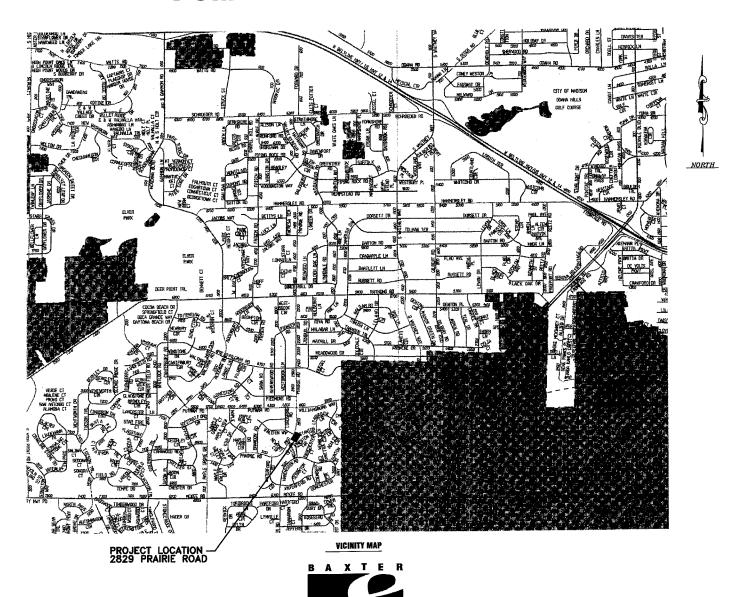
MADISON WATER UTILITY

MADISON, WISCONSIN **UNIT WELL 20 PUMP AND MCC UPGRADES**



Consulting Engineers

Crystal Lake, Illinois

815.459.1260



1-800-242-8511 TOLL FREE

Madison, Wisconsin 608.277.1230

> Mokena, Illinois 708.478.2090

Burlington, Wisconsin 262.763.7834

> DeKalb, Illinois 815.787.3111

Grayslake, Illinois 847.223.5088

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Plainfield, Illinois 815.609.7425

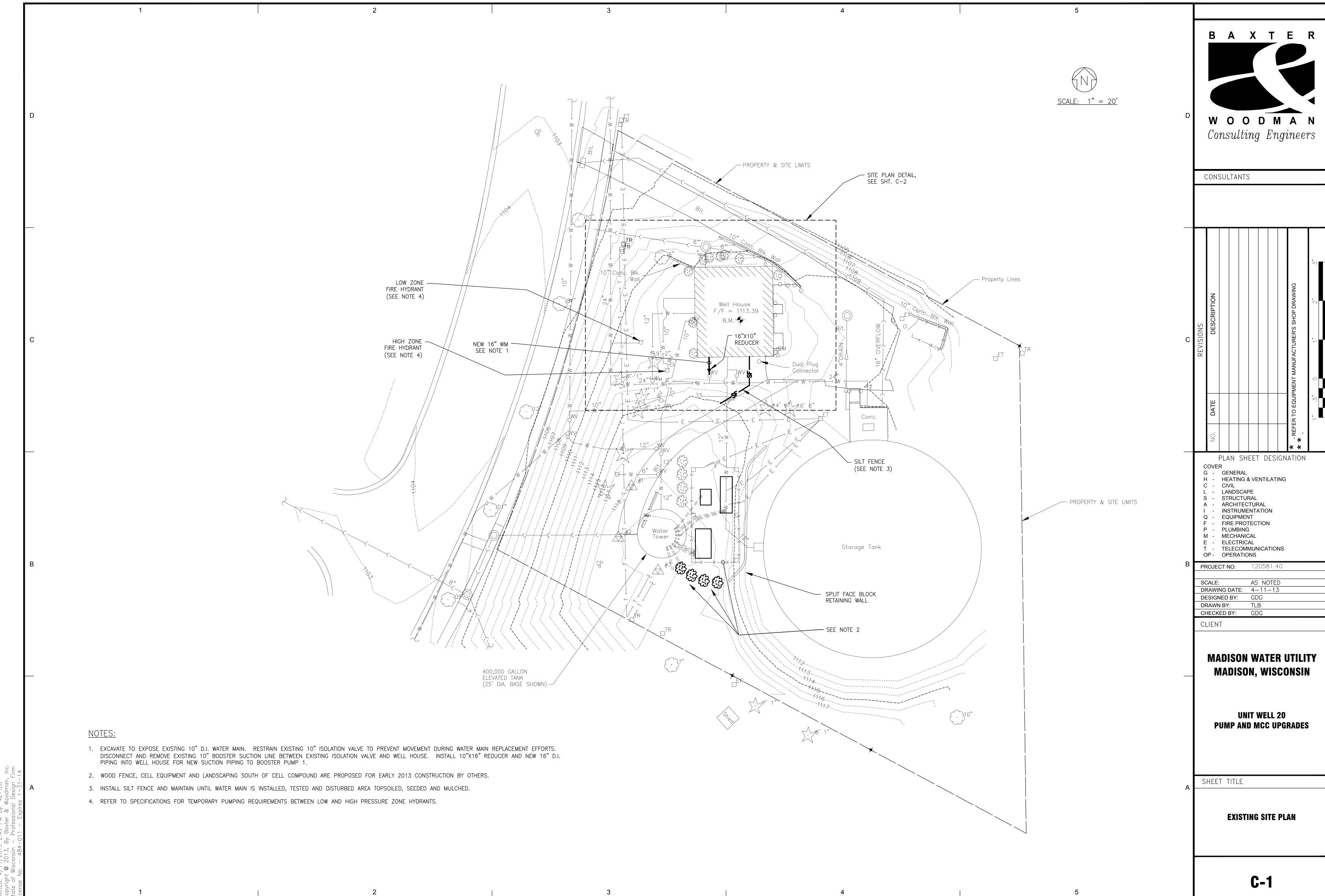
Itasca, Illinois 630.773.1870

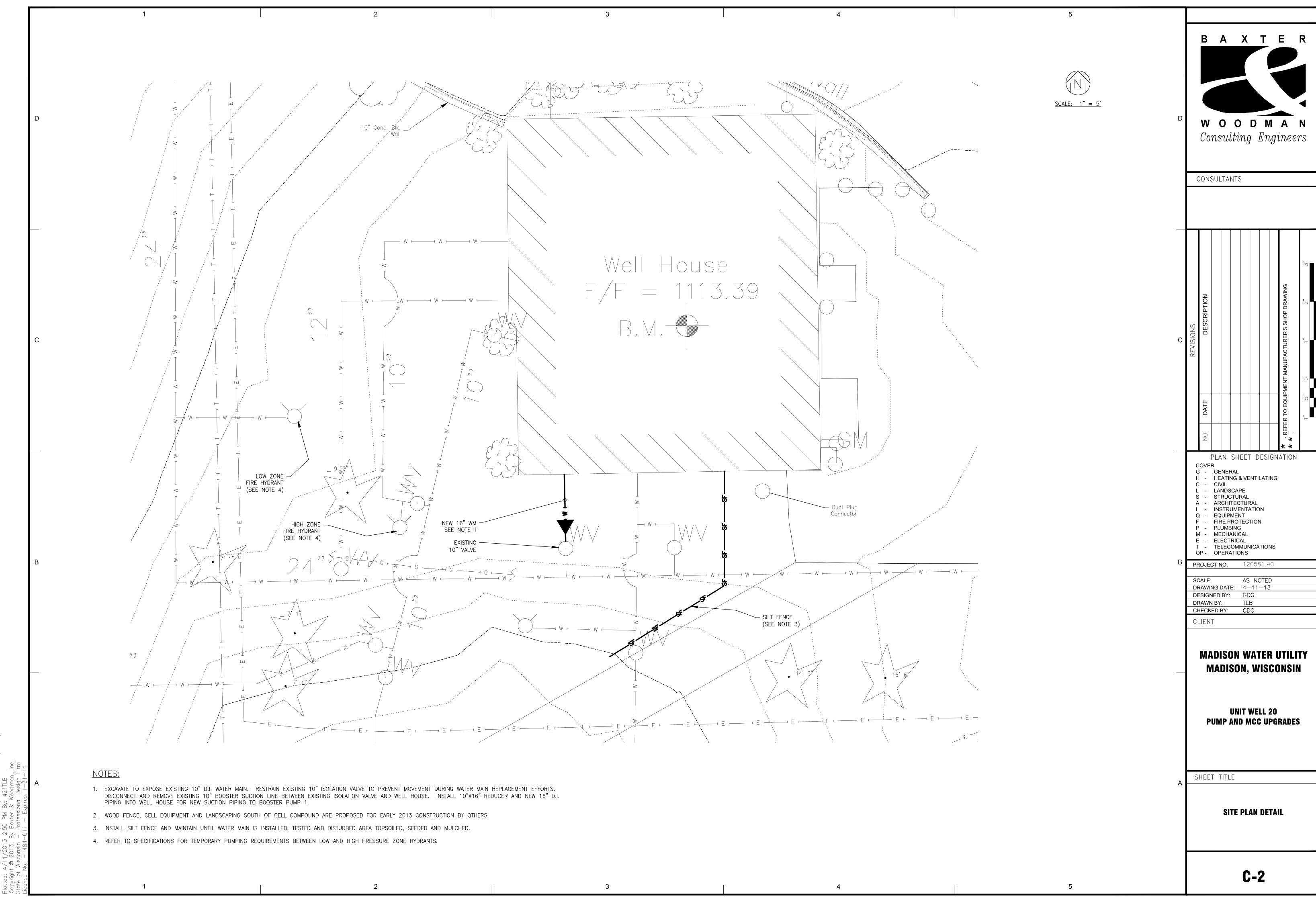


BAXTER & WOODMAN, INC. STATE OF WISCONSIN — PROFESSIONAL DESIGN FIRM LICENSE NO. — 484-001 — EXPIRES 1/31/2014

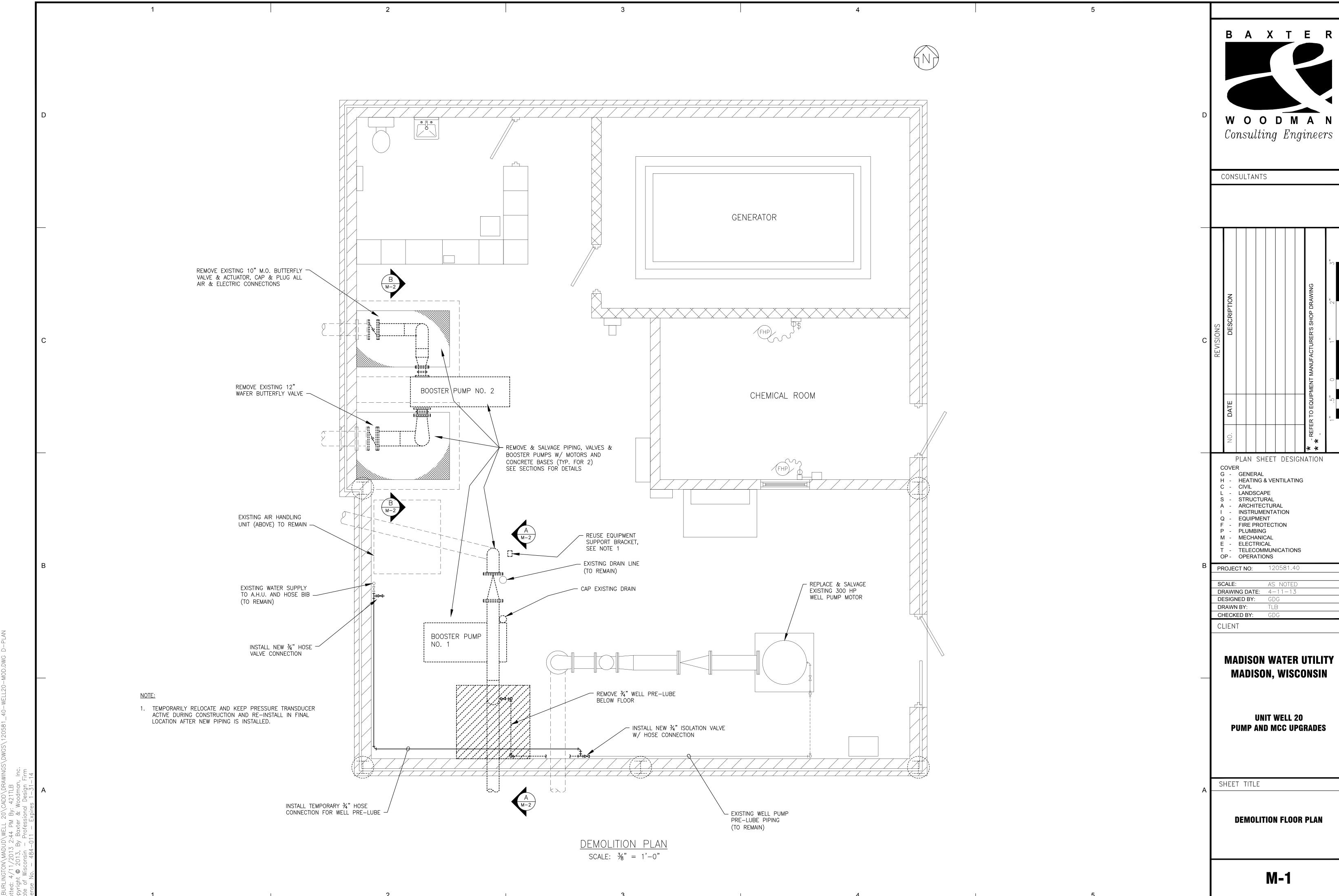
PROJECT NO.: 120581.40 DATE: 4-11-13

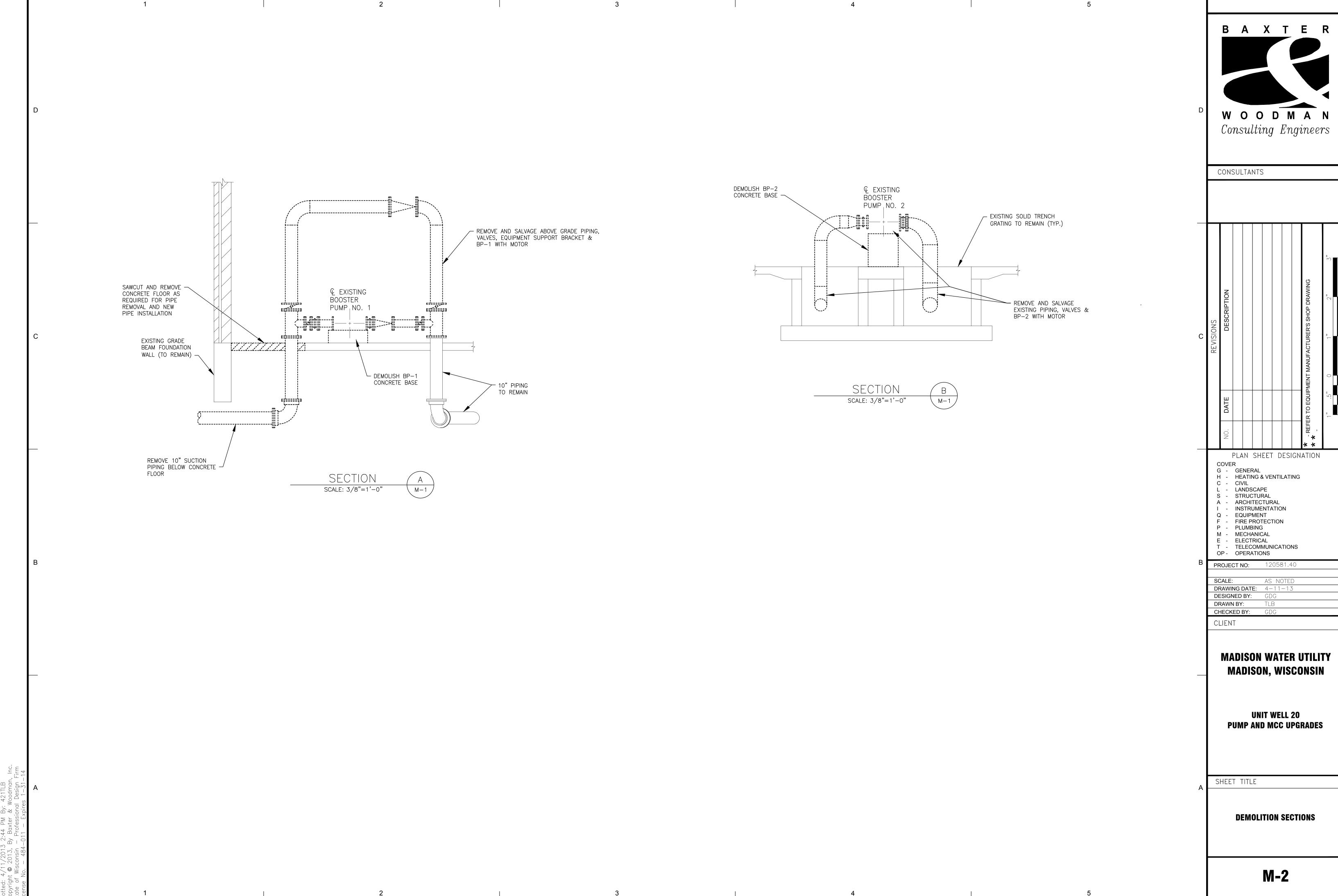
	1	<u>LEGEND</u>	2		3	4	5	
	EXISTING	<u>LLGLND</u>	PROPOSED	ABBREV	<u>/IATIONS_</u>	INDEV		BAXTER
		WORK BOUNDARY FENCE	— WBF ——— WBF—	CL CENTERLINE	R STRUCTURE TO BE RECONSTRUCTED	TITLE	SHEET NO.	
	——SA————SA—— ——ST—————ST——		——SF————SF—— ——SA———————————————————————	CONC PORTLAND CEMENT CONCRETE BIT BITUMINOUS PAVEMENT GR GRAVEL	A STRUCTURE TO BE ADJUSTED CENTRAL ANGLE D= DEGREE OF CURVE		GENERAL CIVIL MECHANICAL ELECTRICAL	
	——————————————————————————————————————	WATER MAIN	——————————————————————————————————————	CMP CORRUGATED METAL PIPE FH FIRE HYDRANT	T= TANGENT LENGTH L= CURVE LENGTH	LEGEND, ABBREVIATIONS, INDEX, GENERAL NOTES AND BENCHMARK	G-1	
	——————————————————————————————————————	FORCE MAIN	—— FM ———	CI CAST IRON DI DUCTILE IRON	R= RADIUS OF CURVE E= EXTERNAL DISTANCE	EXISTING SITE PLAN	C-1	
D	0	MANHOLE CATCH BASIN	•	F-F FACE-TO-FACE E-E EDGE-TO-EDGE	SE= SUPERELEVATION (FT. PER FT. OF WIDTH)	SITE PLAN DETAIL	C-2	WOODMA N
		INLET DRYWELL		B-B BACK-TO-BACK BM BENCH MARK	X = EXTERNAL DISTANCE OF VERTICAL CURVE	DEMOLITION FLOOR PLAN DEMOLITION SECTIONS	M-1 M-2	Consulting Engineers
	\triangleright	FLARED END SECTION FIRE HYDRANT	>	INV EL INVERT ELEVATION CL EL CENTERLINE ELEVATION	PC POINT OF CURVATURE PI POINT OF INTERSECTION PT POINT OF TANGENCY	FLOOR PLAN SECTIONS	M-3 M-4	
	⊙ WV	WATER VALVE W/ BOX AND COVER	⊙w —	P POINT G GUTTER C CURB	POT POINT ON TANGENCY PCC POINT OF COMPOUND CURVATURE	MISCELLANEOUS DETAILS	M-5	CONSULTANTS
	∪ ⊙ BB	WATER VALVE VAULT WATER SERVICE BOX OR CURB STOP	■ ⊙ BB	BC BACK OF CURB EOP EDGE OF PAVEMENT	PRC POINT OF REVERSE CURVATURE VC VERTICAL CURVE	ELECTRICAL PLAN ELECTRICAL NOTES AND WIRING DIAGRAMS	E-1 E-2	
	□ WM ○ CO	WATER METER CLEAN OUT		PL PROPERTY LINE ROW RIGHT OF WAY	N&W NAIL AND WASHER TCE TEMPORARY CONSTRUCTION EASEMENT	ELECTRICAL SYMBOL LIST	E-3	
_	O SV	SEPTIC VENT TO BE ABANDONED AND/OR REMOVED	-	FL FLOW LINE TF TOP OF FRAME				
	G			TC TOP OF CURB OR CONCRETE				
	⊙ GV □ GVV	GAS VALVE W/ BOX AND COVER GAS VALVE VAULT						
	□GM O GR	GAS METER GAS RISER	□ GM	RENCH	HMARKS	GENERAL NOTES:	WISCONSIN DEPARTMENT OF TRANSPORTATION	
	⊙ GAS	GAS SERVICE VALVE		BM = WELL HOUSE FINISH F		 ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH STATE OF STANDARD SPECIFICATIONS AND DEPARTMENT OF NATURAL RESOURCE 	CES REQUIREMENTS.	TION RAWIN
	—— T —————————————————————————————————	TELEPHONE DUCT		DM - WELL HOUSE THUSH I	LOOK ELLVATION - TITO.55	 EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE C ACCORDANCE WITH THE EROSION CONTROL NOTES LISTED BELOW. 	COMMENCEMENT OF ANY WORK, IN	SCRIPT
C	☐ TEL □TR	TELEPHONE VAULT TELEPHONE RISER				3.) CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE OWNE UTILITIES AND THEIR APPURTENANCES MAY BE LOCATED AND ADJUST A	R OF ALL EXISTING FACILITIES SO THE STED, IF NEEDED, PRIOR TO THE START OF	EVISIONS DES DES CTURER'S 5
	——————————————————————————————————————	CABLE TELEVISION (BURIED) CABLE T.V. RISER				CONSTRUCTION. THE CONTRACTOR SHALL COOPERATE WITH ALL UTI SPECIFICATIONS.		REVIS
	CTV	CABLE T.V. VAULT				4.) CONTRACTOR SHALL PROTECT FROM DAMAGE ALL CONCRETE AND A 5.) ONLY CITY OF MADISON PERSONNEL ARE ALLOWED TO OPERATE VA		MAN I
	E EM	UNDERGROUND ELECTRICAL ELECTRIC METER				NOT BE UTILITZED FOR MISCELLANEOUS WATER USE.		DWEN-I
	☐ ET ☐ EV	PAD MOUNTED TRANSFORMER ELECTRIC VAULT				6.) CONTRACTOR SHALL CONTACT THE CITY OF MADISON WATER UTILIT ANY WORK ON THE SITE.	Y 48 HOURS PRIOR TO COMMENCEMENT OF	ATE
	□ JB	JUNCTION BOX						FER TO
		UTILITY POLE w/ GUY ANCHOR UTILITY POLE w/ LIGHT						0 N N N N N N N N N N N N N N N N N N N
	¤ • MB	LIGHT STANDARD MAIL BOX	X					PLAN SHEET DESIGNATION
	-	STREET SIGN RAILROAD SIGNAL				EROSION CONTROL NOTES:		COVER G - GENERAL H - HEATING & VENTILATING
		TRAFFIC SIGNAL CONTROLLER TRAFFIC SIGNAL POST W/ SIGNAL HEAD				1.) ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE STATE RESOURCES REQUIREMENTS AND CITY OF MADISON.	E OF WISCONSIN DEPARTMENT OF NATURAL	C - CIVIL L - LANDSCAPE S - STRUCTURAL
	✓ 12"	HANDHOLE DECIDUOUS TREE (W/ TRUNK INCH DIA.)	(HATCHED SHALL BE REMOVED)			2.) EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO THE C		A - ARCHITECTURAL I - INSTRUMENTATION Q - EQUIPMENT
	16'	CONIFEROUS TREE (W/ HEIGHT)	(HATCHED SHALL BE REMOVED)			THROUGHOUT THE WORK, AND REMOVED AS DIRECTED BY THE ENG. 3.) SILT FENCE SHALL BE MAINTAINED AT LEAST ON A WEEKLY BASIS		F - FIRE PROTECTION P - PLUMBING M - MECHANICAL
		DECIDUOUS BUSH	DE NEMOVES,			1/2-INCH OR GREATER.		E - ELECTRICAL T - TELECOMMUNICATIONS OP - OPERATIONS
В	Z Z Z	CONIFEROUS BUSH DEFINING EDGE OF BRUSH OR FORESTED AREA				4.) EROSION BLANKETS SHALL BE PLACED ON RESTORED SLOPES OF ALL DITCHES TO A WIDTH OF 4 FEET. THE COST SHALL BE INCIE EROSION BLANKETS WILL BE DETERMINED DURING CONSTRUCTION.	DENTAL TO THE CONTRACT. LOCATIONS OF THE	B PROJECT NO: 120581.40
	XX	FENCE				5.) REFER TO THE SPECIFICATIONS AND STANDARD DETAILS FOR MATE	RIALS AND INSTALLATION METHODS.	SCALE: NONE DRAWING DATE: 4-11-13
			<u>├</u>					DESIGNED BY: GDG DRAWN BY: TLB
	→	DITCH SUMMIT						CHECKED BY: GDG CLIENT
		EDGE OF LAKE, RIVER, ETC. MARSH						- CELLITT
	— -Тор— —Тое— —	TOP OR TOE OF SLOPE						MADISON WATER UTILITY
- -	— — — 742— — — — — — — — —	CONTOUR EASEMENT	742 					MADISON, WISCONSIN
	<u></u>	()	PROP. R.O.W					
	□ ROW 	RIGHT OF WAY MONUMENT UNFENCED PROPERTY LINE						UNIT WELL 20
	— X P.L. X • IP	FENCED PROPERTY LINE IRON PIPE (PROPERTY CORNER)						PUMP AND MCC UPGRADES
Jan, In 31 – 14	625.35 (P,G,C)	CENTER LINE PROPOSED EL //EXISTING EL)						SHEET TITLE
4217L Woodrr Desic	625.9)	PROPOSED EL./(EXISTING EL.) (POINT, GUTTER, TOP OF CURB)	#					^
er & By: Expire		SOIL BORING AND NUMBER						LEGEND, ABBREVIATIONS,
2:51 F 2:51 F 7 Baxt 011 —	B.M. 	BENCH MARK SURVEY CONTROL POINT						INDEX, GENERAL NOTES
72013 2: 72013 2: 013, By nsin – 484-0								AND BENCHMARK
4/11/ 4/11/ Wiscon No. –								G-1
red: yrigh e of nse								u-1



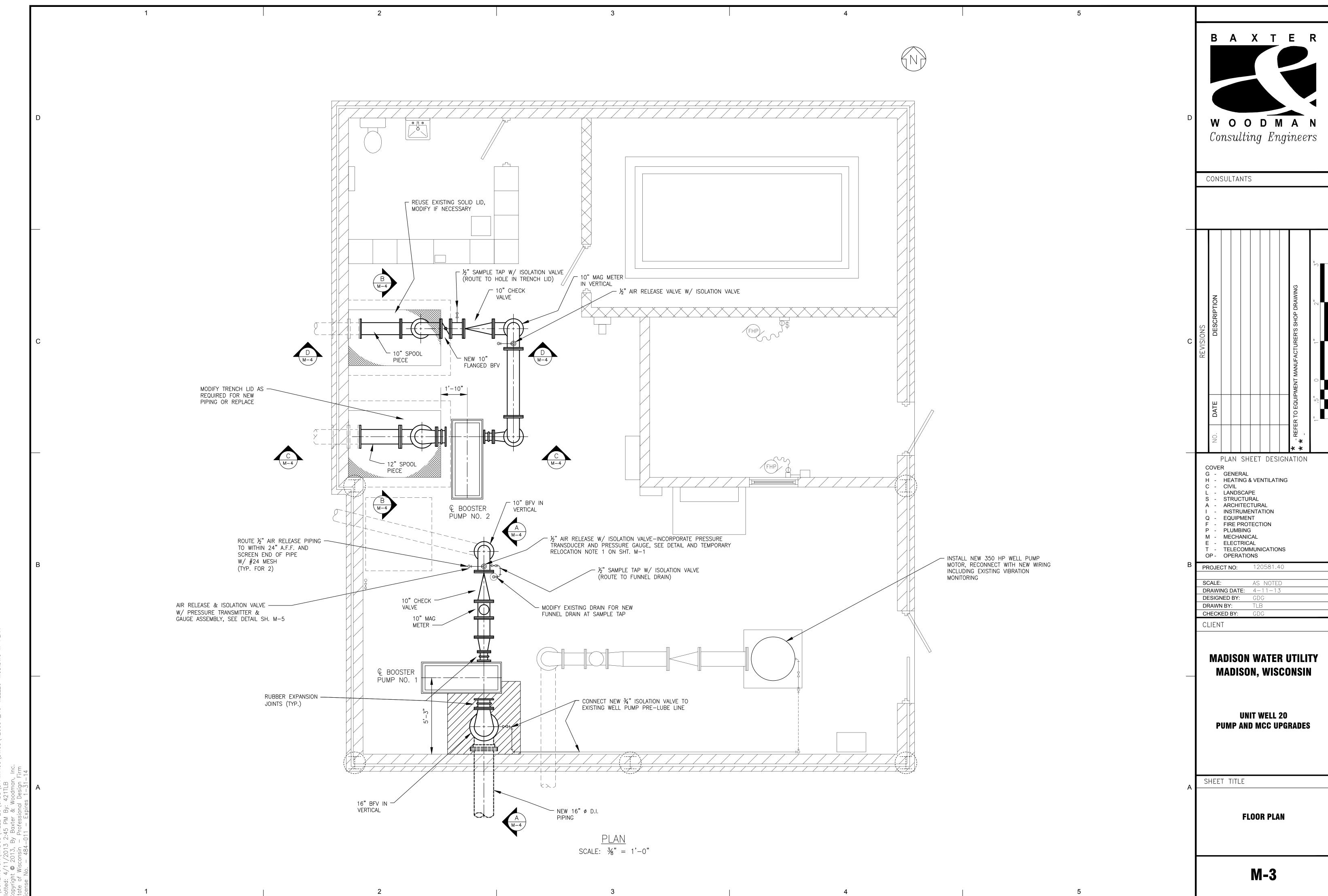


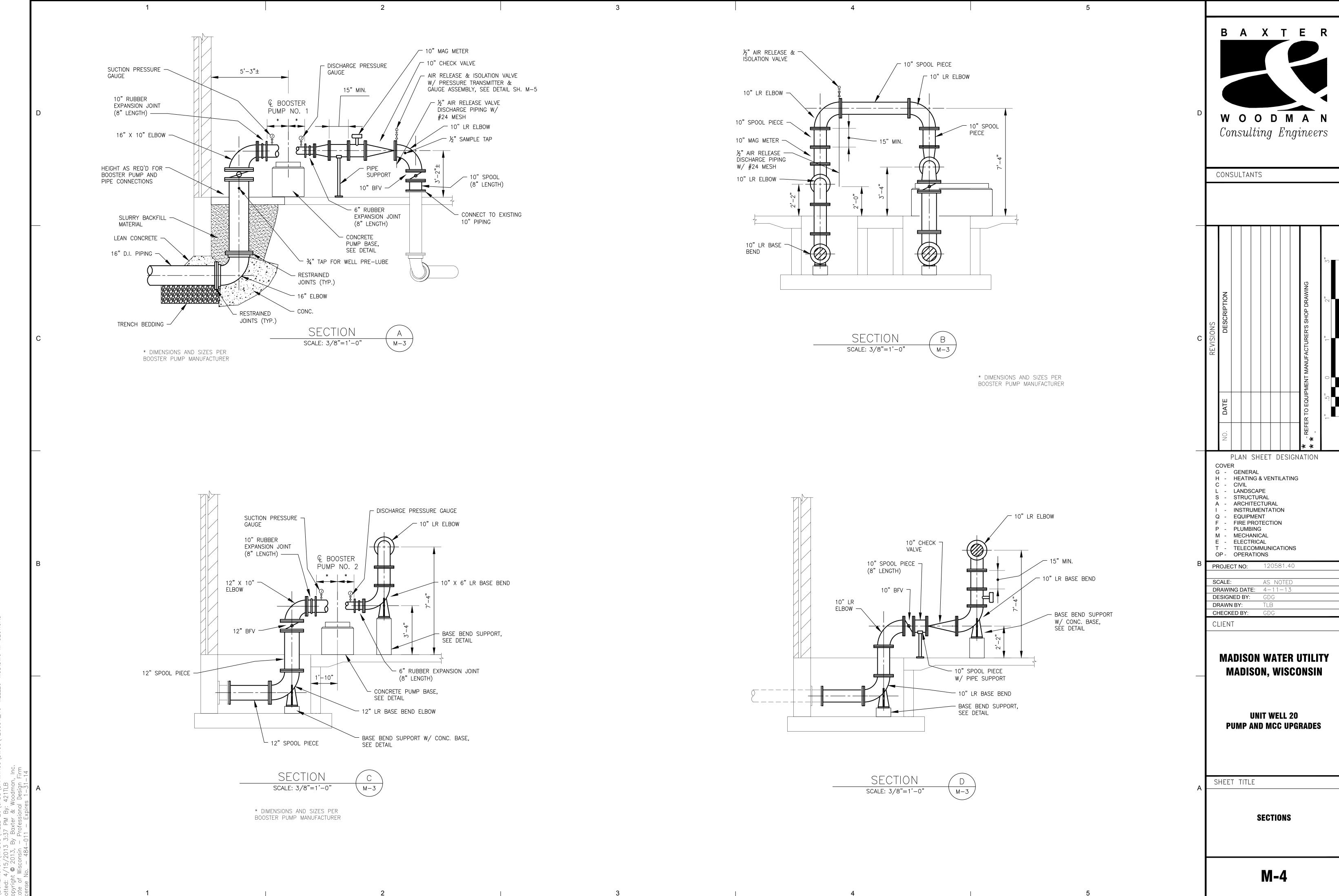
BURLINGTON\MADUD\WELL 20\CADD\DRAWINGS\DWGS\120581_4 btted: 4/11/2013 2:50 PM Bv: 421TIB

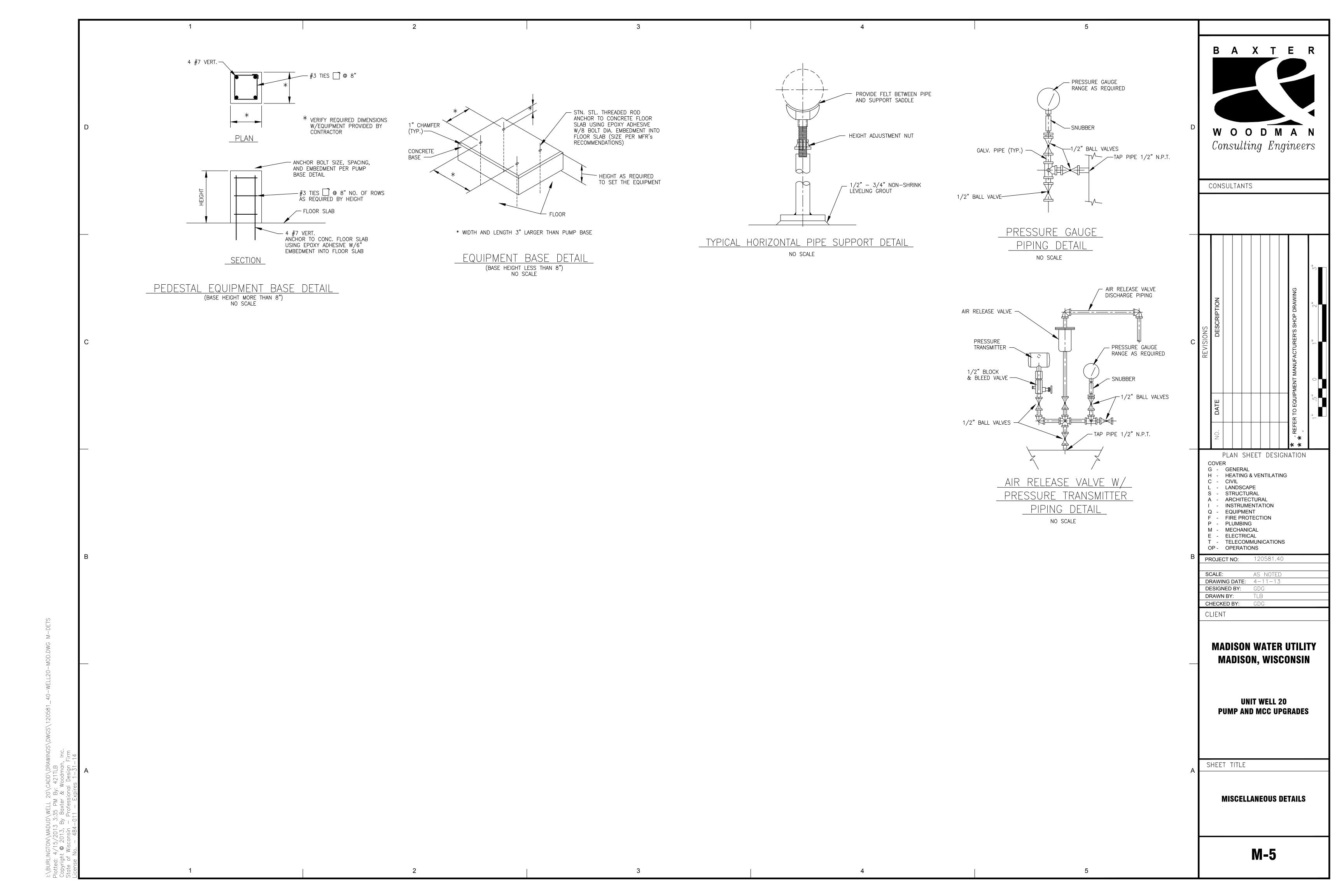


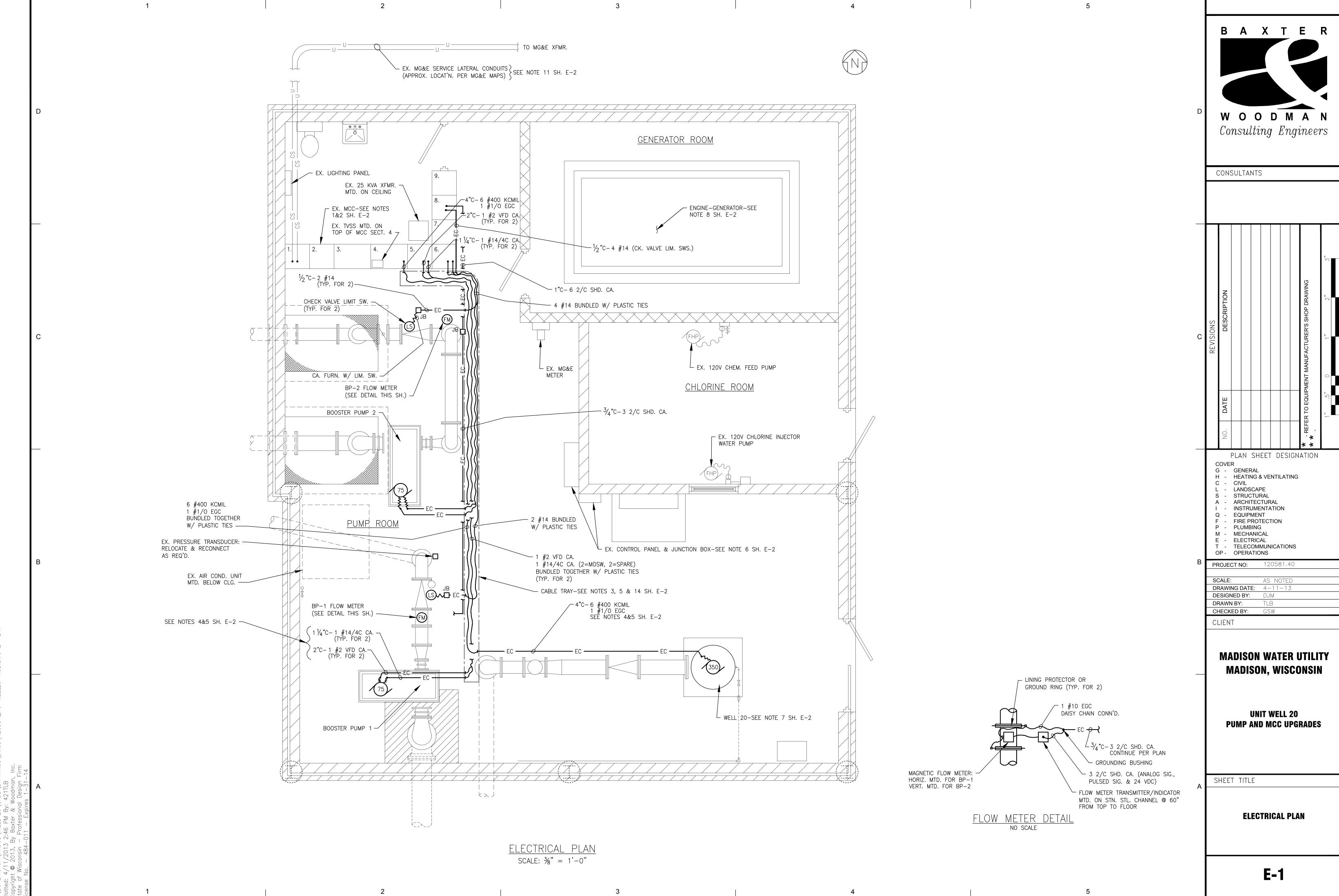


DUD\WELL 20\CADD\DRAWINGS\DWGS\120581_40-WELL20-MOD.DWG D-SECTIONS 3 2:44 PM Bv: 421TIB









:URLINGTON\MADUD\WELL 20\CADD\DRAWINGS\DWGS\120581_40-WELL2(ted: 4/11/2013 2:46 PM By: 421TLB 2. MODIFY THE EXISTING FURNAS SYSTEM 89 MOTOR CONTROL CENTER AS FOLLOWS:

SECTION 1: REMOVE 80% RATED MAIN CIRCUIT BREAKER (SIEMENS SENTRON CAT. # MXD63S800A, 800A FRAME/800A TRIP/3P W/ INVERTED CONNECTIONS) & DOOR-REPLACE W/ 100% RATED MAIN CIRCUIT BREAKER (SIEMENS SENTRON CAT. # MXD63B800H, 800A FRAME/800A TRIP/3P W/ INVERTED CONNECTIONS (LINE @ BOTTOM, LOAD @ TOP) & CAT. # D66501-678 DOOR W/ PADLOCK HASP & LOTO PROVISIONS. SEE NOTE 11.

SECTION 2: REMOVE DIGITAL METER & CHART RECORDER-CLOSE OPENINGS ON HINGED DOOR AFTER REMOVAL OF METER & RECORDER.

SECTION 3: PROVIDE AUTHORIZED SERVICE TECHNICIAN FROM MFR. OF AUTOMATIC TRANSFER SWITCH TO EXAMINE AUTOMATIC TRANSFER SWITCH & PERFORM MAINTENANCE (INCLUDING REPLACEMENT OF DEFECTIVE PARTS) DEEMED TO BE NECESSARY RESULTING FROM EXAMINATION & FROM INPUT PROVIDED BY OWNER'S MAINTENANCE ELECTRICIAN.

SECTION 4:

a) REMOVE ALL EQUIPMENT.

- b) REPLACE CIRCUIT BREAKER WITH 800AF/700AT/3P (SIEMENS SENTRON CAT. # MXD63B700, OR EQUAL BY EATON/CUTLER-HAMMER). REPLACE CIRCUIT BREAKER OPERATING HANDLE AS REQ'D. TO ACHIEVE CORRECT OPERATION OF CIRCUIT BREAKER TOGGLE & DOOR INTERLOCK. REPLACEMENT CIRCUIT BREAKER OPERATING HANDLE MUST INCLUDE LOTO PROVISIONS, DOOR INTERLOCK &
- c) REPLACE INPUT CONTACTOR WITH ROCKWELL/ALLEN-BRADLEY OR EATON/CUTLER-HAMMER IEC TYPE CONTACTORS HAVING 500A INDUCTIVE
- LOAD RATING, 120VAC COIL & LUGS LISTED FOR NUMBER & AWG SIZE OF WIRES SHOWN ON ONE-LINE DIAGRAM THIS SHEET. d) REPLACE FURNAS NORDIC 150-300HP SOFT STARTER & EXTERNAL DC BRAKE COMPONENTS WITH ROCKWELL/ALLEN-BRADLEY
- 200-400HP SMC-FLEX COMPLETE WITH INTEGRAL PUMP CONTROL e) RE-USE EXISTING CONTROL & INDICATION DEVICES ON DOOR OF SECTION 4 & RELOCATE EXISTING KEY-OPERATED SWITCH & ELECTRODE INDICATORS & H-O-A SWITCH ON CONTROL PANEL ON SECTION 8 TO DOOR OF SECTION 4.
- f) PROVIDE BACK-SPIN TIMER MOUNTED ON DOOR OF SECTION 4. q) CONNECT PER WELL PUMP ONE-LINE POWER RISER DIAGRAM SHOWN ON THIS SHEET. PROVIDE CONTROL WIRING PER ALTRONEX WIRING DIAGRAM.

SECTION 5: a) PROVIDE 150A/3P, F-FRAME CIRCUIT BREAKER FOR PROPOSED 75HP BOOSTER PUMP 1 (SIEMENS SENTRON CAT. # HFD63B150, OR EQUAL BY EATON/CUTLER-HAMMER). PROVIDE CIRCUIT BREAKER OPERATING HANDLE WITH LOTO PROVISIONS, DOOR INTERLOCK & DEFEATER

- b) PROVIDE ROCKWELL/ALLEN-BRADLEY POWERFLEX 753, 75HP VFD WITH LINE REATOR & HUMAN MACHINE INTERFACE (HMI) MODULE.
- c) PROVIDE SELECTOR SWITCHES & PILOTLIGHTS MOUNTED ON DOOR OF THIS SECTION TO REPLACE EXISTING LIKE DEVICES LOCATED ON DOOR FOR EXISTING BOOSTER PUMP VFD IN SECTION 6 & ON EXISTING CONTROL PANEL ON SECTION 8.
- d) PROVIDE ENGRAVED NAMEPLATE ON DOOR TO READ "BOOSTER PUMP 1".

SECTION 6: REMOVE 2 VFDs, CIRCUIT BREAKERS & ALL RELATED EQUIPMENT-INSTALL EQUIPMENT (SAME AS SPECIFIED FOR SECTION 5) FOR PROPOSED 75HP BOOSTER PUMP 2-PROVIDE ENGRAVED NAMEPLATE TO READ "BOOSTER PUMP 2".

SECTION 7: RELOCATE H-O-A SELECTOR SWITCH FOR AIR CONDITIONER ON EXISTING CONTROL PANEL ON SECTION 8 TO RESPECTIVE UNIT DOOR ON SECTION 7.

SECTION 8&9:

a) REMOVE EXISTING CONTROL PANEL ON SECTION 8.

- b) PROVIDE PLC BASED CONTROL & ALARM SYSTEM WITH TOUCH SCREEN, PROGRAMMING PORT & UPS, HAVING SAME FUNCTIONALITY AS SYSTEM AT UNIT WELL 30, WHICH WAS PROVIDED BY ALTRONEX CONTROL SYSTEMS.
- 3. HANG CABLE TRAY BELOW SUSPENDED CEILING IN TRAPEZE FASHION W/ GALV. STL. CHANNELS SPACED 4'-0" O.C. ATTACHED TO ½" THREADED GALV. STL.
- RODS FASTENED TO UNDERSIDE OF ROOF STRUCTURE W/ STN. STL. EXPANSION ANCHORS. 4. HANG EXPOSED CONDUITS BELOW SUSPENDED CEILING W/ CONDUIT CLAMPS ATTACHED TO 1/2" THREADED GALV. STL. RODS FASTENED TO UNDERSIDE OF ROOF
- STRUCTURE W/ STN. STL. EXPANSION ANCHORS. 5. DO NOT OBSTRUCT EXISTING LIGHT FIXTURES (NOT SHOWN). RELOCATE LIGHT FIXTURES &/OR REPOSITION CABLE TRAY & EXPOSED CONDUITS ON CEILING
- 6. MODIFICATIONS TO EXISTING CONTROL PANEL ARE TO BE PROVIDED BY ALTRONEX CONTROL SYSTEMS DIVISION OF L.W. ALLEN, INC. & ARE TO INCLUDE REMOVAL OF EXISTING CONTROL EQUIPMENT & CONVERSION OF ENCLOSURE INTO A PULL BOX FOR EXISTING WIRES/CABLES RUNNING FROM EXISTING &/OR NEW EQUIPMENT TO CONTROL PANEL IN MCC SECTIONS 8&9 AS DESCRIBED IN NOTE 2. CONTRACTOR TO COORDINATE W/ ALTRONEX REGARDING ANY
- 7. REINSTALL EXISTING VIBRATION SENSOR & EXISTING TVSS (NOT SHOWN) ON REPLACEMENT WELL PUMP MOTOR.
- 8. PROVIDE AUTHORIZED SERVICE TECHNICIAN FROM MFR. OF ENGINE-GENERATOR TO EXAMINE ENGINE-GENERATOR & PERFORM MAINTENANCE (INCLUDING REPLACEMENT OF DEFECTIVE PARTS) DEEMED TO BE NECESSARY RESULTING FROM EXAMINATION & FROM INPUT PROVIDED BY OWNER'S MAINTENANCE ELECTRICIAN.

INTERCONNECTIONS (CONDUITS & WIRES/CABLES) REQUIRED BY ALTRONEX FROM CONTROL PANEL TO MCC OR OTHER EQUIPMENT.

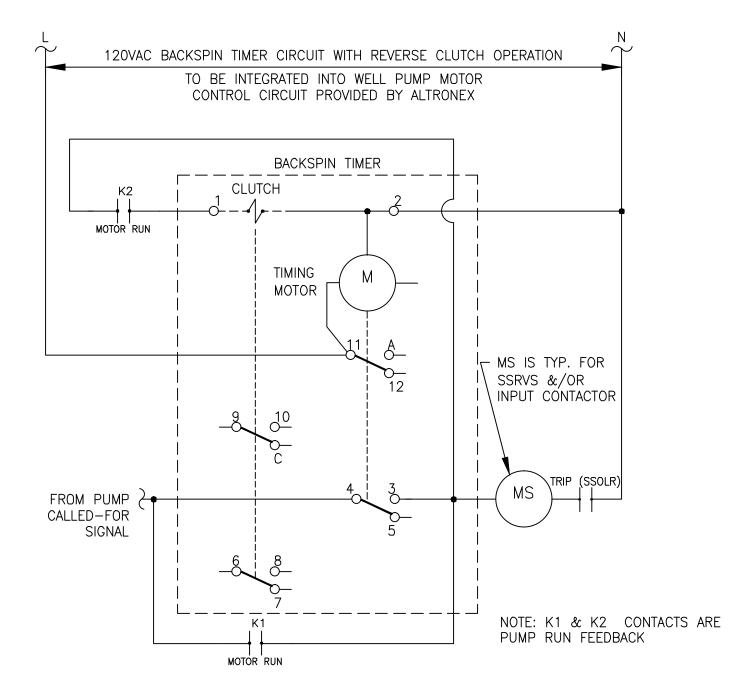
- 9. REMOVE EXISTING POWER WIRES & FLEXIBLE CONDUITS SERVING WELL MOTOR & BOOSTER PUMP MOTORS. PROVIDE PLUG OR CAP ON CONDUIT STUB @ EA. PUMP.
- 10. BOND CABLE TRAY TO EX. MCC W/ 1 # 1/O EGC & SUITABLE LUGS.
- 11. COORDINATE THE REPLACEMENT BY MG&E OF THEIR DUAL SETS OF 4 #350KCMIL CU SERVICE LATERAL WIRES WITH DUAL SETS OF 4 #500KCMIL CU SERVICE LATERAL WIRES.
- 12. ALL WORK REQUIRING SHUTDOWN OF EQUIPMENT SHALL BE PERFORMED AT THE OWNER'S CONVENIENCE. NO SHUTDOWN OF EQUIPMENT SHALL BE PERFORMED WITHOUT OWNER'S APPROVAL. THE CONTRACTOR SHALL INCLUDE ALL PREMIUM TIME REQUIRED TO DO THIS WORK IN HIS BID.
- 13. PROVIDE ARC-FLASH HAZARD WARNING LABEL IN COMPLIANCE WITH NEC 110.16 ON EACH HINGED DOOR OF MCC.
- 14. PROVIDE 11/2" MIN. SEPARATION BETWEEN CABLES & WIRE BUNDLES IN CABLE TRAY.
- 15. RETURN ALL REMOVED EQUIPMENT TO OWNER.

FROM WHERE SHOWN AS REQUIRED.

3 #400 KCMIL △ 800AF/700AT CCT. BKR. 350HP, $460V \bigcirc = 414FLA \times 1.25\% = 517.5A$ - 3 #400 KCMIL △ 500A INDUCTIVE IEC TYPE INPUT CONTACTOR - 3 #400 KCMIL∠\ 200-400HP REDUCED VOLTAGE STARTER W/INTEGRAL PUMP CONTROL TO GROUND BUS \triangle 545 AMP'TY./NEC TABLE 310.15(B)(17), 75° COL. 6 #400KCMIL ▲ 536 TOTAL AMP'TY./NEC TABLE 310.15(B)(16), 75° COL. & TABLE 1 #1/0 EGC 310.15(B)(3)(a) TO 350 HP WELL MOTOR

TO HORIZ. MAIN BUS

WELL PUMP ONE-LINE POWER RISER DIAGRAM NO SCALE



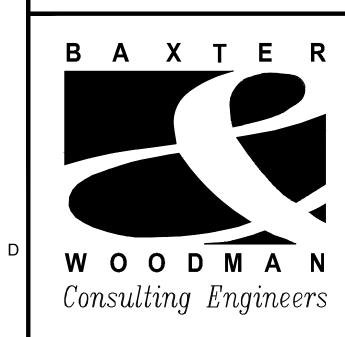
OPERATION OF THE BACKSPIN TIMER

- 1. WITH POWER OFF, TIMER IS IN UN-ENERGIZED STATE. 2. WHEN 120V POWER IS RESTORED, TIMING MOTOR IS ENERGIZED, K2 CONTACT IS OPEN
- 11-A CLOSE, STOPPING TIMING MOTOR AND ENABLING MS TO BE ENERGIZED. 3. WHEN WELL PUMP IS "CALLED FOR", CONTROL POWER IS PRESENT ENERGIZING MS COIL AND STARTING PUMP MOTOR, K1 AND K2 CONTACTS CLOSE, LATCHING CONTACTS 4-3 AND ENERGIZING CLUTCH.

AND CLUTCH IS NOT ENERGIZED. TIMING MOTOR TIMES OUT AND CONTACTS 4-3 AND

- A. THIS RESETS CONTACTS 11-12 AND 4-5 AND CLOSES CONTACTS 9-10 AND 6-8 INSTANTANEOUSLY.
- B. TIMING MOTOR IS ENERGIZED, BUT WILL NOT START TIMING UNTIL CLUTCH IS DE-ENERGIZED.
- 4. WHEN WELL PUMP CONTROL IS OPENED (PUMP CALLED TO TURN OFF), THE MS COIL IS DE-ENERGIZED, OPENING K1 AND K2 CONTACTS. THIS DE-ENERGIZES THE CLUTCH AND STARTS THE TIMING SEQUENCE, CONTACTS 9-C AND 6-7 CLOSE INSTANTANEOUSLY. A. AFTER THE MOTOR TIMES OUT, CONTACTS 11-A AND 4-3 CLOSE STOPPING THE TIMING MOTOR AND ENABLING THE PUMP MOTOR TO START ON THE NEXT "CALLED FOR" SIGNAL.

BACK-SPIN TIMER WIRING DIAGRAM NO SCALE



CONSULTANTS

PLAN SHEET DESIGNATION

GENERAL

HEATING & VENTILATING C - CIVIL

L - LANDSCAPE

S - STRUCTURAL A - ARCHITECTURAL

I - INSTRUMENTATION Q - EQUIPMENT

F - FIRE PROTECTION

P - PLUMBING

M - MECHANICAL E - ELECTRICAL

T - TELECOMMUNICATIONS OP - OPERATIONS

PROJECT NO: 120581.40 SCALE: AS NOTED **DRAWING DATE**: 4-11-13DESIGNED BY: DJM CHECKED BY: GSW

CLIENT

MADISON WATER UTILITY MADISON, WISCONSIN

UNIT WELL 20 PUMP AND MCC UPGRADES

SHEET TITLE

ELECTRICAL NOTES AND WIRING DIAGRAMS

