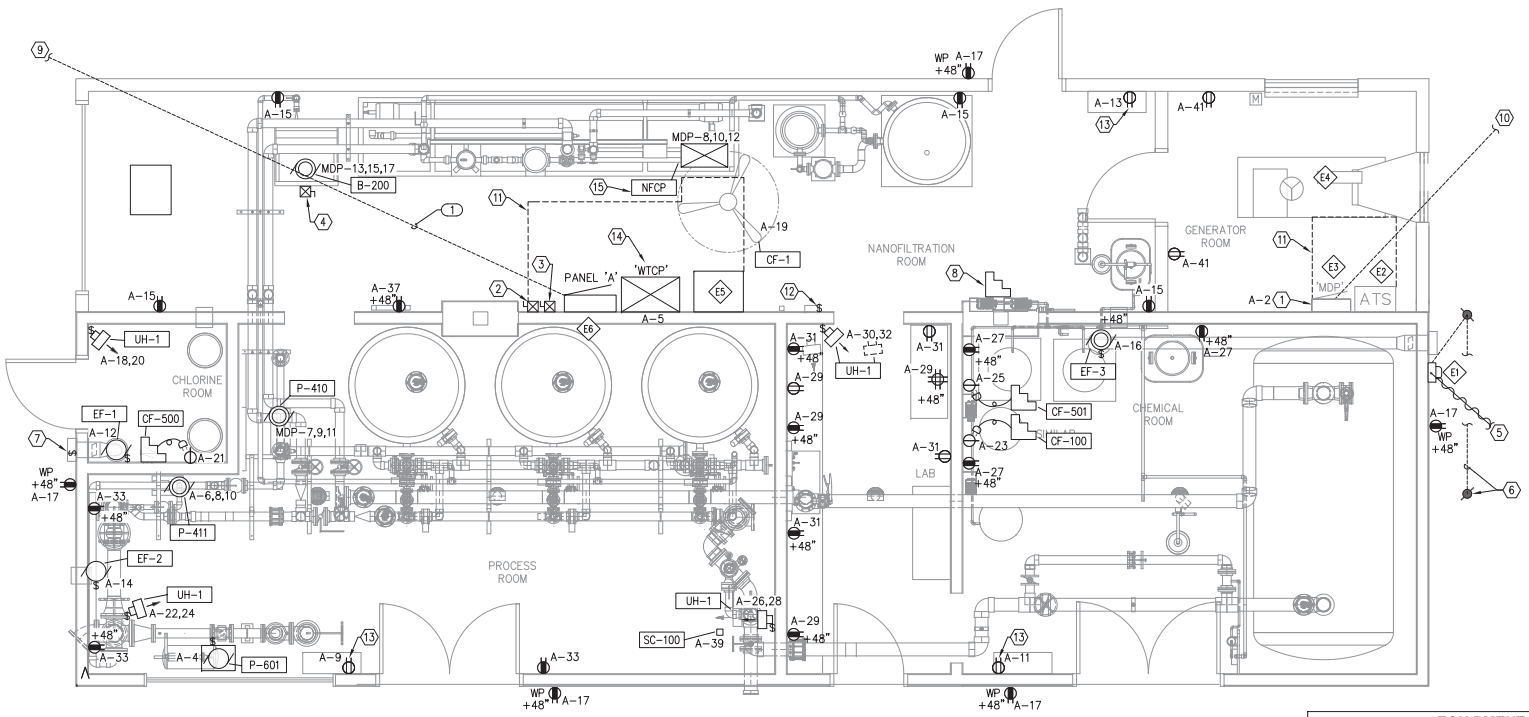
Drawn OM
Approved JF

Sheet No. E03
SHEET 52 OF 71



1 / E04 **ELECTRICAL POWER PLAN**
SCALE: 3/8" = 1'-0"

0' 2' 4'

SHEET NOTES

1. (E) GENERATOR BATTERY CHARGER TO BE RE-INSTALLED BELOW 'MDP'.
2. BACKWASH PUMP, P-410 MOTOR STARTER. SEE SCHEMATIC ON SHEET E10.
3. RE-CIRCULATION PUMP P-411 MOTOR STARTER. SEE SCHEMATIC ON SHEET E10.
4. AIR BLOWER, B-200 MOTOR STARTER. SEE SCHEMATIC ON SHEET E10.
5. OVERHEAD SERVICE DROP, SEE E02 FOR CONTINUATION.
6. GES, SEE SHEET E08, NOTE 10 FOR DESCRIPTION.
7. SWITCH FOR EXHAUST FAN. PROVIDE PLACARD "TURN ON EXHAUST FAN BEFORE ENTERING".
8. ANTI-SCALANT CHEMICAL FEED PUMP SUPPLIED WITH NANO-FILTRATION EQUIPMENT. COORDINATE ELECTRICAL REQUIREMENTS WITH SUPPLIER.
9. CIRCUIT TO KRBD REPEATER. SEE SHEET E02 FOR CONTINUATION.
10. FEEDER TO WATER LAKE RAW WATER PUMP HOUSE. SEE SHEET E02 FOR CONTINUATION.
11. MAINTAIN 3'-0" CLEARSPACE IN FRONT OF ALL PANELS.
12. MANUAL SWITCH FOR CONTROL OF CF-1, SUPPLIED WITH FAN.
13. TOYO STOVE RECEPTACLE.
14. WATER TREATMENT CONTROL PANEL, 'WTCP' FURNISHED BY OTHERS, CONTRACTOR TO INSTALL. SEE SHEETS IC01-IC09 FOR DETAILS.
15. NANO FILTRATION CONTROL PANEL, 'NFCP' FURNISHED BY OTHERS, CONTRACTOR TO INSTALL.

E# SEE E08 FOR ELECTRICAL EQUIPMENT SCHEDULE

CIRCUIT / FEEDER SCHEDULE

TAG	DESCRIPTION
1	3/4"C, (2)#10 & (1)#10 GND

EQUIPMENT CONNECTION SCHEDULE

TAG ID	LOAD					CIRCUIT SIZE	NOTES
	KVA	HP	FLA	V	PH		
B-200	–	3	4.8	460	3	3/4", (3)#12 & (1)#12 (G)	
SC-100	0.1	–	–	120	1	3/4", (2)#12 & (1)#12 (G)	
CF-1	0.1	–	–	120	1	3/4", (2)#12 & (1)#12 (G)	
P-410	–	10	11.9	460	3	3/4", (3)#12 & (1)#12 (G)	1
P-411	–	1/2	1.6	208	3	3/4", (3)#12 & (1)#12 (G)	1
P-601	–	1/2	9.8	120	1	3/4", (2)#12 & (1)#12 (G)	
UH-1	2.5	–	12.2	208	1	3/4", (2)#12 & (1)#12 (G)	1
EF-1	–	F	–	120	1	3/4", (2)#12 & (1)#12 (G)	
EF-2	–	1/16	–	120	1	3/4", (2)#12 & (1)#12 (G)	1
EF-3	–	F	–	120	1	3/4", (2)#12 & (1)#12 (G)	
CF-100	–	1/2	5	120	1	EXISTING CORD AND PLUG	1,3
CF-500	–	1/2	5	120	1	EXISTING CORD AND PLUG	1,3
CF-501	–	1/2	5	120	1	EXISTING CORD AND PLUG	1,3
WTCP	0.2	–	–	120	1	3/4", (2)#12 & (1)#12 (G)	
NFCP	39.0	–	–	460	3	1"C, (3)#6 & (1)#6 (G)	2

NOTE 1: (E) EQUIPMENT TO BE RE-SERVED AS SHOWN.
NOTE 2: COORDINATE EXACT FEEDER REQUIREMENTS WITH NF SYSTEM SUPPLIER. SIZE SHOWN FOR BID PURPOSES ONLY.
NOTE 3: PLUG INTO SWITCHED SIMPLEX RECEPTACLE.

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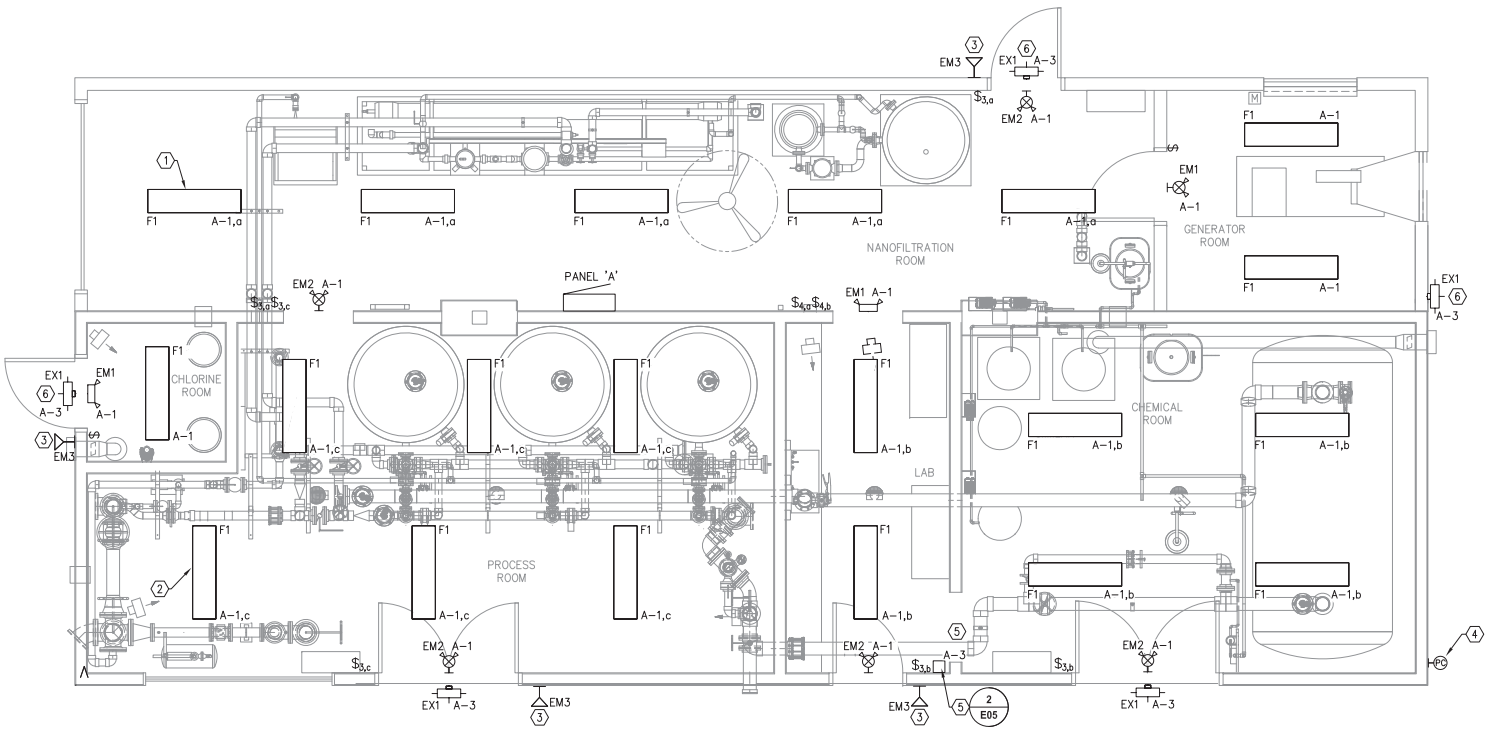
WTP IMPROVEMENTS

ELECTRICAL POWER PLAN

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

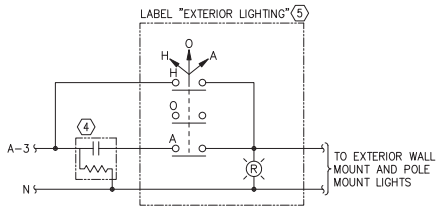
Project No. 1529.50003.01
Date 2018-11-30
Designed JF
Drawn OM
Approved JF

Sheet No. E04
SHEET 53 OF 71



1 E05 **ELECTRICAL LIGHTING PLAN**
SCALE: 3/8" = 1'-0"

0' 2' 4'



2 E05 **EXTERIOR LIGHTING CONTROL SCHEMATIC**
SCALE: NTS

SHEET NOTES

1. PENDANT MOUNT FIXTURES IN NEW ADDITION MOUNTED 10'-0" AFF. TYP. OF 7.
2. PENDANT MOUNT FIXTURES IN EXISTING WATER PLANT MOUNTED 9'-0" AFF. TYP. OF 13.
3. EMERGENCY REMOTE HEAD. WIRE TO NEAREST EM2 EMERGENCY BATTERY BACKUP.
4. PHOTOCELL, 1800VA, 120V RATED, TORK #2101 OR EQUAL. MOUNT ON CONDUIT STEM ABOVE ROOF STRUCTURE; AIM NORTH.
5. HAND-OFF AUTO, 20A, 120V RATED, WITH PILOT LIGHT IN NEMA 4X ENCLOSURE. SQUARE D OR EQUAL.
6. WALL MOUNT FIXTURE AT 10'-0" AFG. TYP OF 3.

GENERAL SHEET NOTES

1. ADJUST FIXTURE LOCATIONS TO MINIMIZE SHADOWING.
2. WALL MOUNT EXIT SIGNS (EM2) ABOVE DOORS.
3. SEE ELECTRICAL SITE PLAN SHEET E02 FOR POLE MOUNT LIGHT FIXTURE LOCATIONS.

FINAL BID SET
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WTP IMPROVEMENTS

ELECTRICAL LIGHTING PLAN

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
Date 2018-11-30
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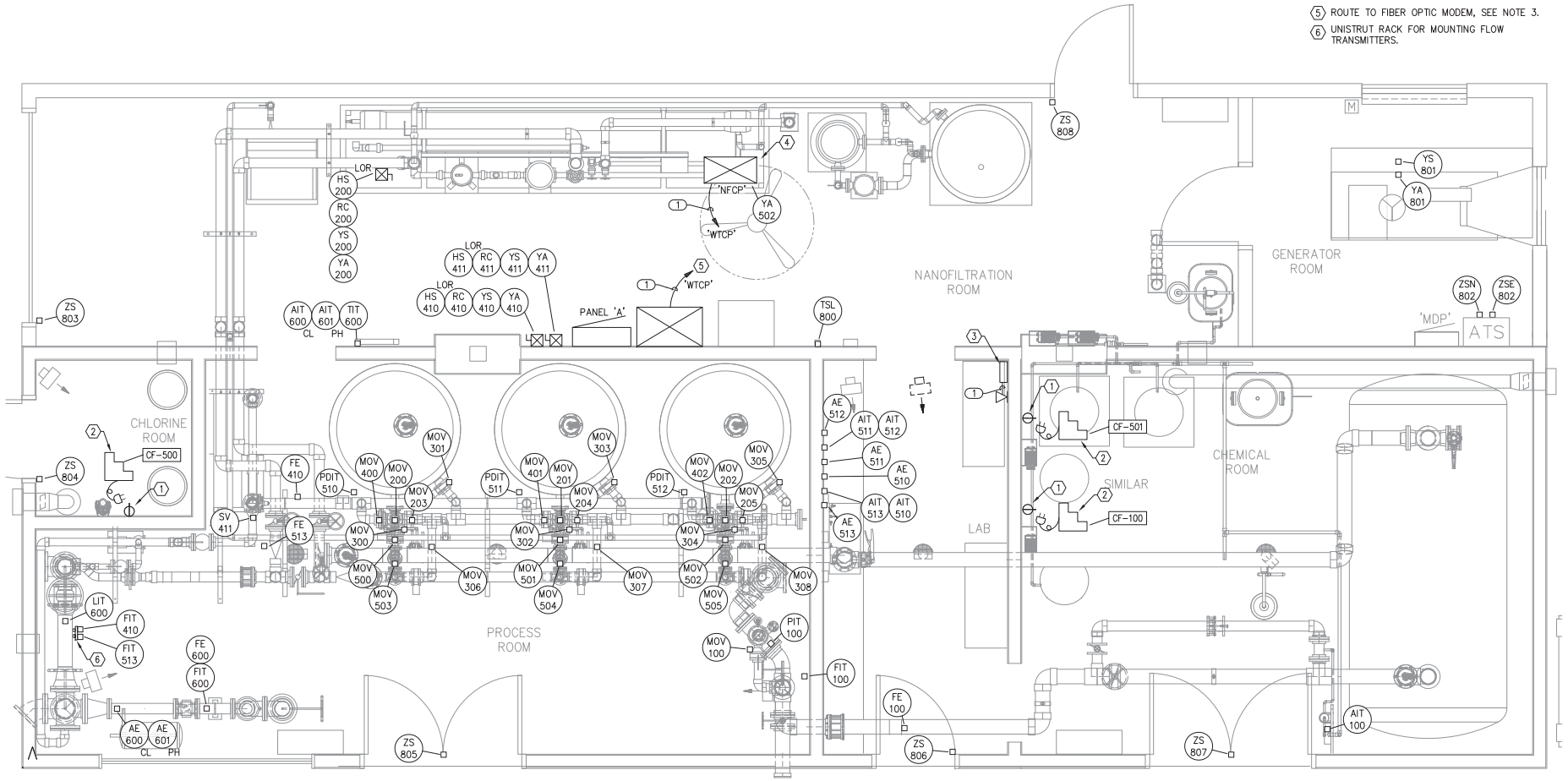
Drawn OM
Approved JF

Sheet No. E05
SHEET 54 OF 71

CIRCUIT / FEEDER SCHEDULE	
TAG	DESCRIPTION
1	3/4"C, (1) CAT 6 ETHERNET CABLE

SHEET NOTES

1. RECEPTACLE CIRCUIT CONTROLLED BY 'WTCP'.
2. CHEMICAL FEED PUMP. SEE SHEET E11 FOR SCHEMATIC.
3. FIBER OPTIC DEMARCATION POINT AND MODEM BY AP&T. COORDINATE INSTALLATION REQUIREMENTS WITH UTILITY.
4. NANO-FILTRATION SKID CONTROL PANEL FURNISHED BY OTHERS.
5. ROUTE TO FIBER OPTIC MODEM, SEE NOTE 3.
6. UNISTRUT RACK FOR MOUNTING FLOW TRANSMITTERS.



1 / E06 **INSTRUMENTATION PLAN**
SCALE: 1/2" = 1'-0"

0 2' 4'

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WTP IMPROVEMENTS

INSTRUMENTATION PLAN

REVISION	BY	DATE
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FINAL BID SET	CN	11-30

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Date 2018-11-30
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Approved JF

Sheet No. E06
SHEET 55 OF 71

INSTRUMENT CONNECTION SCHEDULE

TAG ID	SIGNAL CIRCUIT SIZE	DESTINATION	POWER CIRCUIT SIZE (IF REQUIRED)	DESTINATION	NOTES
AIT-100	3/4"C, 1PR#18 TWSH 3/4"C, 1PR#18 TWSH	WTCP CF-100	3/4"C, (2)#12 & (1)#12 (G)	'WTCP'	1
FE-100	EXISTING CABLE	FIT-100			1
FIT-100	3/4"C, 1PR#18 TWSH 3/4"C, 1PR#18 TWSH	WTCP CF-100			1
MOV-100	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
PIT-100	3/4"C, 1PR#18 TWSH	WTCP			
HS/RC/YS/YA-200	3/4"C, (6)#14 & (1)#14 (G)	WTCP			
MOV-200	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-201	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-202	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-203	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-204	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-205	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-300	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-301	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-302	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-303	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-304	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-305	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-306	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-307	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-308	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-400	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-401	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-402	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
FE-410	EXISTING CABLE	FIT-410			1
FIT-410	3/4"C, 1PR#18 TWSH	WTCP			1
HS/RC/YS/YA-410	3/4"C, (6)#14 & (1)#14 (G)	WTCP			
HS/RC/YS/YA-411	3/4"C, (6)#14 & (1)#14 (G)	WTCP			
SV-411	3/4"C, (2)#14 & (1)#14 (G)	WTCP			1
MOV-500	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
TIT-500	3/4"C, 1PR#18 TWSH	WTCP			
MOV-501	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-502	3/4"C, (5)#14 & (1)#14 (G)	WTCP			

INSTRUMENT CONNECTION SCHEDULE

TAG ID	SIGNAL CIRCUIT SIZE	DESTINATION	POWER CIRCUIT SIZE (IF REQUIRED)	DESTINATION	NOTES
YA-502	3/4"C, (2)#14 & (1)#14 (G)	WTCP			
FE-513	EXISTING CABLE	FIT-513			1
FIT-513	3/4"C, 1PR#18 TWSH 3/4"C, 1PR#18 TWSH	WTCP CF-500/CF-501			1
MOV-503	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-504	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
MOV-505	3/4"C, (5)#14 & (1)#14 (G)	WTCP			
AE-510	EXISTING CABLE	AIT-510/513			1
AE-511	EXISTING CABLE	AIT-511/512			1
AE-512	EXISTING CABLE	AIT-511/512			1
AE-513	EXISTING CABLE	AIT-510/513			1
AIT-510/513	3/4"C, (2) 1PR#18 TWSH	WTCP	3/4"C, (2)#12 & (1)#12 (G)	'WTCP'	1
AIT-511/512	3/4"C, (2) 1PR#18 TWSH	WTCP	3/4"C, (2)#12 & (1)#12 (G)	'WTCP'	1
PDIT-510	3/4"C, 1PR#18 TWSH	WTCP			
PDIT-511	3/4"C, 1PR#18 TWSH	WTCP			
PDIT-512	3/4"C, 1PR#18 TWSH	WTCP			
AE-600	CABLE SUPPLIED WITH SENSOR	AIT-600			
AIT-600	3/4"C, 1PR#18 TWSH	WTCP	3/4"C, (2)#12 & (1)#12 (G)		
AE-601	CABLE SUPPLIED WITH SENSOR	AIT-601			
AIT-601	3/4"C, 1PR#18 TWSH	WTCP	3/4"C, (2)#12 & (1)#12 (G)	'WTCP'	
FE/FIT-600	3/4"C, 1PR#18 TWSH	WTCP	3/4"C, (2)#12 & (1)#12 (G)	'WTCP'	
LIT-600	3/4"C, 1PR#18 TWSH	WTCP			
TIT-600	3/4"C, 1PR#18 TWSH	WTCP			
TSL-800	3/4"C, (2)#14 & (1)#14 (G)	WTCP			
YA-801	3/4"C, (2)#14 & (1)#14 (G)	WTCP			2
YS-801	3/4"C, (2)#14 & (1)#14 (G)	WTCP			2
ZSN-802	3/4"C, (2)#14 & (1)#14 (G)	WTCP			2
ZSE-802	3/4"C, (2)#14 & (1)#14 (G)	WTCP			2
ZS-803	3/4"C, (2)#14 & (1)#14 (G)	WTCP			
ZS-804	3/4"C, (2)#14 & (1)#14 (G)	WTCP			
ZS-805	3/4"C, (2)#14 & (1)#14 (G)	WTCP			
ZS-806	3/4"C, (2)#14 & (1)#14 (G)	WTCP			
ZS-807	3/4"C, (2)#14 & (1)#14 (G)	WTCP			
ZS-808	3/4"C, (2)#14 & (1)#14 (G)	WTCP			

NOTE 1: EXISTING INSTRUMENT.
NOTE 2: STATUS SWITCH IN EXISTING EQUIPMENT.

GENERAL NOTES

1. SIGNAL CIRCUIT REQUIREMENTS SHOWN IN THE TABLE ARE FOR THE FINAL TERMINATION AT THE INSTRUMENT OR SENSOR. MULTIPLE SIGNALS MAY BE COMBINED IN A SINGLE RACEWAY WHEN ROUTED TO A COMMON DESTINATION PROVIDED THAT NEC CONDUIT FILL REQUIREMENTS ARE NOT EXCEEDED. MAXIMUM CONDUIT SIZE SHALL NOT EXCEED 2".
2. WHEN COMBINING CIRCUITS, 120VAC POWER OR SIGNAL CONDUCTORS SHALL NOT BE COMBINED WITH ANALOG OR 24V SIGNAL CONDUCTORS IN A COMMON RACEWAY.

FINAL BID SET
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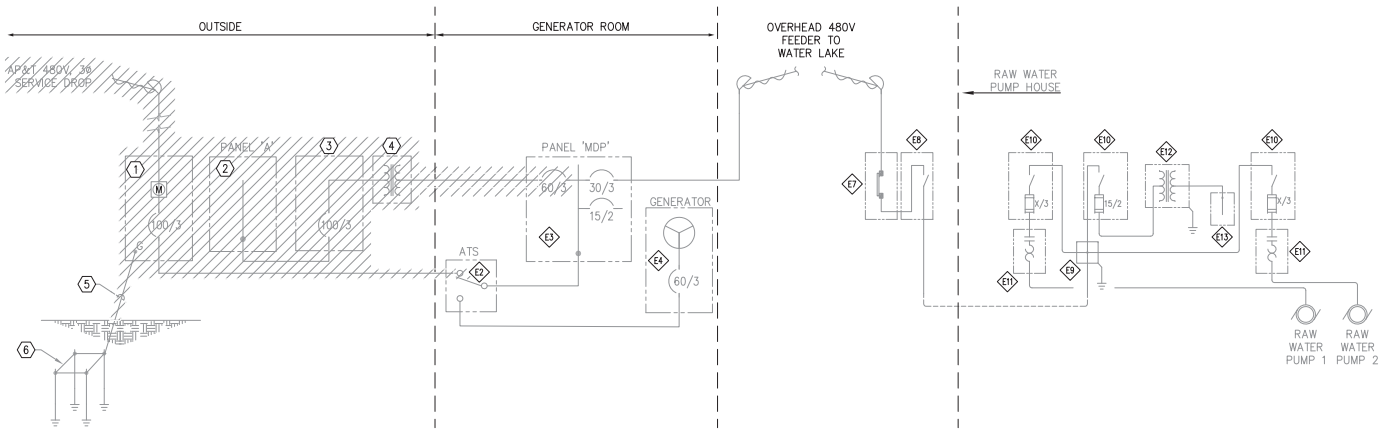
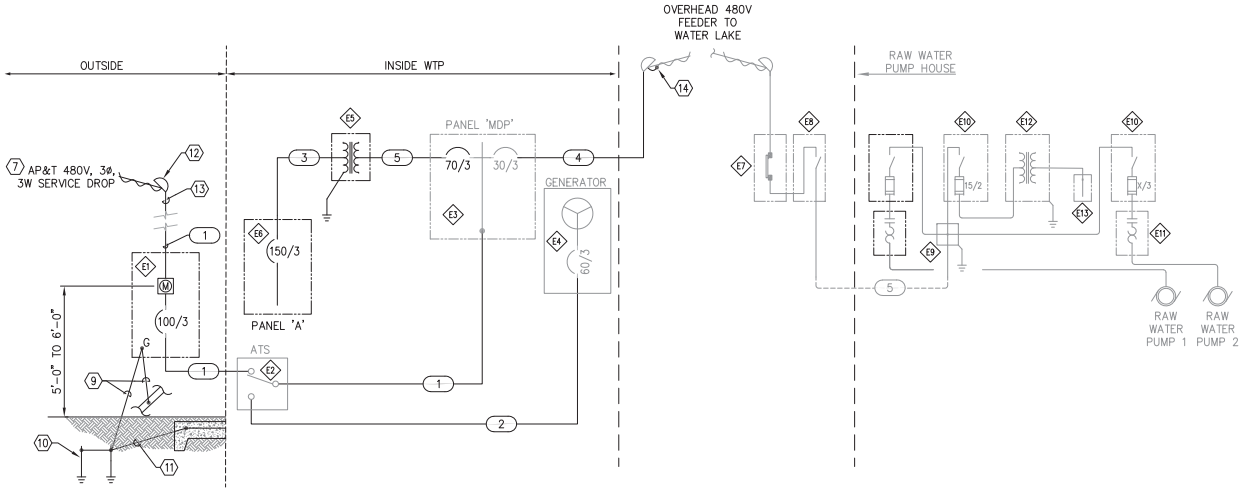
Sheet No. E07
SHEET 56 OF 71



1 EXISTING POWER ONE-LINE
E08 SCALE: NTS



2 NEW POWER ONE-LINE
E08 SCALE: NTS

SHEET NOTES

1. (E) METER/MAIN
2. (E) DISTRIBUTION PANELBOARD 'A'
3. (E) ABANDONED METERBASE
4. (E) 480:208/120V, STEP-DOWN TRANSFORMER.
5. (E) GROUNDING ELECTRODE CONDUCTOR. REMOVE TO BELOW GRADE.
6. (E) GROUNDING ELECTRODE SYSTEM TO BE ABANDONED IN PLACE.
7. COORDINATE (N) SERVICE DROP WITH AP&T. INSTALL SERVICE PER AP&T REQUIREMENTS.
8. #6 BCU GROUNDING ELECTRODE CONDUCTOR. BOND TO ADDITION REBAR PER NEC ARTICLE 250.52.A(3).
9. #4 BCU GROUNDING ELECTRODE CONDUCTOR. BOND TO METER/MAIN, METAL UNDERGROUND WATER PIPE AND GROUNDING ELECTRODE SYSTEM (GES).
10. GES, TWO 3/4"X10' COPPER CLAD STEEL GROUND RODS IMBEDDED A MINIMUM OF 12" BELOW GRADE, SEPARATED A MINIMUM OF 10' AND INTERCONNECTED WITH #2/0 BCU BURIED A MINIMUM OF 30" BELOW GRADE.
11. #6 BCU BOND TO GES AND TO BUILDING ADDITION CONCRETE ENCASED ELECTRODE PER NEC ARTICLE 250.52.A(3).
12. WEATHERHEAD 36" TO 42" ABOVE ROOF LINE. GUY TO ROOF WITH 1/8" AIRCRAFT CABLE.
13. VERIFY WITH AP&T WHETHER OR NOT THEIR SERVICE IS GROUNDED. IF SO, PROVIDE A #2 NEUTRAL CONDUCTOR AND BOND TO GROUND AT THE MAIN DISCONNECT PER NEC 250.24C.
14. SPLICE PIGTAIL TO (E) OVERHEAD LINE.

ELECTRICAL EQUIPMENT SCHEDULE

ITEM NO.	DESCRIPTION	MANUFACTURER/MODEL (OR EQUAL)
E1	100A, 480V, NEMA-4X, 3-PHASE METER/MAIN WITH FACTORY INSTALLED SURGE PROTECTION DEVICE (SPD),	CIRCLE AW PER LOCAL UTILITY REQUIREMENTS; SPD: SQUARE D #SSP04EMA24S
E2	(E) 480V, 100A, 3-POLE ATS	CUTLER HAMMER CAT# ATC3C2X30100XRU
E3	(E) 480V, 125A, 18-SPACE PANELBOARD	SQUARE D CAT# NF4181C
E4	(E) 30kW, 480V, 3-PHASE STANDBY GENERATOR	KOHLER MODEL # 30REOZJC
E5	45kVA, 480:208Y120V, 3-PHASE TRANSFORMER	SQUARE D CAT# EX45T3H
E6	225A, 208/120V, 3-PHASE, 4-WIRE, 54-SPACE, NEMA 1, PANELBOARD WITH FACTORY INSTALLED SPD,	SQUARE D INTERIOR: CAT# NQ454L2C; SPD: #SSP02BIA16PBQ1
E7	(E) METERBASE WITH METER REMOVED AND JUMPERS INSTALLED.	
E8	(E) 480V, 3-POLE, NEMA 3R DISCONNECT	SQUARE D
E9	(E) JUNCTION BOX WITH 3EA, 6-WAY INSULATED SPLICE CONNECTORS	
E10	(E) 480V, 3-POLE FUSED DISCONNECT SWITCH	SQUARE D
E11	(E) 480V, 3-PHASE MOTOR STARTER	SQUARE D
E12	(E) 2KVA, 480:240/120V, 1-PHASE TRANSFORMER	SQUARE D CAT# 2SIF
E13	(E) 100A, 240/120V, 1-PHASE, 18-SPACE LOAD CENTER	SQUARE D

CIRCUIT SCHEDULE

TAG	DESCRIPTION
1	2"C, 3#2 & 1#6 (G)
2	1"C, 3#6 & 1#8 (G)
3	2"C, 4#1/0 & 1#6 (G)
4	2"C, 3#4 & 1#6 (G)
5	1-1/2"C, 3#4 & 1#8 (G)

FINAL BID SET
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VILLAGE SAFE WATER

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WTP IMPROVEMENTS
POWER ONE-LINE DIAGRAM

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50093.01
Date 2018-11-30
Designed JF
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Approved JF

Sheet No. E08
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PANEL 'MDP' SCHEDULE (1)

VOLTAGE: 480 | BUS: 125A | MAIN: MLO | LOCATION: GENERATOR ROOM | MIN. A.I.C. RATING: 10,000 | ENCLOSURE: 3R | MOUNTING: SURFACE

CKT	AMP TRIP	LOAD DESCRIPTION	KVA	LOAD	A	B	C	LOAD	KVA	LOAD DESCRIPTION	AMP TRIP	CKT
1	15/2	SPARE			0.8			F	0.8			2
3						0.8		F	0.8	RAW WATER PUMP HOUSE, WATER LAKE	30/3	4
5							0.8	F	0.8			6
7			3.2	LM	16.2			F	13.0			8
(2) 9	**25/3**	**BACKWASH PUMP, P-410**	3.2	LM		16.2		F	13.0	**NF SKID**	60/3	10 (3)
11			3.2	LM			16.2	F	13.0			12
13			1.3	M	8.3			F	7.0			14
(2) 15	**15/3**	**AIR BLOWER, B-200**	1.3	M		8.6		F	7.3	**PANEL A**	**70/3**	16 (2)
17			1.3	M			8.2	F	6.9			18
					25.3	25.6	25.2					

TOTAL KVA: 76.1
AMPS: 91.5

SUMMARY BY LOAD TYPE		CONNECTED KVA PH A	PH B	PH C	FEED	TOTAL KVA	NEC%	NEC TOTAL	NOTES:
L	LIGHTING	0.0	0.0	0.0		0.0	1.25	0.0	
R	RECEPTACLES	0.0	0.0	0.0		0.0	10K+50%	0.0	
M	MOTORS	1.3	1.3	1.3		3.9	1.00	3.9	
LM	LARGEST MOTOR	3.2	3.2	3.2		9.6	1.25	12.0	
C	CONTINUOUS	0.0	0.0	0.0		0.0	1.25	0.0	
N	NON-CONTINUOUS	0.0	0.0	0.0		0.0	1.00	0.0	
S	SPARE	0.0	0.0	0.0		0.0	1.00	0.0	
X	NON-COINCIDENT	0.0	0.0	0.0		0.0	0.00	0.0	
O	OTHER	0.0	0.0	0.0		0.0	1.00	0.0	
F	FEEDER	20.8	21.1	20.7		62.6	1.00	62.6	
TOTAL KVA (PHASE)		25.3	25.6	25.2		13.5		78.5	
TOTAL AMPERES		91.3	92.4	91.0		16.2		94.4	
PHASE BALANCE, ABC		A-B	B-C	C-A					
PERCENT									

PANEL 'A' SCHEDULE

VOLTAGE: 208/120 | BUS: 225A | MAIN: 150A MCB | LOCATION: NANOFILTRATION ROOM | MIN. A.I.C. RATING: 10,000 | ENCLOSURE: NEMA 3R | MOUNTING: SURFACE

CKT	AMP	LOAD DESCRIPTION	KVA	LOAD	A	B	C	LOAD	KVA	LOAD DESCRIPTION	AMP	CKT
1	20/1	INTERIOR LIGHTS	0.7	L	1.5			C	0.8	GENERATOR BATTERY CHARGER	15/1	2
3	20/1	EXTERIOR LIGHTS	0.8	L		1.9		M	1.1	DOMESTIC WATER PUMP, P-601	20/1	4
5	20/1	WTP CONTROL PANEL, 'WTCP'	0.2	C			0.4	M	0.2			6
7	20/1	KRBD REPEATER	0.1	C	0.3			M	0.2	RECIRCULATIONPUMP, P-411	15/3	8
9	15/1	WTP TOYO STOVE	0.2	C		0.4		M	0.2			10
11	15/1	CHEM ROOM TOYO STOVE	0.2	C			0.3	M	0.1	EXHAUST FAN, EF-1, CHLORINE RM	15/1	12
13	15/1	NF ROOM TOYO STOVE	0.2	C	0.3			M	0.1	EXHAUST FAN, EF-2, WTP RM	15/1	14
15	20/1	NF ROOM RECEPTACLES	0.9	R		1.0		M	0.1	EXHAUST FAN, EF-3, CHEM ROM	15/1	16
17	20/1	EXTERIOR RECEPTACLES	0.9	R			2.1	X	1.2	UNIT HEATER, CHLORINE ROOM	20/2	18
19	15/1	CEILING FAN, CF-1	0.1	M	1.3			X	1.2			20
21	15/1	POLYMER FEED PUMP, CF-100	0.5	M		1.7		X	1.2	UNIT HEATER, WTP ROOM WEST	20/2	22
23	15/1	CHLORINE FEED PUMP, CF-500	0.5	M			1.7	X	1.2			24
25	15/1	SODA ASH FEED PUMP, CF-501	0.5	M	1.7			X	1.2	UNIT HEATER, WTP ROOM EAST	20/2	26
27	20/1	CHEM ROOM RECEPTACLES	0.5	R		1.7		X	1.2			28
29	20/1	LAB RECEPTACLES	0.9	R			2.1	X	1.2	UNIT HEATER, LAB	20/2	30
31	20/1	LAB RECEPTACLES	0.7	R	1.9			X	1.2			32
33	20/1	PROCESS ROOM RECEPTACLES	0.5	R		0.5				SPACE		34
35	20/1	SPARE	0.0				0.0			SPACE		36
37	20/1	SPARE	0.0		0.0					SPACE		38
39	20/1	SELF BACKWASH SCREEN, SC-100	0.1	N		0.1				SPACE		40
41	20/1	GENERATOR ROOM RECEPTACLES	0.3	R			0.3			SPACE		42
43	N/A	SURGE PROTECTION DEVICE	0.0	O	0.0			O	0.0	SURGE PROTECTION DEVICE	N/A	44
45	N/A		0.0	O		0.0		O	0.0		N/A	46
47	N/A		0.0	O			0.0	O	0.0		N/A	48
49	N/A		0.0	O	0.0			O	0.0		N/A	50
51	N/A		0.0	O		0.0		O	0.0		N/A	52
53	N/A		0.0	O			0.0	O	0.0		N/A	54
					7.0	7.3	6.9					

TOTAL KVA: 21.2
AMPS: 58.8

SUMMARY BY LOAD TYPE		CONNECTED KVA PH A	PH B	PH C	FEED	TOTAL KVA	NEC%	NEC TOTAL	NOTES:
L	LIGHTING	0.7	0.8	0.0		1.5	1.25	1.9	
R	RECEPTACLES	0.7	1.9	2.1		4.7	10K+50%	4.7	
M	MOTORS	0.9	1.9	0.8		3.6	1.00	3.6	
LM	LARGEST MOTOR	0.0	0.0	0.0		0.0	1.25	0.0	
C	CONTINUOUS	1.1	0.2	0.4		1.7	1.25	2.1	
N	NON-CONTINUOUS	0.0	0.1	0.0		0.1	1.00	0.1	
S	SPARE	0.0	0.0	0.0		0.0	1.00	0.0	
X	NON-COINCIDENT	3.6	2.4	3.6		9.6	0.00	0.0	
O	OTHER	0.0	0.0	0.0		0.0	1.00	0.0	
F	FEEDER	0.0	0.0	0.0		0.0	1.00	0.0	
TOTAL KVA (PHASE)		7.0	7.3	6.9		21.2		12.4	
TOTAL AMPERES		58.3	60.8	57.5		58.8		34.4	
PHASE BALANCE, ABC		A-B	B-C	C-A					
PERCENT									

SHEET NOTES

(1) (E) PANELBOARD.

(2) PROVIDE NEW CIRCUIT BREAKER IN EXISTING PANELBOARD.

(3) (E) BREAKER. CONFIRM BREAKER SIZE REQUIREMENT WITH NANO FILTRATION SYSTEM SUPPLIER AND REPLACE AS NECESSARY. ASSUME (E) BREAKER TO BE REUSED FOR BID PURPOSE.

FINAL BID SET
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VILLAGE SAFE WATER

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LICENSE NO. AECC705

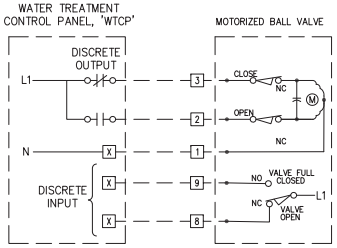
WTP IMPROVEMENTS

PANEL SCHEDULES

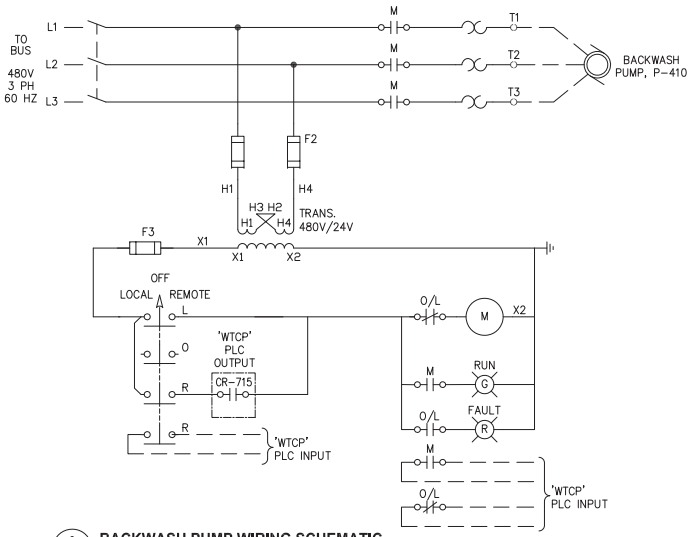
REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
Date 2018-11-30
Designed JF
Drawn OM
Approved JF

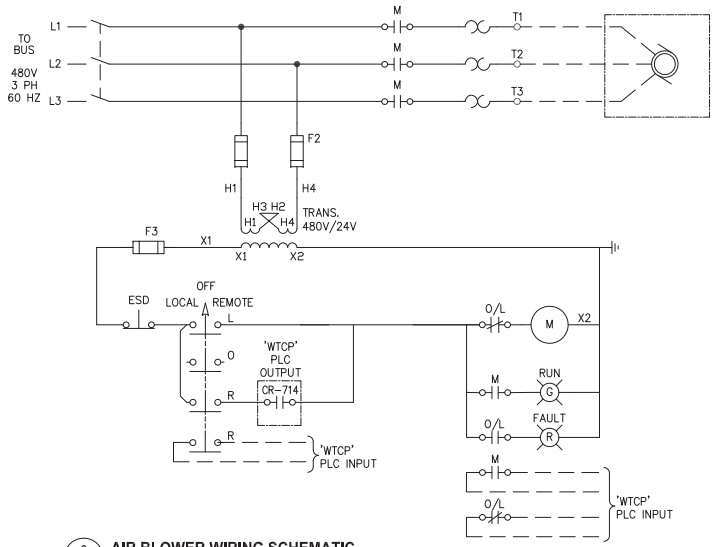
Sheet No. E09
SHEET 58 OF 71



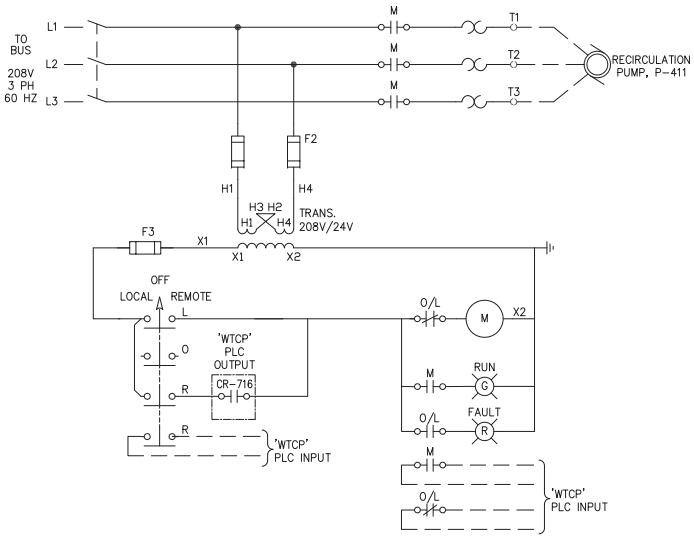
1 E10 **TYPICAL MOTOR OPERATED VALVE (MOV) WIRING SCHEMATIC**
SCALE: NTS



3 E10 **BACKWASH PUMP WIRING SCHEMATIC**
SCALE: NTS



2 E10 **AIR BLOWER WIRING SCHEMATIC**
SCALE: NTS



3 E10 **RECIRCULATION PUMP WIRING SCHEMATIC**
SCALE: NTS

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WTP IMPROVEMENTS

WIRING SCHEMATICS

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50093.01
Date 2018-11-30
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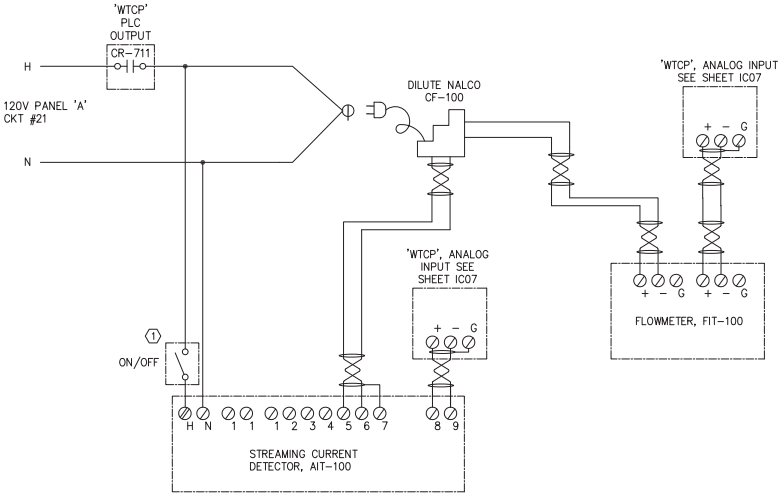
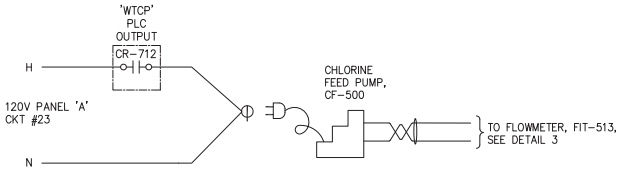
Sheet No. E10
SHEET 59 OF 71



1 E11 **POLYMER FEED PUMP, CF-100 SCHEMATIC**

SCALE: NTS

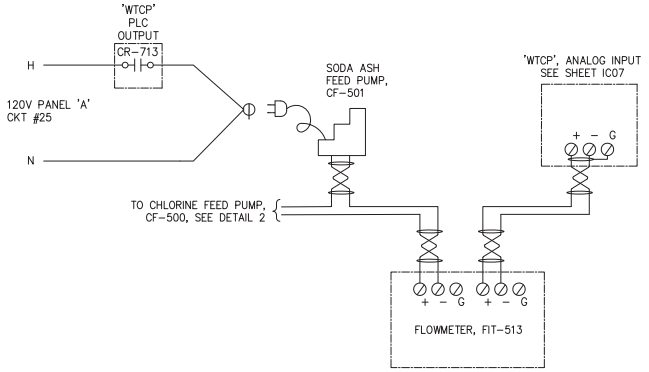


2 E11 **CHLORINE FEED PUMP, CF-500 SCHEMATIC**

SCALE: NTS

SHEET NOTE

1 20A, 120V RATED SNAP SWITCH



3 E11 **SODA ASH FEED PUMP, CF-501 WIRING SCHEMATIC**

SCALE: NTS

FINAL BID SET

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WTP IMPROVEMENTS

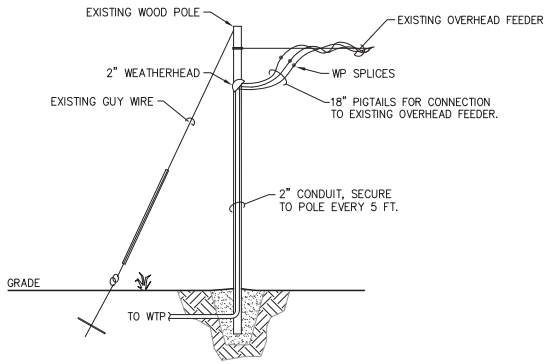
CHEMICAL FEED PUMP WIRING SCHEMATICS

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

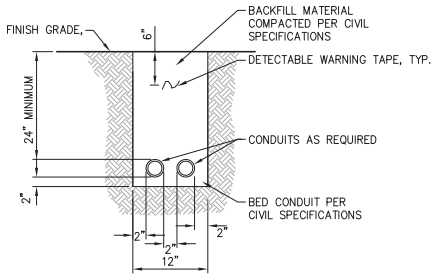
Project No. 1529.50003.01
Date 2018-11-30
Designed JF
Drawn OM
Approved JF

Sheet No. E11

SHEET 60 OF 71

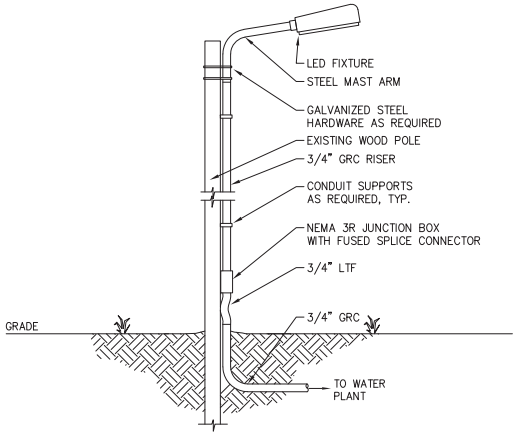


1 / E12 **RAW WATER FEEDER RISER DETAIL**
SCALE: NTS



NOTES:
1. DETAIL DIMENSIONS SHOWN ARE MINIMUM

3 / E12 **TRENCH DETAIL**
SCALE: NTS



2 / E12 **TYPICAL POLE MOUNT LIGHT FIXTURE DETAIL**
SCALE: NTS

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WTP IMPROVEMENTS

ELECTRICAL DETAILS

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
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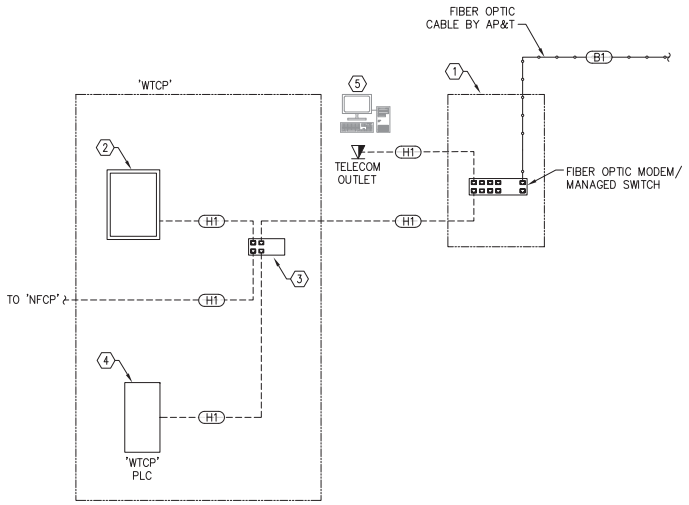
Designed JF
Drawn DM
Approved JF

Sheet No. E12
SHEET 61 OF 71



1 / E13 **LOCAL AREA NETWORK (LAN) RISER DIAGRAM**
SCALE: NTS

SHEET NOTES

1. INTERNET SERVICE EQUIPMENT INCLUDING FIBER OPTIC CABLE AND MODEM/MANAGED SWITCH, PROVIDED BY AP&T. COORDINATE WITH AP&T FOR SERVICE REQUIREMENTS INCLUDING POWER, GROUNDING, CONDUIT, ROUTING, ETC.
2. 'WTCP' OPERATOR INTERFACE TERMINAL.
3. 'WTCP' REMOTE ACCESS GATEWAY / ROUTER.
4. 'WTCP' PLC PROCESSOR.
5. EXISTING WATER TREATMENT PLANT DESKTOP TO BE CONNECTED TO NETWORK.

CABLE SCHEDULE

TAG	DESCRIPTION
B1	BACKBONE: MULTIMODE FIBER OPTIC CABLE BY AP&T.
H1	3/4"C, (1EA) 4PR CAT 6 CABLE, TYPICAL.

FINAL BID SET
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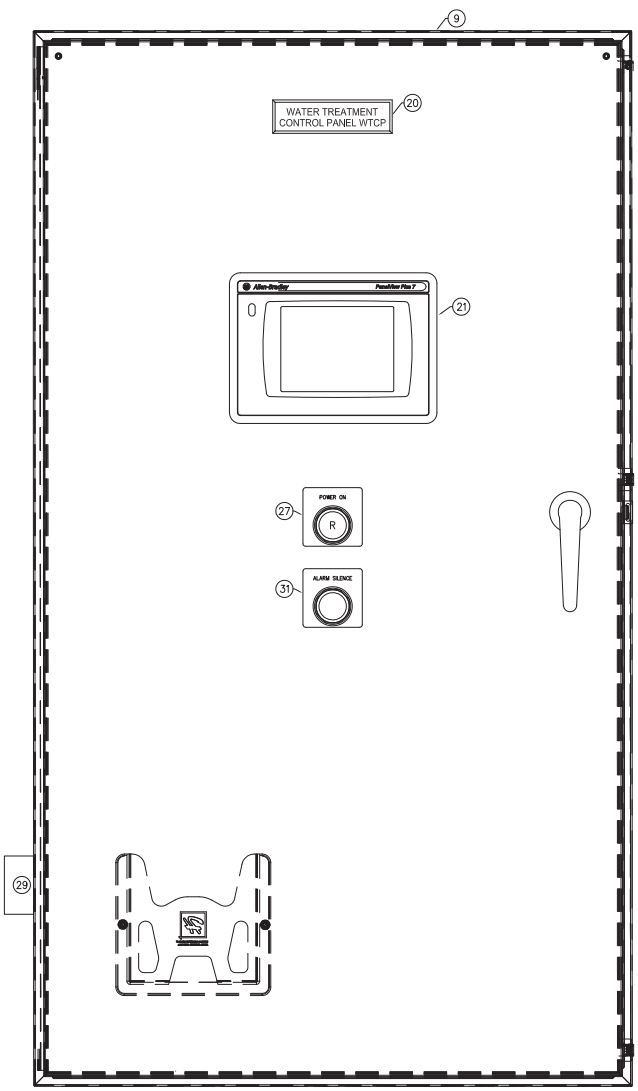
WTP IMPROVEMENTS

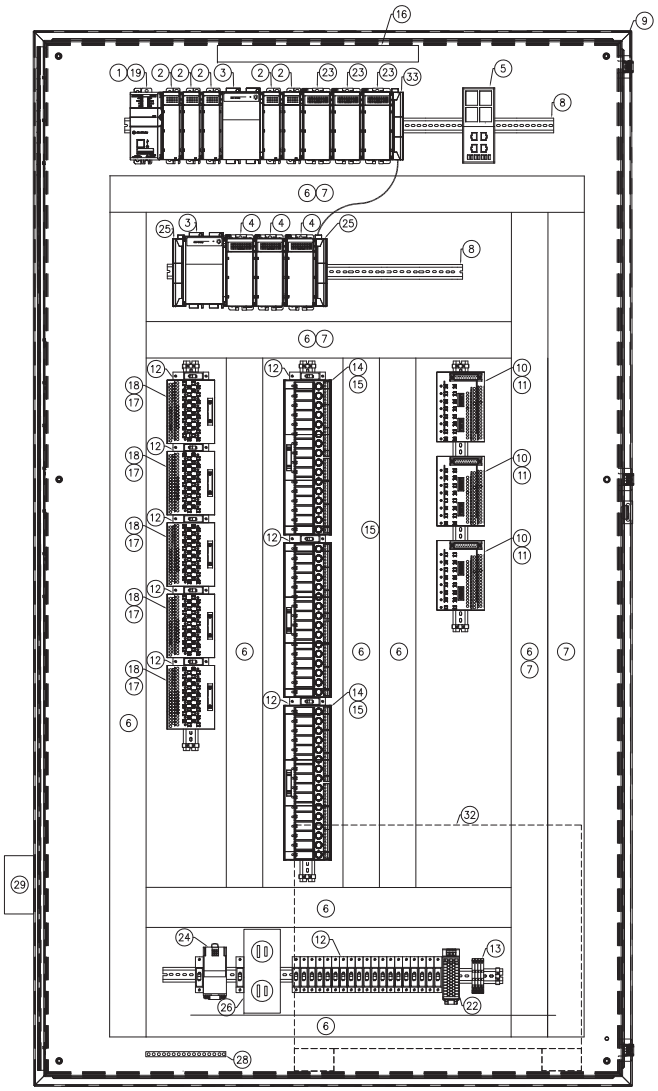
LOCAL AREA NETWORK (LAN) RISER DIAGRAM

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
Date 2018-11-30
Designed JF
Drawn OM
Approved JF

Sheet No. E13
SHEET 62 OF 71





BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION OR EQUAL
1	1	ALLEN BRADLEY 1769-L33ER-2MB COMPACT LOGIC PROCESSOR (CPU).
2	5	1769-IA16 ALLEN BRADLEY - COMPACT LOGIX 16 POINT, 120VAC DISCRETE INPUT MODULE.
3	2	ALLEN BRADLEY 1769-PA4, 120VAC:24VDC POWER SUPPLY.
4	3	ALLEN BRADLEY 1769-IF8 COMPACT LOGIX 8 POINT ANALOG INPUT MODULE.
5	1	WEB-SERVER/GATEWAY EWON FLEXY 205.
6	AS REQUIRED	PANDUIT - WIRE DUCT, ANALOG WIRING.
7	AS REQUIRED	PANDUIT - WIRE DUCT, DISCRETE WIRING.
8	AS REQUIRED	ENTRELEC - 0173.220.05 - DIN RAIL.
9	1	HOFFMAN - NEMA TYPE 4X WALL MOUNTED WITH BACK PANEL. SIZE AS REQUIRED.
10	3	ALLEN BRADLEY - 1492AIFM8-F-5 ANALOG INPUT WIRING MODULE.
11	3	ALLEN BRADLEY - 1492-ACAB-ED69 CABLE ASSEMBLY.
12	AS REQUIRED	ENTRELEC - GMUXXT - DIN RAIL MOUNTED CIRCUIT BREAKER.
13	AS REQUIRED	ENTRELEC - M 4/8.SF FUSED TERMINAL BLOCK
14	3	DISCRETE OUTPUT WIRING MODULE W/ (16) 120VAC FUSED RELAYS, ALLEN BRADLEY - 1492-XIM20120-16RF
15	3	ALLEN BRADLEY - 1492-CAB-H69 CABLE ASSEMBLY.
16	1	HOFFMAN - PANELLITE LEDA1S35 - 120VAC LED LIGHT.
17	5	ALLEN BRADLEY 1492-RIFM20F-F120A02 - DIGITAL INPUT WIRING MODULE WITH FUSIBLE INPUTS AND REMOVABLE FIELD TERMINALS.
18	5	ALLEN BRADLEY 1492-CAB-A69 CABLE ASSEMBLY.
19	AS REQUIRED	MAINTAIN MANUFACTURER'S CLEARANCES AROUND THE PLC.
20	AS REQUIRED	PROVIDE PHENOLIC TAG. BLACK LETTERS ON WHITE BACKGROUND. TEXT SHALL BE 0.75".
21	1	ALLEN BRADLEY - OPERATOR INTERFACE PANEL VIEW PLUS 7 TOUCH SCREEN 12" 2711P-T12W22A9P. CONNECT CAT-6 PATCH CABLE FROM GATEWAY.
22	1	QUINT4 - PS/1AC/24DC/5 - 2866750 24VDC POWER SUPPLY (5A).
23	3	1769-OA16 ALLEN BRADLEY. COMPACTLOGIX 16-POINT DISCRETE OUTPUT MODULE.
24	1	120V, 20A, SURGE SUPRESSOR AND FILTER. ALLEN BRADLEY-4983-DC120-20.
25	1	1769-ECL RIGHT END CAP.
26	1	20A, 120V, DUPLEX RECEPTACLE. DIN RAIL MOUNT.
27	1	ALLEN BRADLEY PANEL MOUNT INDICATOR LIGHT 800L, 30MM, 24 AC/DC.
28	AS REQUIRED	GROUND BAR.
29	1	ALARM HORN, 120V, FEDERAL SIGNAL MODEL 350-120-30
30	-	NOT USED
31	1	NORMALLY OPEN PUSHBUTTON, 30MM, NEMA 4/13, BLACK, ALLEN BRADLEY CAT# 800TA2A.
32	1	120V, 2000VA, UPS, LIEBERT MODEL# GXT4-2000RT120.
33	1	RIGHT TO RIGHT BUS EXPANSION CABLE, ALLEN BRADLEY #1769-CRR1.

2 IC01 **WATER TREATMENT PLANT CONTROL PANEL LAYOUT**
SCALE: NTS

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WTP IMPROVEMENTS
WATER TREATMENT CONTROL PANEL LAYOUT

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
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Project No. 1529.50003.01
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Sheet No. IC01
SHEET 63 OF 71

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P:\Projects\DOWL\Thorne Bay Water Plant\Dwgs\Elec\IC02 WATER TREATMENT CONTROL PANEL FUNCTIONAL NARRATIVES.dwg

FUNCTIONAL NARRATIVE

1.1 GENERAL

A. THE WATER TREATMENT CONTROL PANEL, 'WTCP' SHALL CONTROL AND MONITOR THE OPERATION OF THE ENTIRE WATER TREATMENT PLANT INCLUDING THE RAW WATER SOURCE, CHEMICAL INJECTION, EXISTING FILTRATION EQUIPMENT AND THE NEW NANO–FILTRATION SYSTEM. THE 'WTCP' WILL GENERATE AND STORE ALARMS, GRAPHICALLY DISPLAY ALL PROCESS VARIABLES AND ALLOW FOR REMOTE MONITORING AND ALARMING THROUGH AN INTERNET CONNECTION.

1.2 RAW WATER SOURCE PUMP

A. THE RAW WATER SOURCE PUMP IS A SUBMERSIBLE PUMP LOCATED REMOTELY AT WATER LAKE. CONTROL OF THE RAW WATER SOURCE PUMP IS DONE INDIRECTLY THROUGH PRESSURE IN THE RAW WATER LINE. THE RAW WATER PUMP IS CURRENTLY CONFIGURED TO RUN CONTINUOUSLY UNLESS A PHASE LOSS, LOW VOLTAGE OR PHASE REVERSAL CONDITION IS DETECTED BY AN EXISTING 3–PHASE POWER MONITOR; OR UNLESS A HIGH PRESSURE CONDITION IS DETECTED IN THE RAW WATER LINE BY A HIGH PRESSURE SWITCH.

B. THE 'WTCP' SHALL START AND STOP THE RAW WATER PUMP BASED ON THE WATER LEVEL IN THE TREATED WATER STORAGE TANK. WHEN THE LEVEL GETS BELOW AN OPERATOR ADJUSTABLE PUMP START LEVEL SETPOINT, THE RAW WATER INFLUENT VALVE, MOV–100 SHALL BE CALLED TO OPEN. WHEN THIS VALVE OPENS, THE RAW WATER LINE PRESSURE WILL DROP AND THE HIGH PRESSURE SWITCH AT THE RAW WATER PUMP'S MOTOR STARTER WILL CLOSE CAUSING THE PUMP TO START. THE PUMP WILL RUN UNTIL THE LEVEL IN THE TREATED WATER TANK REACHES THE OPERATOR ADJUSTABLE TANK FULL LEVEL SETPOINT. AT THIS POINT, MOV–100 WILL BE CALLED TO CLOSE CAUSING THE PRESSURE IN THE RAW WATER LINE TO INCREASE UNTIL THE HIGH PRESSURE SWITCH OPENS STOPPING THE RAW WATER PUMP. IF THE PUMP FAILS TO START AND THE TANK LEVEL DROPS TO THE LOW LEVEL ALARM SETPOINT, A LOW LEVEL ALARM WILL BE GENERATED. IF THE PUMP DOESN'T STOP WHEN THE TANK FULL SETPOINT IS REACHED AND THE LEVEL GETS TO THE HIGH LEVEL ALARM SETPOINT, A HIGH LEVEL ALARM WILL BE GENERATED.

C. PRESSURE TRANSMITTER, PIT–100 SHALL MONITOR THE PRESSURE IN THE RAW WATER LINE. IF THE PRESSURE IN THE LINE EXCEEDS THE HIGH PRESSURE SWITCH SETPOINT BY X PSI INDICATING THE HIGH PRESSURE SWITCH HAS FAILED TO SHUT DOWN THE RAW WATER PUMP, A RAW WATER HIGH PRESSURE ALARM WILL BE GENERATED. IF THE PRESSURE DROPS BELOW X PSI, A RAW WATER LOW PRESSURE ALARM WILL BE GENERATED.

1.3 CHEMICAL ADDITION

A. POLYMER WILL BE ADDED TO THE RAW WATER TO AID IN COAGULATION. WHENEVER THE RAW WATER VALVE, MOV–100 IS OPENED, THE RECEPTACLE THAT POWERS THE POLYMER FEED PUMP, CF–100 IS ENERGIZED AND THE PUMP WILL BEGIN TO OPERATE. IF IT IS IN MANUAL MODE, THE PUMP'S SPEED WILL BE SET BY THE POTENTIOMETER ON THE PUMP'S DRIVE. IF IT IS IN AUTOMATIC MODE, THE PUMP'S SPEED WILL BE PACED BASED ON A SIGNAL FROM FLOWMETER, FIT–100. THE PUMP'S STROKE LENGTH IS CONTROLLED BY A SIGNAL FROM THE STREAMING CURRENT DETECTOR, AIT–100.

B. CHEMICALS ARE ALSO ADDED TO THE FINISHED TREATED WATER PRIOR TO ENTERING THE TREATED WATER STORAGE TANK. WHENEVER THE RAW WATER VALVE, MOV–100 IS OPENED, THE RECEPTACLES THAT POWER THE CHLORINE AND THE SODA ASH FEED PUMPS, CF–500 AND CF–501 RESPECTIVELY, ARE ENERGIZED AND THE PUMPS WILL BEGIN TO OPERATE. IF THE CHLORINE FEED PUMP IS IN MANUAL MODE, THE PUMP'S SPEED WILL BE SET BY THE SPEED ADJUSTMENT ON THE PUMP'S DRIVE. IF IT IS IN AUTOMATIC MODE, THE PUMP'S SPEED WILL BE PACED BASED ON A SIGNAL FROM FLOWMETER, FIT–513. IF THE SODA ASH FEED PUMP IS IN MANUAL MODE, THE PUMP'S SPEED WILL BE SET BY THE POTENTIOMETER ON THE PUMP'S DRIVE. IF IT IS IN AUTOMATIC MODE, THE PUMP'S SPEED WILL BE PACED BASED ON A SIGNAL FROM FLOWMETER, FIT–513.

1.4 FILTRATION OPERATING SEQUENCE

A. AFTER THE POLYMER CHEMICAL ADDITION, THE RAW WATER PASSES THROUGH THREE MULTI–MEDIA PRESSURE FILTERS. ALL THREE FILTER VESSELS ARE IDENTICAL AND NORMALLY OPERATE IN PARALLEL. THE OPERATING SEQUENCE BELOW IS FOR A SINGLE FILTER (PF–500), BUT CAN BE APPLIED TO ALL FILTERS. THE MOTOR ACTUATED VALVE AND INSTRUMENT TAGS REFERENCED FOR FILTER PF–500 CAN BE TRANSLATED TO THE ASSOCIATED FILTER PF–501 AND PF–502 VALVES AND INSTRUMENTS BY NUMERICALLY ADDING 1 OR 2 RESPECTIVELY TO THE TAG NUMBER. DESIGN FLOW FOR THE TREATMENT PLANT IS 60 GPM RAW WATER FLOW WITH 20 GPM THROUGH EACH FILTER.

B. FILTRATION MODE:
1. THIS IS THE NORMAL FILTRATION MODE WITH COAGULATED RAW WATER ENTERING THE TOP OF THE VESSELS AND FILTERED WATER EXITING THE BOTTOM THROUGH THE FLOW REGULATOR.
2. RAW WATER INLET VALVE MOV–200, FILTERED WATER OUTLET VALVE MOV–500, AND FILTERED WATER HEADER VALVE MOV–503 ARE ALL OPEN.
3. BACKWASH WATER INLET VALVE MOV–400, BACKWASH WATER OUTLET VALVE MOV–300, AIR SCOUR INLET VALVE MOV–203, FILTER TO DRAIN VALVE MOV–306, AND HEADSPACE DRAIN–DOWN VALVE MOV–301 ARE ALL CLOSED.

C. BACKWASH SEQUENCE INITIATE:
1. A BACKWASH SEQUENCE WILL BE INITIATED EITHER MANUALLY AT THE WTCP OR BY HIGH DIFFERENTIAL PRESSURE (PDIT–510), HIGH FILTER TURBIDITY, (AIT–510) OR BY HIGH TURBIDITY ON ALL FILTERS, AIT–513. A FULL BACKWASH SEQUENCE CONSISTS OF A DRAIN–DOWN, AIR SCOUR, BACKWASH, AND FILTER TO DRAIN AS DESCRIBED IN THE FOLLOWING SECTIONS.
2. THE INITIATION OF A BACKWASH CYCLE ON ONE FILTER WILL CAUSE THE OTHER TWO FILTERS TO BE BACKWASHED IN SEQUENCE.
3. INITIAL SETPOINT FOR HIGH DIFFERENTIAL PRESSURE IS 5 PSIG.
4. INITIAL SETPOINT FOR HIGH OUTLET TURBIDITY IS 0.1 NTU.
5. SETPOINTS FOR BOTH HIGH DIFFERENTIAL PRESSURE AND HIGH OUTLET TURBIDITY SHALL BE OPERATOR ADJUSTABLE.

D. DRAIN–DOWN MODE:
1. THE HEADSPACE OF EACH FILTER MUST BE DRAINED PRIOR TO STARTING THE AIR SCOUR SYSTEM TO ALLOW ROOM FOR AIR EXPANSION OF THE FILTER MEDIA AND ROOM FOR AIR TO SEPARATE FROM THE WATER PRIOR TO EXITING THE TOP OF THE FILTER.
2. ONCE A BACKWASH SEQUENCE HAS BEEN INITIATED, THE FIRST STEP IS TO SWITCH FROM FILTRATION MODE TO DRAIN–DOWN MODE BY CLOSING MOV–200, MOV–500 and MOV–503.
3. DRAIN THE FILTER VESSEL HEADSPACE BY OPENING MOV–301 FOR 30 SECONDS. THIS TIME VALUE SHALL BE OPERATOR ADJUSTABLE.
4. AT THE END OF THE TIMER, CLOSE MOV–301.

E. AIR SCOUR MODE:
1. THE AIR SCOUR MODE IS INTENDED TO SIGNIFICANTLY AGITATE THE FILTER MEDIA IN ORDER TO LOOSEN UP ANY COAGULATED PARTICLES LODGED IN THE MEDIA OR STUCK TO THE TOP OF THE MEDIA.
2. AIR SCOUR BEGINS WITH STARTING THE AIR BLOWER, B–200 AND OPENING MOV–203.
3. AIR SCOUR CONTINUES FOR TWO MINUTES AND EXCESS AIR VENTS THROUGH AV–500. THIS TIME VALUE SHALL BE OPERATOR ADJUSTABLE.
4. AT THE END OF THE TIMER, CLOSE MOV–203 AND STOP THE AIR BLOWER, B–200.

F. VESSEL FILL MODE:
1. AFTER AN AIR SCOUR, THE TOP SECTION OF THE FILTER VESSEL MUST BE PURGED OF AIR PRIOR TO STARTING THE BACKWASH SEQUENCE.
2. TO PREVENT SETTLING OF AGITATED MATERIAL, THE FILL MODE SHOULD BE STARTED AS QUICKLY AS POSSIBLE AFTER THE AIR SCOUR. TO FACILITATE THIS, THE BACKWASH PUMP P–410 SHOULD BE STARTED APPROXIMATELY 2 SECONDS PRIOR TO THE END OF AIR SCOUR MODE.
3. OPEN BACKWASH VALVE MOV–400. AT THIS POINT, ALL OTHER MOV'S SHOULD BE CLOSED. REMAIN IN THIS STATE FOR 60 SECONDS.
4. OPEN BACKWASH OUTLET VALVE MOV–300 AND CONTINUE FOR AN ADDITIONAL TWO MINUTES. THIS TIME VALUE SHALL BE OPERATOR ADJUSTABLE.

G. BACKWASH MODE:
1. THE BACKWASH MODE IS INTENDED TO REMOVE ALL CONTAMINANTS, DIRT, COAGULATED MATERIAL, ETC. FROM THE FILTER VESSELS AFTER THE AIR SCOUR LOOSENS THIS MATERIAL.
2. AFTER VESSEL FILL IS COMPLETED, ACTIVATE THE SOLENOID VALVE, SV–411 ON CLAVAL, FCV–411 TO ENABLE THE HIGH FLOW BACKWASH FLOW RATE TO THE FILTRATION VESSEL.
3. BACKWASH CONTINUES FOR 10 TO 15 MINUTES. THIS VALUE SHALL BE OPERATOR ADJUSTABLE.
4. AFTER THE BACKWASH TIMER COMPLETES, STOP BACKWASH PUMP P–410, DEACTIVATE THE SOLENOID VALVE ON SV–411, CLOSE BACKWASH OUTLET VALVE MOV–300, AND CLOSE BACKWASH INLET VALVE MOV–400.

H. FILTER TO WASTE:
1. FILTER TO WASTE IS INTENDED TO CONDITION THE FILTER MEDIA AND ENSURE FILTRATION IS OCCURRING WITHIN NORMAL OPERATING PARAMETERS.
2. AFTER COMPLETION OF BACKWASH MODE, OPEN THE FOLLOWING VALVES: FILTER TO WASTE VALVE MOV–306, FILTER OUTLET VALVE MOV–500, AND RAW WATER INLET VALVE MOV–200.
3. RUN IN FILTER TO WASTE MODE FOR APPROXIMATELY 5 MINUTES. BEGIN MONITORING THE FILTERED WATER OUTLET TURBIDITY.
4. ONCE THE OUTLET TURBIDITY HAS DROPPED BELOW A VALUE OF 0.2 NTU FOR MORE THAN 30 SECONDS, OPEN FILTERED WATER HEADER VALVE MOV–503 AND CLOSE FILTER TO WASTE VALVE MOV–306.

I. ONLY ONE FILTER MAY BE BACKWASHED AT A TIME. IF MORE THAN ONE FILTER IS CALLED TO BE BACKWASHED AT A TIME, THE FIRST FILTER THAT EXPERIENCES A BACKWASH INITIATE CONDITION WILL START AND THE NEXT WILL FOLLOW IN SEQUENCE AFTER THE FIRST HAS COMPLETED ITS BACKWASH CYCLE. IF AN ALL FILTER HIGH TURBIDITY CONDITION OCCURS, THE FILTER THAT HAS BEEN RUNNING THE LONGEST WITHOUT A BACKWASH SHALL BACKWASH FIRST FOLLOWED BY THE NEXT TWO FILTERS IN SEQUENCE.

J. THE BACKWASH PUMP AND AIR BLOWER ARE NORMALLY SET TO REMOTE OPERATION AT THEIR MOTOR STARTERS WHICH ALLOWS CONTROL BY THE 'WTCP'. SWITCHING TO LOCAL OPERATION WILL START THE RESPECTIVE MOTOR ALLOWING FOR MANUAL OPERATION AND TESTING.

5 NANO–FILTRATION PROCESS

A. FOLLOWING THE PRESSURE FILTERS, THE WATER IS FURTHER TREATED THROUGH A NANO–FILTRATION PROCESS. THIS PROCESS IS CONTROLLED BY A VENDOR PROVIDED PLC CONTROL PANEL, 'NFCP'. WHEN THE 'WTCP' STARTS THE WATER TREATMENT PROCESS BY OPENING VALVE, MOV–100, IT SHALL ALSO SEND A SIGNAL TO THE 'NFCP' VIA AN ETHERNET CONNECTION TO TELL IT TO START. THE NANO–FILTRATION PROCESS IS FULLY AUTOMATED AND WILL RUN UNTIL THE TREATED WATER STORAGE TANK REACHES THE TANK FULL SETPOINT AT WHICH POINT THE 'WTCP' WILL SEND A STOP SIGNAL TO THE 'NFCP' AND CLOSE MOV–100. THE NANO–FILTRATION PROCESS WILL ALSO STOP IF AN ALARM CONDITION OCCURS OR THE UTILITY POWER FAILS (SEE PARAGRAPH 1.7 BELOW).

6 TREATED WATER STORAGE TANK RECIRCULATION

A. RECIRCULATION PUMP, P–411 IS PROVIDED TO CIRCULATE WATER THROUGH THE TREATED WATER STORAGE TANK. IT SHALL RUN CONTINUOUSLY WHEN SET IN REMOTE OPERATION AND PROVIDES FREEZE PROTECTION AND MAINTAINS MIXING.

7 STANDBY POWER MODE

A. WHEN UTILITY POWER FAILS AT THE PLANT, THE WATER TREATMENT PROCESS WILL STOP. A POWER FAIL ALARM WILL BE GENERATED AND THE STANDBY GENERATOR WILL START AND PICK UP THE LOAD. WHEN ON STANDBY POWER, THE NF PROCESS WILL BE DISABLED. THE TREATMENT PROCESS WILL NOT RE–START UNTIL THE OPERATOR ACKNOWLEDGES THE ALARM, POSITIONS THE VALVES TO MANUALLY BYPASS THE NF SKID AND INITIATES A WATER TREATMENT W/ NF BYPASS MODE ON THE OIT. WHEN UTILITY POWER IS RESTORED, THIS CONDITION WILL BE ANNUNCIATED TO THE OPERATOR. THE OPERATOR CAN THEN PUT THE NF SKID BACK ON–LINE AND MANUALLY RE–START THE WATER TREATMENT PROCESS BY PRESSING THE WATER TREATMENT NORMAL MODE ON THE OIT.

8 ALARMS

A. THE 'WTCP' WILL MONITOR THE ENTIRE WATER TREATMENT PROCESS/PLANT AND WILL GENERATE ALARMS WHEN ALARM CONDITIONS OCCUR. THE EXISTENCE OF AN ACTIVE ALARM WILL BE VISIBLE FROM ANY SCREEN ON THE OIT AND AN ALARM SCREEN WILL BE PROVIDED THAT WILL RECORD AND TIME STAMP ALL ALARMS. AN ACTIVE ALARM WILL ACTIVATE THE LOCAL HORN AND SHALL SEND A TEXT MESSAGE VIA THE REMOTE ACCESS GATEWAY AND INTERNET CONNECTION TO THE OPERATORS. THE HORN WILL REMAIN ACTIVE UNTIL THE ALARM IS ACKNOWLEDGED. AN ALARM WILL BE DISPLAYED ON THE OIT UNTIL THE ALARM CONDITION IS CORRECTED.

B. CRITICAL ALARMS – UNLESS OTHERWISE NOTED, THE FOLLOWING CRITICAL ALARMS WILL SHUT DOWN THE WATER TREATMENT PROCESS:
1. TREATED WATER STORAGE TANK HIGH/LOW LEVEL. LOW LEVEL WILL NOT SHUT DOWN PROCESS.
2. NANO–FILTRATION CONTROL PANEL COMMON ALARM – DRY CONTACT FROM 'NFCP'.
3. MOV–100 FAIL TO OPEN
4. LOSS OF AC POWER

C. NON–CRITICAL ALARMS – AT A MINIMUM, THE 'WTCP' SHALL MONITOR, DISPLAY AND ANNUNCIATE THE FOLLOWING ALARMS:
1. BUILDING LOW TEMPERATURE
2. BUILDING INTRUSION – 'WTCP' SHALL PROVIDE MEANS (WITHIN A TIME LIMIT) TO ENTER AN ACCESS CODE TO DISABLE ALARM WHEN ENTERING BUILDING. DISABLE FUNCTION WILL AUTOMATICALLY TIME OUT AFTER OPERATOR ADJUSTABLE TIME PERIOD.
3. VALVE FAILURE – IF AFTER A MOTOR ACTUATED VALVE IS CALLED TO OPEN OR CLOSE AND THE FULL OPEN OR CLOSED CONDITION IS NOT DETECTED WITHIN A SET TIME DELAY A VALVE FAILURE ALARM WILL OCCUR.
4. AC POWER FAIL
5. GENERATOR FAULT
6. HIGH/LOW CONDITION OF ALL ANALOG PROCESS VARIABLES.
7. FAULT CONDITION OF ALL MOTORS
8. BACKWASH, PUMP, AIR BLOWER AND RECIRCULATION PUMPS NOT IN REMOTE.

9 MONITORING AND TRENDING

A. THE 'WTCP' SHALL MONITOR AND DISPLAY ALL PROCESS VARIABLES ON GRAPHICAL SCREENS ON THE OPERATOR INTERFACE TERMINAL (OIT). THE GRAPHICAL SCREENS SHALL ACCURATELY DISPLAY THE PROCESS EQUIPMENT AND CONFIGURATION INCLUDING THE VALVES, FILTER VESSELS, PUMPS, BLOWER AND INSTRUMENTS. ALL THE PROCESS ANALOG VARIABLES SHALL BE RECORDED A MINIMUM OF EVERY 15 MINUTES AND SHALL BE ABLE TO DISPLAYED OVER TIME ON A TREND GRAPH ON THE OIT AND/OR THE OWNER'S DESKTOP PC..

B. AT A MINIMUM, THE OIT ON 'WTCP' SHALL HAVE THE FOLLOWING SCREENS:
1. OVERALL PROCESS DISPLAY
2. MULTI–MEDIA PRESSURE FILTER PROCESS
3. NANO–FILTRATION PROCESS – THIS SHALL DISPLAY MAJOR PROCESS CONDITIONS RECEIVED FROM THE 'NFCP' VIA THE ETHERNET INTERFACE.
4. PROCESS ANALOG VARIABLE TRENDING
5. ALARM LOG

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WTP IMPROVEMENTS
WATER TREATMENT
CONTROL PANEL
FUNCTIONAL
NARRATIVES

REVISION	BY	DATE
65% REVIEW SET	CN	3–18
95% AGENCY SUBMITTAL	CN	5–18
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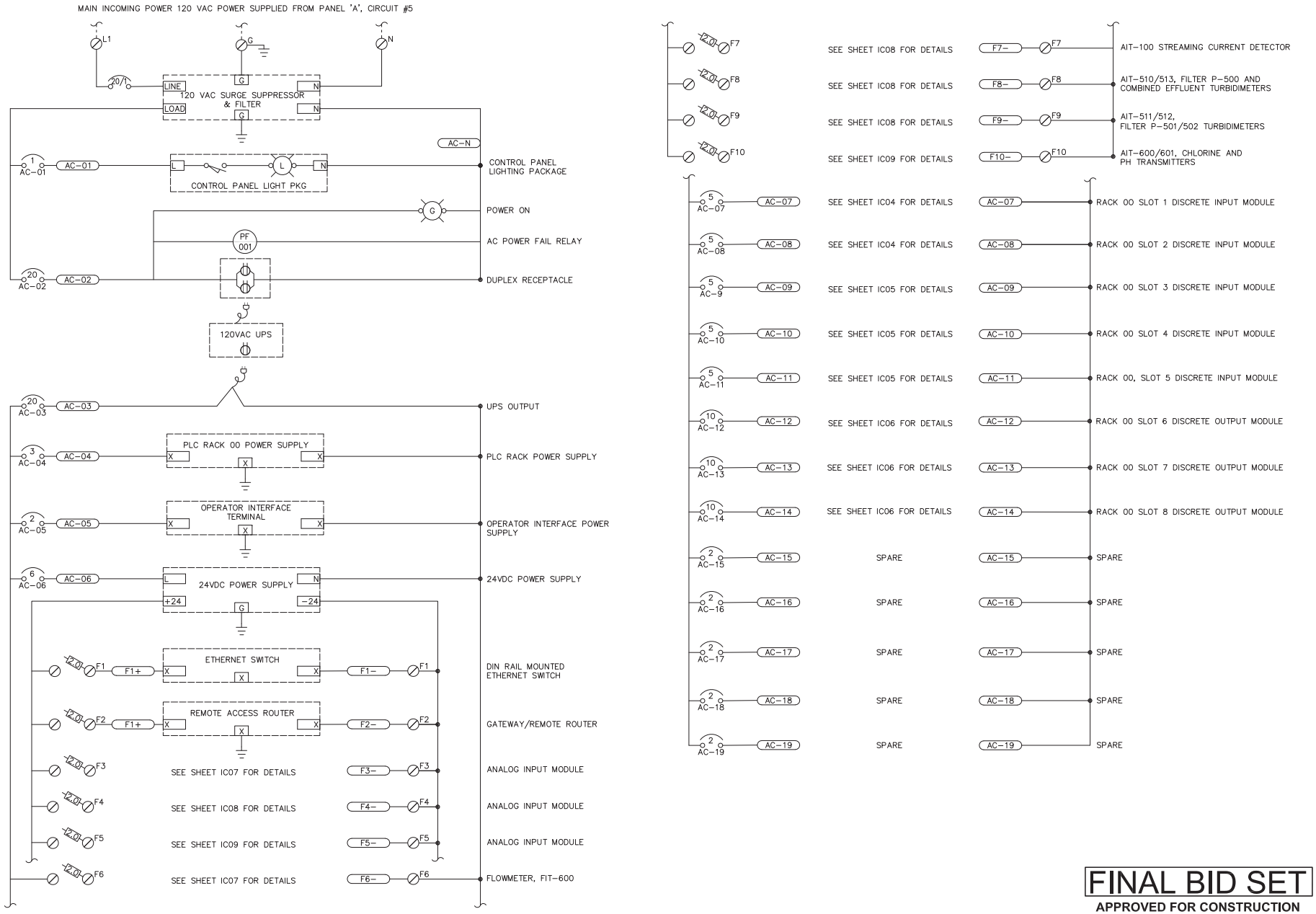

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WTP IMPROVEMENTS
WATER TREATMENT
CONTROL PANEL
POWER
DISTRIBUTION

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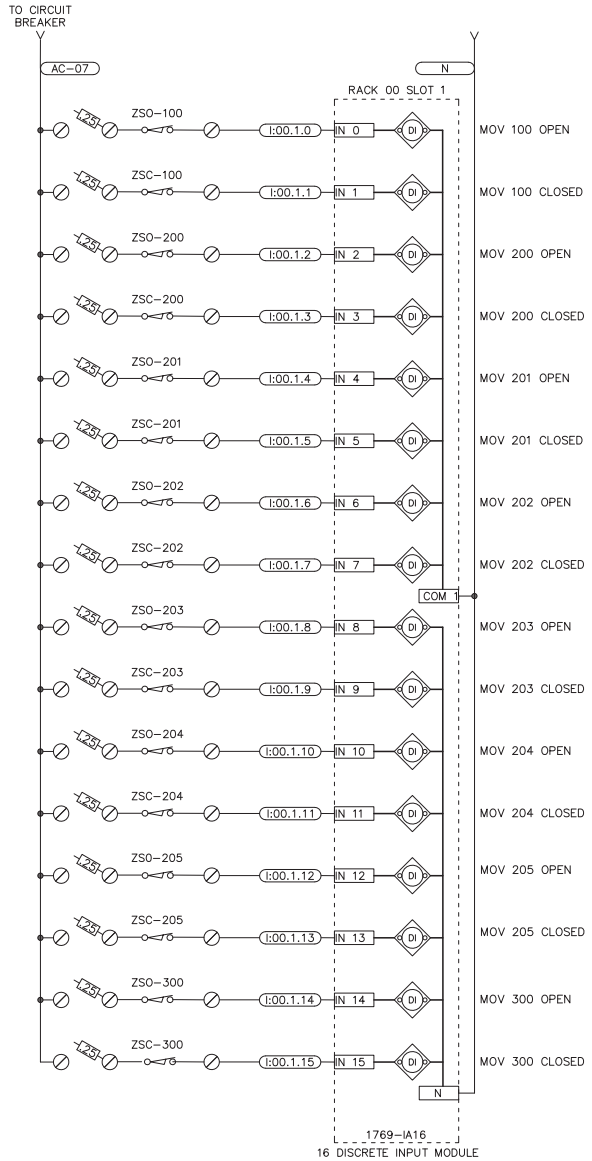
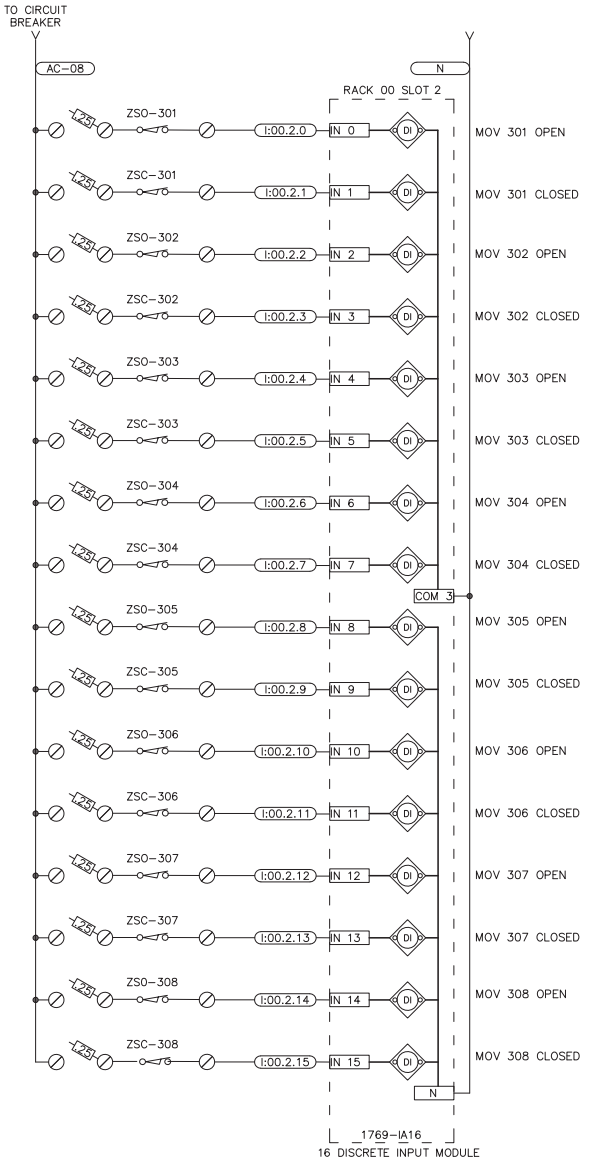
SHEET 65 OF 71





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WTP IMPROVEMENTS
WATER TREATMENT
CONTROL PANEL
DISCRETE INPUTS

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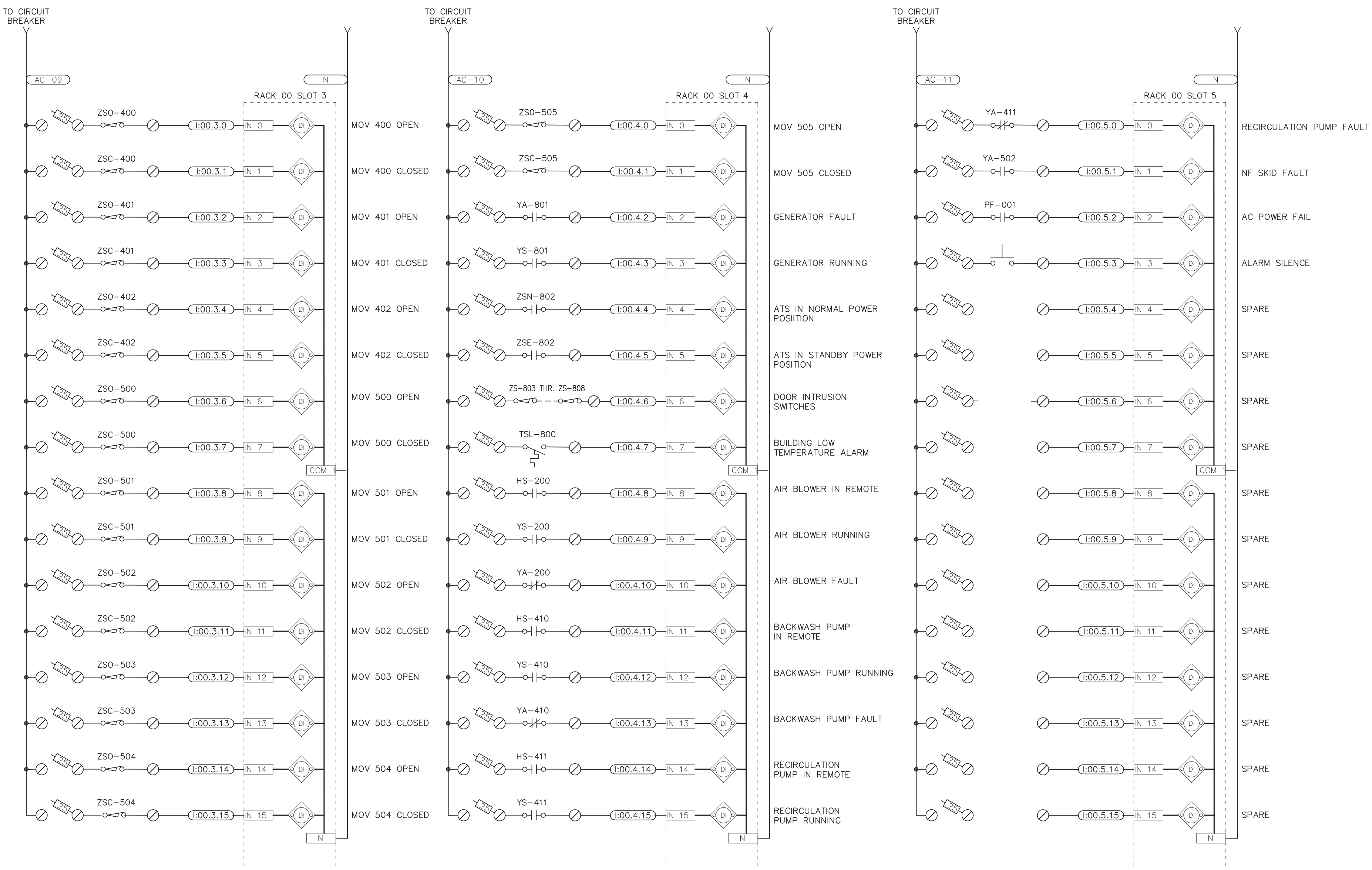
SHEET 66 OF 71



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WTP IMPROVEMENTS
WATER TREATMENT CONTROL PANEL DISCRETE INPUTS

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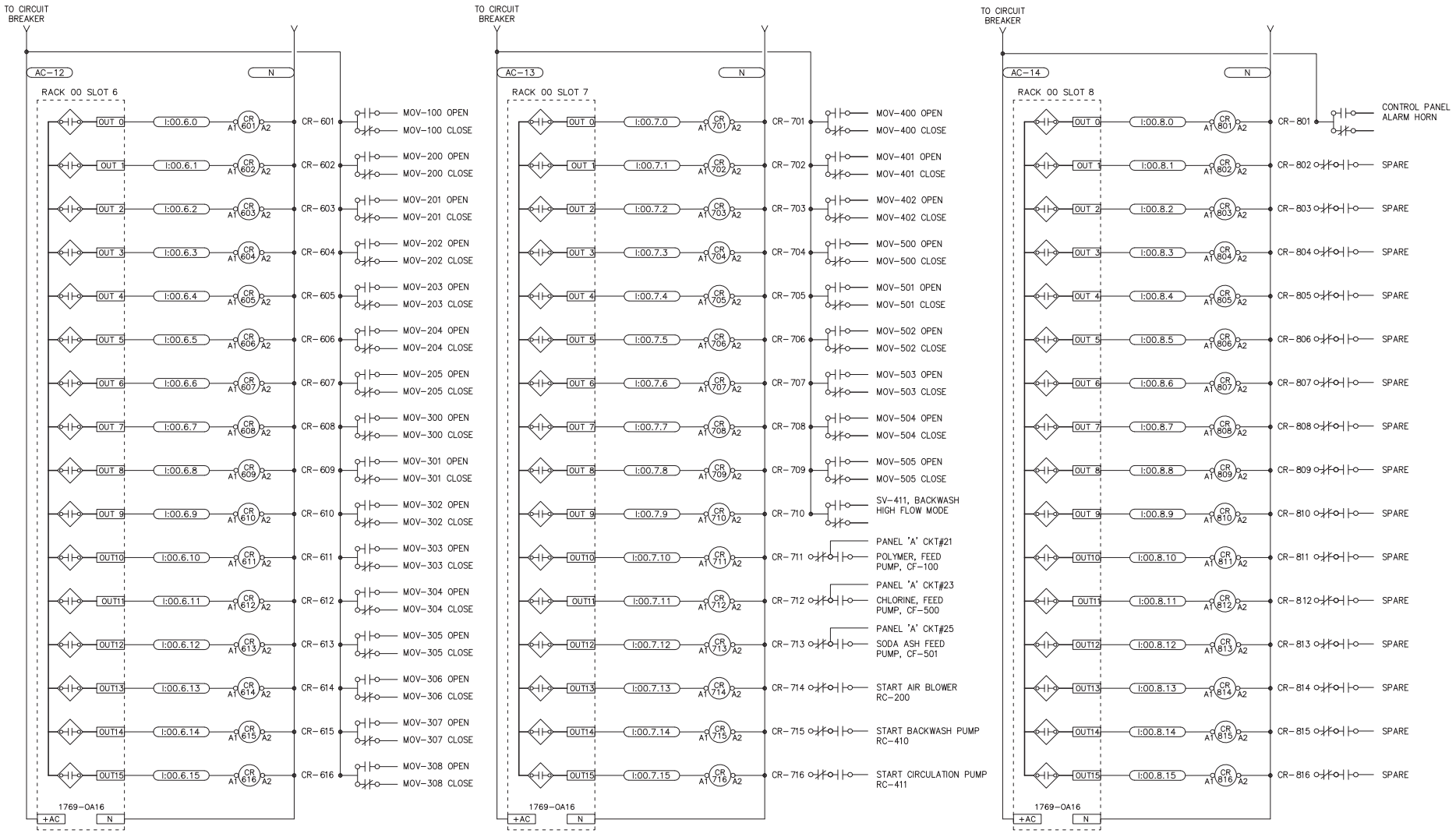

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WTP IMPROVEMENTS
WATER TREATMENT
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DISCRETE OUTPUTS

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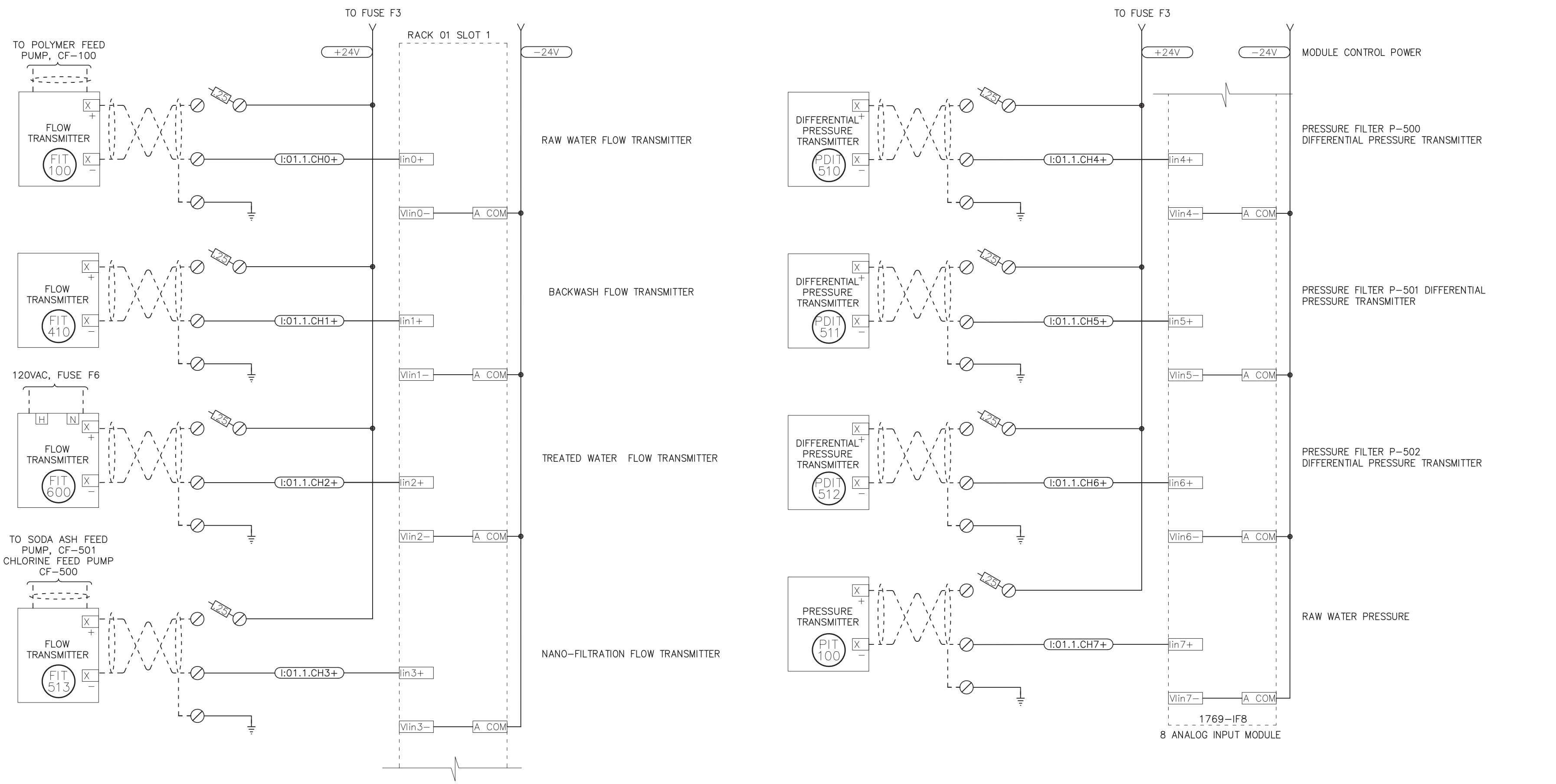

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WTP IMPROVEMENTS
WATER TREATMENT CONTROL PANEL ANALOG INPUTS

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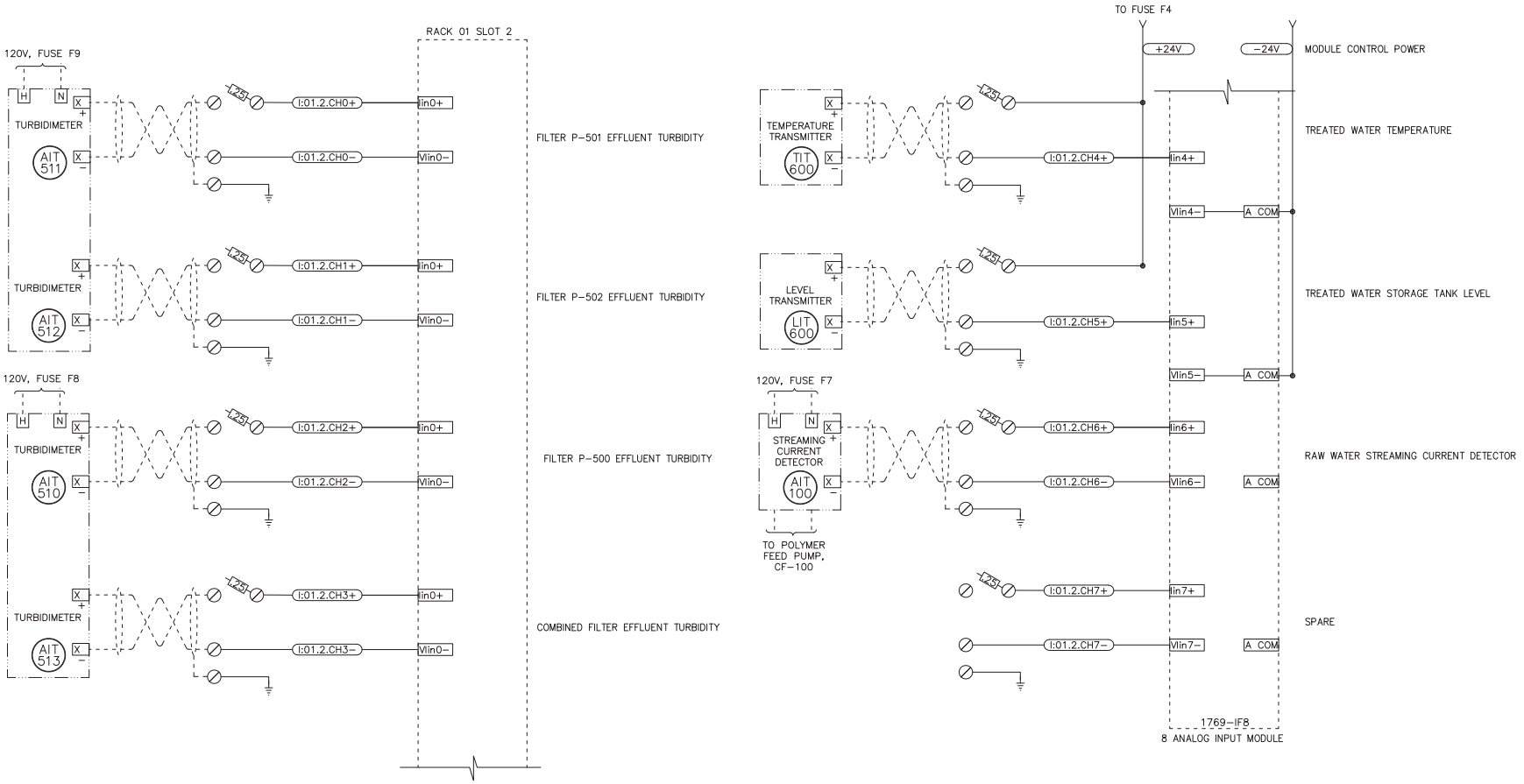

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WATER TREATMENT
CONTROL PANEL
ANALOG INPUTS

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
Date 2018-11-30
Designed JF
Drawn OM
Approved JF

Sheet No. IC08

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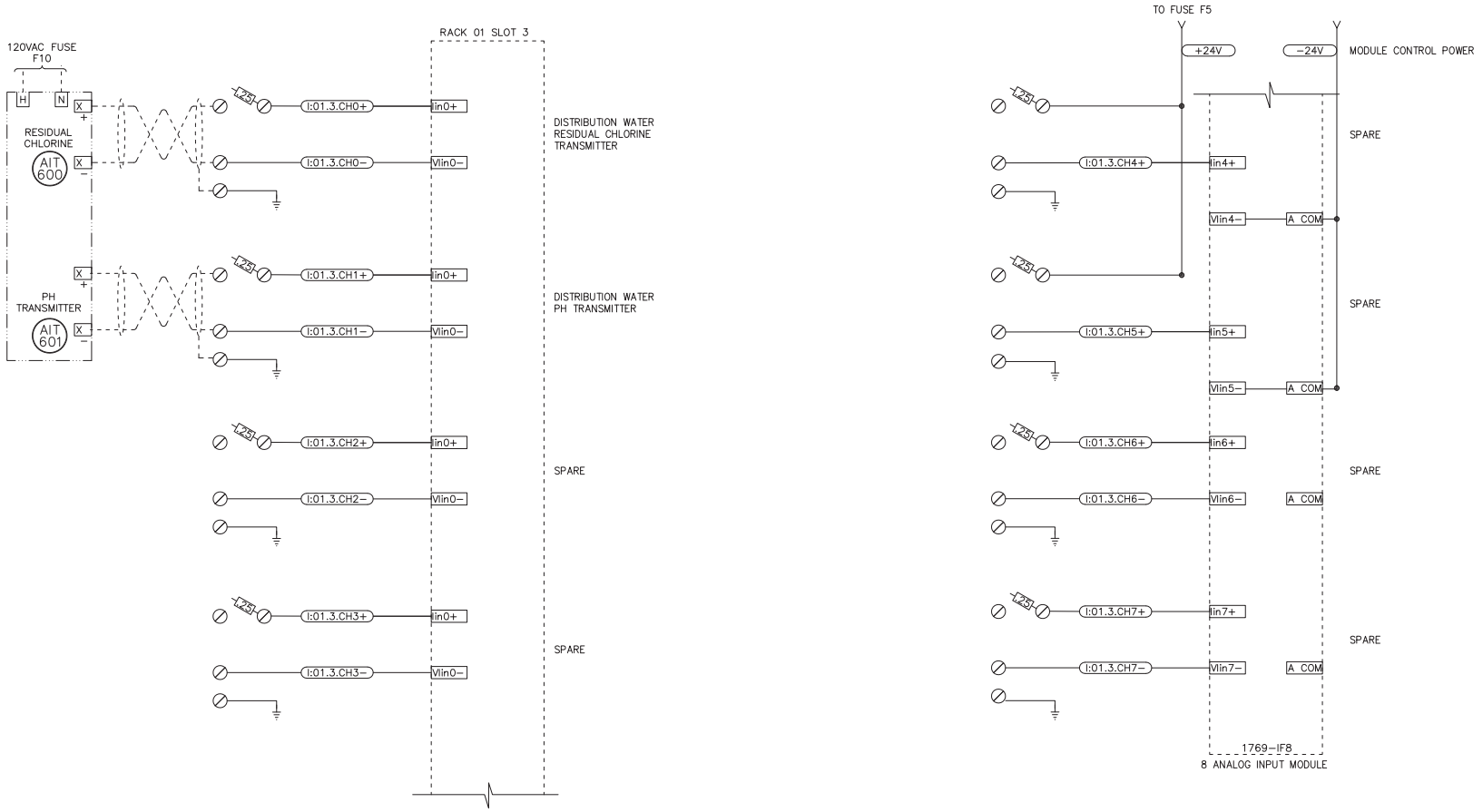

FINAL BID SET

APPROVED FOR CONSTRUCTION

CITY OF THORNE BAY
P.O. BOX 191110
THORNE BAY, ALASKA 99919
(907) 828.3380
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VILLAGE SAFE WATER

EDC, INC.
213 W. FIREWEED LANE
ANCHORAGE, AK 99503
(907) 277-1932
LICENSE NO. AECC705

WTP IMPROVEMENTS
WATER TREATMENT
CONTROL PANEL
ANALOG INPUTS

REVISION	BY	DATE
65% REVIEW SET	CN	3-18
95% AGENCY SUBMITTAL	CN	5-18
FINAL BID SET	CN	11-30

Project No. 1529.50003.01
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Drawn OM
Approved JF

Sheet No. IC09
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