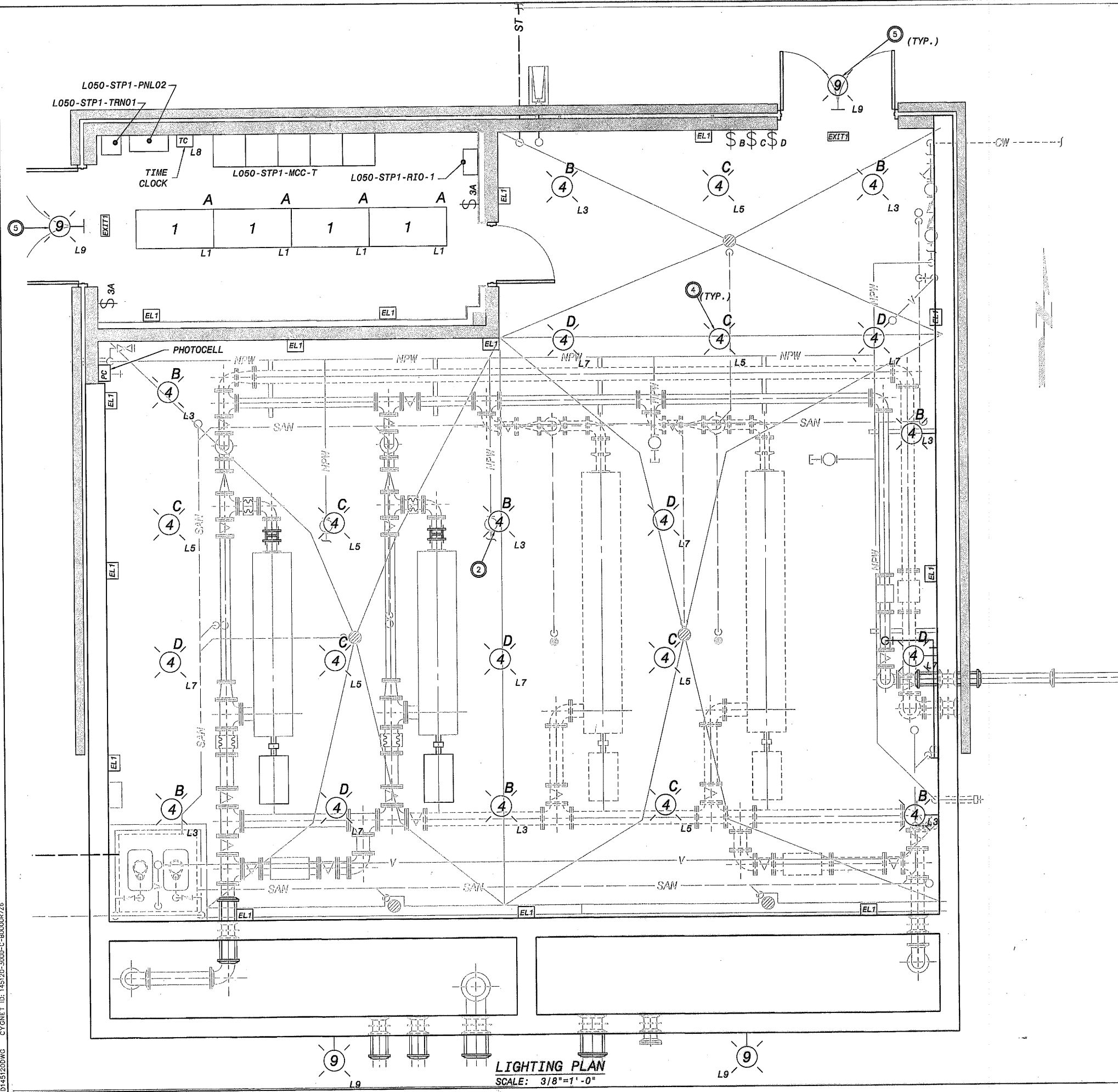


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 SAVED DATE: 9/21/2011 5:40:34 PM
 CYGNET ID: 145120-DWG



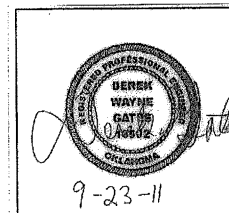
- NOTES:
- 1 WALL MOUNT 10' ABOVE GRADE.
 - 2 PENDANT MOUNT 16' ABOVE FLOOR. (TYP. OF 23)
 - 3 CONNECT EXTERIOR LIGHT TO TIME CLOCK AND PHOTOCELL.
 - 4 ALL LIGHTING CIRCUITS TO BE FED FROM PANEL PNL02 (TYP.)
 - 5 EQUIPMENT FIXTURE W/ EMERGENCY BATTERY.

TYP. FIXTURE SYMBOL

X = SWITCH LEG

(X) = FIXTURE TYPE - REFER TO FIXTURE SCHEDULE ON ELECTRICAL SCHEDULES DRAWINGS.

X = CIRCUIT NUMBER



REVISION	BY	DATE	PLAN SCALE:	DRAWN	SS	APPROVED:
			DESIGNED	AC		
			SURVEY			
			PROFILE SCALE:	FIELD MGR.	704 10/11	
			HORIZONTAL:	SECT. MGR.	204 10/11	
			VERTICAL:	PROJ. MGR.	204 10/11	
			FILE: TE03	DRAWING: TE-3	DATE 10/26/2011	
			ATLAS PAGE NO:		SHEET 203 OF 261 SHEETS	

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B

SLUDGE TRANSFER PUMP STATION
ELECTRICAL
LIGHTING PLAN

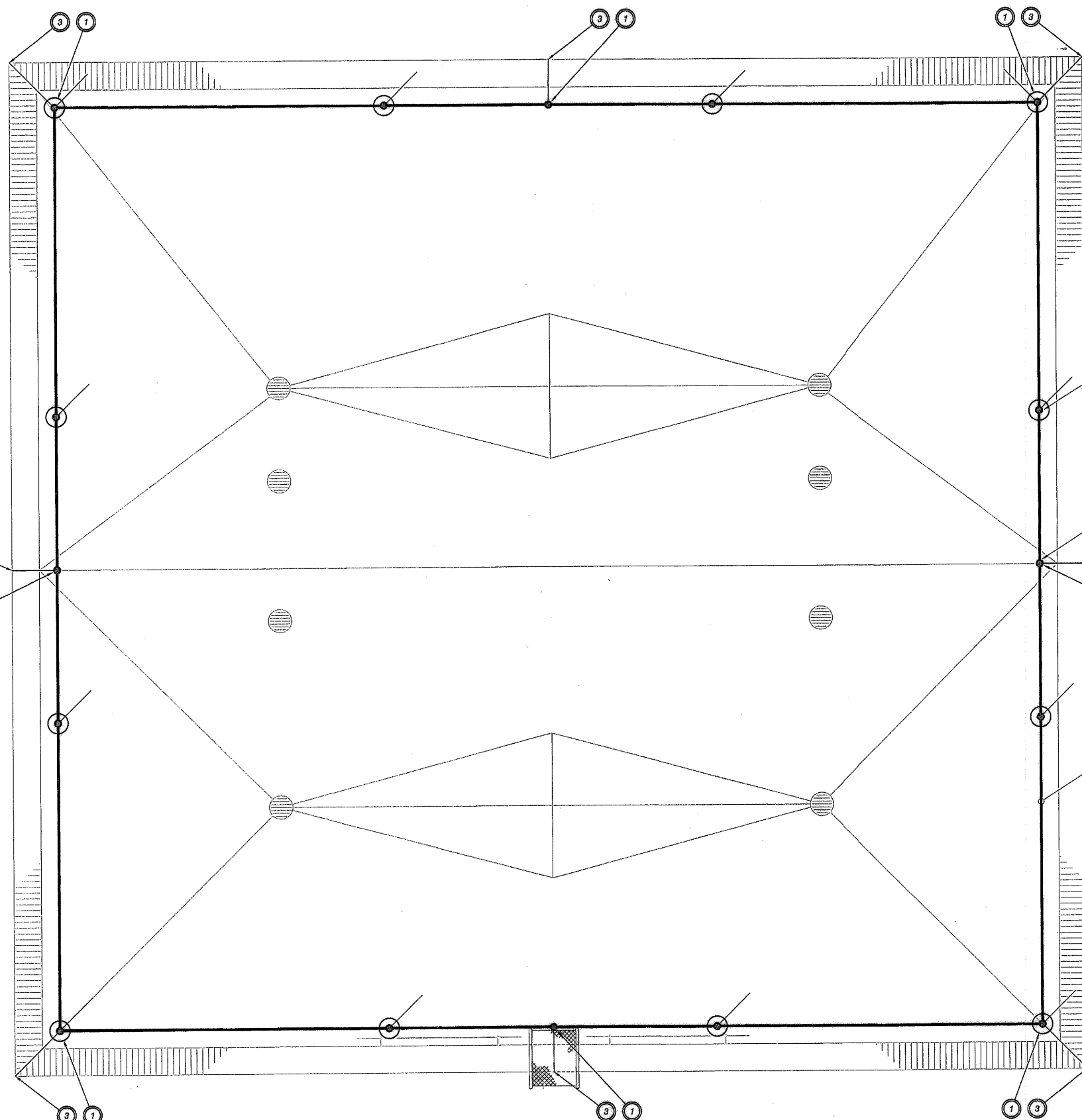
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH
Building a world of difference

Holloway, Updike and Beifen
Consulting Engineers
Mechanical - Electrical - Plumbing

OWGATES
Engineering
Surveying



- NOTES:**
- ① FURNISH AND INSTALL 4/0 COPPER DOWN CONDUCTOR IN 1" SCHEDULE 40 PVC IMBEDDED IN WALL. STUB OUT 18" BELOW FINAL GRADE AND BELOW ROOF INSIDE BUILDING. USE THRU-ROOF ASSEMBLY THAT IS SUITABLE FOR ROOF SYSTEM.
 - ② REFER TO DRAWING TE5 FOR GROUNDING SYSTEM.
 - ③ CONNECT DOWN CONDUCTOR TO GROUNDING SYSTEM WITH THERMOWELL TYPE CONNECTION. REFER TO GROUNDING PLAN.

SYMBOLS

○ LIGHTNING ARRESTOR

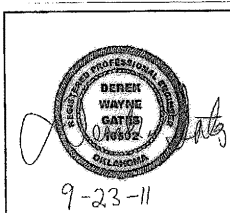
—●— THERMO WELD CONNECTION

NOTES (CONTINUED):

PLAN IS PROVIDED FOR REFERENCE. SEE SPECIFICATION FOR CONTRACT REQUIREMENTS. IF THERE IS CONFLICT BETWEEN PLAN AND SPECIFICATIONS, SPECIFICATIONS SHALL APPLY.

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
SLUDGE TRANSFER PUMP STATION
ELECTRICAL
LIGHTNING PROTECTION PLAN
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

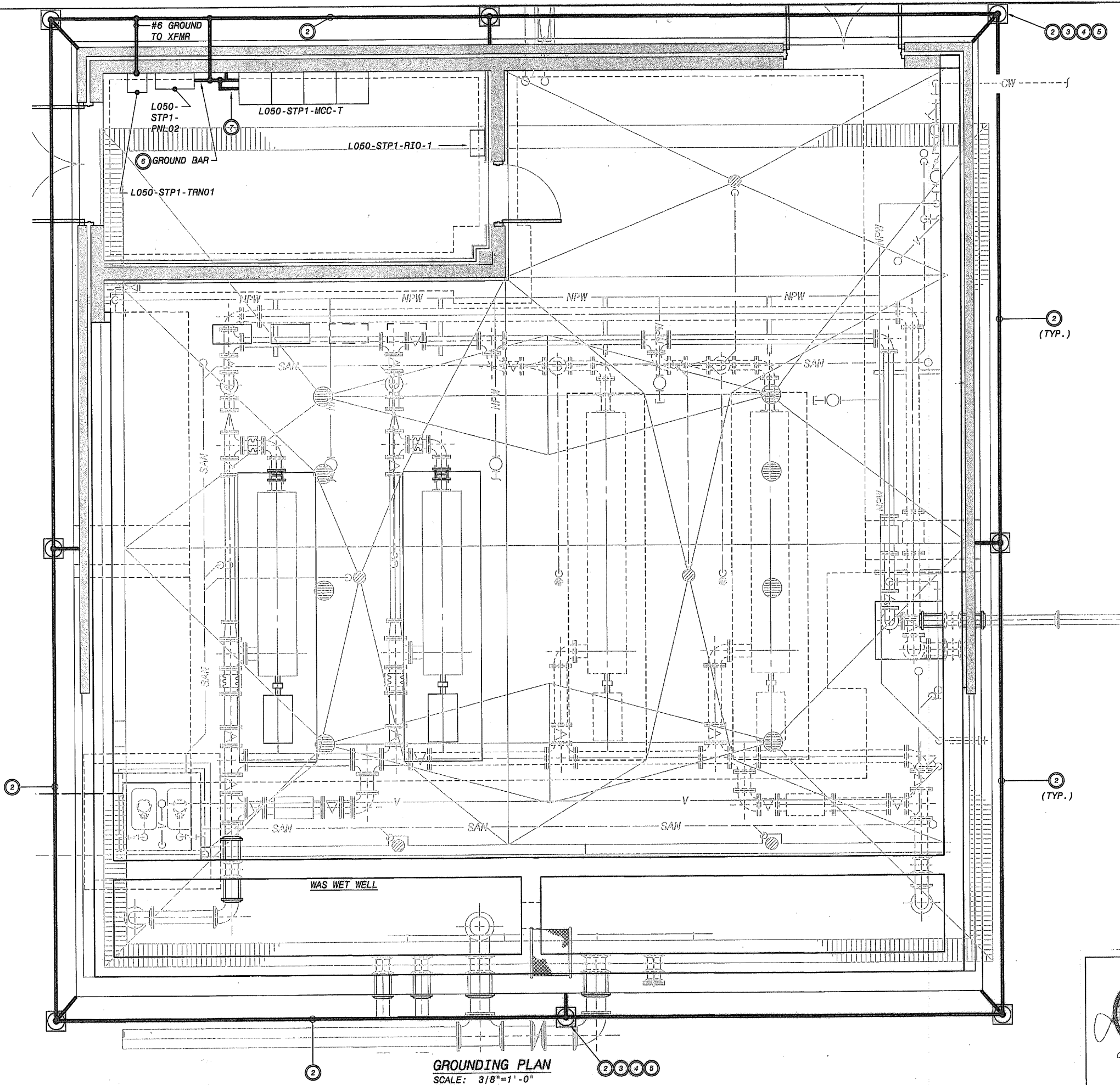
PLANS AND ESTIMATES PREPARED BY:
BLACK & VEATCH
Building a world of difference
Holloway, Updike and Bollen
Consulting Engineers
Muskegon - Broken Arrow
Black & Veatch Corporation
Kansas City, Missouri



REVISION	BY	DATE	PLAN SCALE:	DRAWN	SS	APPROVED:
			DESIGNED	AC		
			SURVEY			
			PROFILE SCALE:	FIELD MGR.		
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			VERTICAL:	RECOMMENDED:		
			1" =			
			FILE: TE04	DRAWING: TE-4		
			ATLAS PAGE NO:			

LIGHTNING PROTECTION PLAN
SCALE: 3/8"=1'-0"

PLOTTED DATE: 9/21/2011 5:42:07 PM
 SAVED DATE: 9/21/2011 5:42:07 PM
 CYCNET ID: 145120-3000-C-B0000726



- NOTES:
- 1 SEE SPECIFICATION SECTION 16050 FOR DETAILS ON GROUNDING MATERIAL AND INSTALLATION.
 - 2 BUILD BARE STRANDED CU, 18" BELOW FINAL GRADE.
 - 3 EXOTHERMIC WELD, TYPICAL
 - 4 LIGHTNING PROTECTION DOWN CONDUCTOR.
 - 5 EXOTHERMIC WELD GROUND ROD TO CONDUCTOR(S)
 - 6 IN ELECTRICAL ROOM, INSTALL COPPER GROUND BAR ON STANDOFF BRACKETS. USE EXOTHERMIC WELDS FOR ALL GROUNDING ELECTRODE CONDUCTORS. BAR SHALL HAVE PRE-DRILLED HOLES FOR AT LEAST (10) - 2-HOLE LUGS WITH 1" SPACING AND 3/8" BOLTS.
 - 7 ROUTE #4/0 BARE CU GND FROM GROUND BAR TO MCC GROUND BUSS.
 - 8 CONNECT GROUND BAR IN ELECTRICAL ROOM TO BUILDING STEEL AND WATER PIPE IN APPROVED FASHION.

LOWER BIRD CREEK WWT EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
SLUDGE TRANSFER PUMP STATION
ELECTRICAL
GROUNDING PLAN
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT
PLANS AND ESTIMATES PREPARED BY:
BLACK & VEATCH
Building a world of difference
Hollaway, Uffink and Ballen
Consulting Engineers
Mechanical - System Areas
INGATE
Engineering
Services

REVISION	BY	DATE

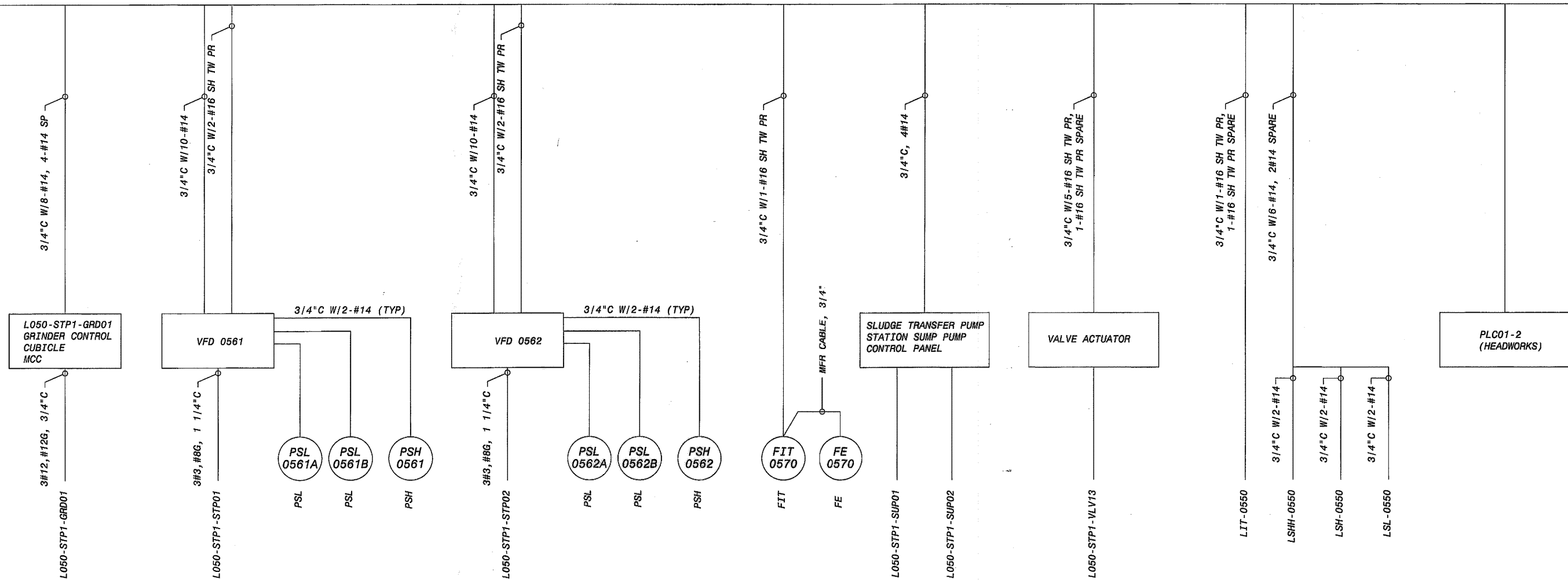
9-23-11

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DESIGNED: AC
SURVEY:
PROFILE SCALE: FIELD MGR.
HORIZONTAL: SECT. MGR.
1" = PROJ. MGR.
RECOMMENDED:
VERTICAL:
1" =
FILE: TE05 DRAWING: TE-5
ATLAS PAGE NO: DATE 10/28/2011
SHEET 205 OF 261 SHEETS
B&V PROJECT NO. 145120

APPROVED:

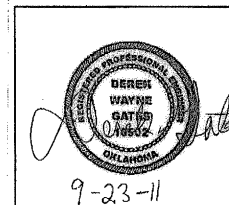
DIRECTOR

(PLC)
L050-STP1-RI0-1



PLC ONE-LINE DIAGRAM
SCALE: NONE

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
SLUDGE TRANSFER PUMP STATION ELECTRICAL PLC ONE-LINE DIAGRAM			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
BLACK & VEATCH Building a world of difference		HATCH Hatch Mott MacDonald Engineering Services	
		APPROVED:	
REVISION	BY	DATE	FILE: TE06 ATLAS PAGE NO:
			DRAWING: TE-6 DATE 10/28/2011 SHEET 206 OF 261 SHEETS



LP50-STP1-PNL02

PNL: PNL02				BUS: 100A				CAB: SURFACE				
SERVICE: 208/120V 3PH/ 4W				WITH GROUND BUS				MAIN: 100A				
ISC RATING: 22,000 AIC								FEED: TOP/BOTTOM				
SERVING	WIRE SIZE	AMPS	POLES	CIRC. NO.	PHASE LOADING AMPS			CIRC. NO.	POLES	AMPS	WIRE SIZE	SERVING
					A	B	C					
LIGHTS - ELECTRICAL ROOM	12	20	1	1				2	1	20	12	RECEPTS - ELECTRICAL ROOM
LIGHTS - PUMP ROOM	12	20	1	3				4	1	20	12	RECEPTS - PUMP ROOM
LIGHTS - PUMP ROOM	12	20	1	5				6	1	20	12	RECEPTS - PUMP ROOM
LIGHTS - PUMP ROOM	12	20	1	7				8	1	20	12	TIME CLOCK - SEE NOTE 1
LIGHTS - EXTERIOR	12	20	1	9				10	1	20	12	LIT 0550, LSHH-0550, LSH-0
EMERGENCY LIGHTS	12	20	1	11				12	1	20	12	RECEPTS - EXTERIOR
RIO-1 CABINET	12	20	1	13				14	1	20	12	
RIO-1 CABINET	12	20	1	15				16	1	20	12	
	12	20	1	17				18	1	20	12	
	12	20	1	19				20	1	20	12	
	12	20	1	21				22	1	20	12	
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	12	20	1	33				34	1	20	12	
	12	20	1	35				36	1	20	12	
	12	20	1	37				38	1	20	12	
	12	20	1	39				40	1	20	12	
	12	20	1	41				42	1	20	12	
TOTALS:												

NOTE 1

EXTERIOR LIGHTS POWERED
THROUGH ATRONOMIC TIME CLOCK
WITH BATTERY BACK-UP.

LIGHTING FIXTURE SCHEDULE

FIXTURE NO.	MANUFACTURER & CATALOG No.	VOLTS WATTS	LAMPS	MOUNTING	NOTES & REMARKS
EL1	EXITRONIX	120	2-12W HALOGEN	SURFACE	EMERGENCY LAMP LOCATION WALL PACK
1	LIGHTOLIER XP2GVA332UNV	120 96	F32T8/SP41/ECO	PENDANT	
4	BANTAM 2000 PRISMATITE	120	175W MH	CEILING OR PENDANT	ENCLOSED AND GASKETED
9	EXCELINE GSXW42HFLLBRW1	120 42	42W CPF	SURFACE	EXTERIOR
EXIT1	LIGHTOLIER LLNCRW	120 10	LED	SURFACE	EXIT LIGHT

ELECTRICAL SCHEDULES
SCALE: NONE

	REVISION	BY	DATE	PLAN SCALE:	DRAWN	FLT	APPROVED:
					DESIGNED	AC	
					SURVEY		
					PROFILE SCALE:	FIELD MGR.	7/28 10/11
					HORIZONTAL:	SECT. MGR.	7/28 10/11
					PROJ. MGR.	7/28 10/11	
					RECOMMENDED:	7/28 10/11	
				VERTICAL:			
				1" =			
				FILE: TE07	DRAWING: TE-7	DATE 10/28/2011	
				ATLAS PAGE NO:		SHEET 207 OF 261 SHEETS	

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
SLUDGE TRANSFER PUMP STATION
ELECTRICAL
ELECTRICAL SCHEDULES
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
 BLACK & VEATCH
Building a world of difference
 Hollway, Upde and Dallen
Consulting Engineers
Muskegon - Broken Arrow
 BENTLEY
Black & Veatch Corporation
Kansas City, Missouri

PROTECT EXIST TANK FILL STATION FROM DAMAGE

EXIST NOCL FEED PUMPS, PIPING AND ENCLOSURE SHALL BE REMOVED AND DELIVERED TO OWNER

REMOVE EXIST 1" SCH 80 PVC SUCTION LINE AND 2" SCH 80 PVC DRAIN LINE

EXIST NOCL STORAGE TANK SHALL BE PROTECTED FROM DAMAGE

EXIST 2" SCH 80 PVC

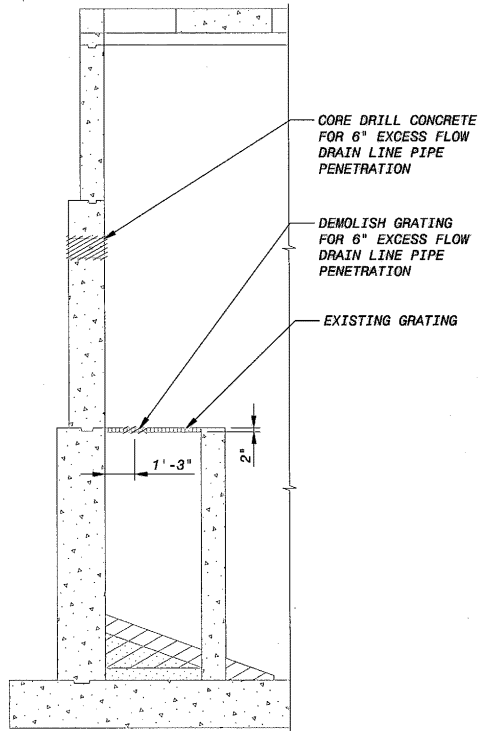
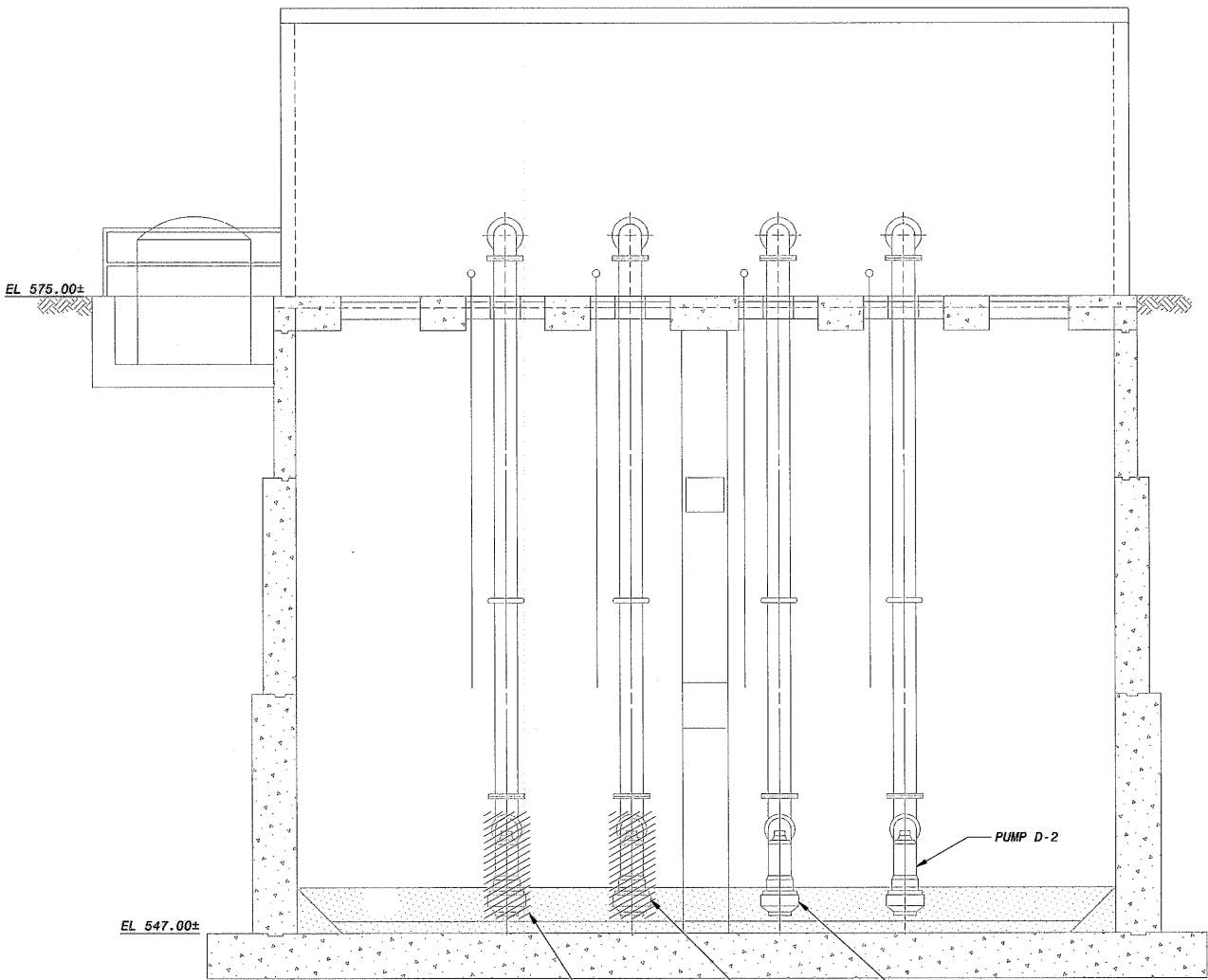
TO LBCWTP

EQUIPMENT ROOM
FINISHED FLOOR
EL 575.00±

CONTROL ROOM

TO DIURNAL BASIN

PLAN - UPPER LEVEL - EL 575.00
1/4" = 1'-0"



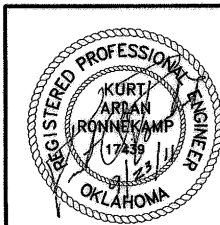
NOTES:

- EXIST SUBMERSIBLE PUMPS W-1 AND W-2 SHALL BE REMOVED AND DELIVERED TO OWNER AS SPECIFIED IN SECTION 02060.

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
PORT SOUTH LIFT STATION
CIVIL
DEMOLITION PLAN AND SECTIONS
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH Building a world of difference
Holloway, Updike and Ballou Consulting Engineers
Black & Veatch Corporation Kansas City, Missouri



REVISION	BY	DATE

PLAN SCALE:	DRAWN	JKS	
DESIGNED	AWL		
SURVEY			
PROFILE SCALE:	FIELD MGR.	705	10/11
HORIZONTAL:	SECT. MGR.		
1" =	PROJ. MGR.	256	10/5/11
VERTICAL	RECOMMENDED:		
1" =	HAS	10/3/11	
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ATLAS PAGE NO:			

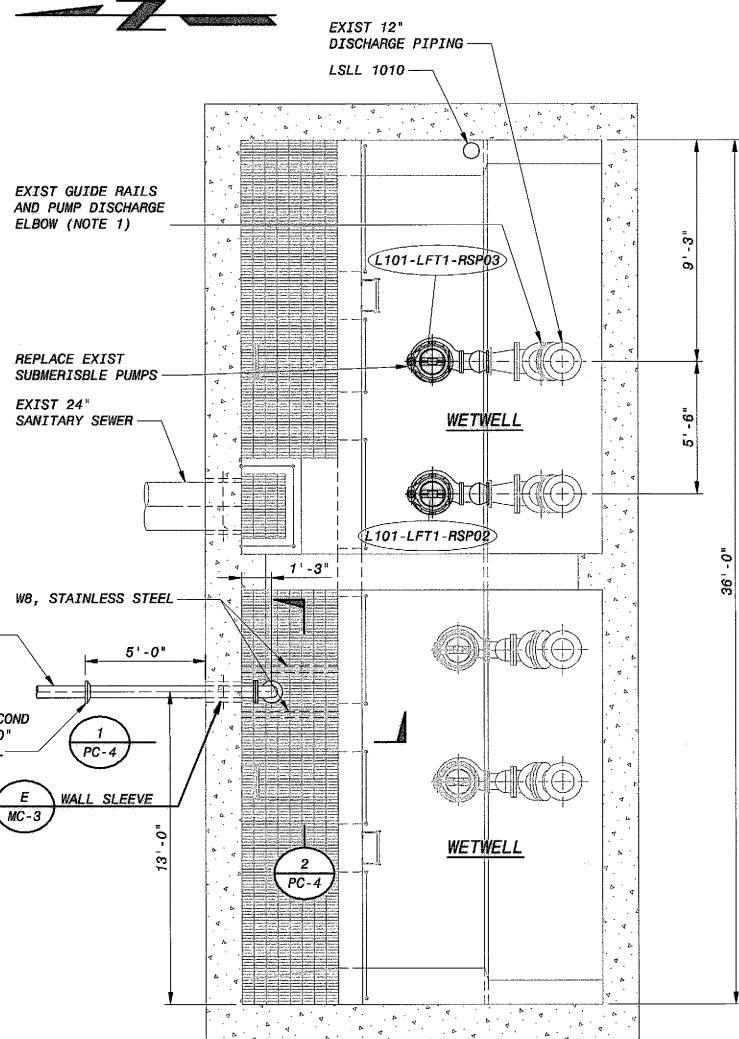
APPROVED:

DIRECTOR

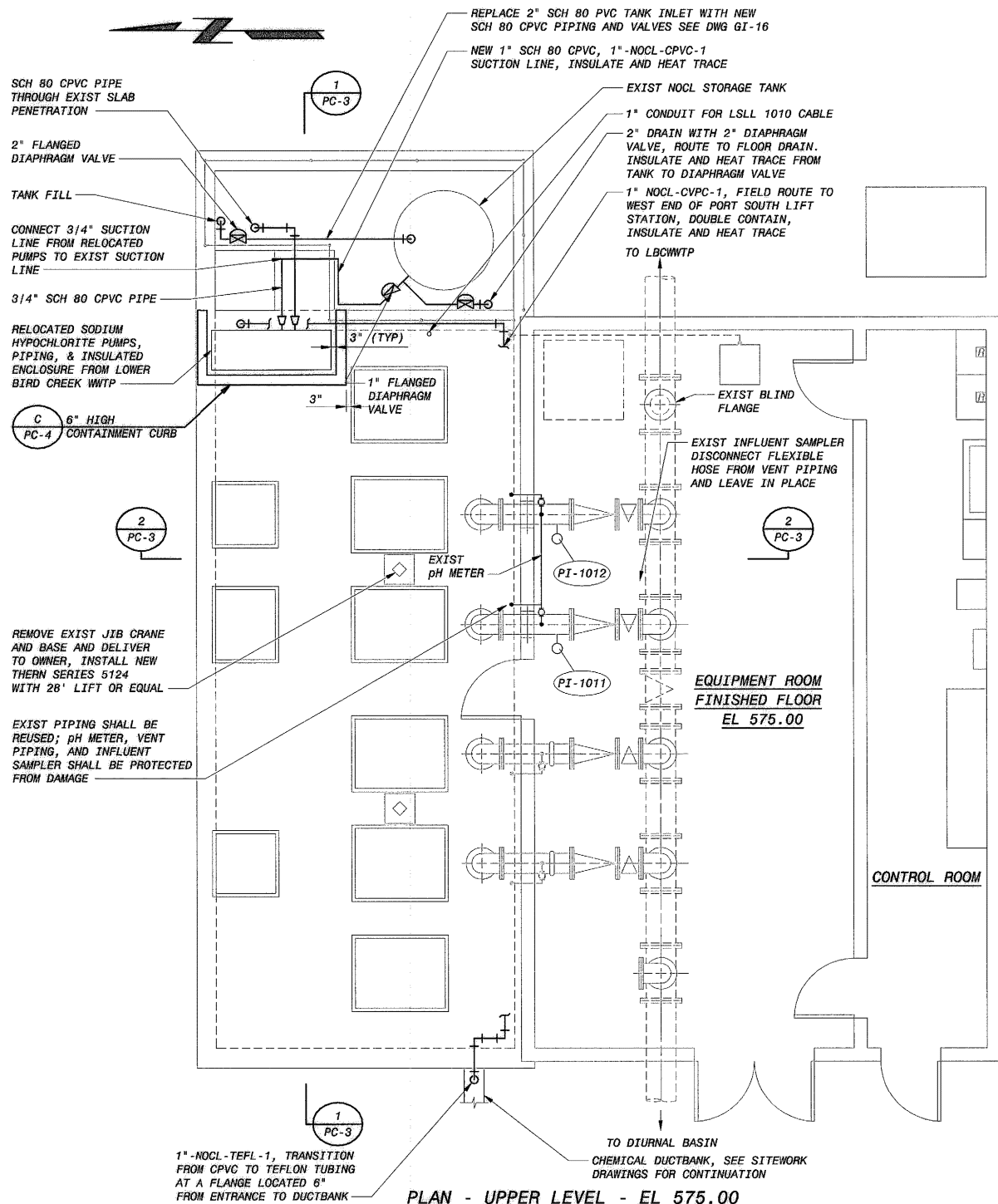
DATE 10/28/2011

SHEET 208 OF 261 SHEETS

PLOTTED DATE: 9/21/2011 5:02:47 PM Batch Plot
 SAVED DATE: 9/21/2011 1:05:13 PM
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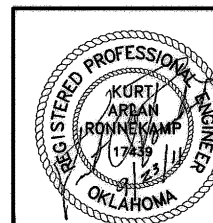


SECTIONAL PLAN - WETWELL - EL 557.50
 1/4" = 1'-0"



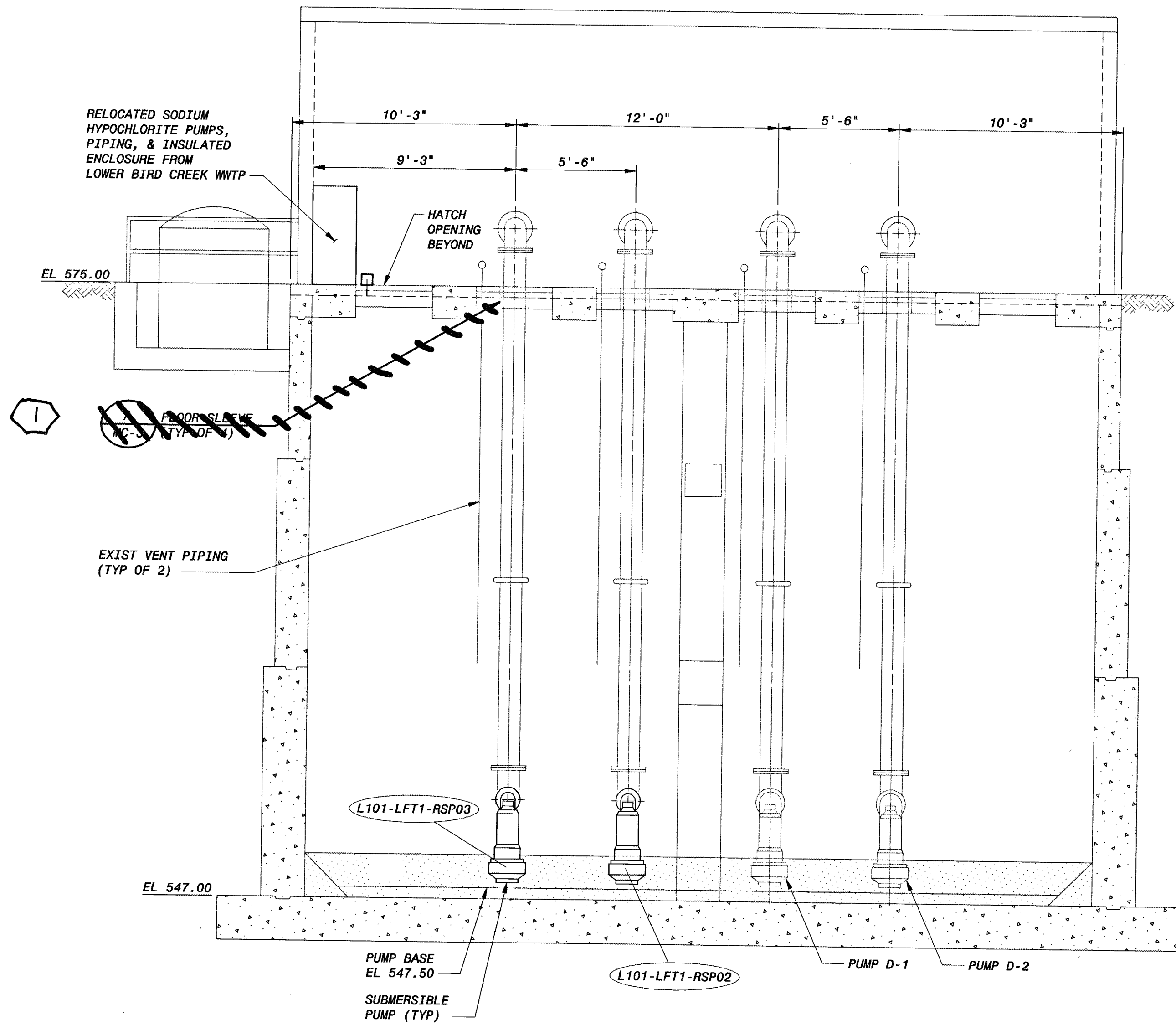
NOTES:

1. THE EXISTING PUMP GUIDE RAILS AND PUMP DISCHARGE ELBOW SHALL BE REUSED. CONTRACTOR SHALL PROVIDE PUMPS THAT ARE COMPATIBLE WITH A FAIRBANKS MORSE MODEL D5432MZ, 4" DISCHARGE ELBOW AND GUIDE RAILS.

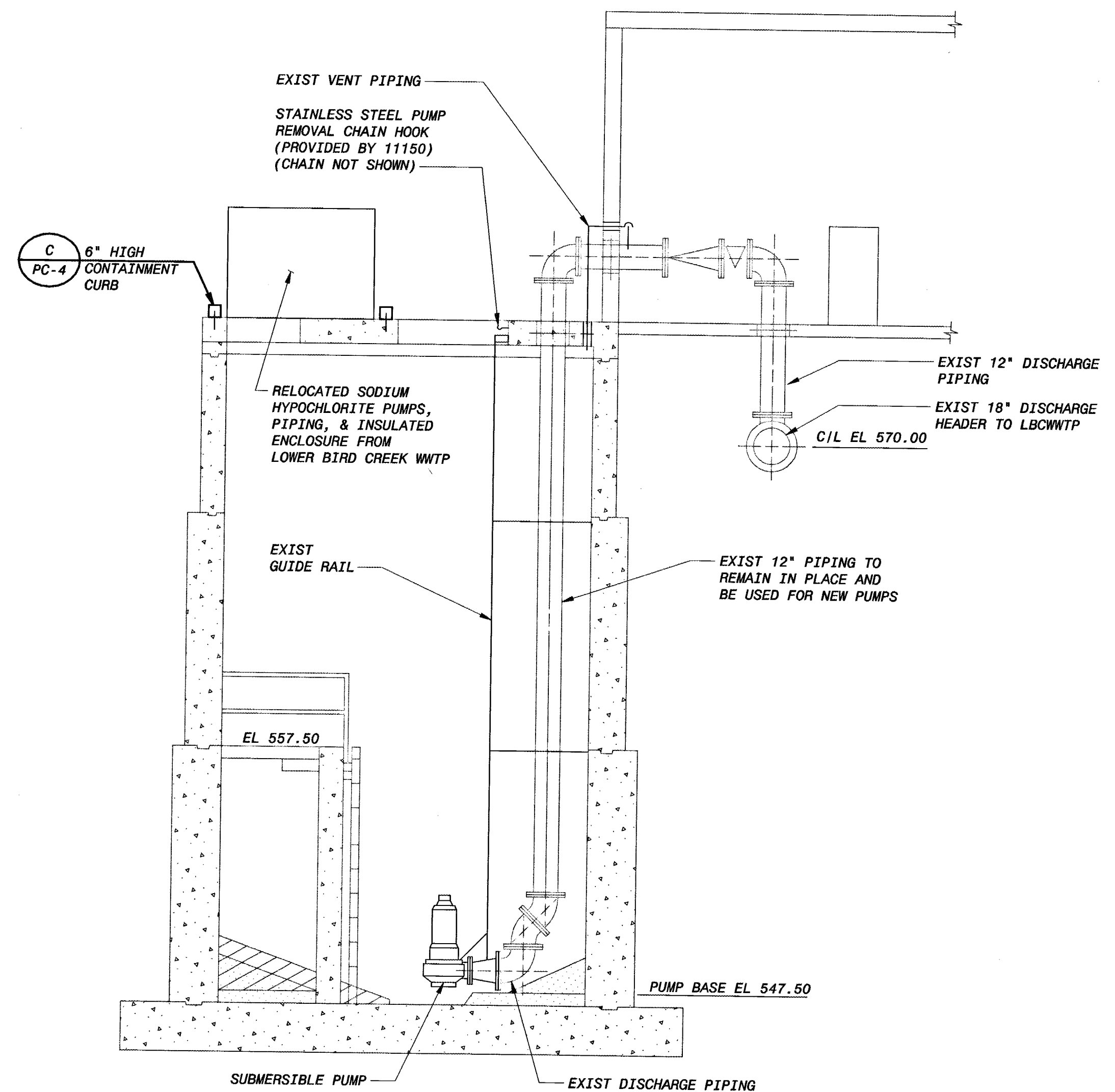


REVISION	BY	DATE

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
PORT SOUTH LIFT STATION CIVIL PLANS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
BLACK & VEATCH Building a world of difference Black & Veatch Corporation Kansas City, Missouri	Holloway, Updike and Bellon Consulting Engineers Muskogee - Broken Arrow		APPROVED:
PLAN SCALE:	DRAWN: JKS DESIGNED: AWL SURVEY:	FIELD MGR. 701 10/11 SECT. MGR. 701 10/11 PROJ. MGR. 701 10/11	RECOMMENDED: HAS 10/11 DIRECTOR:
PROFILE SCALE:	HORIZONTAL: 1" =	VERTICAL: 1" =	DATE 10/28/2011
FILE:	DRAWING: PC-2	ATLAS PAGE NO:	SHEET 209 OF 261 SHEETS

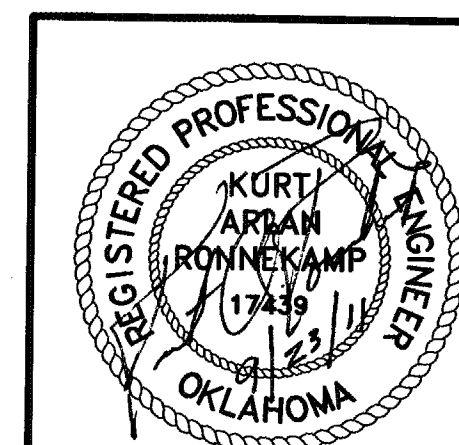


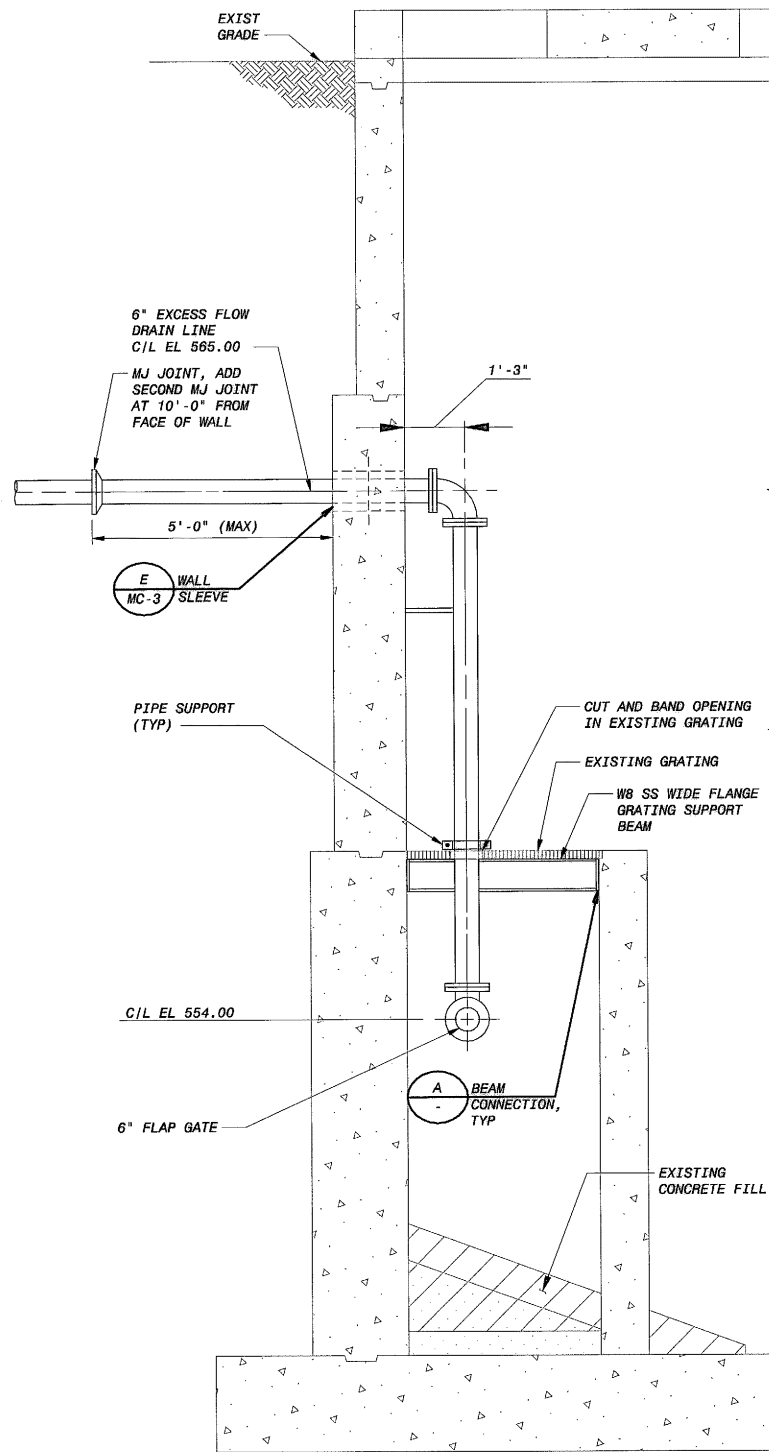
SECTION 1
1/4" = 1'-0" PC-2



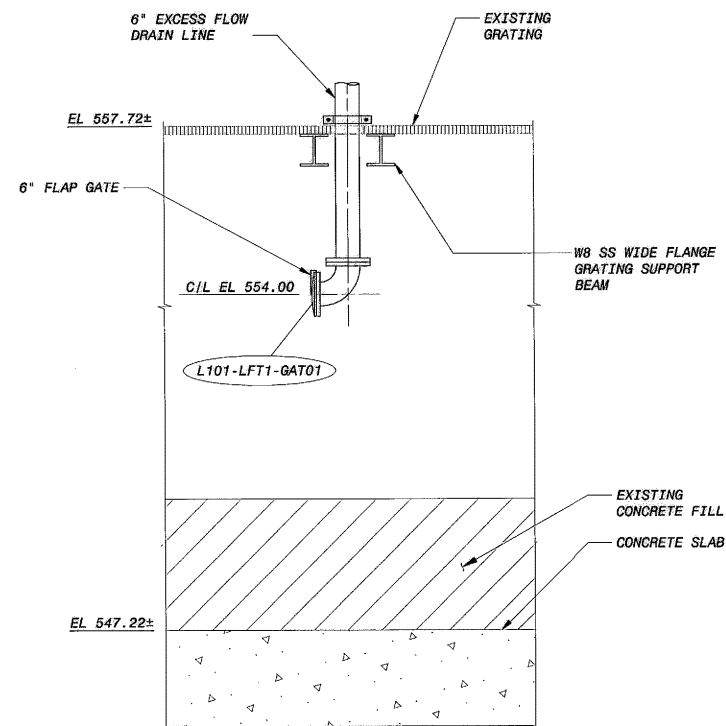
SECTION 2
1/4" = 1'-0" PC-2

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
PORT SOUTH LIFT STATION CIVIL SECTIONS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
BLACK & VEATCH Building a world of difference Kansas City, Missouri		HOLLOWAY, UPTAKE AND BULLIS Consulting Engineers Managing: Broken Arrow	
OWGATES Engineering Services			
REVISION Addition No. 17	BY PSB	DATE 11-6-12	PLAN SCALE: DRAWN: JKS DESIGNED: AWL SURVEY: PROFILE SCALE: FIELD MGR. JKS 10/11 HORIZONTAL: 1" = PROJ. MGR. PSB 10/11 VERTICAL: 1" = RECOMMENDED: PSB 10/11 FILE: DATE 10/28/2011 ATLAS PAGE NO:
APPROVED:			DIRECTOR: [Signature] SHEET 210 OF 261 SHEETS

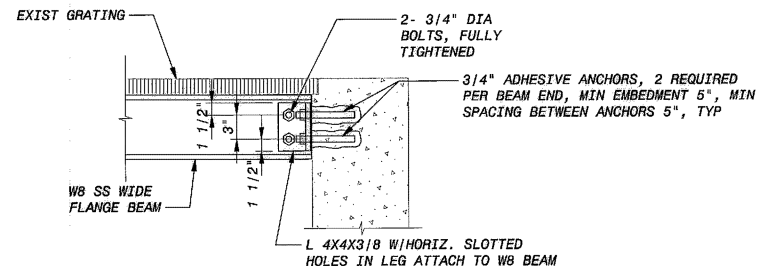




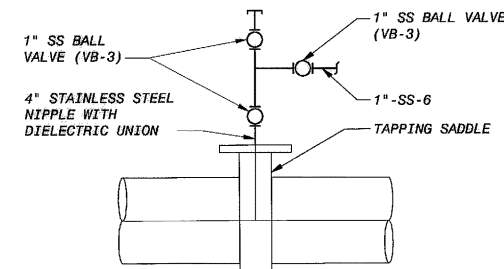
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1/2" = 1'-0" PC-2



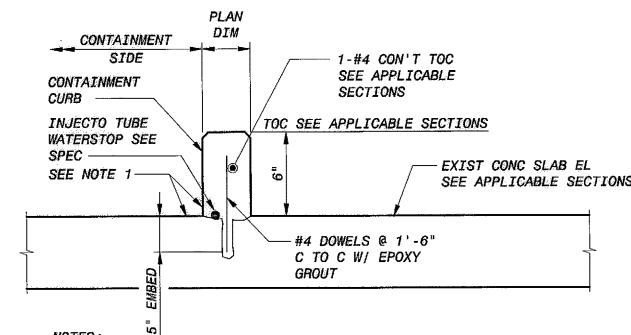
SECTION 2
1/2" = 1'-0" PC-2



DETAIL A
1" = 1'-0"



VENT CONNECTION B
NO SCALE PC-2



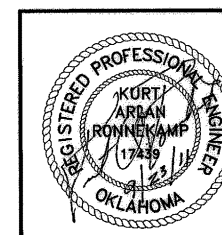
NOTES:
1. CHIP EXISTING CONCRETE SURFACE TO EXPOSE AGGREGATES. APPLY EPOXY RESIN BONDING AGENT PRIOR TO PLACING NEW CONCRETE. APPLICATION SHALL CONFORM WITH BONDING AGENT MANUFACTURER'S RECOMMENDATIONS.

6" HIGH CONTAINMENT CURB C
NO SCALE PC-2, PC-3

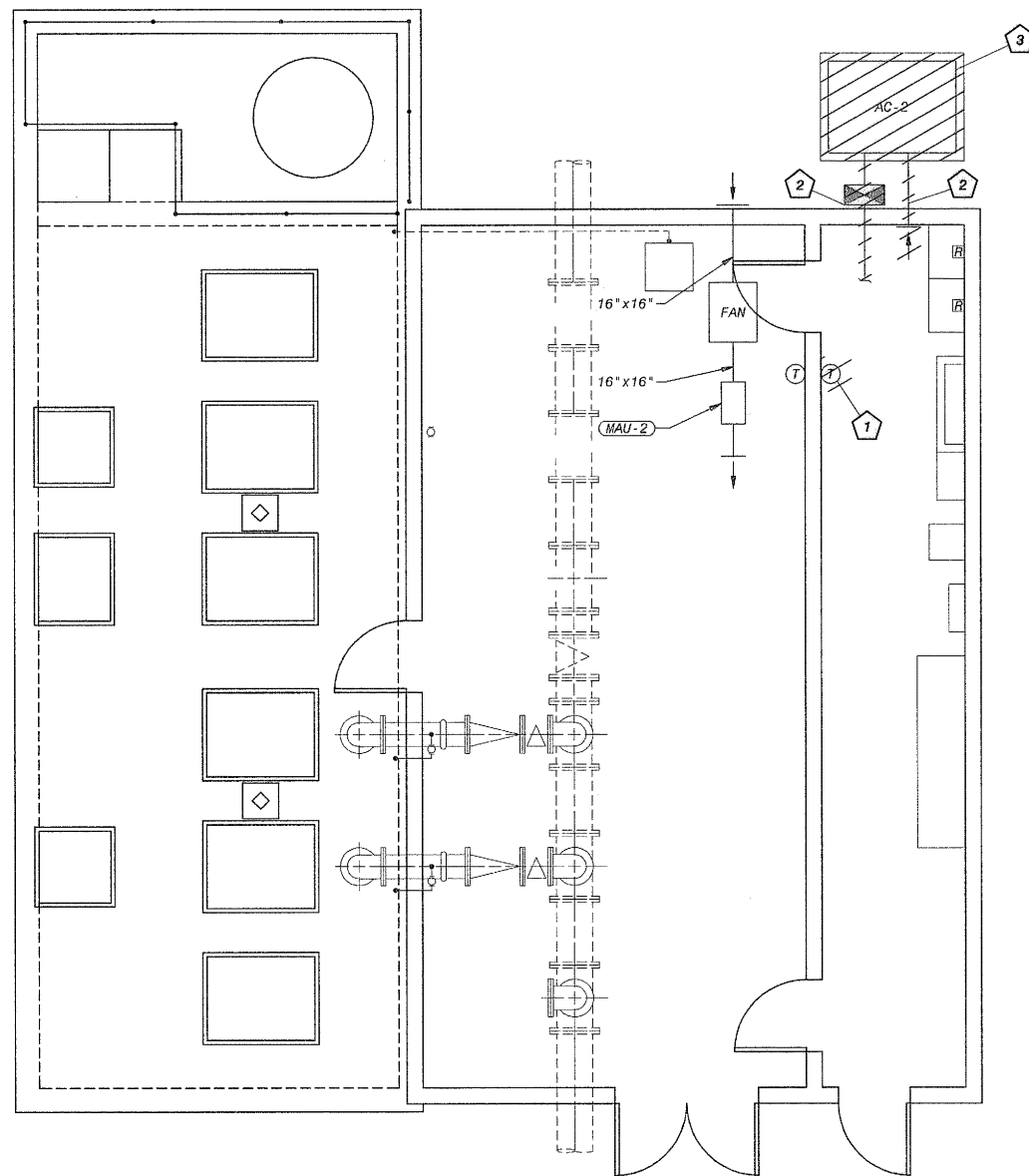
LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
PORT SOUTH LIFT STATION
CIVIL
SECTIONS AND DETAILS
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH
Building a world of difference
Holloway, Updike and Ballen
Consulting Engineers
Masterpiece - Broken Arrow
BVGATES
Engineering Services



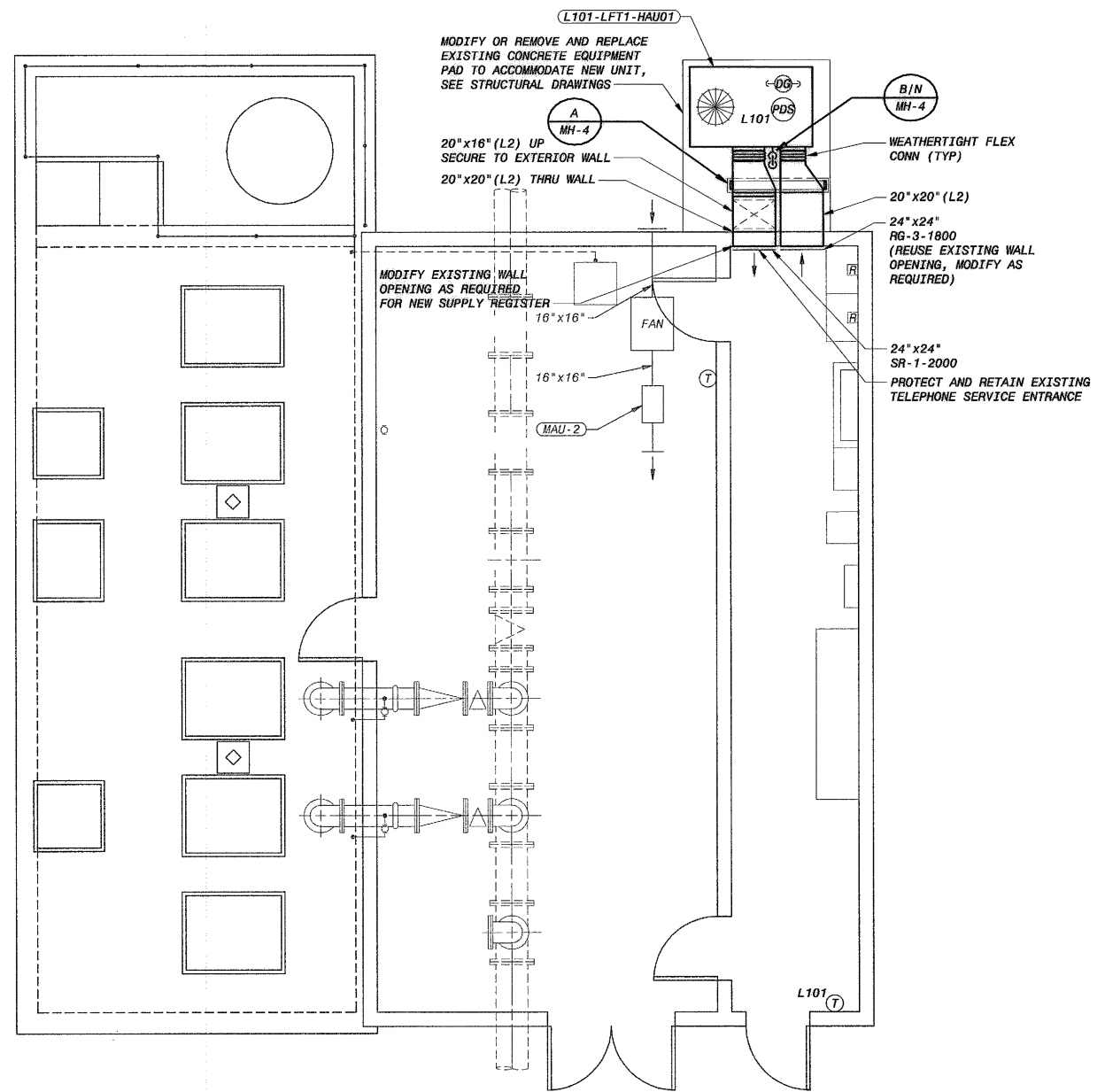
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				SURVEY		
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			ATLAS PAGE NO:			SHEET 211 OF 261 SHEETS



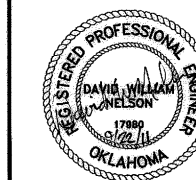
DEMOLITION PLAN - UPPER LEVEL - EL 575.00
1/4" = 1'-0"

DEMOLITION NOTES:

- 1 REMOVE AND DISPOSE OF THERMOSTAT AND ALL CONTROL WIRING.
- 2 REMOVE AND DISPOSE OF SUPPLY AND RETURN AIR DUCT, REGISTERS, GRILLES, AND SUPPORTS. WALL OPENINGS SHALL BE ENLARGED AS REQUIRED AND REUSED.
- 3 REMOVE AND DISPOSE OF AC-2 AND CONCRETE EQUIPMENT PAD.



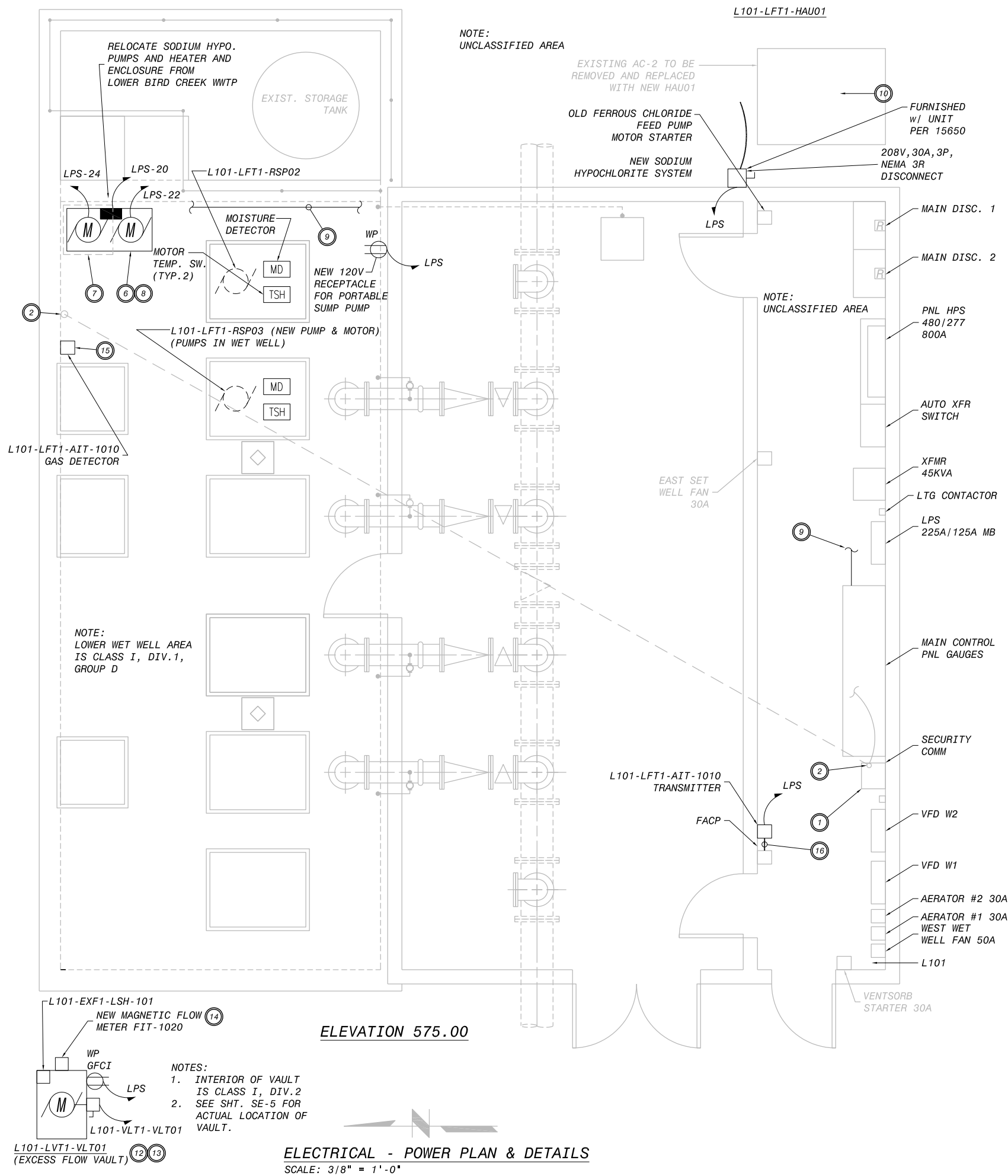
FLOOR PLAN - UPPER LEVEL - EL 575.00
1/4" = 1'-0"



REVISION	BY	DATE

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B PORT SOUTH LIFT STATION HVAC PLANS CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT PLANS AND ESTIMATES PREPARED BY: BLACK & VEATCH Building a world of difference Black & Veatch Corporation Kansas City, Missouri Holloway, Updike and Ballen Consulting Engineers Muskogee - Broken Arrow ENGATES Engineering Services			
PLAN SCALE: 1/4" = 1'-0" PROFILE SCALE: HORIZONTAL: 1" = VERTICAL: 1" = FILE: PH-01.DWG ATLAS PAGE NO:	DRAWN: BDL DESIGNED: TRD SURVEY: FIELD MGR: JDS 10/11 SECT. MGR: PROJ. MGR: BSW 10/11 RECOMMENDED: HAS 10/3/14 DRAWING: PH-1	APPROVED: [Signature] DIRECTOR DATE 10/28/2011 SHEET 212 OF 261 SHEETS	

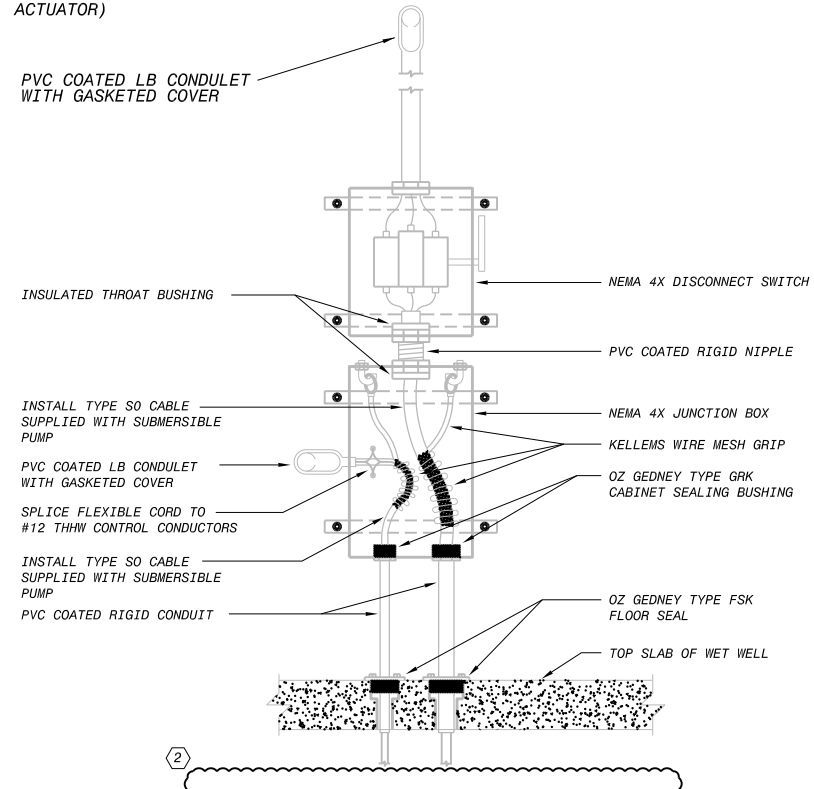
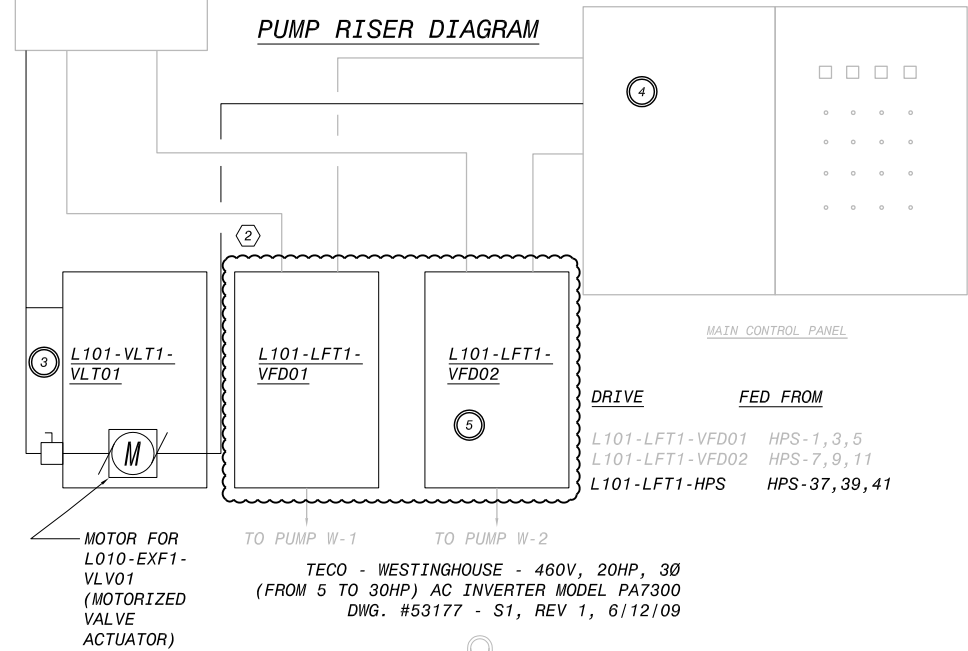
5/3/2012 9:31:47 AM
PW FLD: 145120...Port South Lift Station
FD145120



NOTES (CONTINUED):

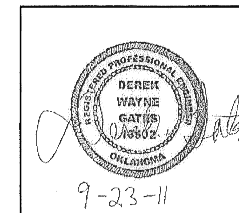
- INSTALL 1" GRS METAL CONDUIT w/ (1) TW. SHIELD PAIR #16 WIRE FROM DETECTOR TO TRANSMITTER. VERIFY EXACT LOCATION OF DETECTOR IN FIELD. INSTALL TRANSMITTER ON WALL NEXT TO EXISTING F/A PANEL. SUPPLY TRANSMITTER WITH 120V FROM PANEL "LPS".
- CONNECT TRANSMITTER TO F/A PANEL w/ (2)#14 & (1) TWISTED PR. SHIELD #16 FOR DISCRETE AND DRY CONTACTS. EXTEND CONNECTION WITH SAME WIRES FROM F/A PANEL TO PLC CABINET IN MAIN CONTROL PANEL.

PUMP RISER DIAGRAM



1 TYPICAL OUTSIDE DISCONNECT SWITCH DETAIL FOR SUBMERSIBLE PUMPS

NO SCALE



REVISION	BY	DATE
ADDENDUM NO. 2	PSB	1-13-12

PLAN SCALE:	DRAWN	FLT		APPROVED:
	DESIGNED	AC		
	SURVEY			
PROFILE SCALE:	FIELD MGR.	704	10/11	
	SECT. MGR.			
HORIZONTAL:	PROJ. MGR.			
	RECOMMENDED:			
VERTICAL				
1" =				
FILE: PE02	DRAWING: PE-2	DATE 10/28/2011		
ATLAS PAGE NO:		SHEET 214 OF 261 SHEETS		

9-28-11

B&V PROJECT NO. 145120

NOTES:

- SECURITY COMMUNICATIONS BOX ON WALL.
- SPARE CONDUIT PREVIOUSLY INSTALLED IN FLOOR FOR FUTURE VFD.
- INSTALL NEW 20A/3P CIRCUIT BREAKER IN PANEL HPS. INSTALL NEW CONDUIT AND WIRE TO NEW MOTORIZED VALVE ACTUATOR PROVIDED BY CONTRACTOR. RUN CONTROL CONDUIT AND WIRE INTO CONTROL PANEL.
- MODIFY AND RE-PROGRAM MAIN CONTROL PANEL AS REQUIRED.
- PUMPS W-1 & W-2 TO BE REPLACED WITH 25HP PUMPS. RE-PROGRAM AFD'S AS REQUIRED. INCLUDE ADDITION OF MAGNETIC FLOW METER L101-FIT-1020, GAS DETECTOR L101-LFT2-AIT-1010 AND L101-LFT1-AIT-101 PER SPECIFICATION AND PLC ONE-LINE DIAGRAM.
- SODIUM HYPOCHLORITE PUMPS (2) AND HEATER RELOATED FROM LOWER BIRD CREEK WWTP. CONNECT PUMP AND HEATER TO SEPARATE 120V, 20A CIRCUITS IN 120V PANEL IN ELECTRICAL ROOM. CONNECT EACH PUMP TO PLC CABINET WITH (4)#14 THWN ON 3/4" CONDUIT. CONTRACTOR TO INSPECT EQUIPMENT BEFORE BIDDING.
- REMOVE EXISTING OUTDOOR SODIUM HYPOCHLORITE PUMP & CONTROLS INCLUDING EXISTING CIRCUITS AND WIRING.
- NOT USED.
- INSTALL 1" CONDUIT w/ (4)#14 THWN FOR LSL 1010 AND CONNECT TO PLC CABINET. REFER TO MECHANICAL PLAN FOR EXACT LOCATION OF LSL.
- RE-USE EXISTING CIRCUIT AND CONDUIT FOR AC-2 INCLUDING THERMOSTAT AND CONTROLS FOR HAU01. REFER TO MECHANICAL PLAN FOR EXACT LOCATION.
- NOT USED.
- SEE ONE-LINE DIAGRAM ON DRAWING PE1 FOR INFORMATION ON ELECTRICAL DEVICE LOCATED IN EXCESS FLOW VAULT AND CONDUIT SIZE & WIRE.
- FOR PORT SOUTH EXCESS FLOW VALVE VAULT LOCATION SEE CIVIL DWG. SC-3.
- NEW FLOW METER. CONNECT PER PLC ONE-LINE DIAGRAM. SEE SHEET SE-5 FOR LOCATION.

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B

PORT SOUTH LIFT STATION
ELECTRICAL
POWER PLAN & DETAILS

CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

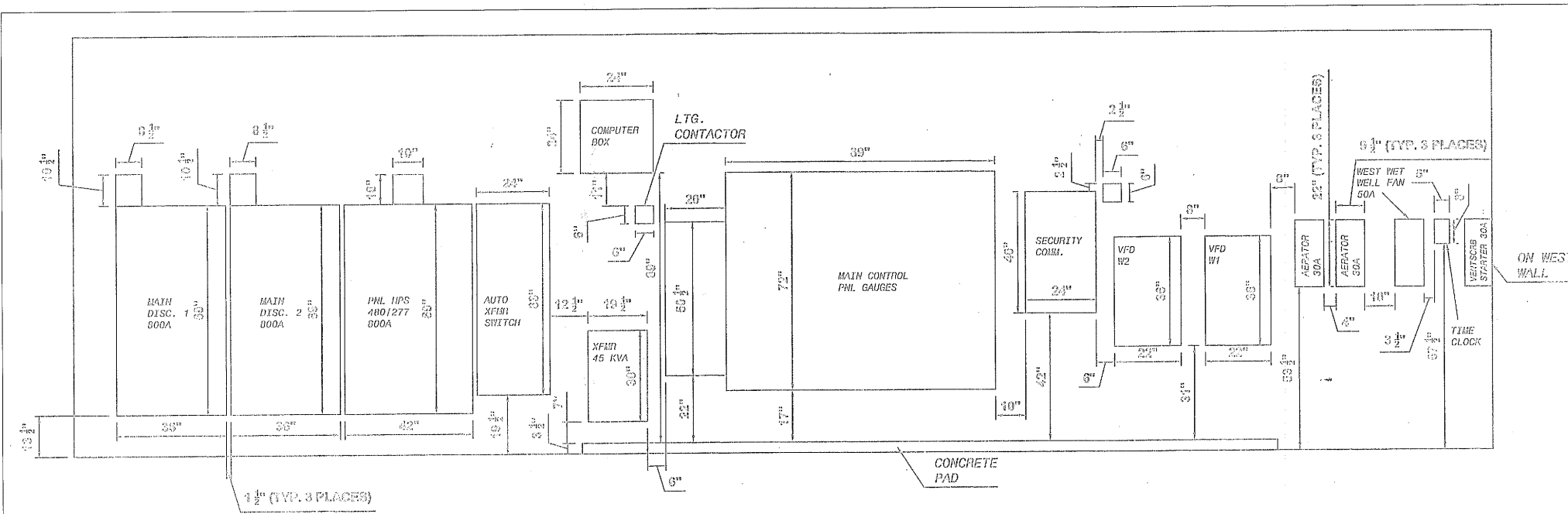
BLACK & VEATCH
Building a world of difference
Kansas City, Missouri

Holloway, Updike and Bolton
Consulting Engineers
Muskegon - Broken Arrow

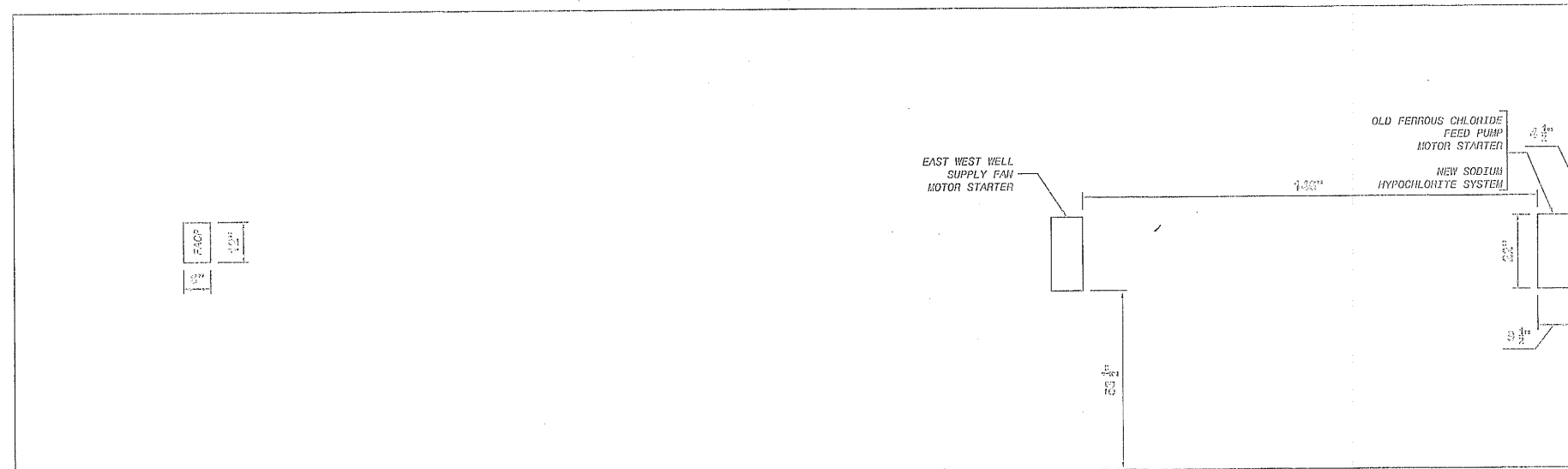
ENGATES
Engineering Services

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			FILE: PE02	DRAWING: PE-2	DATE 10/28/2011		
			ATLAS PAGE NO:		SHEET 214 OF 261 SHEETS		

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SAVED DATE: 9/21/2011 5:59:14 PM
CYPNET ID: 145120-300-C-8000R128



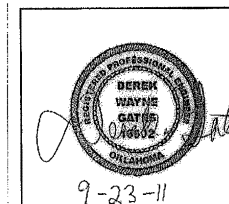
EXISTING SOUTH WALL ELEVATIONS



EXISTING NORTH WALL ELEVATIONS

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

(FOR REFERENCE ONLY)



9-23-11

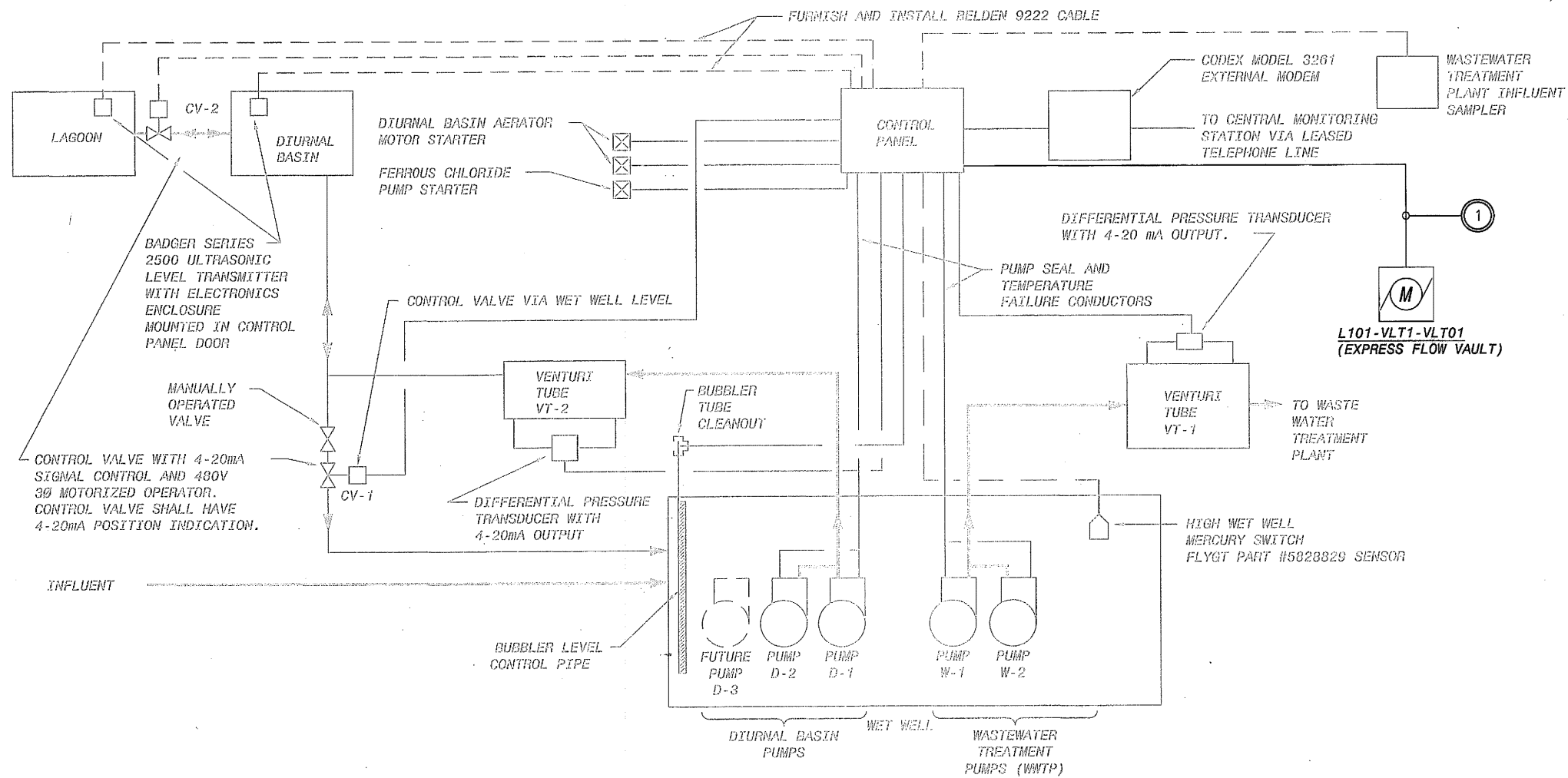
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LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
PORT SOUTH LIFT STATION
ELECTRICAL
ELEVATIONS
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
BLACK & VEATCH
Building a world of difference
Holloway, Updike and Bolton
Consulting Engineers
Muskegon - Broken Arrow
Black & Veatch Corporation
Kansas City, Missouri
ORIGATE
Engineering Services

APPROVED: [Signature]
DIRECTOR
DATE 10/28/2011
SHEET 215 OF 261 SHEETS
B&V PROJECT NO. 145120

	4-20mA INPUT TO PLC	4-20mA OUTPUT FROM PLC	CONTACT CLOSURE READ BY PLC	CONTACT CLOSURE PROVIDED BY PLC	CONTROL PANEL DISPLAY	CONTROL PANEL PILOT LIGHT
CV-1 POSITION	X	X			X	
CV-2 POSITION	X	X			X	
VT-1 FLOW	X				X	
VT-2 FLOW	X				X	
FIRE ALARM			X			
FIRE ALARM TROUBLE			X			
SECURITY DOOR SWITCHES			X			
SECURITY DISARM			X			
LAGOON LEVEL	X				X	
DIURNAL BASIN LEVEL	X				X	
WET WELL LEVEL	X				X	
AERATOR #1 ON/OFF STATUS			X			X
AERATOR #1 START/STOP				X		
AERATOR #2 ON/OFF STATUS			X			X
AERATOR #2 START/STOP				X		
FERROUS CHLORIDE PUMP				X		
UTILITY SOURCE #1 FAILURE			X			
UTILITY SOURCE #2 FAILURE			X			
PUMP D-1 ON/OFF STATUS			X			X
PUMP D-1 HIGH TEMP			X			X
PUMP D-1 MOISTURE			X			X
PUMP D-1 START/STOP				X		
PUMP D-2 ON/OFF STATUS			X			X
PUMP D-2 HIGH TEMP			X			X
PUMP D-2 MOISTURE			X			X
PUMP D-2 START/STOP				X		
FUTURE PUMP D-3 ON/OFF STATUS			X			X
FUTURE PUMP D-3 HIGH TEMP			X			X
FUTURE PUMP D-3 MOISTURE			X			X
FUTURE PUMP D-3 START/STOP				X		
PUMP W-1 ON/OFF STATUS			X			X
PUMP W-1 HIGH TEMP			X			X
PUMP W-1 MOISTURE			X			X
PUMP W-1 START/STOP				X		
PUMP W-1 SPEED	X	X			X	
PUMP W-1 VSD FAILURE			X			X
PUMP W-2 ON/OFF STATUS			X			X
PUMP W-2 HIGH TEMP			X			X
PUMP W-2 MOISTURE			X			X
PUMP W-2 START/STOP				X		
PUMP W-2 SPEED	X	X			X	
PUMP W-2 VSD FAILURE			X			X
HIGH HIGH WET WELL ALARM						X
HIGH WET WELL ALARM						X
LOW WET WELL ALARM						X
LOW LOW WET WELL ALARM						X
LOW DIURNAL BASIN ALARM						X
LAGOON HIGH LEVEL ALARM						X
WASTEWATER SAMPLER		X				
HIGH WET WELL MERCURY SWITCH ALARM			X			X



1 PORT SOUTH LIFT STATION CONTROL DIAGRAM
NO SCALE

NOTE:
NEW WORK SHOWN BOLD

NOTES:

- 1 INSTALL 1" CONDUIT WITH (14) #16 THHW CONDUCTORS FOR VALVE STATUS AND POSITION FOR L101-VLT1-VLT01.

2 CONTROL PANEL INPUT/OUTPUT SCHEDULE
NO SCALE

NOTE:
NEW WORK SHOWN BOLD

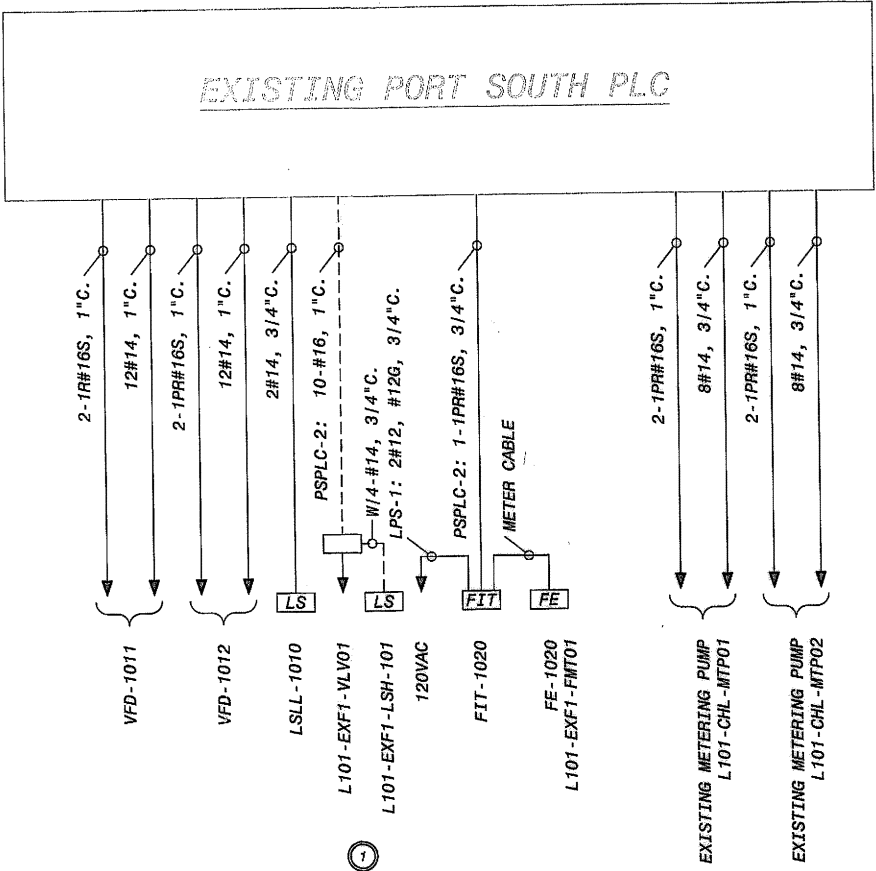
LOWER BIRD CREEK WWTP EXPANSION
TMAA PROJECT NO. ES 2006-01
CONTRACT 1B
PORT SOUTH LIFT STATION
ELECTRICAL
CONTROL PANEL SCHEDULE & LIFT STATION DIAGRAM
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
BLACK & VEATCH
Building a world of difference
Holloway, Updike and Ballen
Consulting Engineers
Muskegon - Broken Arrow
B&V
Black & Veatch Corporation
Kansas City, Missouri

REVISION	BY	DATE	PLAN SCALE:	DRAWN	FLT	APPROVED:
				DESIGNED	AC	
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			FILE: PE04	DRAWING: PE-4		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 216 OF 261 SHEETS



9-23-11



1 **PLC - ONE LINE DIAGRAM**
 NO SCALE

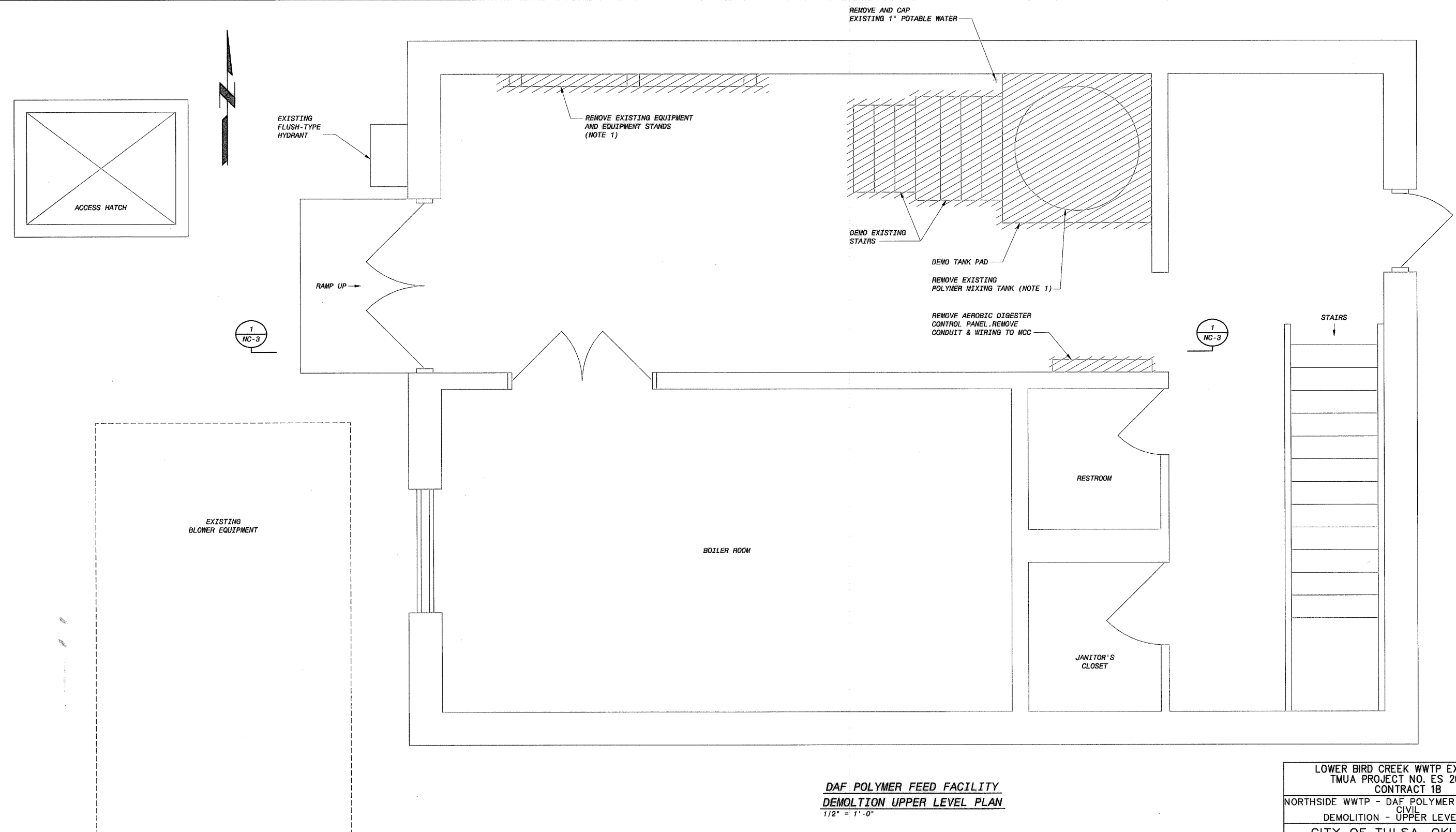
NOTES:

- 1 CONDUIT AND WIRE GOING TO EXCESS FLOW VAULT ARE UNDERGROUND. SEE SHEET SE-5 FOR ROUTING REQUIREMENTS.

 9-23-11	REVISION	BY	DATE	PLAN SCALE:	DRAWN	FLT	APPROVED: DIRECTOR	
				DESIGNED	AC			
				SURVEY				
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				ATLAS PAGE NO:		SHEET 217 OF 261 SHEETS		

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B	
PORT SOUTH LIFT STATION ELECTRICAL PLC - ONE LINE DIAGRAM	
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT	
PLANS AND ESTIMATES PREPARED BY: BLACK & VEATCH Building a world of difference Kansas City, Missouri	
Hatch, Lipke and Bollen Consulting Engineers Muskegon - Broken Arrow	
GATES Engineering Services	

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NOTES:

1. EXISTING POLYMER MIXING TANK, EXISTING EQUIPMENT, EXISTING EQUIPMENT STANDS, AND ASSOCIATED PIPING AND VALVES SHALL BE REMOVED.

DAF POLYMER FEED FACILITY
DEMOLITION UPPER LEVEL PLAN
1/2" = 1'-0"

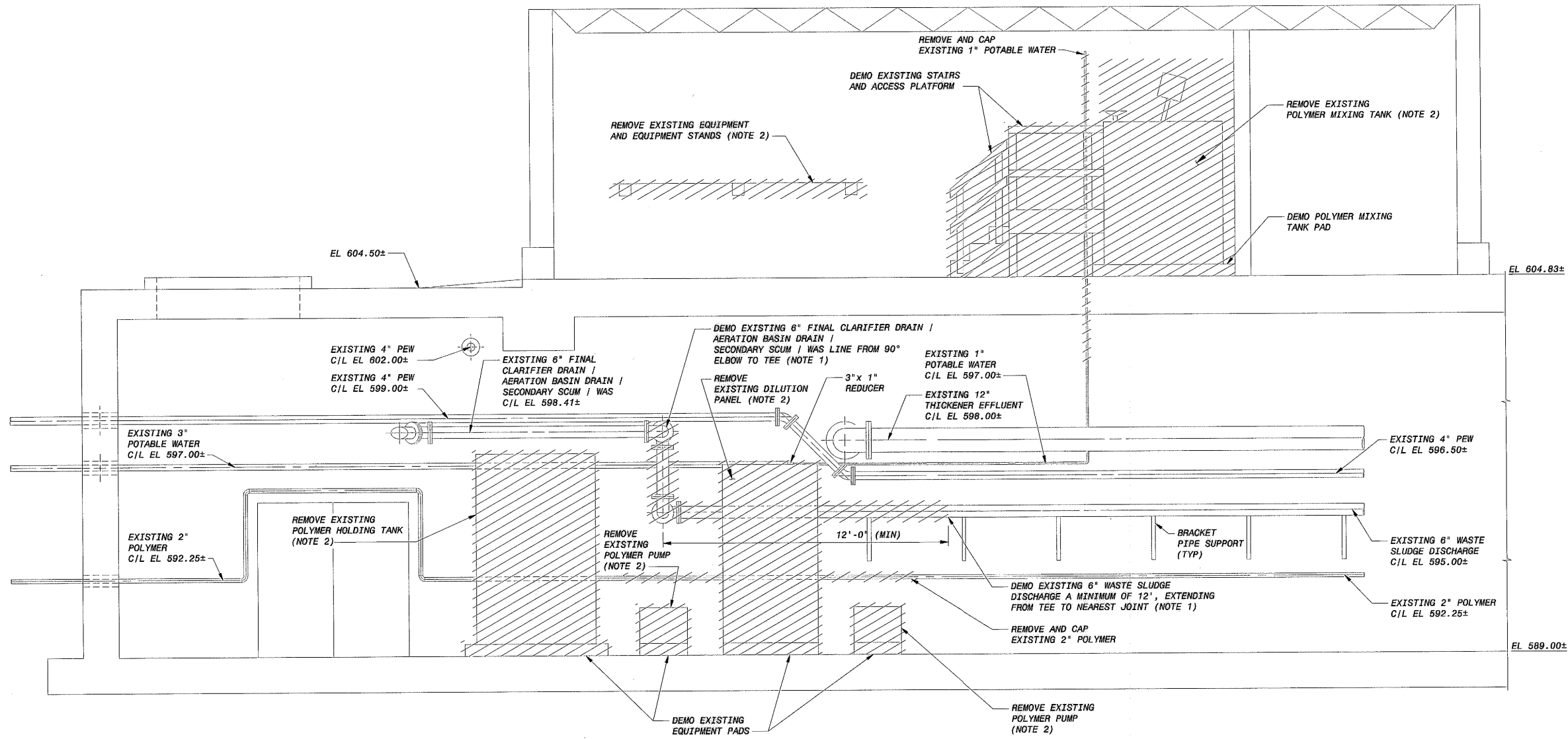
LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B	
NORTHSIDE WWTP - DAF POLYMER FEED FACILITY CIVIL DEMOLITION - UPPER LEVEL PLAN	
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT	
PLANS AND ESTIMATES PREPARED BY:	
BLACK & VEATCH Building a world of difference	Holloway, Updike and Ballou Consulting Engineers Washington - Broken Arrow
DWCATES Engineering Services	

	REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS		APPROVED: DIRECTOR
					DESIGNED	JMS		
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				1" =	PROJ. MGR.			
				VERTICAL	RECOMMENDED:	HAS 10/30/11		
				1" =				
				FILE:	DRAWING: NC-1			DATE 10/28/2011
				ATLAS PAGE NO:				SHEET 218 OF 261 SHEETS

9/28 9-28-11

B&V PROJECT NO. 145120





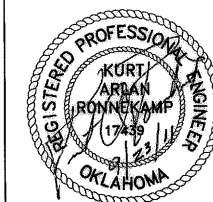
NOTES:

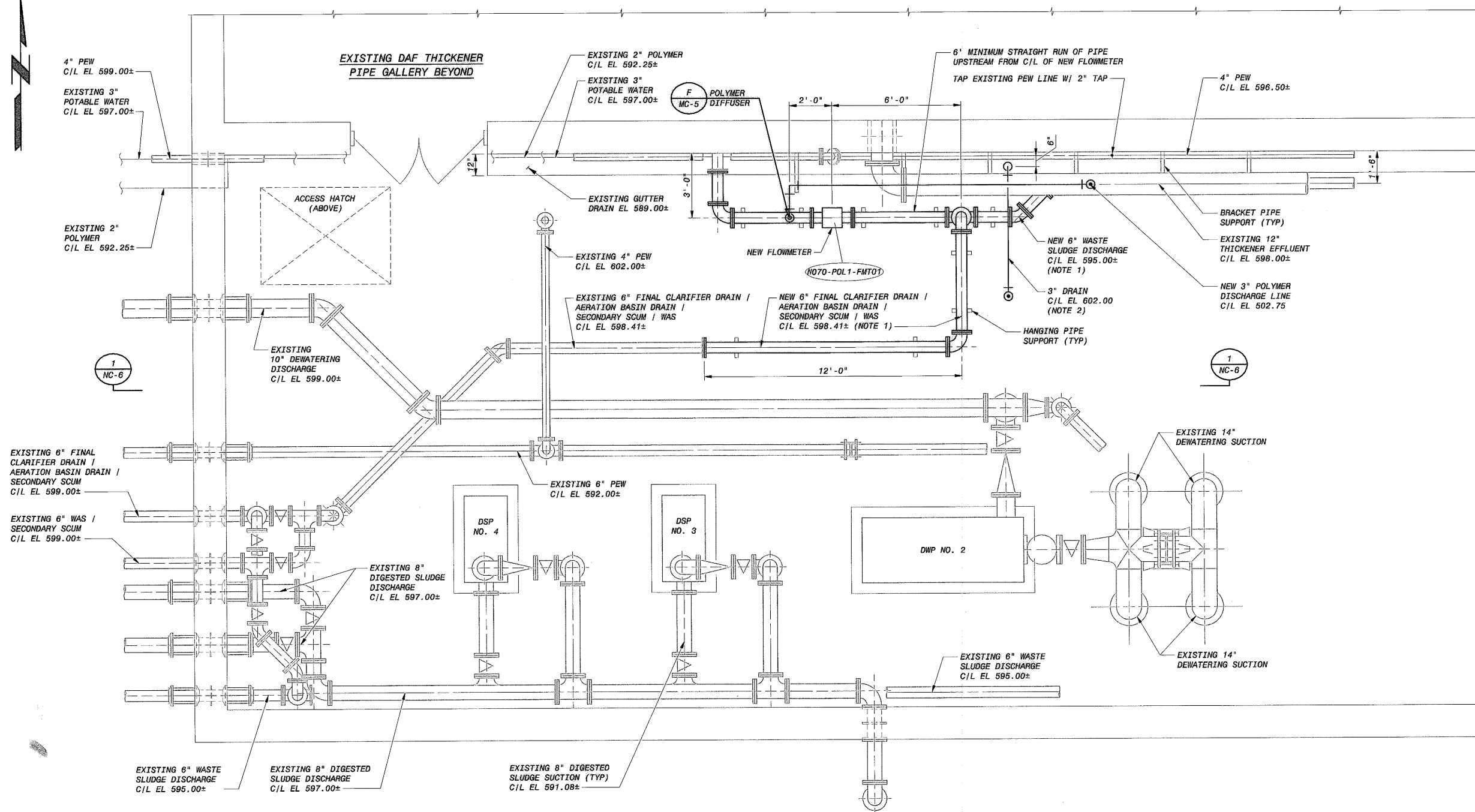
1. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF PIPE. ALL EXISTING PIPE SUPPORTS SHALL BE REMOVED AND REPLACED WITH NEW SUPPORTS AT REVISED LOCATIONS.
2. EXISTING POLYMER TANKS, EXISTING PUMPS, EXISTING DILUTION PANEL, ASSOCIATED PIPING AND VALVES, EXISTING EQUIPMENT, AND EXISTING EQUIPMENT STANDS SHALL BE REMOVED.

SECTION 1
3/8" = 1'-0" NC-1, NC-2

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
NORTHSIDE WWTP - DAF POLYMER FEED FACILITY CIVIL DEMOLITION - SECTIONS AND DETAILS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
BLACK & VEATCH <small>Building a world of difference</small> Black & Veatch Corporation Kansas City, Missouri	Holloway, Updike and Bullen <small>Consulting Engineers</small> Washington - Broken Arrow	BWGATES <small>Engineering Services</small>	

REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
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				SURVEY		
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			ATLAS PAGE NO:			SHEET 220 OF 261 SHEETS



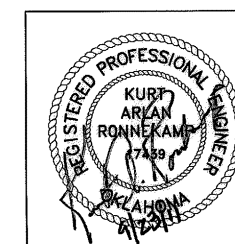


DAF POLYMER FEED FACILITY
LOWER LEVEL PLAN
3/8" = 1'-0"

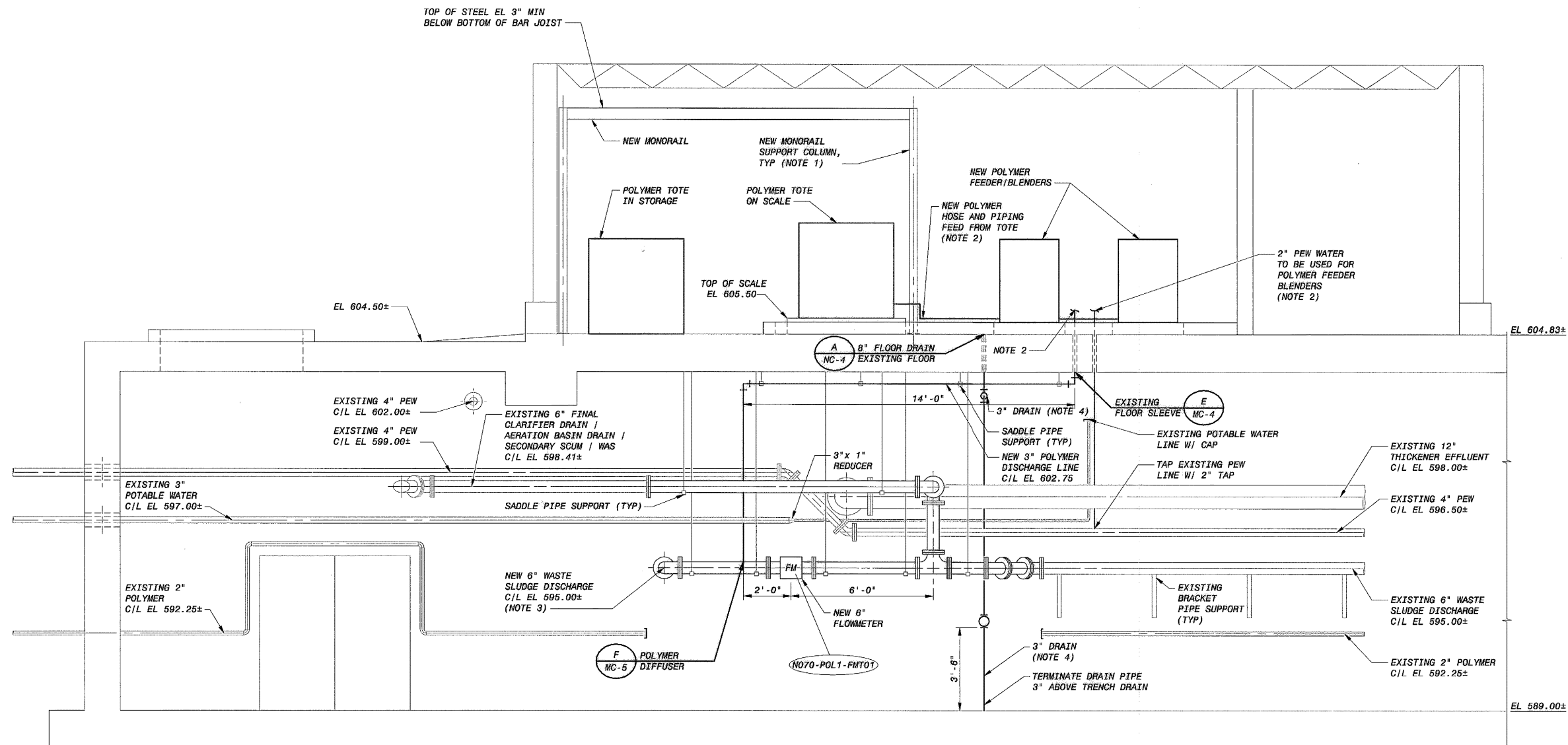
NOTES:

1. CONTRACTOR SHALL PLACE PIPE ELEVATION TO MATCH ELEVATION OF EXISTING PIPE.
2. CONTRACTOR SHALL ROUTE DRAIN PIPE AS NECESSARY TO AVOID CONFLICT WITH EXISTING PIPE.

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B	
NORTHSIDE WWTP - DAF POLYMER FEED FACILITY CIVIL LOWER LEVEL PLAN	
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT	
PLANS AND ESTIMATES PREPARED BY:	
BLACK & VEATCH Building a world of difference	Holloway, Updike and Ballou Consulting Engineers Washington - Broken Arrow
DVGATES Engineering Services	



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
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			VERTICAL	RECOMMENDED:	HAS 10/11	
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			FILE:	DRAWING: NC-5		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 222 OF 261 SHEETS



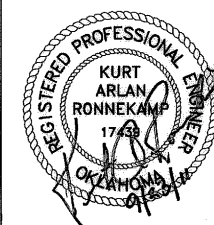
SECTION 1
3/8" = 1'-0" NC-4, NC-5

NOTES:

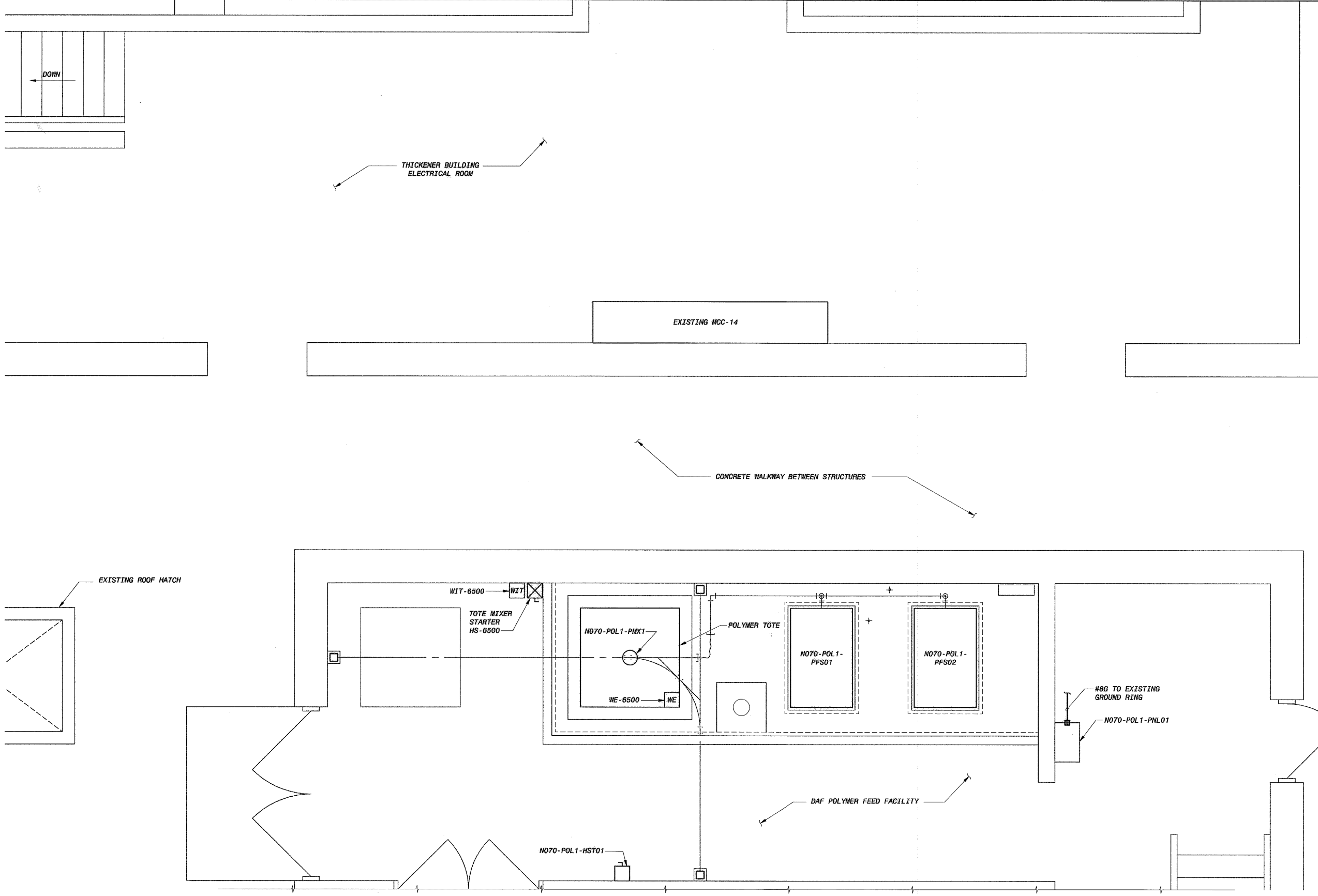
1. MONORAIL SUPPORT COLUMNS AND BEAMS SHALL BE DESIGNED AND FURNISHED BY MONORAIL MANUFACTURER. SUPPORT COLUMNS MAY BE BOLTED TO CMU WALLS FOR LATERAL STABILITY. CONTRACTOR SHALL VERIFY INTERIOR WALL IS Laterally SUPPORTED AT TOP. ASSUME CORES ARE NOT GROUTED AT BOLT LOCATIONS.
2. ROUTING OF PEW WATER TO FEEDER/BLENTERS, AND POLYMER CONNECTIONS TO AND FROM FEEDER/BLENTERS SHALL BE COORDINATED WITH FEEDER/BLENDER MANUFACTURER.
3. CONTRACTOR SHALL PLACE PIPE ELEVATION TO MATCH ELEVATION OF EXISTING PIPE.
4. CONTRACTOR SHALL ROUTE DRAIN PIPE AS NECESSARY TO AVOID CONFLICT WITH EXISTING PIPE.

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
NORTHSIDE WWTP - DAF POLYMER FEED FACILITY CIVIL SECTIONS AND DETAILS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
Black & Veatch Corporation Kansas City, Missouri	Holloway, Updike and Bell Consulting Engineers Muskegon - Broken Arrow	DUGATES Engineering Services	

REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
				DESIGNED	JMS	
				SURVEY		
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			FILE:	DRAWING: NC-5		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 223 OF 261 SHEETS



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NOTES:
 1. SEE DRAWING GE-1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

DAF POLYMER FEED FACILITY
 & THICKENER BUILDINGS
 UPPER LEVEL PARTIAL PLANS
 1/2" = 1'-0"

LOWER BIRD CREEK WWTP EXPANSION
 TMUA PROJECT NO. ES 2006-01
 CONTRACT 1B
 NORTHSIDE WWTP DAF POLYMER FEED FACILITY
 ELECTRICAL
 UPPER LEVEL POWER PLAN
 CITY OF TULSA, OKLAHOMA
 TULSA METROPOLITAN UTILITY AUTHORITY
 ENGINEERING SERVICES DEPARTMENT

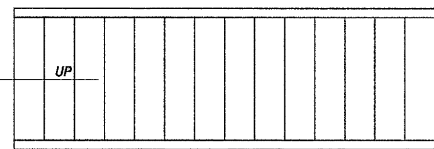
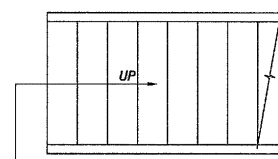
PLANS AND ESTIMATES PREPARED BY:
 BLACK & VEATCH
 Building a world of difference
 Black & Veatch Corporation
 Kansas City, Missouri
 Holloway, Updike and Bolton
 Consulting Engineers
 Muskogee - Broken Arrow
 OKGATES
 Engineering Services



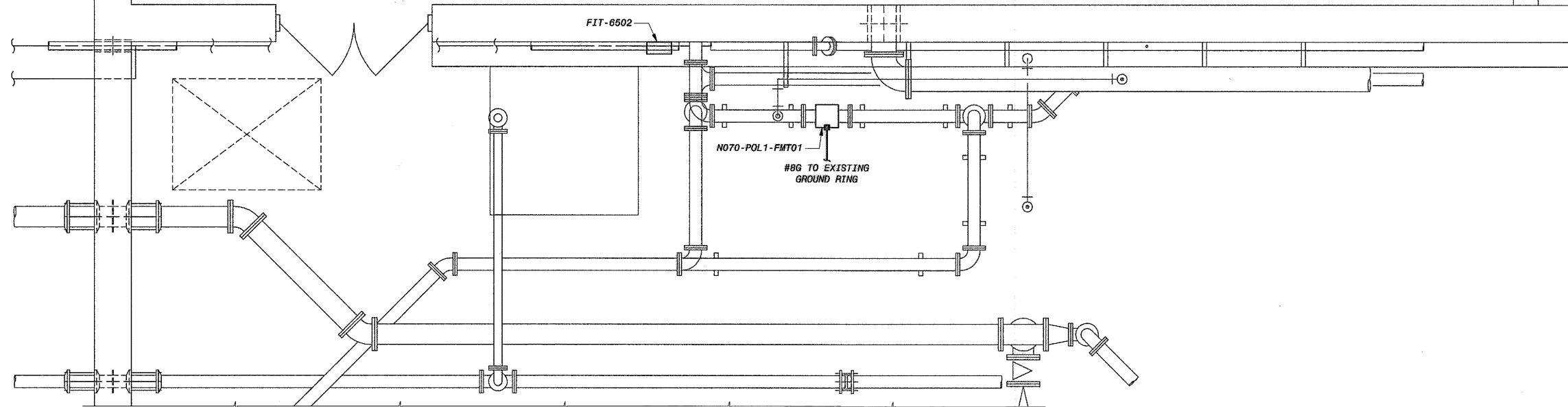
REVISION	BY	DATE

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	SECT. MGR.			
HORIZONTAL:	PROJ. MGR.	BSV D.B./H		
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ATLAS PAGE NO:				SHEET 224 OF 261 SHEETS

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EXISTING MCC-14
LOCATED IN THICKENER BUILDING
ELECTRICAL ROOM ABOVE

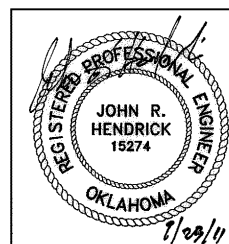


DAF POLYMER FEED FACILITY
LOWER LEVEL PLAN
3/8" = 1' - 0"

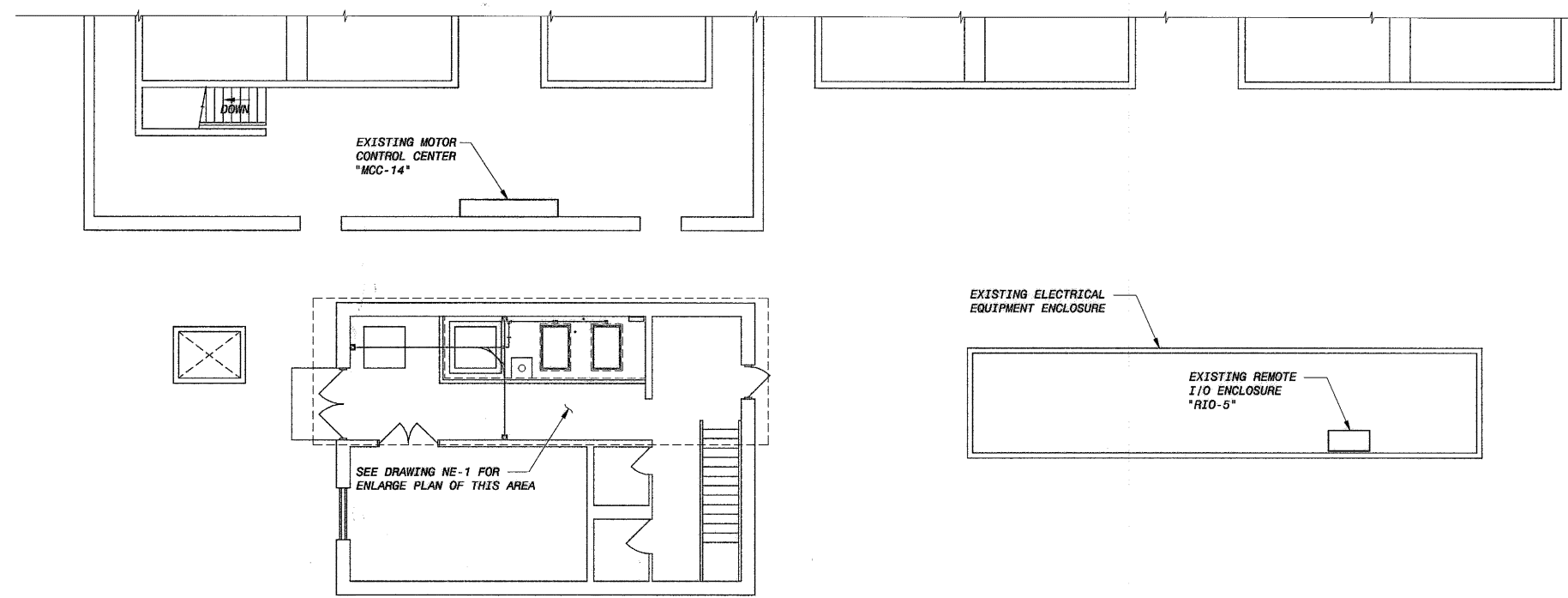
NOTES:
1. SEE DRAWING GE-1 FOR ELECTRICAL LEGEND & ABBREVIATIONS
AND GENERAL REQUIREMENTS.

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
NORTHSIDE WWTP DAF POLYMER FEED FACILITY
ELECTRICAL
LOWER LEVEL POWER PLAN
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
Black & Veatch Corporation
Kansas City, Missouri
Holloway, Updike and Bellon
Consulting Engineers
Muskogee - Broken Arrow
ONGATES
Engineering
Services



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
			DESIGNED	JS		
			SURVEY			
			PROFILE SCALE:	FIELD MGR.	708 10/11	
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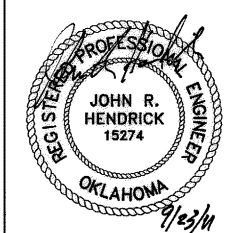
DAF POLYMER FEED FACILITY
& THICKENER BUILDINGS
UPPER LEVEL OVERALL PLAN
1/8" = 1'-0"

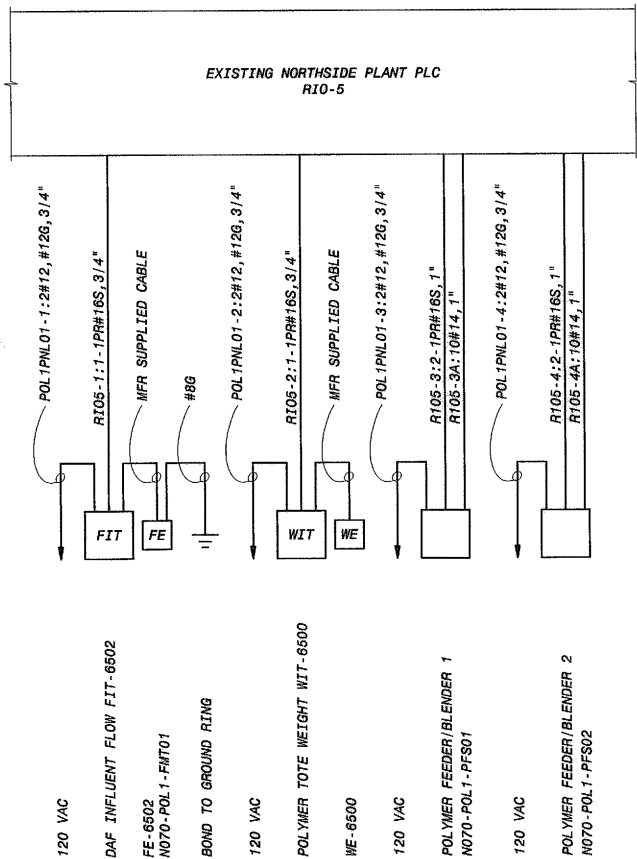
NOTES:
1. SEE DRAWING GE-1 FOR ELECTRICAL LEGEND & ABBREVIATIONS
AND GENERAL REQUIREMENTS.

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
NORTHSIDE WWTP DAF POLYMER FEED FACILITY
ELECTRICAL
OVERALL ELECTRICAL PLAN
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

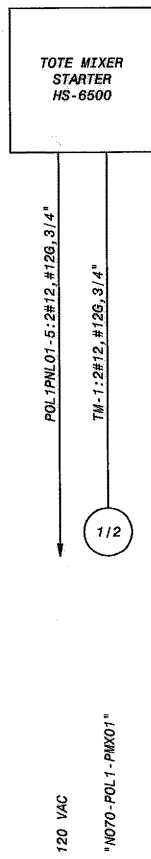
PLANS AND ESTIMATES PREPARED BY:
 **BLACK & VEATCH**
Building a world of difference
Black & Veatch Corporation
Kansas City, Missouri
 **Hollway, Updike and Sellen**
Consulting Engineers
Muskegon - Broken Arrow
 **GATES**
Engineering
Service

REVISION				BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
							DESIGNED	JS	
							SURVEY		
						PROFILE SCALE:	FIELD MGR.	705 10/11	
						HORIZONTAL:	SECT. MGR.		
						1" =	PROJ. MGR.	231 10/11	
						VERTICAL	RECOMMENDED:	105 10/11	
						1" =			
						FILE:	DRAWING: NE-3		DATE 10/28/2011
						ATLAS PAGE NO:			SHEET 226 OF 261 SHEETS

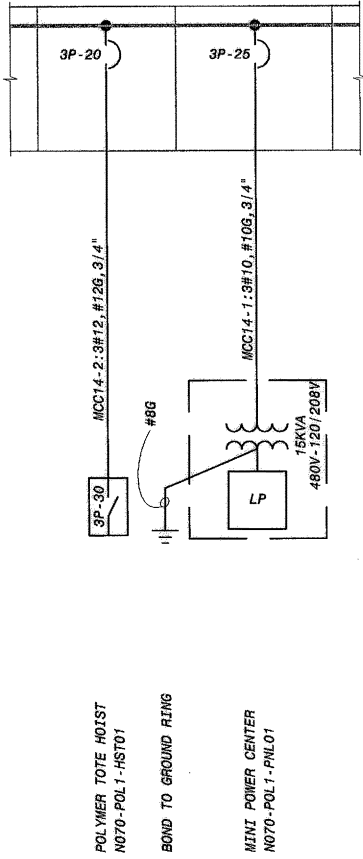




EXISTING NORTHSIDE PLANT
 PLC RIO-5 ONE-LINE DIAGRAM

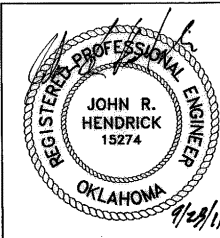


TOTE MIXER STARTER
 ONE-LINE DIAGRAM



EXISTING MCC-14
 PARTIAL ONE-LINE DIAGRAM

- NOTES:**
- SEE DRAWING GE-1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
 - CONTRACTOR SHALL INSTALL NEW CIRCUIT BREAKERS IN EXISTING MCC-14 SPACE OR UTILIZE EXISTING SPARE BREAKERS IF AVAILABLE.

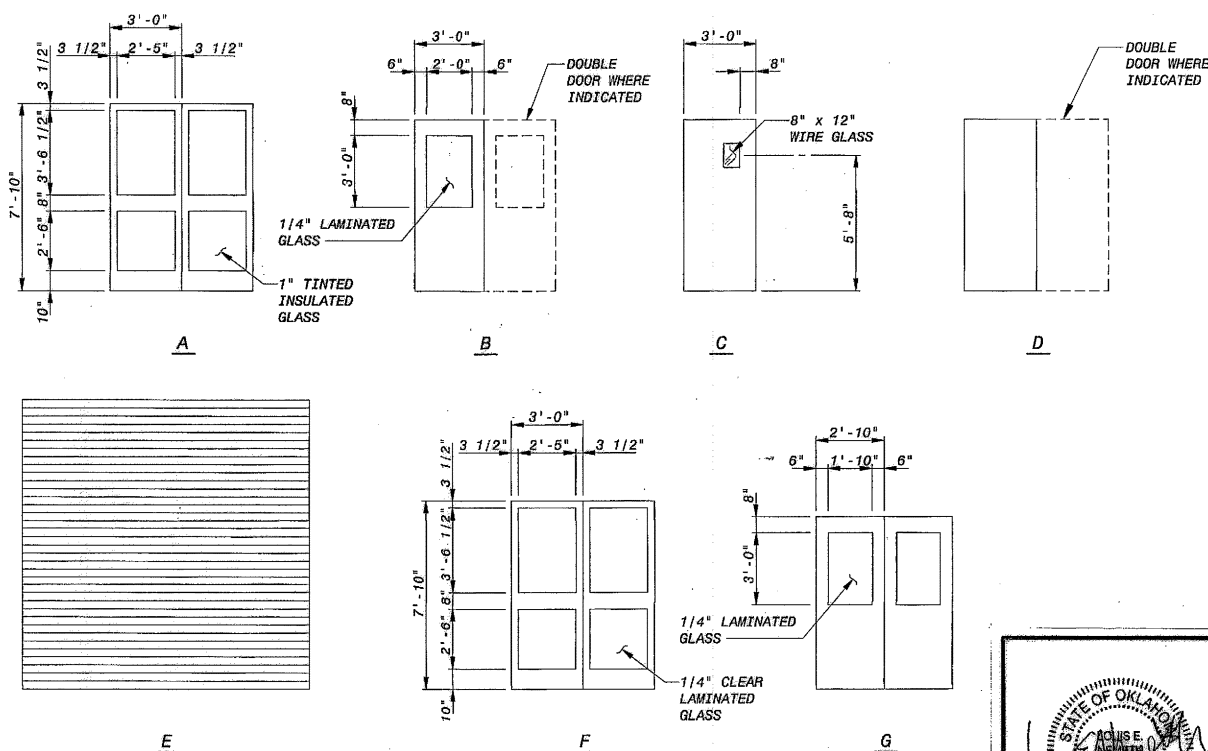


REVISION	BY	DATE	PLAN SCALE:	DRAWN	KMA	APPROVED:
			DESIGNED	SDS		
			SURVEY			
			PROFILE SCALE:	FIELD MGR.	705 10/11	
			HORIZONTAL:	SECT. MGR.	20/10/11	
			1" =	PROJ. MGR.	HAS 10/30/11	
			VERTICAL	RECOMMENDED:		
			1" =			
			FILE:	DRAWING: NE-4		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 227 OF 261 SHEETS

LOWER BIRD CREEK WWTP EXPANSION
 TMUA PROJECT NO. ES 2006-01
 CONTRACT 1B
 NORTHSIDE WWTP DAF POLYMER FEED FACILITY
 ELECTRICAL
 ONE-LINE DIAGRAMS
 CITY OF TULSA, OKLAHOMA
 TULSA METROPOLITAN UTILITY AUTHORITY
 ENGINEERING SERVICES DEPARTMENT
 PLANS AND ESTIMATES PREPARED BY:
 BLACK & VEATCH
 Building a world of difference
 Holloway, Updike and Batton
 Consulting Engineers
 Muskogee - Broken Arrow
 BINGATES
 Engineering Services

ROOM FINISH SCHEDULE																			
ROOM NO.	ROOM NAME	FLOOR		WALLS												CEILING			REMARKS
				NORTH			EAST			SOUTH			WEST						
		MATRL	FINISH	MATRL	FINISH	BASE	MATRL	FINISH	BASE	MATRL	FINISH	BASE	MATRL	FINISH	BASE	MATERL	FINISH	HEIGHT	
OPERATIONS BUILDING																			
A101	PUBLIC WAITING AREA	CO	RF	WS-CB	FF	NO	WS	FF	NO	WS	FF	NO	WS	FF	NO	SA	FF	9'-9"	
A102	OPEN OFFICE AREA	CO	CP	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A103	HALLWAY	CO	CP	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A104	OFFICE	CO	CP	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A105	OFFICE AND CONTROL ROOM	CO	CP	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A106	MENS LOCKER	CO	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	SA	FF	9'-6"	TILE BACKER BD AT SHOWER
A107	MEN	CO	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	SA	FF	9'-6"	
A108	WOMEN	CO	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	SA	FF	9'-6"	
A109	WOMENS LOCKER	CO	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	WRGB	WT-PT	MT	SA	FF	9'-6"	TILE BACKER BD AT SHOWER
A110	JANITOR	CO	RF	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A111	MECH	CO	FS	CB	PT	RB	CB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A112	ELEC ROOM	CO	FS	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A113	STORAGE	CO	RF	CB	PT	NO	CB	PT	NO	CB	PT	NO	CB	PT	NO	CO	PT	8'-8"	
A114	LUNCH ROOM	CO	RF	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A115	SAMPLE ROOM	CO	RF	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
A116	OPERATIONS LABORATORY	CO	RF	GB	PT	RB	GB	PT	RB	GB	PT	RB	GB	PT	RB	SA	FF	9'-6"	
HEADWORKS BUILDING																			
H001	STAIR NO 1	CO	FS	CB	PT	NO	CB	PT	NO	CB	PT	NO	CB	PT	NO	CO	PT	41'-8"	
H002	GRIT LOADING ROOM	CO	FS	CB	EP	NO	CO-CB	EP	NO	CO-CB	EP	NO	CB	EP	NO	CO	EP	28'-8"	
H003	ELECTRICAL ROOM	CO	FS	CB	PT	NO	CB	PT	NO	CB	PT	NO	CB	PT	NO	CO	PT	11'-4"	
H004	GRIT PUMP ROOM	CO	FS	CB	EP	NO	CO	EP	NO	CB	EP	NO	CO	EP	NO	CO	EP	18'-2"	
H005	RESTROOM	CO	FS	CB	PT	NO	CB	PT	NO	CB	PT	NO	CB	PT	NO	CO	PT	8'-8"	
H006	MEZZANINE	CO	FS	CO-CB	PT	NO	CB	PT	NO	-	-	-	CB	PT	NO	CO	PT	11'-4"	
H101	STAIR NO 1	CO	FS	CB	PT	NO	CB	PT	NO	CB	PT	NO	CB	PT	NO	CO	PT	41'-8"	
H102	WALKWAY	CO	FS	CB	-	NO	CB	-	NO	CB	-	NO	-	-	NO	CO	PT	17'-0"	
H103	DEWATERING ROOM	CO	FS	CB	EP	NO	CB	EP	NO	CB	EP	NO	CB	EP	NO	CO	EP	17'-0"	
H104	SCREEN ROOM	CO	FS	CB	EP	NO	CB	EP	NO	CB	EP	NO	CB	EP	NO	CO	EP	17'-0"	
SLUDGE TRANSFER PUMP STATION																			
T101	ELECTRICAL ROOM	CO	FS	CB	PT	NO	GB	PT	RB	GB	PT	RB	CB	PT	NO	MD	FF	17'-4"	
T102	PUMP ROOM	CO	FS	CB	PT	NO	CO-CB	PT	NO	CO-CB	PT	NO	CO-CB	PT	NO	MD	FF	17'-4"	
MATERIAL & FINISH LEGEND																			
AL - ALUMINUM CP - CARPET FS - FLOOR SEALER HM - HOLLOW METAL NO - NONE RB - RUBBER COVE BASE WRGB - WATER RESISTANT GYPSUM BOARD																			
CB - CONCRETE BLOCK EP - EPOXY PAINT GB - GYPSUM BOARD MD - METAL DECK PT - PAINT RF - RESILIENT FLOOR WS - WINDOW STOREFRONT																			
CO - CONCRETE FF - FACTORY FINISH GBK - GLASS BLOCK MT - MOSAIC TILE RA - ROLLING ALUMINUM SA - SUSPENDED ACOUSTICAL TILE WT - WALL TILE																			
FRP - FIBERGLASS REINFORCED PLASTIC																			

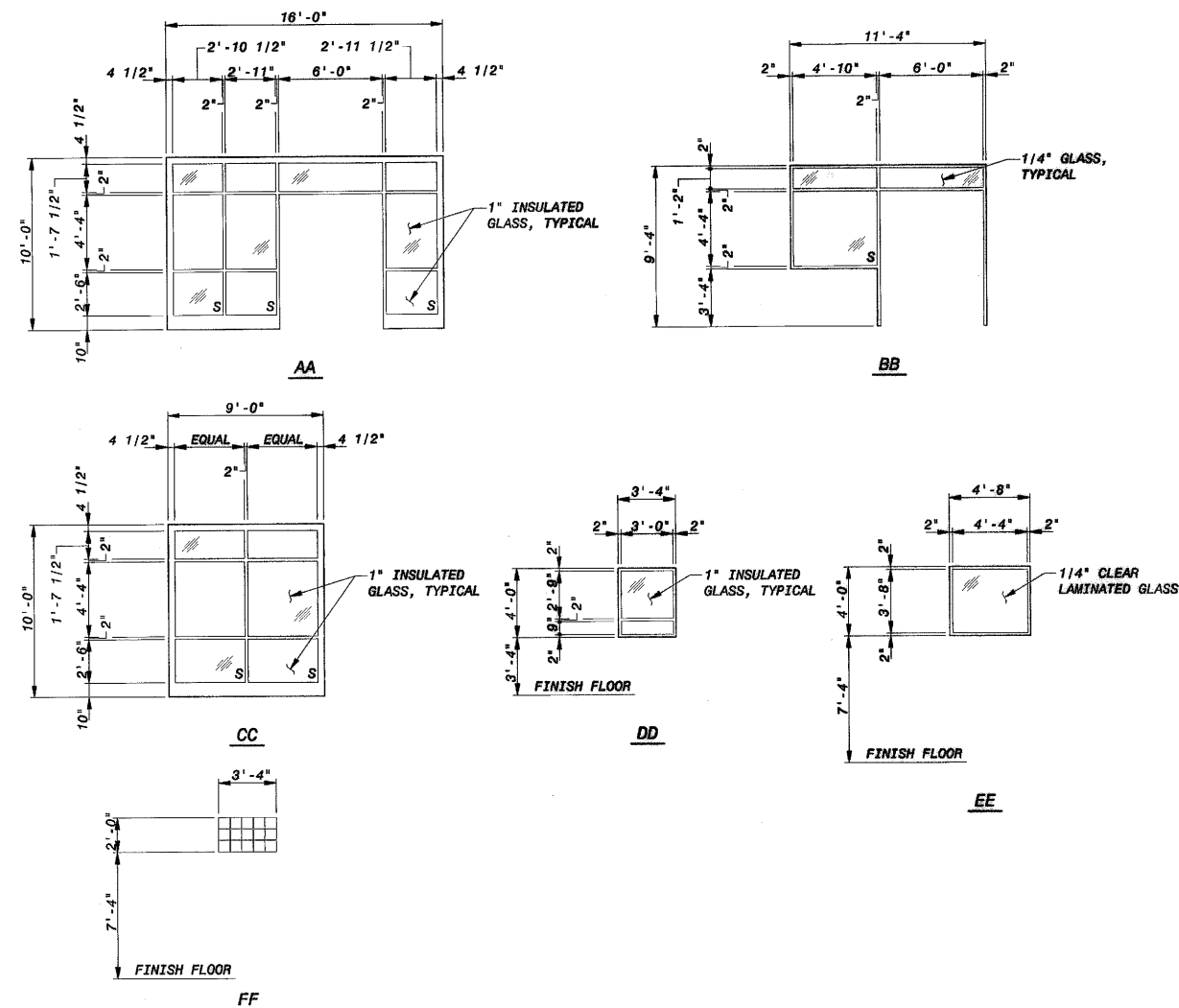
LOUVER SCHEDULE							
No. (L)	OPENING (WxH)	LOUVER					REMARKS
		TYPE	HEAD	JAMB	SILL	TOP ELEV	
OPERATIONS BUILDING							
A 101	1'-4" x 1'-4"	AL	58	59	60	EL 597.43	
A 102	1'-4" x 1'-4"	AL	58	59	60	EL 597.43	
HEADWORKS BUILDING							
H 001	2'-8" x 2'-8"	AL	61	62	63	EL 608.00	
H 002	3'-4" x 5'-4"	AL	67	68	69	EL 598.67	
H 003	2'-8" x 2'-8"	AL	61	62	63	EL 608.00	
H 004	6'-4" x 2'-8"	AL	61	62	63	EL 607.33	
H 101	3'-4" x 2'-8"	AL	61	64	65	EL 629.33	
H 102	3'-4" x 2'-8"	AL	61	64A	65A	EL 619.33	
H 103	3'-4" x 2'-8"	AL	61	64A	65A	EL 619.33	
SLUDGE TRANSFER PUMP STATION							
T 101	8'-0" x 4'-0"	AL	30	68 SIM	69 SIM	EL 584.50	
RETURN SLUDGE PUMP STATION							
B 101	3'-4" x 3'-4"	AL	70	71	72	EL 593.55 ±	
B 102	3'-4" x 3'-4"	AL	70	71	72	EL 597.55 ±	



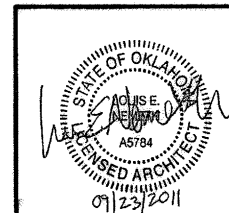
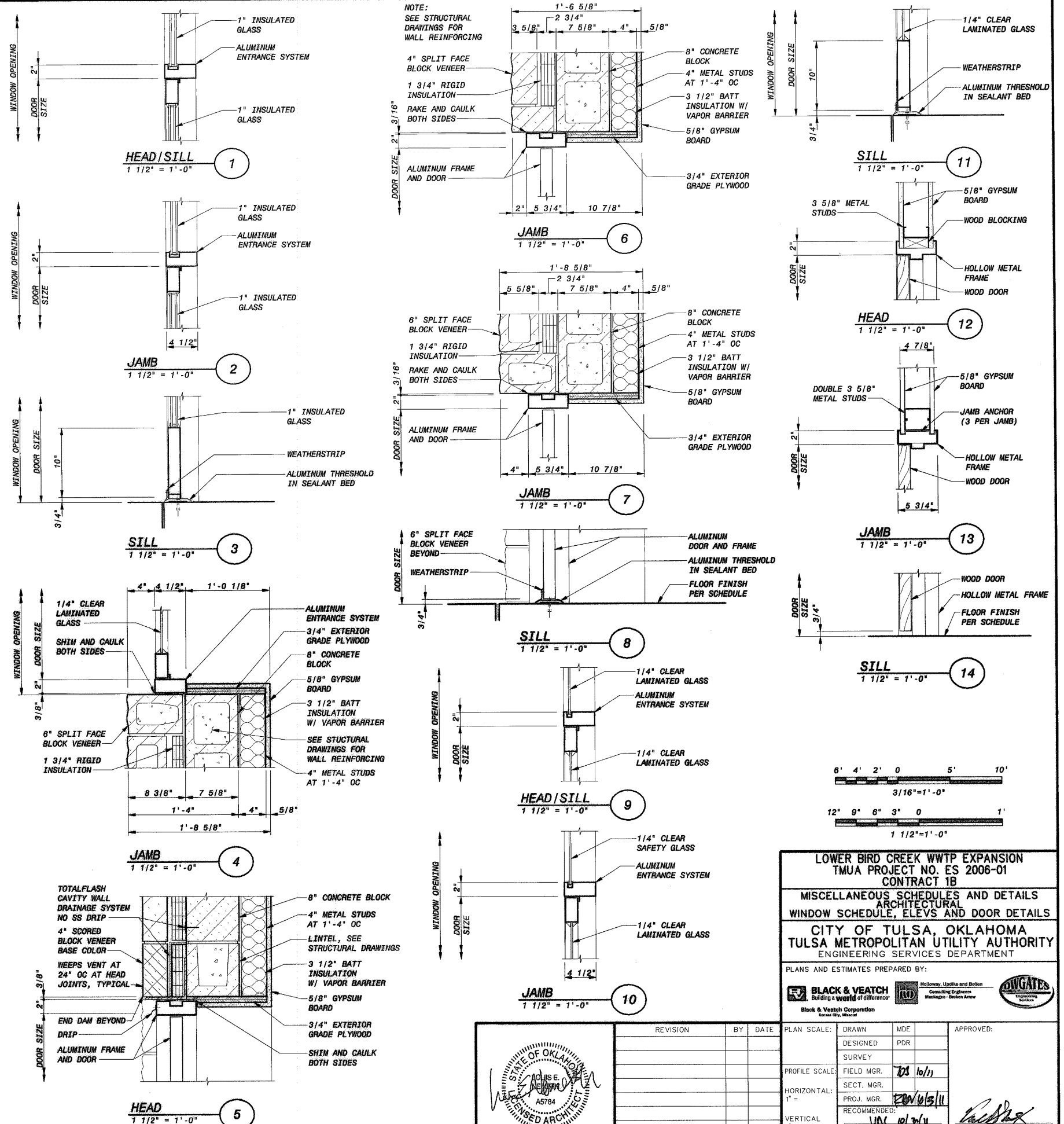
DOOR ELEVATIONS
7/4" = 1'-0"

DOOR SCHEDULE														
No. (D)	DOOR SIZE	DOOR					FRAME		LABEL	HDWR	REMARKS			
		TYPE	HEAD	JAMB	SILL	ELEV	TYPE	SIZE						
NOTE: ALL DOOR HARDWARE IN THE OPERATIONS BUILDING SHALL COMPLY WITH ACCESSIBILITY REQUIREMENTS PER ANSI A117.1														
OPERATIONS BUILDING														
A 101	PR 3'-0" x 7'-10"	AL	1	2	3	A	AL	4 1/2"	-	A	SEE SPEC 08120			
A 102	PR 3'-0" x 7'-10"	AL	9	4/10	11	F	AL	4 1/2"	-	A	SEE SPEC 08120			
A 103	3'-0" x 7'-2"	AL	5	6/7	8	B	AL	5 3/4"	-	1				
A 104	3'-0" x 7'-2"	AL	5	6/7	8	B	AL	5 3/4"	-	1				
A 105	3'-0" x 7'-2"	WD	12	13	14	B	HM	5 3/4"	-	2				
A 106	3'-0" x 7'-2"	WD	12	13	14	B	HM	5 3/4"	-	2	TORNADO RESISTANT			
A 107	3'-0" x 7'-2"	WD	12	13	14	B	HM	5 3/4"	-	4				
A 108	3'-0" x 7'-2"	HM	15	16	14 SIM	D	HM	5 3/4"	-	5				
A 109	3'-0" x 7'-2"	WD	12	13	14	D	HM	5 3/4"	-	6				
A 110	3'-0" x 7'-2"	WD	12	13	14	D	HM	5 3/4"	-	6				
A 111	3'-0" x 7'-2"	WD	12	13	14	D	HM	5 3/4"	-	4				
A 112	3'-0" x 7'-2"	WD	12	13	14	D	HM	5 3/4"	-	2				
A 113	3'-0" x 7'-2"	WD	12	13	14	D	HM	5 3/4"	-	2				
A 114	3'-0" x 7'-2"	WD	12	13	14	B	HM	5 3/4"	-	3				
A 115	3'-0" x 7'-2"	WD	12	13	14	B	HM	5 3/4"	-	3				
HEADWORKS BUILDING														
H 001	PR 3'-0" x 7'-2"	FRP	17	18	19	D	FRP	5 3/4"	-	9				
H 002	12'-0" x 14'-0"	RA	20	21/22	23	E	AL	-	-	-	MOTOR OPERATED			
H 003	3'-0" x 7'-2"	FRP	17	18	19	D	FRP	5 3/4"	-	10				
H 004	PR 3'-0" x 7'-10"	FRP	24	18	19	D	FRP	5 3/4"	-	7				
H 005	PR 3'-0" x 7'-10"	FRP	24	18	19	D	FRP	5 3/4"	-	7				
H 006	12'-0" x 14'-0"	RA	20	21/22	23	E	AL	-	-	-	MOTOR OPERATED			
H 007	3'-0" x 7'-2"	FRP	25	26	27	C	FRP	5 3/4"	1 HR	12				
H 008	PR 3'-0" x 7'-2"	FRP	25	26	27	B	FRP	5 3/4"	-	11				
H 009	3'-0" x 7'-2"	FRP	25	26	27	D	FRP	5 3/4"	-	14				
H 010	3'-0" x 7'-2"	FRP	25	26	27	C	FRP	5 3/4"	1 HR	12				
H 101	PR 3'-0" x 7'-2"	FRP	28	29	19 SIM	D	FRP	5 3/4"	-	9				
H 102	PR 2'-10" x 7'-2"	FRP	28	29	19 SIM	G	FRP	5 3/4"	-	15				
H 103	3'-0" x 7'-2"	FRP	31	32	33	C	FRP	5 3/4"	-	10				
H 104	3'-0" x 7'-2"	FRP	31	32	33	C	FRP	5 3/4"	1 HR	13				
H 105	3'-0" x 7'-2"	FRP	25	26	27	C	FRP	5 3/4"	1 HR	12				
SLUDGE TRANSFER PUMP STATION														
T 101	PR 3'-0" x 7'-10"	FRP	17 SIM	18 SIM	19 SIM	B	FRP	5 3/4"	-	7				
T 102	PR 3'-0" x 7'-10"	FRP	17 SIM	18 SIM	19 SIM	B	FRP	5 3/4"	-	7				
T 103	3'-0" x 7'-2"	FRP	25	26	27	B	FRP	5 3/4"	-	8				
RETURN SLUDGE PUMP STATION														
B 101	3'-0" x 7'-2"	HM	73	74	75	B	HM	5 3/4"	-	16				
B 102	3'-0" x 7'-2"	HM	73	74	75	B	HM	5 3/4"	-	16				

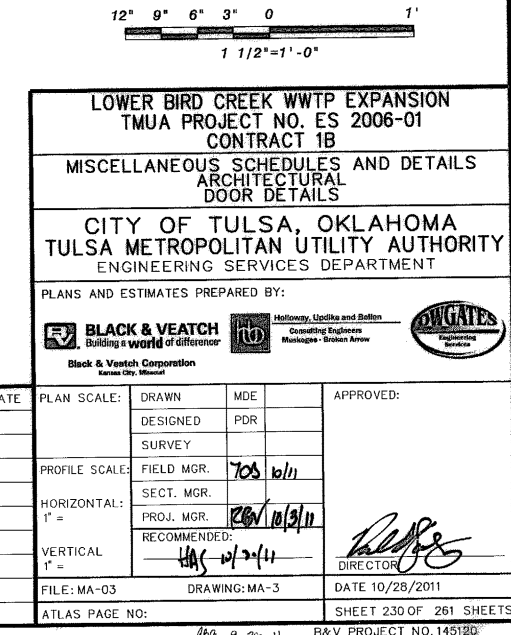
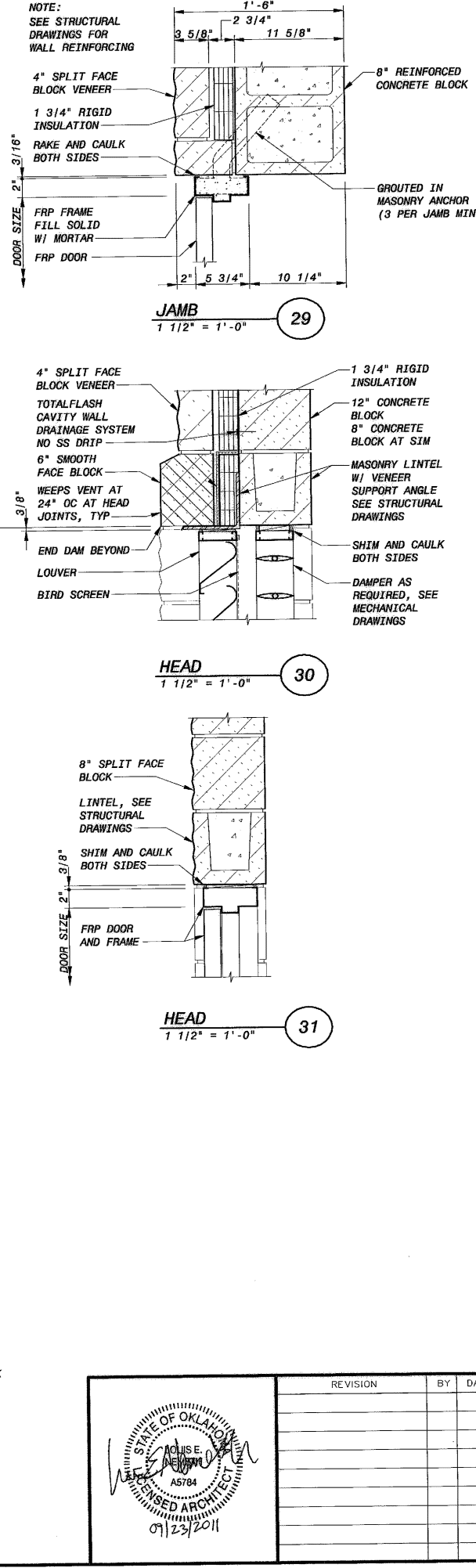
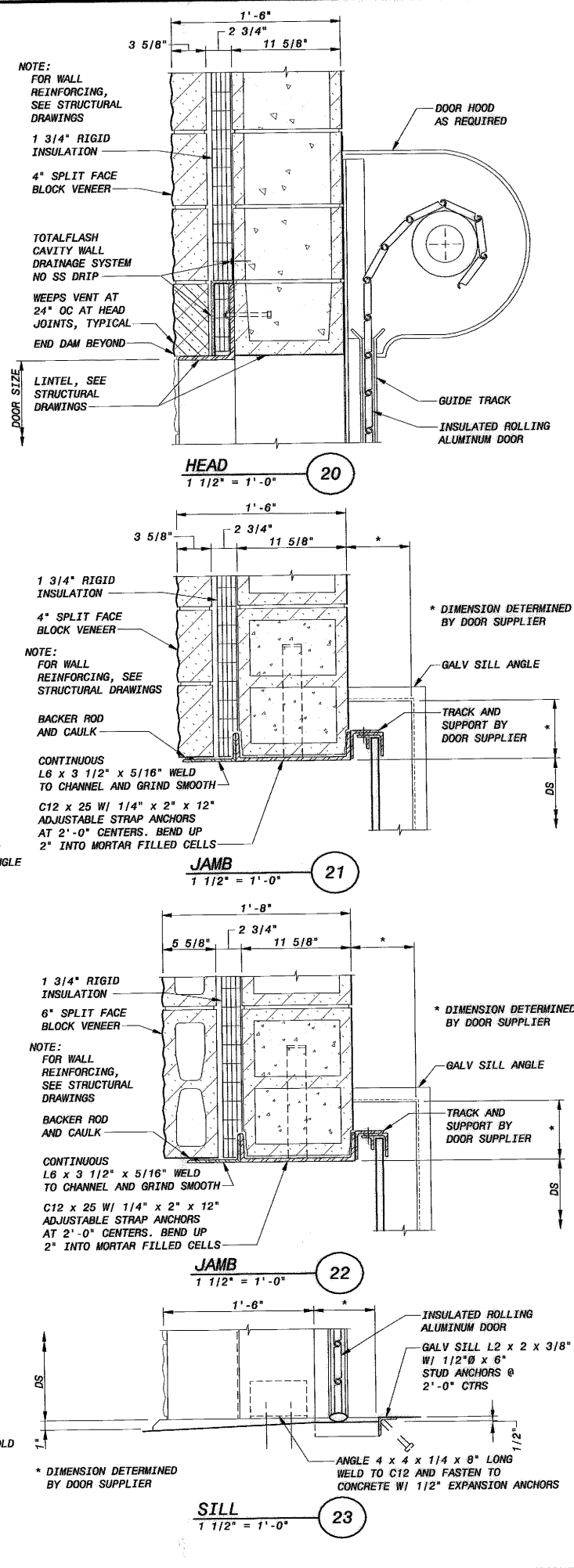
WINDOW SCHEDULE									
NO. (W)	OPENING (WxH)	WINDOW							REMARKS
		TYPE	HEAD	JAMB	SILL	MULL	ELEV	GLASS	
OPERATIONS BUILDING									
A 101	16'-0" x 10'-0"	AL	34	2/35	37	36	AA	1" TINTED INSULATED	
A 102	11'-4" x 9'-4"	AL	38	10/39	9/40	41	BB	1/4" CLEAR LAMINATED	
A 103	9'-0" x 10'-0"	AL	34 SIM	35/42	37	36	CC	1" TINTED INSULATED	
A 104	9'-0" x 10'-0"	AL	34 SIM	35/42	37	36	CC	1" TINTED INSULATED	
A 105	3'-4" x 4'-0"	AL	43	44	45	36	DD	1" TINTED INSULATED	
A 106	3'-4" x 4'-0"	AL	43	44	45	36	DD	1" TINTED INSULATED	
A 107	3'-4" x 2'-0"	GBK	46	47	48	-	FF	GLASS BLOCK	
A 108	3'-4" x 2'-0"	GBK	46	47	48	-	FF	GLASS BLOCK	
A 109	3'-4" x 4'-0"	AL	43	44	45	36	DD	1" TINTED INSULATED	
A 110	3'-4" x 4'-0"	AL	43	44	45	36	DD	1" TINTED INSULATED	
A 111	3'-4" x 4'-0"	AL	43	44	66	36	DD	1" TINTED INSULATED	
A 112	3'-4" x 4'-0"	AL	43	44	45	36	DD	1" TINTED INSULATED	
HEADWORKS BUILDING									
H 001	3'-4" x 4'-0"	AL	49	50	51	36	DD	1" TINTED INSULATED	
H 002	3'-4" x 4'-0"	AL	49	50	51	36	DD	1" TINTED INSULATED	
H 101	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 102	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 103	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 104	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 105	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 106	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 107	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 108	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 109	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 110	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 111	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 112	3'-4" x 4'-0"	AL	52	53	54	36	DD	1" TINTED INSULATED	
H 113	4'-8" x 4'-0"	AL	55	56	57	-	EE	1/4" CLEAR LAMINATED	



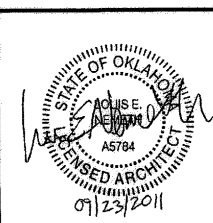
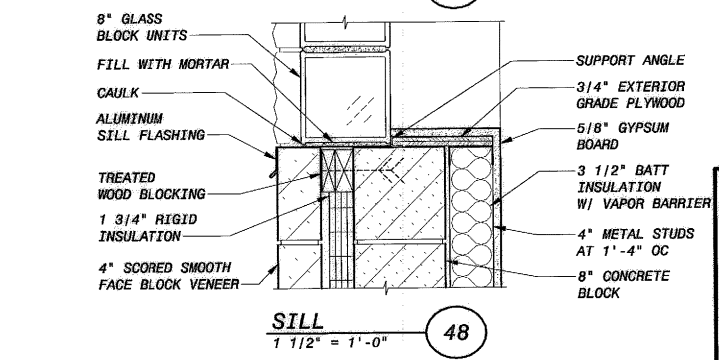
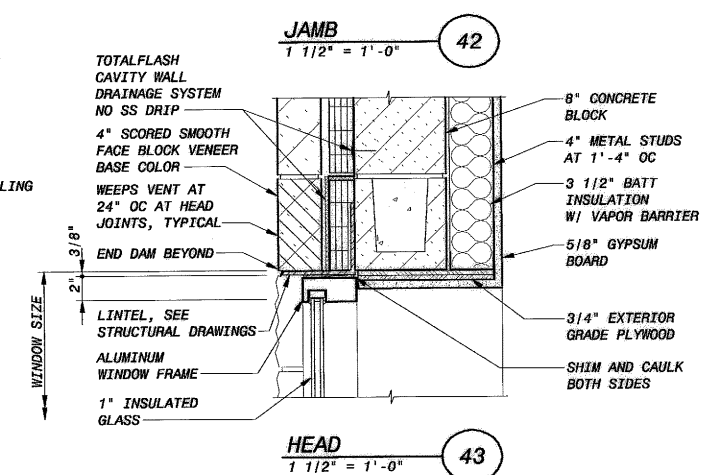
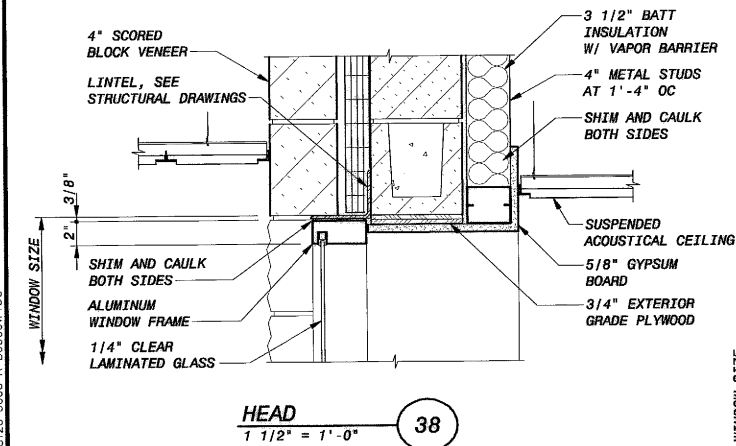
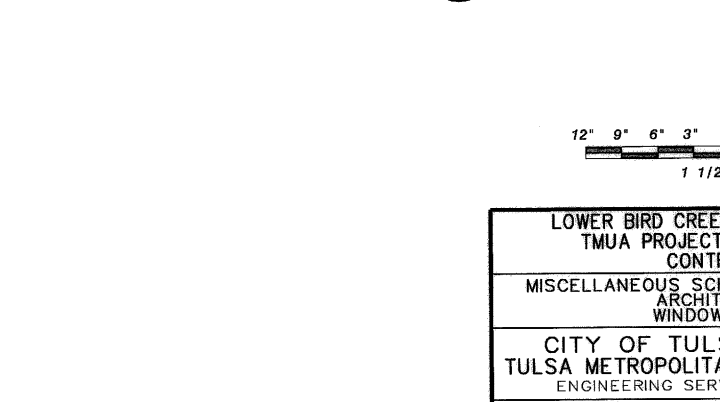
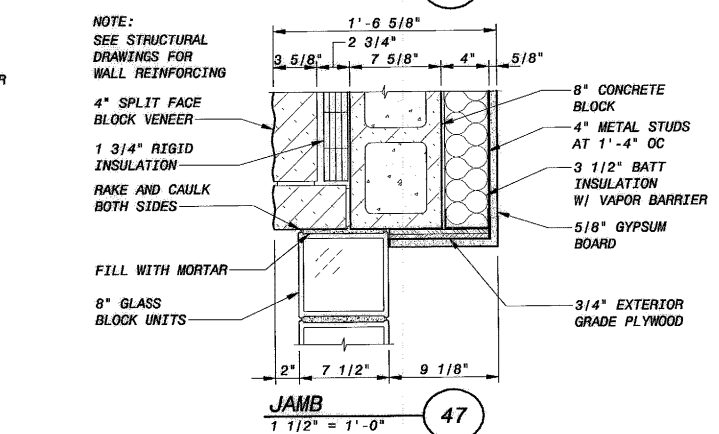
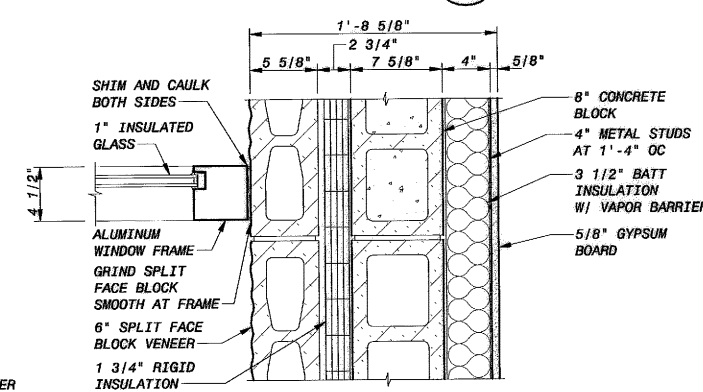
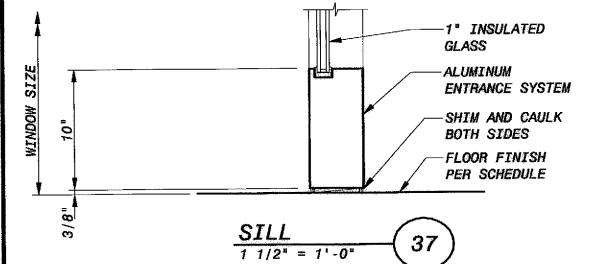
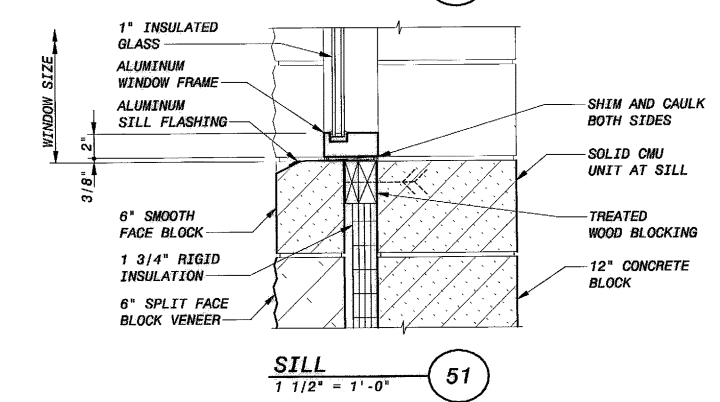
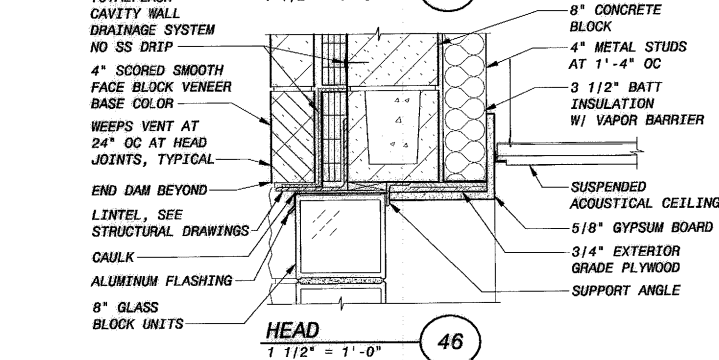
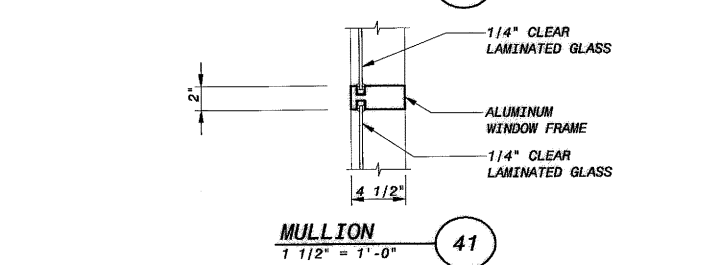
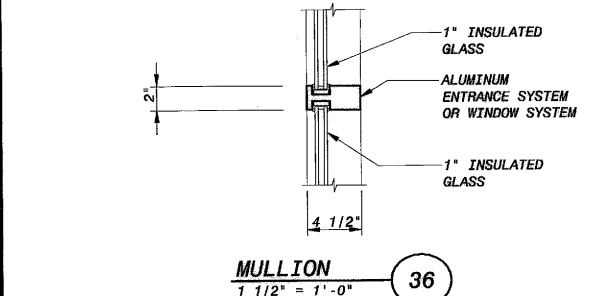
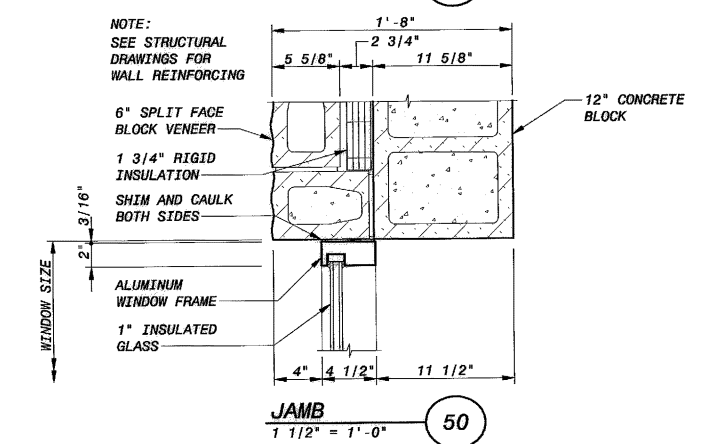
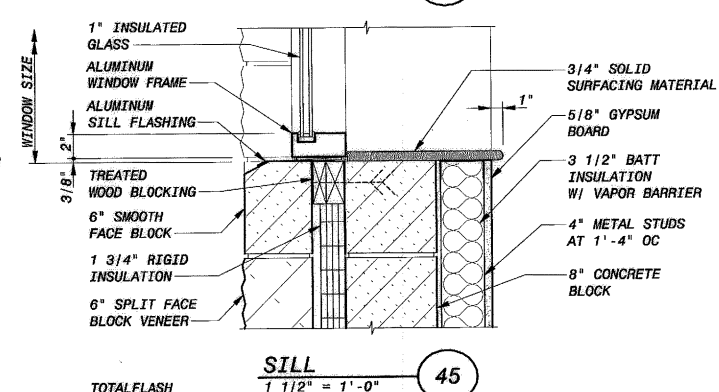
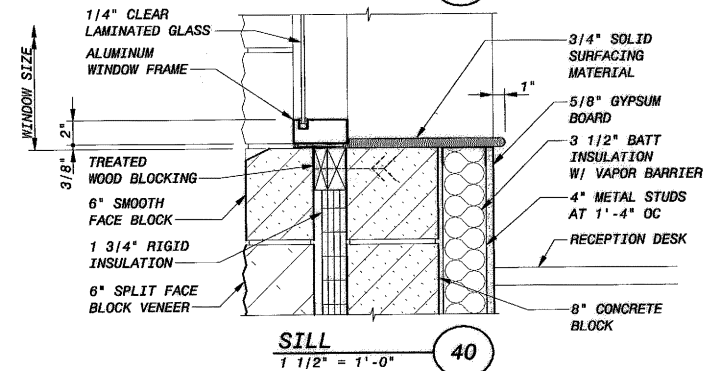
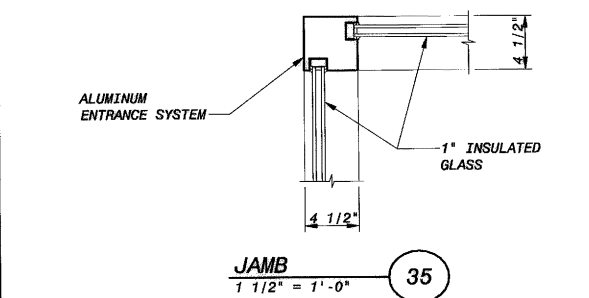
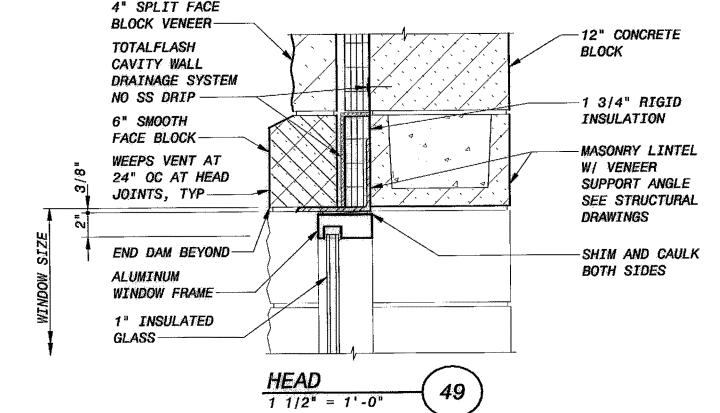
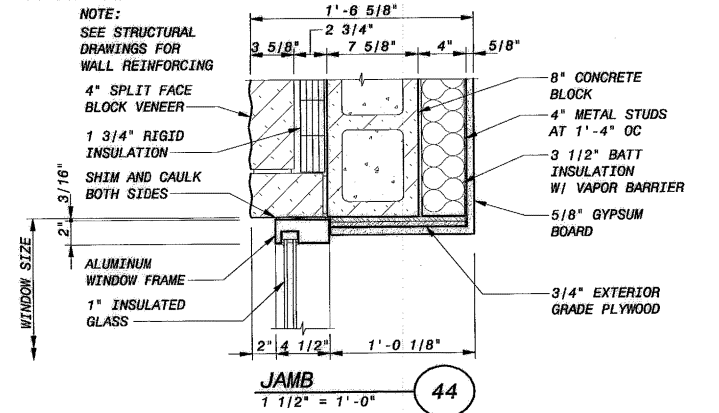
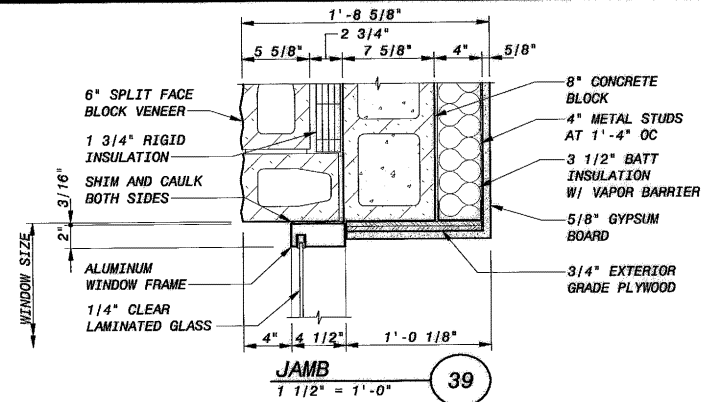
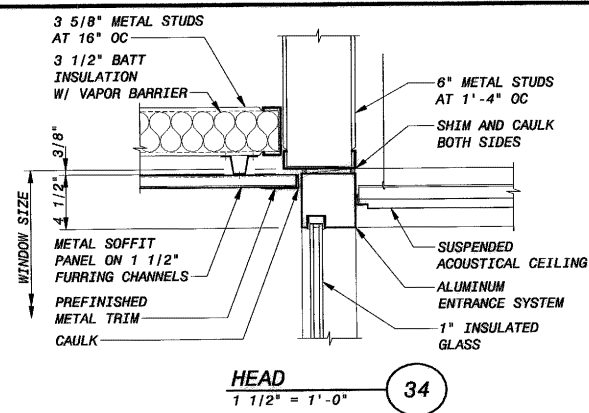
WINDOW ELEVATIONS
3/16" = 1'-0"



LOWER BIRD CREEK WWTW EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
MISCELLANEOUS SCHEDULES AND DETAILS ARCHITECTURAL WINDOW SCHEDULE, ELEVATIONS AND DOOR DETAILS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
BLACK & VEATCH Building a world of difference Black & Veatch Corporation Kansas City, Missouri	Holloway, Updike and Bollen Consulting Engineers Oklahoma - Boston - New York	APPROVED:	
DRAWN: MDE DESIGNED: PDR SURVEY: [blank] FIELD MGR: [blank] SECT. MGR: [blank] PROJ. MGR: [blank] RECOMMENDED: [blank]	DATE: 10/25/2011 DRAWING: MA-2 ATLAS PAGE NO:	SHEET 229 OF 261 SHEETS	



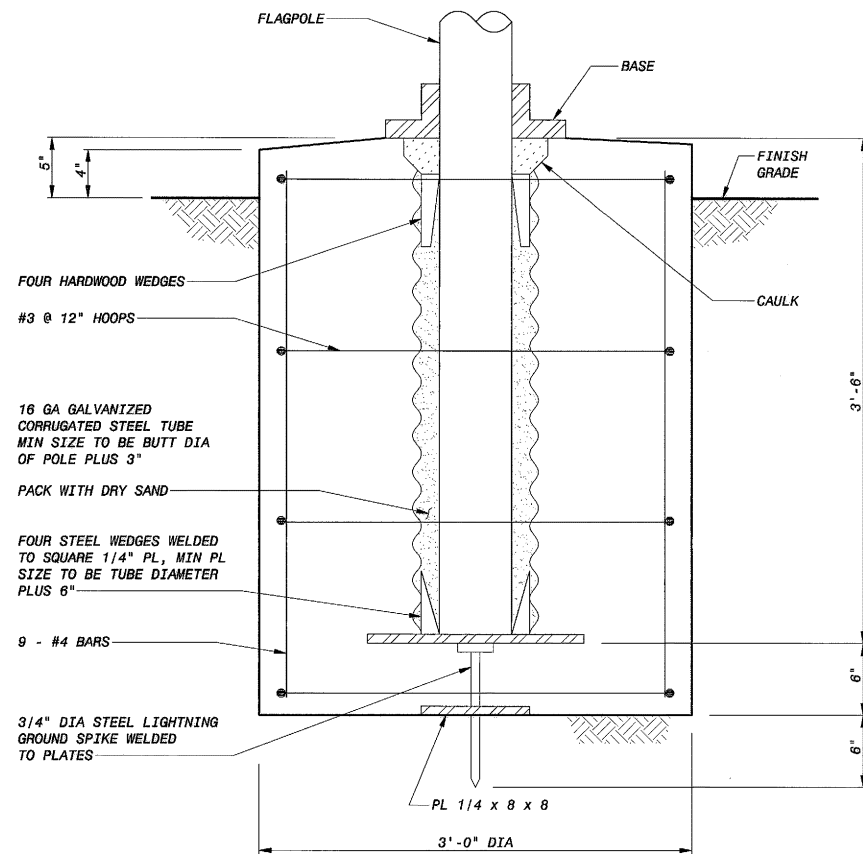
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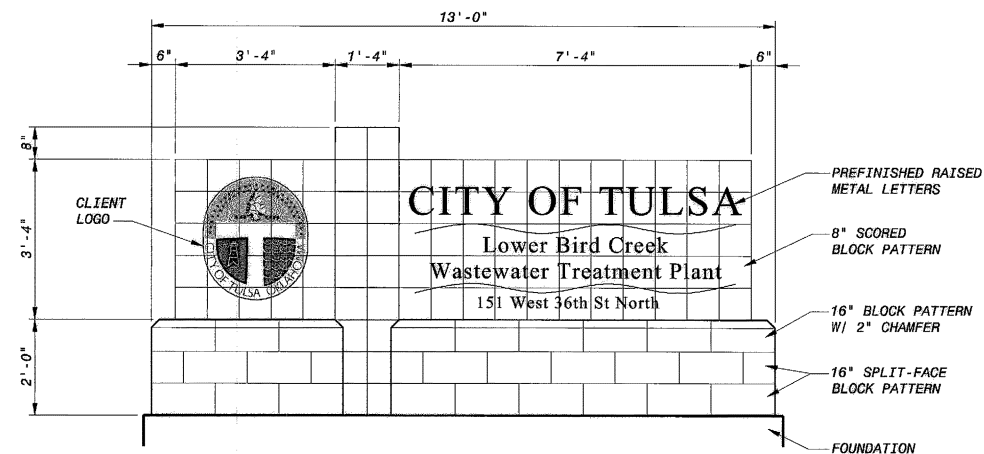
REVISION	BY	DATE

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DESIGNED	PDR		
SURVEY			
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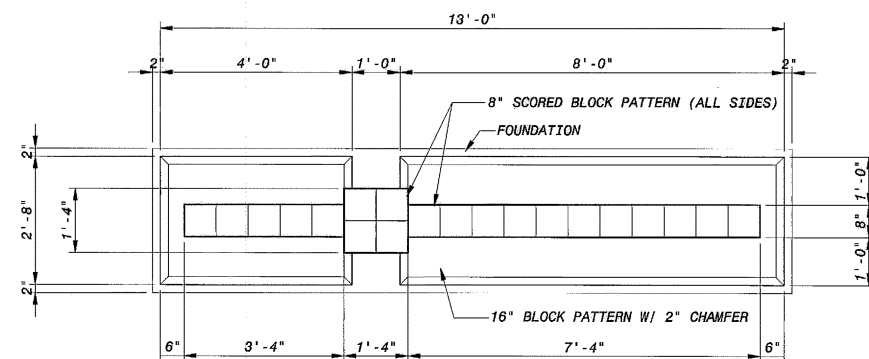
LOWER BIRD CREEK WWTP EXPANSION
 TMUA PROJECT NO. ES 2006-01
 CONTRACT 1B
 MISCELLANEOUS SCHEDULES AND DETAILS
 ARCHITECTURAL
 WINDOW DETAILS
 CITY OF TULSA, OKLAHOMA
 TULSA METROPOLITAN UTILITY AUTHORITY
 ENGINEERING SERVICES DEPARTMENT
 PLANS AND ESTIMATES PREPARED BY:
 BLACK & VEATCH
 Building a world of difference
 1001 E. 17th Avenue
 Tulsa, Oklahoma 74103
 918.581.1000
 9-28-11



FLAGPOLE FOUNDATION
1 1/2" = 1'-0"

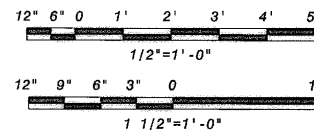


ENTRY MONUMENT FRONT ELEVATION
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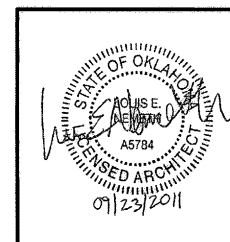


ENTRY MONUMENT PLAN
1/2" = 1'-0"

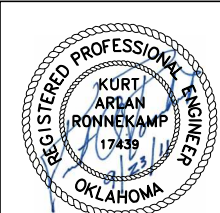
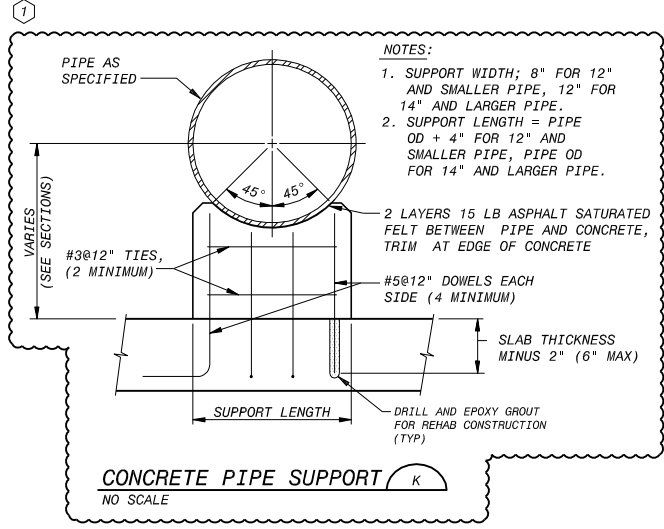
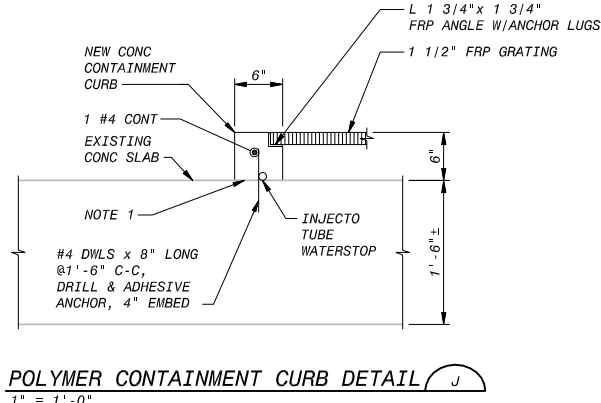
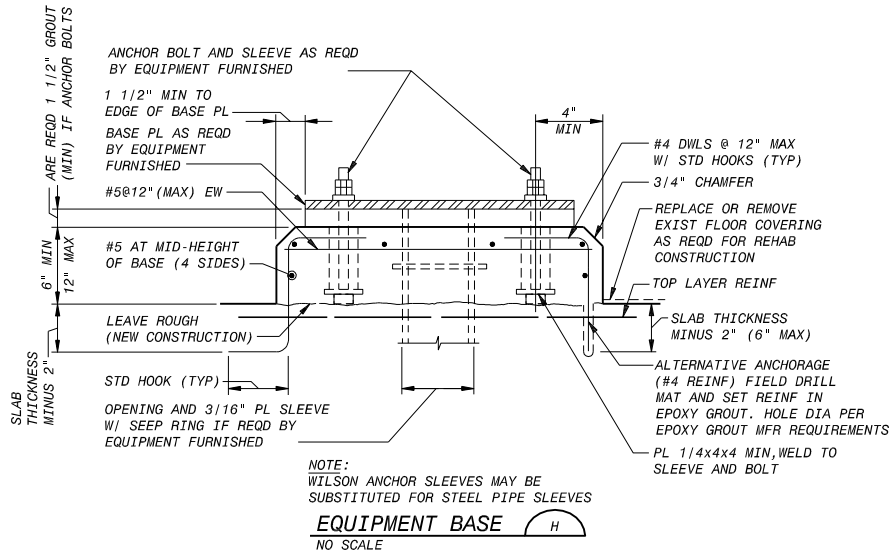
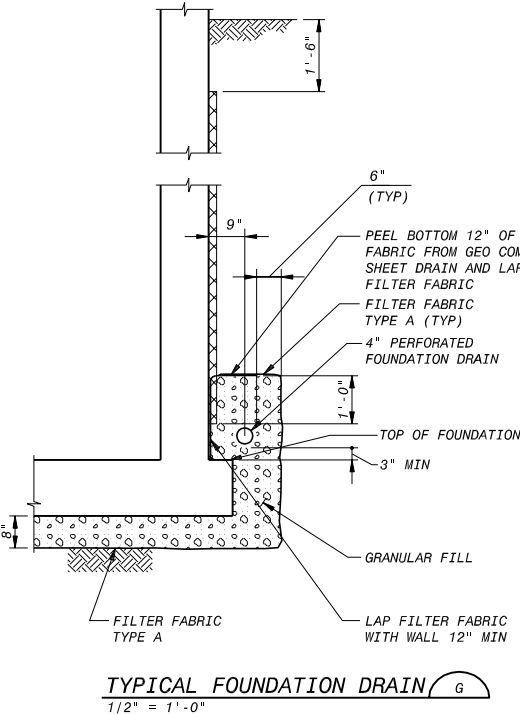
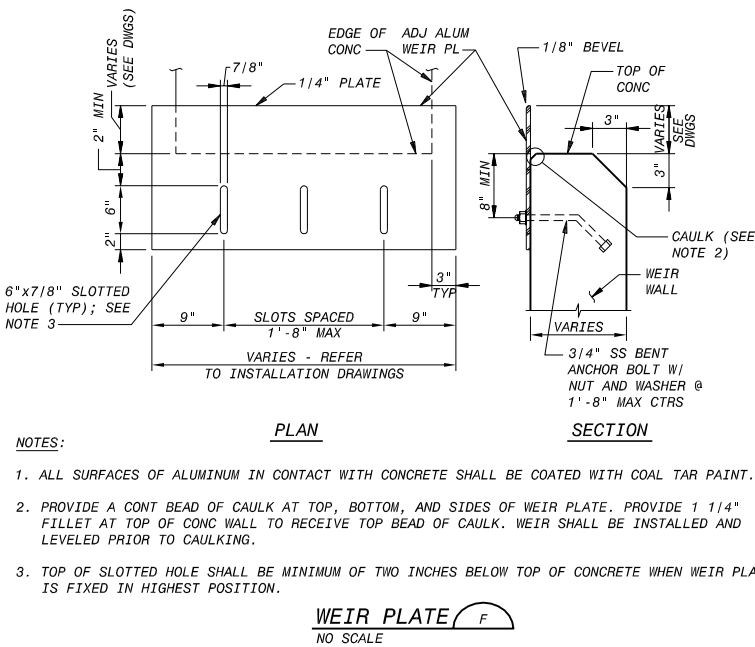
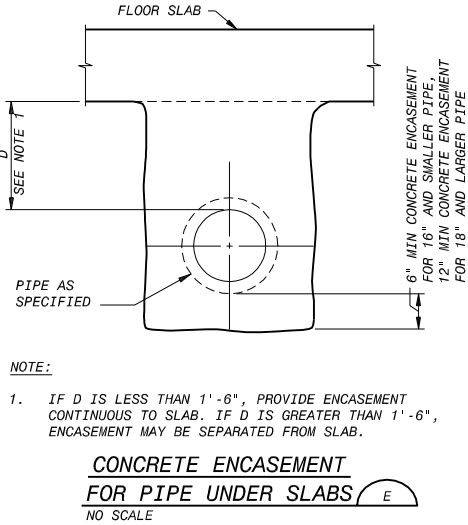
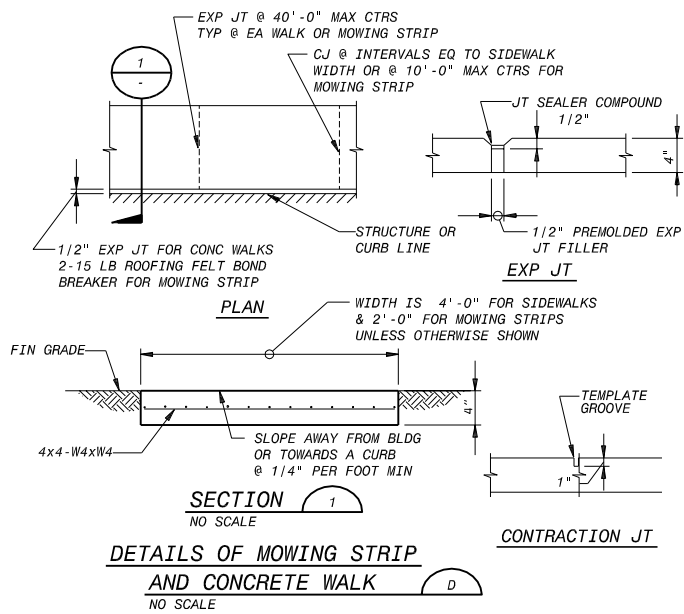
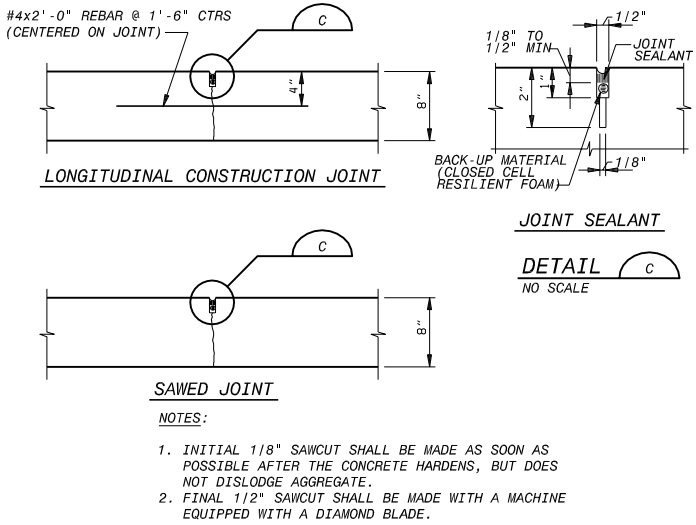
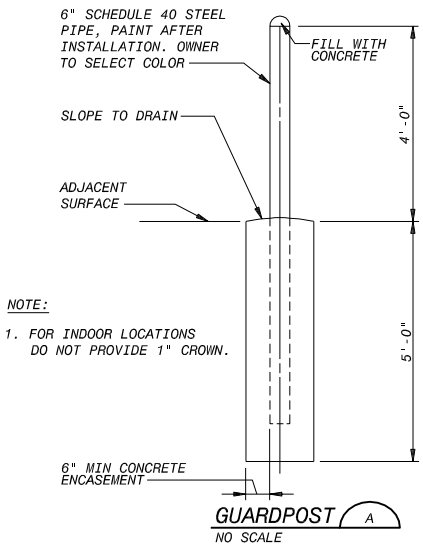
NOTE:
ENTRY MONUMENT SHALL BE CONSTRUCTED WITH HIGH DENSITY URETHANE (HDU) PER SPECIFICATION 10990.
ALL MASONRY BLOCK PATTERNS ON THE ENTRY MONUMENT SHALL RESEMBLE THE COLOR, TEXTURE, AND SIZE OF THE MASONRY USED ON THE NEW OPERATIONS BUILDING.
THE 'CLIENT LOGO' SHALL BE COORDINATED WITH THE CLIENT TO DETERMINE THE GRAPHIC COLOR AND SIZE.
ALL TEXT SHALL BE COORDINATED WITH THE CLIENT TO DETERMINE THE TEXT CONTENT, FORMAT, FONT, AND SIZE.
APPROPRIATE MOUNTING DETAILS SHALL BE PROVIDED BY THE MONUMENT MANUFACTURER TO ENSURE SUFFICIENT ATTACHMENT TO THE PROVIDED FOUNDATION.



LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
MISCELLANEOUS SCHEDULES AND DETAILS ARCHITECTURAL MISCELLANEOUS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
<div style="display: flex; justify-content: space-between;"> <div> BLACK & VEATCH <small>Building a world of difference</small> Black & Veatch Corporation Kansas City, Missouri </div> <div> <small>Holloway, Updike and Bolton</small> Consulting Engineers <small>Muskogee - Broken Arrow</small> </div> <div> </div> </div>			
PLAN SCALE: DRAWN: MDE DESIGNED: PDR SURVEY:	PROFILE SCALE: FIELD MGR. 10/11/11 SECT. MGR. 10/11/11 PROJ. MGR. 10/11/11 RECOMMENDED: 10/11/11	APPROVED: <div style="text-align: right;"> DIRECTOR </div>	
HORIZONTAL: 1" =	VERTICAL: 1" =	FILE: MA-06 DRAWING: MA-6 ATLAS PAGE NO:	DATE 10/28/2011 SHEET 233 OF 261 SHEETS



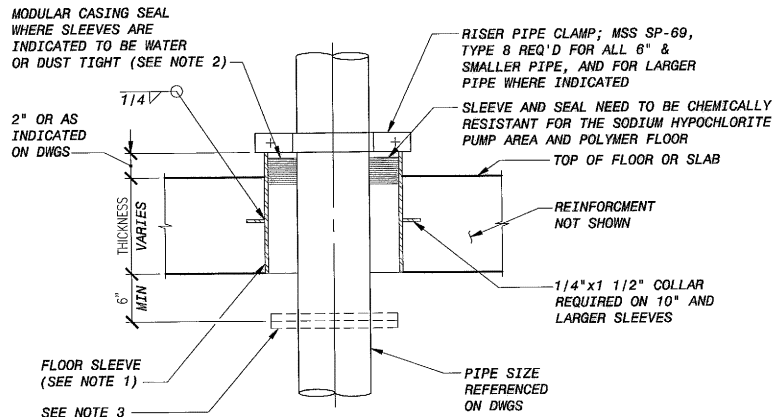
REVISION	BY	DATE



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
ADDENDUM NO. 1	PSB	1-6-12	DESIGNED	AWL		
			SURVEY			
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			1" =			
			FILE:	DRAWING: MC-1		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 234 OF 261 SHEETS

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
MISCELLANEOUS SCHEDULES AND DETAILS
CIVIL
MISCELLANEOUS DETAILS
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT
PLANS AND ESTIMATES PREPARED BY:

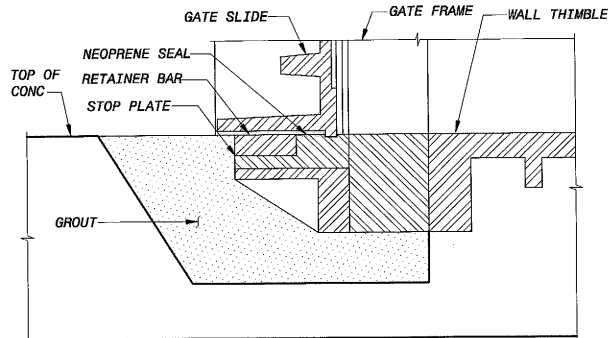




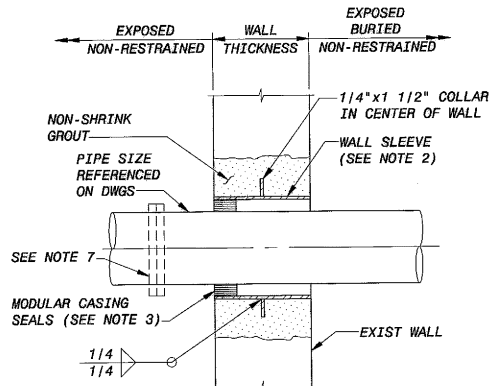
NOTES:

- FLOOR SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZE AFTER FABRICATION. COORDINATE SIZE OF SLEEVE WITH MODULAR SEAL MANUFACTURER.
- FIRE SAFETY TO BE PROVIDED AT ALL RATED LOCATIONS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEMS.
- TO MINIMIZE SLEEVE SIZE PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.

STEEL FLOOR SLEEVE (A)
NO SCALE



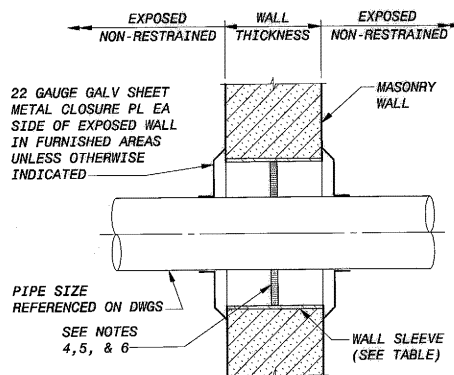
FLUSH BOTTOM SLIDE GATE (D)
NO SCALE



NOTES:

- CUT OPENING FOR WALL SLEEVE, ROUGHEN EXIST CONCRETE, APPLY BONDING AGENT AND FILL WITH NON-SHRINK GROUT PER THE SPECIFICATIONS. DIAMETER OF OPENING TO BE COLLAR DIAMETER + 4".
- WALL SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZED AFTER FABRICATION, 304 SS, OR OTHER MATERIAL AS SPECIFIED OR INDICATED ON DRAWINGS. COORDINATE SLEEVE SIZE WITH MODULAR CASING SEAL MANUFACTURER.
- WHERE SOIL OR WATER MAY BE PRESENT, USE TWO SETS OF CASING SEALS. ONE AT EACH FACE OF WALL.
- FIRE SAFETY TO BE PROVIDED AT ALL RATED WALLS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEM.
- FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
- USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.
- TO MINIMIZE SLEEVE SIZE, PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.

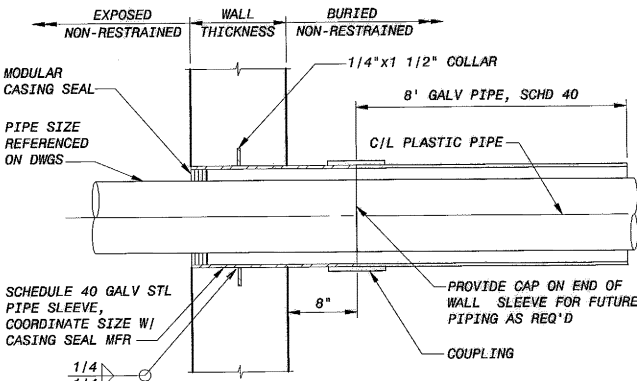
WALL SLEEVE AT EXISTING CONCRETE WALL (E)
NO SCALE



NOTES:

- SCHEDULE 40 GALV STEEL PIPE FOR PIPING SMALLER THAN 3", SCHEDULE 20 GALV STEEL PIPE FOR PIPING SMALLER THAN 6", AND GALV 1/4" MINIMUM WALL THICKNESS FOR PIPING LARGER THAN 6".
- FOR PIPING LARGER THAN 3" PROVIDE PIPE SUPPORT WITHIN 3' OF WALL SLEEVE TO PREVENT THE TRANSFER OF PIPE LOADS TO MASONRY WALL WHEN MODULAR CASING SEALS ARE USED.
- WHERE REQUIRED, USE SLEEVE LARGE ENOUGH FOR FLANGE OR OTHER JOINT RESTRAINT TO PASS THROUGH.
- FOR PIPE SIZES 1 1/2" IN DIAMETER AND SMALLER, CAULK ANNULAR SPACE AROUND PIPE. FOR PIPE LARGER THAN 1 1/2" IN DIAMETER, USE MODULAR CASING SEALS AND COORDINATE SLEEVE SIZE WITH CASING SEAL MANUFACTURER.
- PROVIDE MODULAR CASING SEALS ON ALL SLEEVES AT CHLORINE AND AMMONIA FEED AND STORAGE ROOMS AND WHERE INDICATED ON THE DRAWINGS. COORDINATE SLEEVE SIZE WITH CASING SEAL MANUFACTURER.
- FIRE SAFETY TO BE PROVIDED AT ALL RATED WALLS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEMS.

MASONRY WALL SLEEVE (B)
NO SCALE



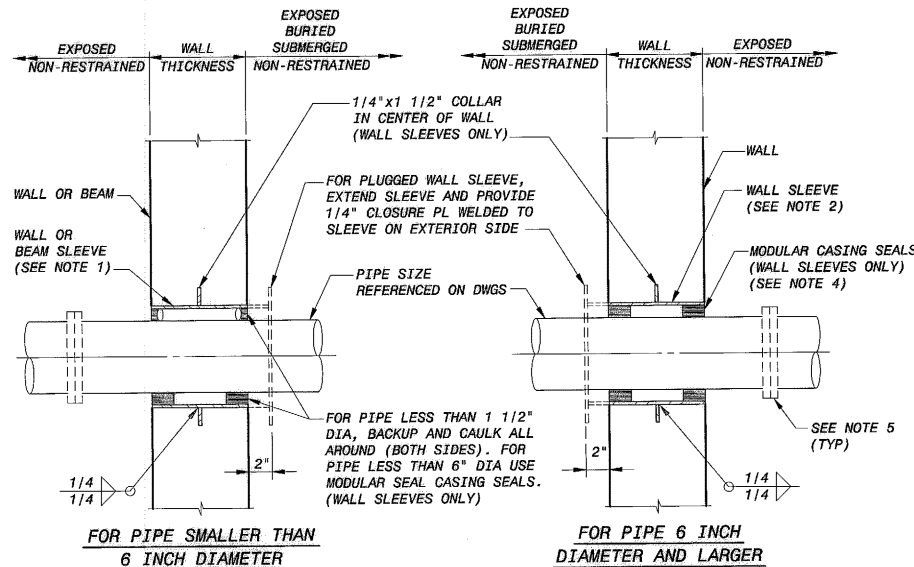
FOR PIPE DIAMETER 6 INCH AND SMALLER

NOTES:

- WALL SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZED AFTER FABRICATION, 304 SS, OR OTHER MATERIAL AS SPECIFIED OR INDICATED ON DRAWINGS. COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
- FOR PIPE LARGER THAN 6", DIP MJ WALL SLEEVE AND PLASTIC PIPE WITH EQUIVALENT DIP OUTSIDE DIAMETER MAY BE USED AS AN ALTERNATE TO STEEL WALL SLEEVE.
- FOR BURIED PVC PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NOT CLOSER THAN 5 FEET.

EXTERIOR WALL SLEEVE FOR PLASTIC PIPE (F)
NO SCALE

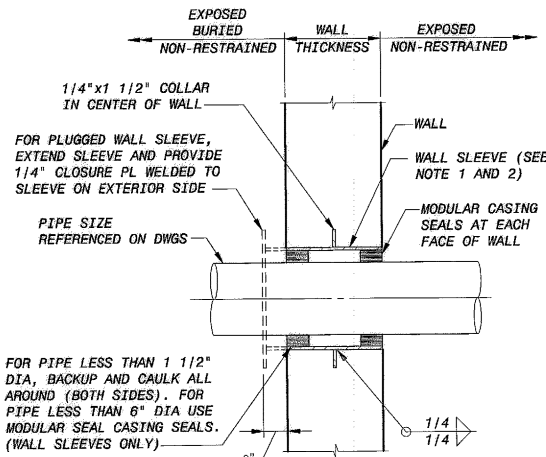
WALL SLEEVE TABLE	
PIPE SIZE	SLEEVE SIZE UNLESS OTHERWISE INDICATED (SEE NOTES 3 & 4)
1" & SMALLER	3"
1 1/4" & 1 1/2"	3 1/2"
2" & 2 1/2"	4"
3"	6"
4"	8"
6"	8"
8" & LARGER	PIPE OD+2"±



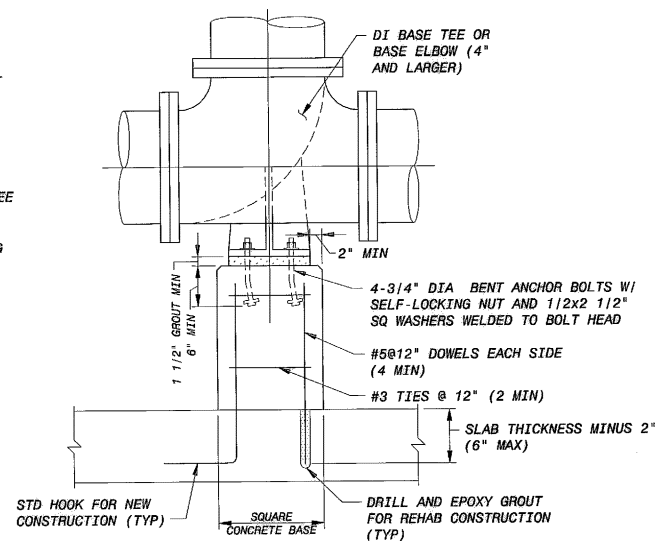
NOTES:

- SCHEDULE 40 GALV STEEL PIPE SLEEVE. SIZE TO PROVIDE 3/4" ANNULAR SPACE AROUND PIPE FOR ALL BEAM SLEEVES AND FOR WALL SLEEVES FOR PIPES SMALLER THAN 1 1/2" DIAMETER. FOR PIPE SMALLER THAN 6" DIAMETER, COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
- WALL SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZED AFTER FABRICATION, 304 SS, OR OTHER MATERIAL AS SPECIFIED OR INDICATED ON DRAWINGS. COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
- FIRE SAFETY TO BE PROVIDED AT ALL RATED WALLS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEM.
- WHERE SUBMERGED OR WHERE SOIL MAY BE PRESENT, USE TWO SETS OF CASING SEALS. ONE AT EACH FACE OF WALL. OTHERWISE, ONE SET OF CASING SEALS MAY BE PROVIDED.
- TO MINIMIZE SLEEVE SIZE, PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.
- FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
- USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.

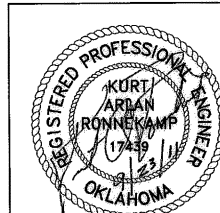
CONCRETE WALL OR BEAM SLEEVE (C)
NO SCALE



FOR PIPE DIAMETER LARGER THAN 6 INCH



CONCRETE SUPPORT FOR BASE ELBOW (G)
NO SCALE



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
				DESIGNED	AWL	
				SURVEY		
			PROFILE SCALE:	FIELD MGR.	708 10/11	
				SECT. MGR.		
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			1" =			
			FILE:	DRAWING: MC-3		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 236 OF 261 SHEETS

LOWER BIRD CREEK WWTP EXPANSION
TMAA PROJECT NO. ES 2006-01
CONTRACT 1B

MISCELLANEOUS SCHEDULES AND DETAILS
CIVIL
MISCELLANEOUS DETAILS

CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH
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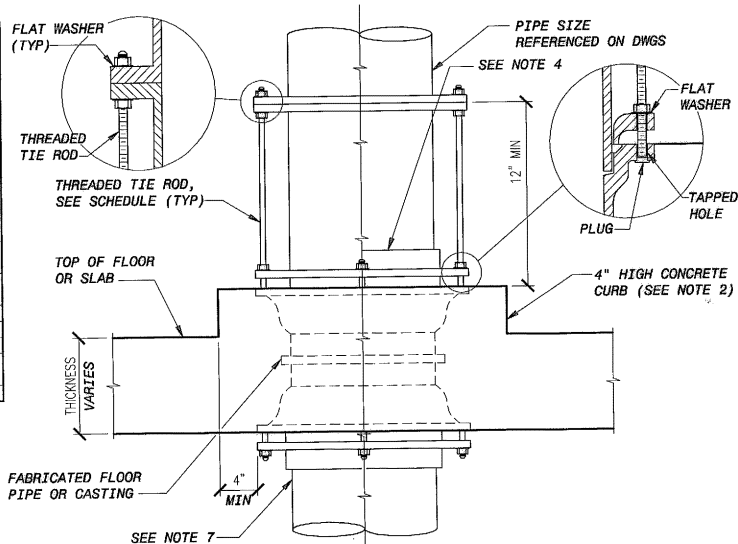
Black & Veatch Corporation
Kansas City, Missouri

Holloway, Urdike and Bullen
Consulting Engineers
Madison, Wisconsin

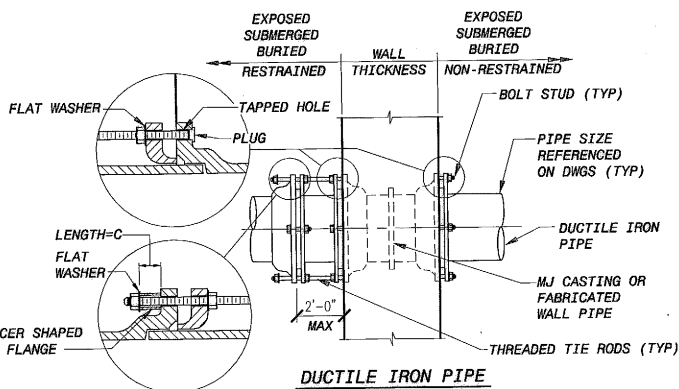
AWGATES
Engineering Services

9-28-11 B&V PROJECT NO. 145120

TIE ROD SCHEDULE			
PIPE SIZE (IN)	MAXIMUM PRESSURE (PSI) (NOTE 1)	TIE RODS (NOTE 2)	DIA (IN)
6	250 OR LESS	2	3/4
8	150 OR LESS	2	3/4
10	200 OR LESS	2	3/4
12	150 OR LESS	2	3/4
14	100 OR LESS	2	3/4
16	75 OR LESS	2	3/4
18	75 OR LESS	2	3/4
20	50 OR LESS	2	3/4
24	75	4	3/4
30	50 OR LESS	4	1
36	50 OR LESS	4	1
42	50 OR LESS	4	1 1/4



FLANGED - MECHANICAL JOINT FLOOR PIPE WITH TIE RODS (A)
NO SCALE



DUCTILE IRON PIPE

NOTES:

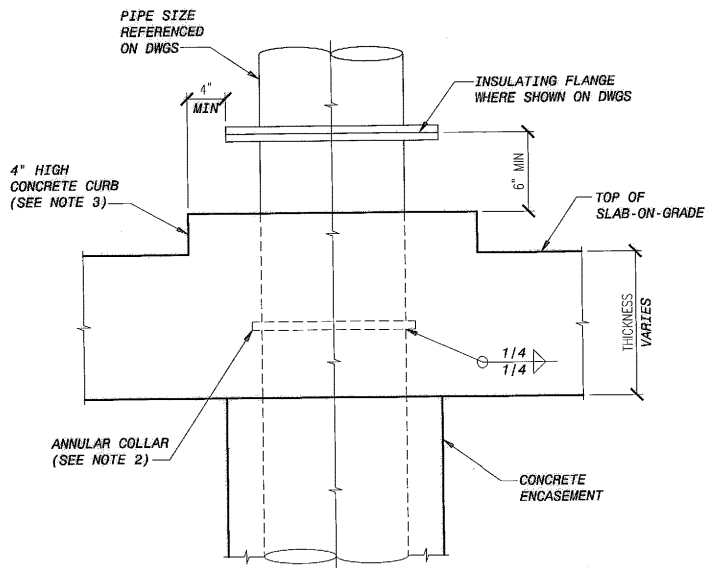
- MECHANICAL JOINT OR PUSH-ON STYLE FITTINGS MAY BE FURNISHED WHERE RESTRAINED JOINTS ARE NOT CALLED FOR ON THE DRAWINGS OR PIPE SCHEDULE.
- PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
- UNLESS OTHERWISE INDICATED, TIE RODS SHALL BE SPACED UNIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
- EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE BOLT-STUDS ON WALL PIPE. ALL BOLT HOLES IN WALL PIPE SHALL BE TAPPED. WALL PIPES SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.
- AT CONTRACTOR'S OPTION, 4" THROUGH 48" MAY BE FURNISHED AS MECHANICAL JOINT STYLE WITH TIE RODS, OR POSITIVE LOCKING SEGMENTS AND/OR RINGS SUCH AS AMERICAN PIPE 14" THROUGH 36" SIZE MAY BE FURNISHED AS FLEX RING STYLE RESTRAINED JOINTS AND 42" THROUGH 64" SIZE MAY BE FURNISHED AS LOC RING STYLE RESTRAINED JOINTS, OR U.S. PIPE "TR-FLEX", OR GRIFFIN PIPE "SNAP-LOCK".
- FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT WITHIN 5 FEET FROM WALL.
- WHERE PIPE IS REQUIRED ON ONE SIDE ONLY, PROVIDE MJXPE WALL PIPE UNLESS OTHERWISE INDICATED ON DRAWINGS.

MECHANICAL JOINT TIE ROD SCHEDULE						
NOMINAL PIPE SIZE (INCHES)	MAX PRESSURE (PSI) (NOTE 1)	TIE BOLTS (NOTE 2)	PIPE SPACERS	PIPE SCHEDULE		
		NO. OF RODS (NOTE 2)	DIA OF RODS (INCHES)	LENGTH (INCHES)		
4	350 OR LESS	2	3/4	1	2 1/2	40
6	250 OR LESS	2	3/4	1	2 1/2	40
8	150 OR LESS	2	3/4	1	2 1/2	40
10	200 OR LESS	2	3/4	1	2 1/2	80
12	150 OR LESS	2	3/4	1	2 1/2	80
14	100 OR LESS	2	3/4	1	3 1/2	80
16	150 OR LESS	4	3/4	1	3 1/2	80
18	150 OR LESS	4	3/4	1	3 1/2	80
20	100 OR LESS	4	3/4	1	3 1/2	80
24	100 OR LESS	6	3/4	1	3 1/2	80
30	100 OR LESS	8	1	1 1/4	4	80
36	100 OR LESS	8	1	1 1/4	4	80
42	100 OR LESS	12	1 1/4	1 1/2	4	80
48	100 OR LESS	16	1 1/4	1 1/2	4	80

MECHANICAL JOINT WALL PIPE WITH TIE RODS (C)
NO SCALE

NOTES:

- PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
- ORIENTATION OF FLOOR PIPE SHALL BE COORDINATED WITH CONNECTING PIPE AND TIE RODS, TIE RODS SHALL BE SPACED UNIFORMLY AROUND THE PIPE.
- EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE BOLT-STUDS ON FLOOR PIPE. ALL BOLT HOLES IN FLOOR PIPE SHALL BE TAPPED. FLOOR PIPES SHALL BE ORIENTED SO THAT THE BOLT HOLES ALIGN WITH FLANGE BOLT HOLES.
- FOR STEEL AND OTHER PIPE APPLICATIONS, BUILD UP END OF STEEL PIPE TO FIT MJ WALL PIPE.
- CURB MAY BE ROUND OR HEXAGONAL AT CONTRACTOR'S OPTION.
- WHERE PIPE IS REQUIRED ON ONE SIDE OF THE SLAB ONLY, PROVIDE A MJXPE FITTING.
- SLAB-ON-GRADE APPLICATIONS REQUIRE CONCRETE ENCASEMENT OF BELOW FLOOR PIPING. RESTRAINED STYLE JOINTS ARE REQUIRED WHERE PIPE IS CONCRETE ENCASED.



NOTES:

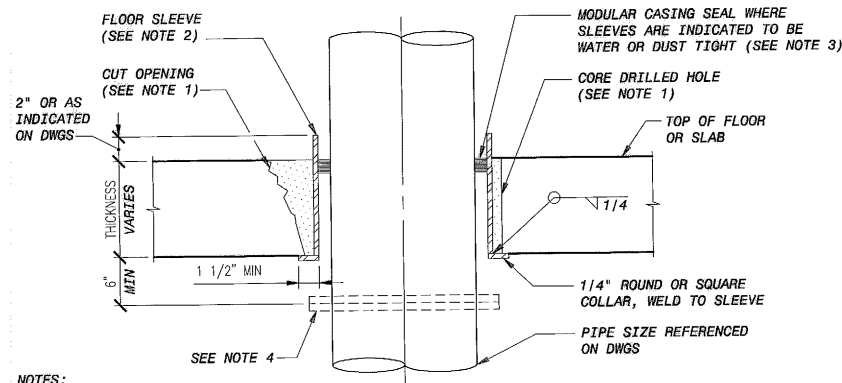
- SLAB-ON-GRADE APPLICATIONS REQUIRE CONCRETE ENCASEMENT OF BELOW SLAB PIPING. RESTRAINED STYLE JOINTS ARE REQUIRED WHERE PIPE IS CONCRETE ENCASED.
- ANNULAR COLLAR SHALL BE SAME MATERIAL AS PIPE. 1/4" X 2" FOR PIPE 20" AND SMALLER, AND 3/8" X 3" FOR PIPE LARGER THAN 20".
- CURB MAY BE ROUND OR HEXAGONAL AT CONTRACTORS OPTION.
- ORIENTATION OF FLOOR PIPE SHALL BE COORDINATED WITH CONNECTING PIPE.

SLAB-ON-GRADE FLOOR PIPE (D)
NO SCALE

MECHANICAL TIE ROD SCHEDULE

PIPE SIZE (INCHES)	MINIMUM PRESSURE (PSI) (NOTE 1)	TIE RODS		PIPE SPACERS		PIPE SCHEDULE
		NO. OF RODS (NOTE 2)	DIA OF RODS (INCHES)	DIA OF SPACERS (INCHES)	LENGTH-C (INCHES)	
4	350 OR LESS	2	3/4	1	2 1/2	40
6	250 OR LESS	2	3/4	1	2 1/2	40
8	150 OR LESS	2	3/4	1	2 1/2	40
10	200 OR LESS	2	3/4	1	2 1/2	80
12	150 OR LESS	2	3/4	1	2 1/2	80
14	100 OR LESS	2	3/4	1	3 1/2	80
16	150 OR LESS	4	3/4	1	3 1/2	80
18	150 OR LESS	4	3/4	1	3 1/2	80
20	100 OR LESS	4	3/4	1	3 1/2	80
24	100 OR LESS	6	3/4	1	3 1/2	80
30	100 OR LESS	8	1	1 1/4	4	80
36	100 OR LESS	8	1	1 1/4	4	80
42	100 OR LESS	12	1 1/4	1 1/2	4	80
48	100 OR LESS	16	1 1/4	1 1/2	4	80

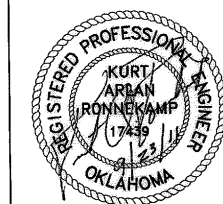
DIP MECHANICAL JOINT COUPLING WITH TIE RODS (B)
NO SCALE



NOTES:

- FOR SLEEVE OPENINGS SMALLER THAN 12 INCHES IN DIAMETER CORE DRILLED OPENINGS MAY BE USED. FOR LARGER SLEEVES CUT AND BREAK OUT OPENINGS AS NOTED ON THE DRAWINGS. APPLY BONDING AGENT TO EXISTING CONCRETE AND FILL SPACE WITH NON-SHRINK GROUT.
- FLOOR SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZE AFTER FABRICATION. COORDINATE SIZE OF SLEEVE WITH MODULAR SEAL MANUFACTURER.
- FIRESAFING TO BE PROVIDED AT ALL RATED LOCATIONS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEMS.
- TO MINIMIZE SLEEVE SIZE PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.

EXISTING FLOOR SLEEVE DETAIL (E)
NO SCALE



REVISION		BY	DATE

PLAN SCALE:	DRAWN	JKS	APPROVED:
DESIGNED	AWL		
SURVEY			
PROFILE SCALE:	FIELD MGR.	705 10/11	
HORIZONTAL:	SECT. MGR.		
1" =	PROJ. MGR.	200 10/3/11	
VERTICAL	RECOMMENDED:		
1" =	HAS 10/30/11		
FILE:	DRAWING: MC-4	DATE 10/28/2011	
ATLAS PAGE NO:		SHEET 237 OF 261 SHEETS	

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B

MISCELLANEOUS SCHEDULES AND DETAILS
CIVIL
MISCELLANEOUS DETAILS

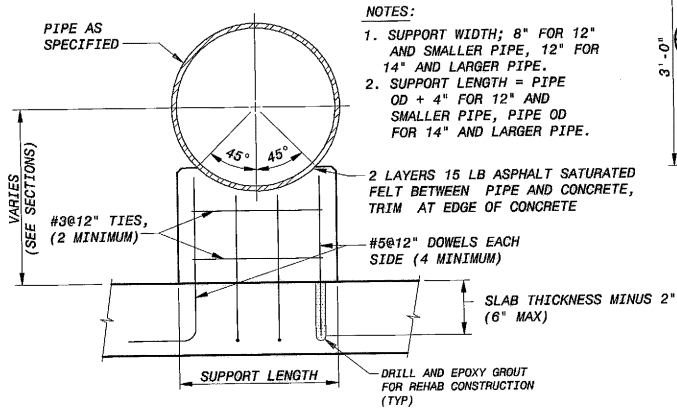
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH
Building a world of difference
Kansas City, Missouri

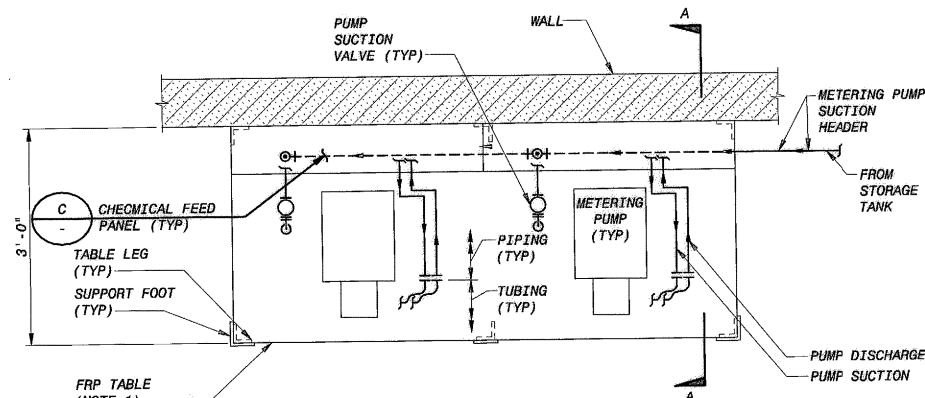
Holloway, Updike and Bollen
Consulting Engineers
Muskegon - Broken Arrow

OWGATES
Engineering Services



CONCRETE PIPE SUPPORT (A)

NO SCALE

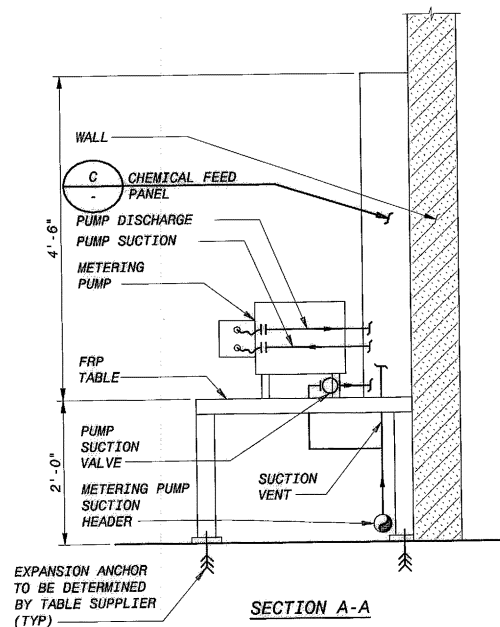


PLAN

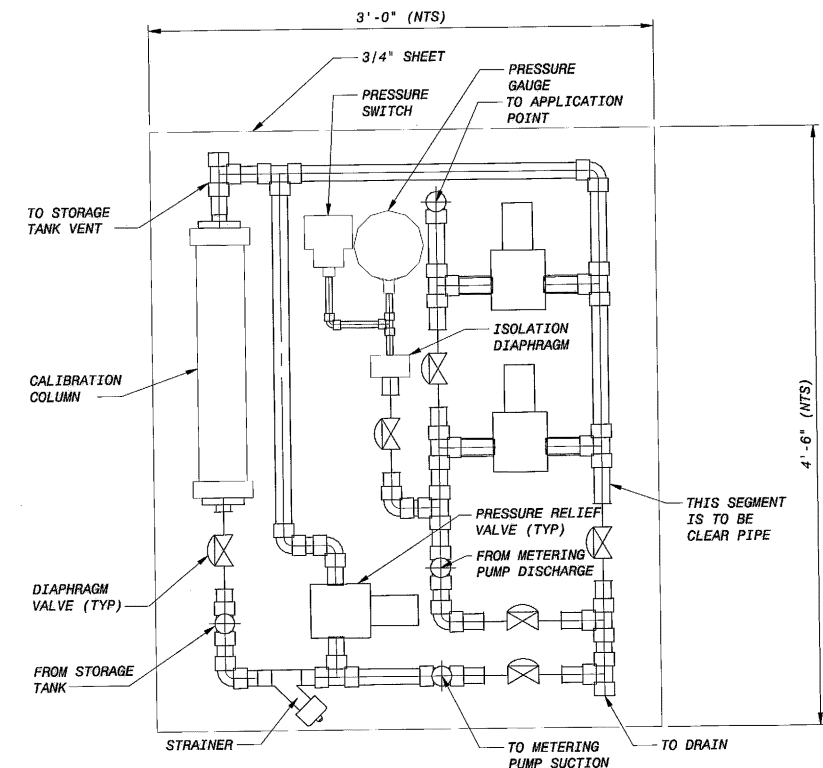
- NOTES:
- METERING PUMP TABLES SHALL BE OF FRP CONSTRUCTION AS DESCRIBED IN SPECIFICATION SECTION 11727.
 - SEE P&ID'S FOR ALL PIPING, VALVES AND PIPING DEVICES REQUIRED.

TYPICAL METERING PUMP TABLE LAYOUT (B)

3/4" = 1'-0"

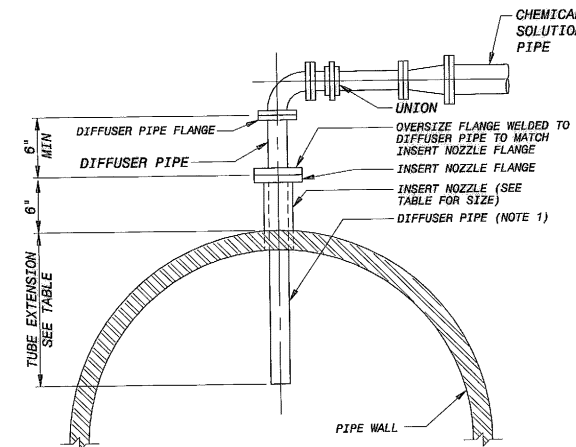
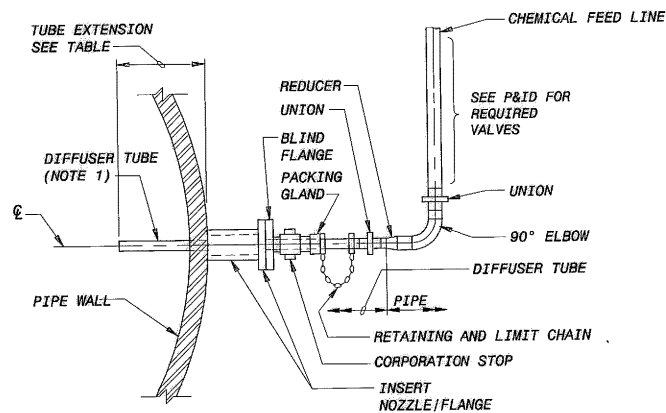
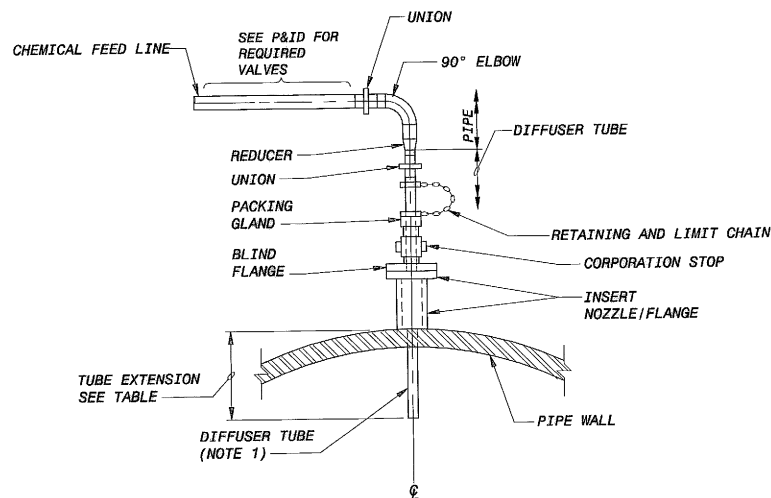


SECTION A-A



CHEMICAL FEED PANEL (C)

NO SCALE



- NOTES:
- DIFFUSER TUBE TO BE SCHEDULE 80 PVC.

DIFFUSER AND INSTALLATION DETAILS				
CHEMICAL	DIFFUSER LOCATION	DIFFUSER TUBE DIA, IN	INSERT NOZZLE/FLANGE DIA, IN	TUBE EXTENSION IN
SODIUM HYPOCHLORITE	CHLORINE CONTACT BASIN INFLUENT MANHOLE	1"	2 1/2"	12"
SODIUM HYPOCHLORITE	PLANT EFFLUENT WATER MANHOLE	1/2"	2"	2 1/2"

- NOTES:
- DIFFUSER TUBE TO BE SCHEDULE 80 CPVC.

**CORPORATION STOP TYPE DIFFUSER
BLIND FLANGE INSTALLATION - TOP OF PIPE** (D)

NO SCALE

DIFFUSER AND INSTALLATION DETAILS				
CHEMICAL	DIFFUSER LOCATION	DIFFUSER TUBE DIA, IN	INSERT NOZZLE/FLANGE DIA, IN	TUBE EXTENSION IN
SODIUM HYPOCHLORITE	PORT SOUTH VALVE VAULT	1"	2 1/2"	7"
SODIUM HYPOCHLORITE	RAS DISCHARGE	1"	2 1/2"	5"

- NOTES:
- DIFFUSER TUBE TO BE SCHEDULE 80 CPVC.

**CORPORATION STOP TYPE DIFFUSER
BLIND FLANGE INSTALLATION - SIDE OF PIPE** (E)

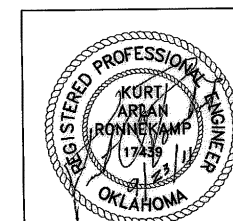
NO SCALE

DIFFUSER AND INSTALLATION DETAILS				
CHEMICAL	DIFFUSER LOCATION	DIFFUSER TUBE DIA, IN	INSERT NOZZLE/FLANGE DIA, IN	TUBE EXTENSION IN
POLYMER	DAF INFLUENT AT NORTHSIDE WWTP	2"	3"	2"

PRETREATMENT VAULT

**OPEN END-OF-PIPE TYPE DIFFUSER FOR
1 1/2" AND LARGER DIFFUSER TUBES** (F)

NO SCALE



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JKS	APPROVED:
				DESIGNED	AWL	
				SURVEY		
			PROFILE SCALE:	FIELD MGR.	708 10/11	
			HORIZONTAL:	SECT. MGR.		
			VERTICAL:	RECOMMENDED:	204 10/11	
			FILE:	DRAWING: MC-5		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 238 OF 261 SHEETS

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B

MISCELLANEOUS SCHEDULES AND DETAILS
CIVIL
MISCELLANEOUS DETAILS

CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH
Building a world of difference

Black & Veatch Corporation
Kansas City, Missouri

RD
Holloway, Urdahl and Bolton
Consulting Engineers
Muskegon - Broken Arrow

ENGATES
Engineering Services

STRUCTURAL NOTES

GENERAL

1. THE APPLICABLE BUILDING CODE IS THE 2006 INTERNATIONAL BUILDING CODE (IBC)
2. THE REQUIREMENTS INDICATED ON THIS SHEET ARE INTENDED AS A BASIC SUMMARY OF THE MATERIAL AND CONSTRUCTION REQUIREMENTS FOR THE PROJECT. ADDITIONAL, MORE STRINGENT REQUIREMENTS ARE GIVEN IN THE PROJECT SPECIFICATIONS.
3. ALL STRUCTURAL RELATED SHOP DRAWINGS SHALL BE REVIEWED BY THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

CAST-IN-PLACE CONCRETE

1. A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c) OF 4,000 PSI WAS UTILIZED IN THE DESIGN OF STRUCTURAL REINFORCED CONCRETE.
2. CEMENT SHALL BE ASTM C150, TYPE II OR TYPE I/II, LOW ALKALI.
3. THE LOCATION OF ALL CONSTRUCTION JOINTS AND OTHER TYPES OF JOINTS, OTHER THAN SPECIFIED OR SHOWN ON THE PLANS, SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO PLACING CONCRETE.

REINFORCING STEEL

1. ALL REINFORCING BAR SHALL BE GRADE 60, DEFORMED, ASTM A615.
2. DIMENSIONS TO REINFORCING BARS ARE TO BAR CENTERLINES, UNLESS NOTED OTHERWISE. BAR COVER IS THE CLEAR DISTANCE BETWEEN THE BAR AND THE CONCRETE SURFACE.
3. NO WELDING OF REINFORCING BARS SHALL BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.
4. WHEN BARS OF DIFFERENT SIZE LAP TO EACH OTHER, THE SPLICE LENGTH FOR THE SMALLER BAR CAN BE USED.

STAINLESS STEEL

1. STAINLESS STEEL BOLTS SHALL CONFORM TO ASTM F593, ALLOY GROUP 1 OR 2, UNLESS NOTED OTHERWISE.
2. STAINLESS STEEL PLATES SHALL CONFORM TO ASTM A240, TYPE 316L.
3. STAINLESS STEEL STRUCTURAL SHAPES SHALL CONFORM TO ASTM A276, TYPE 316L.

ALUMINUM

1. UNLESS NOTED OTHERWISE, ALUMINUM ALLOY IN ALL ALUMINUM STRUCTURAL MATERIALS SHALL BE 6061-T6. PIPE AND TUBING FOR GUARDRAIL AND HANDRAIL SHALL BE ALLOY 6061-T6.
2. ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE OR DISSIMILAR METALS SHALL BE COATED OR COVERED WITH A HEAVY COAT OF EPOXY ENAMEL TO PREVENT ALUMINUM-CONCRETE REACTION OR ELECTROLYTIC ACTION.

STRUCTURAL STEEL

1. ROLLED WIDE FLANGE SHAPES SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI; CHANNELS, PLATES, AND ANGLES A MINIMUM OF 36 KSI; STRUCTURAL PIPES A MINIMUM OF 35 KSI; AND RECTANGULAR STRUCTURAL TUBES A MINIMUM OF 46 KSI AND ROUND STRUCTURAL TUBES A MINIMUM OF 42 KSI, UNLESS NOTED OTHERWISE.
2. WELDING SHALL BE DONE WITH A FILLER MATERIAL HAVING A MINIMUM TENSILE STRENGTH OF 70 KSI.
3. BOLTED CONNECTIONS SHALL USE 3/4" DIA ASTM A325 BOLTS WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE, UNLESS NOTED OTHERWISE.
4. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 36.
5. HOLES FOR ANCHOR BOLTS IN COLUMN BASE PLATES SHALL BE AS FOLLOWS:

BOLT 3/4" TO 1" - 5/16" OVERSIZE
BOLT 1" TO 2" - 1/2" OVERSIZE
BOLTS OVER 2" - 1" OVERSIZE

AT THE CONTRACTOR'S OPTION, OVERSIZE HOLES LARGER THAN THOSE LISTED ABOVE MAY BE USED, PROVIDED THAT 3/8" PLATE WASHERS ARE ALSO USED AND FIELD WELDED WITH A 5/16" FILLET TO THE BASE PLATE ALONG A MIN OF 3 SIDES.

STRUCTURAL STEEL CONT.

6. STEEL LEGEND

- INDICATES TWO BOLT ATTACHMENT OF HORIZONTAL BRACING TO UNDERSIDE OF BEAM. SHIM AS REQUIRED. BOLTS TO BE 3/4" DIAMETER A325.
- INDICATES ANGLE OR PLATE TO BE WELDED ON THREE SIDES
- INDICATES FOUR BOLT ATTACHMENT OF MONORAIL TO UNDERSIDE OF SUPPORT BEAM. SPACER OR STANDOFF DETAIL AS REQUIRED.
- INDICATES NONSTANDARD FRAMING CONNECTION
- INDICATES HORIZONTAL OR VERTICAL BRACING CONNECTION DETAIL
- INDICATES MOMENT CONNECTION

VERTICAL BRACING IS SHOWN ON PLANS THUS:

- EXTENDING UP FROM THE ELEVATION INDICATED.
- EXTENDING DOWN FROM THE ELEVATION INDICATED.
- EXTENDING UP AND DOWN FROM THE ELEVATION INDICATED.

MASONRY

1. CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90. THE TOTAL MASONRY ASSEMBLAGE SHALL HAVE A COMPRESSIVE STRENGTH EQUAL TO 1500 PSI AT 28 DAYS BASED ON UNIT STRENGTH METHOD.
2. MASONRY MORTAR SHALL CONFORM TO ASTM C270, TYPE S.
3. ALL BOND BEAMS AND ANY BLOCK CELLS CONTAINING EMBEDMENTS, REINFORCING STEEL, ANCHORS, ETC., SHALL BE FILLED WITH GROUT FILL MEETING THE REQUIREMENTS OF ASTM C476.
4. BOND BEAM REINF SHALL BE CONTINUOUS AT CORNERS AND INTERSECTIONS.

SOIL AND FOUNDATIONS

1. FOUNDATION CONSTRUCTION SHALL NOT BEGIN UNTIL ANY REQUIRED SPECIAL INSPECTION HAS BEEN COMPLETED AND THE CONTRACTOR NOTIFIED TO PROCEED.
2. TO FACILITATE SCHEDULING, AT LEAST 48 HOURS ADVANCE NOTICE SHALL BE GIVEN TO THE ENGINEER PRIOR TO THE REQUIRED INSPECTIONS.
3. UNLESS NOTED OTHERWISE, BACKFILL SHALL NOT BE PLACED AGAINST WALLS WHICH SUPPORT A CONCRETE SLAB OR WALKWAY UNTIL THE TOP SLAB OR WALKWAY HAS BEEN PLACED IN IT'S ENTIRETY AND ALL CONCRETE HAS REACHED ITS DESIGN STRENGTH.
4. THE FOLLOWING NET ALLOWABLE BEARING PRESSURES WERE UTILIZED IN THE DESIGN OF THE FOUNDATIONS.

MAX NET ALLOWABLE BEARING CAPACITY (PSF)

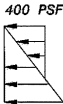
OPERATIONS BLDG	2500 @ISOLATED FDNS 2500 @CONTINUOUS FDN
FINAL CLARIFIER NO. 1	4000 @ PERIMETER 4000 @ CENTER
HEADWORKS BLDG	4000 @ ISOLATED FDN 4000 @ CONTINUOUS FDN
SLUDGE TRANSFER PUMP STATION	4000 @ ISOLATED FDN 4000 @ CONTINUOUS FDN
SHALLOW FOUNDATIONS FOR MINOR STRUCTURES	2500 @ ISOLATED FDNS

SPECIAL INSPECTIONS

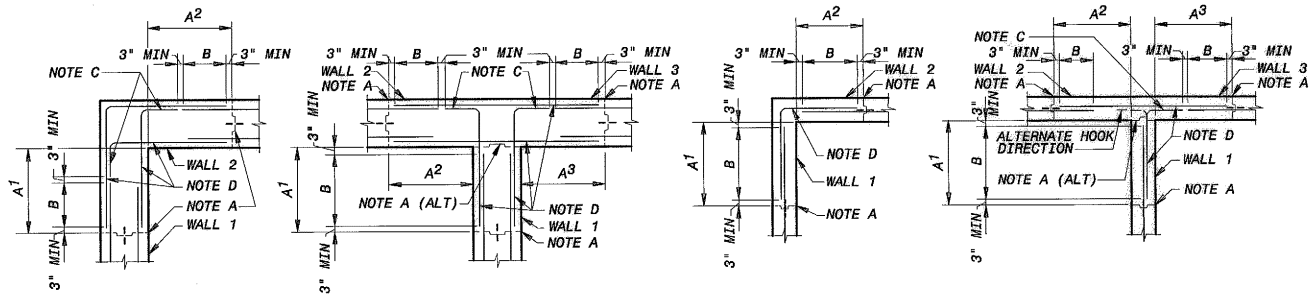
1. SPECIAL INSPECTION IS NOT THE RESPONSIBILITY OF THE CONTRACTOR, BUT IS PRESENTED HERE FOR THE BENEFIT OF THE CONTRACTOR AND THE CODE OFFICIAL.
2. SPECIAL INSPECTION WILL BE PERFORMED IN ACCORDANCE WITH CHAPTER 17 OF THE APPLICABLE 2006 INTERNATIONAL BUILDING CODE.
3. MASONRY SPECIAL INSPECTION WILL BE IN ACCORDANCE WITH IBC TABLE 1704.5.1.
4. SPECIAL INSPECTION WILL BE PERFORMED ON THE FOLLOWING SEISMIC RESISTANCE SYSTEMS:
- STRUCTURAL STEEL WELDING OF COMPLETE PENETRATION WELDS AND FILLET WELDS GREATER THAN 5/16 INCH

LOADING CRITERIA

1. DEAD LOAD CALCULATED
2. LIVE LOADS:
OPERATING AND PROCESS FLOORS..... 150 PSF
STAIRS, SERVICE PLATFORMS & LANDINGS..... 100 PSF
GRATING AREAS..... 100 PSF
ELECTRICAL AND CONTROL ROOM FLOORS..... 250 PSF
CHEMICAL STORAGE ROOMS..... 250 PSF
STORAGE ABOVE HEADWORKS ELECT. ROOM..... 100 PSF
ALL FLOORS NOT INDICATED..... 100 PSF
ROOF..... 20 PSF(UNREDUCED)
3. LATERAL EARTH PRESSURE (EFP)
AT-REST ACTIVE
GRANULAR
NON-SATURATED..... 55 PSF/FT 40 PSF/FT
SATURATED..... 89 PSF/FT 82 PSF/FT
LEAN CLAY
NON-SATURATED..... 70 PSF/FT 50 PSF/FT
SATURATED..... 96 PSF/FT 87 PSF/FT
4. LATERAL SURCHARGE..... EQUIVALENT TO 2 FEET OF SOIL WHERE ADJACENT TO A ROADWAY
5. COMPACTIVE SURCHARGE LOAD..... 400 PSF AT FINISH GRADE ELEVATION DECREASING LINEARLY AT SAME RATE AS BACKFILL LOAD INCREASES. FOR WALLS 8 FEET OR LESS IN HEIGHT, USE CRITERIA 4 ABOVE AS COMPACTIVE SURCHARGE.
6. HYDROSTATIC FLUID PRESSURE..... 63 PSF/FT
7. WIND LOAD:
BASIC WIND SPEED..... 90 MPH
EXPOSURE..... C
IMPORTANCE FACTOR..... 1.15
INTERNAL PRESSURE COEFFICIENT (G Cpi)
OPERATIONS BUILDING ±0.18 (ENCLOSED)
HEADWORKS BUILDING ±0.18 (ENCLOSED)
SLUDGE TRANSFER PUMP STATION ±0.55 (PARTIALLY ENCLOSED)
8. SEISMIC LOAD:
OCCUPANCY CATEGORY..... III
IMPORTANCE FACTOR..... 1.25
MAPPED SPECTRAL RESPONSE ACCELERATION (Ss)..... 0.166g
MAPPED SPECTRAL RESPONSE ACCELERATION (S1)..... 0.070g
DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (Sds)..... 0.133g
DESIGN SPECTRAL RESPONSE ACCELERATION AT 1 SECOND PERIOD (Sd1)..... 0.079g
SITE CLASS..... C
SEISMIC DESIGN CATEGORY..... B
SEISMIC DESIGN COEFFICIENT..... 0.166g/R
BUILDING SEISMIC FORCE-RESISTING SYSTEM:
OPERATIONS BUILDING..... ORDINARY REINFORCED CMU SHEAR WALLS (R=2)
HEADWORKS BUILDING..... ORDINARY REINFORCED CONCRETE SHEAR WALLS (FIRST FLOOR, R=5)
ORDINARY REINFORCED CONCRETE MOMENT FRAME(SECOND FLOOR, R=3)
SLUDGE TRANSFER PUMP STATION ORDINARY REINFORCED CMU SHEAR WALLS (R=2)
ANALYSIS PROCEDURE..... EQUIVALENT LATERAL FORCE
9. SNOW LOAD:
GROUND SNOW LOAD (Pg)..... 10 PSF
OPERATIONS BLDG SLOPED ROOF SNOW LOAD..... 10 PSF
HEADWORKS BLDG FLAT-ROOF SNOW LOAD..... 11 PSF
SNOW EXPOSURE FACTOR..... 0.9
IMPORTANCE FACTOR..... 1.10
THERMAL FACTOR..... 1.00
10. 100 YEAR FLOOD ELEVATION..... EL 574.00± USGS



LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B				
MISCELLANEOUS SCHEDULES AND DETAILS STRUCTURAL STRUCTURAL NOTES				
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT				
PLANS AND ESTIMATES PREPARED BY: BLACK & VEATCH Building a world of difference Black & Veatch Corporation Kansas City, Missouri				
	REVISION	BY	DATE	
	PLAN SCALE:	DRAWN	NMC	APPROVED:
		DESIGNED	DLW	
		SURVEY		
	PROFILE SCALE:	FIELD MGR.	703 10/11	
HORIZONTAL:	SECT. MGR.			
1" =	PROJ. MGR.	BSV 10/3/11		
VERTICAL:	RECOMMENDED:	HPS 10/10/11		
1" =				
FILE:MS-01.DWG	DRAWING:MS-1		DATE 10/25/2011	
ATLAS PAGE NO:			SHEET 239 OF 261 SHEETS	



A = VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER.

A (ALT) = ALTERNATE VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER IN T WALL JOINT WHICH DOES NOT REQUIRE WATERSTOP.

AX = DISTANCE FROM INSIDE CORNER FACE TO NEAREST VERTICAL CONSTRUCTION JOINT IN SIMILARLY NUMBERED WALL. AX SHALL NOT BE LESS THAN DIMENSIONS INDICATED BY THESE DETAILS; NOR GREATER THAN INDICATED ON PLAN DRAWINGS; BUT IN ANY CASE SHALL NOT EXCEED 30 FEET IN LIQUID CONTAINMENT STRUCTURES OR 40 FEET IN OTHER STRUCTURES. IN T WALL JOINTS WHICH DO NOT REQUIRE WATERSTOP, A1 MAY BE ZERO.

B = OPTIONAL SPLICE LOCATION UNLESS SPECIFICALLY NOTED ON PLAN DRAWINGS. SPLICE LENGTH SHALL NOT BE LESS THAN THAT REQUIRED FOR TOP BARS AS SHOWN IN TABLE ON THIS SHEET. USE SPLICE LENGTH FOR THE SMALLER OF THE TWO BARS BEING SPLICED.

C = STANDARD HOOK

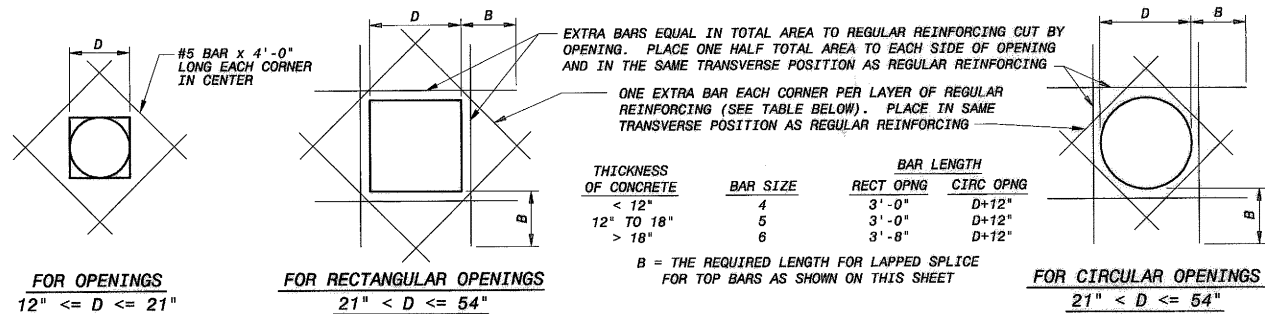
D = TYPICAL CORNER REINFORCEMENT. SIZE SHALL MATCH LARGEST ADJACENT WALL HORIZONTAL REINFORCEMENT; SPACING SHALL MATCH MINIMUM ADJACENT WALL HORIZONTAL REINFORCEMENT SPACING.

MAIN REINFORCEMENT FOR ALL STRUCTURES

TYPICAL HORIZONTAL CORNER REINFORCING DETAILS

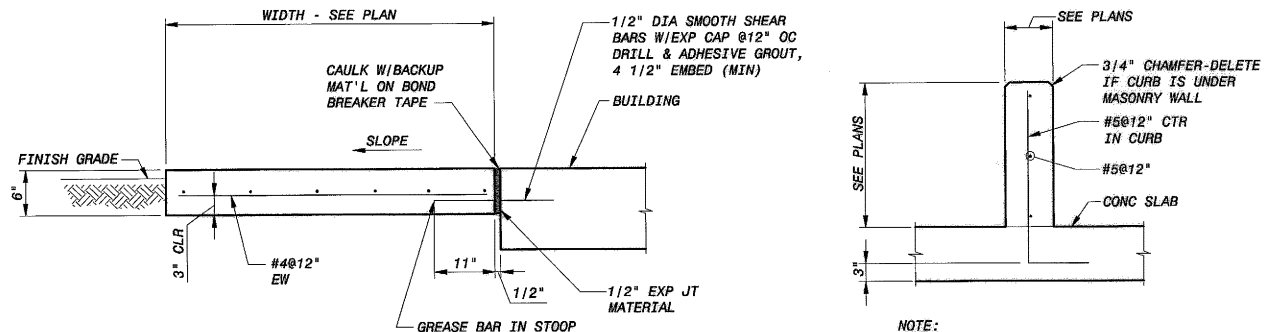
NOTES:

- VERTICAL REINFORCING NOT SHOWN.
- THESE DETAILS SHALL BE APPLICABLE TO ALL WALL CORNERS UNLESS NOTED OTHERWISE ON THE DRAWINGS.



TYPICAL EXTRA REINFORCING AT OPENINGS 12" TO <= 54"

(TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS)



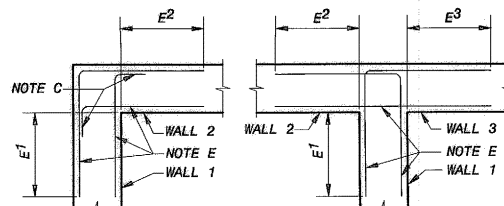
NOTE: SLOPE AWAY FROM BLDG @ 1/8" PER FOOT.

TYPICAL CONCRETE STOOP

NO SCALE

TYPICAL CONCRETE CURB

NO SCALE



E = WHERE SPECIFICALLY NOTED ON THE DRAWINGS, ADDITIONAL CORNER REINFORCEMENT SHALL BE PLACED IN BOTH FACES OF THE INDICATED CORNER OVER THE FULL HEIGHT. ADDITIONAL CORNER REINFORCEMENT SHALL BE OF THE SAME SIZE AND SPACING AS THE MAIN CORNER REINFORCEMENT, UNLESS NOTED OTHERWISE. PLACE ADDITIONAL REINFORCEMENT ALTERNATELY WITH, AND EQUAL DISTANCE BETWEEN, MAIN CORNER REINFORCEMENT.

EX = DISTANCE FROM INSIDE CORNER FACE TO TERMINATION OF ADDITIONAL CORNER REINFORCEMENT IN SIMILARLY NUMBERED WALL. EX SHALL NOT BE LESS THAN 0.20 THE CLEAR SPAN DISTANCE MEASURED HORIZONTALLY BETWEEN THIS CORNER AND THE NEXT OR 0.40 THE CLEAR SPAN DISTANCE OR CANTILEVERED DISTANCE MEASURED VERTICALLY, WHICHEVER IS SMALLER, BUT NOT LESS THAN 3'-0".

CONTRACTOR'S OPTION: E BAR TAILS MAY BE SPLICED USING LAPPED SPLICE LENGTHS FOR TOP BARS. SPLICES SHALL NOT BE LOCATED IN THE CORNER AREA COMMON TO BOTH WALLS AND SHALL CLEAR HOOK ENDS BY 3" MIN.

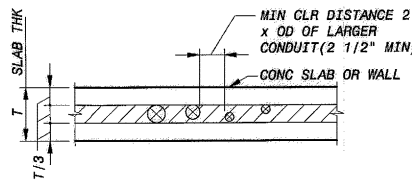
MARK NO.	ADDITIONAL REINF TO MAIN REINF (NOTE 1)				REMARKS
		E ¹	E ²	E ³	

NOTES:

- SEE TYPICAL CORNER REINF DETAILS THIS SHEET FOR MAIN REINF CORNER DETAILS.

ADDITIONAL REINFORCEMENT WHERE SPECIFICALLY NOTED ON THE DRAWINGS

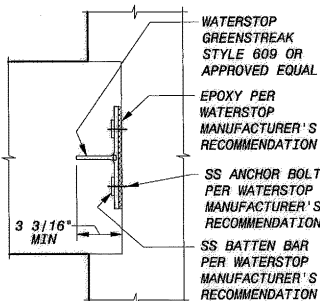
DETAIL NO SCALE



- NOTES:
- PLACE CONDUIT ONLY IN SHADED AREA.
 - FOR CONDUIT REQUIREMENTS SEE THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.

CONDUIT PLACING DETAIL

NO SCALE

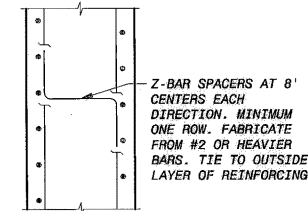


WATERSTOP

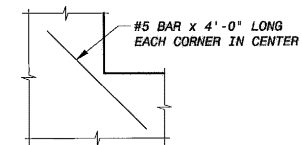
1 1/2" = 1'-0"

NOTES

- DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS OTHERWISE NOTED.
- WORK THIS DRAWING WITH THE STANDARD CONCRETE JOINT DETAILS.

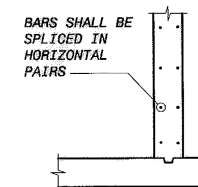


SPACERS FOR WALL REINFORCEMENT

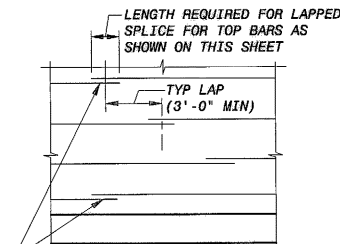


TYPICAL EXTRA REINFORCING AT ISOLATED RE-ENTRANT CORNERS

(TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS)



WALL SECTION



WALL ELEVATION

TYPICAL CIRCULAR TANK OR RING WALL REINFORCING SPLICE DETAIL

LENGTH OF LAPPED SPLICES FOR REINFORCEMENT (INCHES)					CONCRETE COVER FOR REINFORCEMENT	
(F'c=4000 PSI) (UNLESS NOTED OTHERWISE ON THE DRAWINGS)					LOCATION	MINIMUM COVER
BAR SIZE	BEAMS & COLUMNS		WALLS & SLABS		BAR SIZE	
	*TOP BARS	OTHERS	*TOP BARS	OTHERS		
3	16	16	16	16	3	UNFORMED SURFACES ADJACENT TO EXCAVATION
4	20	16	20	16	4	SURFACES INSIDE OF OZONE CONTACTORS EXPOSED TO OZONE IN WATER OR AIR
5	26	20	29	22	5	FORMED OR TOP SURFACES EXPOSED TO WEATHER OR SATURATED AIR, SUBMERGED OR IN CONTACT WITH EARTH, INCLUDING STIRRUPS, TIES OR SPIRALS
6	37	29	29	23	6	OTHER LOCATIONS:
7	60	47	48	37	7	BARS IN BEAMS OR GIRDERS, INCLUDING STIRRUPS AND COLUMN SPIRALS OR TIES
8	70	54	60	47	8	SLABS, WALLS AND JOISTS
9	80	62	74	57	9	#5 AND LARGER
10	92	70	91	70	10	#5 AND SMALLER
11	103	79	109	84	11	

* TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS. VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS

LOWER BIRD CREEK WWTP EXPANSION

MISCELLANEOUS SCHEDULES AND DETAILS

STANDARD CONCRETE REINFORCEMENT DETAILS

CITY OF TULSA, OKLAHOMA

TULSA METROPOLITAN UTILITY AUTHORITY

ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH

CONSULTING ENGINEERS

OKLAHOMA

REVISION

DATE

BY

PLAN SCALE:

DRAWN

NMC

DESIGNED

DLW

SURVEY

FIELD MGR.

708 10/11

SECT. MGR.

PROJ. MGR.

RECOMMENDED:

HAS 10/2/11

DIRECTOR

FILE: MS-03.DWG

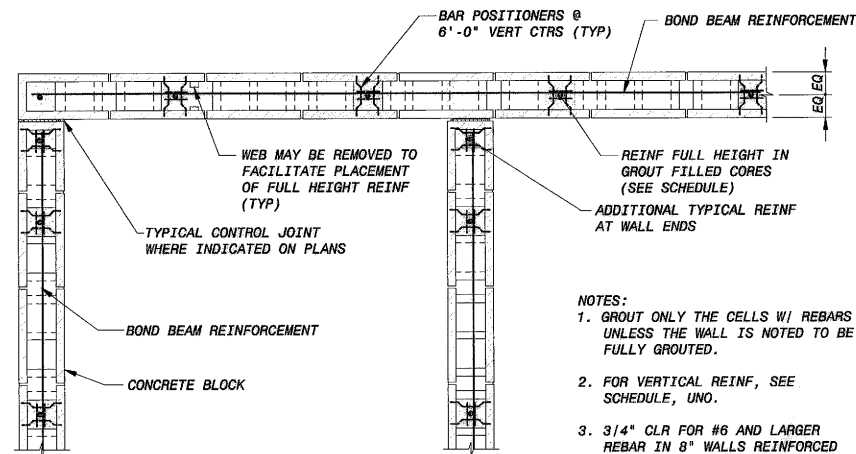
DRAWING: MS-3

DATE 10/28/2011

ATLAS PAGE NO:

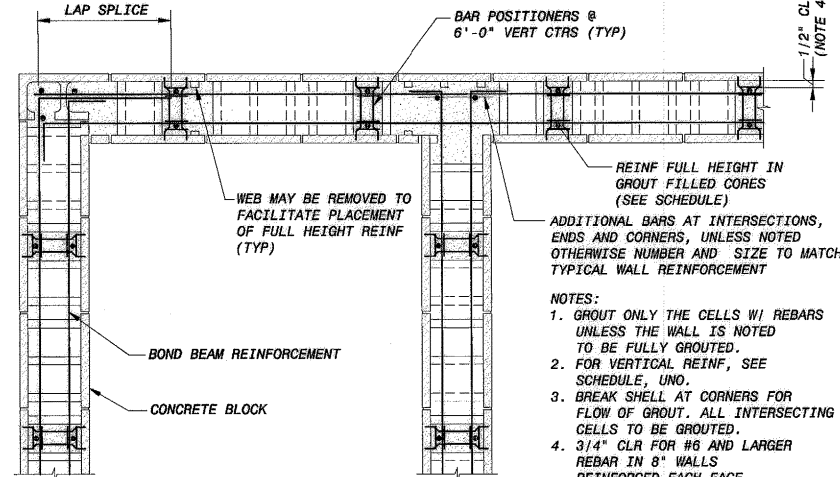
SHEET 241 OF 261 SHEETS

B&V PROJECT NO. 145120



TYPICAL REINFORCING WITH CORNER CONTROL JOINTS

SINGLE CURTAIN REINFORCEMENT SHOWN. DOUBLE CURTAIN SIMILAR WITH 1/2" CLEAR FROM EACH WALL FACE. (SEE NOTE 3)

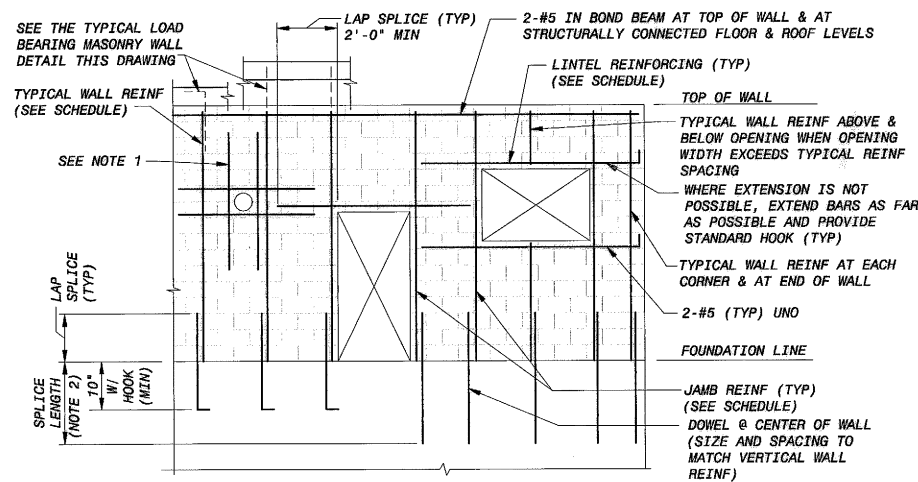


TYPICAL REINFORCING WITHOUT CORNER CONTROL JOINTS

DOUBLE CURTAIN REINFORCEMENT SHOWN. SINGLE CURTAIN SIMILAR EXCEPT CENTERED IN WALL.

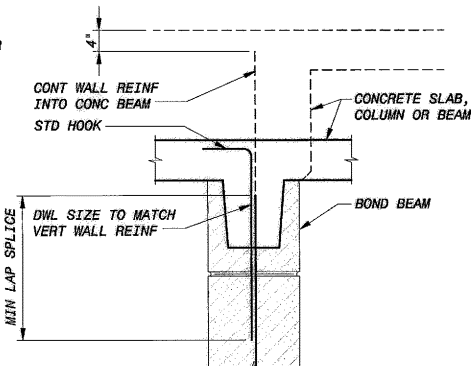
TYPICAL MASONRY REINFORCING PLANS

3/4" = 1'-0"



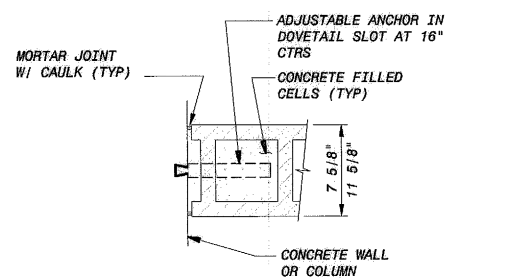
TYPICAL MASONRY REINFORCING ELEVATION

NO SCALE



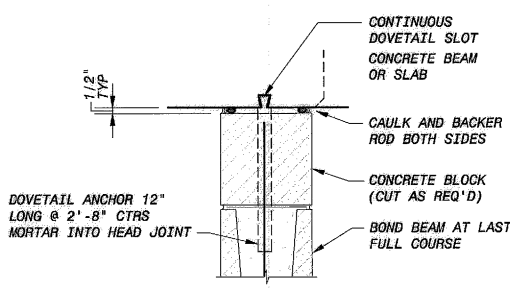
TYPICAL LOAD BEARING MASONRY WALL AT CONCRETE BEAM OR SLAB

NO SCALE



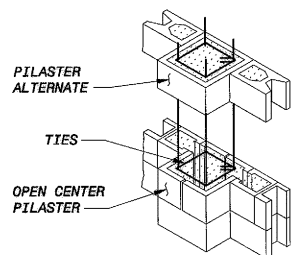
TYPICAL NON-LOAD BEARING MASONRY WALL AT CONCRETE WALL OR COLUMN

NO SCALE



TYPICAL NON-LOAD BEARING INTERIOR MASONRY WALL AT CONCRETE BEAM OR SLAB

NO SCALE

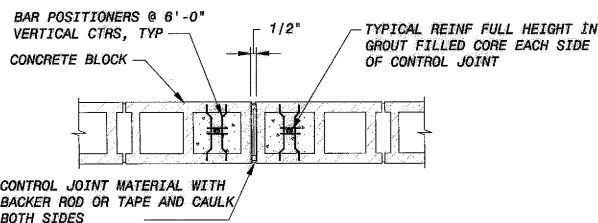


TYPICAL OPEN CENTER PILASTER

PILASTER SCHEDULE				
TYPE	NOM SIZE (DxW)	VERT REINF	TIES	REMARKS
PT-1	1'-4"x1'-4"	4-#5	#4@8"	SEE TS-1

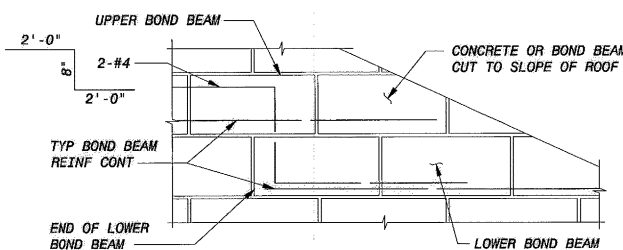
TYPICAL CONCRETE MASONRY PILASTERS

NO SCALE



TYPICAL CONCRETE MASONRY CONTROL JOINT

NO SCALE



BOND BEAM STEP DETAIL

NO SCALE

CMU WALL REINFORCING SCHEDULE (NOTE 5)
(SPECIAL INSPECTION REQUIRED)

WALL SIZE	WALL HEIGHT	VERTICAL REINFORCEMENT		HORIZONTAL REINFORCEMENT		REMARKS
		EXTERIOR WALL	INTERIOR WALL	EXTERIOR WALL	INTERIOR WALL	
OPERATIONS BUILDING						
8"	12' - 0"	#5@48"	#5@16" EF (STG/ SAFE RM ALL WALLS FULLY GROUTED)	LADDER TYPE JOINT REINF @ 16" CTRS VERT	LADDER TYPE JOINT REINF @ 16" CTRS VERT	---
HEADWORKS BUILDING						
12"	20' - 8" GROUND LEVEL	#5@16" NOTE 7 #5@24" NOTE 8	#5@48"	LADDER TYPE JOINT REINF @ 16" CTRS VERT	LADDER TYPE JOINT REINF @ 16" CTRS VERT	---
12"	18' - 0" SECOND FLR LEVEL	#5@24" NOTE 7 #5@32" NOTE 8	#5@48"	LADDER TYPE JOINT REINF @ 16" CTRS VERT	LADDER TYPE JOINT REINF @ 16" CTRS VERT	---
8"	4' - 0" PARAPET	#5@48"	---	LADDER TYPE JOINT REINF @ 16" CTRS VERT	LADDER TYPE JOINT REINF @ 16" CTRS VERT	---
SLUDGE TRANSFER PUMP STATION						
8"	17' - 4"	#5@24"	#5@24"	LADDER TYPE JOINT REINF @ 16" CTRS VERT	LADDER TYPE JOINT REINF @ 16" CTRS VERT	---

- NOTES:
- WALL HEIGHT IS DISTANCE FROM BOTTOM OF MASONRY WALL TO THE LOCATION OF TOP LATERAL SUPPORT.
 - WHERE BARS ARE CALLED OUT EACH FACE (EF), BARS SHALL BE PLACED, IN A DOUBLE CURTAIN WITH ONE BAR TOWARD EACH FACE OF THE WALL. OTHERWISE BARS SHALL BE CENTERED IN THE WALL.
 - AN INTERIOR WALL IS A WALL IN WHICH NO PORTION OF THE WALL IS EXPOSED TO THE EXTERIOR.
 - AT LOCATIONS WHERE WALLS CANTILEVER ABOVE THE TOP LATERAL SUPPORT, THE WALL HEIGHT FOR THE ABOVE SCHEDULE SHALL BE THE GREATER OF THE HEIGHT IN NOTE 1 OR DOUBLE THE DISTANCE FROM LATERAL SUPPORT TO THE TOP OF THE WALL.
 - IN ADDITION TO THE SCHEDULED REINFORCEMENT, WALLS SHALL HAVE A CONTINUOUS BOND BEAM WITH AT LEAST 2-#5 BARS AT OR NEAR THE TOP COURSE, SCHEDULED REINFORCEMENT AT OPENINGS, AND ALL OTHER HORIZONTAL AND VERTICAL REINFORCEMENT AS INDICATED ON THE STRUCTURAL AND ARCHITECTURAL DRAWINGS.
 - SEE THE STRUCTURAL DRAWINGS FOR ADDITIONAL REINFORCEMENT DETAILS.
 - REINF AT THIS SPACING FOR 6'-8" EACH DIRECTION FROM EACH CORNER.
 - REINF AT THIS SPACING IN MIDDLE OF WALL AWAY FROM CORNERS.

LENGTH OF LAP SPLICES FOR REINFORCEMENT (INCHES)

BAR SIZE	8" CMU		12" CMU	
	SINGLE REINF	DOUBLE REINF	SINGLE REINF	DOUBLE REINF
3	19	20	19	19
4	25	35	25	31
5	31	55	31	48
6	57	(98)	52	(98)
7	(79)	(142)	61	(133)
8	(112)	(229)	(74)	(186)
9	(145)	(342)	(90)	(235)

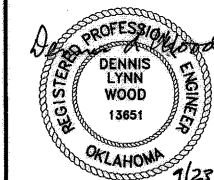
() BRACKETED SPLICE LENGTHS NOT RECOMMENDED. USE MECHANICAL CONNECTORS.

GENERAL NOTES

- THE DETAILS ON THIS SHEET ARE APPLICABLE TO ALL CONCRETE MASONRY CONSTRUCTION. SPECIAL NOTES, SECTIONS AND DETAILS SPECIFICALLY NOTED ON THE DESIGN DRAWINGS SHALL BE APPLICABLE IN LIEU OF THESE TYPICAL DETAILS, EXCEPT THAT REINFORCEMENT SHALL NOT BE LESS THAN THE TYPICAL REINFORCEMENT REQUIRED.
- FOR MISCELLANEOUS APPURTENANCES INCLUDING EMBEDMENTS, BRACING, STEEL OR PRECAST LINTELS, VENEER, FLASHING, WEEPS, INSULATION, SEALING, CAULKING AND EMBEDDED PIPE AND ELECTRICAL CONDUIT, SEE THE DESIGN DRAWINGS.
- UNO DENOTES "UNLESS NOTED OTHERWISE".
- LEVEL 1 SPECIAL INSPECTION IN COMPLIANCE WITH IBC TABLE 1704.5.1 IS REQUIRED FOR ALL MASONRY.
- WORK THIS DRAWING WITH THE STANDARD MASONRY LINTEL & JAMB REINFORCING DRAWING.

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
MISCELLANEOUS SCHEDULES AND DETAILS
STRUCTURAL
TYPICAL MASONRY WALL REINFORCEMENT DETAILS
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:



REVISION	BY	DATE	PLAN SCALE:	DRAWN	NMC	APPROVED:
				DESIGNED	DLW	
				SURVEY		
			PROFILE SCALE:	FIELD MGR.	JOS 10/11	
			HORIZONTAL:	SECT. MGR.		
			1" =	PROJ. MGR.	BV 10/3/11	
			VERTICAL:	RECOMMENDED:	HAS 10/3/11	
			1" =			
			FILE: MS-04.DWG	DRAWING: MS-4		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 242 OF 261 SHEETS

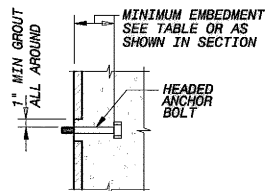
JAMB AND LINTEL REINFORCING SCHEDULE							
MARK	WALL SIZE	LINTEL		JAMB		COMBINED JAMB	REMARKS
		DEPTH	LONGITUDINAL REINFORCEMENT	VERTICAL REINFORCEMENT			
				EXTERIOR WALL	INTERIOR WALL		
OPERATIONS BUILDING							
D102, W102	8"	2'-8"	2-#6 BOT	4 CELLS w/2-#5 PER CELL, 1 EF	-	NO	-
D103, D104	8"	8"	2-#5 BOT	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	-
W105,W106,W109 W110,W111,W112	8"	8"	2-#5 BOT	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	-
HVAC 14x14 EAST	8"	8"	2-#5 BOT	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	LINTEL SPANS BOTH OPENINGS
HVAC 14x14 WEST	8"	8"	2-#5 BOT	1 CELL w/2-#5 PER CELL, 1 EF	-	YES	14x14 EAST & 14x14 WEST
HVAC 20x24	8"	8"	2-#5 BOT	1 CELL w/2-#5 PER CELL, 1 EF	-	YES	20x24 & 20x16
HVAC 20x16	8"	8"	2-#5 BOT	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	LINTEL SPANS BOTH OPENINGS
HEADWORKS BUILDING							
DH001	12"	1'-4"	2-#5	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	
DH002	12"	2'-0"	2-#5	4 CELLS w/2-#5 PER CELL, 1 EF	-	NO	S. JAMB, (N. JAMB SEE MS-9)
DH003	12"	8"	2-#5	1 CELL w/2-#5 PER CELL, 1 EF	-	NO	
DH004	12"	1'-4"	2-#5	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	
DH005	12"	1'-4"	2-#5	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	
DH006	12"	2'-0"	2-#5	4 CELLS w/2-#5 PER CELL, 1 EF	-	NO	S. JAMB, (N. JAMB SEE MS-9)
DH007,009,010	12"	8"	2-#5	1 CELL w/2-#5 PER CELL, 1 EF	-	NO	
DH101	12"	1'-4"	2-#5	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	
DH102	12"	1'-4"	2-#5	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	
DH103,104,105	12"	8"	2-#5	1 CELL w/2-#5 PER CELL, 1 EF	-	NO	
WH001,002	12"	8"	2-#5	1 CELL w/2-#5 PER CELL, 1 EF	-	NO	
WH101,102,103,104, 105,106,107,108, 109,110,111,112	12"	8"	2-#5	1 CELL w/2-#5 PER CELL, 1 EF	-	NO	
WH113	8"	1'-4"	2-#5	-	1 CELL w/2-#5 PER CELL, 1 EF	NO	
LH001,002,003	12"	8"	2-#5	1 CELL w/2-#5 PER CELL, 1 EF	-	NO	
LH004	12"	1'-4"	2-#5	2 CELLS w/2-#5 PER CELL, 1 EF	-	NO	
LH101,102,103	12"	8"	2-#5	1 CELL w/2-#5 PER CELL, 1 EF	-	NO	
DH008	8"	1'-4"	2-#5	-	1 CELL w/2-#5-PER CELL, 1 EF	NO	
SLUDGE TRANSFER PUMP STATION							
DT101	8"	1'-4"	2-#5 BOT	4 CELLS w/2-#5 PER CELL, 1 EF		NO	
DT101	8"	1'-4"	2-#5 BOT	5 CELLS w/2-#5 PER CELL, 1 EF		YES	LT101
LT101	8"	1'-4"	2-#5 BOT	4 CELLS w/2-#5 PER CELL, 1 EF		NO	
LT101	8"	1'-4"	2-#5 BOT	5 CELLS w/2-#5 PER CELL, 1 EF		YES	DT101
DT102	8"	1'-4"	2-#5 BOT	3 CELLS w/2-#5 PER CELL, 1 EF		NO	
DT103	8"	8"	2-#5 BOT		2 CELLS w/2-#5 PER CELL, 1 EF	NO	
HVAC 20x20	8"	1'-4"	2-#5 BOT	3 CELLS w/2-#5 PER CELL, 1 EF		NO	LINTEL SPANS BOTH OPENINGS
HVAC 32x16	8"	1'-4"	2-#5 BOT	ALL CELLS w/2-#5 PER CELL, 1 EF		YES	20x20 & 32x16
HVAC 32x16	8"	1'-4"	2-#5 BOT	3 CELLS w/2-#5 PER CELL, 1 EF		NO	LINTEL SPANS BOTH OPENINGS

JAMB NOTES:

- THE SCHEDULED REINFORCING SHALL BE PLACED WITH ONE BAR AT EACH FACE OF THE WALL. ONLY ONE PAIR OF BARS SHALL BE PLACED IN EACH CELL.
- AN INTERIOR WALL IS A WALL IN WHICH NO PORTION OF THE WALL IS EXPOSED TO THE EXTERIOR.
- REINFORCE JAMBS AS INDICATED UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- NUMBER OF CELLS INDICATED ARE FOR EACH SIDE OF OPENING UNLESS ONE SIDE IS A COMBINED JAMB.

LINTEL NOTES:

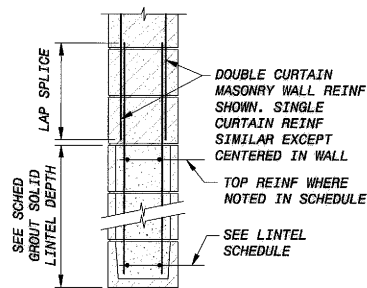
- BEAR ALL LINTELS A MINIMUM 2'-0" AT EACH END.
- REINFORCE LINTELS AS INDICATED ABOVE UNLESS NOTED OTHERWISE ON THE DRAWINGS.



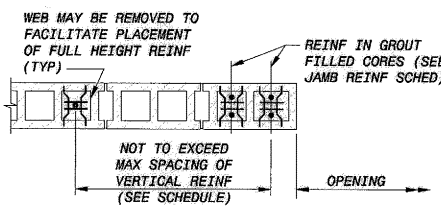
NOTE: MINIMUM BOLT SPACING SHALL BE 12 BOLT DIAMETERS WITH A MINIMUM EDGE DISTANCE OF 6 BOLT DIAMETERS AND WITH A MINIMUM OF 6" TO END OF WALL.

TYPICAL MASONRY ANCHOR BOLT DETAIL
NO SCALE

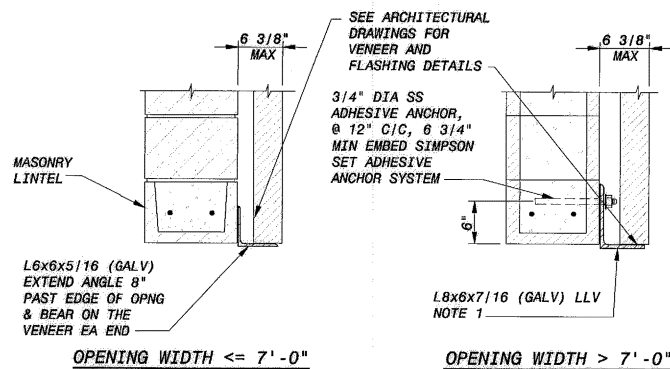
BOLT EMBEDMENT SCHEDULE (UNO)	
BOLT SIZE	EMBED
1/2"	4"
5/8"	4"
3/4"	5"
7/8"	6"
1"	7"



TYPICAL MASONRY LINTEL SECTION AND SCHEDULE
NO SCALE



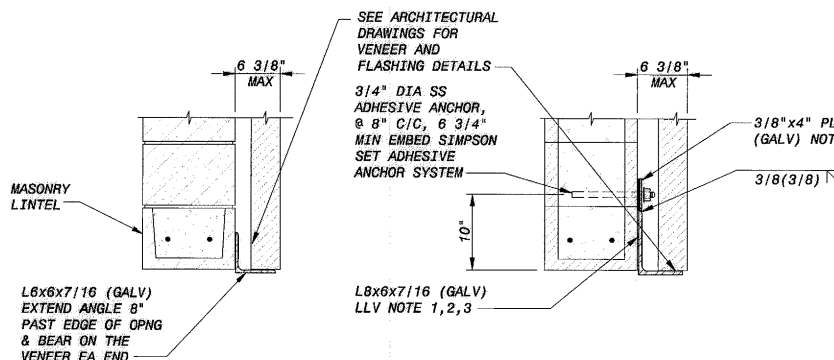
TYPICAL MASONRY JAMB PLAN AND SCHEDULE
NO SCALE



OPERATIONS BUILDING AND SLUDGE TRANSFER PUMP STATION

VENEER SUPPORT DETAIL AT OPENING

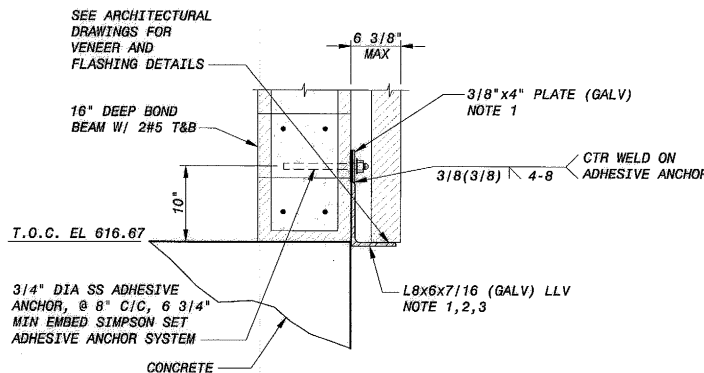
- NO SCALE
- NOTE: 1. ANGLE LENGTH IS 1" LESS THAN OPENING WIDTH.



HEADWORKS BUILDING

VENEER SUPPORT DETAIL AT OPENING

- NO SCALE
- NOTES:
- ANGLE LENGTH & PLATE LENGTH IS 1" LESS THAN OPENING WIDTH.
 - GALVANIZE AFTER FABRICATION.
 - CONTRACTOR MAY FABRICATE NEW 7/16" MIN THICK BENT PLATE, SAME DIMS AS ABOVE, IN LIEU OF WELDING PLATE TO ANGLE.

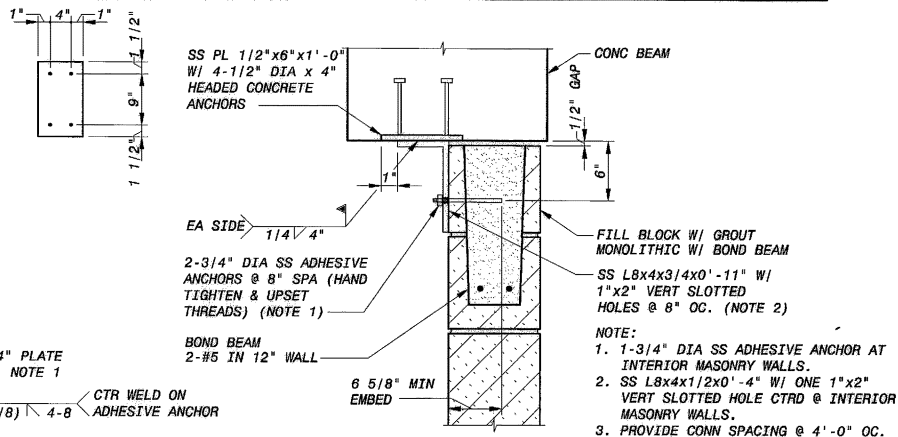


HEADWORKS BUILDING

- NOTES:
- GALVANIZE AFTER FABRICATION.
 - CONTRACTOR MAY FABRICATE NEW 7/16" MIN THICK BENT PLATE, SAME DIMS AS ABOVE, IN LIEU OF WELDING PLATE TO ANGLE.

GENERAL NOTES

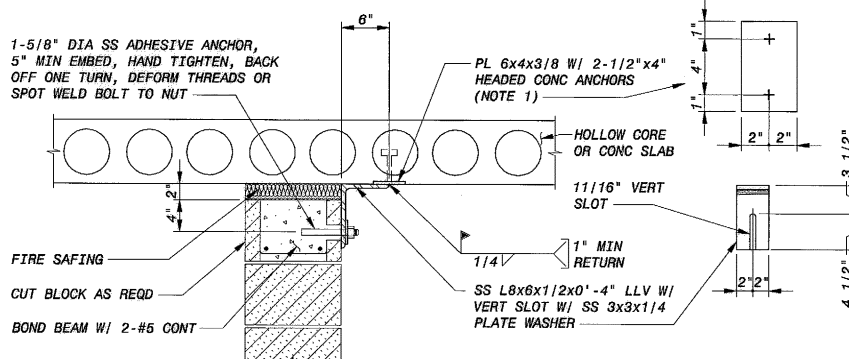
- THE DETAILS ON THIS SHEET ARE APPLICABLE TO ALL CONCRETE MASONRY CONSTRUCTION. SPECIAL NOTES, SECTIONS AND DETAILS SPECIFICALLY NOTED ON THE DESIGN DRAWINGS SHALL BE APPLICABLE IN LIEU OF THESE TYPICAL DETAILS, EXCEPT THAT REINFORCEMENT SHALL NOT BE LESS THAN THE TYPICAL REINFORCEMENT REQUIRED.
- FOR MISCELLANEOUS APPURTENANCES INCLUDING EMBEDMENTS, BRACING, STEEL OR PRECAST LINTELS, VENEER, FLASHING, WEEPS, INSULATION, SEALING, CAULKING AND EMBEDDED PIPE AND ELECTRICAL CONDUIT, SEE THE DESIGN DRAWINGS.
- UNO DENOTES "UNLESS NOTED OTHERWISE".
- SPECIAL INSPECTION IS REQUIRED FOR ALL MASONRY.
- WORK THIS DRAWING WITH THE TYPICAL MASONRY WALL REINFORCING DRAWING.



TYPICAL NON-LOAD BEARING EXTERIOR OR INTERIOR

(AS NOTED) MASONRY WALL DETAIL AT CONCRETE BEAM

NO SCALE



- NOTE:
- PROVIDE CONNECTIONS AT 4'-0" C-C (MAX) UNLESS NOTED OTHERWISE ON PLANS. PLATE IN HOLLOW CORE MAY BE CAST IN DURING MANUFACTURE, ALTERNATIVELY, PLATE MAY BE GROUTED IN A HOLLOW CORE VOID BY THE PRECASTER AFTER CASTING; GROUT IN VOID SHALL EXTEND A MINIMUM OF 6" BEYOND HEADED ANCHOR CENTERLINE EACH WAY. CONTRACTOR SHALL COORDINATE CONNECTION LOCATIONS WITH HOLLOW CORE SHOP DRAWINGS.

TYPICAL NON-LOAD BEARING INTERIOR MASONRY WALL

DETAIL AT HOLLOW CORE SLAB OR CONCRETE SLAB

7" = 1'-0"

LOWER BIRD CREEK WWTP EXPANSION
TMAA PROJECT NO. ES 2006-01
CONTRACT 1B

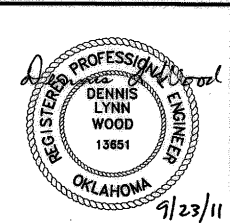
MISCELLANEOUS SCHEDULES AND DETAILS
STRUCTURAL
TYP MASONRY LINTEL, JAMB & MISC DETAILS

CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:



REVISION	BY	DATE	PLAN SCALE:	DRAWN	NMC	APPROVED:
			DESIGNED	DLW		
			SURVEY			
			PROFILE SCALE:	FIELD MGR.	7/01/10/11	
			HORIZONTAL:	SECT. MGR.		
			1" =	PROJ. MGR.	10/10/11	
			VERTICAL	RECOMMENDED:		
			1" =			
			FILE: MS-05.DWG	DRAWING: MS-5		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 243 OF 261 SHEETS

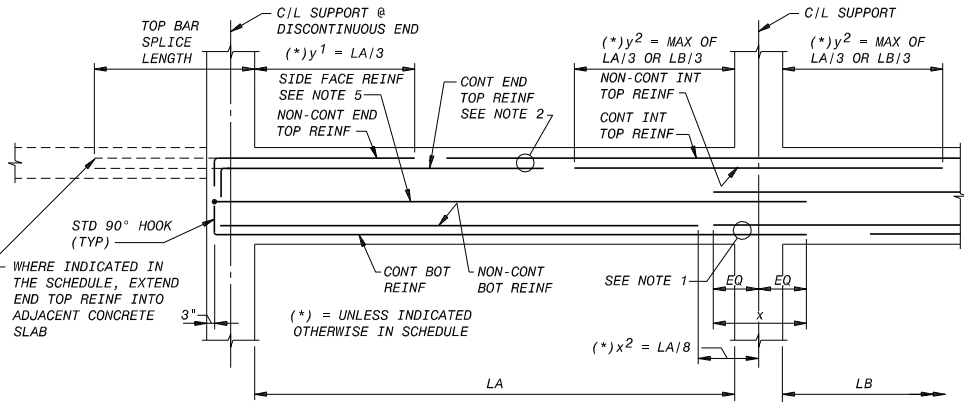


7/23/11

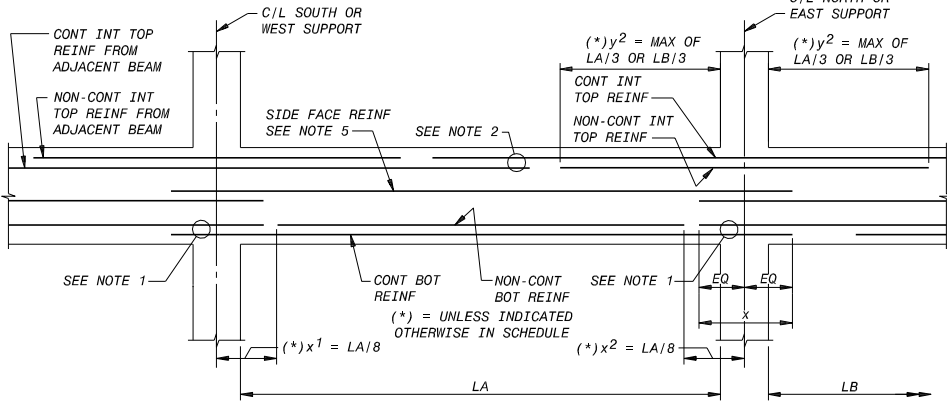
BEAM SCHEDULE																					
MARK	TYPE	BEAM SIZE		BOTTOM REINF					END TOP REINF			INT TOP REINF			SIDE FACE REINF (EF)	STIRRUPS					REMARKS
		WIDTH	DEPTH	CONT	NON-CONT	X	X ¹	X ²	CONT	NON-CONT	Y ¹	CONT	NON-CONT	Y ²		TYPE	SIZE	S1	Z	S2	
HEADWORKS																					
BH-001	E	20	30	2-#8	1-#8				3-#8			2-#9	1-#9		1-#4 EF	SA	#4	12"		12"	NOTE 13
BH-002	E	20	28	2-#6					3-#7			2-#7	2-#7			SA	#4	12"		12"	
BH-003	I	20	28	2-#8												SA	#4	12"		12"	NOTE 12
BH-004	S	20	24	2-#5					2-#6							SA	#4	12"		12"	
BH-005	S	16	20	2-#5					2-#5							SA	#4	12"		12"	
BH-006	S	12	20	2-#5					2-#6							SA	#4	12"		12"	
BH-101	E	24	48	2-#7	4-#7				2-#8	4-#8		2-#8	4-#8		5-#5 EF	SA	#5	6"		6"	NOTES 9,10,13
BH-101A	E	24	30	2-#7	4-#7				2-#8	4-#8		2-#8	4-#8		1-#4 EF	SA	#5	6"		6"	NOTES 9,10,13
BH-102	S	12	18		2-#6				2-#5							SA	#3	6"		6"	NOTE 11 BOTH ENDS
BH-102A	E	25	16		3-#6			4"	3-#5							SA	#3	6"		6"	NOTE 11
BH-103	S	12	16		2-#7				2-#5							SA	#3	6"		6"	
BH-104	E	20	32	2-#7	2-#7				2-#7	1-#7		2-#7	2-#7		1-#4 EF	SA	#4	12"		12"	NOTE 14
BH-105	E	20	32	2-#6	2-#6				2-#7	1-#7		2-#7	2-#7		1-#4 EF	SA	#4	12"		12"	NOTE 14
BH-106	E	20	32	2-#7	2-#7				2-#8	1-#8		2-#8	2-#8		1-#4 EF	SA	#4	12"		12"	
BH-107	E	20	30	3-#6	3-#6				3-#8	3-#8					1-#4 EF	SA	#4	12"		12"	NOTES 9,10
BH-108	S	20	30	3-#6	3-#6				3-#7	3-#7					1-#4 EF	SA	#4	12"		12"	NOTES 9,10
BH-109	S	26	42	2-#7	4-#7				3-#7						2-#5	SA	#4	12"		12"	NOTE 11 WEST END
BH-110	E	20	30	2-#7	1-#7				2-#7	2-#7					1-#4 EF	SA	#4	12"		12"	
BH-111	E	24	40	2-#6	6-#6				2-#7	4-#7		2-#7	4-#7		3-#4 EF	SA	#4	6"		6"	
BH-112	S	26	42	2-#7	4-#7				3-#7						2-#5	SA	#4	12"		12"	NOTE 11 NORTH END
BH-113	E	16	24		3-#7			2"		3-#5			3-#7		1-#5	SA	#3	10"		10"	NOTE 14
BH-114	S	12	16		2-#7				2-#5							SA	#3	6"		6"	NOTE 11 EAST END
BH-115	S	24	24	3-#7					4-#5							SA	#4	10"		10"	NOTE 11 BOTH ENDS
BH-201	E	24	30	2-#8	4-#8				2-#8	2-#8		2-#8	3-#8		1-#4 EF	SA	#4	6"	5'-0"	12"	NOTES 9,13
BH-202	E	24	30	2-#7	2-#7				2-#7	2-#7		2-#8	2-#8		1-#4 EF	SA	#4	6"	5'-0"	12"	NOTE 13
BH-203	E	24	40	2-#8	2-#8				2-#8	2-#8		2-#8	3-#8		5-#5 EF	SA	#4	6"	6'-8"	12"	NOTE 13
BH-204	E	20	30	3-#5	1-#5				2-#7			2-#8	1-#8		1-#4 EF	SA	#4	5"	5'-0"	12"	NOTE 14
BH-205	S	24	24		4-#6					4-#6						SA	#4	10"		10"	

SCHEDULE NOTES

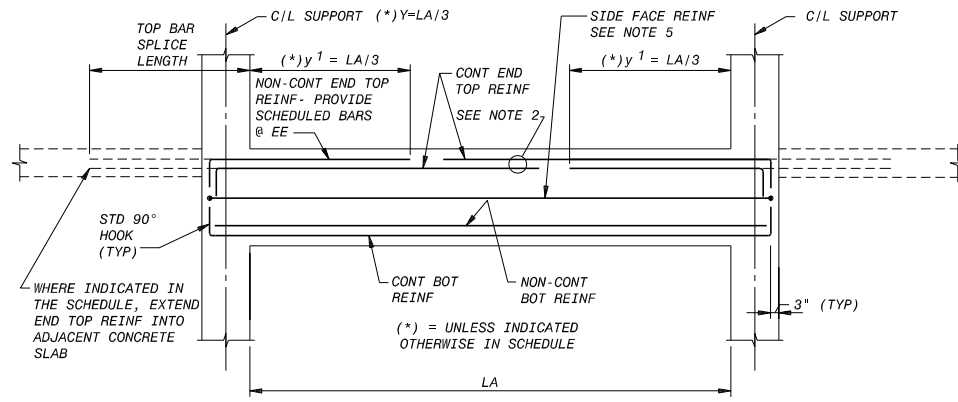
- UNLESS INDICATED OTHERWISE IN BEAM SCHEDULE, CONTINUOUS BOTTOM REINF SHALL HAVE LAP SPLICES CENTERED ON THE CENTERLINE OF THE SUPPORT USING 75% OF THE LAP SPlice LENGTH INDICATED ON THE STANDARD CONCRETE DETAILS SHEET. USE THE LAP SPlice REQUIREMENT OF THE SMALLER BOTTOM BAR IF BAR SIZES IN ADJACENT SPANS DIFFER. AT THE CONTRACTORS OPTION, BOTTOM REINF MAY BE MADE CONTINUOUS, WITHOUT SPLICING, ACROSS THE SUPPORT IF BARS IN THE ADJACENT SPAN ARE EQUAL IN SIZE AND QUANTITY.
- CONTINUOUS END AND INTERIOR TOP REINF SHALL BE LAPPED AT MIDSPAN BETWEEN SUPPORTS USING 75% OF THE LAP SPlice LENGTH INDICATED ON THE STANDARD CONCRETE DETAILS SHEET. USE THE LAP SPlice REQUIREMENT OF THE SMALLER TOP BAR, IF THE BAR SIZES EACH SIDE OF MIDSPAN DIFFER. AT THE CONTRACTORS OPTION, TOP REINF MAY BE MADE CONTINUOUS, WITHOUT SPLICING, IF THE TOP BARS EACH SIDE OF MIDSPAN ARE EQUAL IN SIZE AND QUANTITY.
- CONTINUOUS TOP AND BOTTOM BARS SHALL BE PLACED IN THE BEAM SECTION SUCH THAT ONE OF THE CONTINUOUS BARS IS LOCATED IN EACH CORNER OF THE BEAM STIRRUPS.
- ALL TOP AND BOTTOM BARS SHALL BE PLACED IN ONE LAYER UNLESS INDICATED OTHERWISE. WHERE MORE THAN ONE LAYER IS NOTED, PROVIDE GREATER OF 2.5 INCHES OR 3 BAR DIAMETER CLEAR BETWEEN LAYERS.
- SIDE FACE REINF SHALL BE CONTINUOUS WITH LAP SPLICES CENTERED AT THE CENTERLINE OF THE SUPPORT. A 90 DEGREE STANDARD HOOK SHALL BE PROVIDED AT THE EXTERIOR ENDS OF END SPANS. SCHEDULED SIDE FACE REINF SHALL BE SPACED EQUALLY ON EACH FACE.
- PROVIDE MINIMUM #5 STIRRUP SUPPORT BARS IN ALL CORNERS OF STIRRUPS WHEN TOP OR BOTTOM BARS ARE NOT PRESENT. LAP #5 BARS 1'-8" MIN TO SCHEDULED REINF.
- UNLESS INDICATED OTHERWISE, CONSECUTIVE STIRRUP CROSSTIES SHALL HAVE THEIR 90 DEGREE HOOK PLACED ON OPPOSITE SIDES. IN THE EVENT THAT A SLAB FRAMES INTO ONLY ONE SIDE OF A BEAM, THEN THE 90 DEGREE HOOK SHALL BE PLACED ON THE SLAB SIDE CONSISTENTLY. IN THE EVENT A BEAM IS NOT CONFINED BY A SLAB ON EITHER SIDE, THE STIRRUP CROSSTIE SHALL HAVE TWO 135 DEGREE HOOKS AND NO 90 DEGREE HOOK.
- ABBREVIATIONS USED:
ADD = ADDITIONAL
BOT = BOTTOM
CONT = CONTINUOUS
EE = EACH END
EF = EACH FACE
EQ = EQUAL
INT = INTERIOR
LE = LEFT END
RE = RIGHT END
REINF = REINFORCEMENT
STD = STANDARD (PER ACI 318)
T = TOP
TYP = TYPICAL
- INTERIOR TOP REINFORCEMENT FROM ADJACENT BEAM.
- INTERIOR TOP REINF PROVIDED IN EAST BEAM IS CONTINUED INTO THE WEST BEAM. DO NOT PROVIDE DOUBLE REINFORCEMENT.
- INTERIOR TOP REINF PROVIDED IN SOUTH BEAM IS CONTINUED INTO NORTH BEAM. DO NOT DOUBLE REINFORCEMENT.
- BEAM DEPTH IS THE MINIMUM DEPTH REQUIREMENT, WHERE TOP OF BEAM ELEVATION VARIES. CONTRACTOR SHALL ADJUST THE BEAM SOFFIT ELEVATION TO PROVIDE ATLEAST THE MINIMUM REQUIRED BEAM DEPTH.
- BOTTOM REINFORCEMENT IN TWO LAYERS.
- TOP REINFORCEMENT IN TWO LAYERS.
- EXTEND END TOP REINFORCEMENT INTO ADJACENT SLAB.



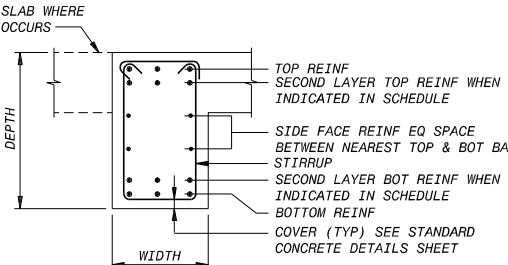
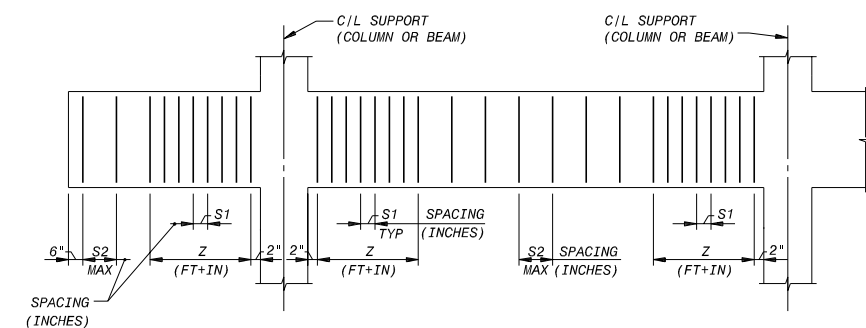
TYPE E-END SPAN



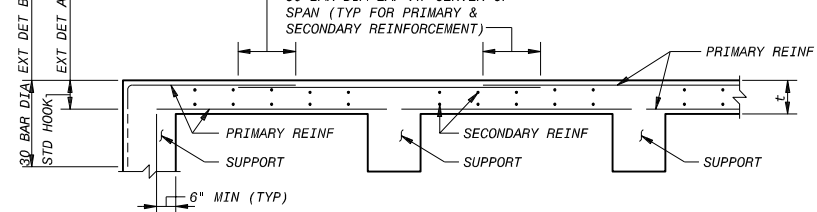
TYPE I-INTERIOR SPAN



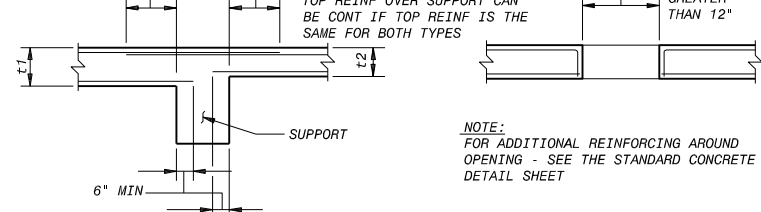
TYPE S-SINGLE SPAN



TYPICAL BEAM SECTION



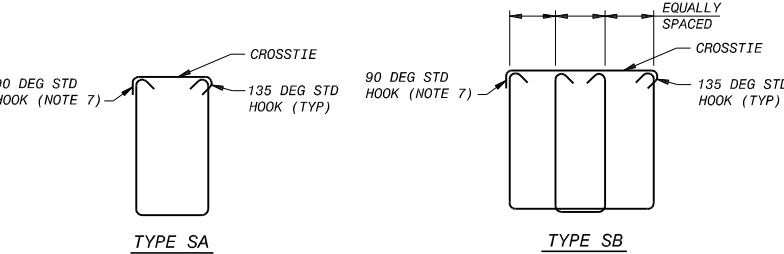
TYPICAL SUSPENDED SLAB DETAIL



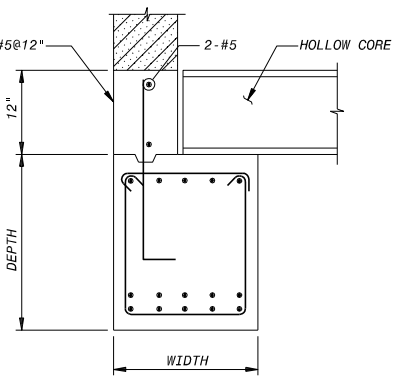
SLAB INTERACTION DETAIL

DETAIL AT OPENINGS

STIRRUP SPACING LAYOUT



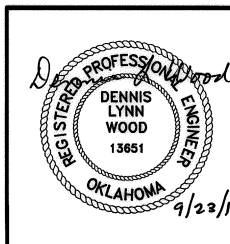
STIRRUP DETAILS



TYPE - TB

SLAB NOTES:

- THE DRAWING INDICATES MAXIMUM SLAB THICKNESS, FOR TAPERED SLABS AT FLOOR DRAIN, SEE THE FLOOR DRAIN PIPING SHEETS.
- ALL SLAB DETAILS TYPICAL FOR BOTH PRIMARY AND SECONDARY REINFORCEMENT.
- REINFORCING IN SLABS MAY BE CONTINUOUS.
- CONCRETE SLAB CONSTRUCTION:
 - SLAB DEPTHS FOR SUSPENDED SLABS SLOPED TO FLOOR DRAINS SHALL BE MEASURED FROM THE TOP OF THE FLOOR AT HIGH POINT OF SLAB TO THE UNDERSIDE OF SLAB. THE SPECIFIED MINIMUM CLEARANCE FOR REINFORCING IN SUSPENDED SLABS IN AREAS SLOPED TO FLOOR DRAINS IS MEASURED FROM THE LOW POINTS IN THE TOP SURFACE OF SLAB, AND TOP AND BOTTOM MATS OF REINFORCING STEEL MAY BE PLACED IN LEVEL PLANES IN SLOPED AREAS.
 - THE UNDERSIDE OF FORMED OR SUSPENDED SLABS SHALL BE AT A CONSTANT ELEVATION EXCEPT WHEN SPECIFICALLY SHOWN OTHERWISE SUCH AS FOR LARGE ROOFS.
 - THICKNESS OF SLOPED SLABS ON GRADE SHALL BE MEASURED FROM THE THINNEST POINT. THE UNDERSIDE OF SLOPED FLOORS THAT ARE PLACED ON GRADE MAY BE CONSTRUCTED WITH FLAT OR SLOPED SUBGRADE TO PROVIDE THE SPECIFIED SLAB DEPTH.



REVISION	BY	DATE
ADDENDUM NO. (2)	PSB	1-13-12

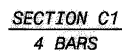
LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B

MISCELLANEOUS SCHEDULES AND DETAILS
STRUCTURAL
STD CONCRETE BEAM/SLAB SCHEDULE & NOTES

CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
BLACK & VEATCH
Building a world of difference
Holloway, Updike and Ballen
Consulting Engineers
Muskegon - Broken Arrow
OWGATES
Engineering Services

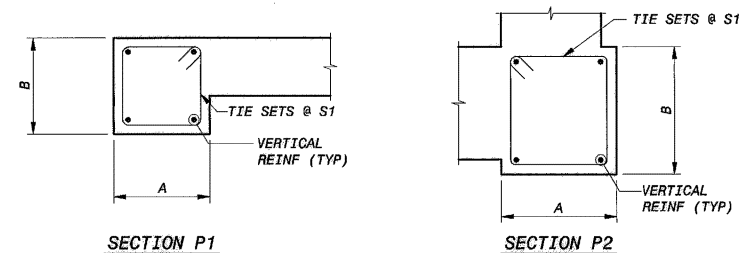
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	DESIGNED	DLW	
	SURVEY		
PROFILE SCALE:	FIELD MGR.	JOS 10/11	
HORIZONTAL:	SECT. MGR.		
1" =	PROJ. MGR.	BA 10/13/11	
VERTICAL	RECOMMENDED:	HAS 10/20/11	
1" =			
FILE: MS-07.DWG	DRAWING: MS-8	DATE 10/28/2011	
ATLAS PAGE NO:		SHEET 246 OF 261 SHEETS	



NOTES:

1. * WHEN 6" OR LESS, INTERIOR TIE MAY BE OMITTED.
2. ** WHEN 6" OR LESS, ONE INTERIOR TIE MAY BE OMITTED.
3. ALTERNATE 90 DEG HOOK LOCATION AT EACH SIDE.

TYPICAL COLUMN SECTIONS
NO SCALE



NOTES:


1. PILASTER SIZES IN REINFORCING SCHEDULE ARE CALLED OUT AS A X B.
2. TYPICAL HORIZONTAL AND VERTICAL WALL REINFORCING IS CONTINUOUS THROUGH PILASTERS.

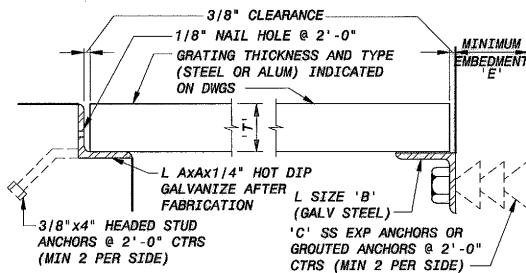
TYPICAL PILASTER SECTIONS
NO SCALE

CONCRETE COLUMN AND PILASTER MARK SCHEDULE					
	ROW				
COLUMN	A	A.1	B	C	D
1	M11	M2	M12	M14	-
2	-	M3	M4	-	-
3	M11	M13	M21	M14	-
4	M15	-	M13	M15	M17
5	M12	-	M11	M11	-

[illegible]

PLOTTED DATE: SAW4327, 6/2/2011 11:21:21 AM
 SAVED DATE: CAR24039, 9/2/2011 10:02:28 AM
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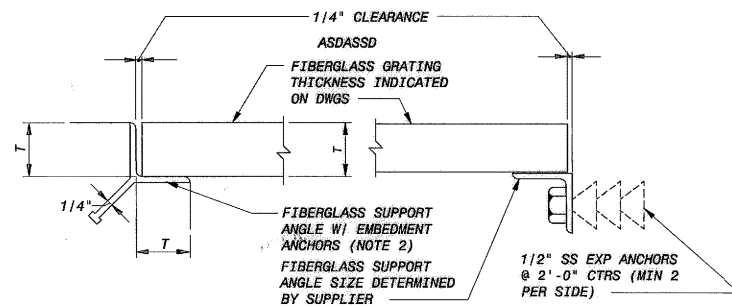
REVISION			BY	DATE	PLAN SCALE: DRAWN RR DESIGNED DLW SURVEY			APPROVED:	
					PROFILE SCALE: FIELD MGR. 708 10/11 HORIZONTAL: SECT. MGR. 1" = PROJ. MGR. 1251 10/8/11 RECOMMENDED:			 DIRECTOR	
					VERTICAL: 1" = WAS 10/30/11				
FILE: MS-09.DWG					DRAWING: MS-9		DATE 10/28/2011		
ATLAS PAGE NO:							SHEET 247 OF 261 SHEET		



GRATING THICKNESS ('T')	L SIZE AXAX1/4	L SIZE 'B'	'C' EXP ANCHOR DIA	MIN 'E'
1	1 1/4x1 1/4	2 1/2x2 1/2x1/4	1/2"	4 1/8"
1 1/4	1 1/2x1 1/2	2 1/2x2 1/2x1/4	1/2"	4 1/8"
1 1/2	1 3/4x1 3/4	2 1/2x2 1/2x1/4	1/2"	4 1/8"
1 3/4	2x2	3x3x3/8	3/4"	6 3/8"
2	2 1/2x2 1/2	3x3x3/8	3/4"	6 3/8"
2 1/4	2 1/2x2 1/2	3x3x3/8	3/4"	6 3/8"
2 1/2	3x3	3x3x3/8	3/4"	6 3/8"

* TRIM AND BEVEL UPSTANDING LEG TO FIT

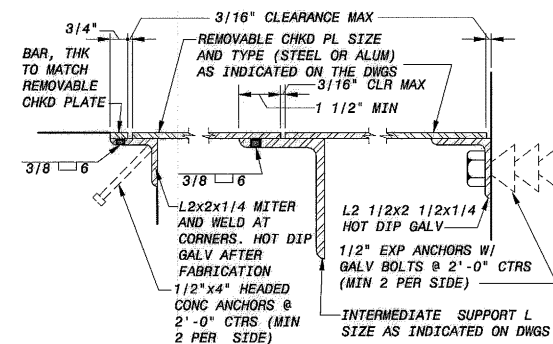
GRATING SUPPORT (A)
3" = 1'-0"



NOTES:

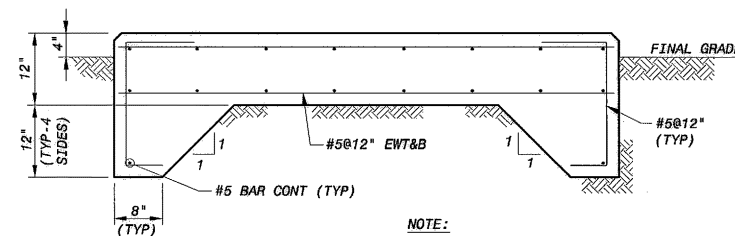
- WALL SUPPORT MAY BE CONNECTED W/ 5/8" SS ANCHOR BOLTS EMBEDDED 6" INTO CONCRETE IN LIEU OF EXPANSION ANCHORS.
- ANCHORAGE OF CURB ANGLES SHALL CONSIST OF INTERMITTENT EMBEDDED SHAPES OR INTERLOCKING DEFORMATIONS ON THE BACK SIDE OF THE ANGLE. EMBEDMENT UTILIZING A CONTINUOUS SHAPE WHICH WOULD INTERFERE WITH CONCRETE PLACEMENT SHALL NOT BE PERMITTED.

FIBERGLASS GRATING SUPPORT (B)
NO SCALE



NOTE: WALL SUPPORT MAY BE CONNECTED W/ 5/8" GALV ANCHOR BOLTS EMBEDDED 6" INTO CONCRETE IN LIEU OF EXPANSION ANCHORS.

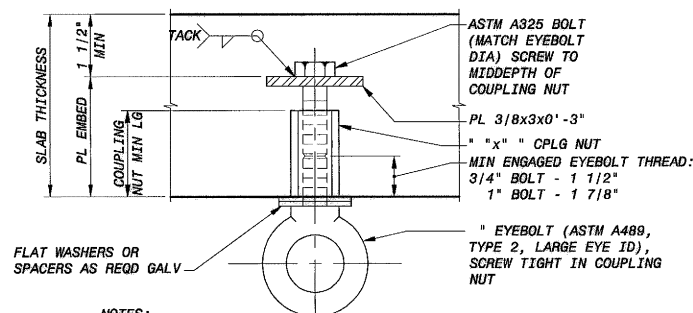
CHECKED PLATE SUPPORT (C)
3" = 1'-0"



NOTE:

PAD DIMENSIONS DETERMINED BY EQUIPMENT FURNISHED

EXTERIOR EQUIPMENT PAD (D)
3/4" = 1'-0"



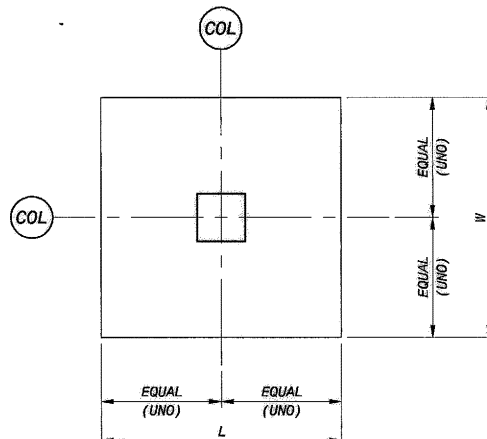
NOTES:

- ALIGN EYEBOLT PLANE WITH DIRECTION OF LOADING. SEAT SHOULDER FIRMLY AGAINST MATING SURFACE; USE WASHERS OR SPACERS AS REQUIRED.
- DO NOT PAINT OR GALVANIZE EYEBOLT.
- TAG EYEBOLT AS INDICATED BELOW. TAG AND WIRE TO BE CORROSION RESISTANT METAL.

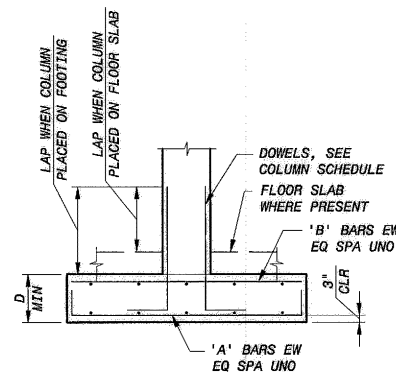
SAFE VERTICAL WORKING LOAD	XXXX LBS
SAFE WORKING LOAD AT 45 DEGREES (IN PLANE OF EYEBOLT)	XXXX LBS

SAFE VERTICAL WORKING LOAD (LBS)	SAFE WORKING LOAD AT 45° MAX (LBS)	MINIMUM SLAB THICKNESS (IN)	MINIMUM PLATE EMBED (IN)	COUPLING NUT SIZE DIA X MIN LENGTH (IN)	EYEBOLT SIZE (IN)
4000	1000	6	4	3/4 x 3 1/2	3/4
6000	1500	8	6	3/4 x 3 1/2	3/4
8000	2000	8	6	1 x 4	1

TYPICAL EYEBOLT (E)
NO SCALE



SPREAD FOOTING - TYPICAL DETAILS
NO SCALE



ELEVATION

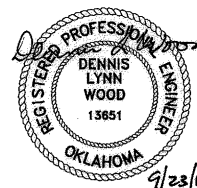
MARK	DIMENSIONS			REINFORCING		REMARKS
	L	W	D MIN	"A"	"B"	
F1	5'-0"	5'-0"	2'-6"	#7@6"	#5@6"	
F2	12'-0"	12'-0"	3'-0"	#7@8"	#5@8"	
F3	10'-0"	10'-0"	3'-0"	#7@10"	#5@8"	

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B
MISC SCHEDULES & STANDARD DETAILS
STRUCTURAL
MISCELLANEOUS STRUCTURAL DETAILS
CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH
Building a world of difference
Holloway, Updike and Ballen
Consulting Engineers
Waskings - Broken Arrow
DWCATES
Engineering Services

REVISION	BY	DATE	PLAN SCALE:	DRAWN	TSH	APPROVED:
				DESIGNED	DLW	
				SURVEY		
			PROFILE SCALE:	FIELD MGR.	7/5 10/11	
			HORIZONTAL:	SECT. MGR.		
			1" =	PROJ. MGR.	10/3/11	
			VERTICAL:	RECOMMENDED:	10/3/11	
			1" =			
			FILE:	DRAWING: MS-10		DATE 10/28/2011
			ATLAS PAGE NO:			SHEET 248 OF 261 SHEETS



9/23/11

BACKFLOW PREVENTER SCHEDULE						
UNIT NUMBER	SERVICE	BODY SIZE (IN)	MAXIMUM FLOW (GPM)	MAXIMUM PD (PSI)	MANUFACTURER / MODEL	REMARKS
L010-HDW1-BFL01	NONPOTABLE WATER	1	12	12	FEBCO 880	
L010-HDW1-BFL02	NONPOTABLE WATER	1	12	12	FEBCO 880	
L050-STP1-BFL01	NONPOTABLE WATER	2	42	11	FEBCO 880	
L050-STP1-BFL02	NONPOTABLE WATER	2	42	11	FEBCO 880	

PLUMBING EQUIPMENT SCHEDULE				
UNIT NUMBER	DESCRIPTION	MANUFACTURER / MODEL	REMARKS	
L010-HDW1-HWH01	ELECTRIC WATER HEATER, COMMERCIAL GRADE, 10 GALLON STORAGE, 12 GPH RECOVERY AT 100 F RISE, 3 KW, 480 VOLT, 3 PHASE, 60 HZ.	STATE SSE SERIES		
L001-OPS1-HWH01	ELECTRIC WATER HEATER, COMMERCIAL GRADE, 119 GALLONS STORAGE, 148 GPH RECOVERY AT 100 F RISE, 36 KW, 480 VOLT, 3 PHASE, 60 HZ.	STATE CSB SERIES		
L060-CHL1-HWH01	ELECTRIC WATER HEATER, COMMERCIAL GRADE, 80 GALLONS STORAGE, 98 GPH RECOVERY AT 100 F RISE, 24 KW, 480 VOLT, 3 PHASE, 60 HZ.	STATE CSB SERIES		
HR-1	HOSE REEL WITH 1 1/2" SWIVEL WATER SUPPLY AND 50 FEET TYPE 1 HOSE.	HANNAY 3528-25-26		
TPP-1	ELECTRONIC TRAP RIMING MANIFOLD, SURFACE MOUNTED, 3/4" NPT INLET, 1/2" TUBE CONNECTIONS, 120 VOLT, 1 PHASE, 60 HZ. SERVES FLOOR DRAINS AT OPERATIONS BUILDING (9 ACTIVE/3 SPARE CONNECTIONS)	PRECISION PLUMBING PRODUCTS, INC. PRIME-TIME PT-12		
NT-1	NEUTRALIZATION TANK, 1.5 GALLON, 2" INLET AND OUTLET CONNECTION	ORION STYLE 8		

PLUMBING FIXTURE SCHEDULE							
LABEL	DESCRIPTION	MANUFACTURER / MODEL	WATER		SANITARY		REMARKS
			HOT	COLD	WASTE	VENT	
WC-1	WATER CLOSET, WALL MOUNT, FLUSH VALVE, 1.6 GALLON/FLUSH MAX.	AMERICAN STANDARD 2257.103 AFWALL	---	1"	4"	2"	
WC-2	WATER CLOSET, WALL MOUNT, FLUSH VALVE, 1.6 GALLON/FLUSH MAX.	AMERICAN STANDARD 2257.103 AFWALL	---	1"	4"	2"	1
UR-1	URINAL, WALL MOUNT, FLUSH VALVE, 1.0 GALLON/FLUSH MAX.	AMERICAN STANDARD 6501.010 WASHBROOK	---	3/4"	2"	1 1/2"	1
L-1	LAVATORY, WALL HUNG 21"x18", WITH 0.5 GPM AERATED FAUCET AND POP-UP DRAIN.	LAV: AMERICAN STANDARD 0355.012 LUCERNE FAUCET: AMERICAN STANDARD 7385.000 BELTANT 3	1/2"	1/2"	1 1/2"	1 1/2"	1
S-1	KITCHEN SINK, 21"x33", DOUBLE BOWL, 7 1/2" DEEP, 20 GAUGE STAINLESS STEEL, THREE HOLE PUNCHED, SINGLE LEVER FAUCET.	SINK: ELKAY PSR3321 FAUCET: AMERICAN STANDARD 4175.500 COLONY SOFT	1/2"	1/2"	1 1/2"	1 1/2"	
GD-1	FOOD WASTE DISPOSER, 3/4 HP, 120 VOLT, 1 PHASE.	IN-SINK-ERATOR "EVOLUTION ESSENTIAL"	---	---	---	---	
MS-1	MOP SINK, 32"x32", 12" DEEP, FLOOR MOUNTED, DIAGONAL FRONT, TWO SPLASH PANELS.	SINK: STERN-WILLIAMS SBC-1725-BP2 FAUCET: AMERICAN STANDARD 8344.112	1/2"	1/2"	3"	2"	
LS	LAB SINK, SEE LAB SPEC SECTION FOR DETAILS.	---	1/2"	1/2"	1 1/2"	1 1/2"	
SH-1	BUILT-UP SHOWER UNIT, WITH WALL/HAND SHOWER, FLEXIBLE HOSE, AND SLIDE BAR, 2.5 GPM MAX FLOW.	SYMMONS S-96-300 B30-X-V-L	1/2"	1/2"	2"	2"	1
EWC-1	ELECTRIC WATER COOLER, WALL MOUNTED, DUAL HEIGHT, TWO BUBBLERS, 8 GPH, 120 VOLT, 1 PHASE, 60 HZ.	ELKAY EZSTL8C	---	1/2"	1 1/2"	1 1/2"	1
L001-OPS1-EES01	EMERGENCY SHOWER/EYE/FACE WASH COMBINATION, PEDESTAL MOUNTED, 1 1/4" IPS SUPPLY.	HAWS 8300-8309	---	1 1/4"	---	---	2,3
L060-CHL1-EES01,02,03	EMERGENCY SHOWER/EYE/FACE WASH COMBINATION, FROST-PROOF TO -30 F, PEDESTAL MOUNTED, 1 1/4" IPS SUPPLY, 120 VOLT.	HAWS 8317 CTFP	---	1 1/4"	---	---	2,4
N070-POL1-EES01	EMERGENCY EYE/FACE WASH, WALL MOUNTED, 1/2" IPS SUPPLY.	HAWS 7752WC	---	1/2"	---	---	2,5
REMARKS: 1 - FIXTURE AND INSTALLATION SHALL BE ADA COMPLIANT. 2 - TEMPERED WATER SUPPLY. 3 - LOCAL AND REMOTE ALARM SYSTEM. 4 - FREEZE PROTECTION AND SCALD PROTECTION BLEED VALVES 5 - SEE SHEET NC-4 FOR LOCATION AT NORTHSIDE PLANT							

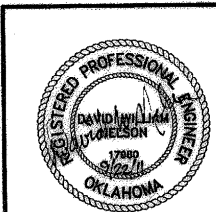
PRESSURE SUSTAINING VALVE SCHEDULE							
UNIT NUMBER	SERVICE	TYPE	FLOW RATE (GAS-SCFH, AIR-SCFM, WATER-GPM)			INLET PRESSURE SETPOINT (PSIG)	MINIMUM OUTLET PRESSURE (PSIG)
			MINIMUM	MAXIMUM	ORDINARY		
W-2	PLANT EFFLUENT WATER	PILOT OPERATED	0	200	150	50	15
REMARKS: 1 - ANTI-CAVITATION							

PLUMBING PIPING ACCESSORIES SCHEDULE				
LABEL	DESCRIPTION	MANUFACTURER / MODEL	REMARKS	
MV-1	THERMOSTATIC MIXING VALVE, 1/2" BODY, 0.5 GPM MINIMUM FLOW, 6.0 GPM FLOW AT 20 PSI MAXIMUM DIFFERENTIAL PRESSURE, INITIAL SETPOINT 115 F.	SYMMONS THERMIXER 5-120-CK		
FD-1	MEDIUM DUTY CAST IRON FLOOR DRAIN, ADJUSTABLE TOP, LOOSE SET CAST IRON GRATE.	SMITH 2310 SERIES		
FD-2	MEDIUM DUTY CAST IRON FLOOR DRAIN, ADJUSTABLE TOP, NICKEL BRONZE ROUND GRATE W/ TRAP PRIMER.	SMITH 2005-A SERIES		
FD-3	MEDIUM DUTY CAST IRON FLOOR DRAIN, ADJUSTABLE TOP, NICKEL BRONZE ROUND GRATE	SMITH 2005-SERIES		
FD-4	MEDIUM DUTY CAST IRON FLOOR DRAIN, 12" DIAMETER DOME GRATE.	SMITH 2131-D SERIES		
FD-5	MEDIUM DUTY CAST IRON FLOOR DRAIN, 12" DIAMETER CAST IRON GRATE.	SMITH 2131 SERIES		
FCO-1	HEAVY DUTY FLOOR CLEANOUT, SECURED ROUND ADJUSTABLE NICKEL BRONZE TOP.	SMITH 4111 SERIES		
FCO-2	CORROSION RESISTANT FLOOR CLEANOUT, PVC BODY, POLYPROPYLENE BODY, NICKEL BRONZE COVER.	SIOUX CHIEF 852 SERIES		
RD-1	CAST IRON PRIMARY ROOF DRAIN.	SMITH 1010-E SERIES		
ORD-1	CAST IRON OVERFLOW ROOF DRAIN WITH ADJUSTABLE INTERNAL STANDPIPE.	SMITH 1070-E SERIES		1
REMARKS: 1. INTERNAL STANDPIPE TO BE ADJUSTED TO MAINTAIN MAX 2" ELEVATION DIFFERENCE TO ADJACENT ROOF DRAIN.				

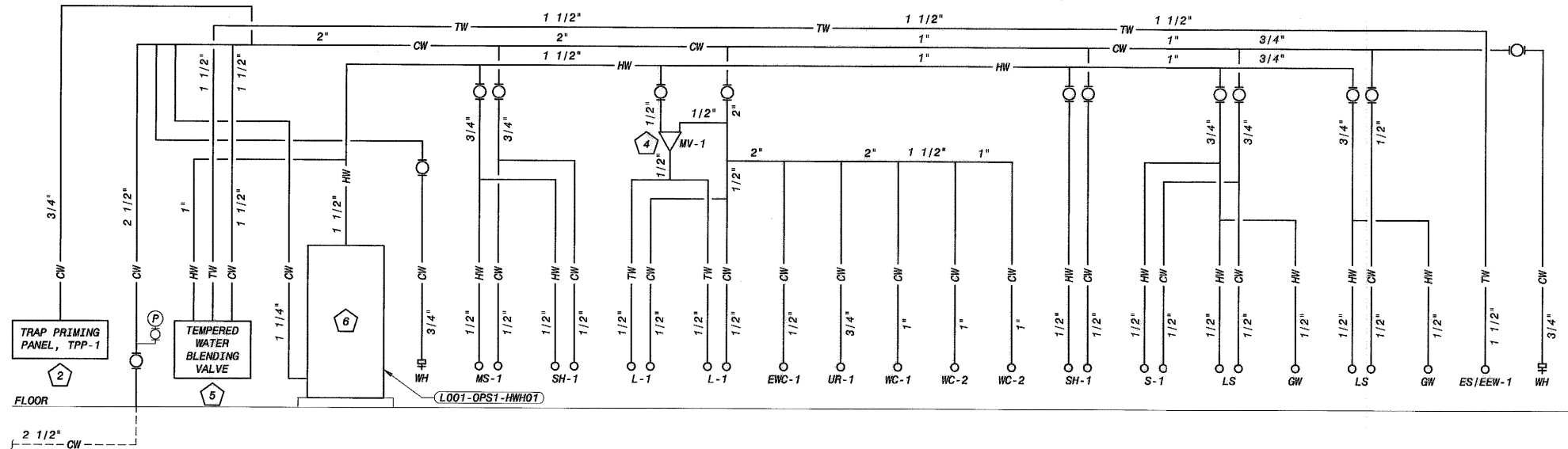
PRESSURE REDUCING VALVE SCHEDULE										
UNIT NUMBER	SERVICE	TYPE	FLOW RATE (GAS-SCFH, AIR-SCFM, WATER-GPM)			REDUCED PRESSURE SETPOINT (PSIG)	INLET PRESSURE (PSIG)		MINIMUM PRESSURE AT MAXIMUM FLOW (PSIG)	REMARKS
			MINIMUM	MAXIMUM	ORDINARY		MINIMUM	MAXIMUM		
G-1	GAS - OPER BLDG - HAU01	DIRECT ACTING	0	100	50	14" wc	4.2	5	12" wc	
G-2	GAS - OPER BLDG - HAU02	DIRECT ACTING	0	53	27	14" wc	4.2	5	12" wc	
G-3	GAS - RETURN SLUDGE PS	DIRECT ACTING	0	500	250	14" wc	4.1	5	12" wc	
G-4	GAS - HEADWORKS BLDG	DIRECT ACTING	0	704	352	14" wc	4.3	5	12" wc	
W-1	PLANT EFFLUENT WATER	PILOT OPERATED	0	120	80	15	65	80	10	1
REMARKS: 1 - ANTI-CAVITATION										

SUMP AND SEWAGE PUMP SCHEDULE														
UNIT NUMBER	LOCATION	TYPE	CAPACITY (GPM)	TOTAL HEAD (FT)	MAXIMUM SPEED (RPM)	MOTOR HP	POWER SUPPLY VOLTS/ PHASE	DISCHARGE SIZE (IN)	SUMP LEVELS (FT) *				MANUFACTURER/ MODEL	REMARKS
									OFF	LEAD	LAG	HWA		
L010-HDW1-SUP01	HEADWORKS BLDG	DUPLEX, SUBMERSIBLE, HEAVY DUTY GRINDER PUMP	50	45	3450	5	480/3	2	2	2.75	3	3.25	WEIL 2516	1,2,3,4
L010-HDW1-SUP02			50	45	3450	5								
L050-STP1-SUP01	SLUDGE TRANSFER PUMP STATION	DUPLEX, SUBMERSIBLE, HEAVY DUTY SEWAGE PUMP	45	65	3450	3	480/3	2	2	2.75	3.25	3.75	WEIL 2557	1,2,3
L050-STP1-SUP02			45	65	3450	3								
* PUMPS OFF, LEAD PUMP START, LAG PUMP START AND HIGH WATER ELEVATIONS AS MEASURED FROM THE BOTTOM OF THE SUMP.														
REMARKS:														
1 - HIGH WATER ALARM														
2 - GUIDERAIL MOUNTED														
3 - SUMP COVER REQUIRED														
4 - EXPLOSION PROOF MOTOR														

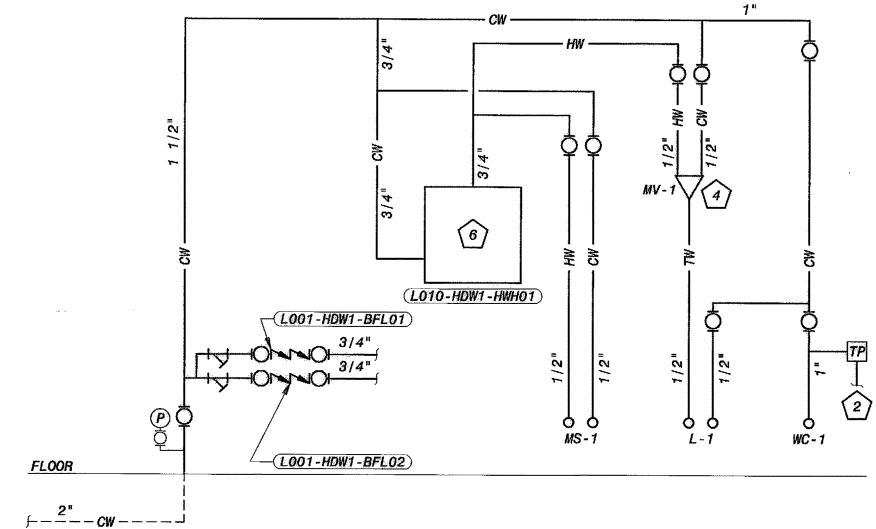
LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
MISC SCHEDULES & STANDARD DETAILS PLUMBING SCHEDULES			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: BLACK & VEATCH Building a world of difference Holladay, Utah and Dallas, Texas Black & Veatch Corporation Tulsa City, Oklahoma			
PLAN SCALE:	DRAWN	BDL	APPROVED:
NONE	DESIGNED	MM,TD	
SURVEY			
PROFILE SCALE:	FIELD MGR.	703 10/11	
HORIZONTAL: 1" =	SECT. MGR.		
VERTICAL: 1" =	PROJ. MGR.	10/11	
	RECOMMENDED:	10/11	
FILE: MP-01.DWG	DRAWING: MP-1	DATE 10/28/2011	
ATLAS PAGE NO:		SHEET 249 OF 261 SHEETS	



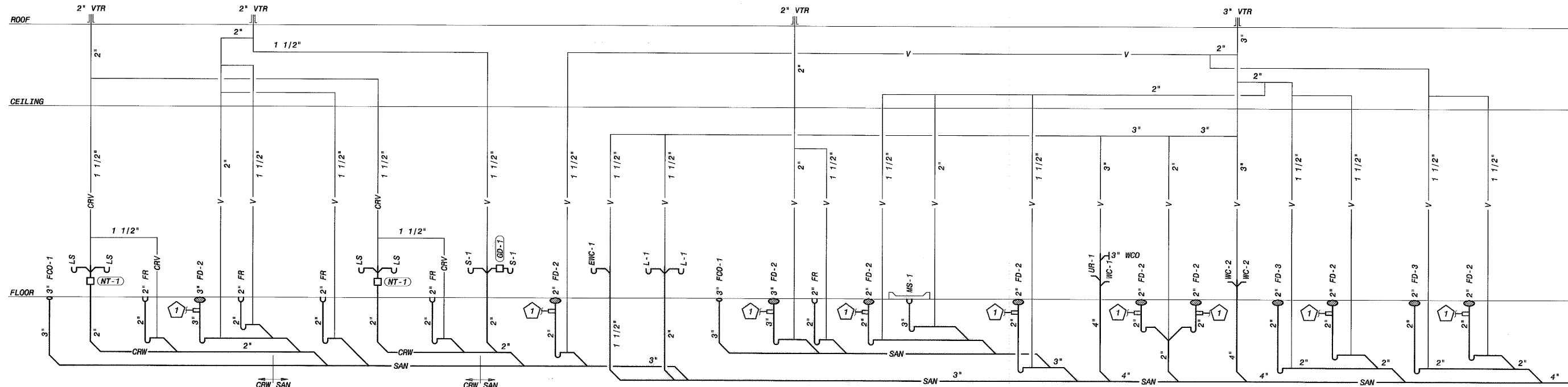
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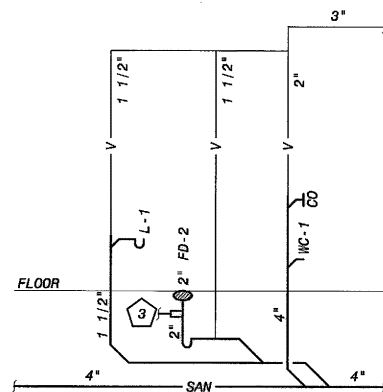
OPERATIONS BUILDING WATER SUPPLY RISER DIAGRAM
NO SCALE



HEADWORKS POTABLE WATER SUPPLY RISER DIAGRAM
NO SCALE



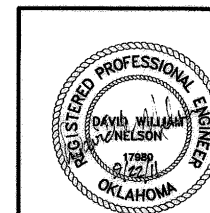
OPERATIONS BUILDING DRAIN AND VENT RISER DIAGRAM
NO SCALE



**HEADWORKS BUILDING
PARTIAL DRAIN AND VENT RISER DIAGRAM**
NO SCALE

PLAN NOTE:

- 1 1/2" TRAP PRIMER CONNECTION FROM TRAP PRIMING PANEL, TPP-1.
- 2 1/2" TRAP PRIMER CONNECTION PIPING TO FLOOR DRAINS WITH TRAP PRIMERS.
- 3 1/2" TRAP PRIMER CONNECTION.
- 4 FOR ADDITIONAL PIPING REQUIREMENTS, SEE DETAIL K ON SH MP-2.
- 5 FOR ADDITIONAL PIPING REQUIREMENTS, SEE DETAIL L ON SH MP-2.
- 6 FOR ADDITIONAL PIPING REQUIREMENTS, SEE DETAIL F ON SH MP-2.



REVISION	BY	DATE

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B MISC SCHEDULES & STANDARD DETAILS PLUMBING RISER DIAGRAMS CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT PLANS AND ESTIMATES PREPARED BY: BLACK & VEATCH Building a world of difference Kansas City, Missouri Holloway, Uptake and Bollen Consulting Engineers Muskogee - Broken Arrow 			
PLAN SCALE:	DRAWN	BDL	APPROVED:
NONE	DESIGNED	TRD	
PROFILE SCALE:	SURVEY		
HORIZONTAL:	FIELD MGR.	DS 10/11	
VERTICAL:	SECT. MGR.		
1" =	PROJ. MGR.	PD 10/11	
1" =	RECOMMENDED:	HAS 10/11	
FILE: MP-03.DWG	DRAWING: MP-3	DATE 10/26/2011	
ATLAS PAGE NO:		SHEET 251 OF 261 SHEETS	

PACKAGED AIR CONDITIONING / HEAT PUMP UNIT SCHEDULE																							
UNIT NUMBER	LOCATION	INDOOR FAN				POWER SUPPLY VOLTS/ PHASE	MINIMUM CIRCUIT AMPACITY	COOLING				HEATING			DISCHARGE DIRECTION	ARI MINIMUM EFFICIENCY	OA (CFM)	APPROX WEIGHT (LBS)	FILTER DATA		ECONOMIZER	REMARKS	
		AIRFLOW (CFM)	ESP (IN WG)	MOTOR HP	DRIVE			EAT		CAPACITY (MBTUH)		MIN CAPACITY STAGES	EAT	TYPE					OUTPUT CAPACITY (BTUH OR (KW))	TYPE			THICKNESS (IN)
								(FDB)	(FWB)	SENSIBLE	TOTAL												
L001-OPS1-HAU01	OPERATIONS	3600	1.125	3	BELT	480/3	22.7	84.8	68.5	90.2	111.9	2	61.3	NATURAL GAS	80500	HORIZONTAL	11.2 EER	700	1500	PLEATED	2	---	1, 2, 3, 5
L001-OPS1-HAU02	OPERATIONS	1600	0.75	1	BELT	480/3	15.5	72.5	60.3	37.2	48.3	1	59.6	NATURAL GAS	52600	HORIZONTAL	13 SEER	250	600	PLEATED	2	---	1, 2, 3, 5
L050-STP1-HAU01	SLUDGE TRANSFER PS	1760	0.375	1	BELT	480/3	12.5	85	65.4	47.6	49.0	1	---	---	---	HORIZONTAL	11.2 EER	---	900	PLEATED	2	---	1, 2, 3
L101-LFT1-HAU01	PORT SOUTH LS	2000	0.5	1	BELT	208/3	61.4	86.2	67.2	46.1	50.2	1	55.4	AUXILIARY ELECTRIC	(9)	HORIZONTAL	13 SEER	200	750	PLEATED	2	---	1, 2, 3, 4
NOTE:OUTDOOR COIL ENTERING AIR TEMPERATURE: COOLING - 105 F DESIGN/ 0 F MIN HEATING - 14 F DESIGN (HEAT PUMP)													REMARKS: 1 - FILTER VELOCITY SHALL NOT EXCEED 350 FEET PER MINUTE 2 - UNIT PROVIDED WITH FACTORY PROVIDED RETURN AIR SMOKE DETECTOR AND DIRTY FILTER DIFFERENTIAL PRESSURE SWITCH 3 - MANUFACTURER BASIS OF DESIGN IS TRANE 4 - HEAT PUMP UNIT 5 - AIR CONDITIOING UNIT WITH GAS HEAT										

AIR DEVICE SCHEDULE							
SYMBOL	MODEL	FRAME/BORDER	MODULE SIZE	MATERIAL	FINISH	DAMPER TYPE	REMARKS
ED-1	PAR-AA	LAY-IN	24"X24"	ALUMINUM	BAKED WHITE ENAMEL	---	1,2,3B
ER-1	3FS	SURFACE MOUNT	---	ALUMINUM	BAKED WHITE ENAMEL	OPPOSED BLADE	1,3A
RD-1	PAR-AA	LAY-IN	24"X24"	ALUMINUM	BAKED WHITE ENAMEL	---	1,2,3B
RG-1	50F	LAY-IN	12"X24"	ALUMINUM	BAKED WHITE ENAMEL	---	1,3C,4
RG-2	50F	SURFACE MOUNT	---	ALUMINUM	BAKED WHITE ENAMEL	---	1,3C
SD-1	PAS-AA	LAY-IN	24"X24"	ALUMINUM	BAKED WHITE ENAMEL	---	1,2,3B
SR-1	272FS	SURFACE MOUNT	---	ALUMINUM	BAKED WHITE ENAMEL	OPPOSED BLADE	1,3A
NOTE: SEE DRAWINGS FOR DEVICE LENGTH, WIDTH, AND SUPPLY PATTERN. REMARKS: 1 - EQUIPMENT SCHEDULE MODEL NUMBERS BASED ON TITUS. 2 - ALL DIFFUSER CORE STYLES ARE 4-WAY UNLESS OTHERWISE INDICATED ON THE PLANS. 3 - CONSTRUCTION STLYE A) AIRFOIL B) PERFORATED C) EGGRATE 4 - CORE ONLY							

AIR TERMINAL UNIT SCHEDULE - FAN POWERED												
UNIT NUMBER	LOCATION	UNIT SIZE	DISCHARGE AIRFLOW (CFM)	PRIMARY AIR			FAN		ELECTRIC COIL		REMARKS	
				INLET DIA (IN)	CFM		ESP (IN WC)	MOTOR HP	VOLTS/ PHASE	EAT (FDB)		HEATING CAPACITY (KW)
					MAX	MIN						
L001-OPS1-HAU03	OPERATIONS	6	400	6	400	0	0.375	1/3	480/3	60	2	

AIR TERMINAL UNIT SCHEDULE - SINGLE DUCT								
UNIT NUMBER	LOCATION	UNIT SIZE	AIRFLOW (CFM)		AIR PD (IN WC)	EAT (F)	HEATING CAPACITY (KW)	VOLTS / PHASE
			MAX	MIN				
L001-OPS1-HAU04	OPERATIONS	8	800	240	0.07	62	3	480/3
L001-OPS1-HAU05	OPERATIONS	6	400	120	0.17	62	2	480/3
L001-OPS1-HAU06	OPERATIONS	10	1300	390	0.05	62	5.5	480/3
L001-OPS1-HAU07	OPERATIONS	8	700	210	0.1	62	2.5	480/3




FAN COIL SCHEDULE									
UNIT NUMBER	AIRFLOW (CFM)	EAT		LAT (FDB)	CAPACITY (BTUH)		MOTOR (WATTS)	MCA	POWER SUPPLY VOLTS/ PHASE
		(FDB)	(FWB)		SENSIBLE	TOTAL			
L010-HDW1-AHU01	1200	85	67.2	66.5	24,100	24,400	74	1	208/1

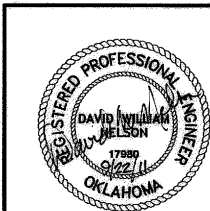
HEATER SCHEDULE									
UNIT NUMBER	LOCATION	TYPE	UNIT ORIENTATION	AIRFLOW (CFM)	OUTPUT CAPACITY (KW)	MOTOR HP	POWER SUPPLY VOLTS/ PHASE	APPROX WEIGHT (LBS)	REMARKS
L010-HDW1-HTR01	HEADWORKS	EUHCR	HORIZONTAL	405	5	1/15	480/3	75	
L010-HDW1-HTR02	HEADWORKS	EUHCR	HORIZONTAL	405	5	1/15	480/3	75	
L010-HDW1-HTR03	HEADWORKS	EUHCR	HORIZONTAL	405	5	1/15	480/3	75	
L010-HDW1-HTR04	HEADWORKS	EUHCR	HORIZONTAL	405	5	1/15	480/3	75	
L010-HDW1-HTR05	HEADWORKS	EUHCR	HORIZONTAL	405	5	1/15	480/3	75	
L010-HDW1-HTR06	HEADWORKS	EUHCR	HORIZONTAL	590	7.5	1/15	480/3	75	
L010-HDW1-HTR07	HEADWORKS	EUHCR	HORIZONTAL	590	7.5	1/15	480/3	75	
L010-HDW1-HTR08	HEADWORKS	WH	SURFACE MOUNT	50	1	---	120/1	25	
L001-OPS1-HTR01	OPERATIONS	WH	RECESSED MOUNT	50	2	---	208/1	25	
L001-OPS1-HTR02	OPERATIONS	WH	RECESSED MOUNT	50	2	---	208/1	25	
L050-RAP1-HTR01	RETURN SLUDGE PS	EUHHD	HORIZONTAL	850	7.5	1/15	480/3	50	
L050-RAP1-HTR02	RETURN SLUDGE PS	EUHHD	HORIZONTAL	850	7.5	1/15	480/3	50	
L050-STP1-HTR01	SLUDGE TRANSFER PS	EUHCR	HORIZONTAL	405	5	1/15	480/3	75	
L050-STP1-HTR02	SLUDGE TRANSFER PS	EUHCR	HORIZONTAL	405	5	1/15	480/3	75	
L050-STP1-HTR03	SLUDGE TRANSFER PS	WH	SURFACE MOUNT	50	3	---	208/1	25	
TYPE NOTES: EUHCR - CORROSION RESISTANT ELECTRIC UNIT HEATER EUHHD - HEAVY DUTY ELECTRIC UNIT HEATER WH - WALL HEATER									
REMARKS:									

HEAT PUMP SCHEDULE											
UNIT NUMBER	LOCATION	CAPACITY (BTUH)	COOLING		HEATING CAPACITY [HEAT PUMP] (BTUH)	POWER SUPPLY VOLTS/ PHASE	MINIMUM CIRCUIT AMPACITY	ARI MINIMUM EFFICIENCY	MATCHED WITH INDOOR UNIT	APPROX WEIGHT (LBS)	REMARKS
			SUCTION TEMPERATURE (F)	MIN	MAX						
L010-HDW1-HAU01	HEADWORKS	24,400	40	50	13,000	208/1	24	10 SEER	L010-HDW1-AHU01	250	1, 2
NOTE: OUTDOOR COIL ENTERING AIR TEMPERATURE: COOLING - 105 F DESIGN / 0 F MIN HEATING - 14 F (HEAT PUMP)											
REMARKS: 1 - UNIT AND COIL SURFACES SHALL BE GIVE A PROTECTIVE COATING SUITABLE FOR A HYDROGEN SULFIDE ATMOSPHERE 2 - LOW AMBIENT KIT											

FAN SCHEDULE											
UNIT NUMBER	LOCATION	FAN TYPE	AIRFLOW (CFM)	ESP (IN WC)	MOTOR HP	POWER SUPPLY VOLTS/ PHASE	MIN WHEEL DIA (IN)	WHEEL TYPE	DRIVE	VIBRATION ISOLATION	APPROX WEIGHT (LBS)
L010-HDW1-EHF01	HEADWORKS	DF	2600	0.75	1.5	480/3	13	C	BELT	SPRING HANGER	190
L010-HDW1-EHF02	HEADWORKS	DF	3500	0.5	1.5	480/3	14	C	BELT	SPRING HANGER	280
L010-HDW1-EHF03	HEADWORKS	CF	100	0.25	80 W	120/1	11	C	DIRECT	---	20
L001-OPS1-EHF01	OPERATIONS	DF	550	0.375	1/10	120/1	9	C	DIRECT	SPRING HANGER	80
L050-RAP1-EHF01	RETURN SLUDGE PS	PF	3200	0.375	1/2	480/3	24	P	BELT	---	110
L050-STP1-EHF01	SLUDGE TRANSFER PS	PRV	6700	0.875	2	480/3	30	C	BELT	---	300
FAN TYPE NOTES: CF - CABINET FAN DF - DUCT FAN PF - PROPELLER FAN PRV - POWER ROOF VENTILATOR WF - WALL FAN WHEEL TYPE NOTES: C - CENTRIFUGAL P - PROPELLER REMARKS: 1 - UNIT SURFACES SUBJECT TO CORROSION FROM A HYDROGEN SULFIDE ATMOSPHERE SHALL BE GIVEN A PROTECTIVE COATING 2 - WALL CAP 3 - CONSTRUCTION A) ALUMINUM FAN BLADES B) STEEL FAN BLADES											

MAKEUP AIR UNIT SCHEDULE											
UNIT NUMBER	LOCATION	HEATING TYPE	AIRFLOW (CFM)	ESP (IN WC)	MOTOR HP	POWER SUPPLY VOLTS/ PHASE	OUTPUT CAPACITY (BTUH)	MIN WHEEL DIA (IN)	FILTER DATA		REMARKS
									TYPE	THICKNESS (IN)	
L010-HDW1-MAU01	HEADWORKS	DF	6000	0.875	5	480/3	374000	15	PLEATED	2	1100
L010-HDW1-MAU02	HEADWORKS	DF	5000	0.875	3	480/3	273200	12	PLEATED	2	1000
HEATING TYPE NOTES: DF - DIRECT FIRED REMARKS: 1 - FILTER VELOCITY SHALL NOT EXCEED 350 FEET PER MINUTE 2 - COIL AND UNIT SURFACES SUBJECT TO CORROSION FROM A HYDROGEN SULFIDE ATMOSPHERE SHALL BE GIVEN A PROTECTIVE COATING 3 - DISCHARGE DAMPER 4 - VERTICAL ARRANGEMENT, UPBLAST FAN DISCHARGE, PROVIDE BASE FRAME AND VERTICAL SUPPORT CHANNELS											

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B											
MISC SCHEDULES & STANDARD DETAILS HVAC SCHEDULES											
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT											
PLANS AND ESTIMATES PREPARED BY:											
											
Black & Veatch Corporation Kansas City, Missouri				Holloway, Updegraff and Bollen Overseeing Engineers Mackay & Bollen Engineering Services							
PLAN SCALE:			DRAWN	BOL			APPROVED:				
NONE			DESIGNED	MM,TD							
			SURVEY								
PROFILE SCALE:			FIELD MGR.	705	10/11						
HORIZONTAL:			PROJ. MGR.	261	10/11						
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FILE: MH-01.DWG			DRAWING: MH-1		DATE 10/28/2011						
ATLAS PAGE NO:									SHEET 252 OF 261 SHEETS		



CARBON ADSORPTION UNITS SCHEDULE										
UNIT NUMBER	LOCATION	AIRFLOW (CFM)	MAXIMUM PRESSURE DROP (IN WG)	MAXIMUM CARBON FACE VELOCITY (FPM)	MINIMUM DIAMETER (FT)	AIR CONNECTION SIZE (INCHES DIA)	WIND LOAD (MPH)	DESIGN PRESSURE (IN WG)	DESIGN VACUUM (IN WG)	REMARKS
L010-HDW1-CAU01	HEADWORKS	8150	5.1	53	14	24	120	15	5	
L010-HDW1-CAU02	HEADWORKS	5200	5.1	46	12	24	120	15	5	
REMARKS :										

MIST ELIMINATOR SCHEDULE										
UNIT NUMBER	LOCATION	AIRFLOW (CFM)	FLANGED INLET DIA (IN)	FLANGED OUTLET DIA (IN)	CONSTRUCTION	PERFORMANCE		FILTER CONFIGURATION (IN DIRECTION OF AIRFLOW)		REMARKS
						REMOVAL EFFICIENCY	PARTICULATE SIZE	1ST STAGE	2ND STAGE	
ME-H101	HEADWORKS	8150	24	24	FRP	99.90%	10 MICRONS	SS	PP	1, 2, 3
CONSTRUCTION NOTES: FRP - FIBERGLASS REINFORCED PLASTIC HOUSING										
FILTER CONFIGURATION NOTES: SS - 304L STAINLESS STEEL PAD PP - POLYPROPYLENE PAD										
REMARKS: 1 - CONDENSATE DRAIN HEAT TRACING 2 - MAGNEHELIC DRAFT GAUGES 3 - MAXIMUM VELOCITY 400 FEET PER MINUTE										

ODOR CONTROL DAMPER SCHEDULE					
UNIT NUMBER	LOCATION	TYPE	NOMINAL SIZE (INCHES DIA)	AIRFLOW (CFM)	REMARKS
L010-HDW1-OCDD1	HEADWORKS	SHUTOFF	24	---	1A, 2
L010-HDW1-OCDD2	HEADWORKS	SHUTOFF	24	---	1B, 2
L010-HDW1-OCDD3	HEADWORKS	SHUTOFF	18	---	1A, 2
L010-HDW1-OCDD4	HEADWORKS	SHUTOFF	24	---	1B, 2
L010-HDW1-OCDD5	HEADWORKS	BALANCING	12	1300	1A
L010-HDW1-OCDD6	HEADWORKS	BALANCING	12	1300	1B
L010-HDW1-OCDD7	HEADWORKS	BALANCING	12	1300	1B
L010-HDW1-OCDD8	HEADWORKS	BALANCING	12	1300	1A
L010-HDW1-OCDD9	HEADWORKS	BALANCING	12	950	1A
L010-HDW1-OCDD10	HEADWORKS	BALANCING	12	950	1B
L010-HDW1-OCDD11	HEADWORKS	BALANCING	12	950	1A
L010-HDW1-OCDD12	HEADWORKS	BALANCING	12	950	1B
L010-HDW1-OCDD13	HEADWORKS	BALANCING	8	370	1A
L010-HDW1-OCDD14	HEADWORKS	BALANCING	12	950	1B
L010-HDW1-OCDD15	HEADWORKS	BALANCING	12	950	1A
L010-HDW1-OCDD16	HEADWORKS	BALANCING	4	50	1A
L010-HDW1-OCDD17	HEADWORKS	BALANCING	8	370	1A
L010-HDW1-OCDD18	HEADWORKS	BALANCING	12	1090	1A
L010-HDW1-OCDD19	HEADWORKS	BALANCING	6	160	1A
L010-HDW1-OCDD20	HEADWORKS	BALANCING	6	160	1A
L010-HDW1-OCDD21	HEADWORKS	SHUTOFF	24	---	1A
L010-HDW1-OCDD22	HEADWORKS	SHUTOFF	24	---	1A
L050-STP1-OCDD1	HEADWORKS	BALANCING	6	250	1A

NOTE: SEE SPECIFICATION FOR CONTROL DAMPER TYPE MODEL.

REMARKS:
 1 - ACTUATOR TYPE A) HAND B) CHAINWHEEL
 2 - PROVIDED BY ODOR CAU SUPPLIER




UNIT NUMBER	LOCATION	AIRFLOW (CFM)	ESP (IN WG)	MOTOR HP	POWER SUPPLY VOLTS/ PHASE	MINIMUM WHEEL DIA (IN)	WHEEL TYPE	DRIVE	APPROX WEIGHT (LBS)	CONSTRUCTION	ARRANGEMENT	REMARKS
L010-HDW1-OCF01	HEADWORKS	8150	11.25	25	480/3	24	C	BELT	600	FRP	10	1, 2, 3
L010-HDW1-OCF02	HEADWORKS	5200	9.5	15	480/3	18	C	BELT	400	FRP	10	3

CONSTRUCTION NOTES:

FRP - FIBERGLASS REINFORCED PLASTIC

REMARKS:

- 1 - SUITABLE FOR NEC CLASS I DIVISION II INSTALLATION
- 2 - AMCA TYPE B SPARK RESISTANT CONSTRUCTION
- 3 - BOTTOM HORIZONTAL DISCHARGE

<p align="center">LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B</p>				
<p align="center">MISC SCHEDULES & STANDARD DETAILS HVAC SCHEDULES</p>				
<p align="center">CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT</p>				
<p>PLANS AND ESTIMATES PREPARED BY:</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>BLACK & VEATCH Building a world of difference</p> <p>Black & Veatch Corporation Kansas City, Missouri</p> </div> <div style="text-align: center;">  <p>HNTB Hatch, Mittleman, Lyttle and Bollen Consulting Engineers Muskegon - Broken Arrow</p> </div> <div style="text-align: center;">  <p>OWGATES Engineering Services</p> </div> </div>				
<p>PLAN SCALE:</p> <p>NONE</p>	<p>DRAWN</p> <p>SURVEY</p>	<p>BDL</p> <p>MM,TD</p>	<p>APPROVED:</p>	<p>DATE</p>
<p>PROFILE SCALE:</p> <p>HORIZONTAL: 1" =</p> <p>VERTICAL 1" =</p>	<p>FIELD MGR. 708 1/4 in</p> <p>SECT. MGR. 1/4 in</p> <p>PROJ. MGR. 1/4 in</p> <p>RECOMMENDED: 1/4 in</p>	<p>DIRECTOR</p>	<p>DATE 10/28/2011</p>	<p>SHEET 253 OF 261 SHEETS</p>
<p>FILE: MH-02.DWG DRAWING: MH-2</p>				



HVAC SEQUENCE OF OPERATIONS

1. GENERAL SYSTEM OPERATIONS.

1.1. TEMPERATURE CONTROL PANEL(S). TEMPERATURE CONTROL PANEL(S) IDENTIFIED IN THE SEQUENCE OF OPERATION SHALL BE PROVIDED WITH THE INDICATING LIGHTS, RUNNING LIGHTS, ALARM LIGHTS, AUDIBLE ALARMS, TIMERS, AND SELECTOR SWITCHES FOR CONTROL AND STATUS INDICATION OF THE EQUIPMENT SERVED. RUNNING LIGHTS SHALL BE PROVIDED TO INDICATE BOTH ENERGIZED AND DE-ENERGIZED STATUS FOR THE EQUIPMENT AND SHALL POSITIVELY INDICATE EQUIPMENT STATUS FROM THE MOTOR STARTER OR CURRENT SENSOR. SWITCH POSITION SHALL NOT BE USED FOR LIGHT ILLUMINATION. INDICATING AND RUNNING LIGHTS SHALL BE LOCATED DIRECTLY ABOVE EACH RESPECTIVE SELECTOR SWITCH WITH LIGHT COLORS AS FOLLOWS:

GREEN	-	DE-ENERGIZED
RED	-	ENERGIZED
AMBER	-	ALARM
WHITE	-	STATUS

INDICATING LIGHTS AND SELECTOR SWITCHES SHALL BE LOCATED ON THE FACE OF THE TEMPERATURE CONTROL PANEL SERVING THE RESPECTIVE EQUIPMENT. IN ADDITION TO THE LIGHTS, TIMERS, AND SELECTOR SWITCHES DESCRIBED IN THE SEQUENCE OF OPERATION FOR THE INDIVIDUAL EQUIPMENT, EACH CONTROL PANEL SHALL BE PROVIDED WITH THE FOLLOWING:

CONTROL POWER ON	STATUS LIGHT
INDICATING LIGHT TEST	PUSHBUTTON
ALARM RESET	PUSHBUTTON (WHERE APPLICABLE)

TEMPERATURE CONTROL PANELS SPECIFIED TO BE PROVIDED WITH ALARM CONDITION INDICATING LIGHTS SHALL BE PROVIDED WITH AN ELECTRICALLY ISOLATED CONTACT TO PROVIDE REMOTE INDICATION OF THE ALARM TO THE PLANT CONTROL SYSTEM (PCS). EACH TEMPERATURE CONTROL PANEL SHALL BE PROVIDED WITH A MINIMUM OF ONE ALARM OUTPUT POINT TO THE PCS AND ADDITIONAL POINTS AS INDICATED BELOW.

TEMPERATURE CONTROL PANELS SHALL COME WITH PHENOLIC NAMEPLATES FOR EACH CONTROL SWITCH INDICATING SWITCH TYPE, EQUIPMENT CONTROLLED, ROOM OR AREA SERVED, AND SWITCH AUTOMATIC POSITION EQUIPMENT INTERLOCK.

1.2. SYSTEM INTERLOCKS AND ALARMS

ALL EQUIPMENT INTERLOCKING DEVICES AS DESCRIBED HEREIN SHALL BE PROVIDED WITHIN THE RESPECTIVE TEMPERATURE CONTROL PANEL (TCP).

1.2.1. SMOKE DETECTION (AREA SMOKE DETECTION) SYSTEMS. IN FACILITIES WHERE AREA SMOKE DETECTION IS PROVIDED A SMOKE DETECTED SIGNAL SHALL BE SENT FROM THE FIRE ALARM PANEL TO THE HVAC EQUIPMENT IN THE EVENT SMOKE IS DETECTED BY THE BUILDING SMOKE DETECTION SYSTEM. THE EQUIPMENT AND ANY INTERLOCKED EQUIPMENT SHALL BE DE-ENERGIZED AND OUTSIDE AIR DAMPERS ASSOCIATED WITH THE DE-ENERGIZED EQUIPMENT SHALL CLOSE.

1.2.2. FREEZE PROTECTION. LOW AIR TEMPERATURE THERMOSTATS SHALL BE LOCATED IN THE AIR DISTRIBUTION SYSTEMS LISTED BELOW. UPON DETECTION OF LOW AIR TEMPERATURE, THE THERMOSTAT SHALL DE-ENERGIZE THE RESPECTIVE EQUIPMENT AND ALL INTERLOCKED EQUIPMENT, CONTROL DAMPER(S) OF THE RESPECTIVE EQUIPMENT AND INTERLOCKED EQUIPMENT SHALL CLOSE, AND A "LOW AIR TEMPERATURE" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE CONTROL PANEL SHALL BE ILLUMINATED. AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY RELAY SHALL BE PROVIDED TO ALLOW FOR STARTING OF THE EQUIPMENT DURING COLD AMBIENT CONDITIONS.

EQUIPMENT	THERMOSTAT	EQUIPMENT CONTROL PANEL
L010-HDW1-MAU01	PROVIDED W/MAU	L010-HDW1-PNL03
L010-HDW1-MAU02	PROVIDED W/MAU	L010-HDW1-PNL04

1.2.3. HIGH FILTER PRESSURE LOSS. A HIGH LIMIT PRESSURE DIFFERENTIAL FLOW SWITCH SHALL BE LOCATED ACROSS THE FILTER BANK OF THE EQUIPMENT INDICATED BELOW. IN THE EVENT THE PRESSURE DIFFERENTIAL ACROSS THE FILTER EXCEEDS THE PRESET VALUE, A "HIGH FILTER PRESSURE LOSS" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE/EQUIPMENT CONTROL PANEL OR THERMOSTAT SHALL BE ILLUMINATED.

EQUIPMENT	PRESSURE SWITCH	TEMPERATURE/EQUIPMENT CONTROL PANEL
L010-HDW1-MAU01	PDS-H101	L010-HDW1-PNL03
L010-HDW1-MAU02	PDS-H102	L010-HDW1-PNL04
L001-OPS1-HAU01	PDS-A101	L001-OPS1-PNL02
L001-OPS1-HAU02	PDS-A102	L001-OPS1-PNL02
L050-STP1-HAU01	PDS-S101	T-S102
L101-LFT1-HAU01	PDS-L101	T-L101

1.2.4. VENTILATION SYSTEM FAILURE.

1.2.4.1. VENTILATION SYSTEM FAILURE (AIRFLOW SWITCHES). VENTILATION SYSTEM FAILURE PRESSURE DIFFERENTIAL SWITCHES SHALL BE LOCATED IN THE DUCT OF EQUIPMENT INDICATED BELOW. IN THE EVENT THAT AIRFLOW IN THE DUCT OF THE EQUIPMENT IS NOT ATTAINED OR LOST AS DETERMINED BY THE PRESSURE DIFFERENTIAL FLOW SWITCH, A "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE FIRE PROTECTION AND SUPPRESSION PANEL (FPSP). A VISUAL ALARM SHALL BE ILLUMINATED AND AUDIBLE ALARM SHALL SOUND AT EACH ROOM ENTRANCE AND WITHIN THE ROOM. A SIGNAL SHALL BE TRANSMITTED FROM THE FPSP TO THE RESPECTIVE TEMPERATURE CONTROL PANEL ILLUMINATING AN ALARM INDICATING LIGHT FOR THE RESPECTIVE EQUIPMENT.

EQUIPMENT	PRESSURE SWITCH	TEMPERATURE CONTROL PANEL
L010-HDW1-MAU01	PDS-H103	L010-HDW1-PNL02
L010-HDW1-OCF01	PDS-H104	L010-HDW1-PNL02

2. HEATING SYSTEMS.

2.1. UNIT HEATERS. UNIT HEATERS SHALL BE CONTROLLED BY THEIR RESPECTIVE THERMOSTATS.

2.2. WALL HEATERS. WALL HEATERS SHALL BE CONTROLLED BY THEIR RESPECTIVE BUILT-IN THERMOSTATS.

3. VENTILATING/EXHAUST SYSTEMS.

3.1. "ON-OFF" EQUIPMENT CONTROL. L010-HDW1-EHF03 SHALL BE INTERLOCKED WITH THE RESTROOM LIGHTS. WHEN THE LIGHT SWITCH IS TURNED ON, L010-HDW1-EHF03 SHALL BE ENERGIZED. WHEN THE LIGHT SWITCH IS TURNED OFF, L010-HDW1-EHF03 SHALL BE DE-ENERGIZED AFTER A 5 MINUTE DELAY.

3.2. "ON-OFF-AUTO" EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR "ON-OFF-AUTO" CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "ON-OFF-AUTO" FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "AUTO" POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION, THE FAN SHALL BE ENERGIZED. BEFORE A FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMALLY CLOSED POSITION UNLESS OTHERWISE INDICATED. IN THE EVENT THE RESPECTIVE EXHAUST FAN IS INTERLOCKED WITH A SYSTEM SUPPLY FAN, ALL SYSTEM DAMPERS SHALL BE PROVEN OPEN AND BOTH SUPPLY AND EXHAUST FANS SHALL START SIMULTANEOUSLY.

EQUIPMENT	SWITCH LOCATION	FAN INTERLOCK	CONTROL DAMPER(S)
L001-OPS1-EHF01	STARTER	L001-OPS1-HAU01	CD-A101
L010-HDW1-EHF01	L010-HDW1-PNL02	T-H101	CD-H101, H103
L010-HDW1-EHF02	L010-HDW1-PNL02	T-H106	CD-H105, H106, H107
L010-HDW1-OCF01	L010-HDW1-PNL02	L010-HDW1-MAU01	---
L010-HDW1-OCF02	L010-HDW1-PNL02	L010-HDW1-MAU02	---
L050-RAP1-EHF01	STARTER	T-R101	CD-R101, R102
L050-STP1-EHF01	STARTER	T-S101	CD-S101, S102

4. HEATING AND VENTILATING SYSTEMS.

4.1. MAKEUP AIR UNIT (L010-HDW1-MAU01). THE MAKEUP AIR UNIT SHALL BE CONTROLLED BY AN INDIVIDUAL "SUMMER-OFF-WINTER" SYSTEM SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "WINTER" POSITION, THE FAN SHALL OPERATE AND THE SUPPLY AIR SENSOR/THERMOSTAT SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPERS SHALL BE PROVEN OPEN. WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE HEATING CHANGEOVER TEMPERATURE SETPOINT AS DETECTED BY THE OUTDOOR AIR SENSOR/THERMOSTAT, THE HEATING SHALL BE LOCKED OUT. WHEN THE SWITCH IS PLACED IN THE "SUMMER" POSITION, THE FAN SHALL OPERATE AND THE HEATING SHALL BE LOCKED OUT. WHEN THE UNIT IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL CLOSE.

EQUIPMENT	SWITCH LOCATION	SA THERMOSTAT	CONTROL DAMPER
L010-HDW1-MAU01	L010-HDW1-PNL03	BUILT-IN	CD-H102

4.1.1. ROOM OVERRIDE CONTROL. L010-HDW1-MAU01 SHALL HAVE A ROOM THERMOSTAT (T-H104) TO OVERRIDE THE SUPPLY AIR THERMOSTAT. UPON A DECREASE IN THE ROOM TEMPERATURE BELOW THE ROOM THERMOSTAT SETPOINT, THE HEATING OUTPUT SHALL BE INCREASED TO A PRE-SELECTED TEMPERATURE UNTIL THE ROOM TEMPERATURE IS SATISFIED. WHEN THE ROOM TEMPERATURE IS AGAIN SATISFIED, THE SYSTEM CONTROLS SHALL REVERT BACK TO THE SUPPLY AIR THERMOSTAT.

4.2. MAKEUP AIR UNIT (L010-HDW1-MAU02). THE MAKEUP AIR UNIT SHALL BE CONTROLLED BY AN INDIVIDUAL "ON-OFF-AUTO" SYSTEM SELECTOR SWITCH. WHEN THE SWITCH IS IN THE "AUTO" POSITION, THE UNIT SHALL BE INTERLOCKED AND CONTROLLED FROM THE REMOTE "MAU START" CONTROL STATION AND ROOM THERMOSTAT T-H103. WHEN THE "MAU START" BUTTON IS DEPRESSED, THE MAU SHALL START AND SHALL OPERATE FOR A MINIMUM RUN TIME (INITIALLY SET TO 20 MINUTES, ADJUSTABLE), THE FAN SHALL OPERATE AND THE SUPPLY AIR SENSOR/THERMOSTAT SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. WHEN IN THE "AUTO" POSITION, AND THE ROOM AIR TEMPERATURE INCREASES ABOVE THERMOSTAT T-H103 (INITIALLY SET TO 85 F), THE SUPPLY FAN SHALL OPERATE. WHEN THE SELECTOR SWITCH IS IN THE "ON" POSITION, THE FAN SHALL OPERATE AND THE SUPPLY AIR SENSOR/THERMOSTAT SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPERS SHALL BE PROVEN OPEN. WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE HEATING CHANGEOVER TEMPERATURE SETPOINT AS DETECTED BY THE OUTDOOR AIR SENSOR/THERMOSTAT, THE HEATING SHALL BE LOCKED OUT. WHEN THE UNIT IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL CLOSE.

EQUIPMENT	SWITCH LOCATION	SA THERMOSTAT	CONTROL DAMPER
L010-HDW1-MAU02	L010-HDW1-PNL04	BUILT-IN	CD-H104

5. AIR CONDITIONING SYSTEMS.

5.1. PACKAGED SYSTEMS. PACKAGED SYSTEMS SHALL BE CONTROLLED BY THEIR RESPECTIVE THERMOSTAT. SYSTEM OPERATION SHALL BE CONTROLLED BY AN "OFF-HEAT-AUTO-COOL" SYSTEM SWITCH AND AN "AUTO-ON" FAN SWITCH LOCATED ON THE THERMOSTAT SUB-BASE. HEAT PUMPS SHALL ALSO HAVE AN "EMERGENCY HEAT" SYSTEM SWITCH POSITION TO ENERGIZE THE HEATING AND DE-ENERGIZE THE COMPRESSORS.

EQUIPMENT	THERMOSTAT (TYPE)
L050-STP1-HAU01	T-S102 (PROGRAMMABLE)
L101-LFT1-HAU01	T-L101 (PROGRAMMABLE)

5.2. SINGLE ZONE CONSTANT VOLUME SYSTEMS. SINGLE ZONE CONSTANT VOLUME SYSTEMS SHALL BE CONTROLLED BY THEIR RESPECTIVE THERMOSTAT. THE THERMOSTAT SHALL CONTROL OPERATION OF THE FANS, COMPRESSORS, HEATING COIL, TO MAINTAIN THE DESIRED SPACE TEMPERATURE.

EACH SYSTEM SHALL BE IN THE OCCUPIED MODE WHEN THE AREA SERVED REQUIRES OCCUPIED STATUS. IN THIS MODE, THE FAN SHALL OPERATE CONTINUOUSLY AND THE OUTSIDE AIR CONTROLS SHALL BE SET AT THE MINIMUM OUTSIDE AIR POSITION. WHEN THE AREA SERVED DOES NOT REQUIRE OCCUPIED STATUS, THE FAN SHALL BE DE-ENERGIZED AND ONLY OPERATE WHEN HEATING OR COOLING IS REQUIRED TO MAINTAIN THE SETBACK TEMPERATURES. IN ALL CASES, THE FAN SHALL OPERATE CONTINUOUSLY WHEN THE SPACE IS OCCUPIED AND CYCLE ON AND OFF TO MEET THE HEATING OR COOLING LOADS WHEN THE SPACE IS UNOCCUPIED.

EQUIPMENT	THERMOSTAT (TYPE)
L001-OPS1-HAU02	T-A101 (PROGRAMMABLE)

5.3. VARIABLE VOLUME AND TEMPERATURE (VVT) CONTROL SYSTEMS. THE VVT CONTROL SYSTEM SHALL CONTROL THE AIR CONDITIONING SYSTEMS LISTED BELOW, UNIT HEATING SECTIONS, ZONE DAMPERS, ZONE HEATERS, AND BYPASS DAMPERS. THE SYSTEM MODE OF OPERATION SHALL BE DETERMINED BY THE VVT CENTRAL CONTROL PANEL BASED ON THE STATUS OF OCCUPANCY, TIME OF LAST CHANGEOVER, AND NUMBER OF ZONES REQUIRING HEATING OR COOLING.

5.3.1. STATIC PRESSURE SENSOR. THE AIR CONDITIONING SYSTEM SHALL BE CONTROLLED BY THE VVT CENTRAL CONTROL PANEL WHICH RECEIVES INPUTS FROM THE SYSTEM STATIC PRESSURE SENSOR. THE VVT SYSTEM SHALL ENERGIZE THE UNIT FAN DURING PROGRAMMED OCCUPIED PERIODS.

EQUIPMENT	CONTROL PANEL	PRESSURE SENSOR
L001-OPS1-HAU01	L001-OPS1-PNL02	SPS-A101

5.3.2. BYPASS DAMPER. THE BYPASS DAMPER LISTED BELOW SHALL BE CONTROLLED BY THE VVT CENTRAL CONTROL PANEL BASED ON INPUT FROM THE SYSTEM STATIC PRESSURE SENSOR. THE STATIC PRESSURE SENSOR SHALL SENSE THE SUPPLY DUCT STATIC PRESSURE AND MODULATE THE BYPASS DAMPER POSITION TO MAINTAIN THE SET SUPPLY DUCT STATIC PRESSURE. THE SETPOINT SHALL BE ADJUSTABLE AND THE INITIAL SETPOINT SHALL BE DETERMINED DURING SYSTEM STARTUP.

CONTROL PANEL	PRESSURE SENSOR	BYPASS DAMPER
L001-OPS1-PNL02	SPS-A101	BD-A101

5.3.3. AIR TERMINAL UNITS. WHEN COOLING IS REQUIRED, THE AIR TERMINAL UNIT SHALL INCREASE THE PRIMARY AIRFLOW TO THE ZONE. UPON A DECREASE IN THE ZONE TEMPERATURE BELOW THE THERMOSTAT SETPOINT, THE PRIMARY AIRFLOW SHALL BE REDUCED TO THE MINIMUM AIRFLOW RATE. WHEN THE DAMPER HAS REACHED ITS MINIMUM POSITION AND WITH A FURTHER DECREASE IN ZONE TEMPERATURE, THE AUXILIARY HEATING COIL SHALL BE ENERGIZED TO MAINTAIN THE ZONE TEMPERATURE SETPOINT.

TEMP SENSORS	ZONE DAMPERS
TS-A104	L001-OPS1-HAU03
TS-A101	L001-OPS1-HAU04
TS-A102	L001-OPS1-HAU05
TS-A103	L001-OPS1-HAU06
TS-A105	L001-OPS1-HAU07

5.3.4. FAN POWERED AIR TERMINAL UNIT. FAN POWERED AIR TERMINAL UNIT, L001-OPS1-HAU03, SHALL BE INTERLOCKED WITH L001-OPS1-HAU01 SUPPLY FAN. WHEN COOLING IS REQUIRED, L001-OPS1-HAU03 SHALL INCREASE THE PRIMARY AIRFLOW TO THE ZONE. UPON A DECREASE IN THE ZONE TEMPERATURE BELOW TS-A104 SETPOINT, THE PRIMARY AIRFLOW SHALL BE REDUCED TO THE MINIMUM AIRFLOW RATE. L001-OPS1-HAU03 SHALL SUPPLY THE SAME AMOUNT OF TOTAL AIR TO THE ZONE, AS THE PRIMARY AIR IS REDUCED THE QUANTITY OF AIR FROM THE PLENUM SPACE WILL INCREASE PROPORTIONALLY. THE START-UP SEQUENCE SHALL PREVENT BACKWARD ROTATION OF THE TERMINAL UNIT FAN.

5.3.5. COOLING MODE. WHEN THE ZONE TEMPERATURES DICTATE THE SYSTEM TO OPERATE IN THE COOLING MODE, THE UNITS SHALL BE CONTROLLED BY THEIR RESPECTIVE VVT CENTRAL CONTROL PANEL. THE CONTROL PANEL SHALL MONITOR THE ZONE CONDITIONS AND SUPPLY AIR TEMPERATURE TO DETERMINE THE NUMBER OF COOLING STEPS REQUIRED. THE UNIT HEATING SECTION SHALL BE LOCKED OUT WHEN THE UNITS ARE IN THE COOLING MODE. INDIVIDUAL ZONE HEATERS SHALL ONLY BE ALLOWED TO OPERATE WHEN THE INDIVIDUAL ZONE DAMPER IS IN THE MINIMUM POSITION AND THE TEMPERATURE DEVIATION OF THAT ZONE REQUIRES HEATING.

5.3.6. HEATING MODE. WHEN THE ZONE TEMPERATURES DICTATE THE SYSTEMS TO OPERATE IN THE HEATING MODE, THE HEATING SECTION SHALL BE CONTROLLED BY THE VVT CENTRAL CONTROL PANEL. THE VVT CENTRAL CONTROL PANEL SHALL MONITOR ZONE CONDITIONS AND SUPPLY AIR TEMPERATURE TO DETERMINE THE NUMBER OF HEATING STEPS REQUIRED. WHEN THE UNIT IS IN HEATING MODE THE ZONE HEATERS SHALL NOT BE ALLOWED TO OPERATE UNLESS THE UNIT ELECTRIC HEATER IS AT FULL CAPACITY AND THE INDIVIDUAL ZONE DAMPER IS FULLY OPEN.

5.4. DUCTLESS SPLIT SYSTEMS. DUCTLESS SPLIT SYSTEMS SHALL BE CONTROLLED BY THEIR THERMOSTATS AS INDICATED BELOW. THE THERMOSTAT SHALL CONTROL THE OPERATION OF THE FANS, COMPRESSOR, AND HEATING COIL (IF EQUIPPED). SYSTEM OPERATION SHALL BE CONTROLLED BY ONE OF THE PRE-PROGRAMMED SETTINGS. UNDER NORMAL OPERATION THE EQUIPMENT SHALL BE ENERGIZED UPON A CALL FOR COOLING OR HEATING AS REQUIRED TO MAINTAIN THE DESIRED ROOM TEMPERATURE.

EQUIPMENT	THERMOSTAT
L010-HDW1-HAU01/L010-HDW1-AHU01	T-H105

6. RETURN SLUDGE PUMP STATION CONTROL SYSTEM MODIFICATIONS

6.1. EXISTING AIR HANDLING UNIT HVU-1. EXISTING AIR HANDLING UNIT HVU-1 SHALL BE CONTROLLED BY AN "ON-OFF" SWITCH ON THE FACE OF NEW TEMPERATURE CONTROL PANEL TCP-1. WHEN THE SWITCH IS IN THE "ON" POSITION THE UNIT FAN SHALL BE ENERGIZED, EXISTING CONTROL DAMPER CD-R103 SHALL BE OPEN AND THE HEATING SHALL BE CONTROLLED BY WALL-MOUNTED THERMOSTAT T-R102 TO MAINTAIN THE DESIRED ROOM TEMPERATURE.

EXISTING CONTROL DAMPERS CD-R104 THRU CD-R109 SHALL BE CONTROLLED BASED UPON OUTDOOR AIR TEMPERATURE, AS DETERMINED BY CHANGEOVER THERMOSTAT T-R103. WHEN THERMOSTAT T-R103 DETECTS AN OUTDOOR AIR TEMPERATURE LESS THAN 70 F (ADJUSTABLE), CONTROL DAMPER CD-R104 SHALL BE CLOSED AND CONTROL DAMPERS CD-R105 THRU CD-R109 SHALL BE OPEN. WHEN THE OUTDOOR TEMPERATURE IS GREATER THAN 70 F (ADJUSTABLE), CD-R104 SHALL OPEN AND CD-R-105 THRU CD-R109 SHALL BE CLOSED.

6.2. EXISTING EXHAUST/RETURN FANS. EXISTING FANS REF-1 AND EAF-1, 2, 3, AND 4 SHALL EACH BE CONTROLLED BY "ON-OFF-AUTO" SELECTOR SWITCHES LOCATED ON THE FACE OF NEW TEMPERATURE CONTROL PANEL TCP-1. WHEN THE RESPECTIVE SWITCH IS IN THE "AUTO" POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION THE FAN SHALL BE ENERGIZED. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THEIR NORMALLY CLOSED POSITION.

EQUIPMENT	SWITCH LOCATION	FAN INTERLOCK	CONTROL DAMPERS
REF-1	TCP-1	HVU-1	N/A
EAF-1	TCP-1	HVU-1	N/A
EAF-2	TCP-1	WALL SWITCH CS-R101	CD-R110, CD-R111
EAF-3	TCP-1	HVU-1	N/A
EAF-4	TCP-1	WALL SWITCH CS-R102	CD-R112

7. THERMOSTAT SETPOINTS

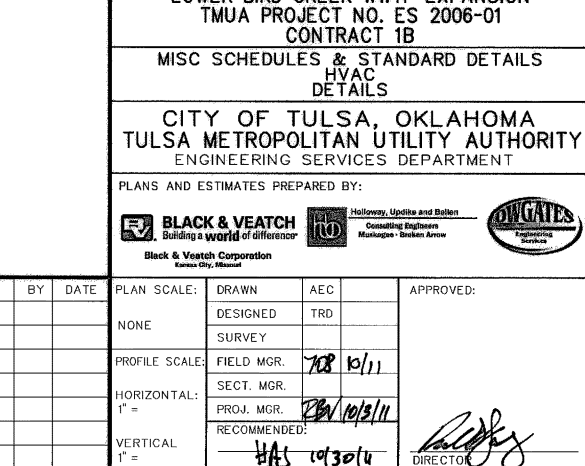
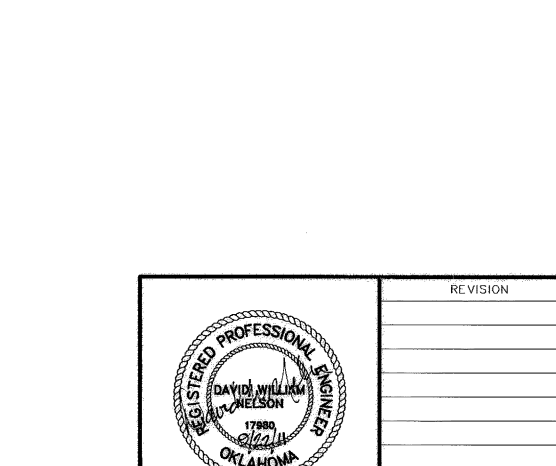
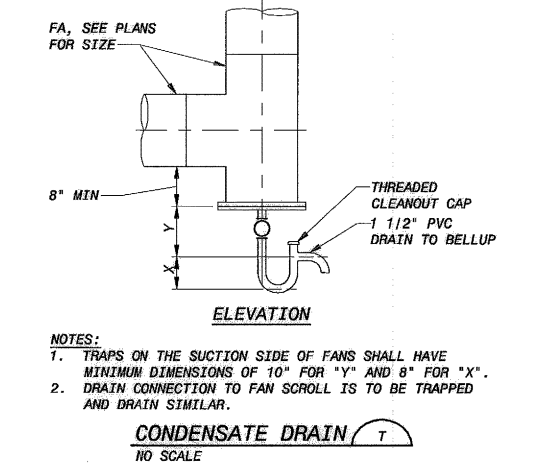
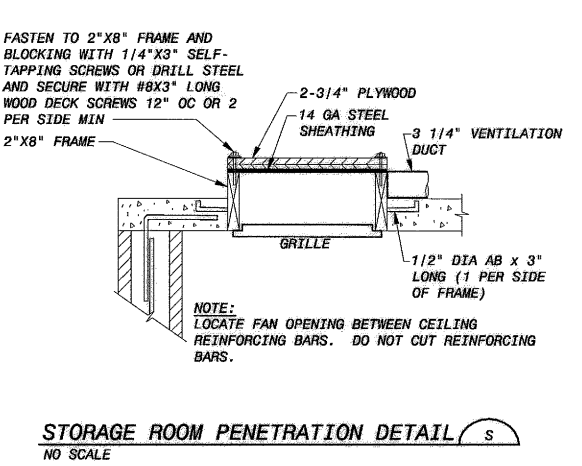
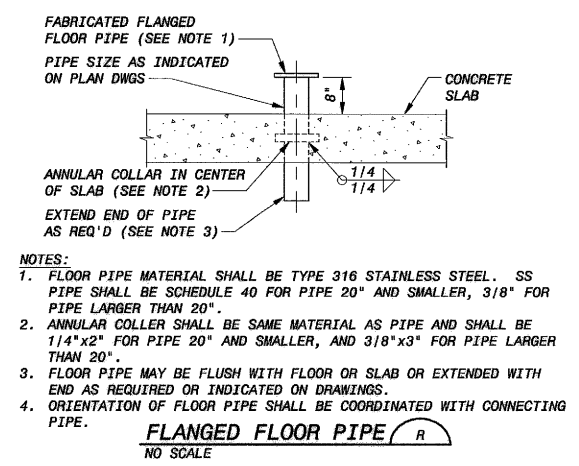
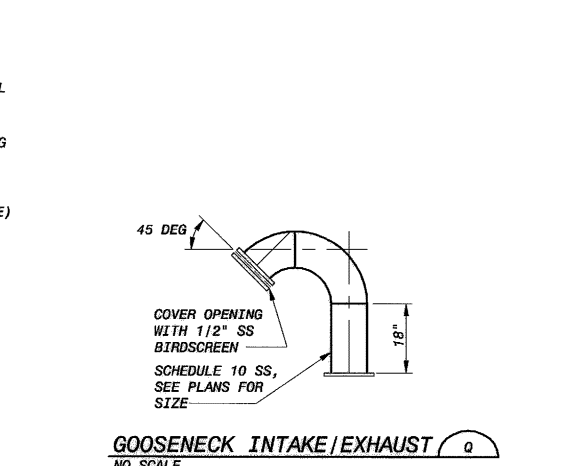
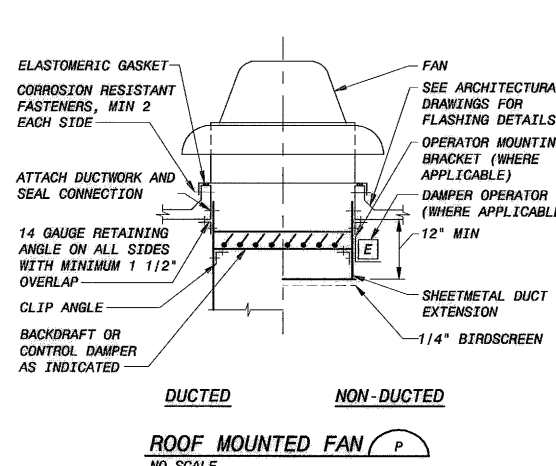
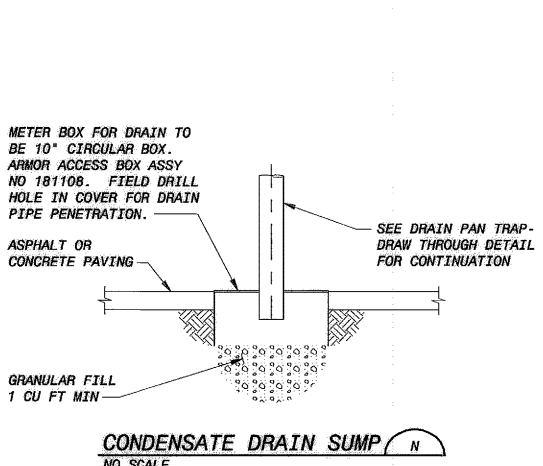
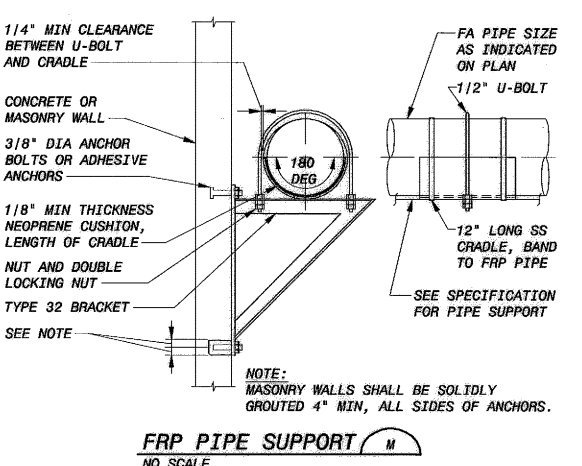
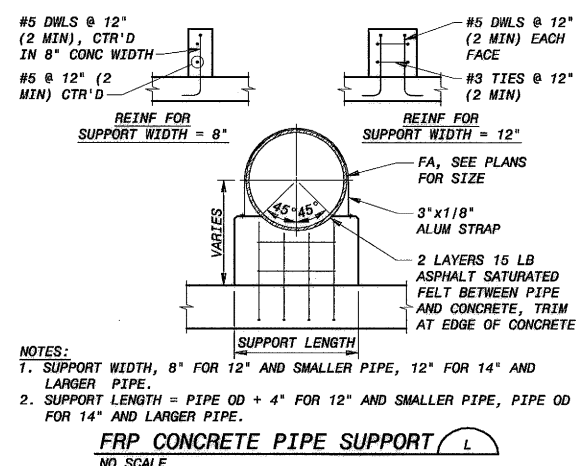
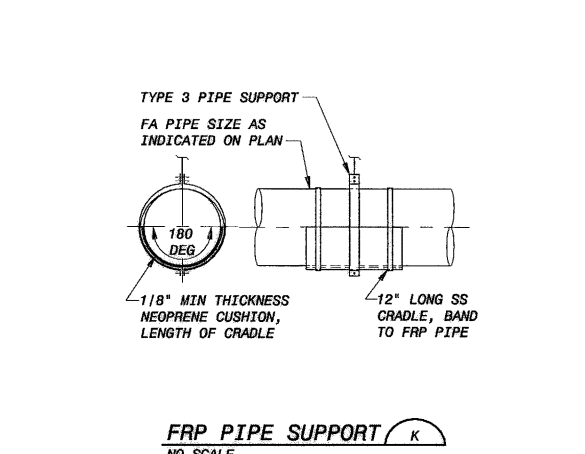
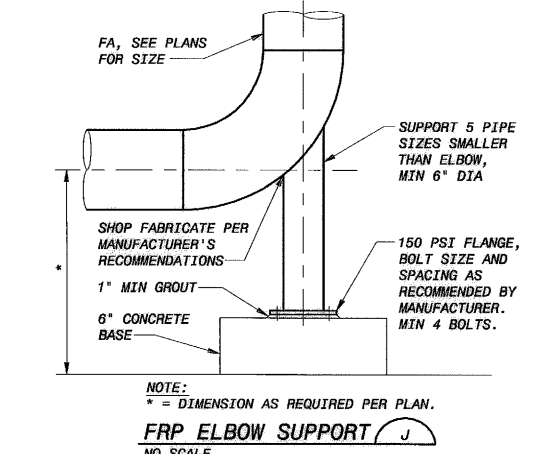
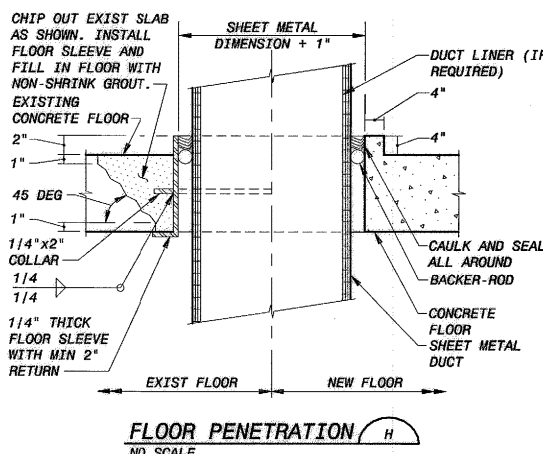
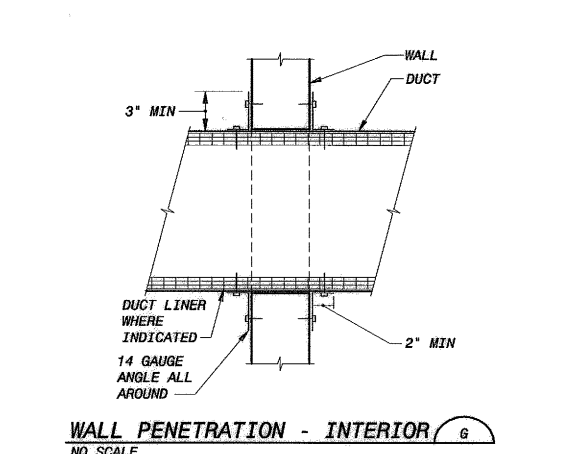
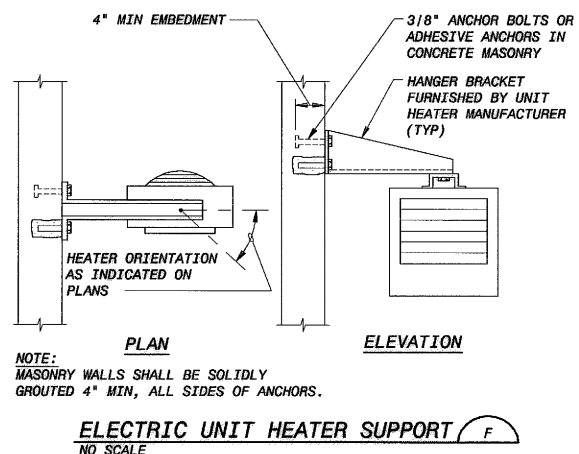
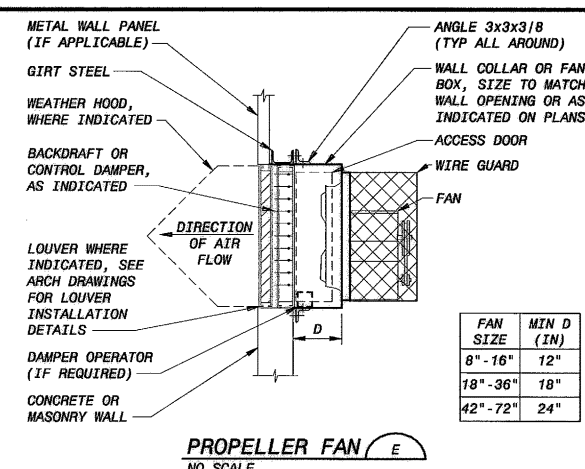
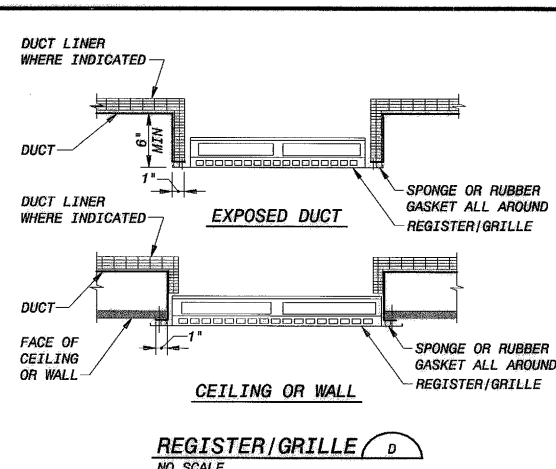
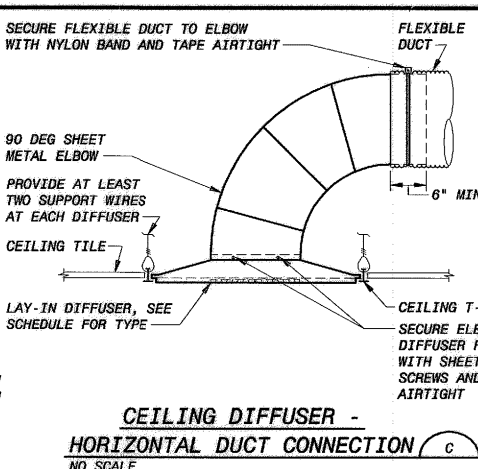
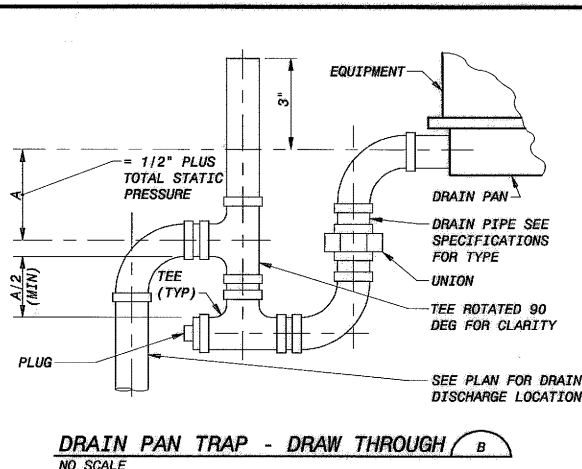
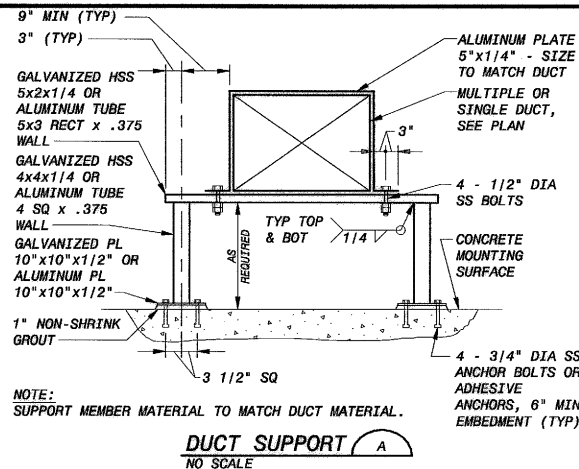
7.1 THERMOSTAT SETPOINTS SHALL BE AS INDICATED BELOW, UNLESS THE SETPOINT HAS BE DESCRIBED PREVIOUSLY IN THIS SEQUENCE OF OPERATIONS.

LOW TEMPERATURE THERMOSTATS	-	40° F
HEATERS	-	60° F
MAKEUP AIR SUPPLY HEATING	-	60° F
VENTILATING EQUIPMENT	-	95° F
AIR CONDITIONED ELECTRICAL ROOMS	-	85° F
LABORATORY (PROGRAMMABLE THERMOSTAT)	-	68° F COOLING
	-	68° F HEATING
OPERATIONS BLDG (ZONE SENSORS)	-	78° F COOLING
	-	72° F HEATING

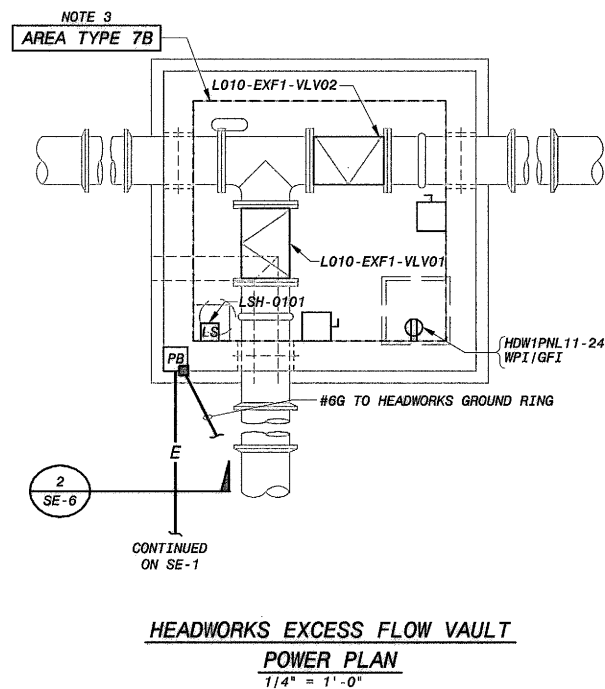
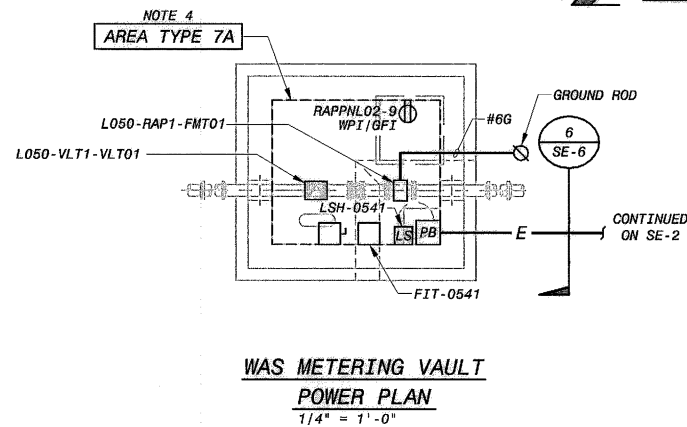
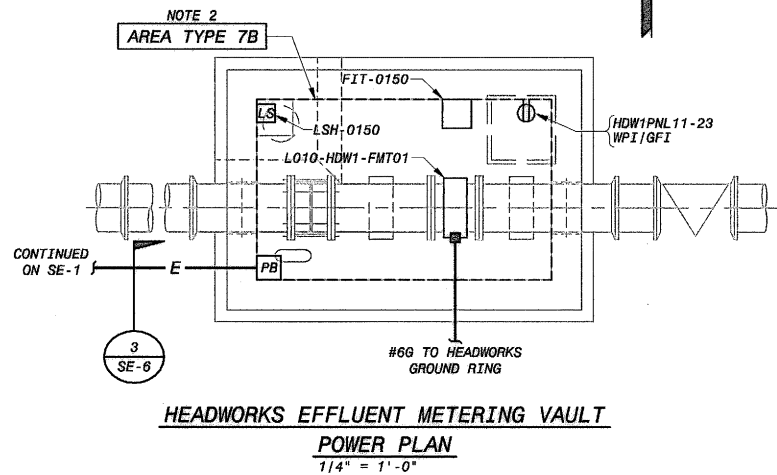


REVISION	BY	DATE

PLAN SCALE:	DRAWN	BDL		APPROVED:
NONE	DESIGNED	MM,TD		
	SURVEY			
PROFILE SCALE:	FIELD MGR.	JCB	10/11	
HORIZONTAL:	SECT. MGR.			
1" =	PROJ. MGR.	BB	10/9/11	
VERTICAL	RECOMMENDED:			
1" =	HAS	10/10/11		
FILE: MH-03.DWG	DRAWING: MH-3	DATE 10/28/2011		
ATLAS PAGE NO:		SHEET 254 OF 261 SHEETS		

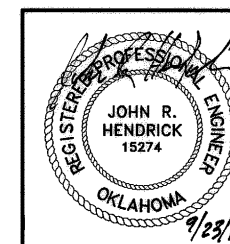


LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
MISC SCHEDULES & STANDARD DETAILS HVAC DETAILS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
BLACK & VEATCH Building a world of difference		Holloway, Updike and Bollen Consulting Engineers Muskogee - Broken Arrow	
Black & Veatch Corporation Kansas City, Missouri		OKMATES Engineering Services	
PLAN SCALE:	DRAWN	AEC	APPROVED:
NONE	DESIGNED	TRD	
	SURVEY		
PROFILE SCALE:	FIELD MGR.	7/8 10/11	
HORIZONTAL:	SECT. MGR.		
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1" =		4/5 10/30/11	
FILE: MH-04.DWG	DRAWING: MH-4	DATE 10/28/2011	
ATLAS PAGE NO:		SHEET 255 OF 261 SHEETS	



NOTES:

1. SEE DRAWING GE-1 FOR ELECTRICAL LEGEND AND ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. INTERIOR OF VAULT A CLASS 1, DIVISION 2, GROUP D AREA PER NFPA 820 TABLE 4.2 ROW 36a. ALL EQUIPMENT & INSTALLATION INSIDE VAULT SHALL BE SUITABLE FOR CLASS 1, DIVISION 2, GROUP D AREA.
3. INTERIOR OF VAULT A CLASS 1, DIVISION 2, GROUP D AREA PER NFPA 820 TABLE 4.2 ROW 31a. ALL EQUIPMENT & INSTALLATION INSIDE VAULT SHALL BE SUITABLE FOR CLASS 1, DIVISION 2, GROUP D AREA.
4. INTERIOR OF VAULT A CLASS 1, DIVISION 1, GROUP D AREA PER NFPA 820 TABLE 4.2 ROW 37a. ALL EQUIPMENT & INSTALLATION INSIDE VAULT SHALL BE SUITABLE FOR CLASS 1, DIVISION 1, GROUP D AREA.



REVISION	BY	DATE


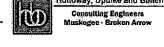

LOWER BIRD CREEK WASTEWATER TREATMENT PLANT EXPANSION PROJECT NO. ES 2006-01			
MISCELLANEOUS ELECTRICAL MISCELLANEOUS PLANS			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
 Black & Veatch Corporation Kansas City, Missouri	 Consulting Engineers Muskogee - Broken Arrow	 Engineering Service	APPROVED:
PLAN SCALE:	DRAWN: KMA DESIGNED: SDS SURVEY:	FIELD MGR. 7/23/11 SECT. MGR. 7/23/11 PROJ. MGR. 7/23/11	DATE 10/28/2011
PROFILE SCALE:	FIELD MGR. 7/23/11 SECT. MGR. 7/23/11 PROJ. MGR. 7/23/11	FIELD MGR. 7/23/11 SECT. MGR. 7/23/11 PROJ. MGR. 7/23/11	DATE 10/28/2011
HORIZONTAL: 1" =	FIELD MGR. 7/23/11 SECT. MGR. 7/23/11 PROJ. MGR. 7/23/11	FIELD MGR. 7/23/11 SECT. MGR. 7/23/11 PROJ. MGR. 7/23/11	DATE 10/28/2011
VERTICAL: 1" =	FIELD MGR. 7/23/11 SECT. MGR. 7/23/11 PROJ. MGR. 7/23/11	FIELD MGR. 7/23/11 SECT. MGR. 7/23/11 PROJ. MGR. 7/23/11	DATE 10/28/2011
FILE:	DRAWING: ME-1	SHEET 256 OF 261 SHEETS	ATLAS PAGE NO:

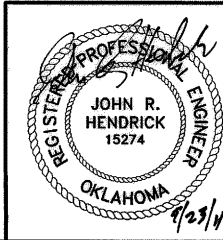
PHASE			PANELBOARD: "L010-HDW1-PNL11"				BUS: COPPER RATING: 225A				MAINS: 3P-150A MAIN BREAKER LOCATION: HEADWORKS BUILDING ROOM: ELECTRICAL ROOM				PHASE			
"A"	"B"	"C"	MOUNTING: SURFACE												"A"	"B"	"C"	
V.A.	V.A.	V.A.	LOAD				P				LOAD				V.A.	V.A.	V.A.	
495	1470	372	LIGHTS-INTERMEDIATE LEVEL				1	20	1	2	20	1	LIGHTS-STAIRWELL NO. 1	372	1260	1680		
			LIGHTS-GRIT LOADING RM				1	20	3	4	20	1	LIGHTS-GRIT LOADING RM					
1260	720		LIGHTS-ELEC RM & RESTROOM				1	20	5	6	20	1	LIGHTS-GRIT PUMP RM	520	720			
			LIGHTS-GRIT PUMP RM				1	20	7	8	20	1	LIGHTS-EXTERIOR					
540	1680		RECEP-GRIT LOADING RM				1	20	9	10	20	1	RECEP-GRIT PUMP RM	1300		720		
			RECEP-GRIT LOADING RM				1	20	11	12	20	1	RECEP-ELEC RM & RESTROOM					
			RECEP-EQUIPMENT RM				1	20	13	14	20	1	LIGHTS-EXT STAIRS & GRIT WELL	1050		1680		
			LIGHTS-SCREEN RM				1	20	15	16	20	1	LIGHTS-SCREEN RM					
1680	720	180	LIGHTS-SCREEN RM				1	20	17	18	20	1	LIGHTS-DEWATERING RM	900	540			
			LIGHTS-DEWATERING RM				1	20	19	20	20	1	RECEP-DEWATERING RM					
			RECEP-SCREEN RM				1	20	21	22	20	1	RECEP-EXT GRIT WELL AREA			180		
			RECEP-EFFLUENT METERING VAULT				1	20	23	24	20	1	RECEP-EXCESS FLOW VAULT					
			SPARE				1	20	25	26	20	1	SPARE					
			SPARE				1	20	27	28	20	1	SPARE					
			SPARE				1	20	29	30	20	1	SPARE					
			SPARE				1	20	31	32	20	1	SPARE					
			SPARE				1	20	33	34	20	1	SPARE					
			SPARE				1	20	35	36	20	1	SPARE					
			SPARE				1	20	37	38	20	1	SPARE					
			SPACE				1		39	40		1	SPACE					
			SPACE				1		41	42		1	SPACE					
3975	4590	2322	TOTAL "A"				7067				TOTAL "A"				3092			
			TOTAL "B"				8160				TOTAL "B"							
			TOTAL "C"				6582				TOTAL "C"						4260	
							TOTAL =				21809							

PLOTTED DATE: DEV1267, 5/27/2011 3:12:05 PM
SAVED DATE: AND4974, 9/21/2011 11:22:22 AM
C:\NET ID: 145120-3000-E-B000WBCF

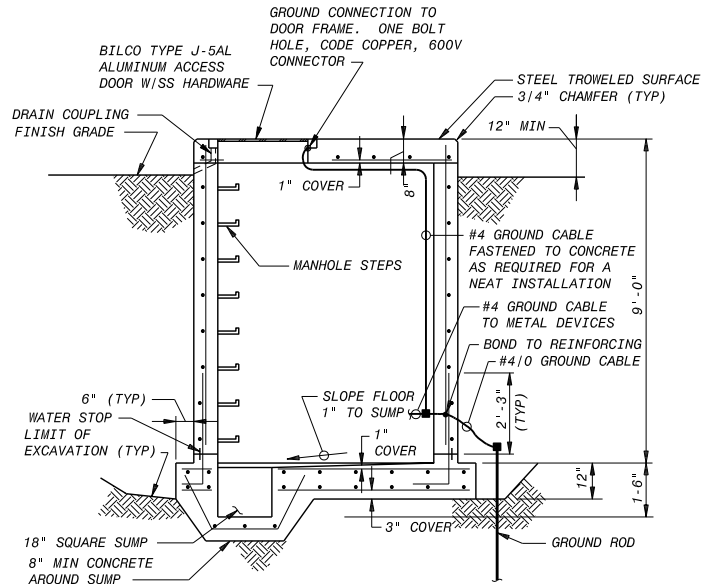
LIGHTING FIXTURE SCHEDULE				
FIXTURE	LAMP	MOUNTING HGT	DESCRIPTION	MANUFACTURER
1	F32T8/SP35 2850 LUMENS	AS NOTED ON PLANS	(2)32W INDUSTRIAL FLUORESCENT FIXTURE, 10% UPLIGHT, HEAVY GAUGE STEEL CONSTRUCTION, WHITE BAKED ENAMEL FINISH, ELECTRONIC BALLAST WITH INSTANT START, 120V	LITHONIA #AF10232120GEB10IS
2	F32T8/SP35 2850 LUMENS	AS NOTED ON PLANS	SAME AS FIXTURE NO.1 EXCEPT WITH LITHONIA EMERGENCY BATTERY PACK PS-1400QD, 120V	LITHONIA #AF10232120GEB10IS- EL14
3	F32T8/SP35 2850 LUMENS	AS NOTED ON PLANS	(2)32W WALL MOUNTED FLUORESCENT FIXTURE, STEEL CONSTRUCTION, ELECTRONIC INSTANT START BALLAST, LITHONIA EMERGENCY BATTERY PACK PS-1400QD, 120V	LITHONIA #WC232120GEB10ISEL14
4	175W MH 14,000 LUMENS	AS NOTED ON PLANS	175W PULSE START METAL HALIDE FIXTURE, DIE-CAST ALUMINUM HOUSING, WHITE POLYESTER PAINT, CORROSION RESISTANT, WET LOCATION RATED, ENCLOSED AND GASKETED, SYMMETRIC REFRACTOR, PENDANT MOUNT, 120V	HOLOPHANE #PTA175PM12P545
5	175W MH 14,000 LUMENS	AS NOTED ON PLANS	175W PULSE START METAL HALIDE FIXTURE, RATED CLASS 1 DIV. 2, ALUMINUM HOUSING, POLYESTER POWDER PAINTED, ENCLOSED AND GASKETED, SYMMETRIC REFRACTOR, PENDANT MOUNT, 120V	HOLOPHANE #PETL175PM12545PD
6	100W MH 8100 LUMENS	AS NOTED ON PLANS	100W METAL HALIDE FIXTURE, ENCLOSED AND GASKETED, NEMA 4X ENCLOSURE, GLOBE AND GUARD, FIBERGLASS REFLECTOR, 1-1/2" STANCHION MOUNT, 120V	KILLARK #MBH100GGD5
7	400W MH 40,000 LUMENS	20' POLE	FIXTURE: 400W METAL HALIDE FIXTURE, ALUMINUM HOUSING, IES TYPE II OPTICS, SQUARE POLE MOUNT WITH 4" ARM, PHOTO-ELECTRICAL CELL, BLACK FINISH, 480V POLE: SQUARE STRAIGHT STEEL 20'-0" POLE, BLACK FINISH	LITHONIA FIXTURE: KSF2-400M-R2-480-SCWA- SP04-PER-PE4-DBL POLE: SSS204GDM19DBL
8	400W MH 40,000 LUMENS	20' POLE	FIXTURE: SAME AS FIXTURE #7 BUT WITH IES TYPE IV WIDE, FORWARD THROW OPTICS, 480V POLE: SQUARE STRAIGHT STEEL 20'-0" POLE, BLACK FINISH	LITHONIA FIXTURE: KSF2-400M-R4W-480- SCWA-SP04-PER-PE4-DBL POLE: SSS204GDM19DBL
9	100W MH 8100 LUMENS	AS NOTED ON PLANS	100W METAL HALIDE FIXTURE, CORROSION RESISTANT DIE-CAST ALUMINUM HOUSING, 12 VOLT EMERGENCY CIRCUIT WITH (2)35W LAMPS, BLACK FINISH, 120V	LITHONIA #TWAC100M1202DC12DBL
EL1	(2)50W HALOGEN LAMPS FURNISHED WITH UNIT	7'-6" ABOVE FLOOR UNLESS OTHERWISE NOTED	INDUSTRIAL EMERGENCY LIGHTING UNIT, NEMA 4X RATED, CORROSION RESISTANT, 12V 100W NICKEL-CADMIUM BATTERY, TIME DELAY, GRAY FINISH, 120V	LITHONIA #INDX12100H5012SPREM
EL2	(2)30W INCAND. LAMPS FURNISHED WITH UNIT	7'-6" ABOVE FLOOR UNLESS OTHERWISE NOTED	INDUSTRIAL EMERGENCY LIGHTING UNIT, CLASS 1 DIV. 2 RATED, FIBERGLASS HOUSING, 12V 100W NICKEL-CADMIUM BATTERY, TIME DELAY, 120V	LITHONIA #Z1200NN3012TD1
EL3	NO LAMPS	7'-6" ABOVE FLOOR UNLESS OTHERWISE NOTED	12V-125W EMERGENCY LEAD-CALCIUM BATTERY, STEEL HOUSING, TIME DELAY, 120V	LITHONIA #ELT125R0TD
EXT1	LED LAMP FURNISHED WITH UNIT	8'-6" ABOVE FLOOR UNLESS NOTED OTHERWISE	MOLDED THERMOPLASTIC HOUSING, CORROSION PROOF, WHITE FINISH, NICKEL CADMIUM BATTERY, 120V	LITHONIA #LQMSW3R120/277
EXT2	LED LAMP FURNISHED WITH UNIT	8'-6" ABOVE FLOOR UNLESS NOTED OTHERWISE	FIBERGLASS-REINFORCED POLYESTER HOUSING, CLASS 1 DIV. 2 RATED, NICKEL-CADMIUM BATTERY, TIME DELAY, 120V	LITHONIA #LZS1R120/277ELNTD1

NOTE: FLUORESCENT FIXTURES SPECIFIED WITH EMERGENCY BATTERY PACK SHALL BE FURNISHED WITH BATTERY PACK THAT PROVIDES A MINIMUM OF 1400 INITIAL LUMENS UPON INTERRUPTION OF NORMAL POWER.

LOWER BIRD CREEK WASTEWATER TREATMENT PLANT EXPANSION PROJECT NO. ES 2006-01			
MISCELLANEOUS ELECTRICAL LIGHTING FIXTURE SCHEDULE			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
 Black & Veatch Corporation Kansas City, Missouri		 Holloway, Updike and Bolton Consulting Engineers Muskegon - Broken Arrow	
 Gates Engineering Service			
PLAN SCALE:	DRAWN	KMA	APPROVED:
	DESIGNED	SDS	
	SURVEY		
PROFILE SCALE:	FIELD MGR.	10/10/11	
HORIZONTAL:	SECT. MGR.		
1" =	PROJ. MGR.	10/10/11	
VERTICAL	RECOMMENDER:	10/10/11	
1" =			
FILE:	DRAWING: ME-3	DATE 10/28/2011	
ATLAS PAGE NO:		SHEET 258 OF 261 SHEETS	



REVISION	BY	DATE

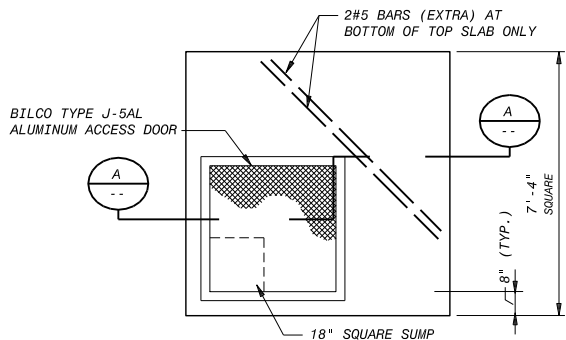


ELECTRICAL MANHOLE NOTES:

1. CABLE AND CONDUIT SUPPORTS SHALL BE SPACED AT 2'-0" HORIZONTAL CENTERS IN WALLS AND SHALL BEGIN 2'-0" FROM FLOOR.
2. SUPPORTS IN CEILINGS SHALL RUN FROM WALL TO WALL.
3. OPENING SHALL BE PROVIDED IN MANHOLE WALLS FOR CONDUIT BANK ENTRANCE AS REQUIRED.
4. ALL REINFORCING ON THIS DETAIL SHALL BE #5@12" UNLESS NOTED OTHERWISE. CENTER VERTICAL REINFORCING IN THE WALLS.
5. CONCRETE TO BE ROUGH AND CLEAN AT CONSTRUCTION JOINT FACES.

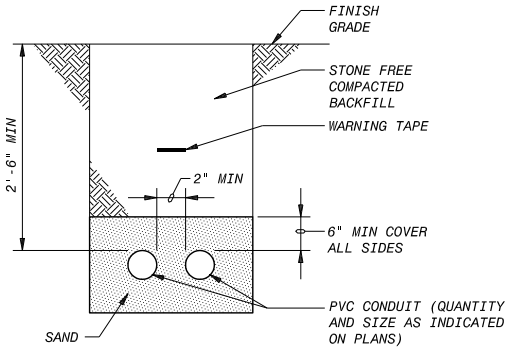
ELECTRICAL MANHOLE SECTION

NO SCALE NOT SUITABLE FOR ROADWAY LOCATIONS



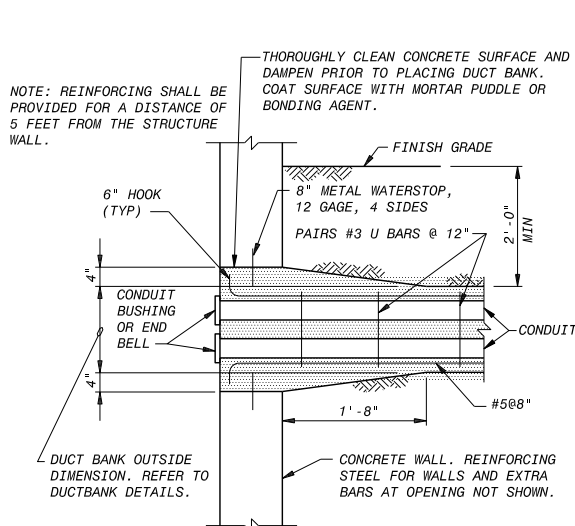
TYPICAL ELECTRICAL MANHOLE (SINGLE CHAMBER)

NO SCALE NOT SUITABLE FOR ROADWAY LOCATIONS



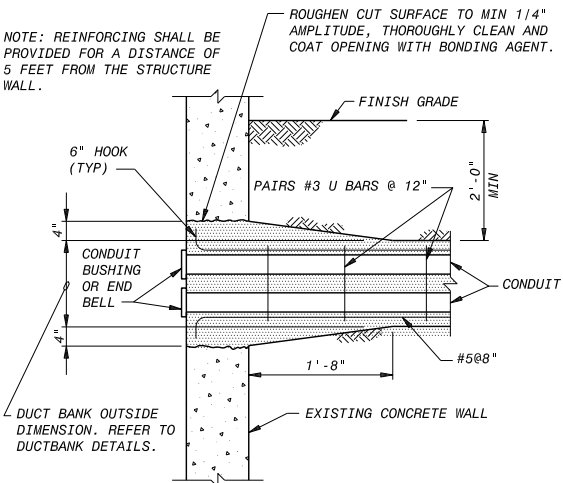
TYPICAL DIRECT BURIED CONDUIT SECTION

NO SCALE



TYPICAL UNDERGROUND DUCT BANK ENTRANCE DETAIL

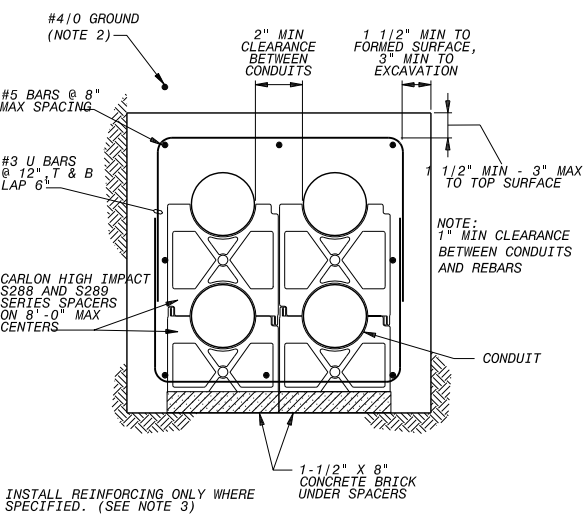
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TYPICAL UNDERGROUND DUCT BANK ENTRANCE DETAIL

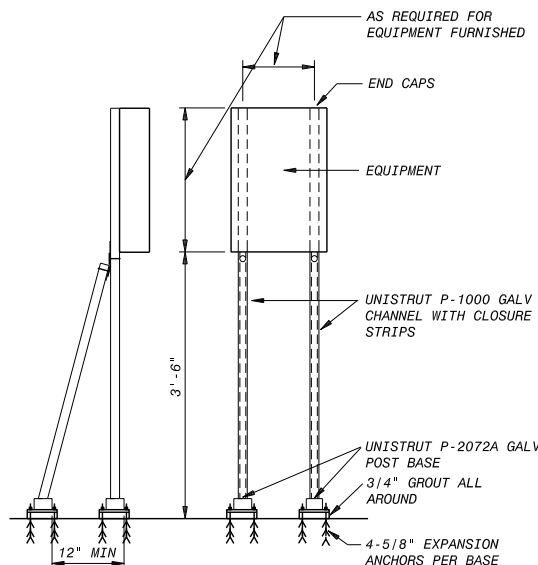
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NOTE: FOR EXISTING WALL



TYPICAL DUCT BANK SECTION

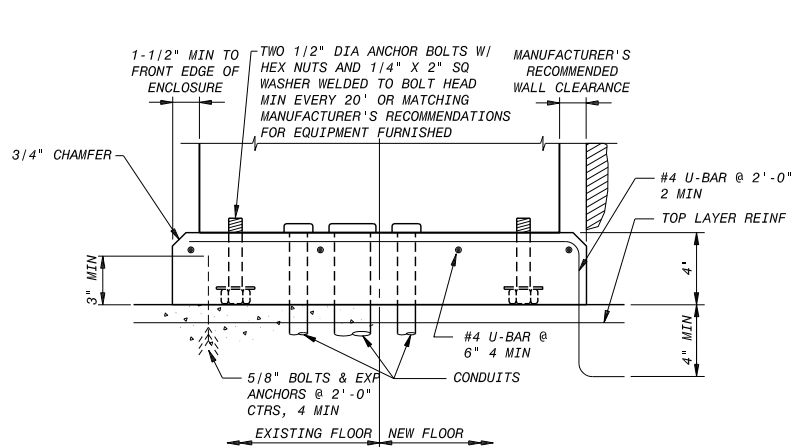
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TYPICAL EQUIPMENT MOUNTING DETAIL

NO SCALE

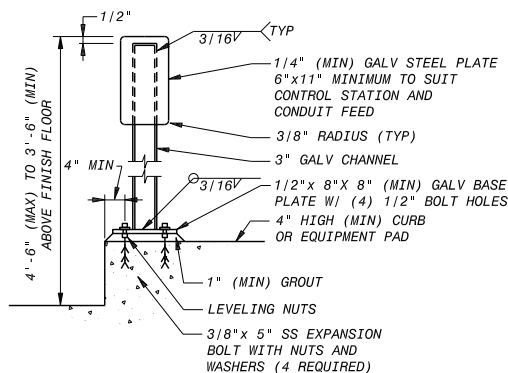
NOTE: IN OUTDOOR LOCATIONS, USE STAINLESS STEEL BOLTS, NUTS, WASHERS, AND ANCHOR BOLTS.



ELECTRICAL EQUIPMENT BASE

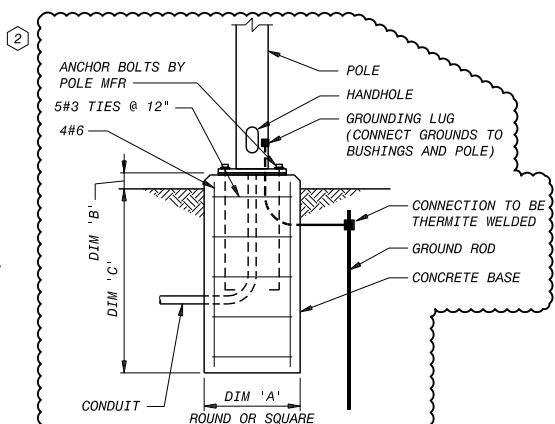
NO SCALE

NOTE: UNLESS OTHERWISE NOTED, ALL INDOOR FLOOR-MOUNTED ELECTRICAL EQUIPMENT, INCLUDING SWITCHGEAR, SWITCHBOARDS, MOTOR CONTROL CENTERS, ADJUSTABLE FREQUENCY DRIVES, INSTRUMENT CABINETS, ETC., SHALL BE PROVIDED WITH EQUIPMENT BASES.



TYPICAL CONTROL STATION MOUNTING DETAIL

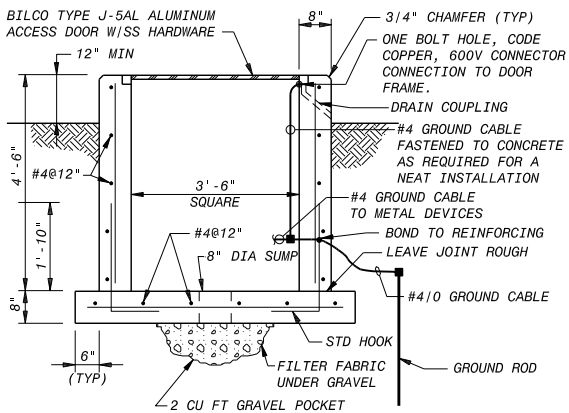
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TYPICAL POLE MOUNTING DETAIL

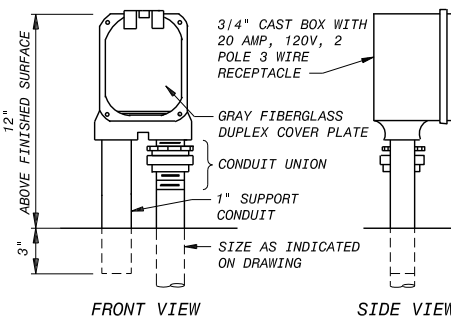
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A	B	C	POLE LENGTH
1'-0"	2"	3'-0"	10' TO 12'
1'-6"	2"	4'-0"	12' TO 20'
2'-0"	2"	5'-0"	20' TO 40'
2'-0"	2'-6"	5'-0"	20' TO 40'



TYPICAL ELECTRICAL HANDHOLE DETAIL

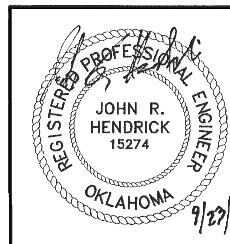
NO SCALE NOT SUITABLE FOR ROADWAY LOCATIONS



NOTE: ALL EXPOSED CONDUIT SHALL BE PVC COATED RIGID STEEL.

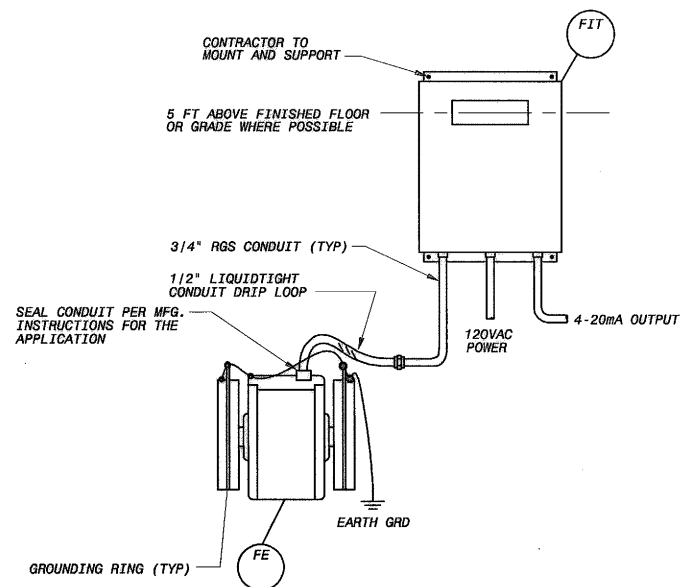
TYPICAL WEATHERPROOF RECEPTACLE MOUNTING DETAIL

NO SCALE



REVISION	BY	DATE
ADDENDUM NO. (2)	PSB	1-13-12

PLAN SCALE:	DRAWN	KVA	APPROVED:
	DESIGNED	SDS	
	SURVEY		
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	SECT. MGR.		
	PROJ. MGR.	10/1/11	
	RECOMMENDED	10/1/11	
	DIRECTOR		
FILE:	DRAWING: M-4	DATE 10/28/2011	
ATLAS PAGE NO:		SHEET 259 OF 261 SHEETS	

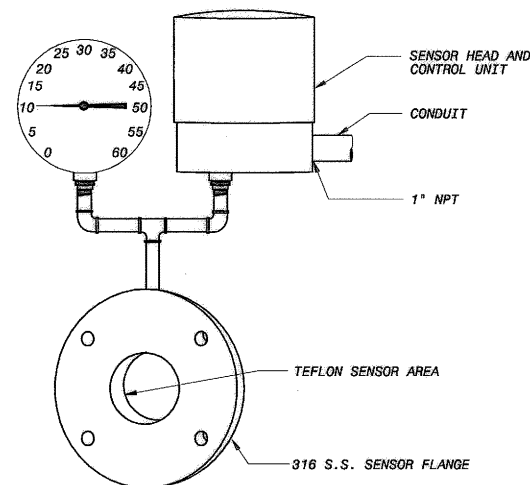


MAGNETIC FLOWMETER INSTALLATION DETAIL

NO SCALE

NOTE: PIPE TO BE SUPPORTED ON BOTH
SIDES OF METER.

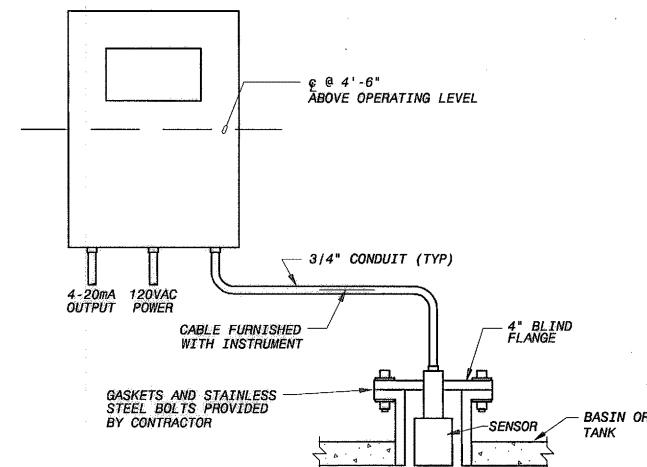
TYPICAL FOR: FIT-0150, FIT-0541, FIT-0570,
FIT-0590, FIT-1020, FIT-6502.



PRESSURE GAUGE/SWITCH INSTALLATION DETAIL

NO SCALE

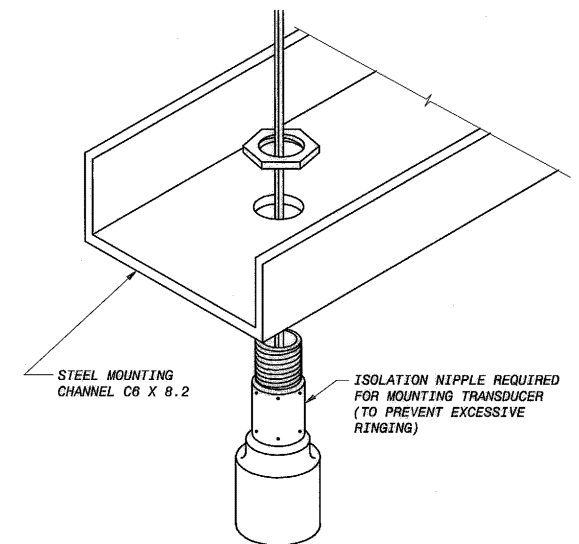
TYPICAL FOR: PI-0161, PI-0171, PI-0522,
PI-0523, PI-0561A, PI-0561B,
PI-0562A, PI-0562B, PSH-0561,
PSH-0562, PSL-0561A, PSL-0562A.



ULTRASONIC LEVEL TRANSMITTER INSTALLATION DETAIL

NO SCALE

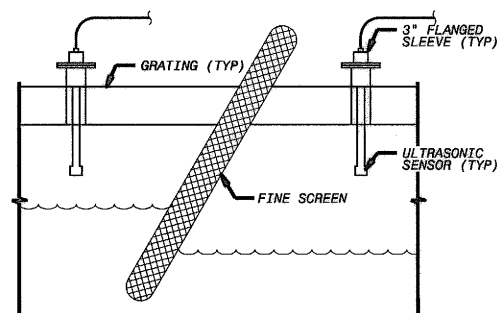
TYPICAL FOR: LIT-0153, LIT-0550, LIT-0602.



ULTRASONIC MOUNTING DETAIL

NO SCALE

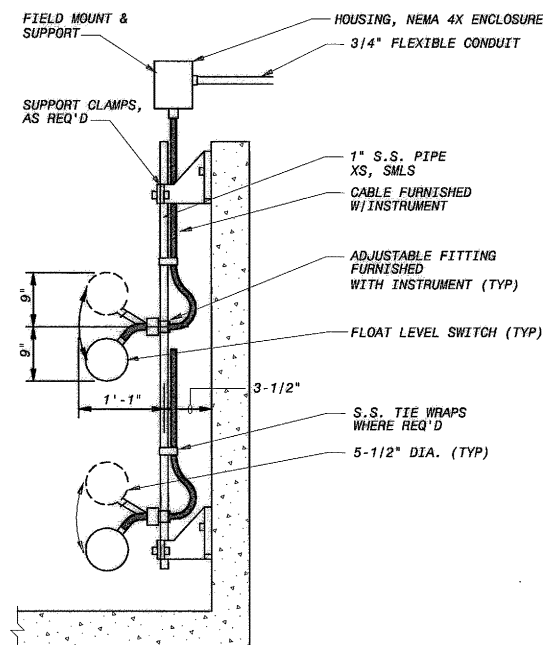
TYPICAL FOR: LIT-0153.



ULTRASONIC DIFFERENTIAL LEVEL SENSORS INSTALLATION DETAIL

NO SCALE

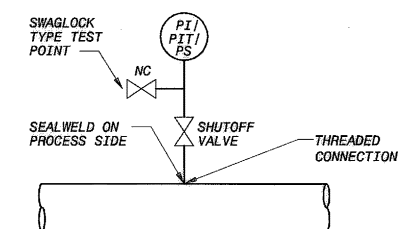
TYPICAL FOR: LE-0111A, LE-0111B, LE-0121A,
LE-0121B.



HIGH/LOW LEVEL FLOATS INSTALLATION DETAIL

NO SCALE

TYPICAL FOR: LSH-0513, LSL-0513, LSL-0513,
LSLL-0550, LSLL-1010.

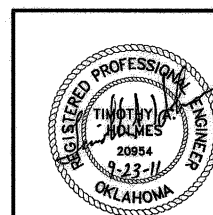


PRESSURE GAUGE, TRANSMITTER AND SWITCH INSTALLATION DETAIL

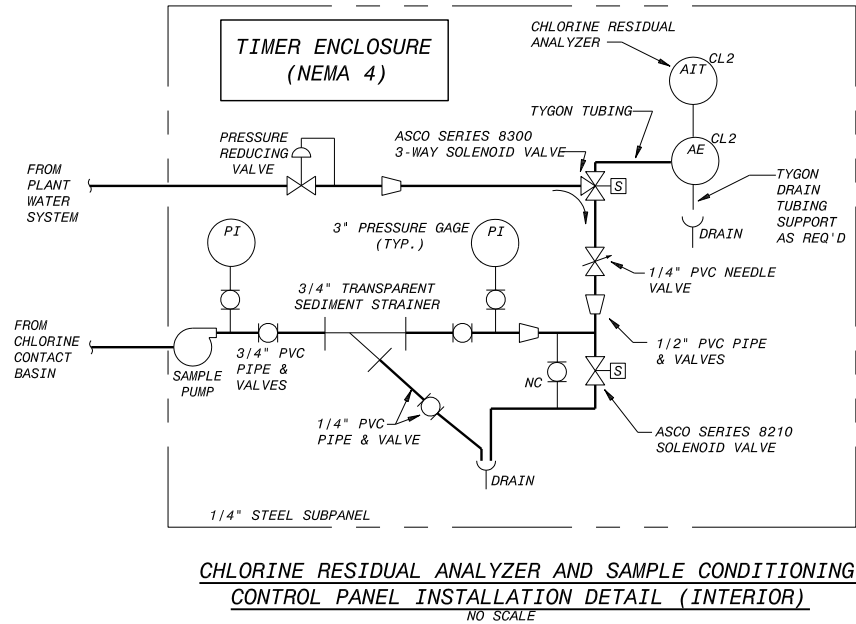
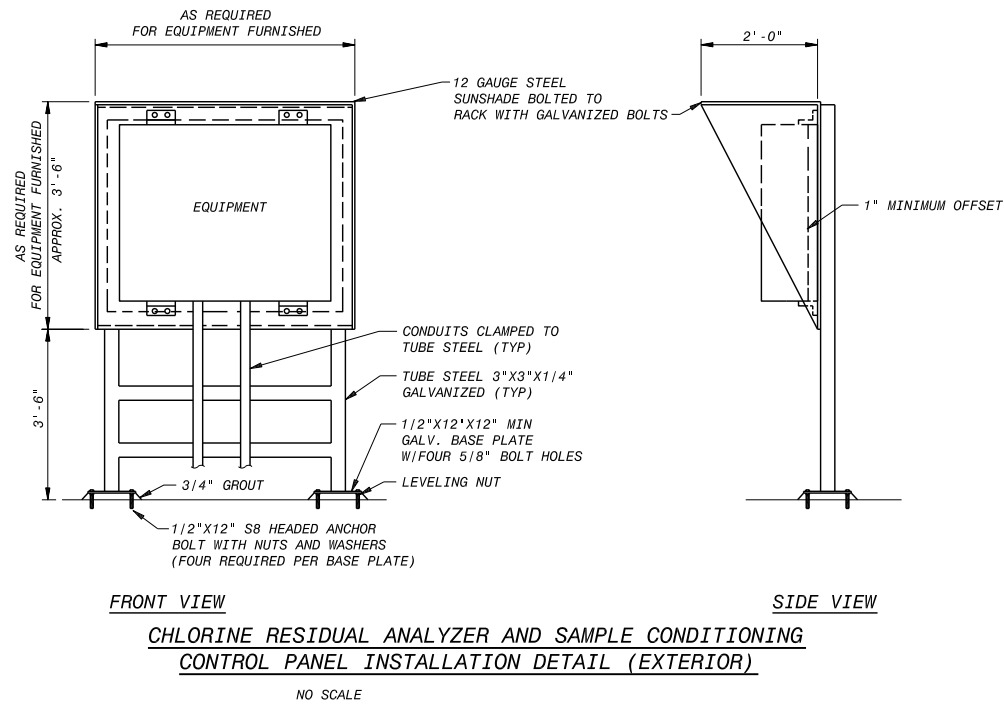
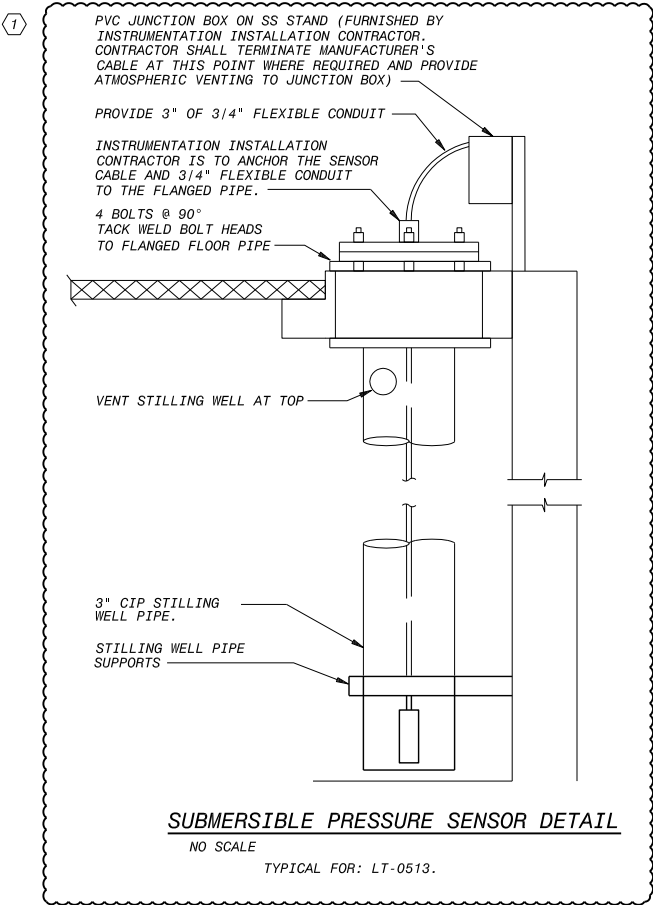
SEE DEVICE SCHEDULE FOR INSTRUMENTS WITH DIAPHRAGM SEALS
NO SCALE

TYPICAL FOR: PDI-0101, PDI-0102, PDSH-0101,
PI-0611, PI-0612, PI-0613,
PI-0614, PI-1011, PI-1012,
PI-6501A, PI-6501B, PIT-0591,
PSH-0611, PSH-0612, PSH-0613,
PSH-0614, PSH-6510, PSH-6520.

LOWER BIRD CREEK WWTP EXPANSION TMUA PROJECT NO. ES 2006-01 CONTRACT 1B			
GENERAL P&ID - INSTRUMENT INSTALLATION DETAILS SHEET 1 OF 2			
CITY OF TULSA, OKLAHOMA TULSA METROPOLITAN UTILITY AUTHORITY ENGINEERING SERVICES DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY:			
BLACK & VEATCH Building a world of difference Black & Veatch Corporation Kansas City, Missouri		Holloway, Updike and Bolton Consulting Engineers Muskegon - Broken Arrow DOWGATES Engineering Services	
PLAN SCALE:	DRAWN	SCD	APPROVED:
	DESIGNED	SCD	
	SURVEY		
PROFILE SCALE:	FIELD MGR.	703 b/jj	
HORIZONTAL:	SECT. MGR.		
1" =	PROJ. MGR.	26/10/11	
VERTICAL:	RECOMMENDED		
1" =		11/5 10/11	
FILE:	DRAWING: MI-1		DATE 10/28/2011
ATLAS PAGE NO:			SHEET 260 OF 261 SHEETS

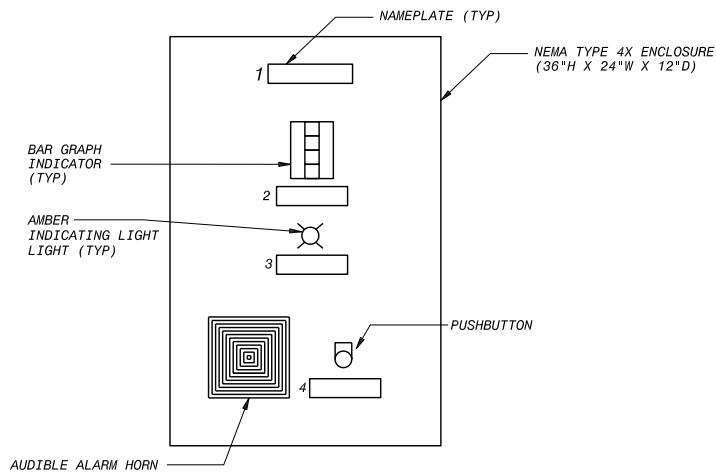


REVISION	BY	DATE



TYPICAL FOR INSTRUMENTS:
AE/AIT-0699A AND AE/AIT-0699B.

SEE CIVIL/SITEWORK PLAN DRAWINGS FOR ROUTING OF SAMPLE PIPING. SEE ELECTRICAL/SITEWORK PLAN DRAWINGS FOR CONNECTION TO EXISTING POWER SOURCE.



NOCL TRUCK UNLOADING PANEL

NO SCALE
LOCATED IN TRUCK UNLOADING AREA

NAMEPLATE LEGEND:

1. SODIUM HYPOCHLORITE TRUCK UNLOADING PANEL
L060-CHL1-PNL02
2. TANK NO. 2 LEVEL INDICATION
3. TANK NO. 2 HIGH LEVEL ALARM
4. HORN SILENCE/RESET

GENERAL NOTES:

1. OUTDOOR PANELS TO BE PROVIDED WITH HEATERS

LOWER BIRD CREEK WWTP EXPANSION
TMUA PROJECT NO. ES 2006-01
CONTRACT 1B

GENERAL
P&ID - INSTRUMENT INSTALLATION DETAILS
SHEET 2 OF 2

CITY OF TULSA, OKLAHOMA
TULSA METROPOLITAN UTILITY AUTHORITY
ENGINEERING SERVICES DEPARTMENT

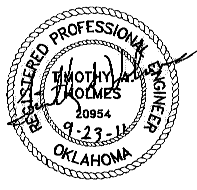
PLANS AND ESTIMATES PREPARED BY:

BLACK & VEATCH
Building a world of a better

Holloway Upthke and Bolton
Consulting Engineers
Washington - Great Arrow

OWGATES
Engineering Services

Black & Veatch Corporation
Kansas City, Missouri

	REVISION	BY	DATE	PLAN SCALE:	DRAWN	SCD	APPROVED: DIRECTOR DATE 10/23/2011 SHEET 261 OF 261 SHEETS
	ADDENDUM NO. (T)	PSB	1-6-12		DESIGNED	SCD	
				PROFILE SCALE:	SURVEY		
				HORIZONTAL:	FELD MGR.	10/23/11	
				VERTICAL:	SECT. MGR.	10/23/11	
					PROJ. MGR.	10/23/11	
					RECOMMENDED:	10/23/11	
				FILE:	DRAWING: MI-2		
				ATLAS PAGE NO:			