

WEAK BASE ANION (WBA) - CHROMIUM REMOVAL DEMONSTRATION FACILITY

"A Feature of the U.S. Environmental Protection
Agency's Glendale Operable Unit"

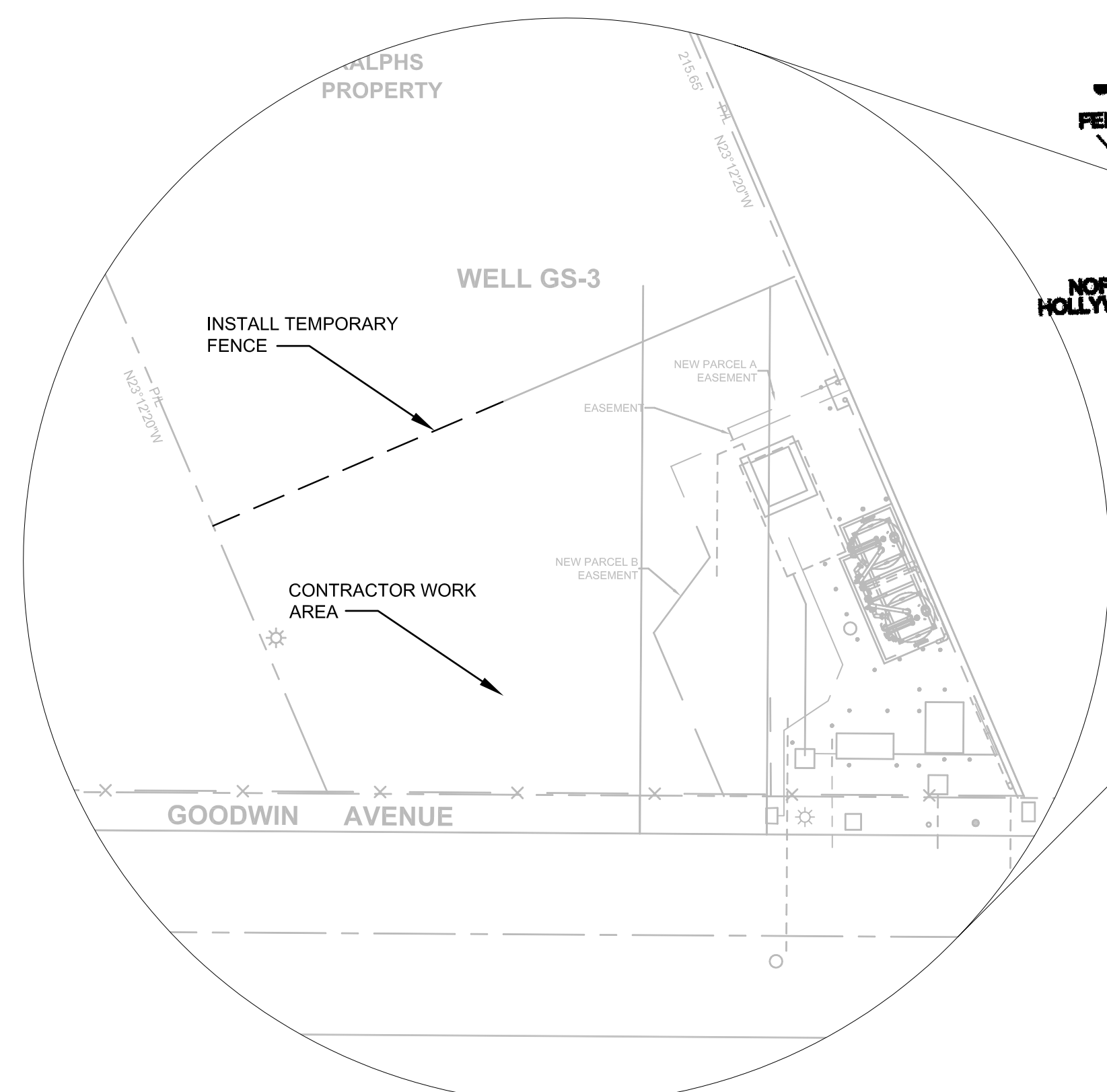
ISSUE FOR CONSTRUCTION

4041 1/2 GOODWIN AVE.

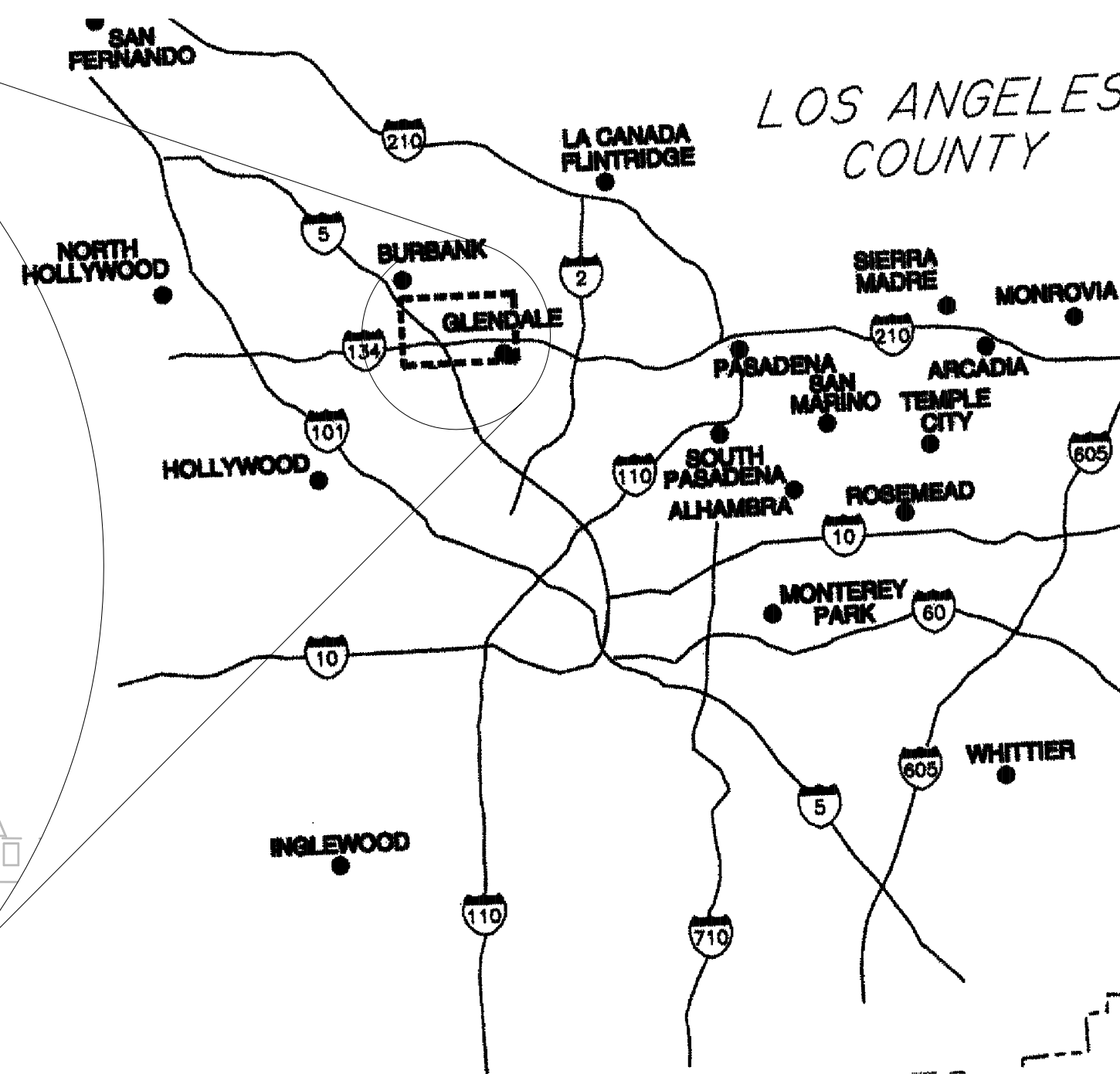
CITY OF LOS ANGELES, CALIFORNIA

MAY 2009

FOR CONSTRUCTION BY CITY OF GLENDALE



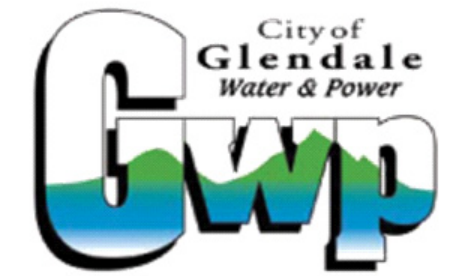
LOCATION MAP



DWG NO.	SHT. NO.	DESCRIPTION
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DATE: DEC 2009
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CONSTRUCTION RECORDS
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Plotted By: armitaged
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Filename: L:\WORK\PROJECTS\106560\GRA\RECORD DRAWINGS\GLENDALE_WBA_COVER.DWG



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DATE	NO.	DESCRIPTION	BY	CHK	APP.
12/09	1	RECORD DRAWING	DMA	AMG	EDL

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DWN: DMA/KAM CH'K:
APPROVED: _____
PETER KAVOUNAS
ASSISTANT GENERAL MANAGER
OF GWP - WATER SERVICES
GLENN O. STEIGER
GENERAL MANAGER OF GLENDALE
WATER & POWER
DATE:

LOCATION MAP and INDEX
**CITY OF GLENDALE
WATER AND POWER**
CALIFORNIA
SHEET 1 OF 18 SHEETS
PLAN NO.
G-01

INSTRUMENT TERMINOLOGY			
TAG LETTER	FIRST LETTER - PROCESS VARIABLE	MODIFIER OR SECOND LETTER READING OR FUNCTION	THIRD OR FOURTH LETTER - FUNCTION
A	ANALYSIS	ALARM	ALARM
B	BURNER FLAME	-	-
C	-	CONTROLLING/ CONTROLLER	CONTROLLER/ CLOSED
D	-	DIFFERENTIAL	-
E	VOLTAGE	ELEMENT	ELEMENT
F	FLOW RATE	RATIO (FRACTION)	HIGH
G	-	GLASS (GAUGE)	GLASS (GAUGE)
H	MANUAL (HAND)	HAND	-
I	CURRENT	INDICATING / INDICATOR	INDICATOR
J	POWER	SCAN	-
K	TIME	TIME RATE OF CHANGE	-
L	LEVEL	LIGHT	LOW
M	MOISTURE (HUMIDITY)	MOMENTARY	MEDIUM / MIDDLE
N	-	-	-
O	-	ORIFICE	OPEN
P	PRESSURE	POINT (TEST) CONNECTION	-
Q	QUANTITY	TOTALIZE / INTEGRATE	-
R	RADIATION	RECORDING / RECORDER	RECORDER
S	SPEED / FREQUENCY	SWITCH	SWITCH
T	TEMPERATURE	TRANSMITTER	TRANSMITTER
U	MULTIVARIABLE	MULTIFUNCTION	MULTIFUNCTION
V	MECHANICAL ANALYSIS	VALVE	VALVE
W	WEIGHT / FORCE	WELL	-
X	-	-	-
Y	EVENT	COMPUTE / CONVERT	RELAY
Z	POSITION	DRIVE	-

PFD/PID PIPELINE TERMINOLOGY			
NOMINAL PIPE SIZE, INCHES		COMMODITY	
3"-TW	COMMODITY	BWR - BACKWASH RETURN	PW - PLANT WATER
		BWS - BACKWASH SUPPLY	RC - REACTOR CARBON
		CA - COMPRESSED AIR	RF - RESIN FILL
		EFF - EFFLUENT	RO - RESIN OUT
		FC - FLUSH CONNECTION	RW - RAW WATER
		GAC - GRANULAR ACTIVATED CARBON	SC - SPENT CARBON
		INF - INFLUENT	SP - SAMPLE PORT
		IX - ION EXCHANGE	TW - TREATED WATER
		PSE - PRESSURE SAFETY ELEMENT	V - VENT

EQUIP TAG LEADERS	
A	AGITATOR
B	BLOWER
BF	BUTTERFLY VALVE
BV	BALL VALVE
CV	CHECK VALVE
COM	COMPRESSOR
D	DRYER
E	HEATER/ HEAT EXCHANGER
F	FILTER/ STRAINER
GC	CARBON BED
HV	HAND VALVE
IC	ISEP CELLS
IV	ISEP VALVE
IT	ISEP TURNTABLE
IX	ION EXCHANGE
MX	STATIC MIXER
P	PUMP
PR	PRESSURE RELIEF
PV	PRESSURE VESSEL
R	REACTOR
RV	ROOF VENTILATOR
TK	TANK
WS	WATER SOFTENER

PFD/PID ACTUATORS	
	PNEUMATIC ACTUATOR & POSITIONER
	SOLENOID ACTUATOR
	PNEUMATIC ACTUATOR
	MOTORIZED ACTUATOR
	PRESSURE CONTROL ACTUATOR
	BACK PRESSURE ACTUATOR

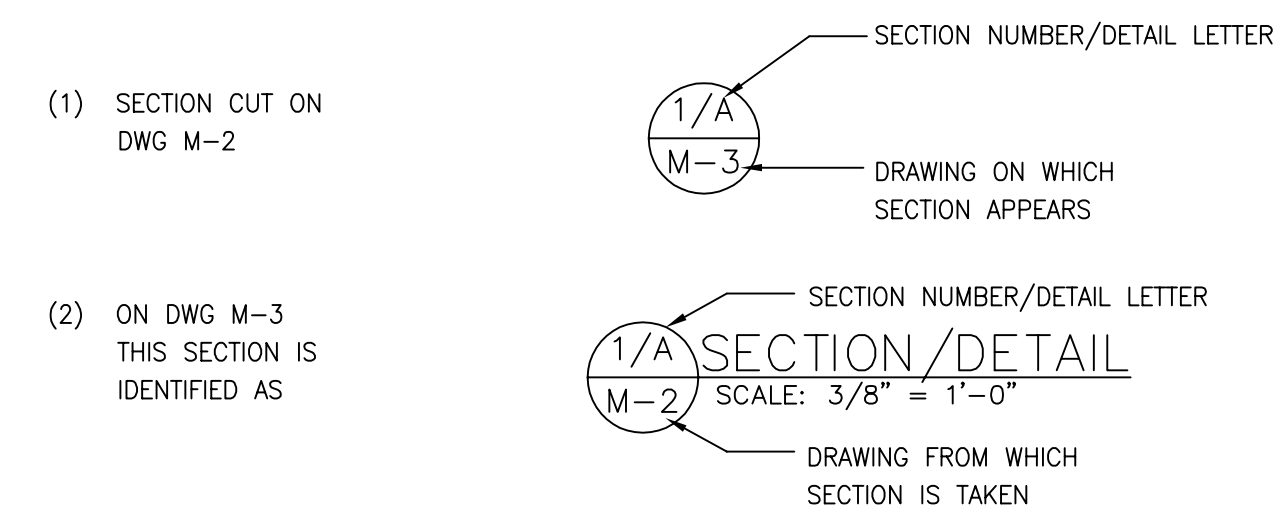
GENERAL ABBREVIATIONS	
ABBREV	DESCRIPTION
ABAND'D	ABANDONED
AB	ANCHOR BOLT
ABBR	ABBREVIATIONS
ABC	AGGREGATE BASE COURSE
AC	ASPHALTIC CONCRETE
ACP	ASBESTOS CEMENT PIPE
ACS	CARBONIC ACID SOLUTION
ADJ	ADJUSTABLE
AF	ANALYTICAL FILTER
ALUM	ALUMINUM
APPROX	APPROXIMATE
ARV	AIR RELEASE VALVE
AUTO	AUTOMATIC
AUX	AUXILIARY
AVE	AVENUE
AVG	AVERAGE
AVRV	COMBINATION AIR AND VACUUM RELEASE VALVE
@	BEGIN CURVE
BCV	BALL CHECK VALVE
BF	BLOW OFF FLANGE
BFP	BACK FLOW PREVENTER
BLDG	BUILDING
BLK	BLOCK
BM	BENCH MARK OR BEAM
BO	BLOW OFF ASSEMBLY
BOD	BIOCHEMICAL OXYGEN DEMAND
BRG	BEARING
BRKR	BREAKER
BW	BACKWASH
BWR	BACKWASH RETURN
BWS	BACKWASH SUPPLY
BV	BUTTERFLY VALVE
CA	CONCRETE ANCHOR/COMPRESSED AIR
CB	CATCH BASIN
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHKD PL	CHECKERED PLATE
CI	CAST IRON
CIP	CAST IRON PIPE
CJ	CONSTRUCTION JOINT
CL	CENTER LINE, CLASS
CLR	CLEAR OR CLEARANCE
CML&C	CEMENT MORTAR LINED AND COATED
CMLCSP	CEMENT LINED CARBON STEEL PIPE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
CO2	CARBON DIOXIDE
COMPR	COMPRESSOR
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUE
COORD	COORDINATE
CPLG	COUPLING
CTF	CUT TO FIT
CUP	COPPER PIPE
Δ	DELTA (ANGLE)
DET	DETAIL
DI	DUCTILE IRON
DIA OR Ø	DIAMETER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DIST	DISTRIBUTION
DMPR	DAMPER
DN	DOWN
DWG	DRAWING
E	EAST OR BURIED ELECTRICAL
EA	EACH
EC	END CURVE
ECC	ECCENTRIC
EF	EACH FACE
EFF	EFFLUENT
EJ	EXPANSION JOINT
EL	ELEVATION
ELB	ELBOW
ELEC	ELECTRIC (AL) ENGINEER
ENGR	ENGINEER
EOP	EDGE OF PAVEMENT
EQ	EQUAL
E/P	EDGE OF PIPE
ESMT	EXISTING
E/W	EAST/WEST
EW	EACH WAY
EX, EXIST	EXISTING
EXP	EXPANSION
FBR	FLUIDIZED BED REACTOR
FC	FLUSH CONNECTION
FCA	FLANGE COUPLING ADAPTER
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FDN	FOUNDATION
FG	FINISH GRADE
FH	FIRE HYDRANT
FI	FLOW INDICATOR
FIG	FIGURE
FIT	FLOW INDICATOR TOTALIZER/ FLOW INDICATOR TRANSMITTER
REINF	REINFORCEMENT
FF	FINISH FLOOR
FLEX	FLEXIBLE
FLG	FLANGE, FLANGED
FLGA	FLANGE ADAPTER
FL	FLOW LINE
FMH	FLEXIBLE METAL HOSE
FO	FIBER OPTIC
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET
GA	GAGE OR GAUGE
GALV	GALVANIZED(D)
GB	GRADE BREAK
GCD	GAS, CARBON DIOXIDE
GPM	GALLONS PER MINUTE
GATE VALVE	GATE VALVE
GWTP	GLENDALE WATER TREATMENT PLANT
H	HEIGHT
HB	HOSE BIB
HORIZ	HORIZONTAL
HP	HIGH POINT OR HORSEPOWER
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
INCH	INCH
IN OR "</td <td>IN OR "</td>	IN OR "
INF	INFLUENT
INV	INVERT
IP	IRON PIPE
IRRIGATION	IRRIGATION
IX	ION EXCHANGE
JOINT	JOINT
LB	POUND(S)
LP	LOW POINT
LT	LEFT
M	METER
MATL	MATERIAL
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MW	MOTIVE WATER
N	NORTH
NA	NOT APPLICABLE
NO OR #	NUMBER
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
ON CENTER	ON CENTER
OCL	OPEN-CLOSE
OD	OUTSIDE DIAMETER
OH	OVERHANG
OHE	OVERHEAD ELECTRIC
OPNG	OPENING
PDI	PRESSURE DIFFERENTIAL INDICATOR
PDSH	PRESSURE DIFFERENTIAL SWITCH HIGH
PE	PLAIN END
PI	PRESSURE INDICATOR OR POINT OF INTERSECTION
PIT	PRESSURE INDICATOR TRANSMITTER
PL	PROPERTY LINE OR PLATE
PNL	PANEL
PRD	PRESSURE RUPTURE DISC
PRV	PRESSURE REDUCING VALVE
PSH	PRESSURE SWITCH HIGH
PSI	POUND PER SQUARE INCH
PSIG	POUND PER SQUARE INCH GAS
PSL	PRESSURE SWITCH LOW
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
R	RIGHT/RADIUS
RC	REACTOR/RAW CARBON
RCP	REINFORCED CONCRETE PIPE
RED	REDUCER
REF	REFERENCE
REINFC	REINFORCEMENT
REQ	REQUIRED
REV	REVISION OR REVERSE ACTING
RF	RESIN FILL
RO	RESIN OUT
RPMP	REINFORCED PLASTIC MORTAR PIPE
RT	RT
R/W	RIGHT-OF-WAY
RW	RAW WATER
S	SOUTH
SC	SPENT CARBON
SCH/SCHED	SCHEDULE
SD	STORM DRAIN
SHT	SHEET
SP	SAMPLE PORT
SPEC	SPECIFICATION
SQ	SQUARE
SR	SPENT RESIN VACUUM
SRVC	SERVICE
SS	SANITARY SEWER
SST	STAINLESS STEEL
STA	STATION
STD	STANDARD
STL	STEEL
STR	STRUCTURAL
SYMM	SYMMETRICAL
T/TEL	TELEPHONE SERVICE OR TELEPHONE
T&B	TOP & BOTTOM
TC	TOP OR CONCRETE OR CURB
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TFR	TRANSFORMER
THK	THICK
THRU	THROUGH
TW	TREATED WATER
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VENT
VAR	VARIES
VCP	VITRIFIED CLAY PIPE
VLV	VALVE
VERT	VERTICAL
XLPE	LOW DENSITY POLYPROPYLENE
WM	WATER METER
W	WEST
W/	WITH
W/O	WITHOUT
WS	WELDED STEEL
WTR	WELDED STEEL PIPE
WWR	WATER
WWF	WELDED WIRE FABRIC

INSTRUMENT OR FUNCTION SYMBOLS			
	DISCRETE INSTRUMENTS	PROGRAMMABLE LOGIC CONTROL	SHARED DISPLAY SHARED CONTROL
FIELD MOUNTED			
PRIMARY (PANEL) LOCATION			
AUXILIARY LOCATION			
BEHIND PANEL			

	INSTRUMENT TAG LEADER		PILOT LIGHT
	SUPPLEMENTARY INSTRUMENT TAG LETTER		INTERLOCK
	INSTRUMENT TAG NUMBER		

CIVIL LEGEND	
	PROPOSED WATER PIPELINE
	GATE VALVE
	PROPOSED EASEMENT
	CONSTRUCTION LIMIT
	CHANGE IN PIPE MATERIAL
	EXIST OVERHEAD ELECTRIC
	EXIST UNDERGROUND ELECTRIC
	EXIST STORM DRAIN
	EXIST WATER
	EXIST ABANDONED WATER LINE
	EXIST TELEPHONE/COMMUNICATIONS LINE
	EXIST GAS LINE
	EXIST TV/CABLE
	EXIST ROW/PROPERTY LINE
	APPROXIMATE BORING LOCATION
	HORIZONTAL CONTROL POINT
	PROPOSED CONTOUR LINE
	EXISTING CONTOUR LINE
	EXISTING MANHOLE
	EXIST UTILITY POLE
	EXISTING FACILITIES
	FUTURE FACILITIES
	PIPING, EQUIPMENT, ETC. TO BE REMOVED OR DEMOLISHED
	CONCRETE
	NATIVE SOIL
	EASEMENT

SECTION AND DETAILS IDENTIFICATION SYSTEM



BENCHMARK INFORMATION

- NOTES:
- OTHER THAN THOSE SHOWN, SYMBOLS EMPLOYED ON MECHANICAL DRAWINGS ARE AS SET FORTH IN ANSI Z32.2.3, ANSI Z32.2.4, AND ANSI Y32.11.
 - SYMBOLS FOR UNITS OF WEIGHT, LENGTH, TIME, ENERGY AND QUANTITY ARE AS SET FORTH IN ANSI Y10.19, UNLESS NOTED OTHERWISE. ALL UNITS ARE BASED UPON ENGLISH SYSTEM OF MEASUREMENT.

PIPING, VALVES AND APPURTENANCES

DOUBLE LINE	SINGLE LINE
	ABOVE GROUND PIPING
	BELOW GROUND PIPING
	BUTTERFLY VALVE
	CHECK VALVE
	BALL VALVE
	GATE VALVE
	GLOBE VALVE
	STRAINER
	PRESSURE REGULATING
	BALL CHECK
	BUTTERFLY VALVE
	REDUCER
	AIR RELEASE
	SAMPLE TAP

MECHANICAL AND PID LEGEND

	EQUIPMENT IDENTIFICATION
	VALVE IDENTIFICATION
* INDICATES EQUIPMENT FURNISHED BY OTHERS.	

PFD/PID LINE LEGEND

	MAIN FLOW
	EXISTING FLOW
	UTILITY FLOW
	INSTRUMENT AIR
	CAPILLARY TUBING
	ELECTRICAL
	SOFTWARE

DATE: DEC 2009

REVISED TO CONFORM TO CONSTRUCTION RECORDS PROVIDED BY CONTRACTOR

BY: _____

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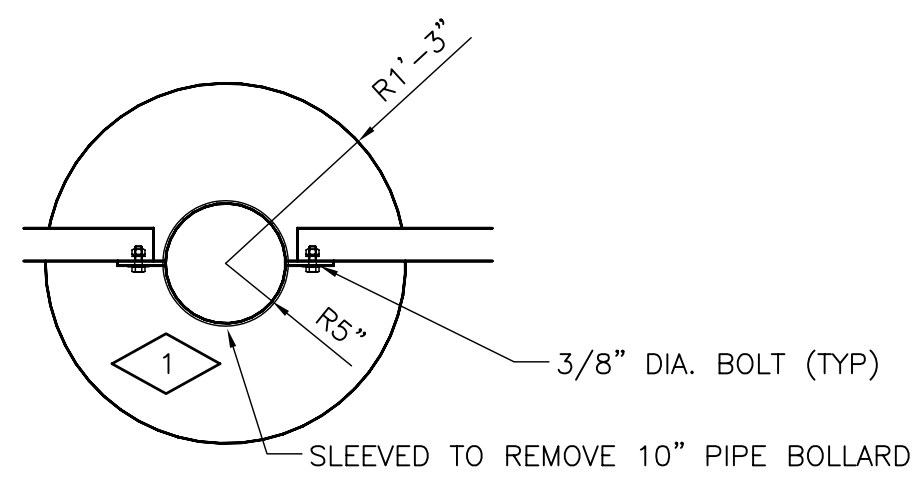
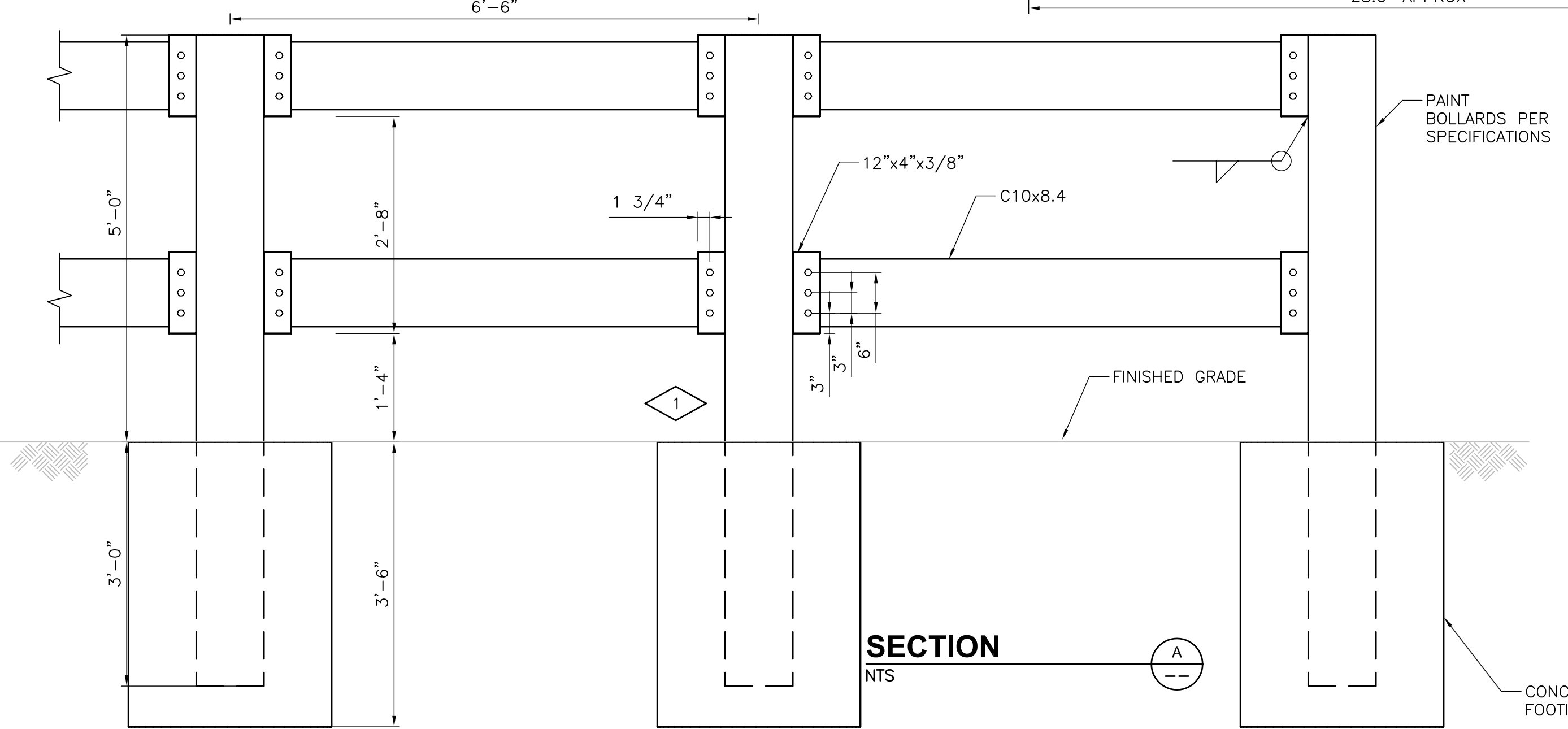
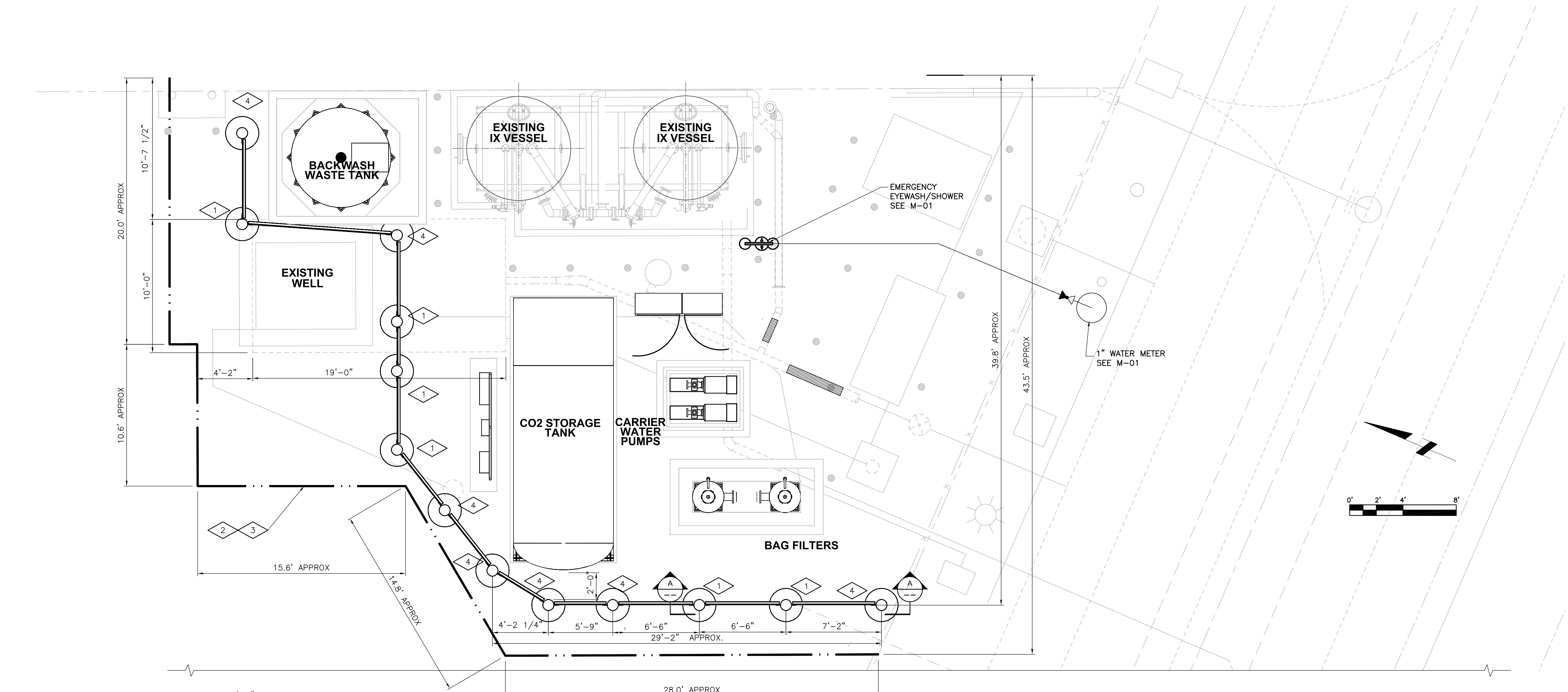
WBA CHROMIUM REMOVAL DEMONSTRATION FACILITY LOS ANGELES, CALIFORNIA

LEGENDS, SYMBOLS, AND ABBREVIATIONS

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	WBA_G-02.dwg
SHEET NO.	2
DRAWING NO.	G-02

PROJECT START DATE (M/Y) DEC 2009
 PROJECT NO. 106560
 FILENAME WBA_G-02.dwg
 SHEET NO. 2
 DRAWING NO. G-02

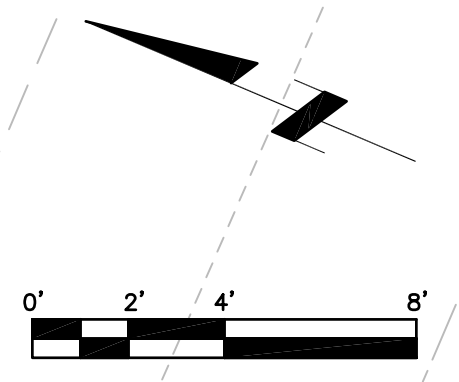
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- PLAN NOTES**
- 1 REMOVABLE BOLLARDS MARKED.
 - 2 TEMPORARY CONSTRUCTION FENCE
 - 3 PROPOSED EASEMENT BOUNDARY
 - 4 FILL PERMANENT BOLLARDS WITH CONCRETE AND PROVIDE SMOOTH CAP AT TOP

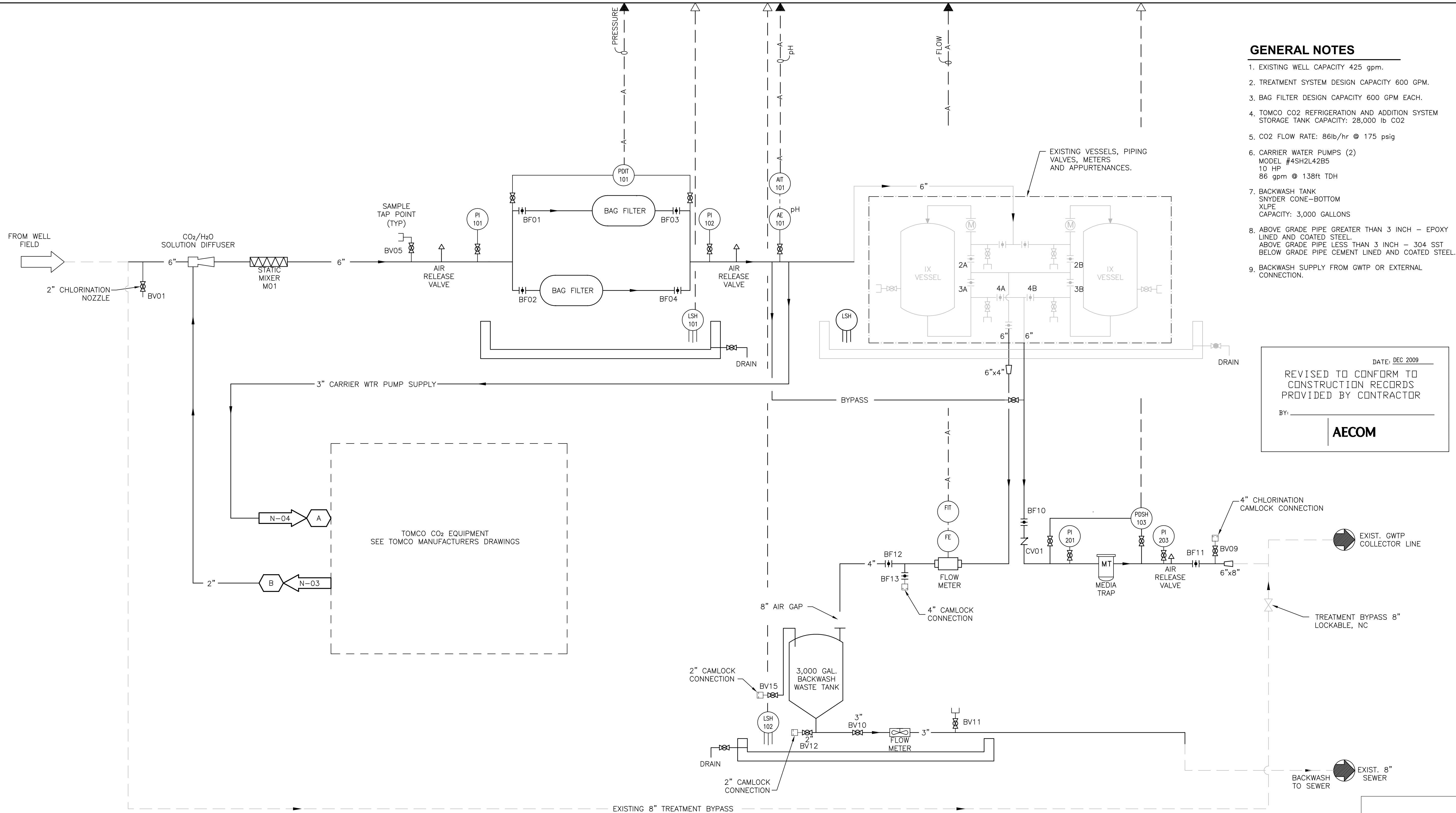
NOTE:
 THE LOCATION OF BOLLARDS ARE PRELIMINARY. THE EXACT LOCATION WILL BE DETERMINED IN THE FIELD AFTER THE WBA FACILITIES ARE INSTALLED. FINAL LOCATION WILL BE IDENTIFIED AFTER WRITTEN APPROVAL BY RALPH GROCERY COMPANY.

DATE: DEC 2009
 REVISED TO CONFORM TO CONSTRUCTION RECORDS PROVIDED BY CONTRACTOR
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AECOM 300 OCEANGATE SUITE 700 LOS ANGELES, CA 90005 T: 659.851.2000 F: 562.495.9257 WWW.AECOM.COM		WBA CHROMIUM REMOVAL DEMONSTRATION FACILITY LOS ANGELES, CALIFORNIA FENCING PLAN AND CIVIL DETAILS
PROJECT START DATE (M/Y) 04/2009	PROJECT NO. 106560	FILENAME 10M01-ALT.dwg
SHEET NO. 3	DRAWING NO. CF-01	PROJECT DESCRIPTION RECORD DRAWING
DRN BY: _____ DES BY: _____ DMA: _____ APP BY: _____ EL: _____	CHECK BY: _____ AMG: _____	1 REV DESCRIPTION
VERIFY SCALE IF PLAN SHEET IS REDUCED	1"=1'-0"	DATE (M/Y) DEC 2009

CONTROL PANEL



GENERAL NOTES

- EXISTING WELL CAPACITY 425 gpm.
- TREATMENT SYSTEM DESIGN CAPACITY 600 GPM.
- BAG FILTER DESIGN CAPACITY 600 GPM EACH.
- TOMCO CO2 REFRIGERATION AND ADDITION SYSTEM STORAGE TANK CAPACITY: 28,000 lb CO2
- CO2 FLOW RATE: 86lb/hr @ 175 psig
- CARRIER WATER PUMPS (2)
MODEL #4SH2L42B5
10 HP
86 gpm @ 138ft TDH
- BACKWASH TANK
SNYDER CONE-BOTTOM
XLPE
CAPACITY: 3,000 GALLONS
- ABOVE GRADE PIPE GREATER THAN 3 INCH - EPOXY LINED AND COATED STEEL
ABOVE GRADE PIPE LESS THAN 3 INCH - 304 SST
BELOW GRADE PIPE CEMENT LINED AND COATED STEEL.
- BACKWASH SUPPLY FROM GWTP OR EXTERNAL CONNECTION.

DATE: DEC 2009
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 CONSTRUCTION RECORDS
 PROVIDED BY CONTRACTOR
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DRN BY:	DMA:	DES BY:	SJO:	CHK BY:	EL:	APP BY:	REV:	DESCRIPTION:
							1	RECORD DRAWING

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**WBA CHROMIUM
 REMOVAL DEMONSTRATION FACILITY
 LOS ANGELES, CALIFORNIA**

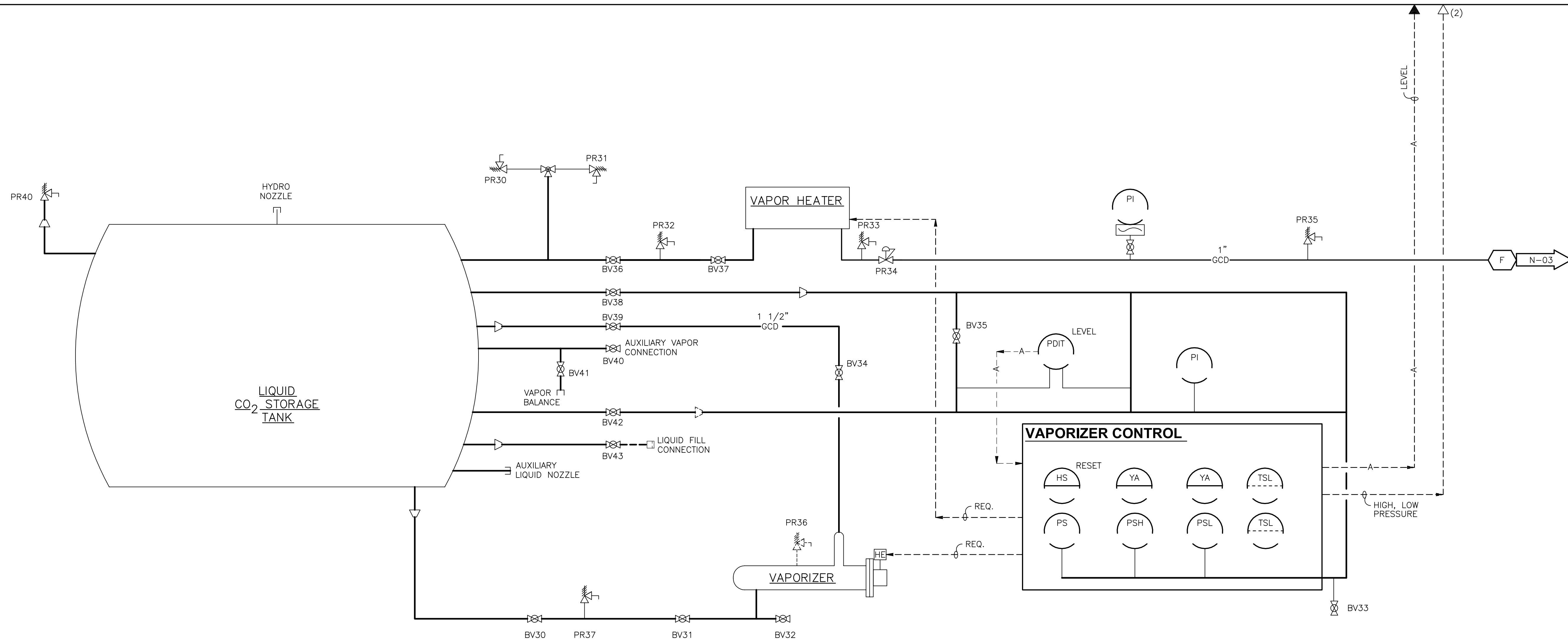
P & ID - FILTERS, VESSELS AND BACKWASH

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	09N01.dwg
SHEET NO.	4
DRAWING NO.	N-01

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VERIFY SCALE IF PLAN SHEET IS REDUCED

CONTROL PANEL



GENERAL NOTES

1. ALL PIPING ON THIS SHEET BY VENDOR

DATE: DEC 2009
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 CONSTRUCTION RECORDS
 PROVIDED BY CONTRACTOR
 BY: _____
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DRN	CHK	EDL	DEC 2009
APP	EL	1	RECORD DRAWING
DES	SJO		
DMA			

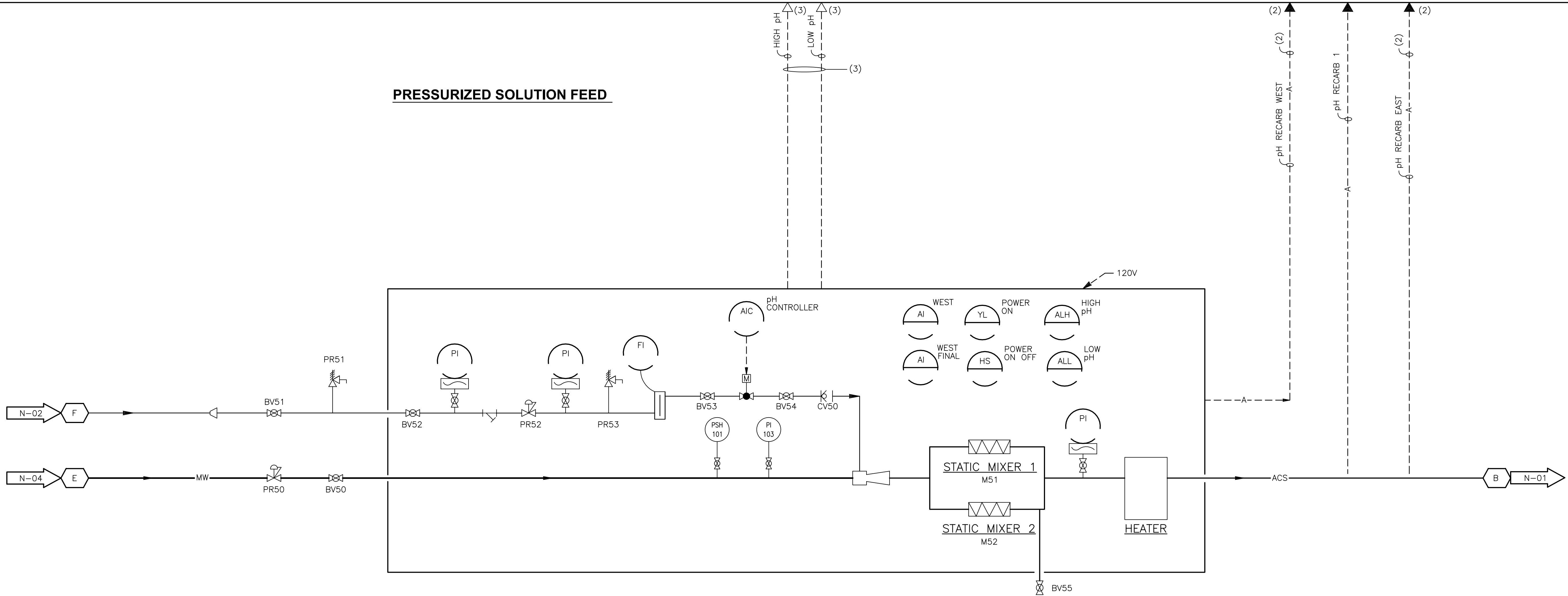
DRN	CHK	EDL	DEC 2009
APP	EL	1	RECORD DRAWING
DES	SJO		
DMA			

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PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	09N02.dwg
SHEET NO.	5
DRAWING NO.	N-02

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Plotted By: mittelsteadtk
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PRESSURIZED SOLUTION FEED

DATE: DEC 2009
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 CONSTRUCTION RECORDS
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 BY: _____
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DRN BY:	DES BY:	CHK BY:	APP BY:	REV	DESCRIPTION
EL	EL	EL	EL	1	RECORD DRAWING

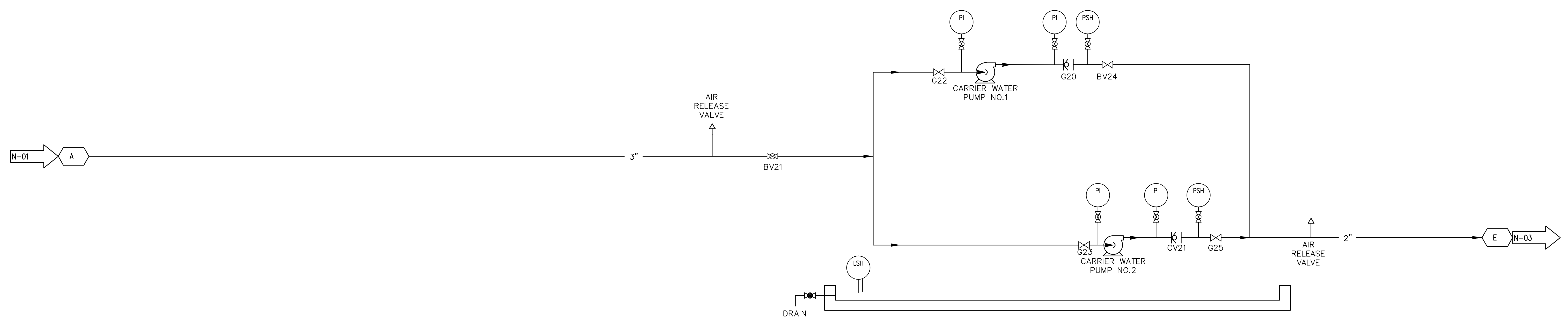
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**WBA CHROMIUM
 REMOVAL DEMONSTRATION FACILITY
 LOS ANGELES, CALIFORNIA**

P & ID - CO2 PANEL

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	09N03.dwg
SHEET NO.	6
DRAWING NO.	N-03

CONTROL PANEL



DATE: DEC 2009
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 BY: _____
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DRN BY:	EL	REV	DESCRIPTION
DMA:			
DES BY:			
SJO:			
CHK BY:			
EL:			
APP BY:	1	RECORD DRAWING	
	KAM	EDL	DEC 2009
	DRN	CHK	DATE (MDY)

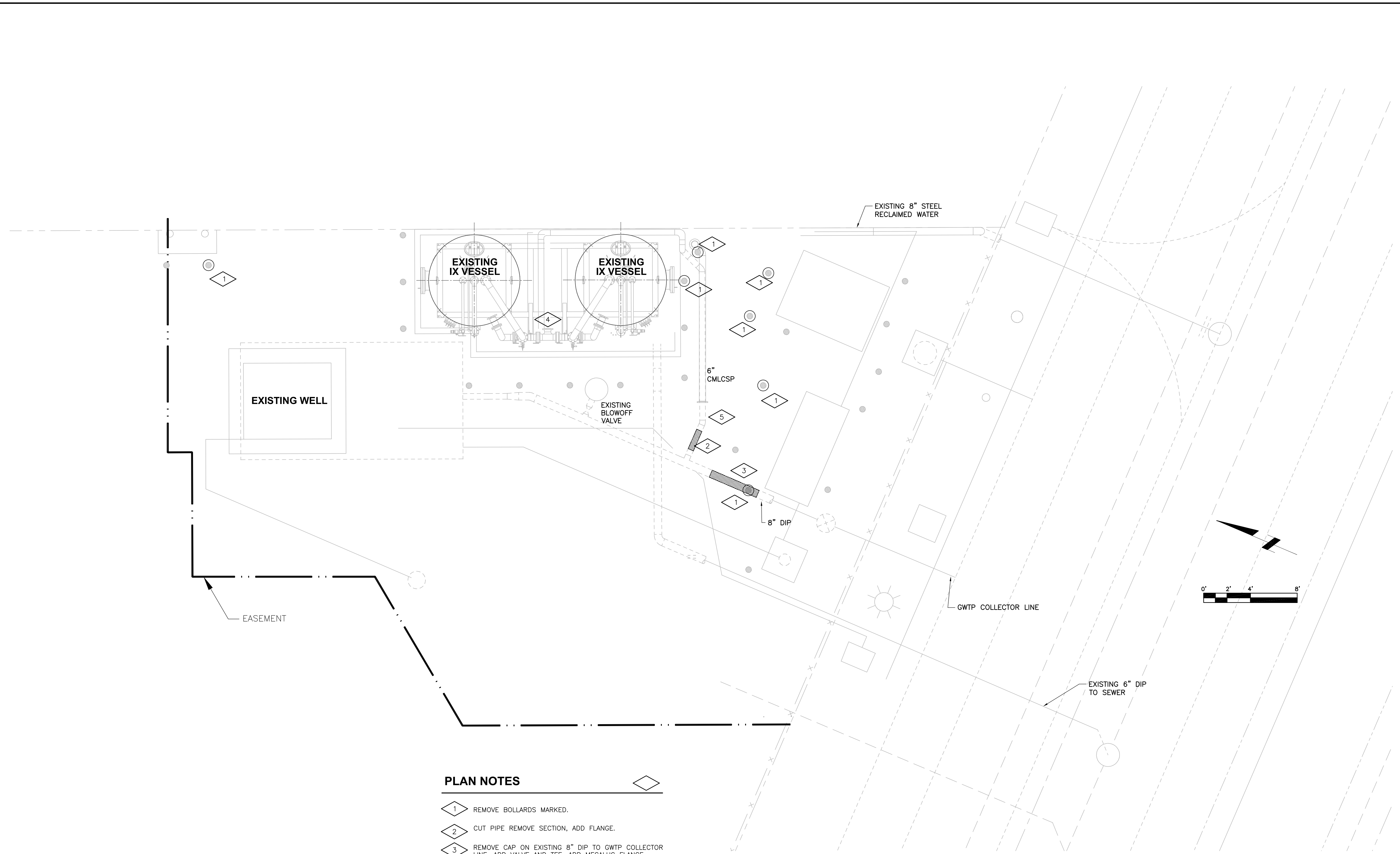
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**WBA CHROMIUM
 REMOVAL DEMONSTRATION FACILITY
 LOS ANGELES, CALIFORNIA**
P & ID - CARRIER WATER PUMPS

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	09N04.dwg
SHEET NO.	7
DRAWING NO.	N-04

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 Layout--Sheet Name: WBA_LR-01
 Filename: L:\WORK\PROJECTS\106560\GRA\WBA\10M01-ALT.DWG



PLAN NOTES

- 1 REMOVE BOLLARDS MARKED.
- 2 CUT PIPE REMOVE SECTION, ADD FLANGE.
- 3 REMOVE CAP ON EXISTING 8" DIP TO GWTP COLLECTOR LINE, ADD VALVE AND TEE, ADD MEGALUG FLANGE ADAPTER FOR VALVE CONNECTIONS.
- 4 REMOVE PIPES AT FLANGES
- 5 CUT PIPE, REMOVE SECTION, ADD FLANGE TO REUSE EXISTING UNDERGROUND PIPE.

DATE: DEC 2009
 REVISED TO CONFORM TO
 CONSTRUCTION RECORDS
 PROVIDED BY CONTRACTOR
 BY: _____
AECOM

DRN BY:	DMA	DES BY:	DMA	CHK BY:	DMA	APP BY:	AMG	EL
						1	RECORD DRAWING	

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**WBA CHROMIUM
 REMOVAL DEMONSTRATION FACILITY
 LOS ANGELES, CALIFORNIA**

REMOVAL PLAN

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	10M01-ALT.dwg
SHEET NO.	9
DRAWING NO.	R-01

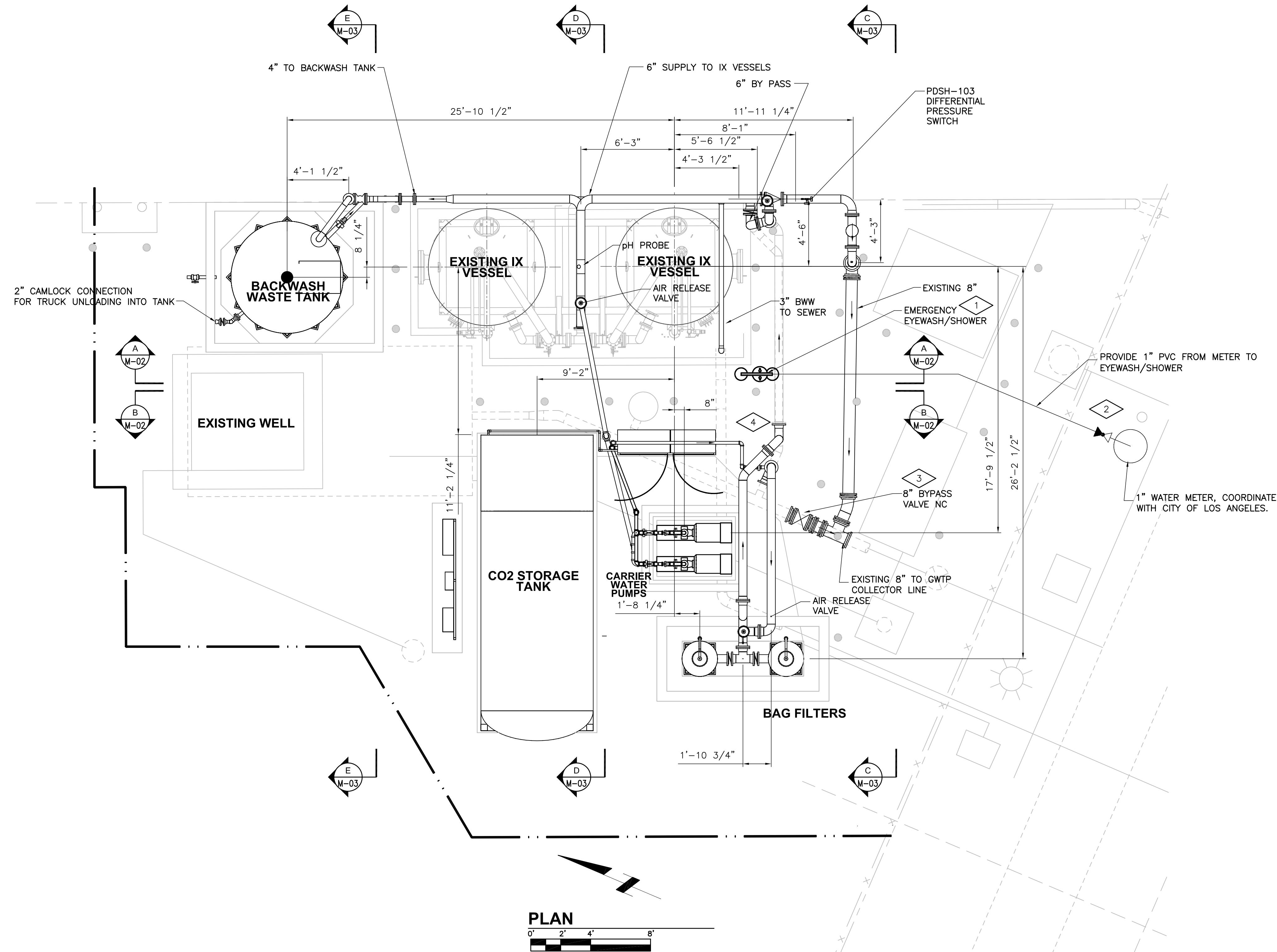
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						1	RECORD DRAWING	

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						1	RECORD DRAWING	

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						1	RECORD DRAWING	

DRN BY:	DMA	DES BY:	DMA	CHK BY:	DMA	APP BY:	AMG	EL
						1	RECORD DRAWING	

Plotted By: armitaged
 Plot File Date Created: Jan/04/2010 8:19 AM
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 Filename: L:\WORK\PROJECTS\106560\GRA\WBA\RECORD DRAWINGS\10M01-ALT.DWG



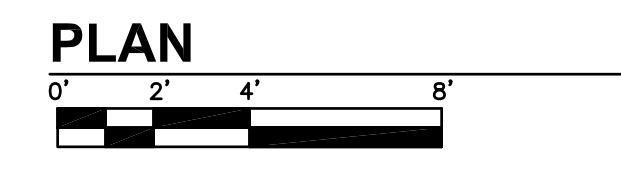
PLAN NOTES

- 1 PROVIDE EYEWASH/SHOWER WITH HOSE BIB.
- 2 PROVIDE VALVE BOXES AND STEM EXTENSIONS TYLER MODEL 6860, SIZE G, 3 PC, SCREW TYPE W/. 5 1/4" SHAFT AND NO TILT DROP COVER MARKED "WATER".
- 3 PROVIDE LOCKABLE GATE VALVE FOR BYPASS OF TREATMENT PROCESS.
- 4 MOUNT FLOOD LIGHTING ON PIPE SUPPORT. DIRECT LIGHTING AT CO2 PANEL.

GENERAL NOTES

- 1. SUBCONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
- 2. SUBCONTRACTOR SHALL PROVIDE VALVE CANS AND EXTENSIONS FOR ALL BURIED VALVES, PER CITY OF GLENDALE.
- 3. ABOVE GRADE PIPE: EPOXY LINED AND COATED STEEL.
 BELOW GRADE PIPE: CEMENT LINED AND COATED STEEL.

DATE: DEC 2009
 REVISED TO CONFORM TO CONSTRUCTION RECORDS PROVIDED BY CONTRACTOR
 BY: _____
AECOM



VERIFY SCALE IF PLAN SHEET IS REDUCED	
DRN BY:	EL
DMA	1
DES BY:	RECORD DRAWING
DMA	AMG
CHK BY:	AMG
APP BY:	AMG
DATE	DEC 2009
CHK	DRN
DESCRIPTION	

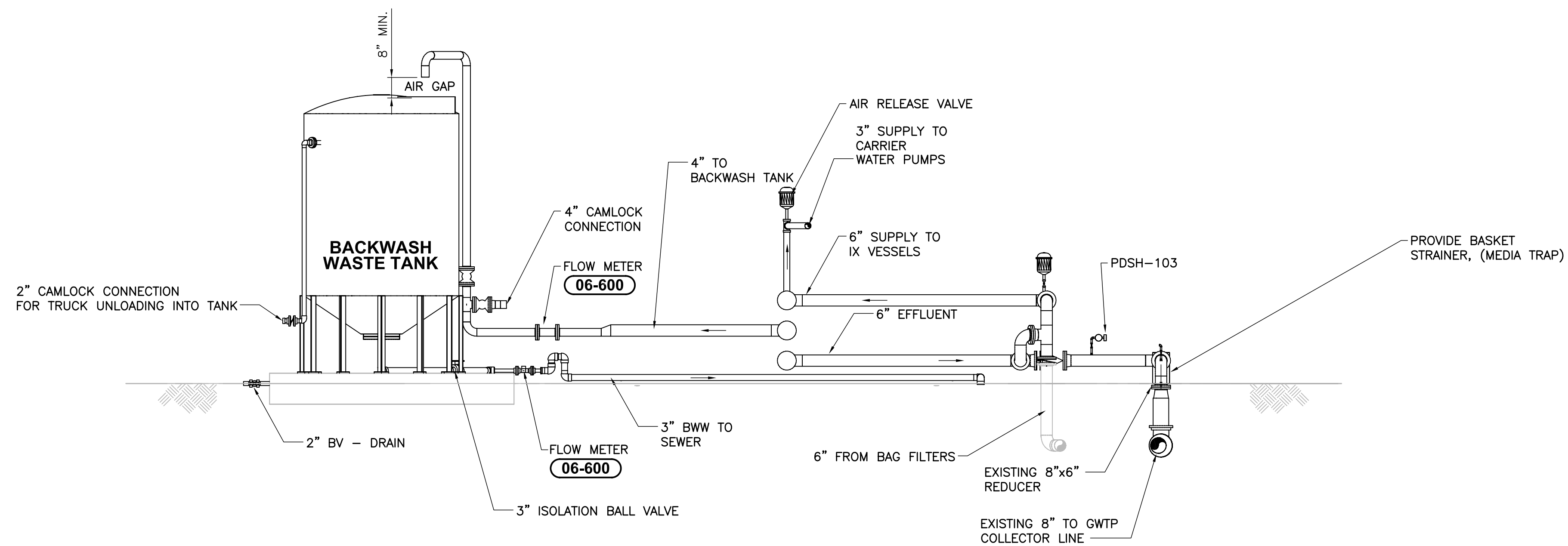
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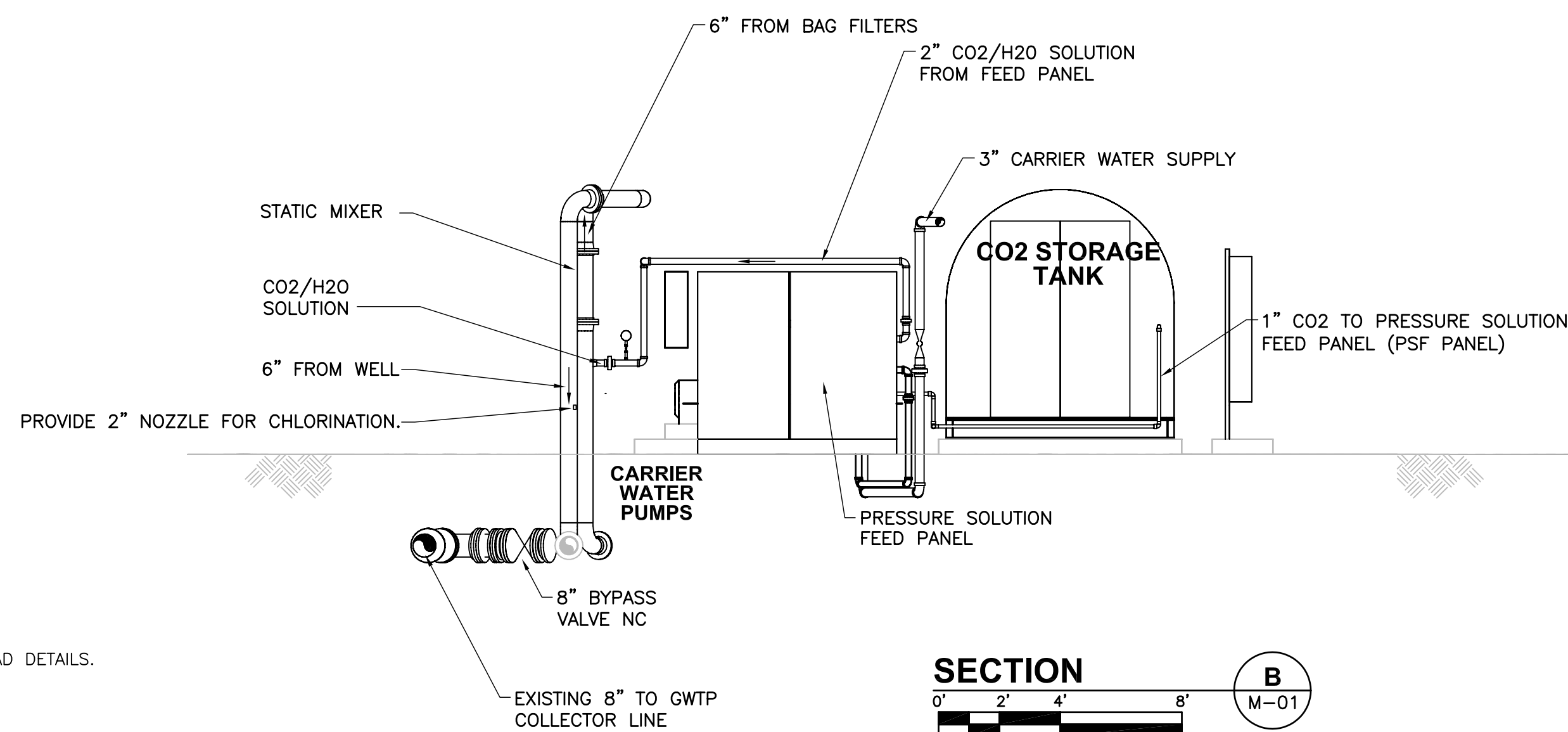
**WBA CHROMIUM
 REMOVAL DEMONSTRATION FACILITY
 LOS ANGELES, CALIFORNIA**

PLAN VIEW

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	10M01-ALT.dwg
SHEET NO.	10
DRAWING NO.	M-01



SECTION A
0' 2' 4' 8'
M-01



SECTION B
0' 2' 4' 8'
M-01

GENERAL NOTES

1. SEE DRAWING S-01 FOR EQUIPMENT PAD DETAILS.

DATE: DEC 2009
 REVISED TO CONFORM TO
 CONSTRUCTION RECORDS
 PROVIDED BY CONTRACTOR
 BY: _____
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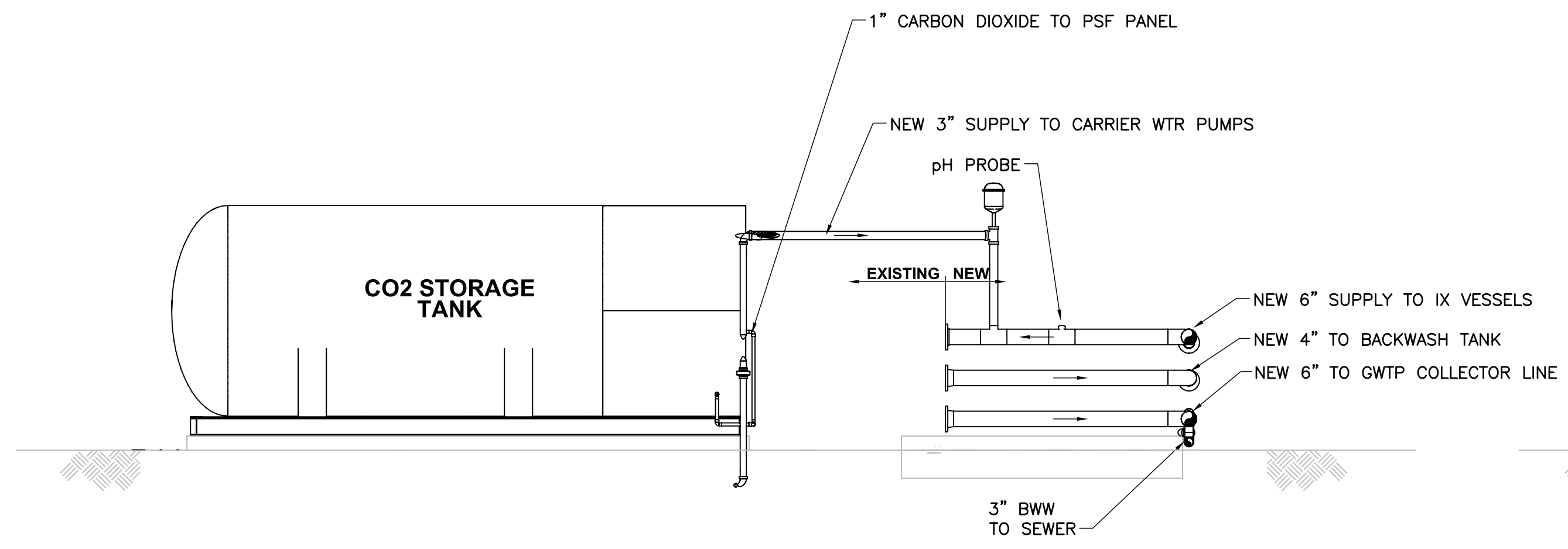
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								1	RECORD DRAWING

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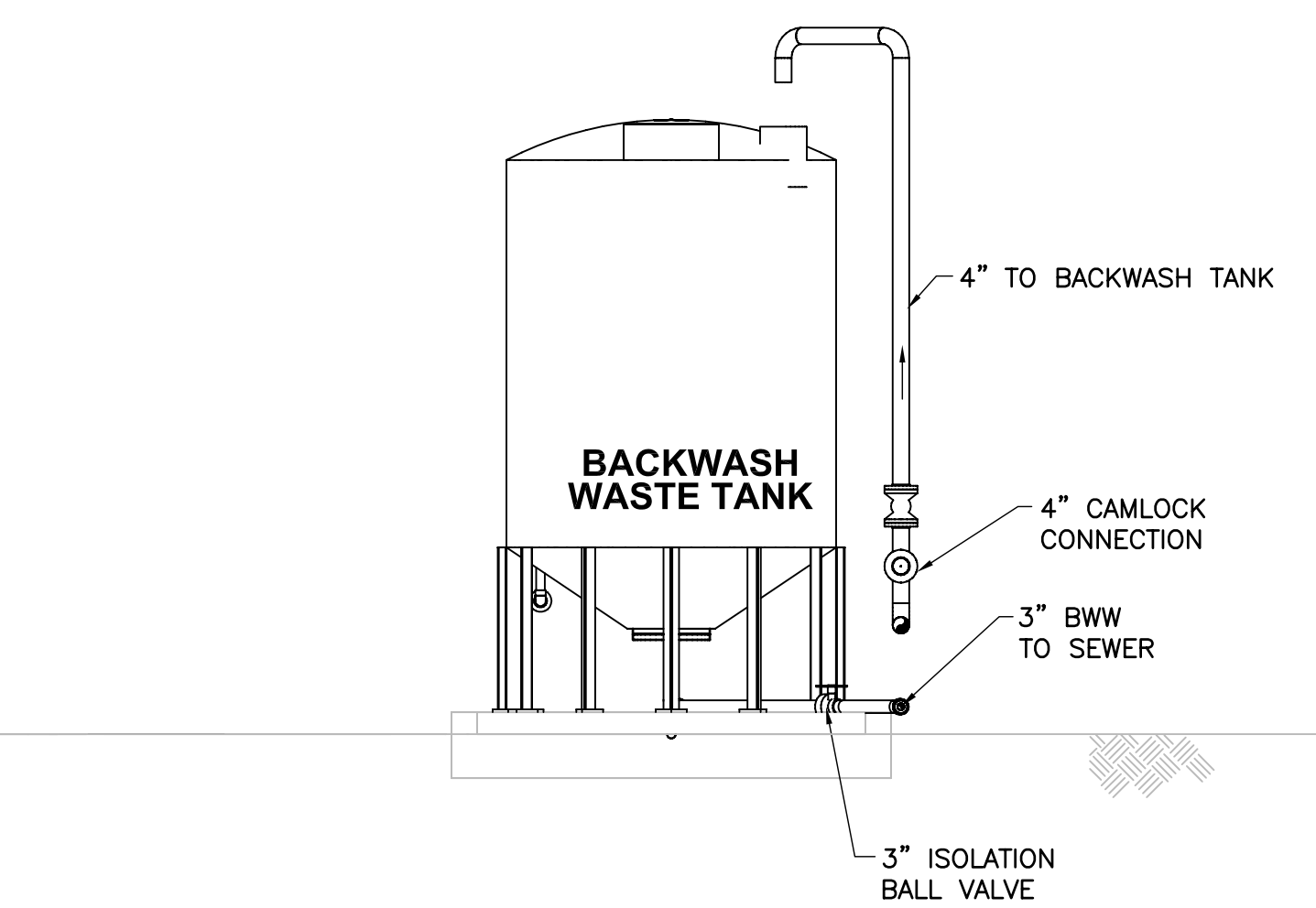
WBA CHROMIUM REMOVAL DEMONSTRATION FACILITY LOS ANGELES, CALIFORNIA	
SECTIONS A and B	
PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	10M01-ALT.dwg
SHEET NO.	11
DRAWING NO.	M-02

Plotted By: armifoged
 Plot File Date Created: Jan/04/2010 8:18 AM
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 Filename: L:\WORK\PROJECTS\106560\GRA\WBA\RECORD DRAWINGS\10M01-ALT.DWG

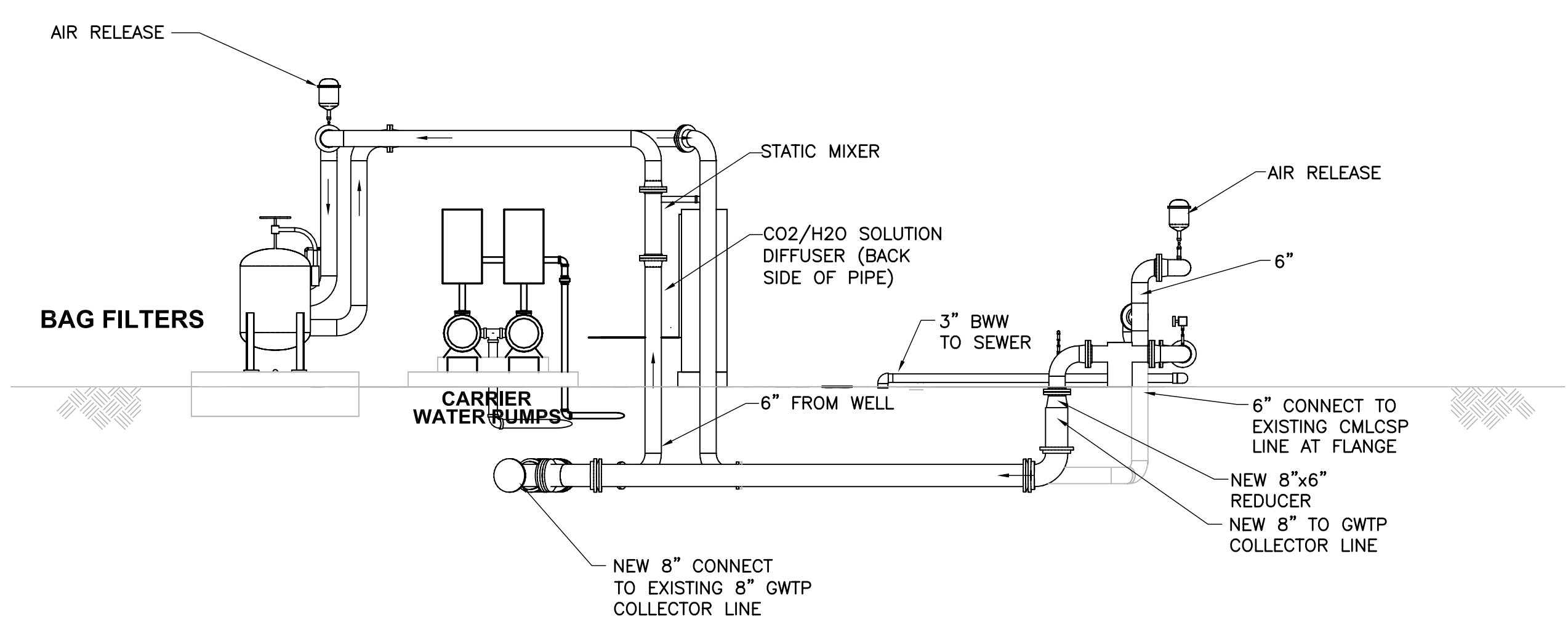
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 Layout--Sheet Name: WBA_M-03
 Filename: L:\WORK\PROJECTS\106560\GRA\WBA\RECORD DRAWINGS\10M01-ALT.DWG



SECTION D
 0' 2' 4' 8'
 M-01



SECTION E
 0' 2' 4' 8'
 M-01



SECTION C
 0' 2' 4' 8'
 M-01

GENERAL NOTES

1. SEE DRAWING S-01 FOR EQUIPMENT PAD DETAILS.

DATE: DEC 2009
 REVISED TO CONFORM TO
 CONSTRUCTION RECORDS
 PROVIDED BY CONTRACTOR
 BY: _____
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DRN BY:	DMA	DES BY:	DMA	CHK BY:	DMA	APP BY:	AMG	1	RECORD DRAWING	DESCRIPTION

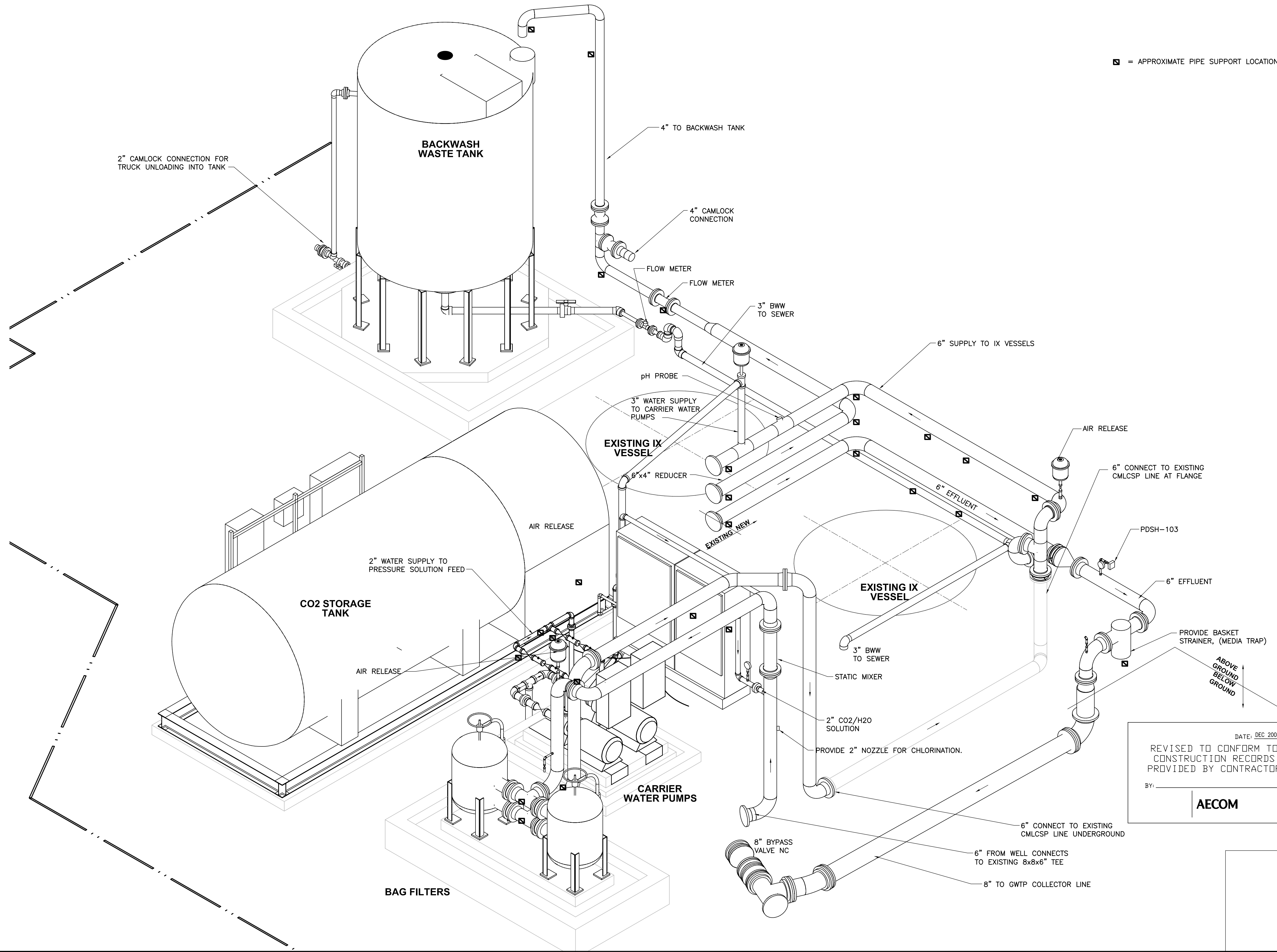
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**WBA CHROMIUM
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 LOS ANGELES, CALIFORNIA**

SECTIONS C, D and E

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	10M01-ALT.dwg
SHEET NO.	12
DRAWING NO.	M-03

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 Plot File Date Created: Jan/04/2010 8:17 AM
 Layout--Sheet Name: WBA_M-05.
 Filename: L:\WORK\PROJECTS\106560\GRA\WBA\RECORD DRAWINGS\10M01-ALT.DWG



☐ = APPROXIMATE PIPE SUPPORT LOCATION

DATE: DEC 2009
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 CONSTRUCTION RECORDS
 PROVIDED BY CONTRACTOR
 BY: _____
AECOM

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								1	RECORD DRAWING

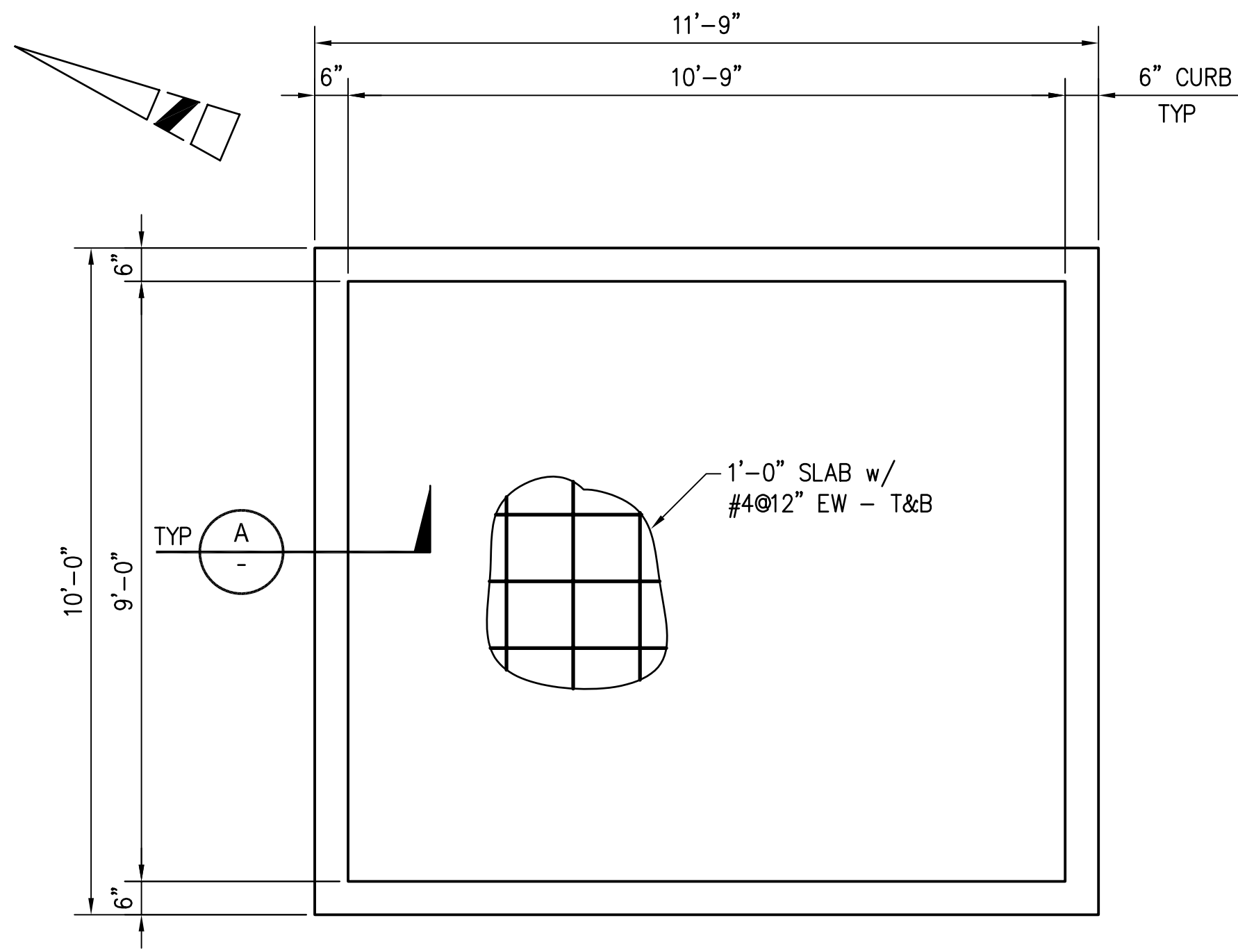
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**WBA CHROMIUM
 REMOVAL DEMONSTRATION FACILITY
 LOS ANGELES, CALIFORNIA**

ISO VIEW 2

PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	10M01-ALT.dwg
SHEET NO.	14
DRAWING NO.	M-05

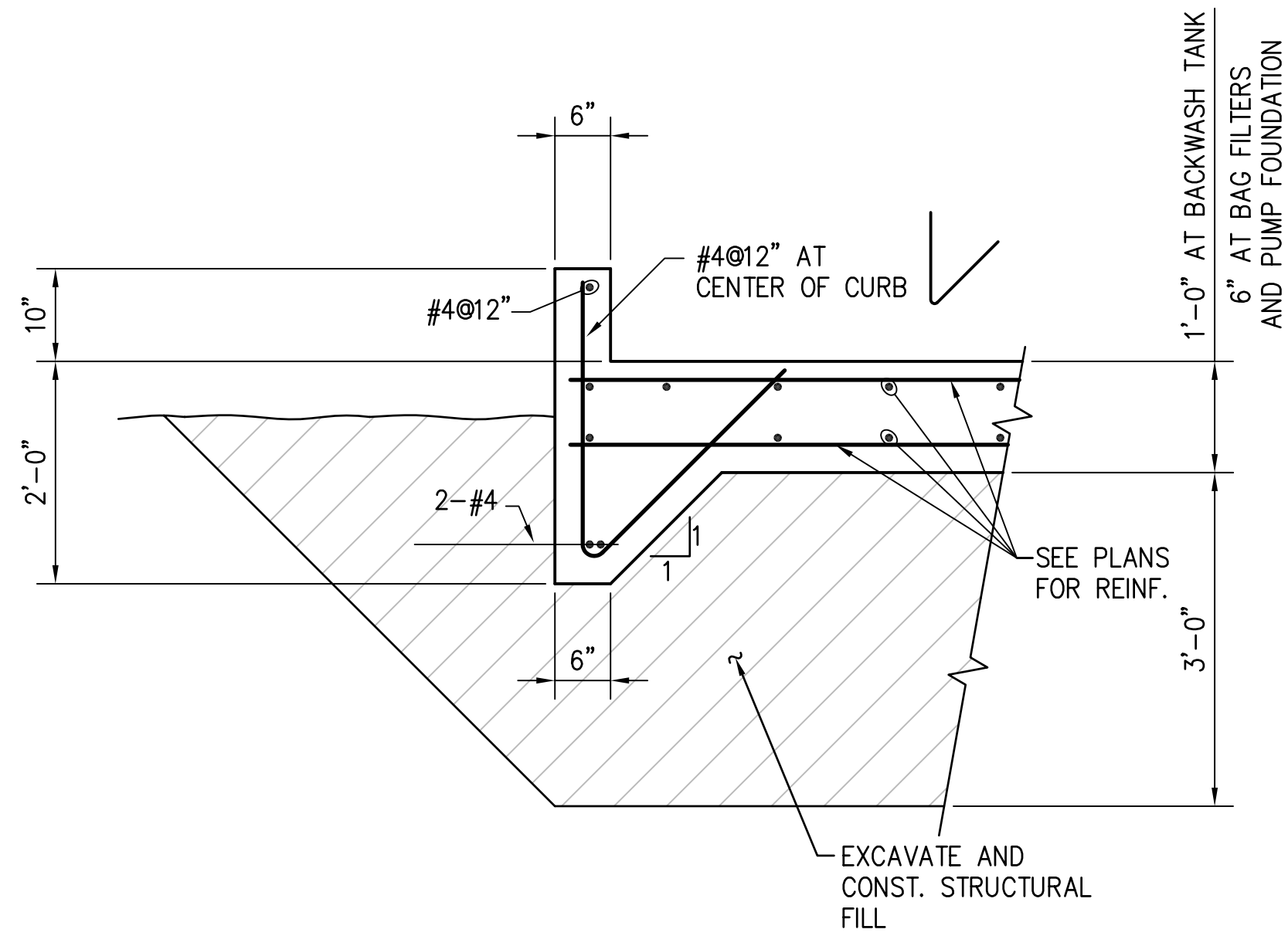
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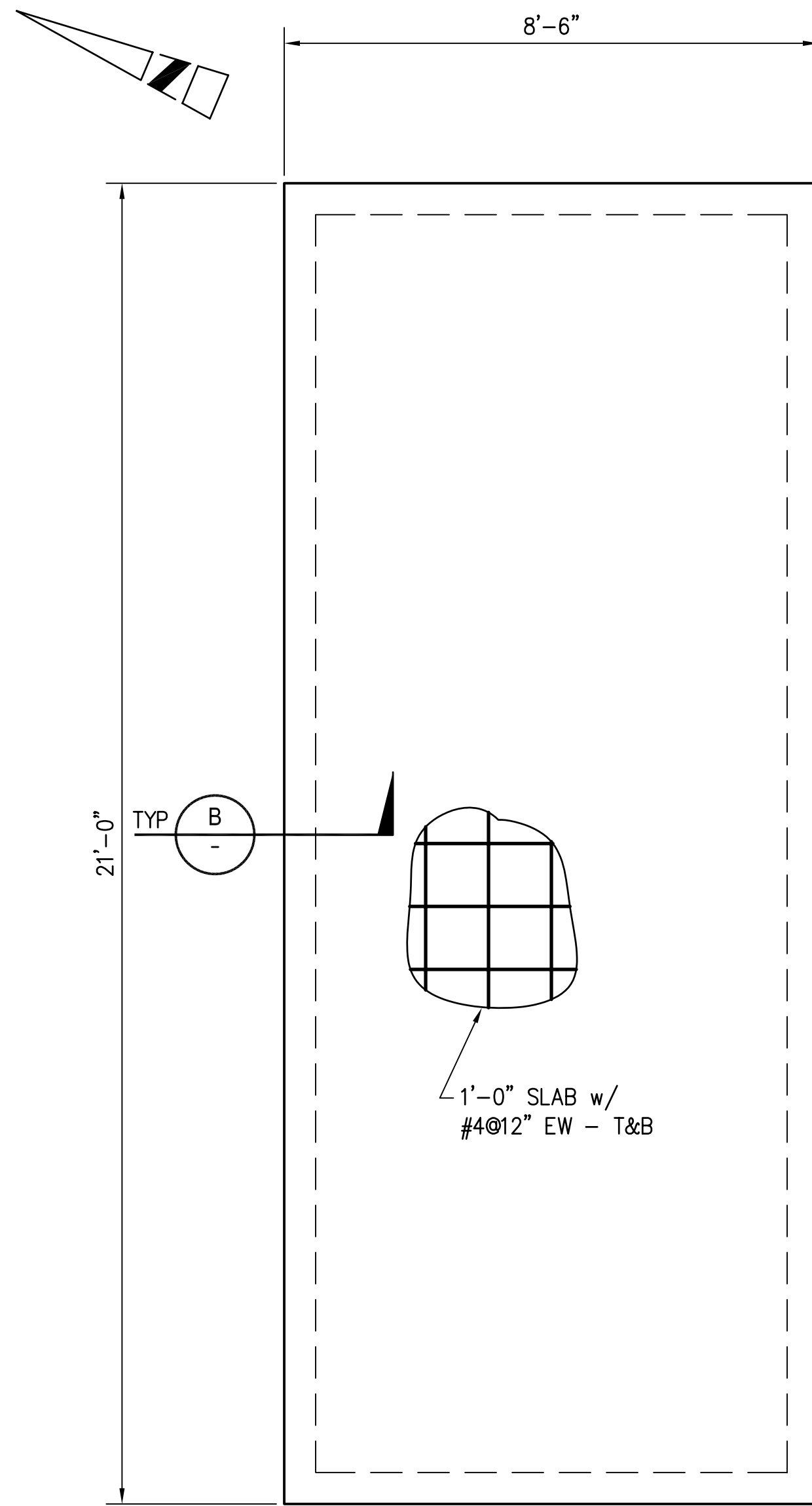
NOTE:
 ANCHORS SHALL BE PER TANK MANUFACTURER.

BACKWASH TANK FOUNDATION PLAN ①
 SCALE: 1/2" = 1'-0"

DATE: DEC 2009
 REVISED TO CONFORM TO
 CONSTRUCTION RECORDS
 PROVIDED BY CONTRACTOR
 BY: _____
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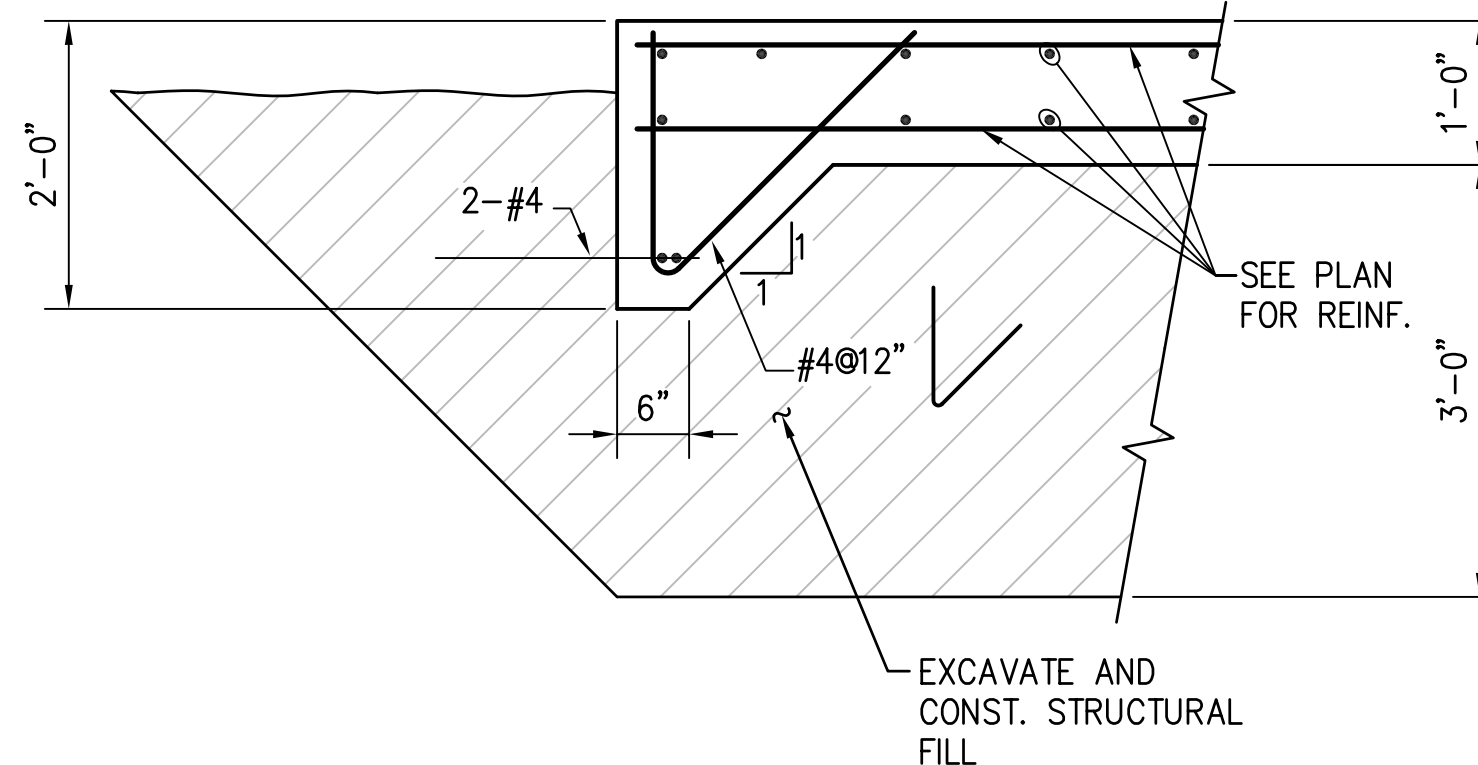


SECTION A
 SCALE: 3/4" = 1'-0"

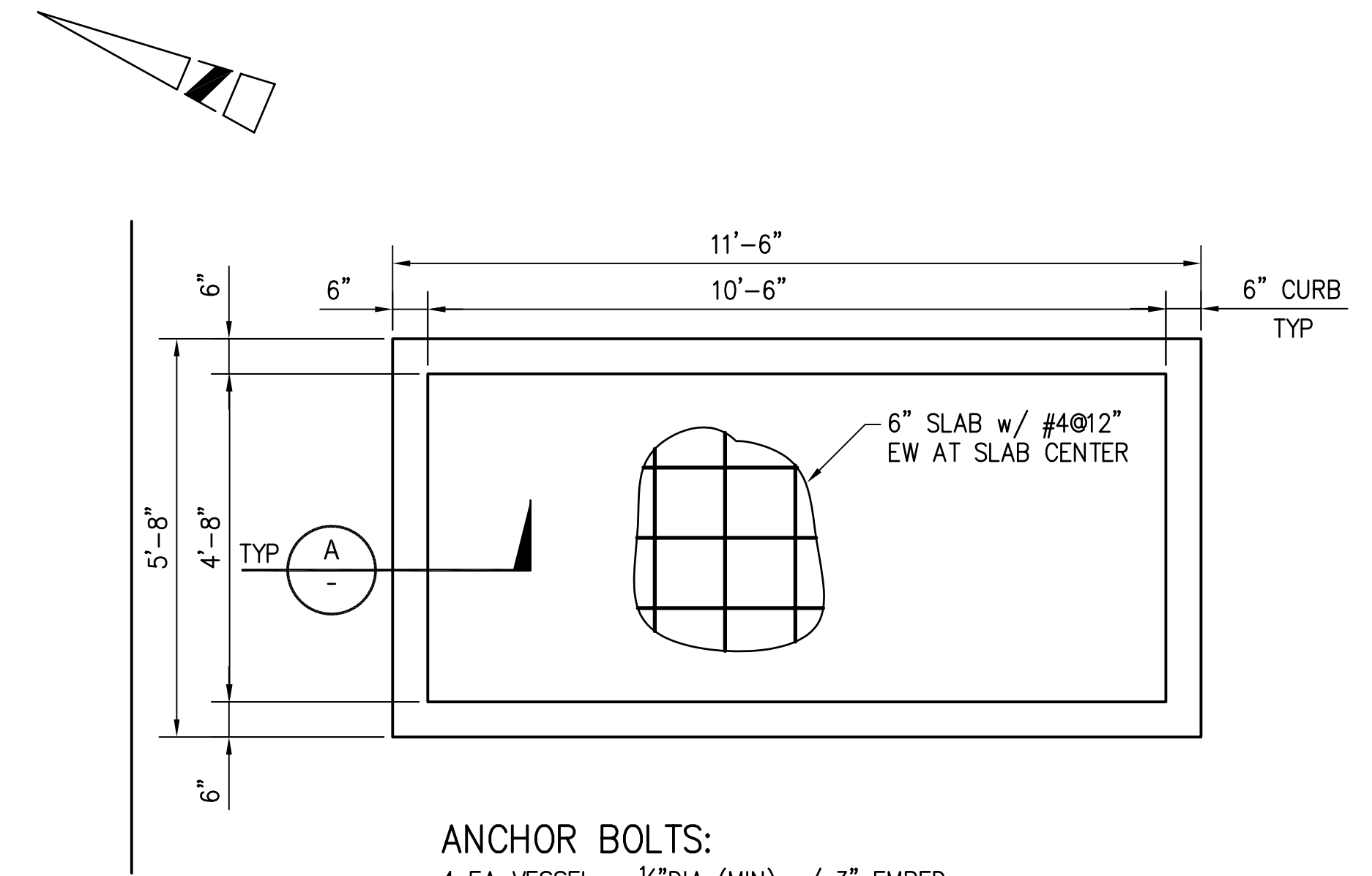


ANCHOR BOLTS:
 16 - 1" DIA (MIN) w/ 9" EMBED.

CO₂ TANK FOUNDATION PLAN ②
 SCALE: 1/2" = 1'-0"

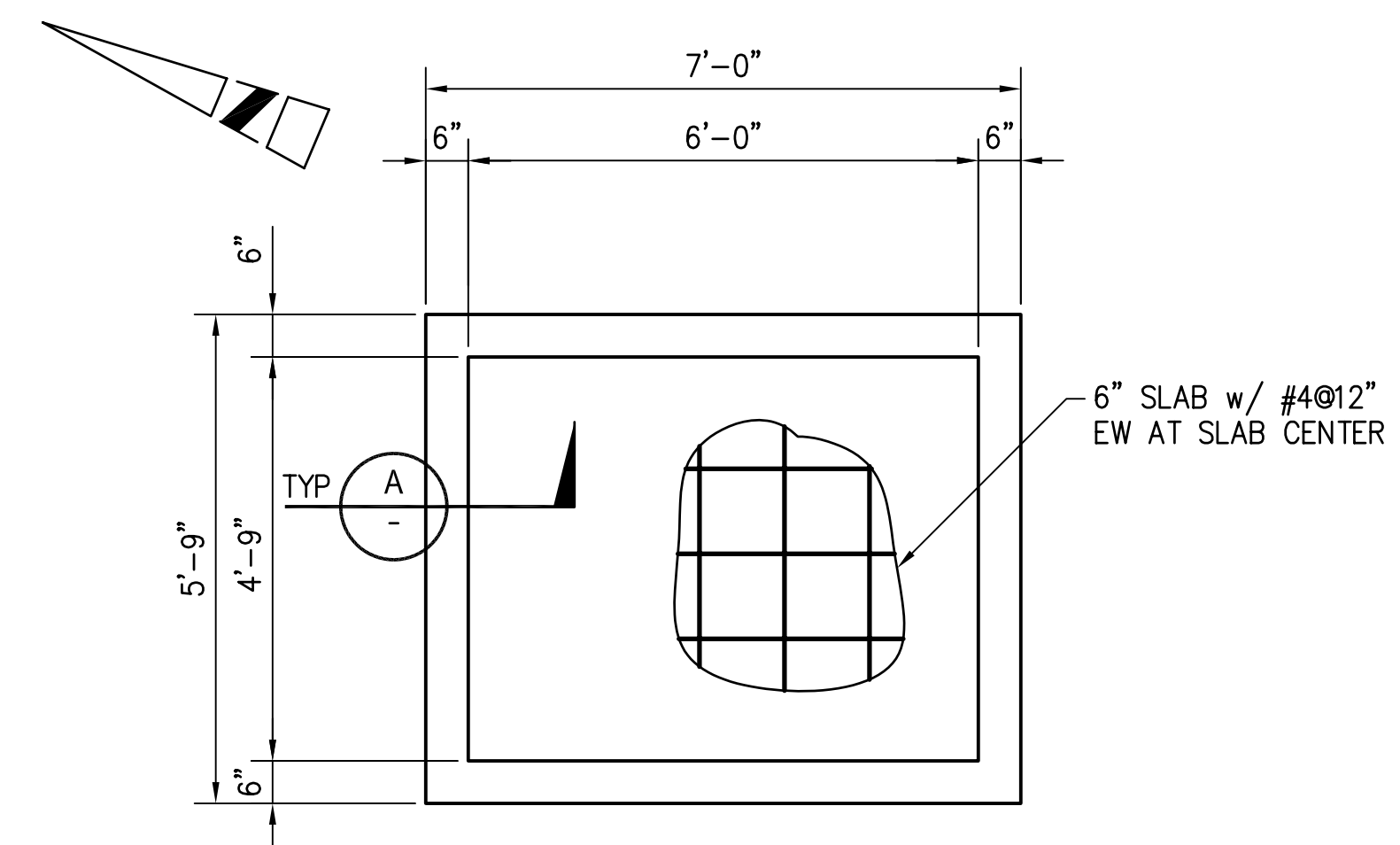


SECTION B
 SCALE: 3/4" = 1'-0"



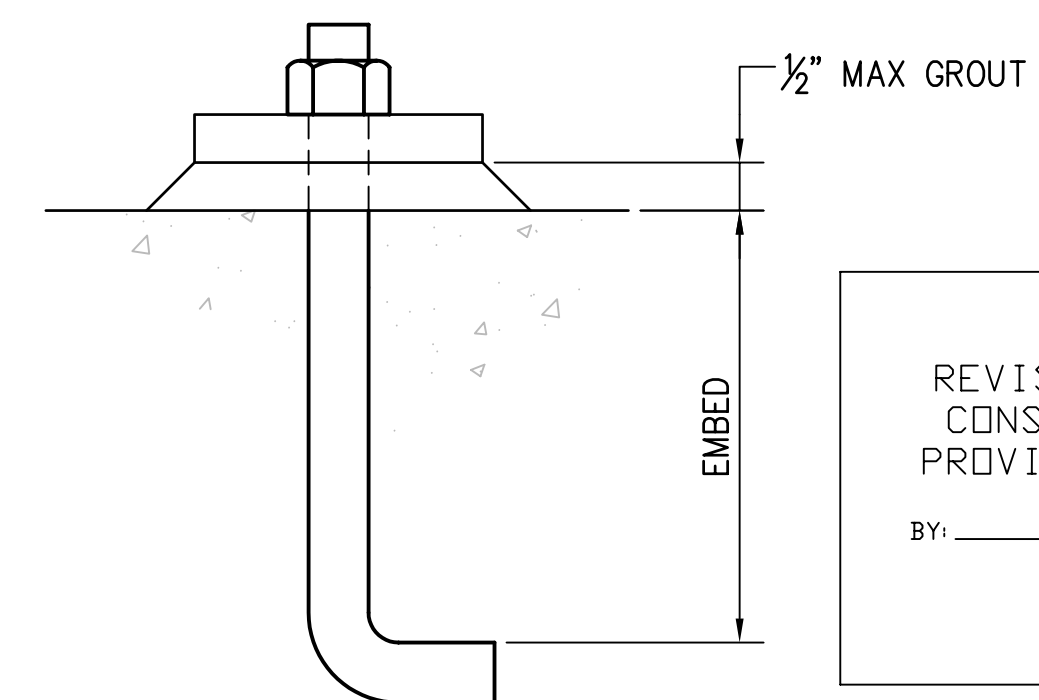
ANCHOR BOLTS:
 4 EA VESSEL - 1/2" DIA (MIN) w/ 3" EMBED.

BAG FILTERS FOUNDATION PLAN ③
 SCALE: 1/2" = 1'-0"



ANCHOR BOLTS:
 HILTI

PUMP FOUNDATION PLAN ④
 SCALE: 1/2" = 1'-0"

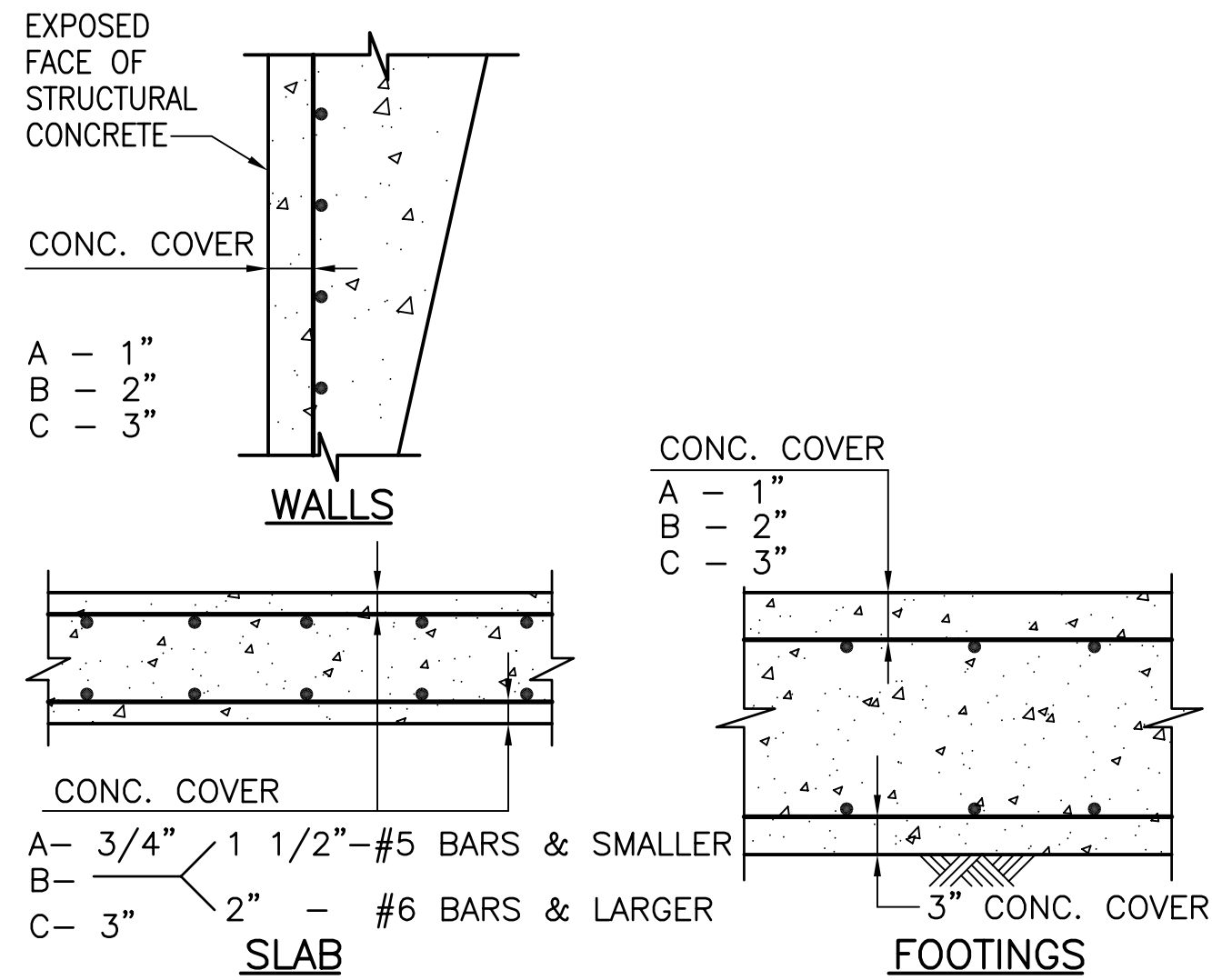


TYPICAL ANCHOR DETAIL ⑤
 SCALE: NONE

DRN BY:	DD	DES BY:	CJU	CHK BY:	EL	APP BY:	EL	REV	DESCRIPTION
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PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	WBA-S01.dwg
SHEET NO.	15
DRAWING NO.	S-01



- COVER**
- A. NO EXPOSURE TO GROUND, WEATHER, OR WATER AFTER FORM REMOVAL.*
 - B. EXPOSURE TO GROUND, WEATHER, OR WATER AFTER FORM REMOVAL.
 - C. CONCRETE PLACED AGAINST SOIL.

CONCRETE COVER OVER REINFORCING STEEL

1

BAR SIZE	90° HOOKS "X"	BAR SIZE	90° HOOKS "X"
#3	6"	#8	16"
#4	8"	#9	19"
#5	10"	#10	22"
#6	12"	#11	24"
#7	14"		

NOTE:
UNLESS NOTED OTHERWISE ON DRAWINGS ALL LENGTHS OF BAR HOOKS IN FOOTINGS, COLUMNS, WALLS AND SLABS SHALL BE GIVEN IN TABLE.

HOOK LENGTH "X" IS STANDARD 90° BAR HOOK LENGTH.

STANDARD 90° BAR HOOK

NOT TO SCALE

2

UNLESS OTHERWISE SHOWN, CONCRETE WALLS & SLABS SHALL BE REINFORCED AS FOLLOWS:

#4 @ 12 E.W. CENTER OF 6" SECTIONS; #5 @ 12 E.W. CENTER OF 8" SECTION; #4 @ 12 E.W.E.F. OF 10" SECTION; #5 @ 12 E.W.E.F. OF 12" SECTION; SINGLE MAT REINFORCING SHALL BE CENTER OF SECTION UNLESS SHOWN OTHERWISE.

UNLESS NOTED OTHERWISE ALL WALL REINFORCING BARS SHALL BE CONT AROUND CORNERS & THROUGH COLUMNS OR PILASTERS. ALL REINFORCEMENT LAPS, UNLESS NOTED OTHERWISE, SHALL SATISFY THE FOLLOWING MINIMUM REQUIREMENTS:

LAP SPLICE LENGTH (INCHES) $f'_c = 4000$ PSI (MULTIPLY BY 1.15 FOR $f'_c = 3000$ PSI)										
COVER	BAR SIZE	#3	#4	#5	#6	#7	#8	#9	#10	#11
3/4"	* TOP BARS	24	36	48	78	96	117	190	165	
	OTHER BARS	19	28	37	60	74	90	108	127	
1"	* TOP BARS	20	29	40	64	80	98	119	141	
	OTHER BARS	16	22	31	50	62	76	92	108	
1.5"	* TOP BARS	20	24	29	48	60	74	91	109	
	OTHER BARS	16	19	22	37	47	57	70	84	
2" OR GREATER	* TOP BARS	20	24	29	42	48	60	74	89	
	OTHER BARS	16	19	22	33	37	46	57	68	

* TOP BARS SHALL BE DEFINED AS ANY HORIZONTAL BARS PLACED SUCH THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE BARS IN ANY SINGLE POUR.

REINFORCEMENT DETAILS

3

NOTES

- GENERAL**
- VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES.
 - NOTES AND DETAILS ON THE DRAWINGS TAKE PRECEDENCE OVER THE STRUCTURAL NOTES AND TYPICAL DETAILS SHOWN ON THE TYPICAL DETAIL SHEETS.
 - USE TYPICAL DETAILS AT ALL LOCATIONS THAT ARE CONFIGURED SIMILAR TO THE TYPICAL DETAILS UNLESS NOTED OTHERWISE.
 - WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF THE WORK, CONSTRUCTION DETAILS SHALL BE THE SAME AS FOR OTHER SIMILAR WORK.
 - STRUCTURES FOR THIS PROJECT MAY NOT BE CAPABLE OF SUPPORTING OR RESISTING LOADS APPLIED TO THEM PRIOR TO COMPLETION OF CONSTRUCTION. BRACE AND SUPPORT THE STRUCTURES AS REQUIRED UNTIL CONSTRUCTION IS COMPLETE AND MATERIALS HAVE ATTAINED THE SPECIFIED STRENGTHS.
 - EXPOSE ALL CONNECTION OR JOINT LOCATIONS FOR ALL CONDUITS BEFORE INSTALLING PIPE OR CONDUITS.

REINFORCED CONCRETE

- CONCRETE STRENGTHS:
REINFORCED CONCRETE $f'_c = 4000$ PSI (28 DAYS)
CEMENT: ASTM C 150 TYPE II/V.
AGGREGATE: ASTM C 33
- REINFORCING STEEL: ASTM A 615 OR A 706 GRADE 60 DEFORMED. USE A 706 REINFORCING WHERE WELDING IS NOTED IN THE DRAWINGS.
- UNLESS OTHERWISE DETAILED, PROVIDE 3/8-INCH DIAMETER SPACER BARS OR TIES AT 24 INCHES ON CENTER TO KEEP REINFORCING IN PLACE.
- AT LOCATIONS OF INTERFERING REINFORCING LAYERS, OFFSET LAYERS BY ONE BAR DIAMETER TOWARD MID-DEPTH OF THE SECTION AS REQUIRED FOR PLACEMENT. REINFORCING MAY BE SPRUNG AT INTERFERENCE LOCATIONS AS PERMITTED BY THE OWNER. INCREASE THE CONCRETE THICKNESS BY LOWERING THE SUBGRADE AS REQUIRED TO MAINTAIN THE SPECIFIED MINIMUM CONCRETE COVERS.
- DO NOT PLACE ANY PIPES, CONDUITS, OR DUCTS IN CONCRETE UNLESS SPECIFICALLY DETAILED.
- ADDITIONAL CONSTRUCTION JOINTS TO FACILITATE CONSTRUCTION MAY BE ADDED IF PERMITTED BY THE OWNER.
- STAGGER LAP SPLICES IN ADJACENT BARS BY ONE LAP LENGTH.
- REINFORCING SHOWN CONTINUOUS MAY BE LAPPED DUE TO CONSIDERATIONS OF MAXIMUM AVAILABLE BAR LENGTHS AS PERMITTED BY THE ENGINEER. SUBMIT A PROPOSED LAYOUT OF LAP LOCATIONS TO THE OWNER FOR REVIEW. BAR COUPLERS MAY BE USED AS AN ALTERNATIVE TO LAPPING. DO NOT WELD REINFORCING UNLESS IT IS NOTED ON THE DRAWINGS. CONTINUOUS BARS MAY BE USED AS AN ALTERNATIVE TO LAPPING.
- FOOTING AND WALL INTERSECTIONS: UNLESS NOTED OTHERWISE, EXTEND HORIZONTAL REINFORCING TO THE EXTENT POSSIBLE (2" CLEAR) AND TERMINATE WITH ACI STANDARD 90-DEGREE HOOKS.
- SECURE ITEMS TO BE EMBEDDED IN CONCRETE IN PLACE PRIOR TO PLACING CONCRETE.

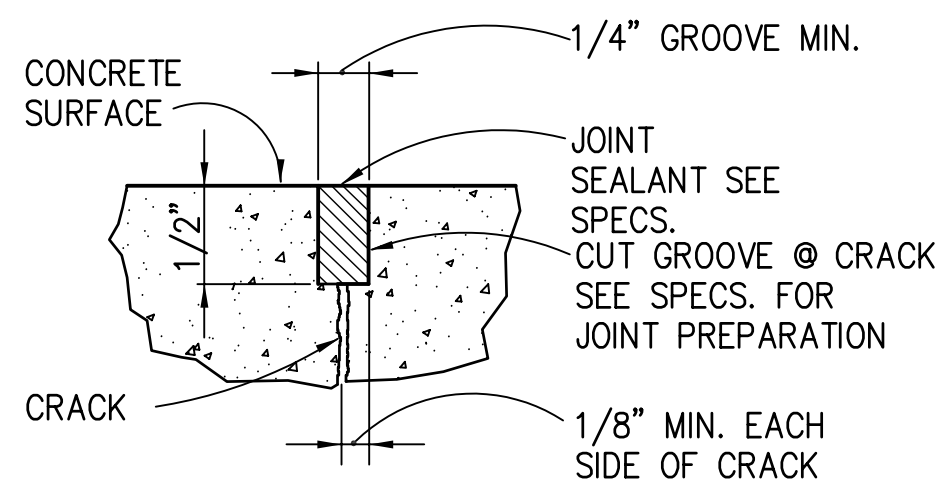
SPECIAL INSPECTION
THE OWNER WILL PROVIDE SPECIAL INSPECTION IN ACCORDANCE WITH THE CALIFORNIA BUILDING CODE SECTION 1704 WHERE NOTED IN THE DRAWINGS AND FOR THE FOLLOWING:

CONTINUOUS INSPECTION:

- EARTHWORK-
SOIL MATERIALS, COMPACTION, LIFT THICKNESS
- CONCRETE-
SAMPLING, SLUMP TESTS, TEMPERATURE PLACEMENT

PERIODIC INSPECTION:

- EARTHWORK-
VERIFY EARTH SUBGRADE, BEARING CAPACITY
EXCAVATION TO PROPER DEPTH
- CONCRETE-
REINFORCING TYPE, SIZE & SPACING
VERIFY DESIGN MIX
FORMWORK & CURING
REVIEW SUBMITTALS



- NOTES:**
- PRIOR TO LEAK-TESTING:
1. CRACKS IN THE STRUCTURE SHALL BE REPAIRED IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
 - NO REPAIRS ARE REQUIRED FOR CRACKS LESS THAN 0.01 INCH IN WIDTH ON SURFACES THAT WILL BE CRYSTALLINE WATERPROOFED.
 - NO REPAIRS ARE REQUIRED FOR CRACKS LESS THAN 0.004 INCH IN WIDTH.

AFTER LEAK-TESTING:
REPAIR ALL LEAKING CRACKS PER THE SPECIFICATIONS.

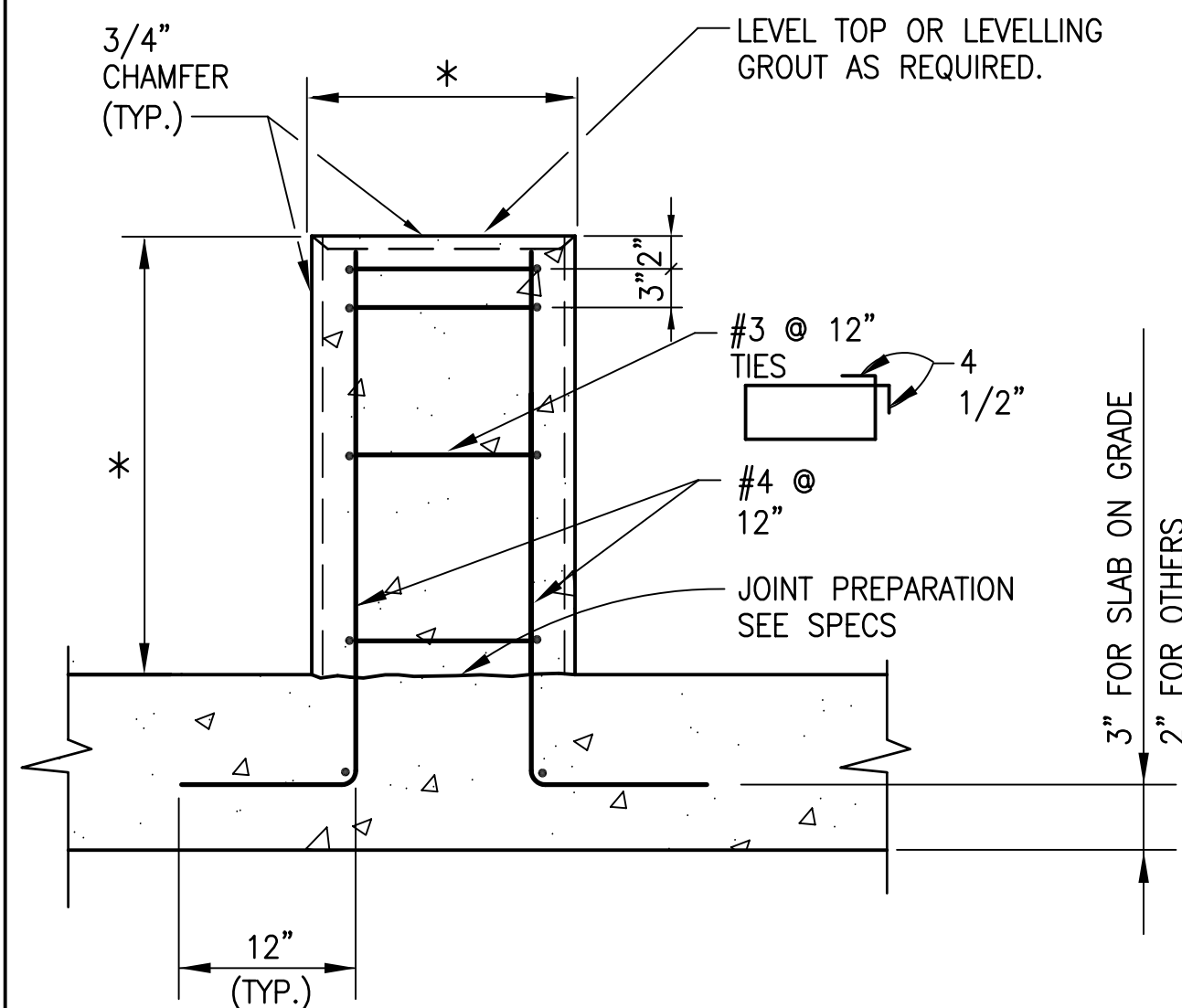
ALTERNATE REPAIRS:

- SUBMIT FOR REVIEW BY THE ENGINEER.

CONCRETE CRACK REPAIR

SCALE: NOT TO SCALE

4



* SEE PIPING PLANS & DETAILS

CONCRETE PIER PIPE SUPPORT

NOT TO SCALE

5

DATE: DEC 2009

REVISED TO CONFORM TO CONSTRUCTION RECORDS PROVIDED BY CONTRACTOR

By: _____

AECOM

NO.	DATE	BY	CHK	DESCRIPTION

AECOM

300 OCEANVIEW SUITE 700
LOS ANGELES, CA 90080
T: 659.851.9200 F: 659.2495.9257
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WBA CHROMIUM REMOVAL DEMONSTRATION FACILITY LOS ANGELES, CALIFORNIA	
TYPICAL STRUCTURAL DETAILS AND NOTES	
PROJECT START DATE (M/Y)	04/2009
PROJECT NO.	106560
FILENAME	WBA-S02.dwg
SHEET NO.	16
DRAWING NO.	S-02

SPECIFICATIONS:

- ALL ELECTRICAL WORK SHALL COMPLY WITH THE STATE OF CALIFORNIA ELECTRICAL SAFETY ORDER, THE NATIONAL ELECTRICAL CODE, AND ALL AUTHORITIES HAVING JURISDICTION.
- OBTAIN AND PAY FOR ALL PERMITS AND FEES.
- ALL MATERIAL SHALL BE NEW, UL LISTED AND APPROVED.
- ALL EXTERIOR INSTALLATIONS SHALL BE WEATHERPROOF.
- CONDUIT SHALL BE GALVANIZED RIGID STEEL CONFORMING TO ANSI C80.1 AND UL 6 FOR EXPOSED CONDUIT AND PVC SCHEDULE 40 CONFORMING TO NEMA TC-2 AND UL 651 FOR UNDERGROUND INSTALLATIONS.
- ALL CONDUIT SHALL BE INSTALLED AT 30" BELOW FINISHED GRADE AND TO BE PROVIDED WITH THE PROPER BEND AND SWEEP RADII REQUIRED FOR THE PROPER INSTALLATION OF CABLE.
- WIRE SHALL BE 600-VOLT THWN-2 STRANDED COPPER.
- TRANSFORMERS SHALL BE DRY-TYPE AND CONFORM TO ANSI C89.2, NEMA TR-27, NEMA ST-20 AND UL LISTED. PROVIDE NEMA 3R ENCLOSURE.
- TEST THE COMPLETE SYSTEM FOR FAILURE AND MALFUNCTION. MAKE NECESSARY CORRECTIONS AND LEAVE SYSTEM READY FOR OPERATION.

NOTES:

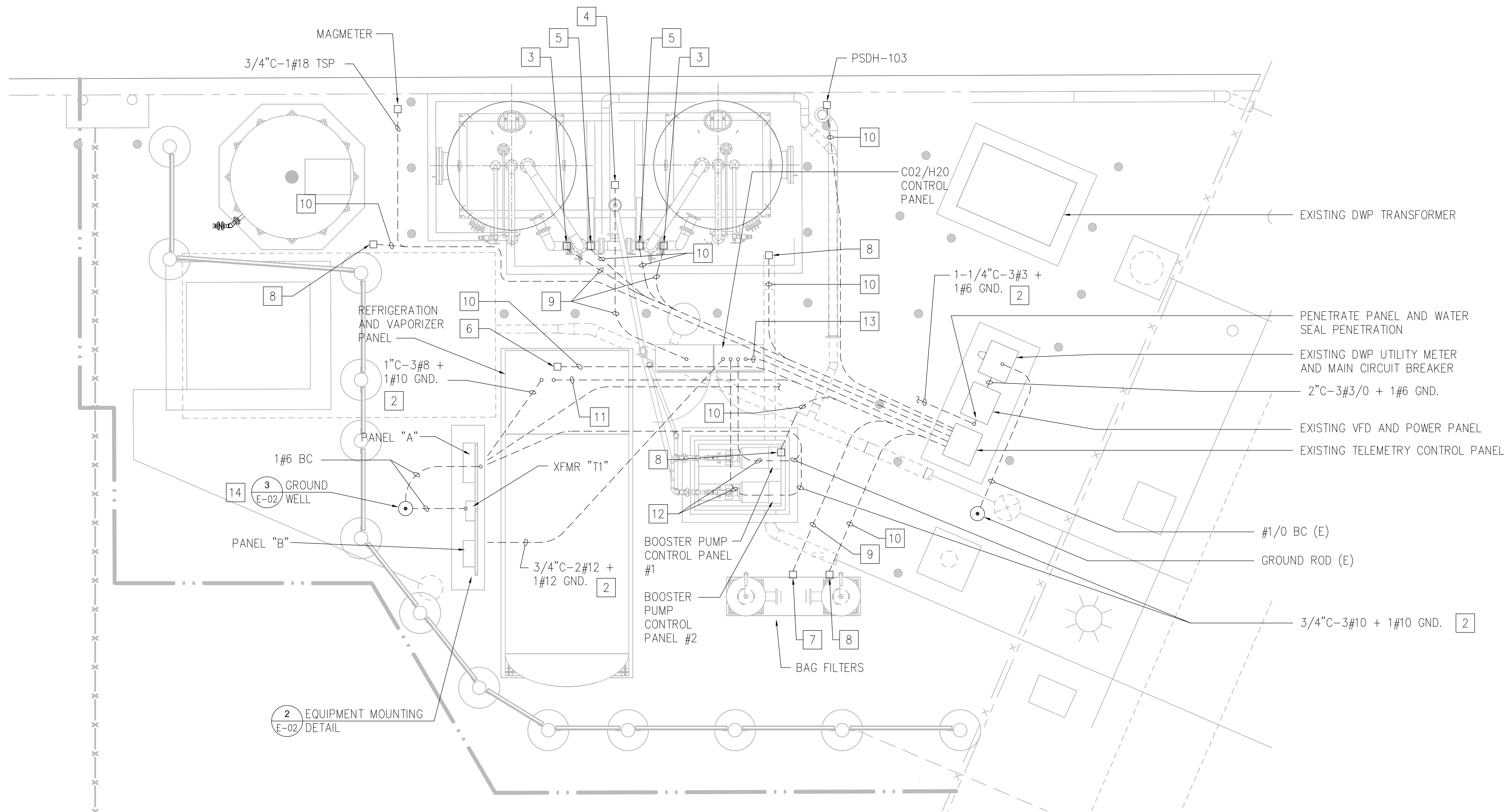
- REFER TO TOMCO COMPANY DRAWINGS AND CIVIL DRAWINGS FOR LOCATION OF INSTRUMENTATION EQUIPMENT.
- CONCRETE ENCASE CONDUITS THAT RUN BELOW CO2/H2O TANK.
- FLOW METER.
- PH METER (AIT-101).
- HIGH PRESSURE DIFFERENTIAL SWITCH.
- CO2 TANK LEVEL SWITCH.
- DIFFERENTIAL PRESSURE TRANSMITTER.
- HIGH LEVEL SWITCH.
- 3/4"C-1#18 TSP.
- 3/4"C-2#14 + 1#14 GND.
- 1"C-1#18 TSP + 1"C-4#14 + 1#14 GND.
- 1"C-10#14 + 1#14 GND.
- 2"C-4#18 TSP + 2"C-24#14 + 1#14 GND.
- PROVIDE 1#6 BC FROM GROUND ROD TO EXISTING MAIN SERVICE GROUND ROD.

LEGEND

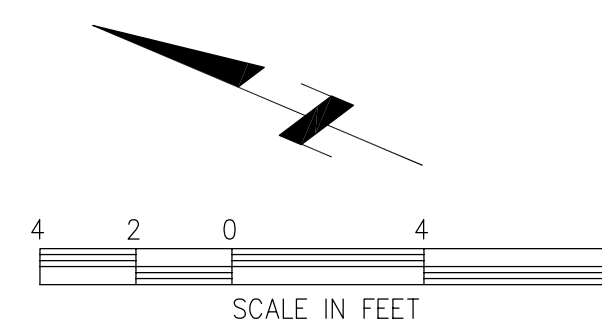
- CONDUIT, UNDERGROUND
- (M) UTILITY METER
- 400A 3P CIRCUIT BREAKER 3P - THREE POLE
- (MOTOR SYMBOL) MOTOR
- (TRANSFORMER SYMBOL) TRANSFORMER
- (DISCONNECT SYMBOL) DISCONNECT
- (GROUND SYMBOL) GROUND
- (X) SEE NOTE SPECIFIED

ABBREVIATIONS

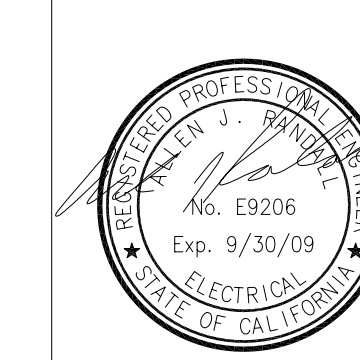
- A AMPERES
- C CONDUIT
- CB CIRCUIT BREAKER
- DIA DIAMETER
- DISC DISCONNECT
- DWP DEPARTMENT OF WATER AND POWER
- (E) EXISTING
- GND GROUND
- HP HORSEPOWER
- MCP MOTOR CONTROL CENTER
- P POLE
- TSP TWISTED SHIELDED PAIR
- UON UNLESS OTHERWISE NOTED
- V VOLT
- VFD VARIABLE FREQUENCY DRIVE
- W WIRE
- XFMR TRANSFORMER
- ∅ PHASE



ELECTRICAL SITE PLAN



DATE: DEC 2009
 REVISED TO CONFORM TO CONSTRUCTION RECORDS PROVIDED BY CONTRACTOR
 BY: _____
AECOM



<p style="text-align: center;">AECOM</p> <p style="text-align: center; font-size: small;">300 OCEANGATE SUITE 700 LONG BEACH, CA 90805 T: 562.981.2000 F: 562.495.9257 WWW.AECOM.COM</p>		PROJECT START DATE (M/Y) 04/2009
		PROJECT NO. 106560
PROJECT NAME WBA-E01.dwg		FILENAME WBA-E01.dwg
SHEET NO. 17		SHEET NO. 17
DRAWING NO. E-01		DRAWING NO. E-01

Plotted By: armitaged
 Plot File Date Created: Jan/04/2010 1:37 PM
 Layout--Sheet Name: WBA_E-01
 Filename: L:\WORK\PROJECTS\106560\GRA\WBA\RECORD DRAWINGS\WBA-E01.DWG

NEMA 3R

NAMEPLATE A MTG. SURFACE MAIN 100A/3P

BUS: AMPS 100A VOLTS: 480V, 3PH, 3W, 35KAICS

	WATTAGE			OUTLETS			10,000 AICS 20A-1P U.O.N.			OUTLETS			WATTAGE			
	A	B	C	LTG	REC	MISC	1	2	3	LTG	REC	MISC	A	B	C	
REFRIGERATION/VAPORIZER CP	8300					1	1					1				BOOSTER PUMP CONTROL PANEL #1 *
		8300														BOOSTER PUMP CONTROL PANEL #2 *
SPACE			8300													TRANSFORMER "T1"
																SPACE
TOTAL LOAD	8300	8300	8300										8383	8383	7460	TOTAL LOAD

49 KW + LCL 6 KW = 55 KW AT 480 VOLTS 3PH = 66 AMPS

* ONLY ONE PUMP OPERATES AT ANY GIVEN TIME.

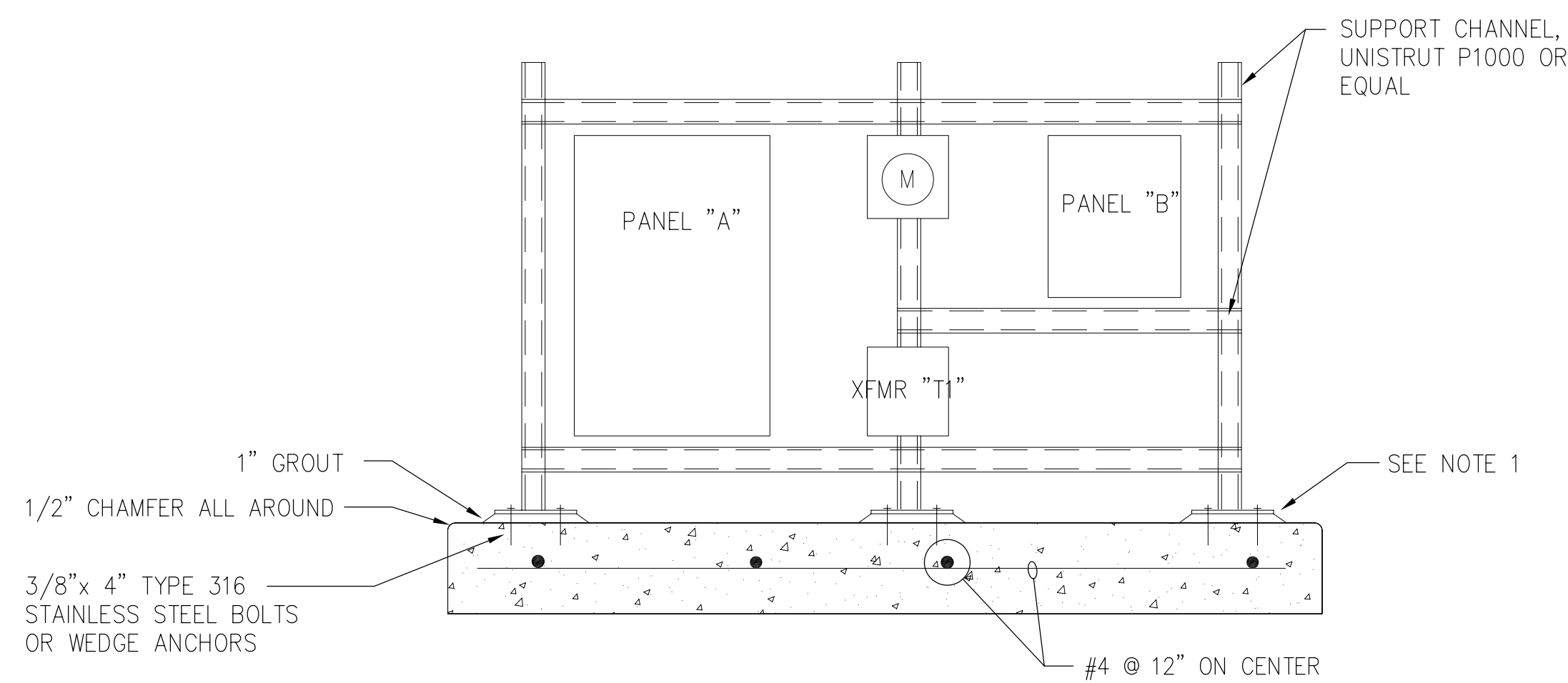
NEMA 3R

NAMEPLATE B MTG. SURFACE MAIN 30A/2P

BUS: AMPS 100A VOLTS: 120/240V, 1PH, 3W, 10KAICS

	WATTAGE		OUTLETS			10,000 AICS 20A-1P U.O.N.			OUTLETS		WATTAGE		
	A	B	LTG	REC	MISC	1	2	3	LTG	REC	A	B	
CO2/H2O CONTROL PANEL	1400				1	1			2				SITE LIGHTS
SPARE													SPARE
SPACE													SPACE
TOTAL LOAD	1400												TOTAL LOAD

1.47 KW + LCL 0.36 KW = 1.83 KW AT 240 VOLTS 1PH = 8 AMPS



NOTE:

- COATING SYSTEM: APPLY THREE OR MORE COATS OF AMERON 400, TNEEC 100, ICI DEVOE BAR-RUST 233H, SHERWIN-WILLIAMS MACROPOXY B58-600, OR EQUAL; 30 MILS TOTAL. MAXIMUM THICKNESS OF AN INDIVIDUAL COATING SHALL NOT EXCEED THE MANUFACTURER'S RECOMMENDATION.

PANEL MOUNTING DETAIL

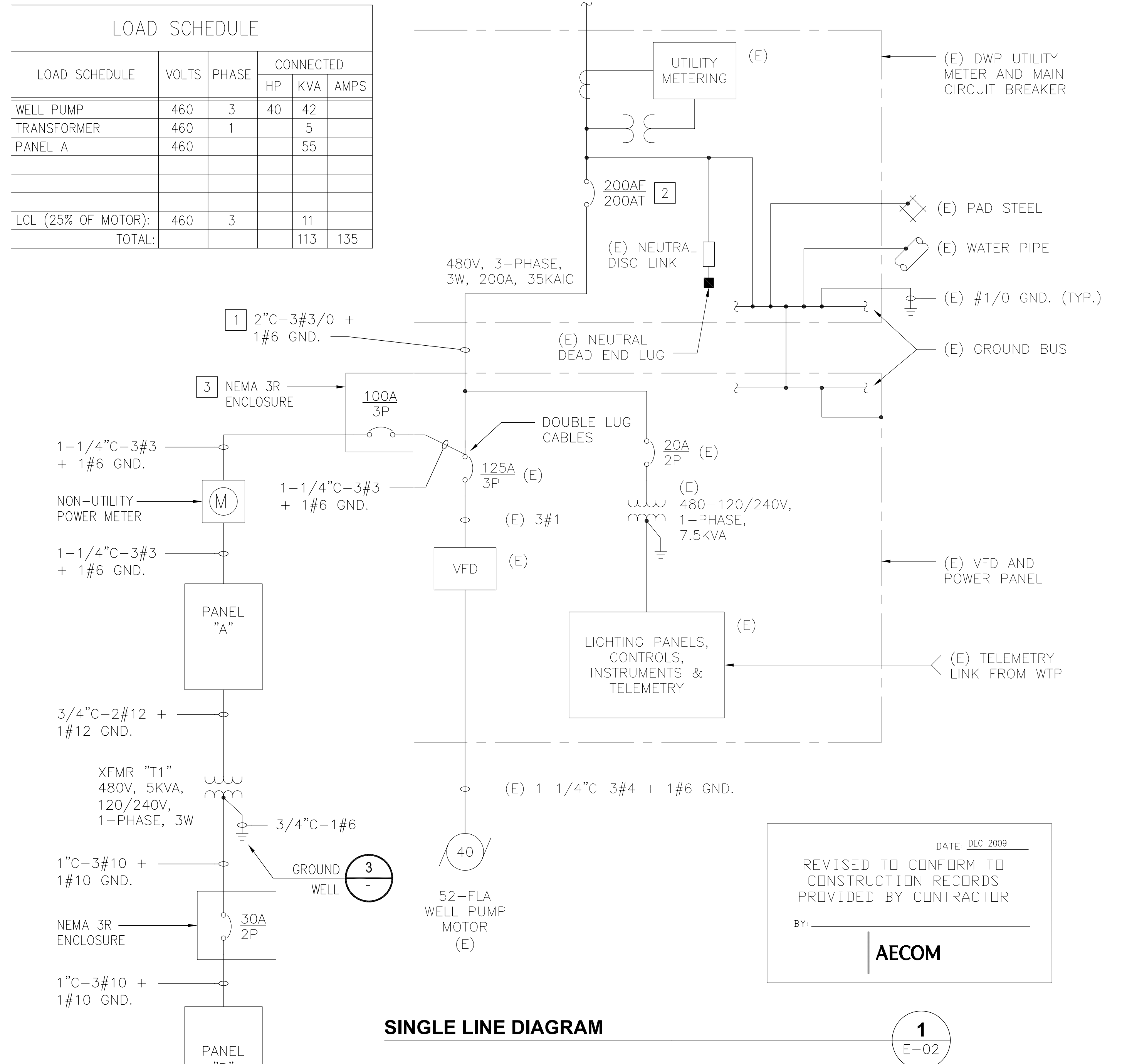
NOT TO SCALE

2

E-02

LOAD SCHEDULE

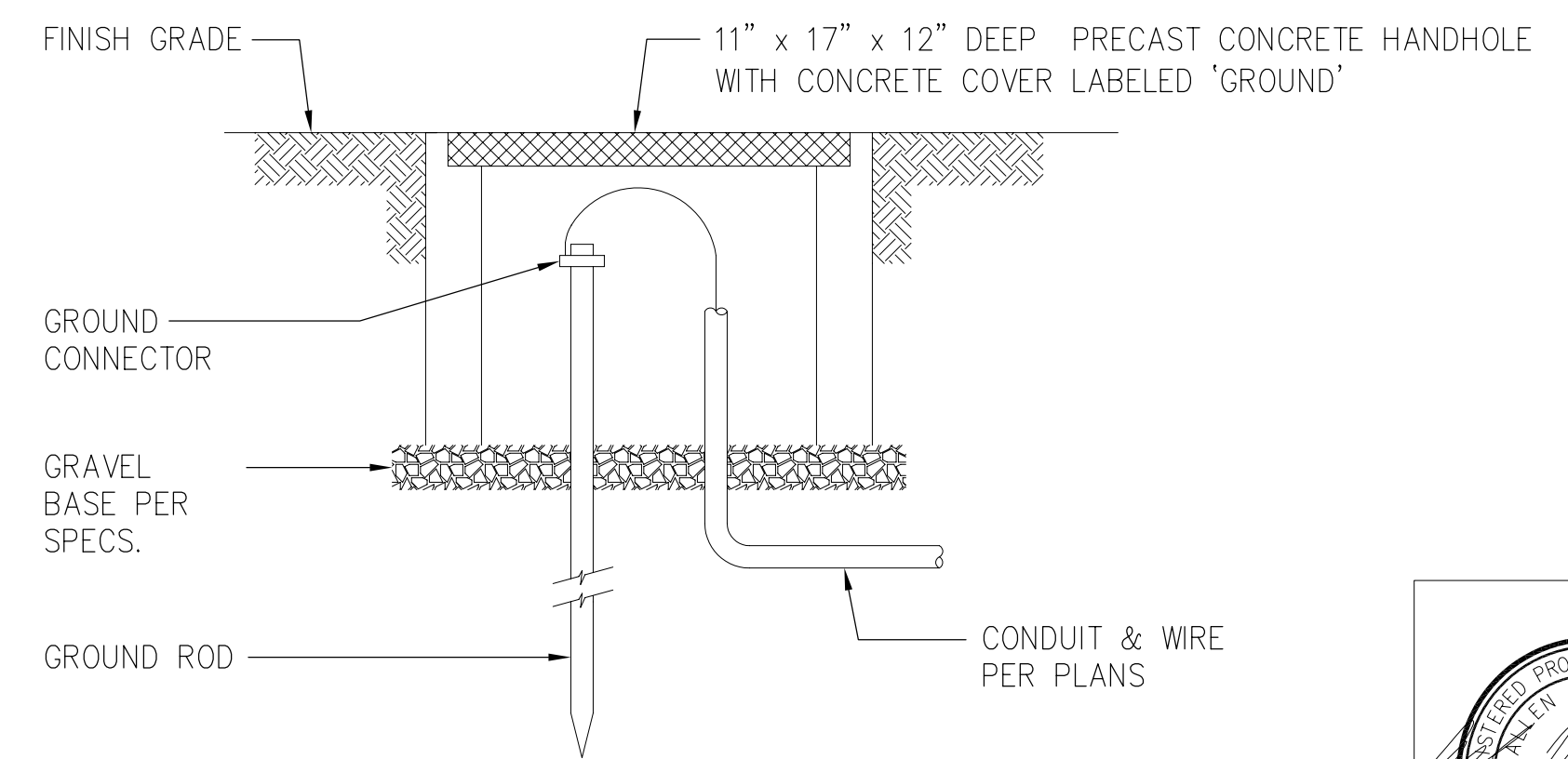
LOAD SCHEDULE	VOLTS	PHASE	CONNECTED		
			HP	KVA	AMPS
WELL PUMP	460	3	40	42	
TRANSFORMER	460	1		5	
PANEL A	460			55	
LCL (25% OF MOTOR):	460	3		11	
TOTAL:				113	135



SINGLE LINE DIAGRAM

1

E-02



GROUND WELL DETAIL

3

E-02

NOTE:

- REMOVE EXISTING 3#1/0 CABLES AND PROVIDE NEW CONDUIT & WIRE.
- REMOVE EXISTING 200AF/150AT CIRCUIT BREAKER AND PROVIDE NEW 200AF/200AT CIRCUIT BREAKER.
- MOUNT ADJACENT TO EXISTING POWER PANEL.

VERIFY SCALE IF PLAN SHEET IS REDUCED

DRNBY:	DES BY:	CHK BY:	APP BY:	REV	DESCRIPTION
DD	CJ	CU	DD	1	RECORD DRAWING

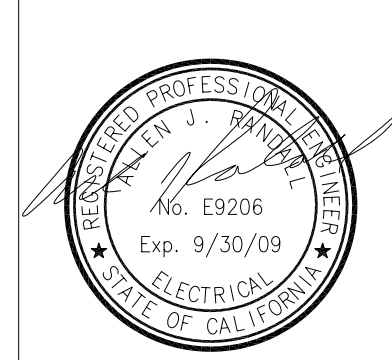
AECOM

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**WBA CHROMIUM
REMOVAL DEMONSTRATION FACILITY
LOS ANGELES, CALIFORNIA**

PRELIMINARY
SINGLE LINE DIAGRAM

PROJECT START DATE (M/Y): 04/2009
PROJECT NO.: 106560
FILENAME: OLDWBA-E02.dwg
SHEET NO.:
DRAWING NO.: E-02



Plotted By: armstrong
Plot File Date Created: Jan/05/2010 8:00 AM
Layout--Sheet Name: WBA_E-02
Filename: L:\WORK\PROJECTS\106560\GRA\WBA\RECORD DRAWINGS\OLDWBA-E02.DWG