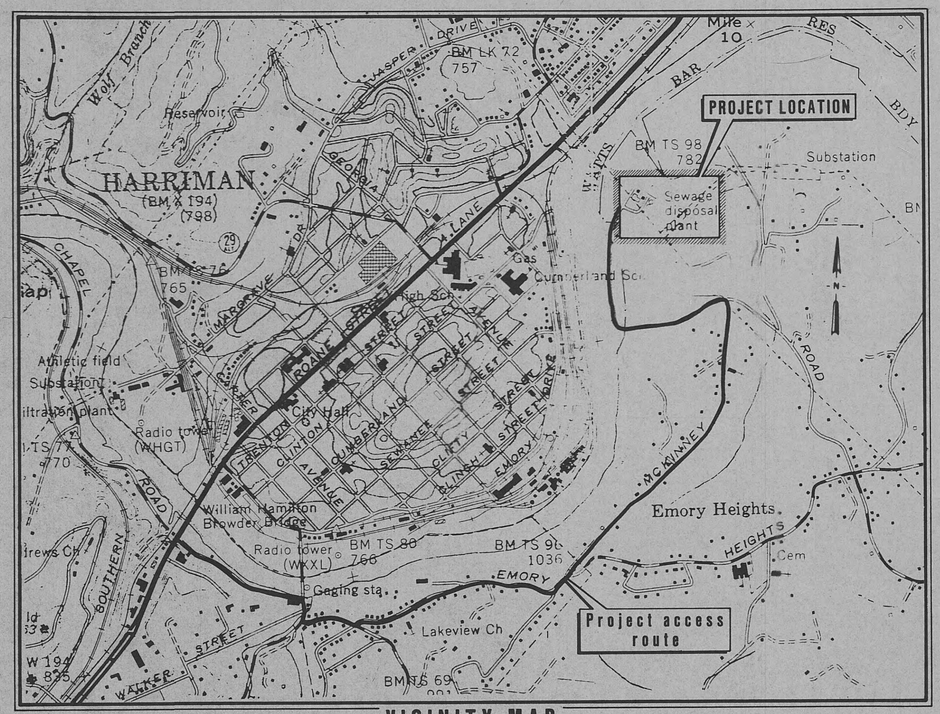
WASTEWATER TREATMENT FACILITY
FOR
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE



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RECORD DRAWINGS
Revisions Drawn by R. RATLIFF Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18376 — STATE OF TENNESSEE

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NO.	DATE	REVISION	BY
	9-9-88	RECORD DRAWING	

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CITY OF HARRIMAN, TENNESSEE

TITLE SHEET, VICINITY MAP, AND INDEX TO DRAWINGS

DWG NO. G-1
DATE MAY 1986
PROJ NO. SA21043.A1

HEATING, VENTILATING, AND AIR CONDITIONIN SYMBOLS

- WALL REGISTER OR GRILLE (SUPPLY) BG, BR, TG, TR
- CEILING DIFFUSER OR REGISTER (SUPPLY) CD, CR
- CEILING REGISTER OR GRILLE (RETURN AND EXHAUST) CG, CR
- *WALL REGISTER OR GRILLE (RETURN AND EXHAUST) BG, BR, TG, TR*
- TURNING VANES
- EXTRACTOR VANES
- SOUND ATTENUATED DUCT
- FD — FIRE DAMPER
- SPLITTER DAMPER
- MANUAL OPPOSED-BLADE DAMPER
- MANUAL BUTTERFLY DAMPER
- M — MOTORIZED DAMPER
- SD — SMOKE DAMPER
- FLEXIBLE CONNECTION
- FLEXIBLE DUCTWORK
- R — INCLINED RISE IN DUCT
- D — INCLINED DROP IN DUCT
- SUPPLY DUCT (SECTION)
- INTAKE, RETURN, OR EXHAUST DUCT (SECTION)
- T — THERMOSTAT
- S — SMOKE DETECTOR
- H — HUMIDISTAT
- MMP — MECHANICAL MOUNTING PANEL
- VIBRATION ELIMINATOR
- (200) — 200 SCFM

HVAC EQUIPMENT IDENTIFICATION

ASU	AIR SUPPLY UNIT
BD	BUTTERFLY DAMPER
BG	LOW WALL GRILLE
BO	BOILER
BOD	BOTTOM OF DUCT
BR	LOW WALL REGISTER
CD	CEILING DIFFUSER
CG	CEILING GRILLE
CR	CEILING REGISTER
CUH	CABINET UNIT HEATER
DG	DOOR GRILLE
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
ET	EXPANSION TANK
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER
FG	FLOOR GRILLE
HCG	HIGH CAPACITY CEILING GRILLE
HTP	HEAT PUMP OUTDOOR UNIT
HU	HUMIDIFIER
HWP	HOT WATER PUMP
HX	HEAT EXCHANGER
LCD	LINEAR CEILING DIFFUSER
MBH	1000 BRITISH THERMAL UNITS
MD	MOTORIZED DAMPER
ML	MOTORIZED LOUVER
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
RAC	ROOM AIR CONDITIONER
SC	SELF CONTAINED AIR CONDITIONING UNIT
TCU	TERMINAL AIR CONTROL UNIT
TG	HIGH WALL GRILLE
TR	HIGH WALL REGISTER
UH	UNIT HEATER
VF	VENTILATING FAN
WC	WATER COLUMN

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

HVAC LEGEND

SHEET	
DWG NO.	M-3
DATE	MAY 1986
PROJ NO.	SA21043.A1

MISCELLANEOUS PIPING SYMBOLS

- STRAINER
- SIGHT GLASS
- FLEXIBLE (ELASTOMER) PIPE CONNECTION
- GAUGE WITH COCK
- THERMOMETER
- ROTAMETER
- PS 26-1-2 — TYPICAL INSTRUMENT SYMBOL (SEE I&C LEGEND)
- GAUGE GLASS WITH COCKS
- EYEWASH
- SAFETY SHOWER
- EYEWASH WITH SAFETY SHOWER

VALVE SYMBOLS

- GATE
- BUTTERFLY
- GLOBE
- BALL
- VEE-BALL
- SEAT PORT
- ECCENTRIC PLUG
- PLUG OR COCK
- NEEDLE
- DIAPHRAGM
- PINCH
- SWING CHECK
- BALL CHECK
- SPLIT DISC CHECK
- HOSE VALVE (HV-X)
  X = NO. IN SPECS
- SAMPLE VALVE CONNECTION
- MUD VALVE
- PRESSURE RELIEF
- AIR AND/OR VACUUM RELEASE (AUTO)
- REGULATED SIDE
- PRESSURE CONTROL
- MULTI-PORT VALVE
  (BALL VALVE SHOWN. FOR OTHER VALVE TYPES, APPROPRIATE VALVE SYMBOL SHOWN.)
  ARROWS INDICATE FLOW PATTERN.
  SEAT PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.
- TELESCOPING VALVE
- SOLENOID
- VX — NON FREEZE HOSE VAVE WITH HOSE RACK
  X = NO. IN SPECS
- REDUCED PRESSURE BACKFLOW PREVENTER

MISCELLANEOUS SYMBOLS

XCO
X = F - FLOOR CLEANOUT
D - DECK CLEANOUT
W - WALL CLEANOUT

HD-Y
HUB DRAIN
Y-T WITH TRAP
Y-P WITH PRIMED TRAP

FD-XY
FLOOR DRAIN
X - NO. IN SPECS
Y - T WITH TRAP
Y - P WITH PRIMED TRAP

OD-X
OVERFLOW DRAIN
X = NO. IN SPECS

RD-X
ROOF DRAIN
X = NO. IN SPECS

AD-XY
AREA DRAIN
X = NO. IN SPECS
Y = T WITH TRAP
Y = P WITH PRIMED TRAP

NONPROCESS SELF CONTAINED VALVE AND EQUIPMENT TAG NUMBERS

D-X-Y

D = DEVICE
P = PUMP
T = TANK
M = MECHANICAL EQUIPMENT (ELEVATOR, BRIDGE, CRANE, ETC.)
PRV = PRESSURE REDUCING VALVE
PCV = PRESSURE CONTROL VALVE
PSV = PRESSURE RELIEF VALVE
RPBP = REDUCED PRESSURE BACKFLOW PREVENTER

X = SPECIFICATION TYPE NO.

Y = UNIT NO.

PLUMBING FIXTURE IDENTIFICATION

DF	DRINKING FOUNTAIN
EE	EMERGENCY EYE WASH
LAV	LAVATORY
SK	SINK
SSH	SAFETY SHOWER
SSK	SERVICE SINK
WC	WATER CLOSET
WH	WATER HEATER

EXAMPLE: LAV-2
FIXTURE LEGEND
NO. IN SPECIFICATIONS

GATE SYMBOLS

- SLUICE
- FABRICATED SLIDE

YARD PIPING SYMBOLS

NEW	EXISTING	
		NON-FREEZE HOSE VALVE X = NO. IN SPECIFICATIONS
		NON-FREEZE HOSE VALVE WITH HOSE RACK X = NO. IN SPECIFICATIONS
		GATE VALVE
		BUTTERFLY VALVE
FLOW, SEATING PORT		ECCENTRIC PLUG VALVE
		INDICATOR POST VALVE
		FIRE HYDRANT

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RECORD DRAWINGS
Revisions Drawn by R. RATLIFF Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — 11-21-82 — STATE OF TENNESSEE

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

MECHANICAL LEGEND

SHEET
DWG NO. M-2
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY SCREEN
PROJ NO. CONTRACT

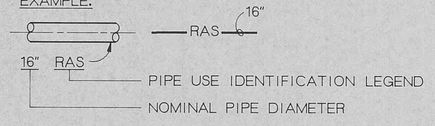
MECHANICAL LEGEND AND NOTES

GENERAL PIPING NOTES

1. LOCATIONS OF EXISTING UTILITIES WERE OBTAINED FROM RECORD DRAWINGS PREPARED FOR THE OWNER BY OTHERS. THESE ARE SHOWN FOR THE CONTRACTOR'S CONVENIENCE AND NO RESPONSIBILITY IS ASSUMED FOR COMPLETENESS OR ACCURACY.
2. PIPE, UNLESS OTHERWISE SHOWN, SHALL BE INSTALLED WITH A MINIMUM COVER OF 36 INCHES.
3. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS.
4. SIZE OF FITTINGS SHOWN ON PLANS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS FOR ADJACENT STRAIGHT RUN OF PIPE.
5. ALL JOINTS SHALL BE WATERTIGHT. STANDARD WALL PIPE DETAIL (314) SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.
6. FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST TIES, BLOCKS, OR ANCHORS. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.
7. SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE PLANS, WHEREVER APPLICABLE. ALL OF THE VARIOUS PIPING APPLICATIONS ARE NOT NECESSARILY USED IN THE PROJECT.
8. ALL BURIED PIPING SPECIFIED TO BE PRESSURE TESTED, EXCEPT FLANGED, WELDED, OF SCREWED PIPING, SHALL BE PROVIDED WITH CONCRETE THRUST BLOCKS OR THRUST TIES AT ALL DIRECTION CHANGES, UNLESS OTHERWISE NOTED.
9. NUMBER AND LOCATION OF UNIONS SHOWN ON PLANS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.

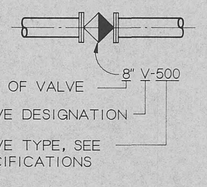
PIPING DESIGNATION

EXAMPLE:



VALVE DESIGATIONS

MANUAL VALVES AND CHECK VALVES



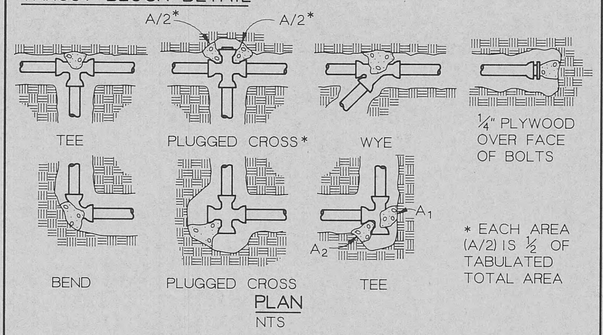
THRUST BLOCK NOTES AND DETAILS

THRUST BLOCK NOTES

1. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES.
2. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
3. REQUIRED VOLUMES OR BEARING AREAS AT FITTINGS SHALL BE AS INDICATED BELOW, ADJUSTED, IF NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES) STATED IN THE SPECIFICATIONS.
4. THRUST BLOCK VOLUMES FOR VERTICAL BENDS HAVING UPWARD RESULTANT THRUSTS ARE BASED ON TEST PRESSURE OF 150 PSIG AND THE WEIGHT OF CONCRETE = 4050 LBS/CU YD. TO COMPUTE VOLUMES FOR DIFFERENT TEST PRESSURES, USE THE FOLLOWING EQUATION: VOLUME = (TEST PRESS./150) x (TABLE VALUE).
5. BEARING AREAS FOR HORIZONTAL BEND THRUST BLOCKS ARE BASED ON TEST PRESSURE OF 150 PSIG AND AN ALLOWABLE SOIL BEARING STRESS OF 2000 LBS/SQ FT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION: BEARING AREA = (TEST PRESS./150) x (2000/SOIL BEARING STRESS) x (TABLE VALUE).*
6. THRUST BLOCKS FOR VERTICAL BENDS HAVING DOWNWARD RESULTANT THRUSTS SHALL BE THE SAME AS FOR HORIZONTAL BENDS.
7. BEARING AREAS, VOLUMES, AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER THIS STANDARD
8. BEARING AREA OF THRUST BLOCK SHALL NOT BE LESS THAN 1.0 SQ FT.
9. VERTICAL BENDS THAT REQUIRE A THRUST BLOCK VOLUME EXCEEDING 5 CUBIC YARDS REQUIRE SPECIAL BLOCKING DETAILS. SEE PLANS.

* ALLOWABLE SOIL BEARING STRESS = 1500 LBS/SQ FT.

THRUST BLOCK DETAIL



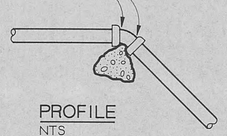
* EACH AREA (A/2) IS ½ OF TABULATED TOTAL AREA

PLAN
NTS

VOLUME OF THRUST BLOCK IN CUBIC YARDS (VERTICAL BENDS)			
FITTING SIZE	BEND ANGLE 45°	22½°	11¼°
4	1.1	0.4	0.2
6	2.7	1.0	0.4
8	4.0	1.5	0.6
10	6.0	2.3	0.9
12	8.5	3.2	1.3
14	11.5	4.3	1.8
16	14.8	5.6	2.3

FITTING SIZE	ROD SIZE	EMBEDDMENT
12" AND LESS	#6	30"
14"-16"	#8	36"

GALVANIZED RODS OVER FITTING AND EMBEDDED IN CONCRETE (SEE TABLE FOR SIZES)



PROFILE
NTS

BEARING AREA OF THRUST BLOCKS IN SQ. FT. (HORIZONTAL BENDS)							
FITTING SIZE	TEE, WYE, PLUG, OR CAP	90° BEND PLUGGED CROSS	TEE PLUGGED RUN A_1	TEE PLUGGED RUN A_2	BEND ANGLE 45°	22½°	11¼°
4	1.0	1.4	1.9	1.4	1.0	-	-
6	2.1	3.0	4.3	3.0	1.6	1.0	-
8	3.8	5.3	7.6	5.4	2.9	1.5	1.0
10	5.9	8.4	11.8	8.4	4.6	2.4	1.2
12	8.5	12.0	17.0	12.0	6.6	3.4	1.7
14	11.5	16.3	23.0	16.3	8.9	4.6	2.3
16	15.0	21.3	30.0	21.3	11.6	6.0	3.0
18	19.0	27.0	38.0	27.0	14.6	7.6	3.8
20	23.5	33.3	47.0	33.3	18.1	9.4	4.7
24	34.0	48.0	68.0	48.0	26.2	13.6	6.8

PIPE AND FITTING SYMBOLS

DOUBLE LINE	SINGLE LINE	
		EXISTING PIPE TO REMAIN EXISTING PIPE
		NEW PIPE
		EXISTING PIPE TO BE ABANDONED
		EXISTING PIPE TO BE REMOVED
		FLANGED JOINT
		MECHANICAL JOINT
		HUB & SPIGOT JOINT (RUBBER GASKET)
		FLEXIBLE COUPLING
		ELBOW UP
		ELBOW DOWN
		FLANGED COUPLING ADAPTER
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER
		UNION
		ELBOW, 90 DEGREE
		CROSS
		TEE
		ELBOW, 45 DEGREE
		LATERAL

NOTES:
1. ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLELINE FITTINGS. FITTINGS WITH OTHER END PATTENS ARE SHOWN SIMILARILY ON THE CONSTRUCTION DRAWINGS. ALSO SEE PIPING SPECIFICATIONS.
2. SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE FITTINGS.
3. EXISTING PIPING AND EQUIPMENT IS SHOWN LIGHT-LINED AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT IS SHOWN HEAVY LINED.

RECORD DRAWINGS
Revisions Drawn by R. RATLIFF Date 9-9-88

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NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWING	RDR	CNC

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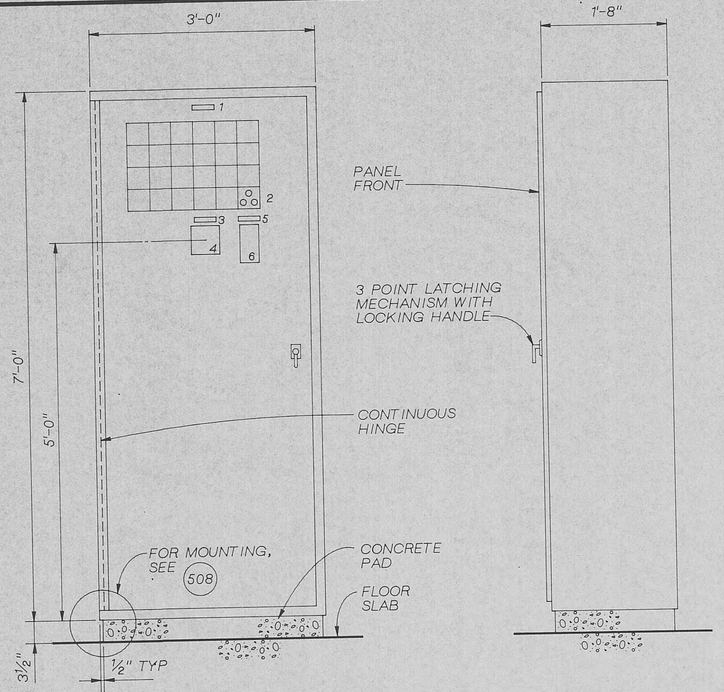
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

MECHANICAL LEGEND

SHEET	
DWG NO.	M-1
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION | COMPOSITE | OVERLAY | SCREEN
PROJ NO.
CONTRACT



NOTE:
ELECTRICAL CONDUIT ENTRY THROUGH TOP.

MAIN CONTROL PANEL - MCP

1"=1'-0"

MCP PANEL SCHEDULE

ITEM NO.	TAG NUMBER	NAMEPLATE INSCRIPTION (SERVICE LEGEND)
1	(NAMEPLATE)	MAIN CONTROL PANEL
2	(ANNUNCIATOR)	(SEE MCP ANNUNCIATOR SCHEDULE)
3	(NAMEPLATE)	BLUE - INFLUENT FLOW RED - EFFLUENT FLOW
4	FR-3-8	—
	FR-5-5	—
5	(NAMEPLATE)	EFFLUENT X 1000 GAL
6	FQI-5-5	—

MCP ANNUNCIATOR SCHEDULE

LOCATION ROW-COL	INSCRIPTION FIRST LINE	SECOND LINE	THIRD LINE	FOURTH LINE TAG NUMBER
1 - 1	INFLUENT	LEVEL	HIGH	LAH-3-1
1 - 2	SBR	SYSTEM	FAILURE	QA-4-8
1 - 3	SBR PROCESS	PUMP NO. 1	OVERTEMP	TAH-4-7-1
1 - 4	SBR PROCESS	PUMP NO. 2	OVERTEMP	TAH-4-7-2
1 - 5	EFFLUENT PUMP	MOTOR	TEMP HIGH	TAH-5-2
1 - 6	SURGE TANK	LEVEL	HIGH/LOW	LAHL-5-3
2 - 1	HEADWORKS	SCREENING	FAILURE	QA-3-2
2 - 2	ELECTRIC POWER	SOURCE NO. 1	FAIL	JAL-4-10-1
2 - 3	SBR PROCESS	PUMP NO. 1	SEAL INTRUSION	QA-4-7-1
2 - 4	SBR PROCESS	PUMP NO. 2	SEAL INTRUSION	QA-4-7-2
2 - 5	—	—	—	—
2 - 6	SURGE TANK	AIR SUPPLY	PRESSURE LOW	PALL-5-6
3 - 1	SUMP	PUMP	FAIL	LAHH-6-4
3 - 2	ELECTRIC POWER	SOURCE NO. 2	FAIL	JAL-4-10-2
3 - 3	DIGESTER	NO. 1	LEVEL HIGH	LAH-6-1-1
3 - 4	DIGESTER	NO. 2	LEVEL HIGH	LAH-6-1-2
3 - 5	EFFLUENT	PUMP STATION	LEVEL HIGH	LAH-5-1
3 - 6	(HORN)	—	—	—
4 - 1	CHLORINE	LEAK	—	QA-7-6-1
4 - 2	CHLORINE	VACCUUM	LOW	PAL-7-3
4 - 3	DIGESTER	NO. 1	LEVEL LOW	LAL-6-1-1
4 - 4	DIGESTER	NO. 2	LEVEL LOW	LAL-6-1-2
4 - 5	EFFLUENT	PUMP STATION	LEVEL LOW	LALL-5-1
4 - 6	(ACK-RESET-TEST)	—	—	—

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18376 — STATE OF TENNESSEE

CH2M HILL

DSGN	FH JOHNSON
DR	25211
CHK	J TURNER
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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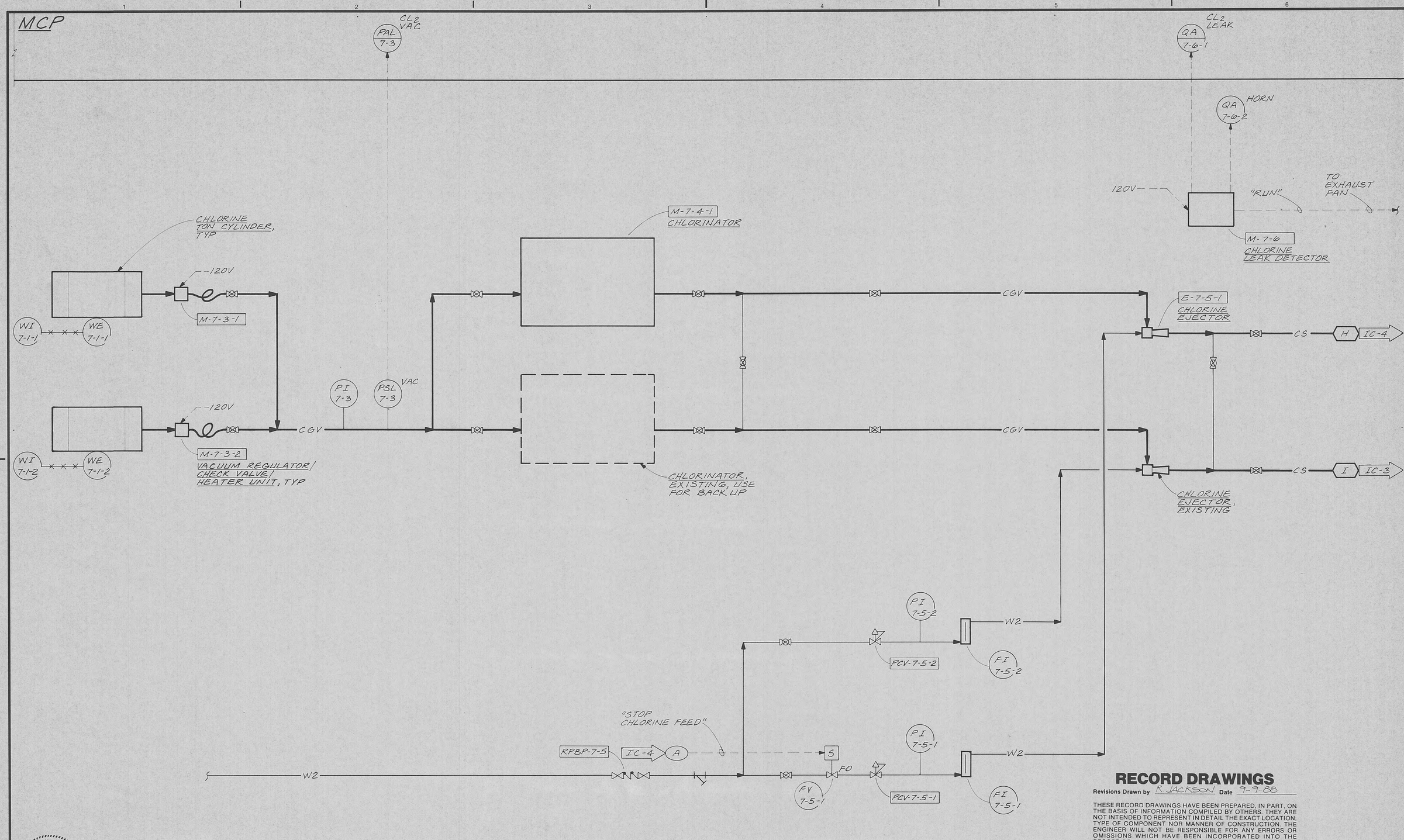
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

INSTRUMENTATION AND CONTROL

PANEL ELEVATION

SHEET	
DWG NO.	IC-8
DATE	MAY 1986
PROJ NO.	SA21043.A1

CHECKED BY
DRAWN BY
DESIGNED BY
PRINTED 2
FILM XE
FORMAT 2234MC
OVERLAY IDENTIFICATION
COMPOSITE
OVERLAY
SCREEN
PROJ
CONTRACT



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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

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DR CV O'RIELY					
CHK J TURNER		9-9-88	RECORD DRAWINGS	RDJ	CNC
APVD C CRANDALL	NO.	DATE	REVISION	BY	APVD

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CITY OF HARRIMAN, TENNESSEE

P&ID-CHLORINATION

DWG NO.	JC-7
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE
OVERLAY
SCREEN

MCP

LAL 6-1-1 (2)

LAH 6-1-1 (2)

LAHH 6-4

"SUMP PUMP FAIL"

00 HS 6-1-1 (2)

T-6-1-1 SLUDGE DIGESTER, TYP

LSL 6-1-1

LSH 6-1-1

00 QL 6-1-1

M-6-1-1 AERATOR, TYP

SLUDGE DRYING BEDS

IC-4 E WAS

TDS

T-6-1-2

00 M-6-1-2

00 QL 6-1-2

LSL 6-1-2

LSH 6-1-2

LCP-6-4

HOA

HS 6-4

ON

QL 6-4

480 V

"POWER"

"SEAL INTRUSION"

UD

SUP

SUP

DR

DR

P-6-4-1 SUBMERSIBLE SUMP PUMP, TYP

LSHH 6-4

LSH 6-4

LSM 6-4

LSL 6-4

UPD G IC-3

P-6-4-2

IC-3 A DR

IC-4 F DR

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CHARLES N. CRANDALL REGISTERED ENGINEER AGRICULTURAL No. 18375 STATE OF TENNESSEE

CH2M HILL

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DR CV O'RIELY
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APVD C CRANDALL

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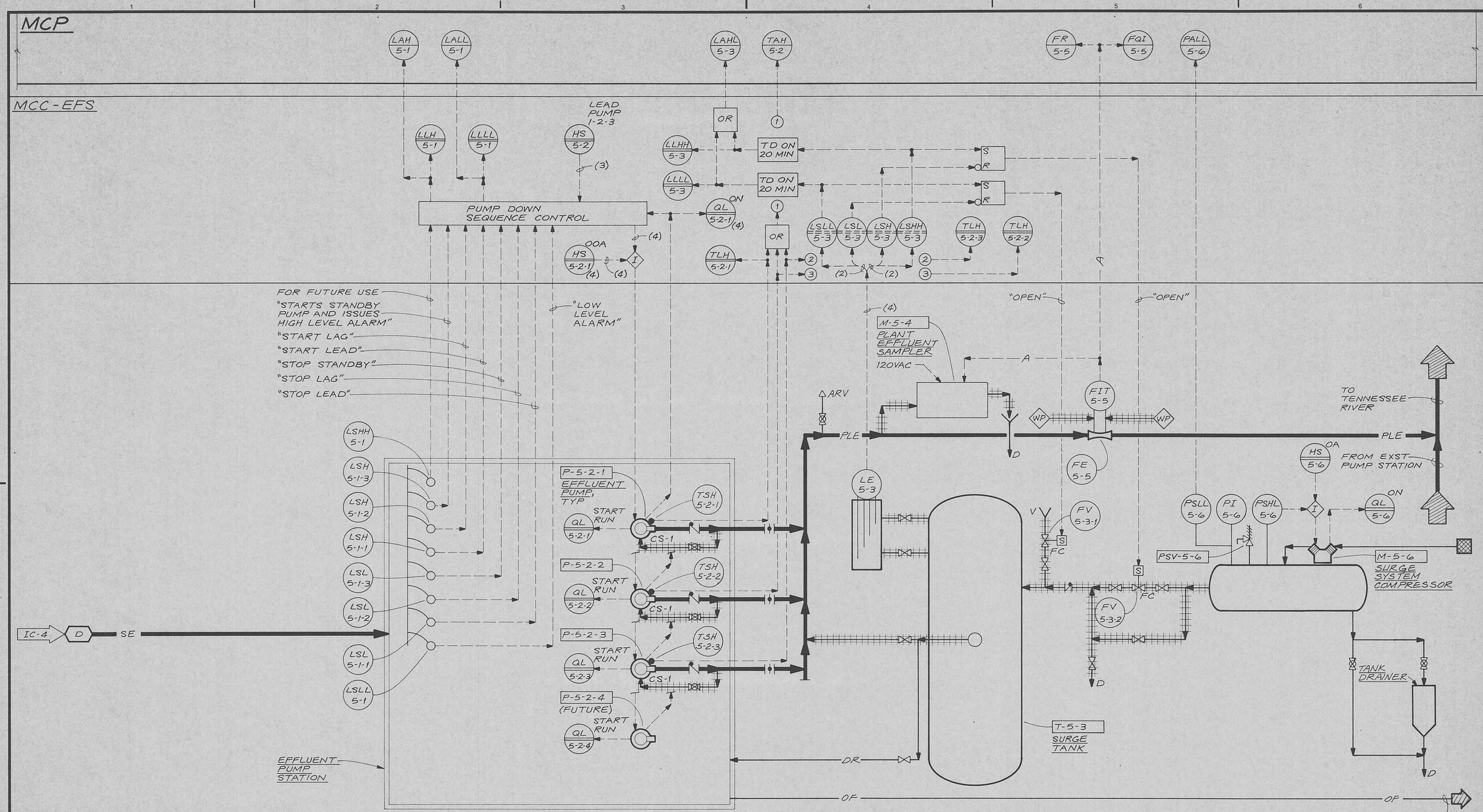
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

P&ID — SLUDGE DIGESTION AND SAND DRYING BEDS

DWG NO. IC-6
DATE MAY 1986
PROJ NO. SA21043.A1

DESIGNED BY 1 2 3
DRAWN BY 1 2 3
CHECKED BY 1 2 3

PRINTED 10 84 FILM KE FORMAT 2334 DC



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CH2M HILL

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DR C V O'RIELY					
CHK J TURNER					
APVD C CRANDALL	9-9-88	RECORD DRAWINGS	RDJ	CNC	
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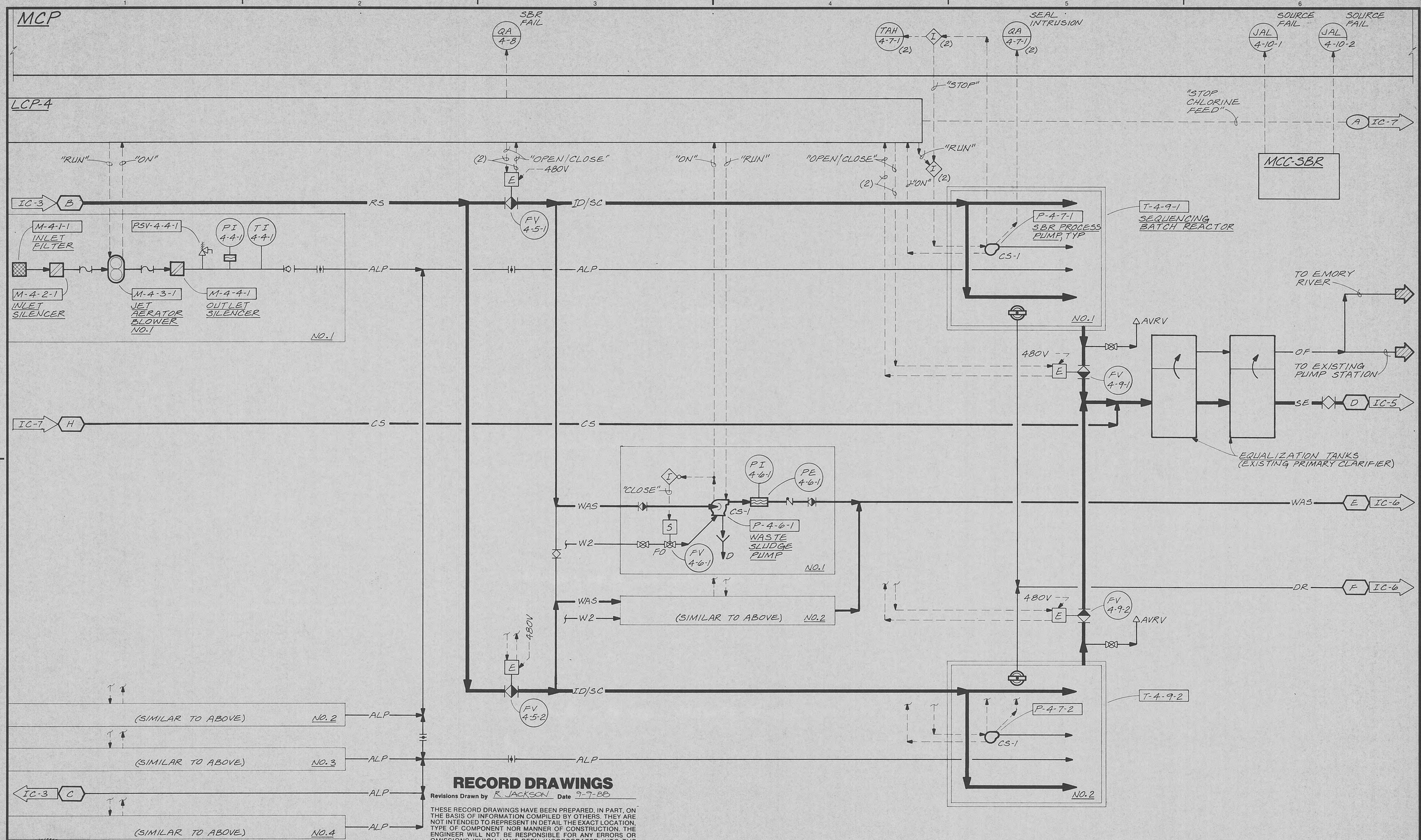
P&ID-EFFLUENT PUMP STATION

DWG NO.	IC-5
DATE	MAY 1986
PROJ NO.	SA21043.A1



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CHARLES N. CRANDALL REGISTERED ENGINEER 11-21-86 No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN F JOHNSON					
DR CV O'RIELY					
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APVD C CRANDALL	NO.	DATE	REVISION	BY	APVD

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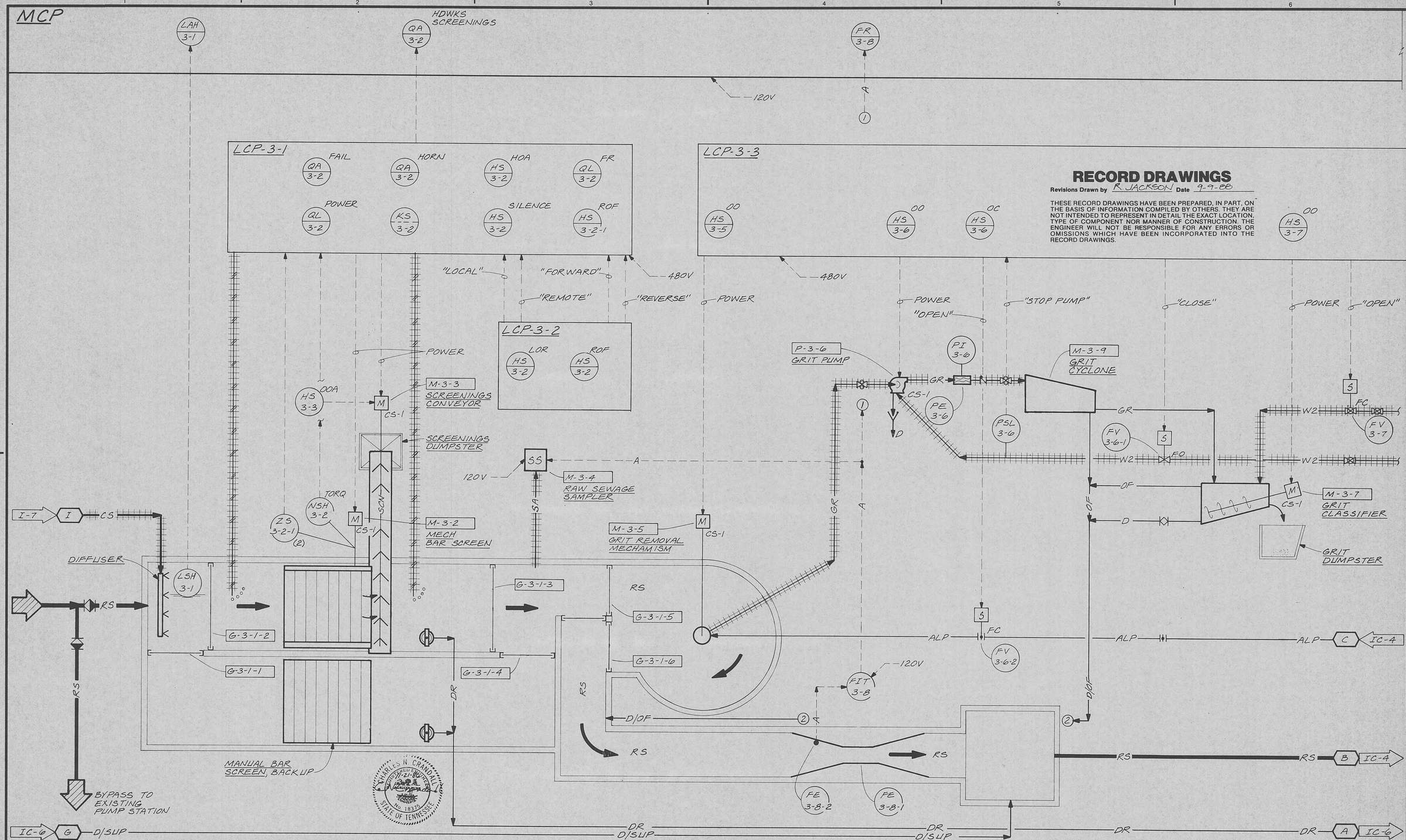
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

P&ID — SEQUENCING BATCH REACTOR

DWG NO.	IC-4
DATE	MAY 1986
PROJ NO.	SA21043.A1



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P&ID-SCREENING AND GRIT REMOVAL

DWG NO.	IC-3
DATE	MAY 1986
PROJ NO.	SA21043.A1

VALVE SYMBOLS

- GATE
- KNIFE GATE
- BUTTERFLY
- GLOBE
- BALL
- VEE- BALL
- PLUG
- SEAT PORT ECCENTRIC PLUG
- DIAPHRAGM
- PINCH
- NEEDLE
- SWING CHECK
- BALL CHECK
- SAMPLE
- MUD
- PRESSURE RELIEF
- AIR AND/OR VACUUM RELEASE
- REGULATED SIDE PRESSURE CONTROL
- MULTI-PORT VALVES (BALL VALVE SHOWN. FOR OTHER VALVE TYPES, APPROPRIATE VALVE SYMBOL SHOWN.) ARROWS INDICATE FLOW PATTERN. SEAT PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.

GATE SYMBOLS

- SLUICE
- BUTTERFLY
- FLAP
- FABRICATED SLIDE
- SHEAR

ACTUATOR SYMBOLS

- PNEUMATIC W/POSITIONER
- PNEUMATIC W/SOLENOID
- ELECTRIC
- ELECTRIC W/POSITIONER
- ELECTROHYDRAULIC
- HYDRAULIC
- PNEUMATIC WITH VOLUME BOOSTER
- SOLENOID
- MANUAL

NOTE:
ON LOSS OF PRIMARY POWER (PNEUMATIC, ELECTRICAL OR HYDRAULIC)
XX: FO =FAIL OPEN
FC =FAIL CLOSED
FLP=FAIL TO LAST POSITION

PRIMARY ELEMENT SYMBOLS

- PARSHALL FLUME
- WEIR
- ORFICE PLATE
- FLOW TUBE
- PITOT-STATIC
- VORTEX METER
- ROTAMETER
- ULTRASONIC FLOWMETER (INLINE)
- ELECTROMAGNETIC FLOWMETER
- PROPELLER OR TURBINE METER
- DENSITY METER (X: N = NUCLEAR, O = OPTICAL, U = ULTRASONIC)
- ULTRASONIC FLOWMETER (CLAMP-ON)
- LEVEL (ULTRASONIC)
- LEVEL (BUBBLER TUBE)
- LEVEL (FLOAT)

MISCELLANEOUS SYMBOLS

- SIGHT GLASS
- DIAPHRAGM SEAL
- BLIND FLANGE
- AIR GAP
- VENT TO ATMOSPHERE
- AERATOR
- PLUG
- RECEPTACLE
- SELF CONTAINED AIR SUPPLY
- COMPOSITE SAMPLER (DIPPER TYPE)
- COMPOSITE SAMPLER (SUCTION TYPE)
- TV CAMERA
- RADIO ANTENNA
- "ON" TIME DELAY B "ON" X-SEC. AFTER A "ON". INSTANT "OFF".
- "OFF" TIME DELAY B "OFF" X-SEC. AFTER A "OFF". INSTANT "ON".
- INTERLOCK. SEE CONTROL DIAGRAMS
- MEMORY ELEMENT S= SET , R= RESET
- PURGE SET X: W = WATER A = AIR
- AIR SET XX= SUPPLY PRESSURE IN PSIG.
- FILTER/ REGULATOR/ GAUGE SET
- HEAT TRACING
- 120 VOLT, 60 HZ POWER
- 480 VOLT, 60 HZ POWER
- ANNULAR DIAPHRAGM SEAL
- RUPTURE DISK
- PIG INSERT POINT
- PIG CATCH POINT
- MIXER
- ELECTRIC MOTOR
- PRESSURE GAUGE
- TONE TRANSMITTER NO. X
- TONE RECEIVER NO. X
- VOICE COMMUNICATION POINT
- TV MONITOR
- LOGIC ELEMENT: IF A AND NOT B THEN C
- LOGIC ELEMENT: IF A OR B THEN C
- ON/OFF RELAY. INPUT IS CONNECTED TO OUTPUT WHEN SWITCHING SIGNAL IS PRESENT.
- SWITCHING SIGNAL
- SWITCHING RELAY. INPUT WITH DOT IS CONNECTED TO OUTPUT WHEN SWITCHING SIGNAL IS PRESENT
- OTHER INPUT IS CONNECTED TO OUTPUT WHEN SWITCHING SIGNAL IS NOT PRESENT.
- FLUSHING CONNECTION
- HOSE ADAPTOR
- SEAL WATER SET
- SIGHT GLASS

RECORD DRAWINGS

Revisions Drawn by R JACKSON Date 9-9-88

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PUMP AND COMPRESSOR SYMBOLS

NOTE: XX:AS ADJUSTABLE SPEED
CS-1 CONSTANT SPEED (SINGLE SPEED)
CS-2 CONSTANT SPEED (TWO SPEED)

- CENTRIFUGAL PUMP (DRY PIT)
- CENTRIFUGAL WET PIT PUMP OR TURBINE PUMP
- CHEMICAL FEED PUMP
- DIAPHRAGM PUMP
- GEAR PUMP OR BLOWER (POSITIVE DISPLACEMENT)
- PISTON PUMP
- PROGRESSIVE CAVITY PUMP
- SUBMERSIBLE SUMP PUMP
- COMPRESSOR (CENTRIFUGAL), BLOWER OR TURBINE
- COMPRESSOR (PISTON)
- EJECTOR

FLOW STREAM IDENTIFCATION

AHP	AIR,HIGH PRESSURE PROCESS
AI	AIR, INSTRUMENT
AL	ALUM
ALP	AIR, LOW PRESSURE PROCESS
ASH	SODA ASH
B	BRINE
BDS	BLENDED DIGESTED SLUDGE
BFE	BIO-FILTER EFFLUENT
BFI	BIO-FILTER INFLUENT
BFR	BIO-FILTER RECYCLE
BFW	BRINE FEEDWATER
BS	BRINE SLUDGE
BWS	BACKWASH SUPPLY
BYP	BYPASS
C	CARBON SLURRY
CD	CARBON DIOXIDE GAS
CG	CHLORINE GAS (PRESSURE)
CGV	CHLORINE GAS (VACUUM)
CHS	CHEMICAL SLUDGE
CL	CHLORINE LIQUID
CNA	CELL CAUSTIC
CO	CONDENSATE DRAIN
CS	CHLORINE SOLUTION
CWR	COOLING WATER RETURN
CWS	COOLING WATER SUPPLY
D	DRAIN (SANITARY)
DAS	DIGESTED ACTIVATED SLUDGE
DG	DIGESTER GAS
DIW	DEIONIZED WATER
DR	PROCESS DRAIN
DS	DIGESTED SLUDGE
DW	DISTILLED WATER
F	FILTRATE
FC	FERRIC CHLORINE
FE	FILTER EFFLUENT
FI	FILTER INFLUENT
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FTW	FILTER TO WASTE
G	NATURAL GAS
GAS	GASOLINE
GOX	GASEOUS OXYGEN
GOX 1-	GOX PRODUCT
GOX 2-	GOX PRODUCT
GOX 3-	GOX VENT
GOX 4-	GOX PRESSURE BUILD
GOX 5-	GOX ADDITION
GR	GRIT SLURRY
H	HYDROGEN GAS
HPR	HIGH PRESSURE RETURN (CONDENSATE)
HPS	HIGH PRESSURE STEAM
HS	HEAVY SOLIDS
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LD	DRY LIME
LOX	LIQUID OXYGEN
LOX 1-	LOX MAKE
LOX 2-	LOX PRODUCT
LOX 3-	LOX ADDITION
LOX 4-	LOX TRANSFER
LOX 5-	LOX WITHDRAWAL
LOX 6-	LOX PRESSURE BUILD
LPO	LIQUID POLYMER
LPR	LOW PRESSURE RETURN (CONDENSATE)
LPS	LOW PRESSURE STEAM
LS	LIME SLURRY
LSD	LIME SLUDGE
ML	MIXED LIQUOR
MPR	MEDIUM PRESSURE RETURN (CONDENSATE)
MPS	MEDUIM PRESSURE STEAM
NA	SODIUM HYDROXIDE
NT	NITROGEN TRICHLORIDE
OF	OVERFLOW
P	PROPANE GAS
PDS	PRIMARY DIGESTED SLUDGE
PE	PRIMARY EFFLUENT
PI	PRIMARY INFLUENT
PLE	PLANT EFFLUENT
PO	POLYMER SOLUTION
PS	PRESSURE SEWER
PSD	PRIMARY SLUDGE
PSM	PRIMARY SCUM
RAS	RETURN ACTIVATED SLUDGE
RB	RAW BRINE
RCS	RECARBONATION SLUDGE
RCY	RECYCLE
RHW	RECIRCULATED HOT WATER
RS	RAW SEWAGE
RSD	RECIRCULATED SLUDGE
S	SANITARY SEWER (GRAVITY)
SA	SAMPLE
SAS	SODA ASH SOLUTION
SB	SPENT BRINE
SC	COLD SLUDGE
SDG	SULFUR DIOXIDE GAS
SDL	SULFUR DIOXIDE LIQUID
SDS	SULFUR DIOXIDE SOLUTION
SDV	SULFUR DIOXIDE GAS (VACUUM)
SE	SECONDARY EFFLUENT
SH	HEATED SLUDGE
SSD	SECONDARY DIGESTED SLUDGE
SSM	SECONDARY SCUM
SW	SURFACE WASH
TAS	THICKENED ACTIVATED SLUDGE
TB	TREATED BRINE
TBS	THICKENER BOTTOM SLUDGE
TDS	THICKENED DIGESTED SLUDGE
TPS	THICKENED PRIMARY SLUDGE
TUF	THICKENER UNDERFLOW
UD	UNDERDRAIN
V	VENT
VAC	VACUUM
WAS	WASTE ACTIVATED SLUDGE
W1	NO. 1 (POTABLE) WATER
W2	NO. 2 (NONPOTABLE) WATER
W3	NO. 3 WATER
W4	NO. 4 WATER

CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2MHILL

DSGN	F JOHNSON
DR	KL MCCOY 25211L2
CHK	J TURNER
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RPJ	CNC

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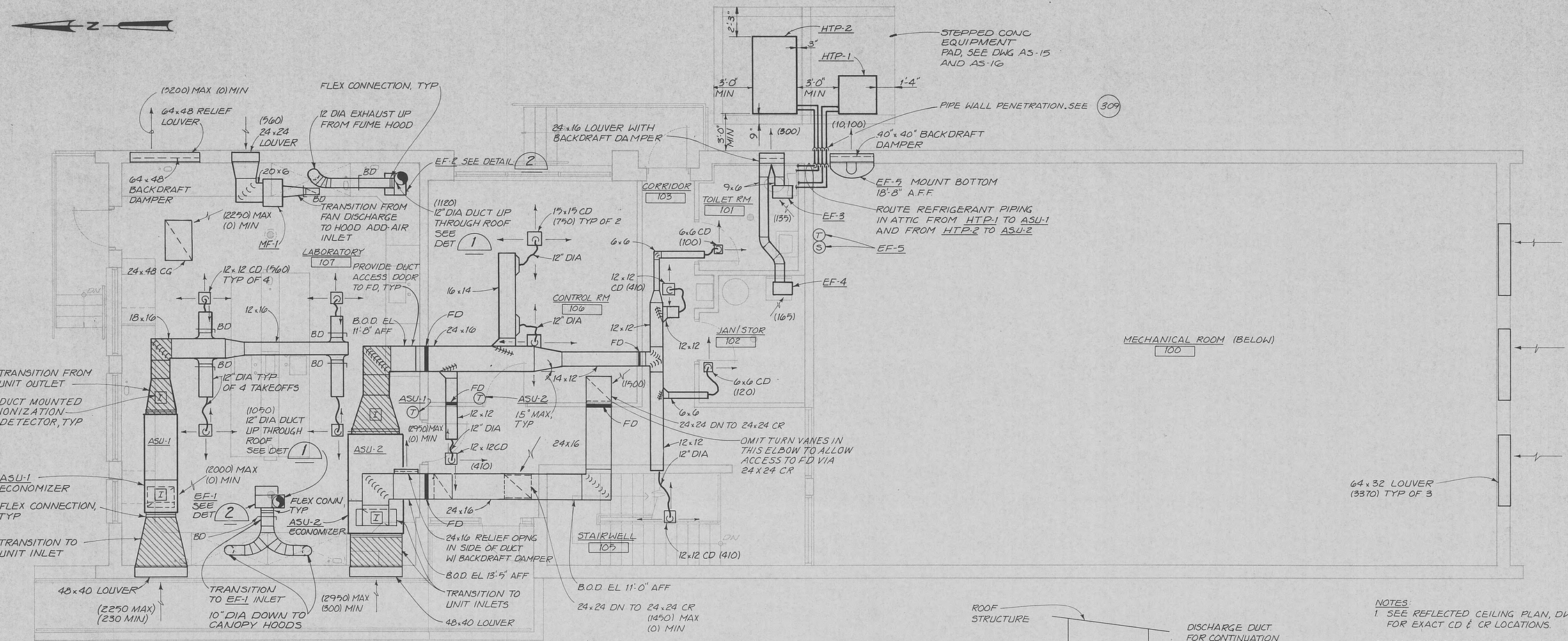
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

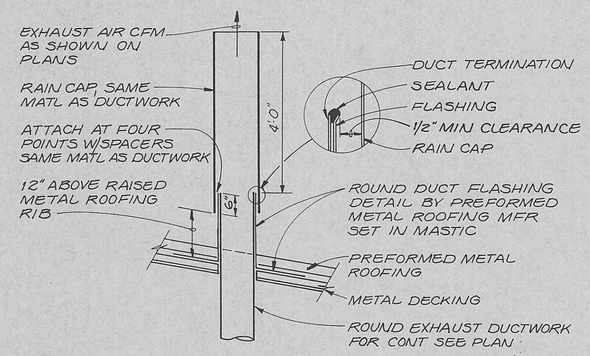
INSTRUMENTATION AND CONTROL

LEGEND

DWG NO. IC-2
DATE MAY 1986
PROJ. NO. SA21043.A1

OVERLAY IDENTIFICATION | COMPOSITE OVERLAY SCREEN
PROJ.NO.
CL. /RACT
PRINTED 2 | FORMAT 223MC | FILM KE
CHECKED BY | DRAWN BY | DESIGNED BY



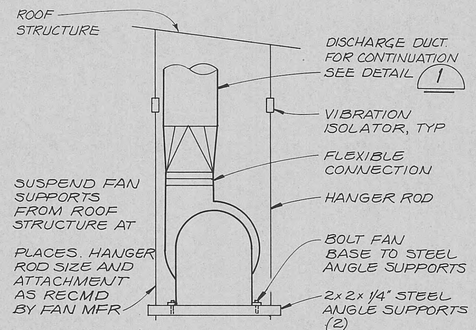


EXHAUST DUCT ROOF PENETRATION DETAIL 1

NTS

CONTROL BUILDING HVAC PLAN

1/4"=1'-0"



EXHAUST FAN MOUNTING DETAIL 2

NTS

NOTES:

1. SEE REFLECTED CEILING PLAN, DWG AS-17, FOR EXACT CD & CR LOCATIONS.
2. ALL HVAC EQUIPMENT, DUCTWORK, AND PIPING SHOWN ON PLAN IS LOCATED IN THE ATTIC SPACE.
3. SUSPEND ASU-1 AND ASU-2 FROM ROOF BEAMS. USE MINIMUM OF 4 HANGER RODS OF SIZE RECOMMENDED BY UNIT MANUFACTURER FOR EACH UNIT, WITH VIBRATION ISOLATOR ON EACH HANGER ROD.
4. FOR CONDENSATE DRAIN PIPING FROM ASU-1 AND ASU-2, AND SCROLL DRAIN PIPING FROM EF-1 AND EF-2, SEE DWG M-10
5. FOR DUCT PENETRATIONS OF FIRE WALLS SEE (127)

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN J. REYNOLDS					
DR A. DURLEY					
CHK J. SIEMENS					
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD
	1	9-9-88	RECORD DRAWINGS	RDJ	CNC

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WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

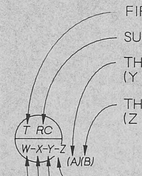
CONTROL BUILDING — HVAC PLAN

SHEET
DWG NO. M-11
DATE MAY 1986
PROJ NO. SA21043.A1

DESIGNED BY
DRAWN BY
CHECKED BY
PRINTED 2
FILM KE
FORMAT 223 MC M-11 M-11 S A3-16
COMPOSITE OVERLAY SCREEN
OVERLAY IDENTIFICATION
PROJ NO. NTRACT

INSTRUMENT IDENTIFICATION

EXAMPLE SYMBOLS



- FIRST LETTER (S)
- SUCCEEDING LETTERS
- THE TOTAL NUMBER OF UNITS PER SET (Y VARIES FROM 1 TO A)
- THE TOTAL NUMBER OF SETS OF UNITS (Z VARIES FROM 1 TO B)
- SET NUMBER (USED WHEN THERE ARE MULTIPLE SETS OF UNITS WITH THE SAME W-X-Y DESIGNATIONS)
- UNIT NUMBER (USED WHEN THERE ARE MULTIPLE UNITS WITH THE SAME W-X DESIGNATIONS)
- LOOP NUMBER
- UNIT PROCESS NUMBER



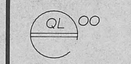
FIELD MOUNTED INSTRUMENT



REAR-OF-PANEL MOUNTED INSTRUMENT



PANEL MOUNTED INSTRUMENT



MOTOR CONTROL CENTER MOUNTED INSTRUMENT

INSTRUMENT SOCIETY OF AMERICA TABLE

LETTER	FIRST LETTER (S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (+)		ALARM		
B	BURNER FLAME		USERS CHOICE (+)	USERS CHOICE (+)	USERS CHOICE (+)
C	CONDUCTIVITY			CONTROL	
D	DENSITY (S.G)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION				MIDDLE
N	USERS CHOICE (+)		USERS CHOICE (+)	USERS CHOICE (+)	USERS CHOICE (+)
O	USERS CHOICE (+)		ORIFICE		
P	PRESSURE (OR VACUUM)		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT(+)	INTEGRATE	INTEGRATE		
R			RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (+)		MULTIFUNCTION (+)	MULTIFUNCTION (+)	MULTIFUNCTION (+)
V	VISCOSITY			VALVE OR DAMPER	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED (+)		UNCLASSIFIED (+)	UNCLASSIFIED (+)	UNCLASSIFIED (+)
Y	USERS CHOICE (+)			RELAY OR COMPUTE (+)	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(+) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.

SPECIAL CASES



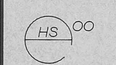
ON AND OFF EVENT LIGHTS



OPENED AND CLOSED POSITION LIGHTS



OPENED AND CLOSED POSITION SWITCHES



ON-OFF HAND SWITCH. MAINTAINED CONTACT SWITCH (CONTROLLED DEVICE WILL RESTART ON RETURN OF POWER AFTER POWER FAILURE).



STOP-START HAND SWITCH MOMENTARY CONTACT SWITCHES (CONTROLLED DEVICE WILL NOT RESTART ON RETURN OF POWER AFTER POWER FAILURE).



ELECTRIC ACTUATOR WITH INTEGRAL OPEN-STOP-CLOSE MOMENTARY CONTACT CONTROL SWITCH



FLOW INDICATING, COMPUTER/MANUAL CONTROL STATION



FLOW INDICATING, COMPUTER/AUTO/MANUAL CONTROL STATION



FLOW INDICATING SUPERVISORY SET POINT (BY COMPUTER) , AUTO/MANUAL CONTROL STATION

TRANSDUCERS

A	ANALOG	I	CURRENT
D	DIGITAL	P	PNEUMATIC
E	VOLTAGE	PF	PULSE FREQUENCY
F	FREQUENCY	PD	PULSE DURATION
H	HYDRAULIC	R	RESISTANCE

EXAMPLE:



CURRENT TO PNEUMATIC TRANSDUCER (BACK OF PANEL, IN A FLOW LOOP)

RECORD DRAWINGS

Revisions Drawn by R JACKSON Date 9-9-88

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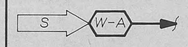
LINE LEGEND

- PROCESS (CLOSED CONDUIT, DASHED LINE INDICATES ALTERNATE FLOW STREAM)
- BUILDING OR FACILITY BOUNDARY
- PROCESS (OPEN CHANNEL)
- PARALLELING LINES (PARENTHETICAL NUMBER INDICATES THE NUMBER OF SIGNALS REPRESENTED)
- ANALOG SIGNAL (4 TO 20 mAdc, ETC.)
- DISCRETE SIGNAL (ON/OFF, ETC.)
- PULSE DURATION SIGNAL
- CONNECTING LINES
- PULSE FREQUENCY SIGNAL
- PNEUMATIC SIGNAL
- NON-CONNECTING LINES
- FILLED SYSTEM SIGNAL
- HYDRAULIC SYSTEM SIGNAL

INTERFACE SYMBOLS





= PROCESS INTERFACE

= SIGNAL INTERFACE

W = SOURCE UNIT PROCESS NO.

A = INTERFACE LETTER

D = DESTINATION DRAWING NO.

S = SOURCE DRAWING NO.

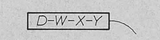


PROCESS OR SIGNAL LINE CONTINUATION N=1,2,3,ETC



INTERFACE TO OR FROM PROCESS EXTERNAL TO PROJECT

SELF CONTAINED VALVE & EQUIPMENT TAG NUMBERS



D:
- ARV = AIR RELEASE VALVE
- AVRV = AIR AND VACUUM RELEASE VALVE
- E = EJECTOR
- FCV = FLOW CONTROL VALVE
- G = GATE
- LCV = LEVEL CONTROL VALVE
- M = MECHANICAL EQUIPMENT
- P = PUMP
- PCV = PRESSURE CONTROL VALVE
- PSE = RUPTURE DISK
- PSV = PRESSURE RELIEF VALVE
- T = TANK
- TCV = TEMPERATURE CONTROL VALVE

W = UNIT PROCESS NUMBER
X = LOOP NUMBER
Y = UNIT NUMBER

ABBREVIATIONS & LETTER SYMBOLS

AC	ALTERNATING CURRENT
ALKY	ALKALINITY
AM	AUTO-MANUAL
CAM	COMPUTER-AUTO-MANUAL
CCS	CENTRAL CONTROL SYSTEM
CL_2 etc.	CHLORINE (TYPICAL: USE STANDARD CHEMICAL ELEMENT ABBREVIATION)
CM	COMPUTER-MANUAL
COD	CHEMICAL OXYGEN DEMAND
CP-X	CONTROL PANEL NO. X
DC	DIRECT CURRENT
DO	DISSOLVED OXYGEN
FCL_2	FREE CHLORINE RESIDUAL
FOS	FAST-OFF-SLOW
FOSA	FAST-OFF-SLOW-AUTO
FOSR	FAST-OFF-SLOW-REMOTE
FP-W-X	FIELD PANEL NO. WX (W = UNIT PROCESS NUMBER X = PANEL NUMBER)
FR	FORWARD-REVERSE
HDNS	HARDNESS
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
LEL	LOWER EXPLOSIVE LIMIT
LOS	LOCKOUT STOP
LR	LOCAL-REMOTE
MA	MANUAL-AUTO
MBAS	METHYLENE BLUE ACTIVE SUBSTANCES
MC	MODULATE-CLOSE
MCC-X	MOTOR CONTROL CENTER NO. X
OC	OPEN-CLOSE (D)
OCR	OPEN-CLOSE-REMOTE
OCA	OPEN-CLOSE-AUTO
OO	ON-OFF
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
OP	ORTHO PHOSPHORUS
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN-STOP-CLOSE
pH	HYDROGEN ION CONCENTRATION
RM-X	REMOTE MULTIPLEXING MODULE NO. X
RTU-X	REMOTE TELEMETRY UNIT NO. X
SF	SLOWER-FASTER
SS	START-STOP
SSC	SUPERVISORY SET POINT CONTROL
TCL_2	TOTAL CHLORINE RESIDUAL
TOC	TOTAL ORGANIC CARBON
TOD	TOTAL OXYGEN DEMAND
TURB	TURBIDITY
VHC	VOLATILE HYDROCARBONS
VIB	VIBRATION
Δ	DIFFERENCE
Σ	SUM
X	MULTIPLY
÷	DIVIDE
f(x)	CHARACTERIZED
X^n	RAISE TO THE Nth POWER
$\sqrt{}$	SQUARE ROOT
AVG	AVERAGE
1:1	REPEAT OR BOOST
>	SELECT HIGHEST SIGNAL
<	SELECT LOWEST SIGNAL
±	BIAS
%	GAIN OR ATTENUATE

GENERAL NOTES

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

CHARLES N. CRANDALL — REGISTERED ENGINEER — 7-20-88 — STATE OF TENNESSEE

CH2MHILL

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DR	KL MCCOY 2521IL1				
CHK	J TURNER				
APVD	C CRANDALL	NO.	DATE	REVISION	BY / APVD
		1	9-9-88	RECORD DRAWINGS	RPJ / CNC

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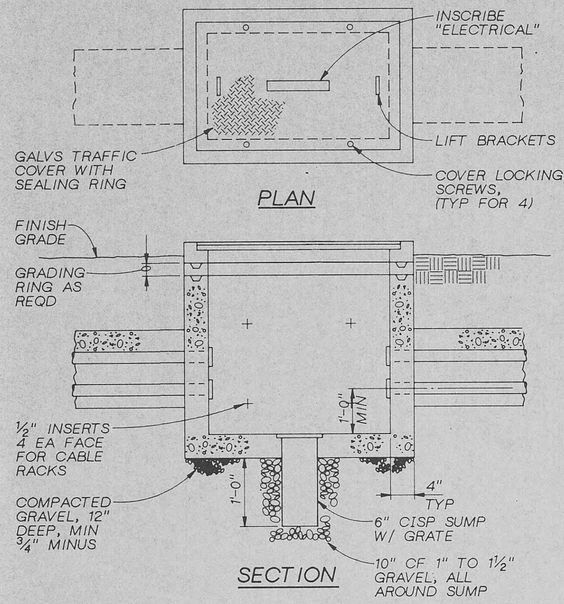
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

INSTRUMENTATION AND CONTROL

LEGEND

DWG NO. IC-1
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION — COMPOSITE / OVERLAY / SCREEN — PROJ NO. — CONTRACT — FORMAT 2234MC — FILM KE — PRINTED — DESIGNED BY — DRAWN BY — CHECKED BY



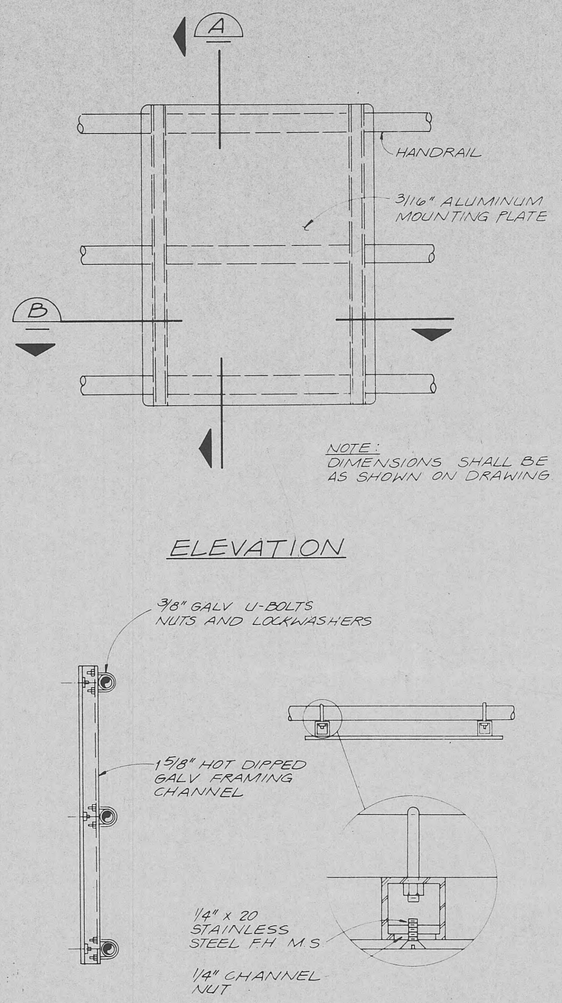
NOTE:
FOR DIMENSIONS, SEE DWG E-2 SITE PLAN-EAST.

MANHOLE / HANDHOLE CONSTRUCTION

NTS

ROOF PENETRATION

NTS

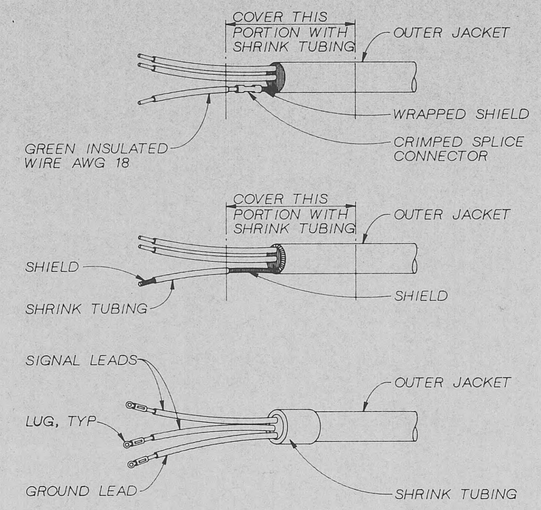


NOTE:
DIMENSIONS SHALL BE AS SHOWN ON DRAWING

ELEVATION

HANDRAIL MOUNTED EQUIPMENT SUPPORT

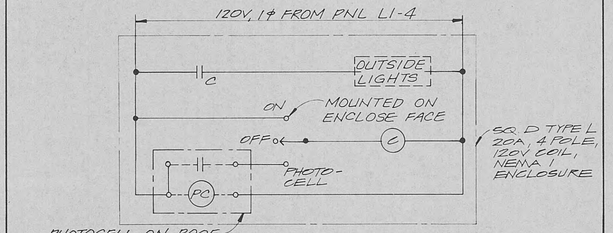
NTS



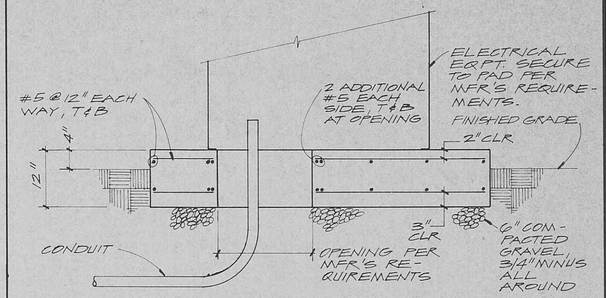
NOTE:
SHIELD GROUNDED AT TERMINATION.

TERMINATION OF SHIELDED CONTROL CABLE

NTS



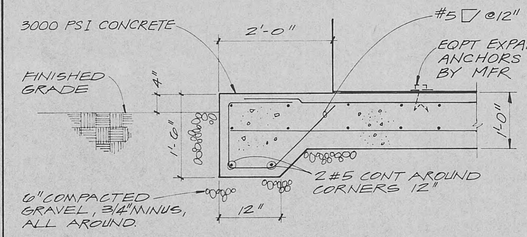
EXTERIOR LIGHTING CONTROL



TRANSFORMERS T1-SBR, T2-SBR, & T1-EPS

CONCRETE PAD

NTS



15 KV METAL ENCLOSED SWGR

CONCRETE PAD

NTS

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Revisions Drawn by R JACKSON Date 9-9-88

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DR D AMEDO						
CHK J TURNER						
APVD C CRANDALL	NO.	DATE	REVISION	BY	APVD	
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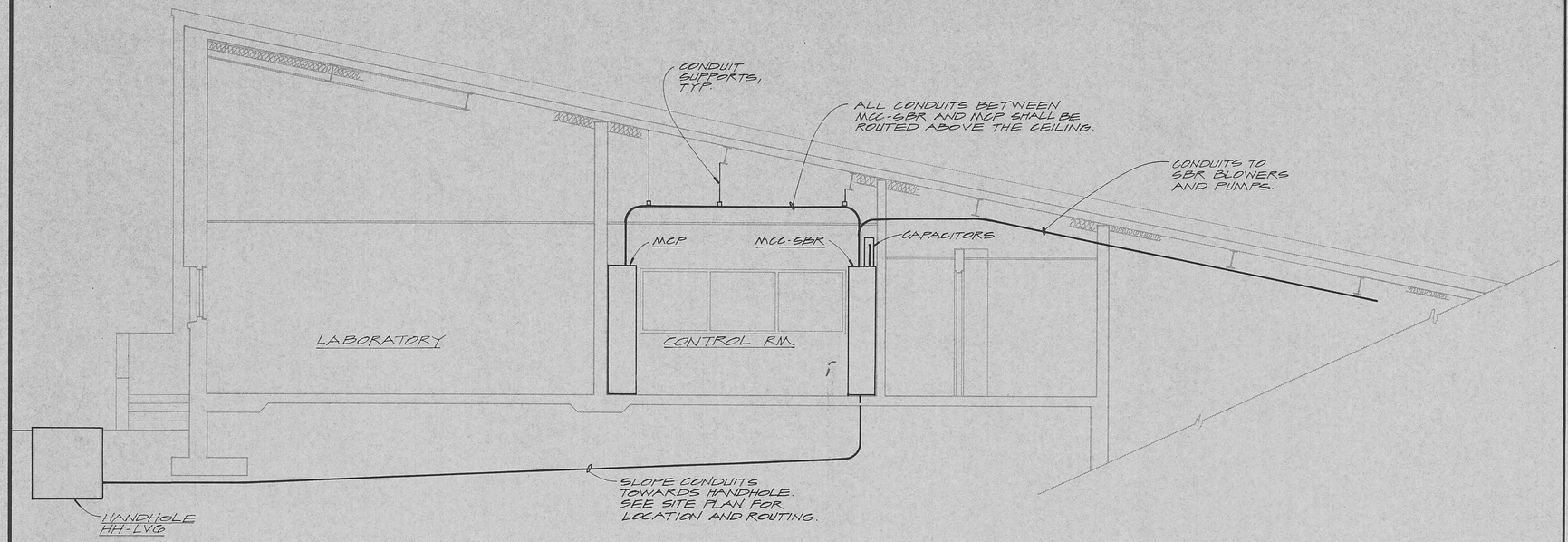
DETAILS

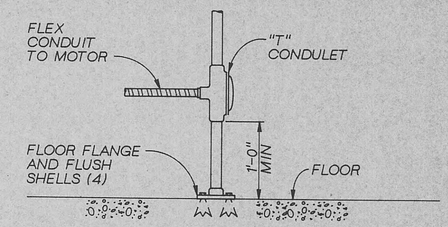
SHEET
DWG NO. E-17
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION: COMPOSITE / OVERLAY / SCREEN
PRINTING
CONTRACT

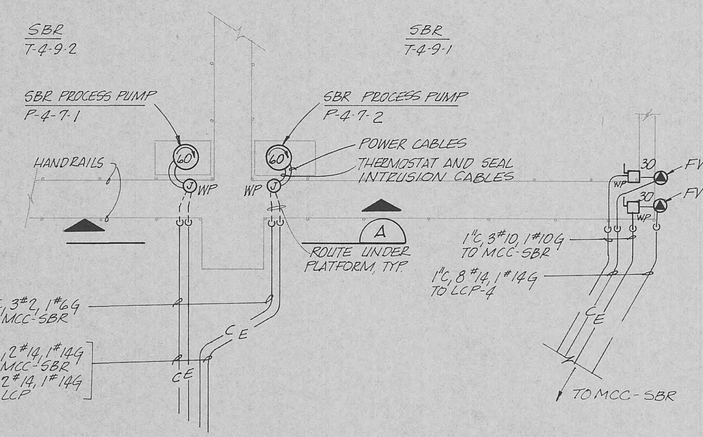
PRINTED 2 FILM XE FORMAT 2234WC



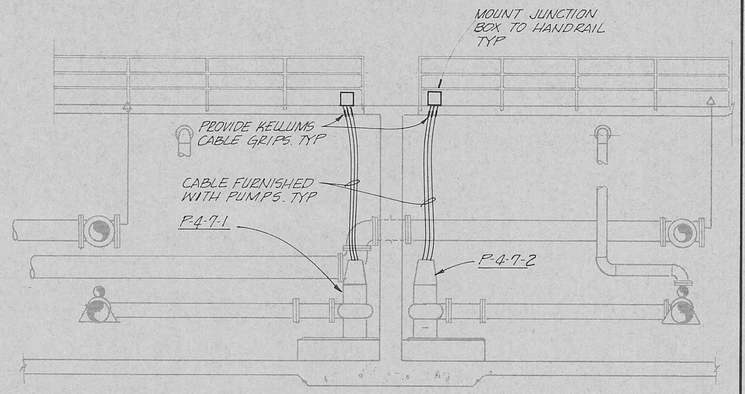
SECTION A
1/4" = 1'-0"
E-10



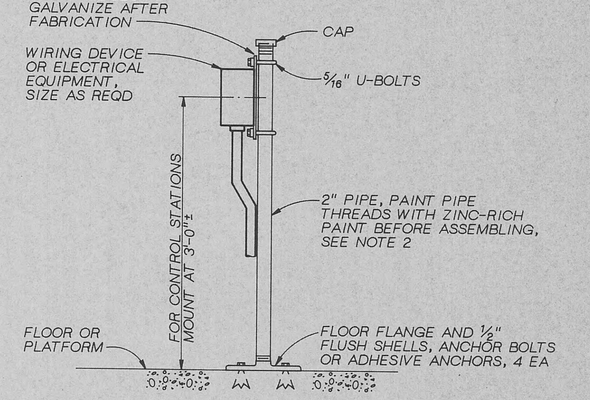
TYPICAL DETAIL FOR CONDUIT TO MOTOR FROM CEILING
NTS



SBR TANKS
PARTIAL POWER PLAN



SECTION A
3/16" = 1'-0"



NOTES:
1. ALL MOUNTING HARDWARE TO BE GALVANIZED. USE WASHERS AND SPLIT LOCK-WASHERS UNDER ALL NUTS.
2. PIPE AND FITTINGS: GALVANIZED STEEL PIPE MEETING ASTM A120, SCHEDULE 40 WALL THICKNESS. THREADED 150-POUND MALLEABLE IRON FLOOR FLANGE MEETING ASTM A197. ANSI STANDARD PIPE THREADS ON PIPE AND FITTINGS.

PEDESTAL MOUNTED DEVICE
NTS (PIPE PEDESTAL)

RECORD DRAWINGS
Revisions Drawn by R.JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER AGRICULTURE MECHANICAL No. 18371 STATE OF TENNESSEE

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DR	D.E. AMEDO				
CHK	R.W. BERKLUND				
APVD	C. CRANDALL	1	9-9-88	RECORD DRAWINGS	RDJ / CNC
		NO.	DATE	REVISION	BY / APVD

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DETAILS

SHEET	
DWG NO.	E-16
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION				
PROJ NO.				
CONTRACT				
COMPOSITE	E-16.1	E-16		
OVERLAY	E-16.1	E-16		
SCREEN	S			

DESIGNED BY / DRAWN BY / CHECKED BY
FILM KE
FORMAT 2324MC
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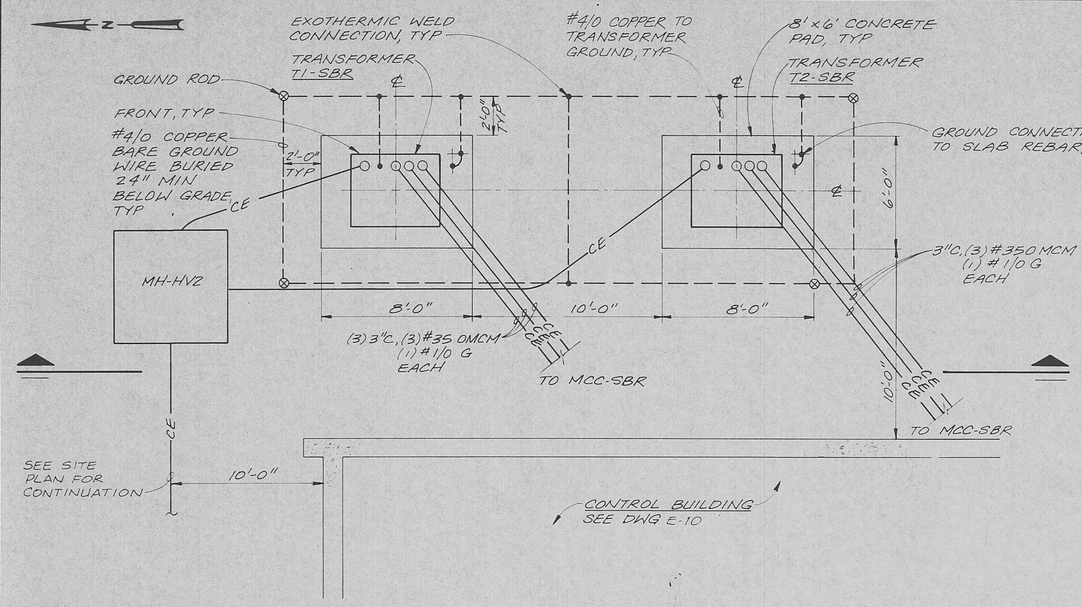
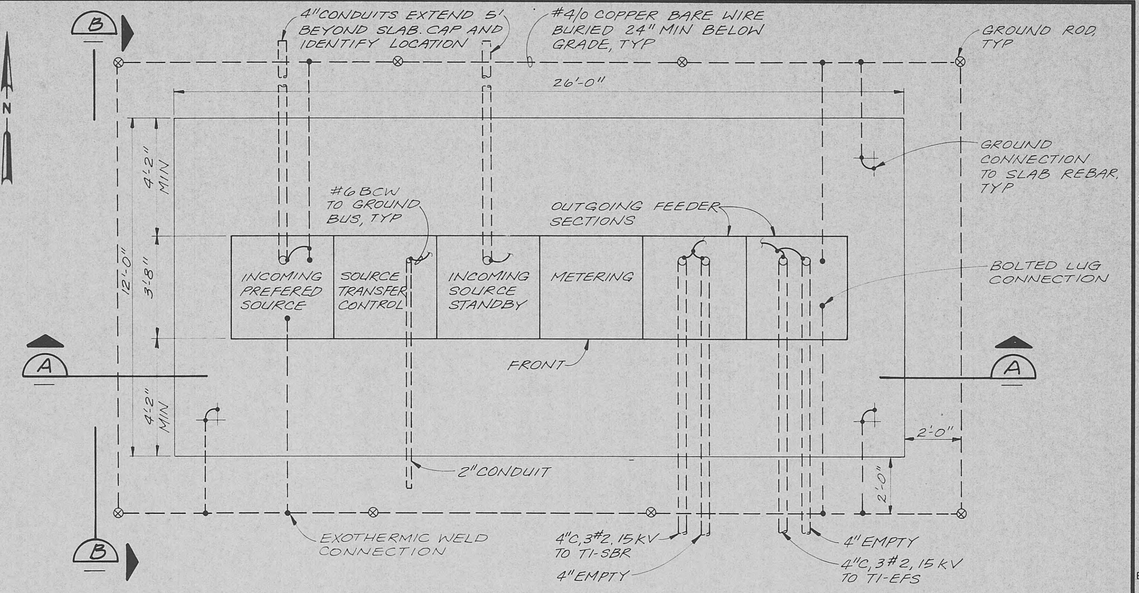
8.6



PLAN



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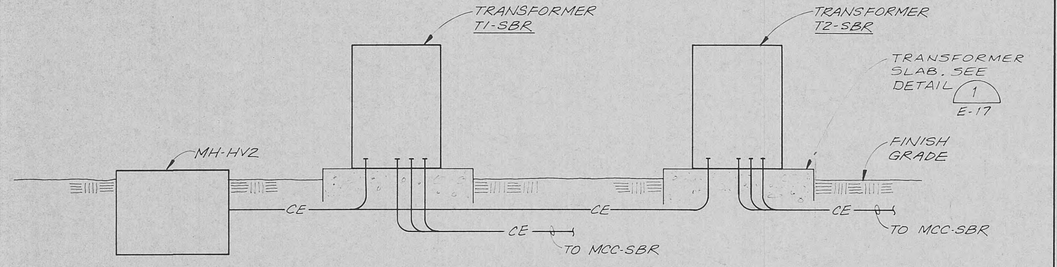

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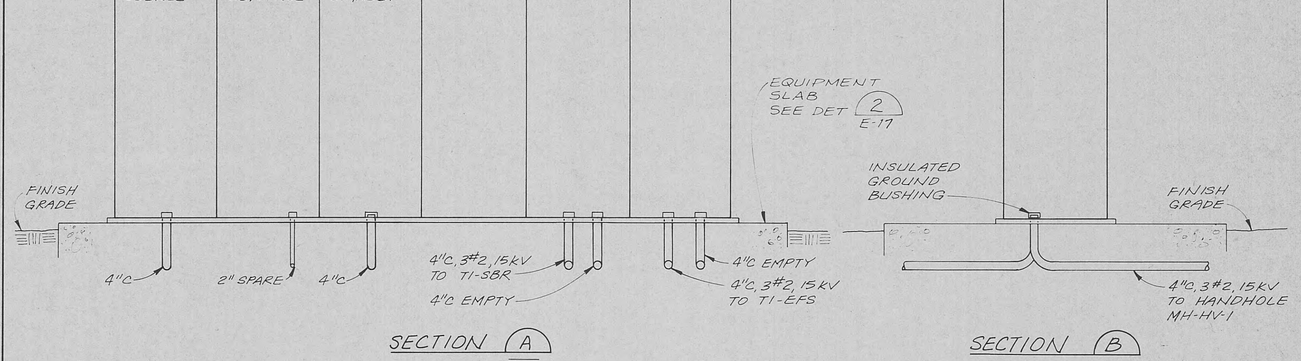

SECTION (A)

SECTION (B)

TRANSFORMERS T1-SBR AND T2-SBR LAYOUT AND GROUNDING PLAN

1/4"=1'-0"

15KV METAL ENCLOSED SWITCHGEAR LAYOUT AND GROUNDING PLAN

3/8"=1'-0"

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL — 11-21-86 — REGISTERED ENGINEER — STATE OF TENNESSEE

CH2M HILL

DSGN M CHAUDHARY				
DR D CLARK				
CHK J TURNER				
APVD C CRANDALL	NO.	DATE	REVISION	BY / APVD
	1	9-9-88	RECORD DRAWINGS	RDJ / CNC

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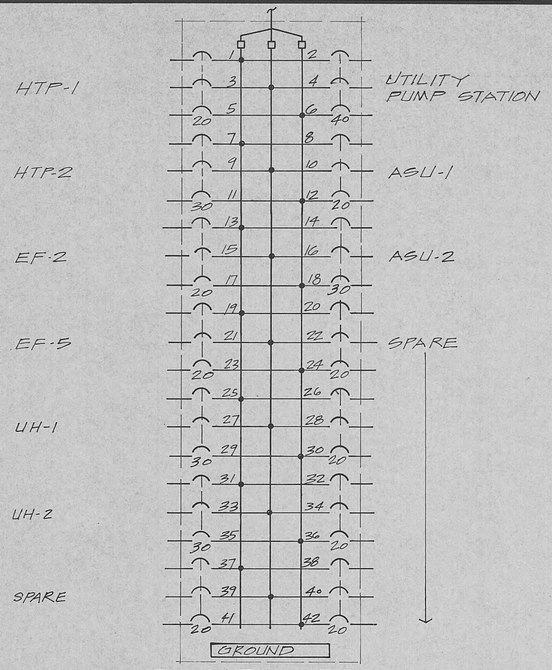
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

DETAILS

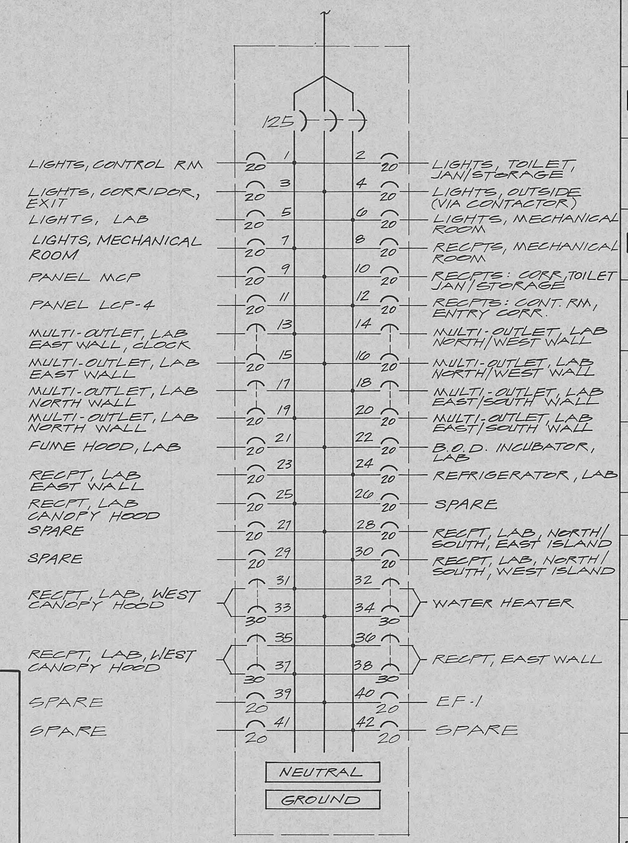
SHEET
DWG NO. E-15
DATE MAY 1986
PROJ NO. SA21043.A1

CHECKED BY | DRAWN BY | DESIGNED BY | FILM KE | FORMAT 2234HC | COMPOSITE / OVERLAY / SCREEN | OVERLAY IDENTIFICATION | PROJ NO. | CONTRACT | PRINTED 2



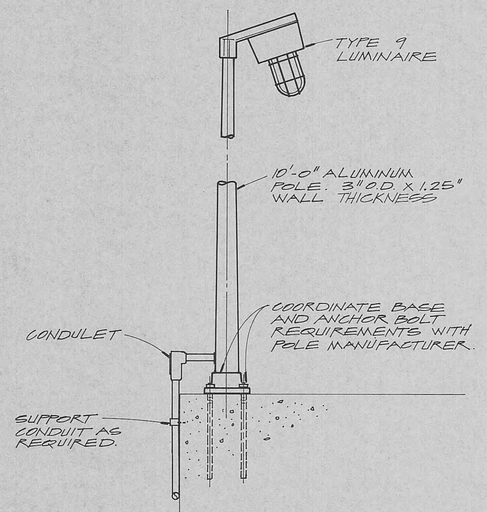
PANEL P1

480V, 3ϕ, 3W, INTEGRATED SHORT CIRCUIT RATING: 22,000A RMS SURFACE MOUNT, TOP FEED, 225A BUS, MAIN LUGS ONLY.

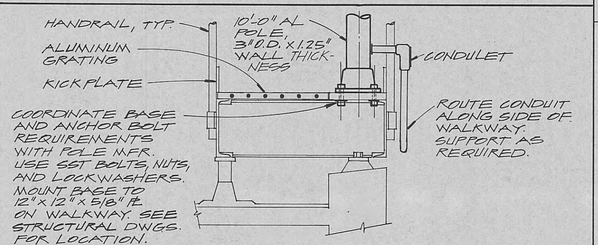


PANEL L1

120/208V, 3ϕ, 4W, INTEGRATED SHORT CIRCUIT RATING: 10,000A RMS. SURFACE MOUNT, TOP FEED, 200 A BUS



HEADWORKS/EFFLUENT PUMP STATION



DIGESTER

DETAIL (3)
NTS

LUMINAIRE SCHEDULE

SYMBOL	TYPE	VOLTAGE	DESCRIPTION	MANUFACTURER	CATALOG NO.	LAMPS	MOUNTING
(1)	175W MH	120V	16" DIA x 13½" HIGH LOW BAY UNIT, COMPLETE DIE-CAST ALUMINUM BALLAST HOUSING WITH PRISMATIC BOROSILICATE GLASS LENS, ⅛" MINIMUM THICKNESS	HOLOPHANE "ENDURALUME"	ENDR	1	PENDENT
(2)	F40W, T12 LITE WHITE	120V	FLUORESCENT, BAKED WHITE ENAMEL FINISH, PRISMATIC ACRYLIC LENS, 2'x4'	DAY-BRITE "DAY-LINE"	WA244	4	SURFACE
(3)	F40W, T12 LITE WHITE	120V	FLUORESCENT, BAKED WHITE ENAMEL FINISH, PRISMATIC ACRYLIC LENS, 2'x2'	DAY-BRITE "DAY-LINE"	CG223-C02C	2	RECESSED
(4)	F40W, T12 LITE WHITE	120V	FLUORESCENT, BAKED WHITE ENAMEL FINISH, PRISMATIC ACRYLIC LENS, 2'x4'	DAY-BRITE "DAY-LINE"	CG242-C02D	2	RECESSED
	—	120V	EXIT LIGHT, SINGLE FACE, SELF-CONTAINED EMERGENCY SUPPLY	DAY-BRITE	EDC	—	—
(5)	70W HPS	120V	HIGH PRESSURE SODIUM, ANODIZED ALUMINUM HOUSING, MOLDED PRISMATIC THERMAL SHOCK-RESISTANT GLASS REFRACTOR SUITABLE FOR WET LOCATIONS	HOLOPHANE "WALLPACKETTE"	419NS-120	1	WALL
(6)	F40W, T12 LITE WHITE	120V	FLUORESCENT, BAKED WHITE ENAMEL FINISH, PRISMATIC ACRYLIC LENS, 2'x2'	DAY-BRITE "DAYLUME"	2X22U-357	2	SURFACE
(7)	70W HPS	120V	HIGH PRESSURE SODIUM, SUITABLE FOR LOCATIONS	HOLOPHANE "SQUARE PAL"	F-1569	1	RECESSED
	—	120V	EMERGENCY LIGHTING UNIT, SEE , SPECIFICATIONS	—	—	—	—
(8)	—	—	NOT USED	—	—	—	—
(9)	150W HPS	120V	HIGH PRESSURE SODIUM, MOUNT AT 25° ANGLE COPPER FREE ALUMINUM BALLAST HOUSING, ENCLOSED AND GASKETED FOR WET LOCATIONS STAINLESS STEEL HARDWARE, GLASS GLOBE WITH GUARD, PHOTOCELL "ON-OFF" CONTROL	CROUSE-HINDS "CHAMP"	VMVS	1	STANCHION
(10)	F40W, T12 LITE WHITE	120V	FLUORESCENT, CORRISION RESISTANT, ENCLOSED, GASKETED, TEMPERED GLASS LENS	CROUSE-HINDS "CORRO-GARD"	FVN	2	PENDENT
(11)	70W HPS	120V	HIGH PRESSURE SODIUM, ANODIZED ALUMINUM HOUSING, MOLDED PRISMATIC THERMAL SHOCK-RESISTANT GLASS REFRACTOR SUITABLE FOR WET LOCATIONS WITH BUILT-IN PHOTOCELL	HOLOPHANE "WALLPACKETTE"	419NS-120	1	WALL

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER 11-21-90 No. 18376 STATE OF TENNESSEE

CH2M HILL

DSGN BD WEHNERT
DR DE AMEDO
CHK J TURNER
APVD C CRANDALL

NO.	DATE	REVISION	BY	CHK
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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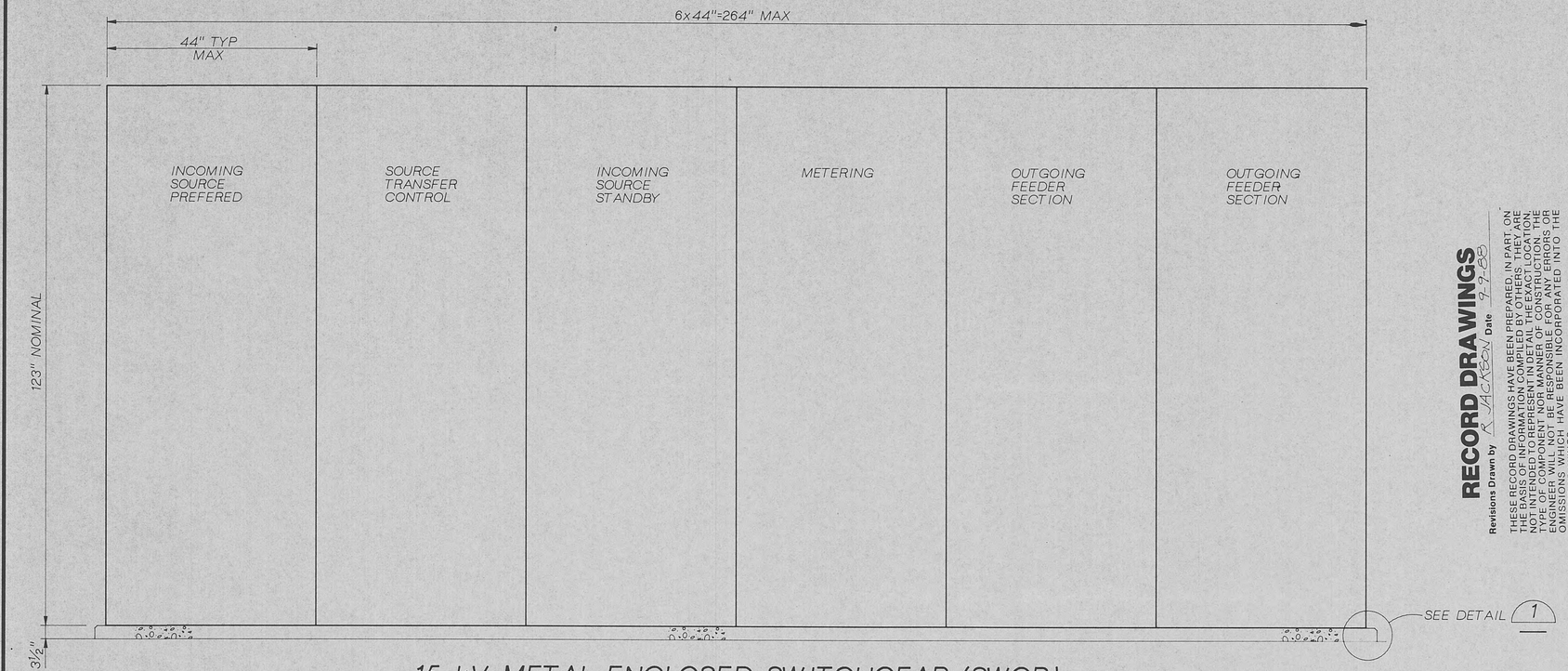
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

LUMINAIRE SCHEDULE AND DETAILS

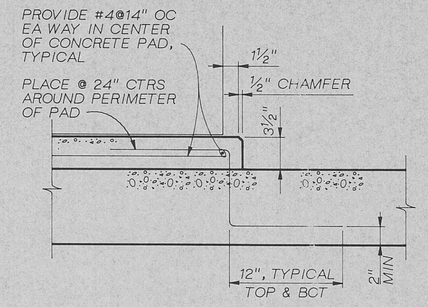
SHEET
DWG NO. E-14
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE E-14
OVERLAY E-14
SCREEN E-14
FORMAT 2234MC
FILM KE
PRINTED 2
CHECKED BY
DRAWN BY
DESIGNED BY



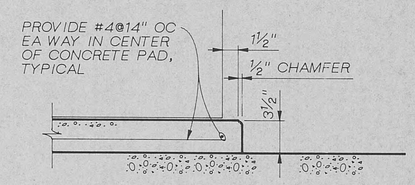
15 kV METAL ENCLOSED SWITCHGEAR (SWGR)

OUTDOOR NON-WALK IN ENCLOSURE



CONCRETE PAD DETAIL 1

NTS



CONCRETE PAD DETAIL 2

NTS

RECORD DRAWINGS

Revisions Drawn by R JACKSON Date 9-9-88

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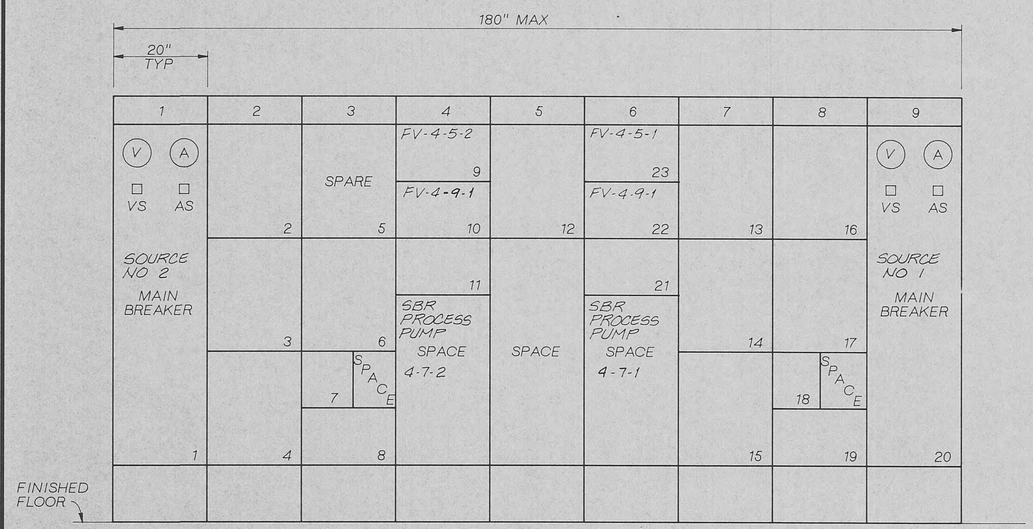
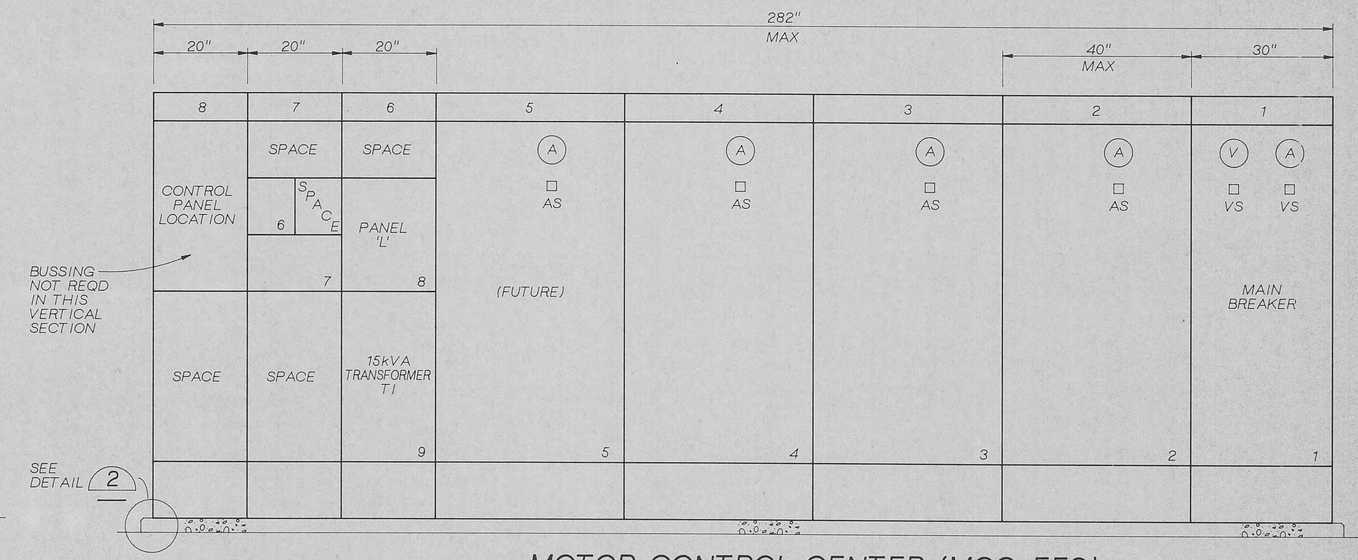


MOTOR CONTROL CENTER (MCC-SBR)

INDOOR NEMA 1A ENCLOSURE



MOTOR CONTROL CENTER (MCC-EFS)

OUTDOOR NEMA 3R WALKIN ENCLOSURE (ENCLOSURE NOT SHOWN)

CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	M CHAUDHARY					
DR	D CLARK PRJ:252 E2					
CHK	J TURNER					
APVD	C CRANDALL	NO.	DATE	REVISION	BY	APVD
			9-9-88	RECORD DRAWINGS	RDJ	CNC

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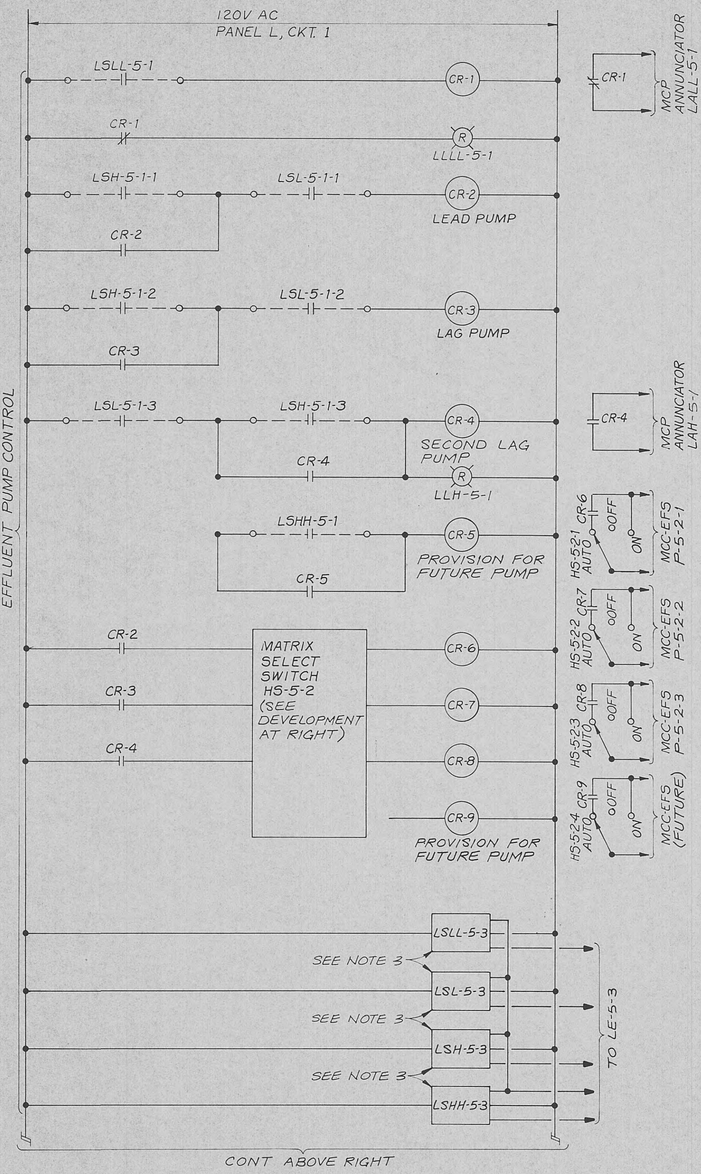
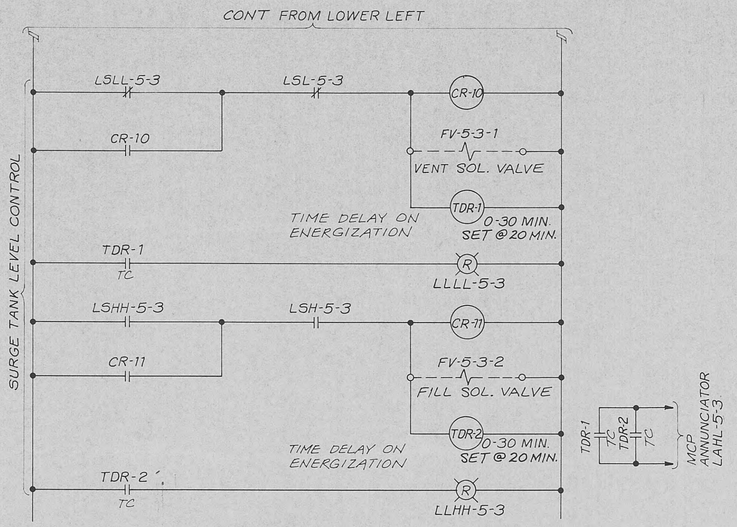
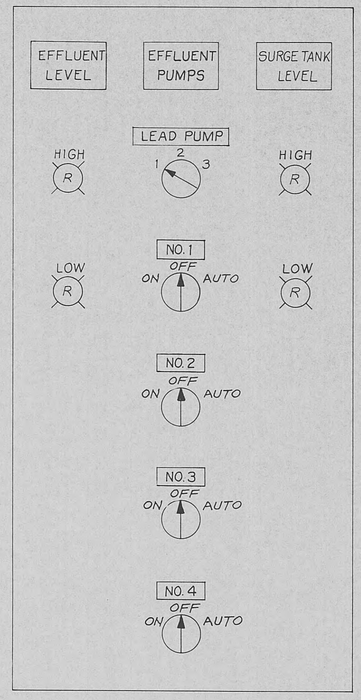
EQUIPMENT LAYOUT AND ELEVATIONS

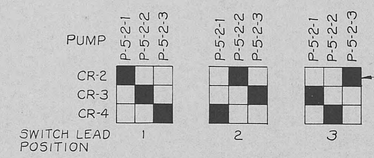
SHEET	
DWG NO.	E-13
DATE	MAY 1986
PROJ NO.	SA21043.A1

- OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE
OVERLAY
SCREEN









MATRIX SELECT SWITCH DEVELOPEMENT HS-5-2

NOTES:

1. CONTROL PANEL SHALL BE MOUNTED IN MCC-EFS. FOR MCC-EFS ELEVATION AND CONTROL PANEL LOCATION SEE DWG E-13.
2. ALL RELAYS, LEVEL SWITCHES AND TERMINAL BLOCKS SHALL BE MOUNTED ON A STEEL PLATE IN THE MCC-EFS. CONTROL DEVICES SHALL BE MOUNTED ON THE FACE OF THE MCC CONTROL PANEL SECTION. ALL FACE MOUNTED DEVICES SHALL BE NEMA-4X.
3. LEVEL SWITCHES ARE FURNISHED UNDER SECTION 13710 TO BE INSTALLED IN THE MCC.

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18370 STATE OF TENNESSEE

CH2M HILL

DSGN M. CHAUDHARY						
DR J. PAULDING						
CHK J. TURNER						
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD	
	1	9-9-88	RECORD DRAWINGS	RDJ	CNC	

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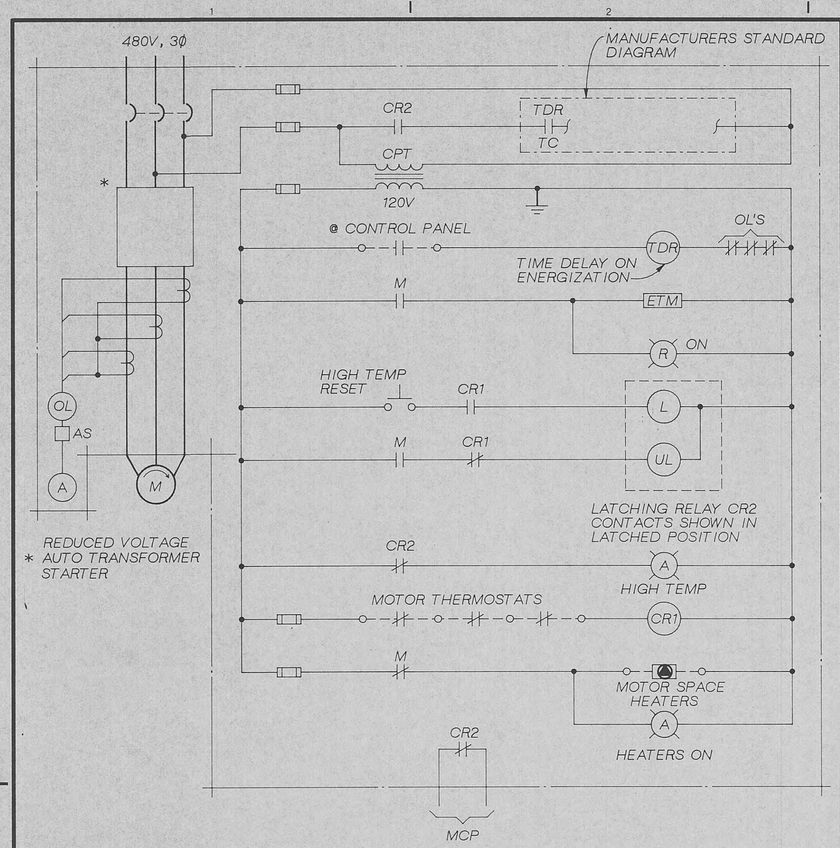
CITY OF HARRIMAN, TENNESSEE

EFFLUENT PUMP STATION CONTROL DIAGRAM

SHEET
DWG NO. E-12
DATE MAY 1986
PROJ NO. SA21043.A1

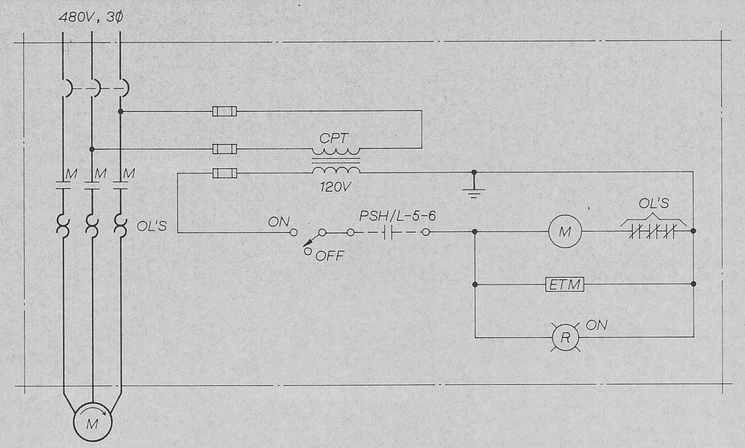
OVERLAY IDENTIFICATION
PROJ NO
CONTRACT
COMPOSITE
OVERLAY
SCREEN

FILM KC 4 SMIT PRINTED 1 82 A2
FORMAT 381 233 MC



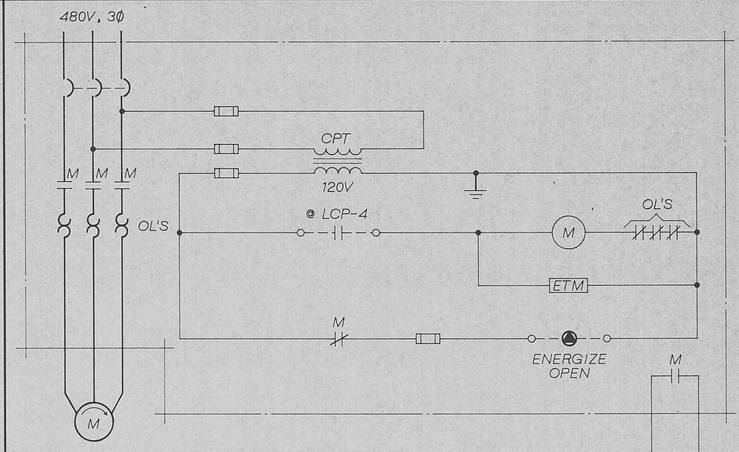
MOTOR CONTROL DIAGRAM

TYPICAL FOR
EFFLUENT PUMPS P-5-2-X (X=1, 2, 3, 4)



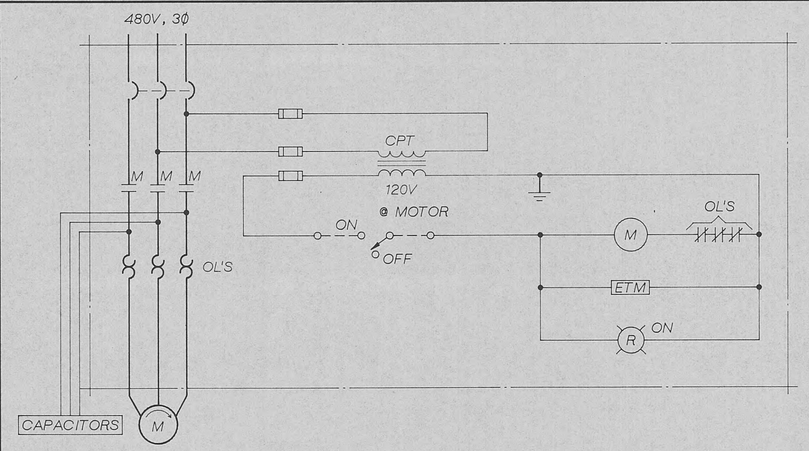
MOTOR CONTROL DIAGRAM

AIR COMPRESSOR (M-5-6)



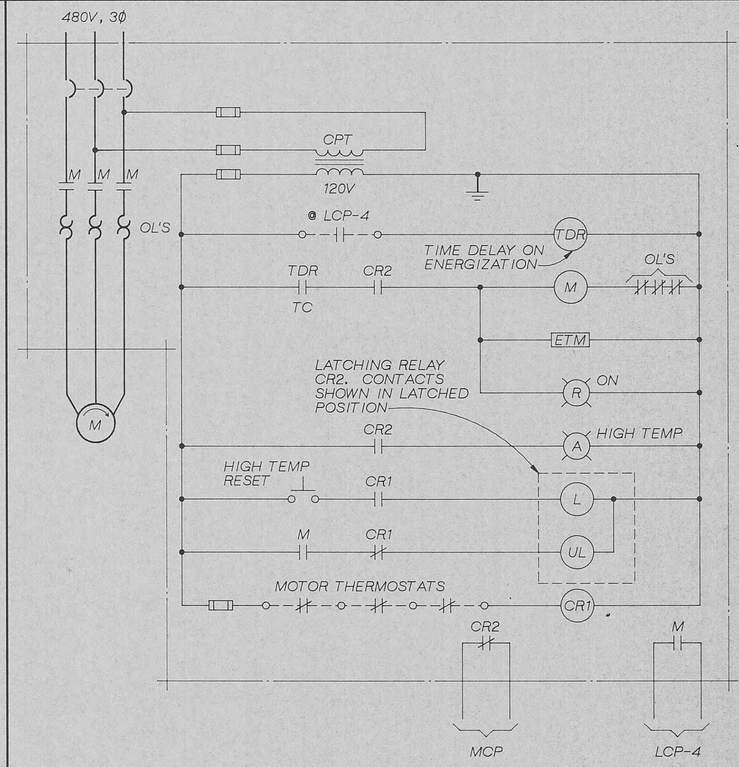
MOTOR CONTROL DIAGRAM

TYPICAL FOR
WASTE SLUDGE PUMPS P-4-6-X (X=1, 2



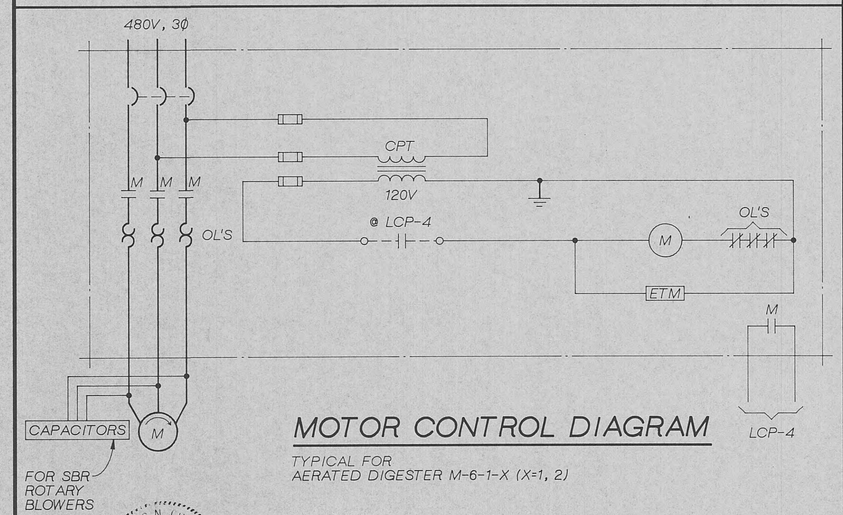
MOTOR CONTROL DIAGRAM

TYPICAL FOR
AERATED DIGESTER M-6-1-X (X=1, 2)



MOTOR CONTROL DIAGRAM

TYPICAL FOR
SBR PROCESS PUMP P-4-7-X (X=1, 2)



MOTOR CONTROL DIAGRAM

TYPICAL FOR
AERATED DIGESTER M-6-1-X (X=1, 2)

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CHANDALL REGISTERED ENGINEER 9-21-88 No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	M CHAUDHARY					
DR	DW CLARK PRJ:2521E3					
CHK	J TURNER		9-9-88	RECORD DRAWINGS	RDJ	CNC
APVD	C CRANDALL	NO.	DATE	REVISION	BY	APVD

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

MOTOR CONTROL DIAGRAMS

SHEET	
DWG NO.	E-11
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE
OVERLAY
SCREEN

WALL CLOCK, 12 HOUR DIAL, WHITE FACE, BLACK NUMERALS, RED SWEEP SECOND HAND, SHATTERPROOF PLASTIC CRYSTAL, 12" DIA. FACE, 120V, ELECTRIC TIME "MONITOR" STYLE G5C412.

FROM TOP TO BOTTOM
2"C, 12CC TYPE 1 FROM EFS
12CC TYPE 1 FROM CHLORINATION
2"C, 12CC TYPE 1 FROM DIGESTER
12CC TYPE 1 FROM HEADWORKS
1"C, 2-TSP TYPE 2 FROM EFS
2-TSP TYPE 2 FROM HEADWORKS
1"C, EMPTY

CONDUITS FROM SBR TANKS TO MCC-SBR. SEE DWG E-16 FOR REQUIREMENTS AND DWG. E-4, E-13 FOR ONELINE DIAGRAM AND MCC-SBR ELEVATION.

SEE TRANSFORMER T1-SBR AND T2-SBR LAYOUT AND GROUNDING PLAN DWG E-15 FOR CONTINUATION

[a] = 1¼"C, 3#3, 1#8G, 2#12 (THIS SHT. ONLY)

UNIT HEATER, EMERSON-CHROMOLOX, N° MUH-20-4, 20KW, 480V, 3ϕ SELF-CONTAINED THERMOSTAT. MTG. BRACKET N° MMB-20 (MT. UP 8'-0" AFF) TYP FOR 2

HTP-2
HTP-1
1½"C, EMPTY TO ASU-2 THERMOSTAT
1½"C, EMPTY TO ASU-1 THERMOSTAT
FUME HOOD MF-1
DIRECT BURIED
HHLV-6
EF-2
EF-5
MCC-SBR
LCP-4
¾"C, 8#14
FV-4-5-1
FV-4-5-2
½"C, EMPTY
THERMOSTAT
P-4-6-2
WASTE SLUDGE PUMPS
P-4-6-1
UH-2
SBR ROTARY BLOWER, TYP FOR 4
M-4-3-1
M-4-3-2
M-4-3-3
M-4-3-4
CAPACITOR, TYP.
C1
C2
C3
C4
C5
C6
MCP
2"C, 3#4, 1#8G, 2#12 FROM DIGESTER M-6-1-1
2"C, 3#4, 1#8G, 2#12 FROM DIGESTER M-6-1-2
(2) 2"C EMPTY
2"C, 3#6, 1#4 GND FROM HEADWORKS
2"C, 37CC TYPE 1
½"C, 2#14, 4#14 SPARE
¾"C, 4#14 POWER FAIL
WATER HEATER (4.5 KW)
CAPACITOR MT ABOVE MCC-SBR, TYP
1¼"C, 3#4, 1#8G, 2#12 FROM DIGESTER M-6-1-2
PNL L1
PNL P1
ATS-1 NEMA 1
T1
T-STAT
MCC-S
2"C, 3#4, 1#8G
1¼"C, 4#2, 1#8G
½"C, EMPTY TO ASU-1
ASU-1
ASU-2
EF-1
1"C, 3#6, 1#10G
½"C, EMPTY TO ASU-2
SEE TRANSFORMER T1-SBR AND T2-SBR LAYOUT AND GROUNDING PLAN DWG E-15 FOR CONTINUATION
DOWN TO RECEPTACLE
UH-1
4-PLEX RECEPTACLES
CANOPY HOODS
1"C, 3#8, 1#10G
¾"C, 4#14, 1#14G
PULL BOX SIZE AS REQ'D
SEE NOTE 6
TO UTILITY PUMP STATION SEE DWG E-3
MECHANICAL ROOM
A E-16

2"C, 12CC TYPE 1 FROM EFS
12CC TYPE 1 FROM CHLORINATION
2"C, 12CC TYPE 1 FROM DIGESTERS
12CC TYPE 1 FROM HEADWORKS
2"C, 2-TSP TYPE 2 FROM EFS
2-TSP TYPE 2 FROM HEADWORKS
2"C, 3#4, 1#8G, 2#12 FROM DIGESTER M-6-1-1
2"C, 3#4, 1#8G, 2#12 FROM DIGESTER M-6-1-2
(2) 2"C EMPTY
2"C, 3#6, 1#4 GND FROM HEADWORKS

NOTES:
1. WHERE 2 CIRCUITS ARE SHOWN FOR MULTI-OUTLET ASSEMBLIES, OUTLETS ARE TO BE WIRED ALTERNATELY.
2. SEE ARCHITECTURAL ELEVATIONS FOR EXACT LOCATIONS OF MULTI-OUTLET ASSEMBLIES AND RECEPTACLES AND CLOCKS.
3. INSTALL BLANK COVER SECTIONS WHERE MULTI-OUTLET ASSEMBLIES ARE ABOVE SINKS.
4. SEE DWG E-14 FOR PANEL SCHEDULES.
5. WALL MOUNT CAPACITORS NEAR MOTORS. PROVIDE NECESSARY MOUNTING BRACKETS.
6. CORE DRILL WALL FOR ROUTING OF CONDUITS. SEAL OPENING AFTER CONDUIT INSTALLATION. MATCH SURFACE TO ADJACENT SURFACE FOR FINISH.

PARTIAL GROUND FLOOR PLAN

RECORD DRAWINGS
Revisions Drawn by R. JACKSON Date 9-9-88
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CONTROL BUILDING POWER PLAN
1/4"=1'-0"

CHARLES N. CRANDALL REGISTERED ENGINEER 2-21-84 No. 18378 STATE OF TENNESSEE

CH2M HILL

DSGN B. WEHNERT					
DR L. BRUNDIDGE					
CHK J. TURNER					
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD
	1	9-9-88	RECORD DRAWINGS	RDJ	CNC

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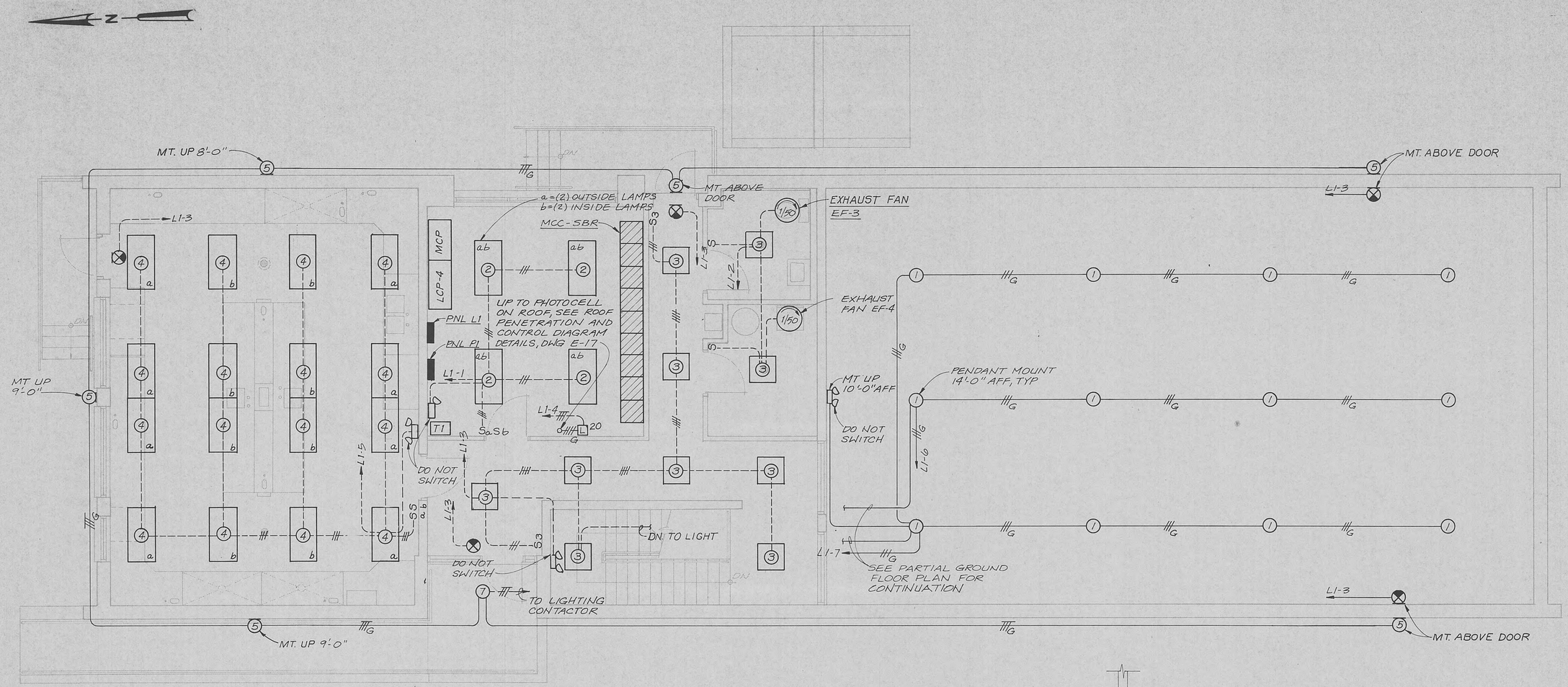
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — POWER PLAN

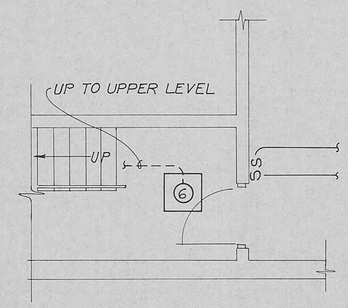
SHEET
DWG NO. E-10
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION: COMPOSITE, OVERLAY, SCREEN
PROJ NO. A5-16
CONTRACT 5
FORMAT 22"x34" E-10
E-10



CONTROL BUILDING LIGHTING PLAN

1/4" = 1'-0"



PARTIAL GROUND FLOOR PLAN

1/4" = 1'-0"

NOTE:
SEE DWG E-14 FOR LUMINAIRE SCHEDULE.

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER 1-21-86 AGRICULTURE COMMERCE No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	B WEHNERT					
DR	J PAULDING					
CHK	J TURNER		9-9-88	RECORD DRAWINGS	RDJ	CNC
APVD	C CRANDALL	NO.	DATE	REVISION	BY	APVD

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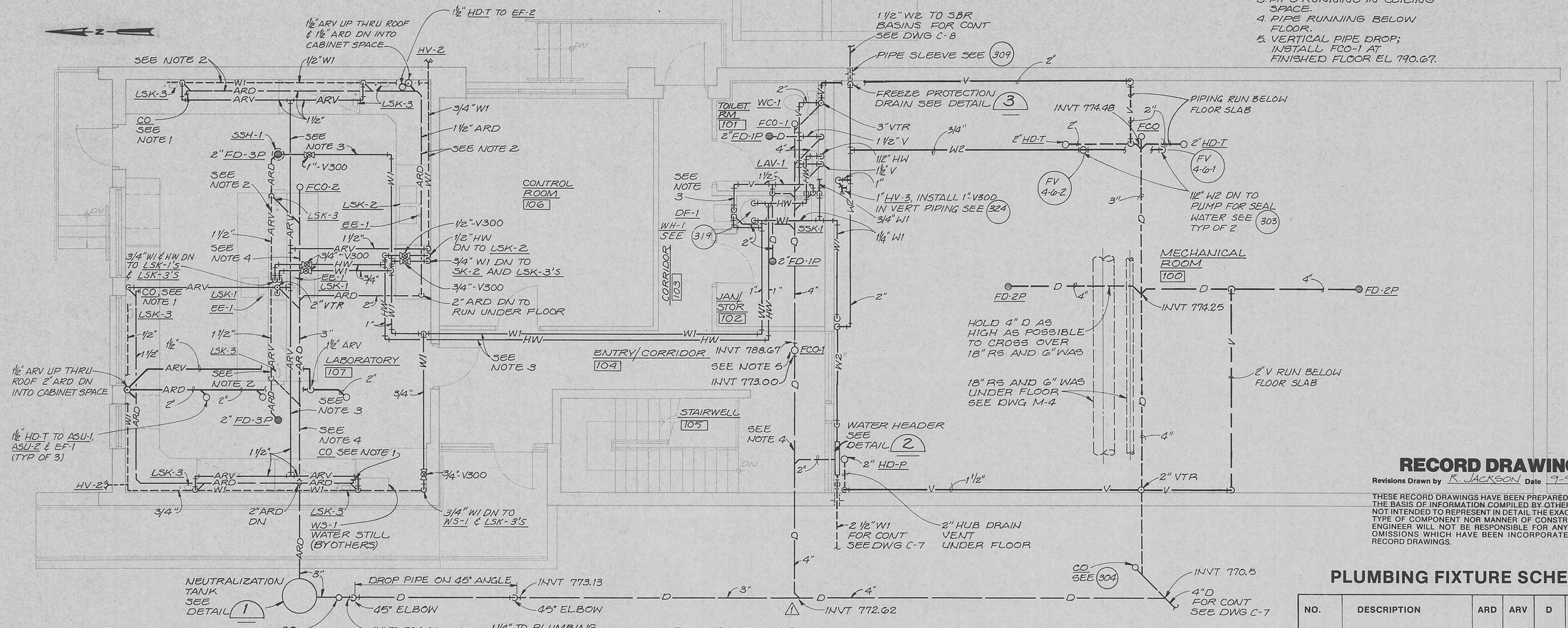
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — LIGHTING PLAN

SHEET
DWG NO. E-9
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
INTRACT
COMPOSITE
OVERLAY
SCREEN

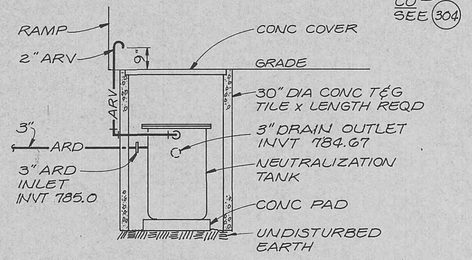


NOTES:

1. CLEANOUT TO BE ACCESSIBLE FROM CABINET SPACE.
2. PIPE RUNNING IN CABINET PIPE CHASE.
3. PIPE RUNNING IN CEILING SPACE.
4. PIPE RUNNING BELOW FLOOR.
5. VERTICAL PIPE DROP; INSTALL FCO-1 AT FINISHED FLOOR EL 790.67.

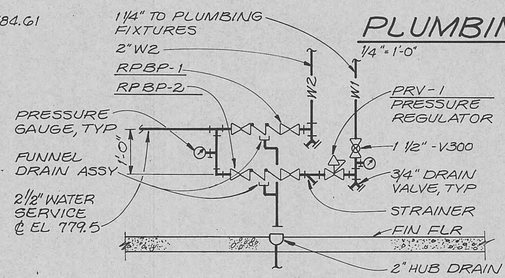
PLUMBING PLAN

1/4" = 1'-0"



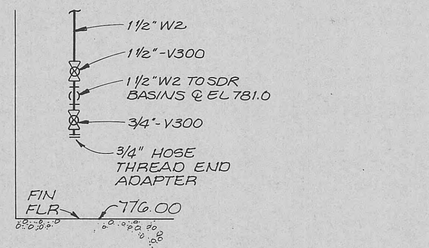
NEUTRALIZATION TANK DETAIL 1

NTS



WATER HEADER DETAIL 2

NTS



FREEZE PROTECTION DETAIL 3

NTS

RECORD DRAWINGS

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PLUMBING FIXTURE SCHEDULE

NO.	DESCRIPTION	ARD	ARV	D	V	W1	HW
WC-1	WATER CLOSET	—	—	4"	2"	1/2"	—
LAV-1	LAVATORY	—	—	1-1/2"	1-1/2"	1/2"	1/2"
SSK-1	SERVICE SINK	—	—	3"	1-1/2"	3/4"	3/4"
DF-1	DRINKING FOUNTAIN	—	—	1-1/2"	1-1/2"	1/2"	—
LSK-1	LABORATORY SINK	2"	1-1/2"	—	—	1/2"	1/2"
LSK-2	LABORATORY SINK	2"	1-1/2"	—	—	1/2"	1/2"
LSK-3	LABORATORY SINK	1-1/2"	1-1/2"	—	—	1/2"	—
EE-1	EMERGENCY EYEWASH			—	—	1/2"	—
SSH-1	EMERGENCY SHOWER			—	—	1"	—
WH-1	WATER HEATER			—	—	1"	1"
WS-1	WATER STILL	—	—	—	—	1/2"*	—

* INSTALL 1/2" - V300 IN WATER SUPPLY TO STILL

CHARLES N. CRANDALL REGISTERED ENGINEER 12/1/87 No. 18315 STATE OF TENNESSEE

CH2M HILL

DSGN	B. REGER
DR	D. McPHERSON
CHK	A. OLSON
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
1	9-9-88	RECORD DRAWINGS	RDJ	CNC
	6-2589	WATER AND DRAIN MODIFICATIONS	JWR	

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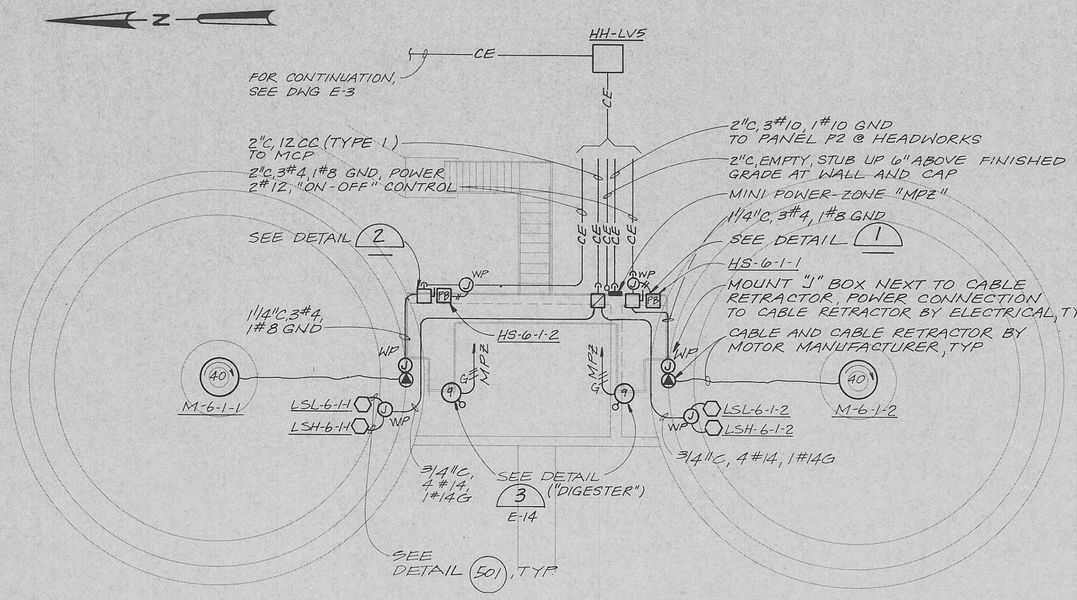
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

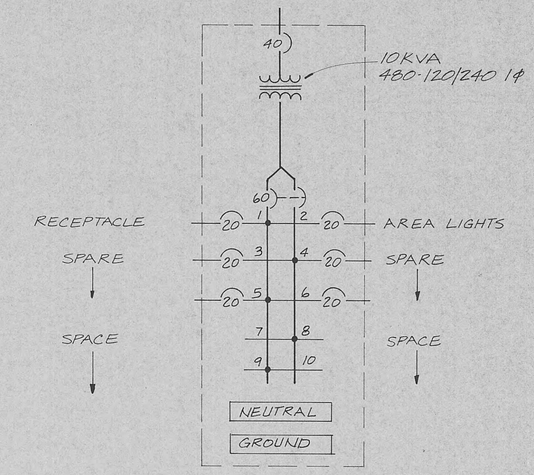
CONTROL BUILDING — PLUMBING PLAN AND DETAILS

DWG NO. M-10
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO. 3NTRACT
COMPOSITE
OVERLAY
SCREEN
FORMAT A5-16 M-10 M-20 S
223 X 4 C
FILM KE
PRINTED 8.5 11



NOTE:
ROUTE CONDUITS ALONG WALKWAY.

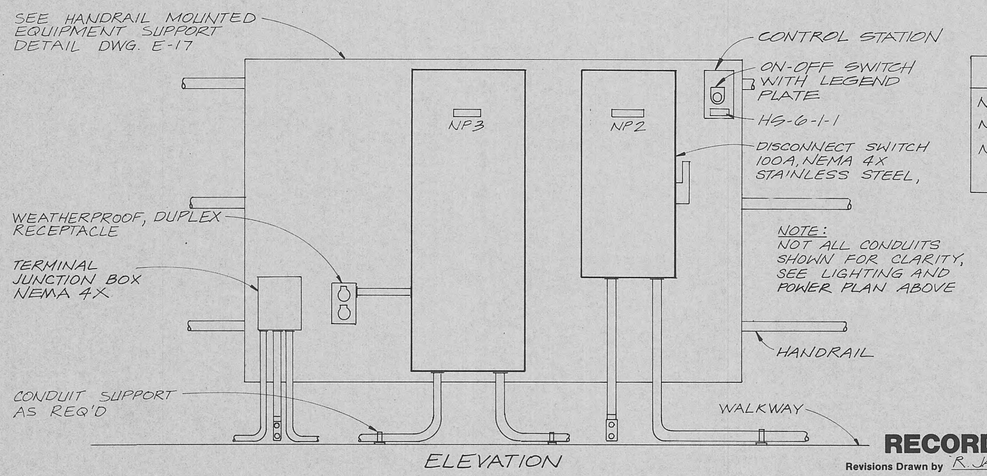


MINI POWER-ZONE (MPZ)

SQUARE D "MPZ" SUITABLE FOR OUTDOOR USE

SLUDGE DIGESTER LIGHTING AND POWER PLAN

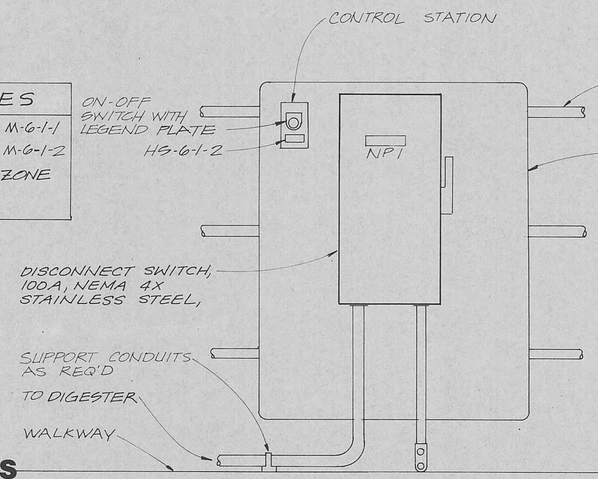
NTS



NAMEPLATES
NP1 = DIGESTER M-6-1-1
NP2 = DIGESTER M-6-1-2
NP3 = MINI POWER ZONE

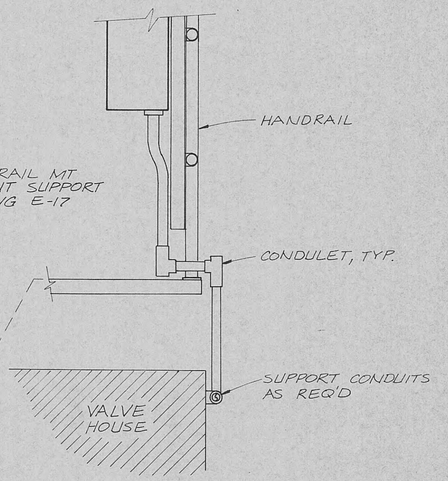
ELEVATION

DETAIL 1
NTS



ELEVATION

DETAIL 2
NTS



SIDE VIEW

RECORD DRAWINGS
Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER 12-2-88 No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	B. WEHNERT
DR	L. BRUNDIDGE
CHK	J. TURNER
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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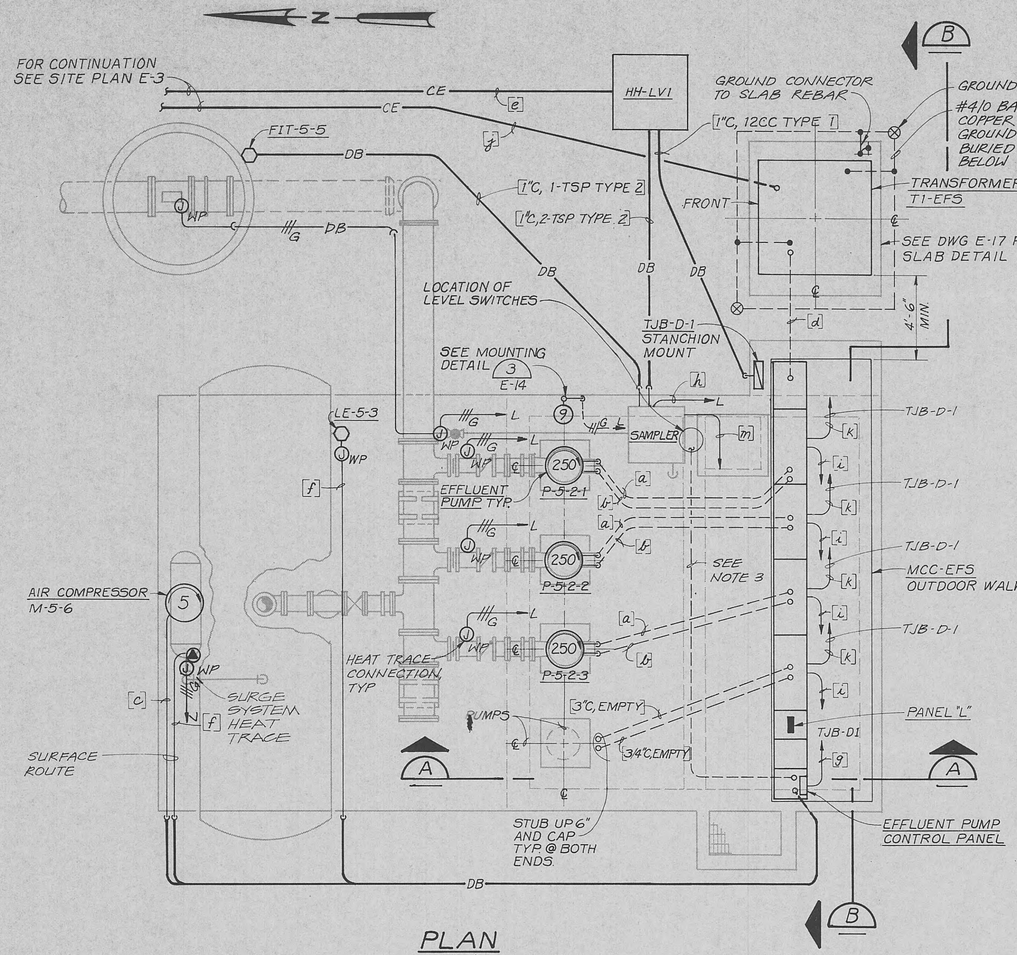
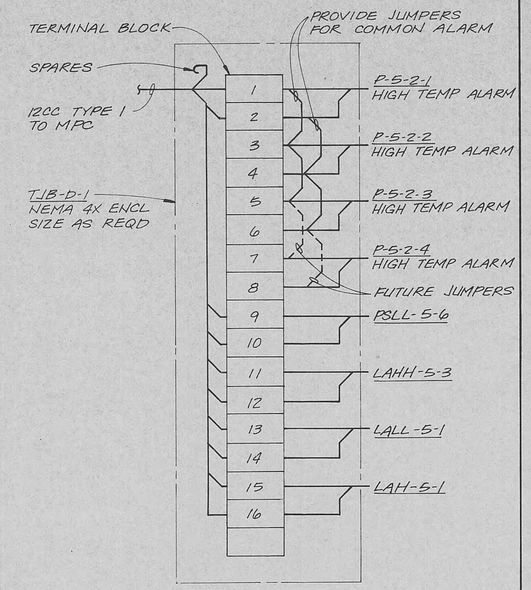
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

SLUDGE DIGESTER - POWER AND LIGHTING PLAN

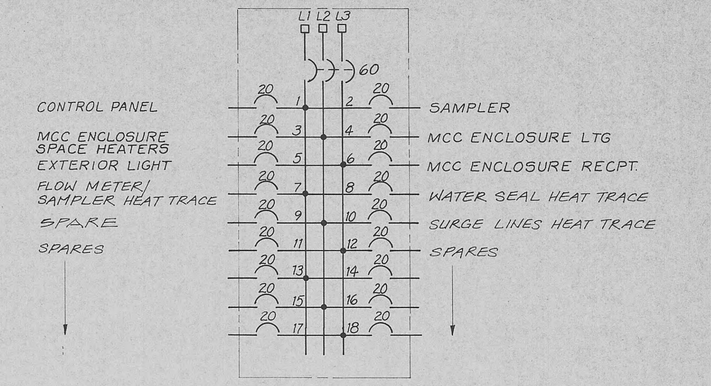
SHEET	
DWG NO.	E-8
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION | COMPOSITE | OVERLAY | SCREEN
PROJ NO. | E-8 | E-8 | S
CONTRACT | E-8 | E-8 |
FORMAT 2234MC FILM KE DESIGNED BY DRAWN BY CHECKED BY PRINTED

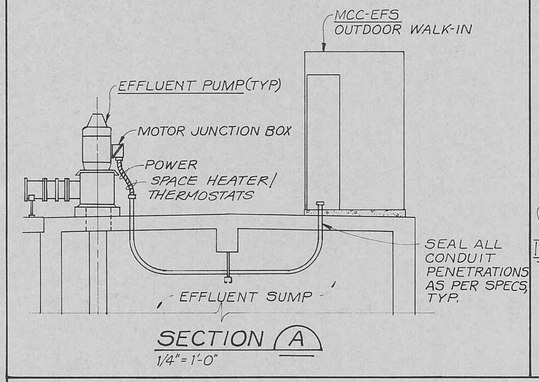




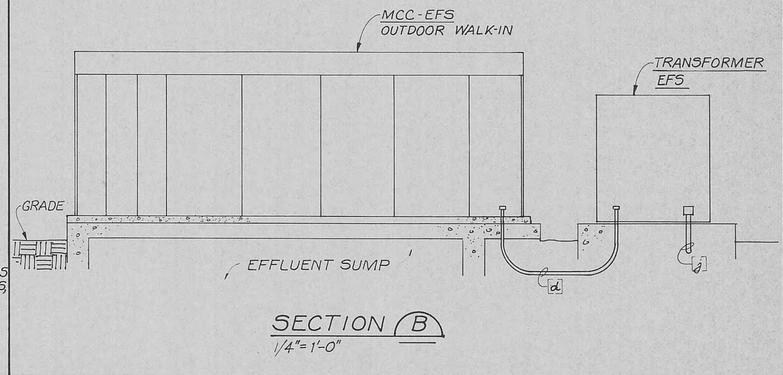
TJB-D-1
NTS



PANEL L
120/208V, 3Ø, 4W
MOUNTED IN MCC-EF5



SECTION A
1/4"=1'-0"



SECTION B
1/4"=1'-0"

RACEWAY LEGEND

[a] = [3"C, 3#500 MCM, 1#3G]

[b] = [3/4"C, 4#12, 1#12G (TO SPACE HEATERS & THERMOSTATS)]

[c] = [3/4"C, 3#12, 1#12G]

[d] = [(4) 3"C, 3#350 MCM, 1#3/0G EA.]

[e] = [2"C, 12CC TYPE 1 (FROM EF5)
2"C, 2-TSP TYPE 2 (FROM EF5 AND SAMPLER)
(2) 2"C, EMPTY]

[f] = [3/4"C, 8#14 (FOR PRESSURE SWITCHES AND SV'S)]

[g] = [1"C, 20#14]

[h] = [3/4"C, 2#12, 1#12G]

[i] = [2#14 (TO CONTROL PANEL VIA MCC WIREWAY)]

[j] = [3"C, 3#2 15KV (TO T1-EF5)
3"C, 3#2 15KV (TO T2-SBR)]

[k] = [3/4"C, 2#14]

[l] = [8#14]

[m] = [3/4"C, 1-TSP (TO CONTROL PANEL IN MCC)]

NOTES:

1. ALL EXPOSED CONDUIT INCLUDING JUNCTION BOXES, FITTINGS, SUPPORTS, COUPLINGS & MISC. HARDWARE SHALL BE PVC COATED, TYP. CONDUIT THREADS SHALL BE COMPLETELY CONCEALED.
2. COORDINATE CONDUIT PENETRATION WITH STRUCTURAL AND EQUIPMENT FURNISHED.
3. CABLES FURNISHISHED WITH LEVEL SWITCHES. COORDINATE SIZE OF CONDUIT REQUIRED FOR ROUTING OF CABLES.

RECORD DRAWINGS
Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 19379 — STATE OF TENNESSEE

CH2M HILL

DSGN	M CHAUDHARY
DR	J. PAULDING
CHK	J TURNER
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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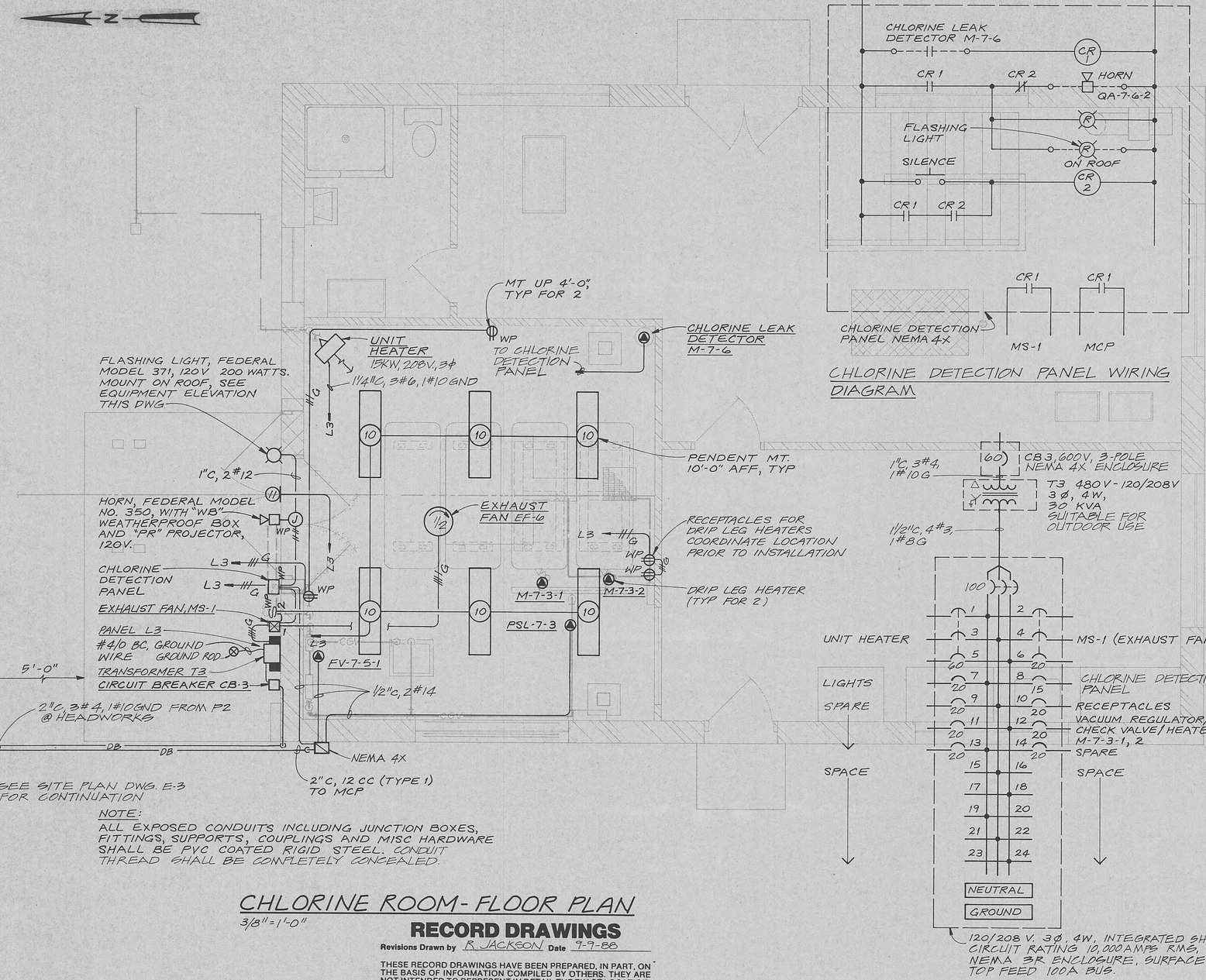
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

EFFLUENT PUMP STATION — POWER AND LIGHTING PLAN

SHEET	
DWG NO.	E-7
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE E-7.1
OVERLAY E-7.1
SCREEN S
FORMAT 2334MC
FILM KE
PRINTED
CHECKED BY
DRAWN BY
DESIGNED BY
1:1
8.5

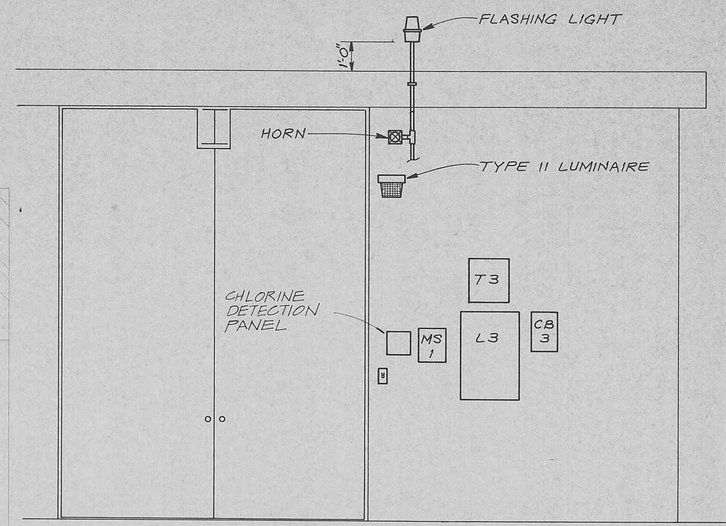


NOTE:
ALL EXPOSED CONDUITS INCLUDING JUNCTION BOXES, FITTINGS, SUPPORTS, COUPLINGS AND MISC HARDWARE SHALL BE PVC COATED RIGID STEEL. CONDUIT THREAD SHALL BE COMPLETELY CONCEALED.

CHLORINE ROOM- FLOOR PLAN

3/8"=1'-0"

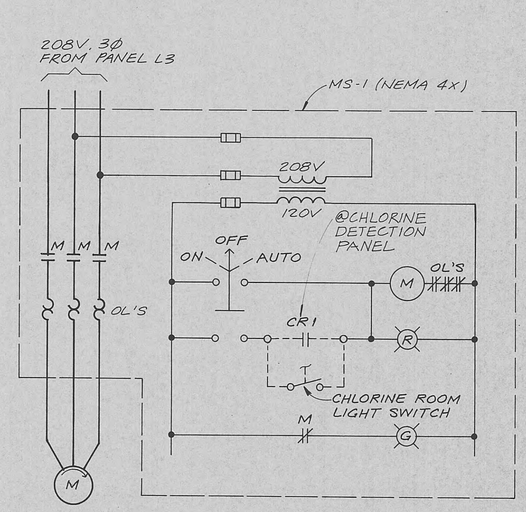
CHLORINE DETECTION PANEL WIRING DIAGRAM



EQUIPMENT ELEVATION

NTS

PANEL L3



EXHAUST FAN EF-6

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER 2-21-89 No. 18379 STATE OF TENNESSEE

CH2M HILL

DSGN	B WEHNERT
DR	D PARKER
CHK	J TURNER
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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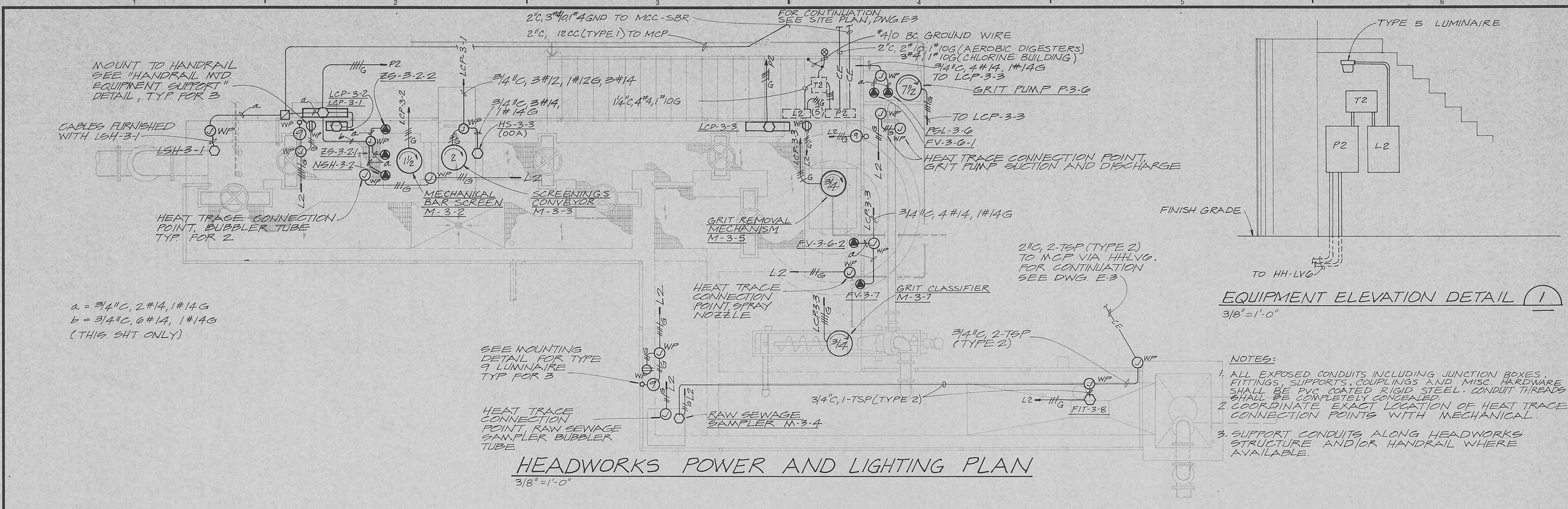
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CHLORINATION BUILDING — POWER AND LIGHTING PLAN

SHEET	
DWG NO.	E-6
DATE	MAY 1986
PROJ NO.	SA21043.A1

FORMAT 223 MC | FILM KE | PRINTED 2 | DESIGNED BY | DRAWN BY | CHECKED BY

OVERLAY IDENTIFICATION: COMPOSITE 100-1 E-6 100-M-11 S; OVERLAY E-6 S; SCREEN; PROJ NO. SA21043.A1



HEADWORKS POWER AND LIGHTING PLAN

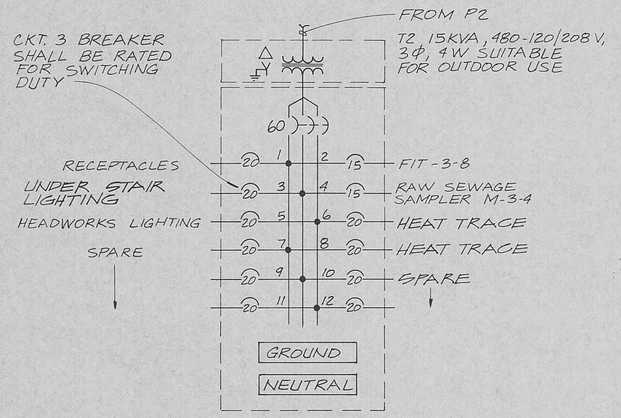
3/8" = 1'-0"

EQUIPMENT ELEVATION DETAIL 1

3/8" = 1'-0"

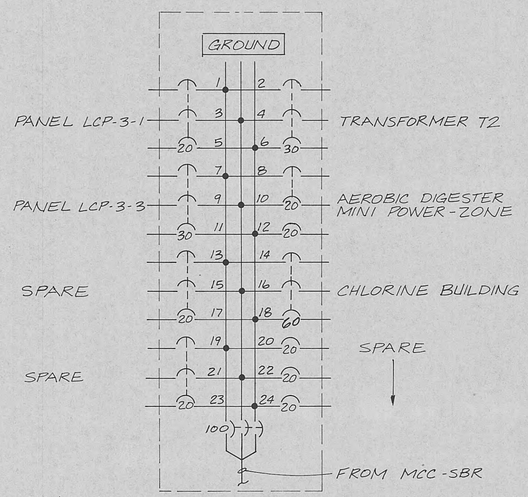
NOTES:

1. ALL EXPOSED CONDUITS INCLUDING JUNCTION BOXES, FITTINGS, SUPPORTS, COUPLINGS AND MISC. HARDWARE SHALL BE PVC COATED RIGID STEEL. CONDUIT THREADS SHALL BE COMPLETELY CONCEALED.
2. COORDINATE EXACT LOCATION OF HEAT TRACE CONNECTION POINTS WITH MECHANICAL.
3. SUPPORT CONDUITS ALONG HEADWORKS STRUCTURE AND/OR HANDRAIL WHERE AVAILABLE.



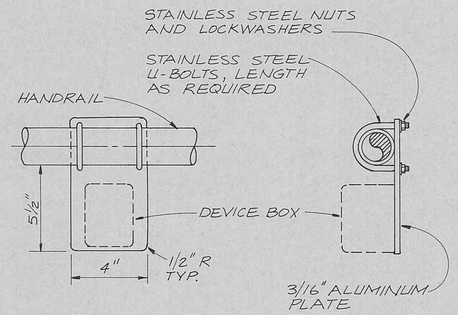
120/208 V, 3φ, 4W, INTEGRATED SHORT CIRCUIT RATING 10,000 AMPS RMS, SURFACE MT., TOP FEED, 100 AMP BUS, NEMA 3R ENCLOSURE

PANEL L2



480 V, 3φ, 3W, INTEGRATED SHORT CIRCUIT RATING 22,000 AMPS RMS, SURFACE MT, BOTTOM FEED, 225 AMP BUS, NEMA 3R ENCLOSURE

PANEL P2



HANDRAIL MOUNTED EQUIPMENT SUPPORT

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18372 — STATE OF TENNESSEE

CH2M HILL

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DR L. BRUNDIDGE
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APVD C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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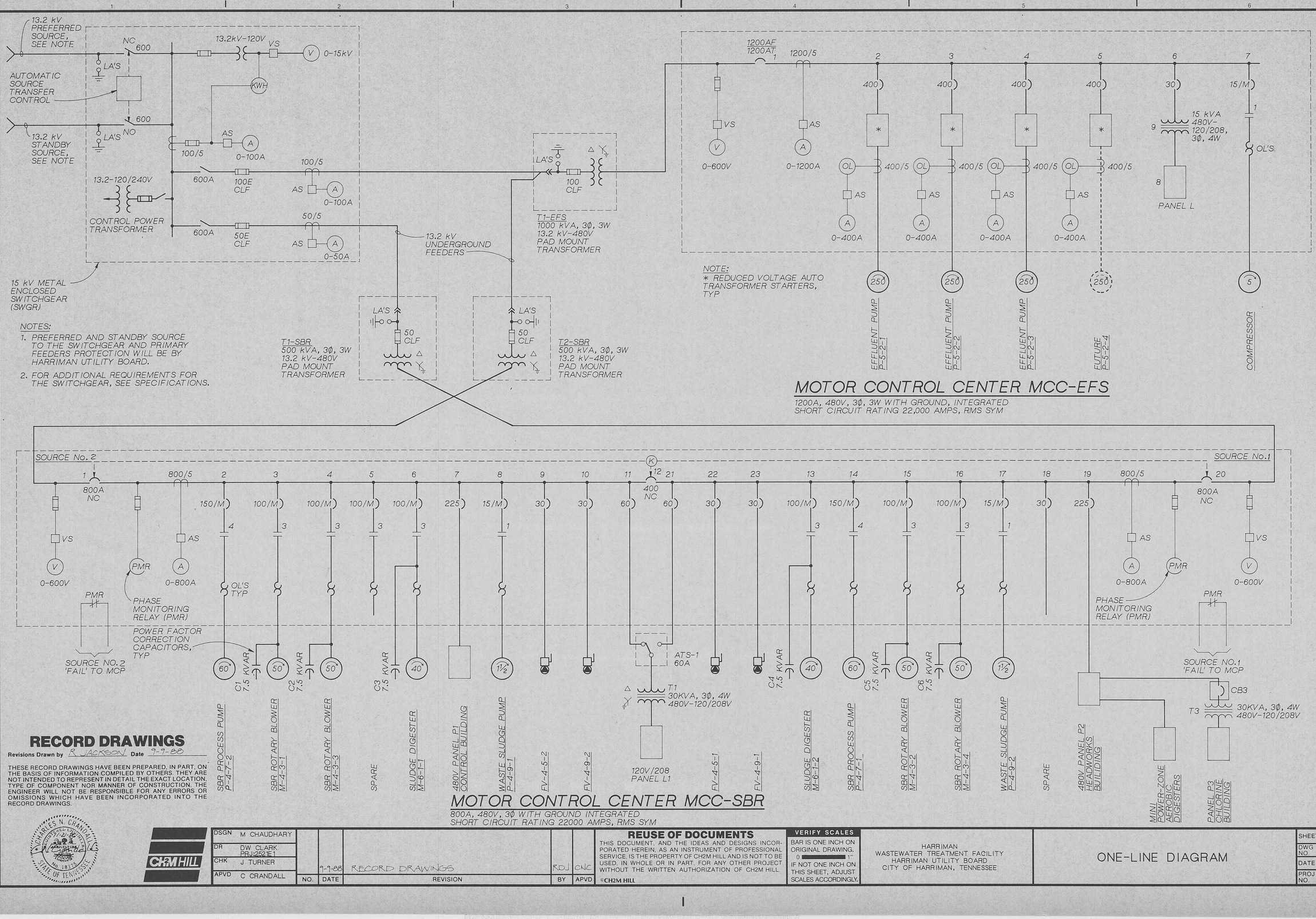
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

HEADWORKS — POWER AND LIGHTING PLAN

SHEET
DWG NO. E-5
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
COMPOSITE SM-A E-S SM-2
OVERLAY S A E-S S
SCREEN
PROJ NO.
TRACT

FORMAT 22 X 34 M/C
FILM KE
PRINTED 8 5 11
CHECKED BY
DRAWN BY
DESIGNED BY



MOTOR CONTROL CENTER MCC-EFS

1200A, 480V, 3Ø, 3W WITH GROUND, INTEGRATED
SHORT CIRCUIT RATING 22,000 AMPS, RMS SYM

MOTOR CONTROL CENTER MCC-SBR

800A, 480V, 3Ø WITH GROUND INTEGRATED
SHORT CIRCUIT RATING 22000 AMPS, RMS SYM

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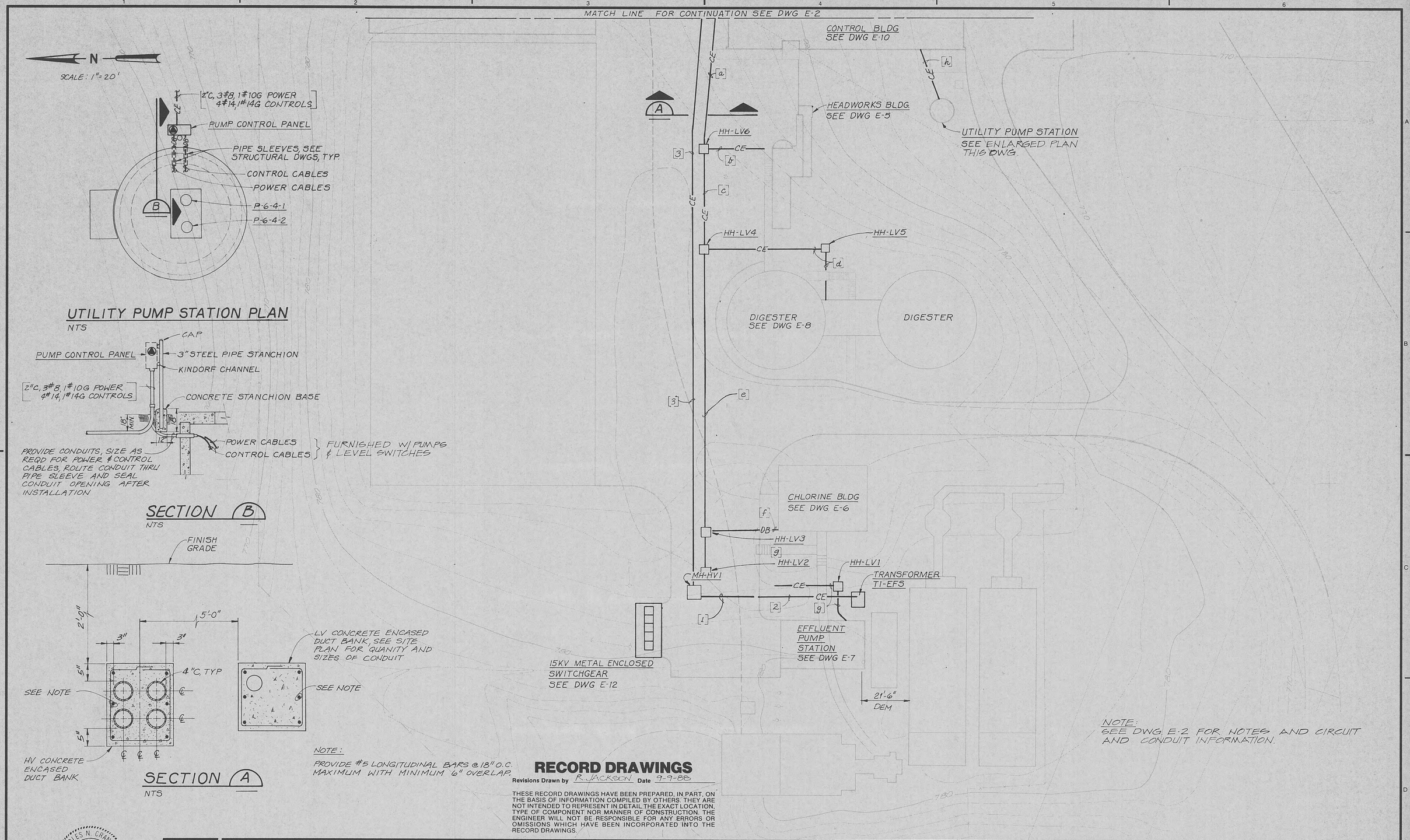
CITY OF HARRIMAN, TENNESSEE

ONE-LINE DIAGRAM

SHEET
DWG NO. E-4
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION: COMPOSITE / OVERLAY / SCREEN
PROJ NO.
CONTRACT



RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

SITE PLAN — WEST

SHEET	
DWG NO.	E-3
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT

COMPOSITE	3-BT	E3	E3.1	3-NS
OVERLAY	3-BT	E3	E3.1	S
SCREEN	S			

HIGH VOLTAGE SCHEDULE

[1] = [4"C, 3#2, 15KV (TO T1-SBR)
4"C, 3#2, 15KV (TO T1-EF5)
2-4"C, EMPTY]

[2] = [4"C, 3#2, 15KV (TO T2-SBR)
4"C, 3#2, 15KV (TO T1-EF5)]

[3] = [4"C, 3#2, 15KV (TO T1-SBR)
4"C, 3#2, 15KV (TO T2-SBR)
2-4"C, EMPTY]

[4] = [4"C, 3#2, 15KV (TO T1-SBR)]

[5] = [4"C, 3#2, 15KV (TO T2-SBR)]

LOW VOLTAGE SCHEDULE

[a] = [2"C, 12CC TYPE 1 (FROM EF5)
12CC TYPE 1 (FROM CHLORINATION)
2"C, 12CC TYPE 1 (FROM DIGESTER5)
12CC TYPE 1 (FROM HEADWORK5)
2"C, 2-T5P TYPE 2 (FROM EF5)
2-T5P TYPE 2 (FROM HEADWORK5)
2"C, 3#4, 1#8G, 2#12, (FROM DIGESTERS M-6-1-1)
2"C, 3#4, 1#8G, 2#12, (FROM DIGESTERS M-6-1-2)
2"C, 3#4/0, 1#4G (FROM HEADWORKS POWER)
2-2"C, EMPTY]

[b] = [2"C, 12CC TYPE 1 (FROM HEADWORK5)
2"C, 2-T5P TYPE 2 (FROM HEADWORK5)
2"C, 3#4/0, 1#4G (FROM HEADWORKS POWER)
2"C, 3#10, 1#10G (FROM MPC POWER)
2"C, 3#4, 1#10G (FROM CHLORINE POWER)
2"C, EMPTY]

[c] = [2"C, 12CC TYPE 1 (FROM EF5)
12CC TYPE 1 (FROM CHLORINATION)
2"C, 12CC TYPE 1 (FROM DIGESTER5)
2"C, 2-T5P TYPE 2 (FROM EF5)
2"C, 3#4, 1#8G, 2#12 (FROM DIGESTERS M-6-1-1
2"C, 3#4, 1#8G, 2#12 (FROM DIGESTERS M-6-1-2
2-2"C, EMPTY
2"C, 3#4, 1#10G (FROM CHLORINE POWER)]

[d] = [2"C, 12CC TYPE 1 (FROM DIGESTERS)
2"C, 3#4, 1#8G, 2#12 (FROM DIGESTERS M-6-1-1)
2"C, 3#4, 1#8G, 2#12 (FROM DIGESTERS M-6-1-2)
2"C, 3#10, 1#10G (FROM MPC POWER)
2-2"C, EMPTY]

[e] = [2"C, 12CC TYPE 1 (FROM EF5)
12CC TYPE 1 (FROM CHLORINATION)
2"C, 2-T5P TYPE 2 (FROM EF5)
2"C, 3#4, 1#10G (FROM CHLORINE POWER)
1-2"C, EMPTY]

[f] = [2"C, 12CC TYPE 1 (FROM CHLORINATION)
2"C, 3#4, 1#10G (FROM CHLORINE POWER)]

[g] = [2"C, 12CC TYPE 1 (FROM EF5)
2"C, 2-T5P TYPE 2 (FROM EF5)
2-2"C, EMPTY]

[h] = [2"C, 3#8, 1#10G (FROM UTILITY PUMP STATION)
4#14, 1#14G (FROM UTILITY PUMP STATION)]

[i] = [(2)1"C, 3#10, 1#10G (FROM FLOW VALVES FV-4-9-1/2)
(2)1"C, 8#14, 1#14G (FROM FLOW VALVES FV-4-9-1/2)]

[j] = [2"C, 3#2, 1#6G (FROM P-4-7-1)
3/4"C, 2#14, 1#14G (FROM P-4-7-1)
3/4"C, 2#14, 1#14G (FROM P-4-7-1)
2"C, 3#2, 1#6G (FROM P-4-7-2)
3/4"C, 2#14, 1#14G (FROM P-4-7-2)
3/4"C, 2#14, 1#14G (FROM P-4-7-2)]

NOTES:
1. COORDINATE ROUTING OF ALL NEW CONCRETE ENCASED (CE) AND DIRECT BURIED (DB) CONDUITS WITH THE EXISTING BELOW GRADE UTILITIES.
2. FIREPROOF 15KV CABLES IN ALL MANHOLES AS SPECIFIED. 15KV CIRCUITS SHALL BE ROUTED ON THE OPPOSITE SIDES OF THE MANHOLE.
3. SEE MECHANICAL PLANS FOR EXACT LOCATION OF FV-4-9-1 AND FV-4-9-2.
4. ALL 15KV MANHOLES SHALL BE 6'x6'x6'-6" DEEP.
5. ALL LOW VOLTAGE HANDHOLES (HH-LV1 THROUGH HH-LV7) SHALL BE 4'x4'x5'-6" DEEP.

SCALE: 1"=20'

SLUDGE DRYING BEDS

SBR

SBR

SEE DWG E-16 FOR THIS AREA

TRANSFORMER T1-SBR/T2-SBR SEE DWG E-15

MH HV2

HH-LV7

TO MCC-SBR AND MCP

CONTROL BLDG, SEE DWG E-10

MATCH LINE, FOR CONTINUATION SEE DWG E-3

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CHARLES N. CRANDALL — REGISTERED ENGINEER — AGRICULTURE — No. 18375 — STATE OF TENNESSEE

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NO.	DATE	REVISION	BY	APVD
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CITY OF HARRIMAN, TENNESSEE

SITE PLAN — EAST

SHEET
DWG NO. E-2
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE 4-BT E2 5
OVERLAY 4-N5 E2 5
SCREEN
FORMAT 2324MC
FILM KE
PRINTED 2
DESIGNED BY
DRAWN BY
CHECKED BY

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
⬡	CONTROL DEVICE - FURNISHED AND INSTALLED UNDER OTHER SECTIONS; RACEWAYS, CONDUCTORS, AND CONDUCTOR END TERMINATORS FURNISHED AND INSTALLED UNDER THIS SECTION AS SHOWN. CONDUCTOR FINAL CONNECTIONS PROVIDED UNDER OTHER SECTIONS.
⬡	CONNECTION POINT TO EQUIPMENT SPECIFIED. FURNISHED AND INSTALLED UNDER OTHER SECTIONS. RACEWAY, CONDUCTOR AND CONNECTION IN THIS SECTION.
[5-6] or [5-E(3)]	INDICATES RACEWAYS AND CIRCUIT NUMBERS. FIRST NUMBER IS RACEWAY AND NUMBER AFTER DASH IS CIRCUIT NUMBER. 5-E(3) INDICATES THAT THERE ARE 3 EMPTY RACEWAY NO.5. SEE SCHEDULE.
MCC-A	MAJOR ELECTRICAL COMPONENT OR DEVICE - NAME OR IDENTIFYING SYMBOL AS SHOWN.
▬	BRANCH CIRCUIT PANEL BOARD
UH1	UNIT HEATER NO.1 SEE SCHEDULE
TTC	TELEPHONE TERMINAL CABINET
▭	TERMINAL JUNCTION BOX
(10)	WOUND-ROTOR MOTOR, HORSEPOWER INDICATED
(5)	MOTOR, SQUIRREL CAGE INDUCTION - HORSEPOWER INDICATED
(1)	LUMINAIRE - SEE SCHEDULE
(2)	LUMINAIRE - SEE SCHEDULE
(3)	LUMINAIRE AND POLE - SEE SCHEDULE
(4)	WALL MOUNTED LUMINAIRE - SEE SCHEDULE
(5)	FLOOD LIGHTS - AIM IN THE DIRECTION SHOWN
⊗	EXIT LIGHTS - SEE SCHEDULE
Sa or 2a	SMALL LETTER SUBSCRIPT AT SWITCH AND LUMINAIRE INDICATES SWITCHING. SUBSCRIPT NUMBER AT LUMINAIRE INDICATES CIRCUIT IN PANELBOARD.
LA-2	HOME RUN - DESTINATION SHOWN
G	EXPOSED CONDUIT AND CONDUCTORS*
G	CONCEALED CONDUIT AND CONDUCTORS*
	NOTE: * ALL UNMARKED CONDUIT RUNS CONSIST OF TWO NO.12 CONDUCTORS IN CONDUIT. RUNS MARKED WITH CROSSHATCHES INDICATE NUMBER OF NO.12 CONDUCTORS. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND WIRE. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.
//	CROSSHATCHES WITH BAR INDICATE #10 CONDUCTOR. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.
	CONDUIT DOWN
	CONDUIT UP
	CONDUIT, STUBBED AND CAPPED AS SHOWN
C	CABLE TRAY - SEE SPECIFICATIONS
B	BUS DUCT - SEE SPECIFICATIONS
P	TRENCHING FOR UTILITY COMPANY PRIMARY POWER CUTS
T	TRENCHING FOR TELEPHONE COMPANY CIRCUITS
CE	CONCRETE ENCASED CONDUIT
DB	DIRECT BURIED CONDUIT
S	WALL SWITCH: 2- DOUBLE POLE, 3- THREE WAY, 4- FOUR WAY, WP-WEATHERPROOF, P- PILOT LIGHT, K- KEY OPERATED, D- DIMMER, CRE-CORROSION RESISTANT
SM	MANUAL MOTOR STARTER SWITCH

SYMBOL	DESCRIPTION
	CONVENIENCE RECEPTACLE - DUPLEX UNLESS SPECIFIED OTHERWISE. WP-WEATHERPROOF, TL-TWIST LOCK, C- CLOCK HANGER, CRE-CORROSION RESISTANT
	CONVENIENCE RECEPTACLE, PEDESTAL, DUPLEX SINGLE FACE UNLESS INDICATED OTHERWISE
30	RECEPTACLE - 240V., 1ϕ, AMPERAGE INDICATED
30	RECEPTACLE, SPECIAL PURPOSE - AMPERAGE AS INDICATED
	DUPLEX CONVENIENCE RECEPTACLE - FLUSH IN FLOOR
	MULTI OUTLET ASSEMBLY
	WALL CLOCK WITH CLOCK HANGER CONVENIENCE RECEPTACLE
	TELEPHONE RECEPTACLE (OUTLET BOX ONLY) FLUSH IN FLOOR
	TELEPHONE RECEPTACLE (OUTLET BOX ONLY)
or HH	GENERAL CONTROL OR WIRING DEVICE. NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. LETTER SYMBOLS OR ABBREVIATIONS INDICATE TYPE OF DEVICE.
PB	PUSH-BUTTON STATION, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. (WP = NEMA 4 ENCLOSURE) SEE CONTROL DIAGRAMS FOR TYPE PUSH BUTTON REQUIRED.
30	NONFUSED DISCONNECT SWITCH, SIZE INDICATED, 3 POLE UNLESS INDICATED OTHERWISE, NEMA 1 ENCLOSURE, WP = WEATHERPROOF NEMA 3R)
60/40 F	FUSED DISCONNECT SWITCH, SIZE INDICATED (60/40, 60 = SWITCH RATING: 40 = FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE, NEMA 1 ENCLOSURE, WP = WEATHERPROOF (NEMA 3R)
2	CONTACTOR, MAGNETIC, NEMA SIZE INDICATED, NEMA 1 ENCLOSURE, UNLESS INDICATED OTHERWISE.
30 L	LIGHTING CONTACTOR, CURRENT RATING INDICATED, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM FOR NUMBER OF POLES.
2	STARTER MAGNETIC NEMA SIZE INDICATED, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM.
2	COMBINATION (FUSE OR CIRCUIT BREAKER ASINDICATED) MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 1 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM.
	METERING FACILITIES
	MULTI-PARTY DESK TOP COMMUNICATIONS SYSTEM STATION WITH REMOTE AMPLIFIER
W	MULTI-PARTY WALL MOUNTED COMMUNICATIONS SYSTEM STATION WITH INTEGRAL AMPLIFIER
	CONE TYPE PAGING SPEAKER, CEILING MOUNTED
	INTERIOR PAGING TRUMPET SOUND REPRODUCER, 120° x 60° WITH REMOTE AMPLIFIER, SURFACE MOUNTED.
	OUTDOOR PAGING TRUMPET SOUND REPRODUCER, 120° x 60° WITH REMOTE AMPLIFIER, SURFACE MOUNTED.
	TERMINAL CABINET FOR COMMUNICATIONS SYSTEM
F	FIRE ALARM STATION, MANUAL
FA	FIRE ALARM STATION, AUTOMATIC, HEAT DETECTOR
F	FIRE ALARM BELL
F	FIRE ALARM HORN
FI	FIRE ALARM IONIZATION DETECTOR
1	AIR DUCT IONIZATION DETECTOR
⊗	GROUND ROD

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SYMBOL	DESCRIPTION
1	CONTACT - NORMALLY OPEN WITH NEMA SIZE INDICATED AS APPLICABLE
1	CONTACT - NORMALLY CLOSED WITH NEMA SIZE INDICATED AS APPLICABLE
	OVERLOAD RELAY HEATER
1	MAGNETIC STARTER WITH NEMA SIZE INDICATED
100/M	CIRCUIT BREAKER, MAGNETIC TRIP ONLY, FRAME SIZE SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
400	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
400 400	CIRCUIT BREAKER WITH CURRENT LIMITING FUSES, TRIP AND FUSE RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
400 225	FUSED SWITCH, SWITCH AND FUSE CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
100	SWITCH - CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
	DRAWOUT AIR CIRCUIT BREAKER, LOW VOLTAGE
	DRAWOUT AIR CIRCUIT BREAKER, MEDIUM VOLTAGE
	DRAWOUT FUSED SWITCH, MEDIUM VOLTAGE
	LIGHTNING ARRESTER
	FUSE
10	CAPACITOR - KVAR INDICATED
SW (V) 0-600V	METER WITH SWITCH - SCALE RANGE SHOWN
	GROUND
120V or	TRANSFORMER, SECONDARY VOLTAGES, PHASE AND RATING INDICATED AS APPLICABLE. 120/240V 15 KVA 1 PH
GFR 25A 0.1	PICK-UP SETTING; TIME CURRENT CHARACTERISTIC } GROUND FAULT RELAY WITH C.T.
	PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
	PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
	PUSH BUTTON SWITCH, MAINTAINED CONTACTS WITH MECHANICAL INTERLOCK
	3 POSITION SELECTOR SWITCH MAINTAINED CONTACT
TDR TC or TDR TO	TIME DELAY RELAY CONTACT (TIME ACTION INDICATED)
	REMOTE DEVICE
O H A 1 2	SELECTOR SWITCH - MAINTAINED CONTACT - CHART IDENTIFIES OPERATION:

	POSITION		
CKT.	HAND	OFF	AUTO
1	X	O	O
2	O	O	X

X - CLOSED CONTACT
O - OPEN CONTACT

SYMBOL	DESCRIPTION
(3)	CURRENT TRANSFORMER, NUMBER INDICATED
A	INDICATING LIGHT, PUSH-TO-TEST, LETTER INDICATES COLOR
A	INDICATING LIGHT - LETTER INDICATES COLOR: A - AMBER, B - BLUE, C - CLEAR, G - GREEN, R - RED, W - WHITE

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
A	AMMETER, AMPERE
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AS	AMMETER SWITCH, AMPERE SENSOR
ASU	AIR SUPPLY UNIT
ATC	AUTOMATIC THROWOVER CONTROL
ATS	AUTOMATIC TRANSFER SWITCH
BC	BARE COPPER
C	CONDUIT, CONTACTOR
CB	CIRCUIT BREAKER
CC	CONTROL CABLE
CKT	CIRCUIT
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CRS	COATED RIGID STEEL CONDUIT
CT	CURRENT TRANSFORMER
DC	DIRECT CURRENT
DIV	DIVISION
E	EMPTY
EF	EXHAUST
ETM	ELAPSED TIME METER
EXST	EXISTING
FDR	FEEDER
F, FU	FUSE
FI	FLOW INDICATOR
FLR	FLOOR
FLUOR	FLUORESCENT
FM	FLOW METER
FS	FLOAT SWITCH
FT	FLOW TRANSMITTER
G	GREEN, GROUND
GALV	GALVANIZED
GFI	GROUND FAULT INTERRUPTER
GFR	GROUND FAULT RELAY
GND	GROUND
H	HIGH SPEED
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HPS	HIGH PRESSURE SODIUM
HVAC	HEATING, VENTILATING & AIR CONDITIONING
IC	INTERRUPTING CAPACITY
I & C	INSTRUMENTATION AND CONTROL
INCAND	INCANDESCENT
INST	INSTANTANEOUS
J, J-BOX	JUNCTION BOX
K	KEY INTERLOCK
L	LIGHTING CONTACTOR, LOW SPEED
LA	LIGHTNING ARRESTER
LS	LIMIT SWITCH
LT FLEX	LIQUID TIGHT FLEX CONDUIT

ABBREVIATIONS	DESCRIPTION
M	MAGNETIC CONTACTOR COIL
MCC	MOTOR CONTROL CENTER
MDC	MOTORIZED DAMPER CONTROL
MERC	MERCURY VAPOR
MH	MANHOLE
MMP	MECHANICAL MOUNTING PANEL
MO	MOTOR OPERATER
MS	MOTOR STARTER
MT, MTD	MOUNT, MOUNTED
N	NEUTRAL
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
NO	NORMALLY OPEN
NP	NAMEPLATE
OL	OVERLOAD RELAY
PB	PULL BOX
PC	PHOTOCELL
PNL	PANEL
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE CONDUIT
R	RED
RECEPT	RECEPTACLE
RM	REMOTE MULTIPLEXER
RMS	ROOT MEAN SQUARE
RS	RIGID STEEL CONDUIT
RT	REMOTE TELEMETRY
SC	SPEED CONTROL
SH	SPACE HEATER
S/N	SOLID NEUTRAL
SPD	SPEED
SST	STAINLESS STEEL
SV	SOLENOID VALVE
SW	SWITCH
SYM	SYMMETRICAL
T	THERMOSTAT
TB	TERMINAL BOARD
TD	TEMPERATURE DETECTOR RELAY
TDR	TIME DELAY RELAY
TJB	TERMINAL JUNCTION BOX
TSP	TWISTED SHEILDED PAIR
TYP	TYPICAL
UH	UNIT HEATER
UVR	UNDER VOLTAGE RELAY
V	VOLTMETER, VOLT
VS	VOLTMETER SWITCH
W	WATT
WHD	WATTHOUR DEMAND METER
WP	WEATHERPROOF
XFMR	TRANSFORMER

NOTE:
THIS IS A STANDARD LEGEND SHEET. SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT ON THE PLANS.

CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	M CHAUDHARY
DR	DW CLARK PRJ:252:E4
CHK	J TURNER
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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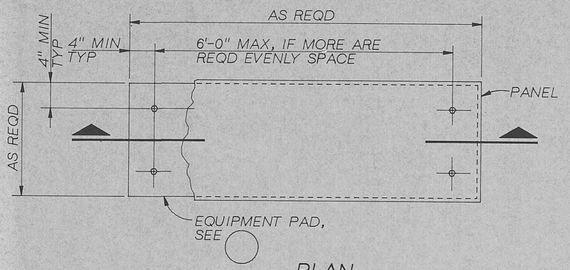
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

LEGEND

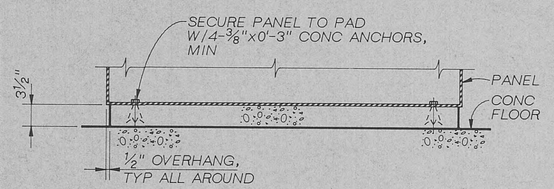
SHEET
DWG NO. E-1
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE OVERLAY SCREEN
FORMAT 22"x34"
FILM KE
PRINTED
DESIGNED BY
DRAWN BY
CHECKED BY



PLAN

NOTE:
PROVIDE OPENING IN PANEL BOTTOM FOR ENTRY OF ELECTRICAL CONDUIT AND/OR PNEUMATIC LINE AS REQUIRED, OR AS SHOWN.

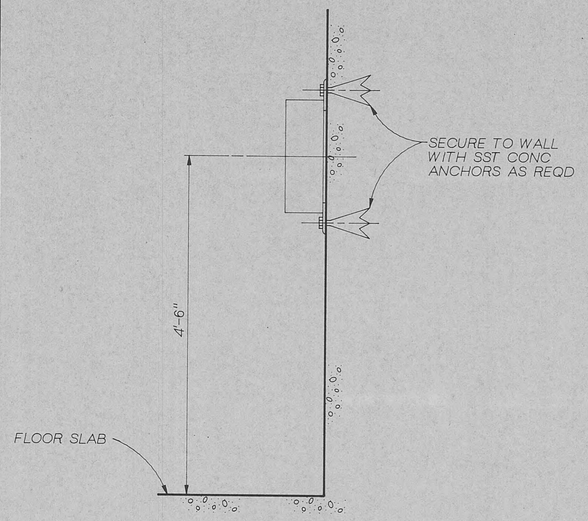


SECTION

STANDARD PANEL MOUNTING

NTS

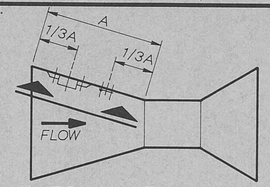
508



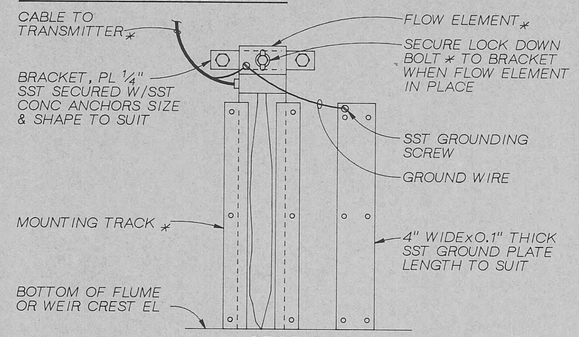
WALL MOUNTED INSTRUMENT INSTALLTION

NTS

510



P RSHALL FLUME PLAN



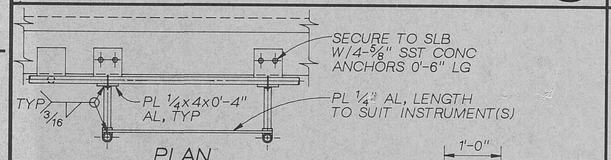
SECTION

NOTES:
1. COMPONENTS DESIGNATED BY * ARE SUPPLIED BY THE INSTRUMENT MANUFACTURER.
2. MOUNT TRACK AND GROUND PLATE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

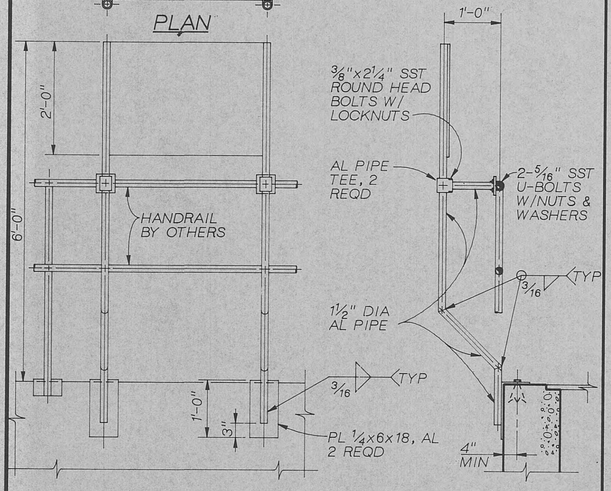
FLUME OR WEIR FLOW ELEMENT INSTALLATION

NTS

512



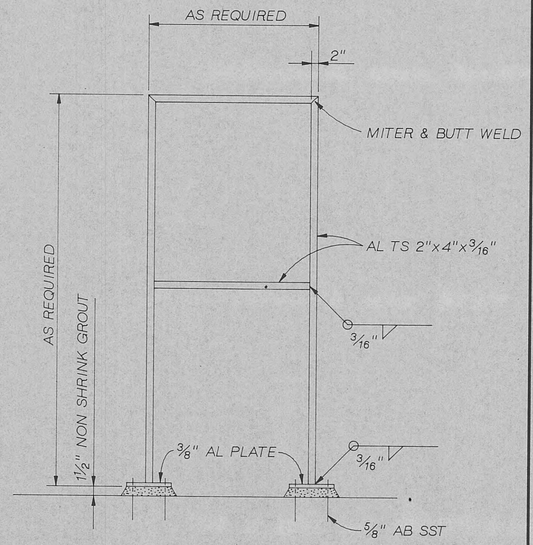
PLAN



OFFSET HANDRAIL MOUNTING FOR CASE MOUNTED INSTRUMENTS

NTS

509



PANEL MOUNTING RACK

NTS

511

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9.9.88

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CHARLES N. CRANDALL REGISTERED ENGINEER 12-31-88 No. 18378 STATE OF TENNESSEE

CH2M HILL

DSGN	FH JOHNSON
DR	252113
CHK	J TURNER
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9.9.88	RECORD DRAWINGS	DAT	CNC

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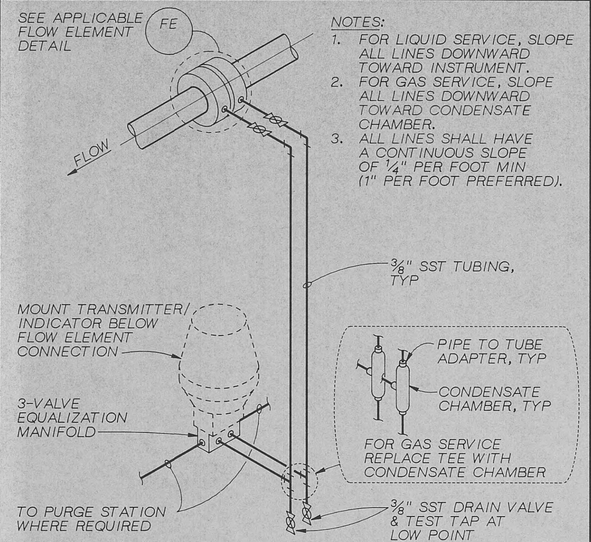
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

UMENTATION AND CONTROL

I & C STANDARD DETAILS

DWG NO.	DI-2
DATE	MAY 1986
PROJ NO.	SA21043.A1

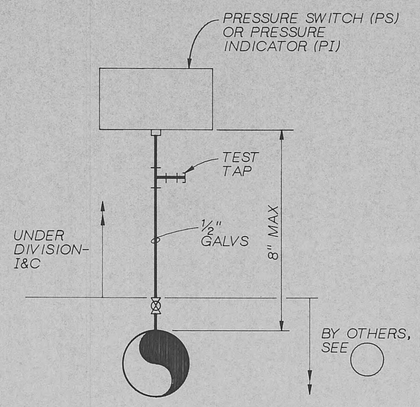
OVERLAY IDENTIFICATION | COMPOSITE | OVERLAY | SCREEN
PROJ NO. | CONTRACT



PRESSURE DIFFERENTIAL TRANSMITTER/INDICATOR FOR FLOW SERVICE INSTALLATION

NTS

(500)

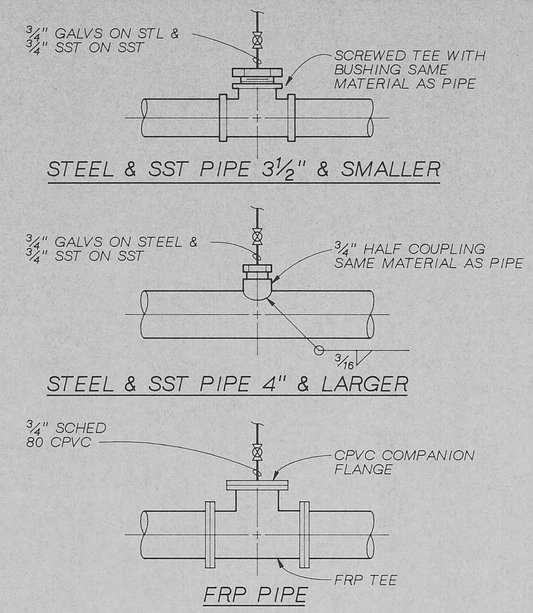


DIRECT MOUNTING

PRESSURE SWITCH & INDICATOR INSTALLATION

NTS

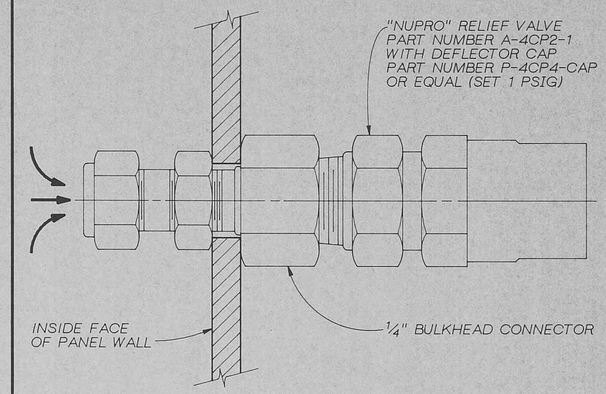
(502)



PRESSURE CONNECTION INSTALLATION DETAILS

NTS

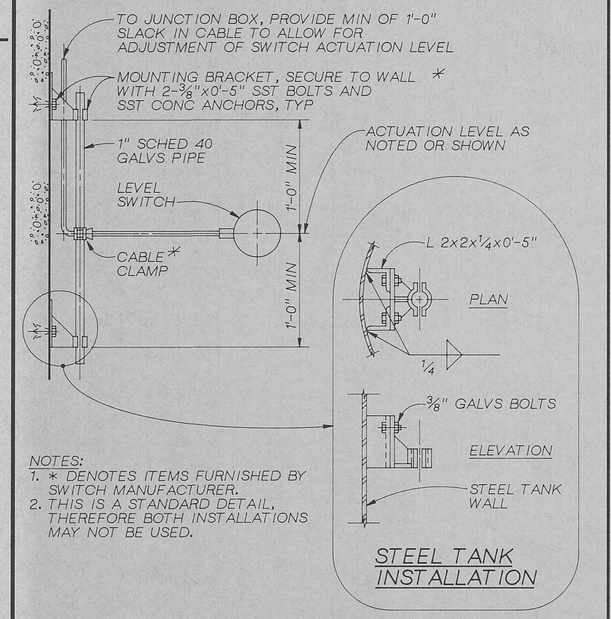
(504)



PANEL PURGE RELIEF INSTALLATION

NTS

(506)

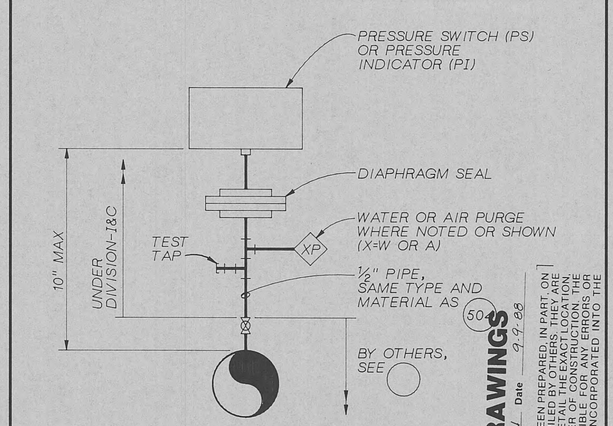


STEEL TANK INSTALLATION

TYPICAL FLOAT TYPE LEVEL SWITCH INSTALLATION

NTS

(501)



DIRECT MOUNTING W/ DIAPHRAGM SEAL

RECORD DRAWINGS
Revisions Drawn by D. THOMPSON Date 9.9.88

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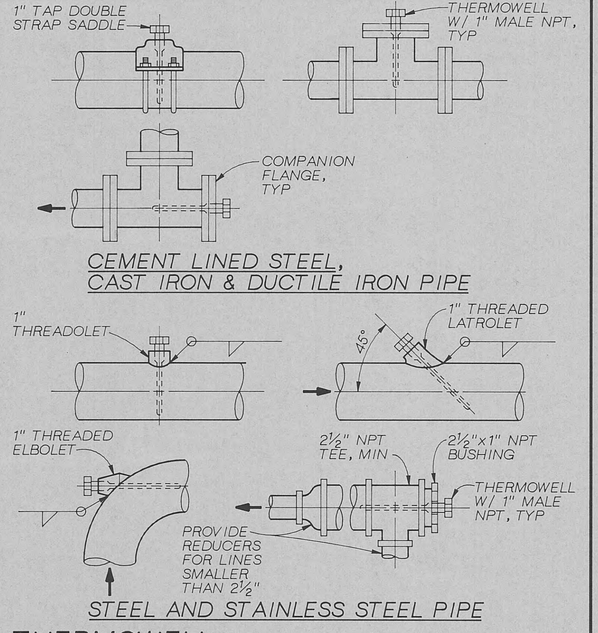
PRESSURE SWITCH & INDICATOR INSTALLATION

NTS

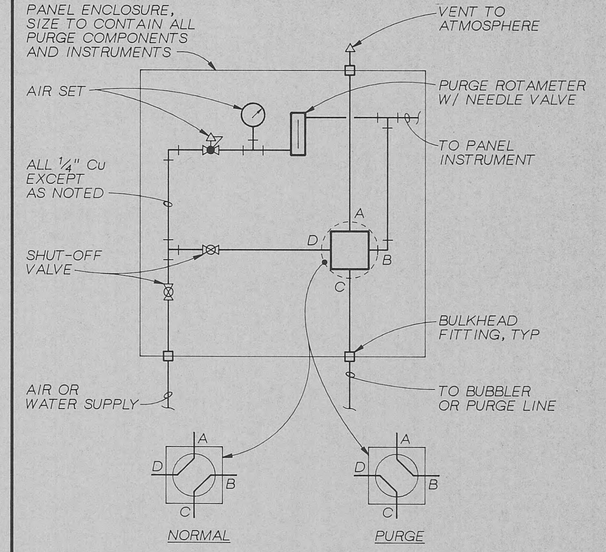
(503)



THERMOWELL INSTALLATION DETAILS

NTS

(505)



TYPICAL PURGE STATION INSTALLATION

NTS

(507)

CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER No. 18371 STATE OF TENNESSEE

CH2MHILL

DSGN	FH JOHNSON
DR	252112
CHK	J TURNER
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9488	RECORD DRAWING	DAT	CNC

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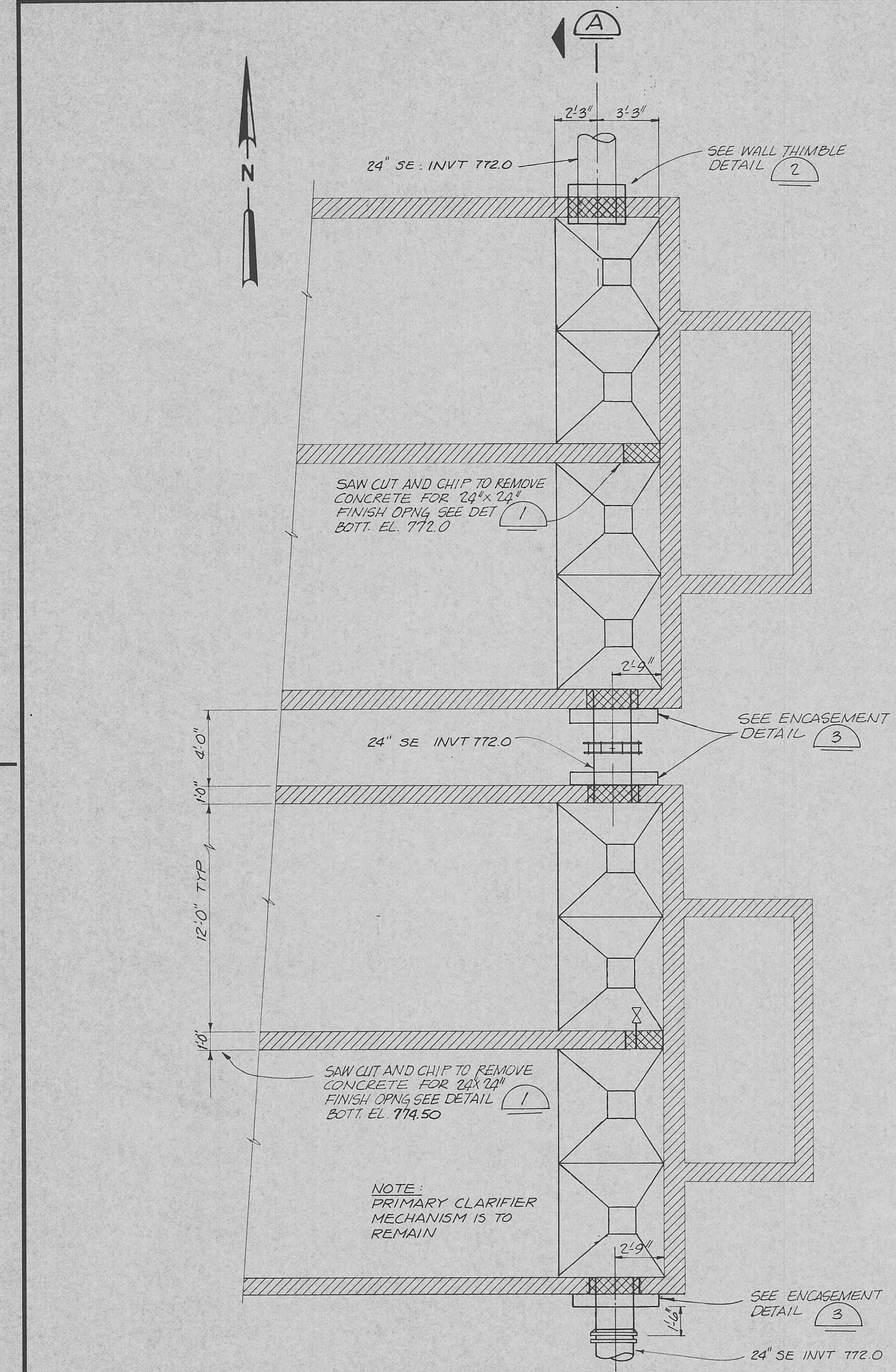
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

INSTRUMENTATION AND CONTROL

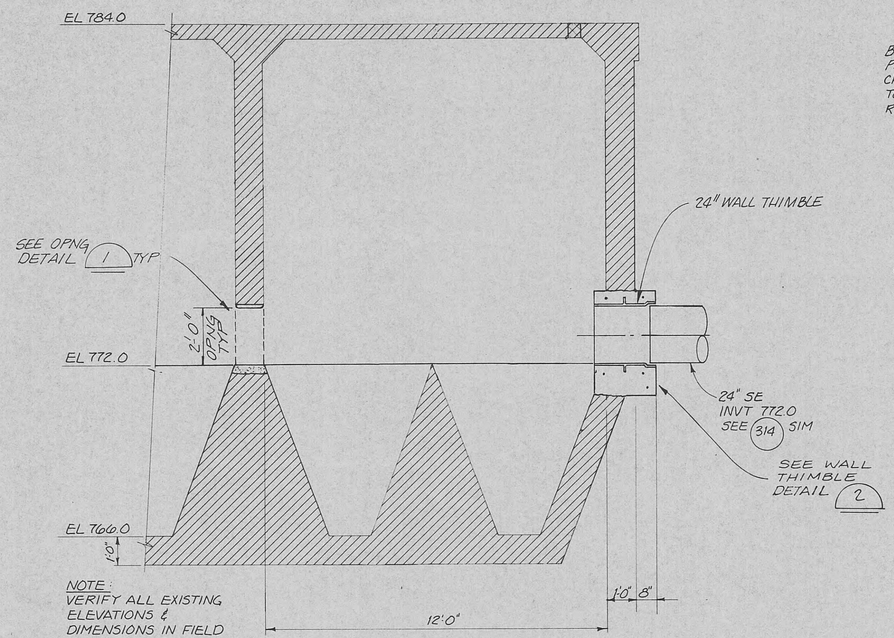
I & C STANDARD DETAILS

DWG NO.	DI-1
DATE	MAY 1986
PROJ NO.	SA21043.A1

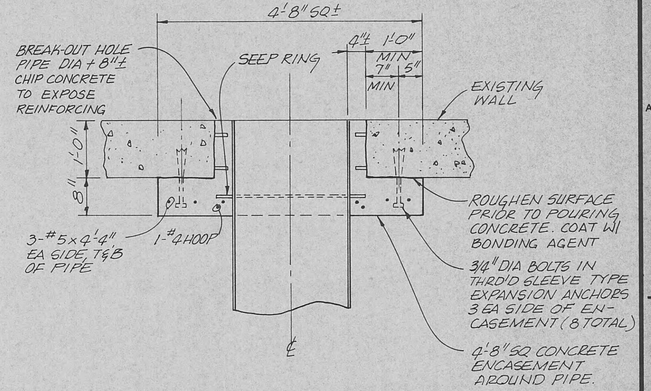
OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE
OVERLAY
SCREEN



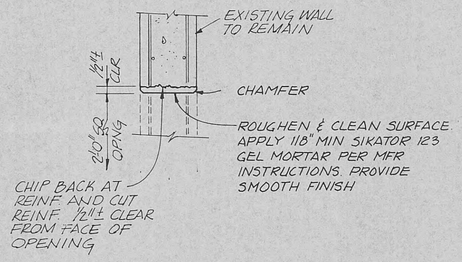
EQUALIZATION BASIN
1/4"=1'-0"



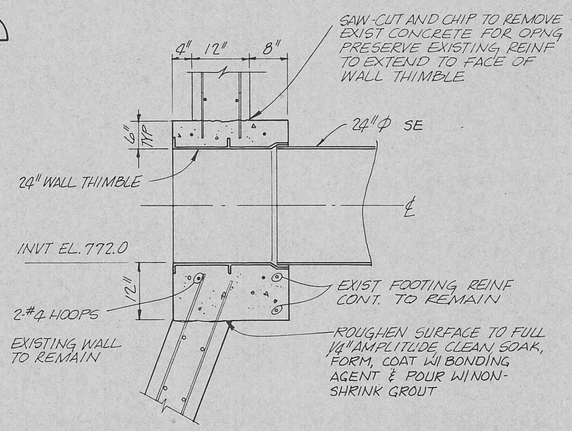
SECTION (A)
3/8"=1'-0"



PIPE ENCASEMENT DETAIL (3)
3/4"=1'-0"



OPENING DETAIL (1)
NTS



WALL THIMBLE DETAIL (2)
3/4"=1'-0"

RECORD DRAWINGS
Revisions Drawn by R. JACKSON Date 7-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER 11-21-86 No. 18370 STATE OF TENNESSEE

CH2M HILL

DSGN K. HOWE
DR A. DURLEY
CHK J. CALL
APVD C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	7-7-88	RECORD DRAWINGS	RDJ	CNC

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

EQUALIZATION BASIN — PLAN, SECTION AND DETAILS

DWG NO. M-9
DATE MAY 1986
PROJ NO. SA21043.A1

CHECKED BY 1 2 3
DRAWN BY 1 2 3
DESIGNED BY 1 2 3
PRINTED 10 84
FILM KE
FORMAT 2334 DC

PIPING SCHEDULE

SERVICE	LEGEND	TEST * PRESSURE AND TYPE (PSIG-X)	SIZE (IN)	SPEC. NO.(S)	INSTALLATION	MAXIMUM OPERATING TEMPERATURE °F	MAXIMUM OPERATING PRESSURE PSIG	MATERIAL	REMARKS
AIR HIGH PRESSURE	AHP	200-P	≤2	15001-17	OUTSIDE	120	150	COPPER	
AIR LOW PRESSURE	ALP	15-P	≥3	15001-13	INSIDE/ OUTSIDE/ SUBMERGED	180	10	STAINLESS STEEL	
		15-P	≤2½	15001-17	OUTSIDE/ BURIED	100	10	COPPER	
ACID RESISTING DRAIN	ARD	5-H	≤3	15001-21	INSIDE/ BURIED	AMBIENT	GRAVITY	PPE	
ACID RESISTING VENT	ARV	5-H	≤2	15001-21	INSIDE	AMBIENT	0	PPE	
CHLORINE GAS (VACUUM)	CGV	15-P	½	15001-14	INSIDE	AMBIENT	0	PVC	
CHLORINE SOLUTION	CS	15-P	1¼, 1½	15001-14	INSIDE/ OUTSIDE	AMBIENT	10	PVC	
INFLUENT DISTRIBUTION/SLUDGE COLLECTION	ID/SC	15-H	18	15001-02	BURIED	AMBIENT	15	CLDI	
DRAIN	D	5-H	≤6	15001-21	BURIED	AMBIENT	GRAVITY	CISP	
DRAIN (PROCESS)	DR	15-H	≤8	15001-02	BURIED	AMBIENT	10	CLDI	
DIGESTED SLUDGE	TDS	15-H	≤8	15001-02	SUBMERGED/ INSIDE/ BURIED	AMBIENT	10	CLDI	
GRIT SLURRY	GR	30-H	4	15001-02	OUTSIDE	AMBIENT	20	CLDI	
HOT WATER	HW	150-H	≤2	15001-17	INSIDE	120	80	COPPER	
OVERFLOW	OF	5-H	16	15001-02	BURIED	AMBIENT	GRAVITY	CLDI	
PLANT EFFLUENT	PLE	200-H	≤24	15001-02	OUTSIDE/ BURIED	AMBIENT	150	CLDI	
INFLUENT FORCE MAIN	RS	150-H	16	15001-02	INSIDE/ BURIED	AMBIENT	100	CLDI	
SBR INFLUENT	RS	15-H	18	15001-02	BURIED	AMBIENT	10	CLDI	
SAMPLE	SA	150-H	≤1	15001-14	OUTSIDE/ SUBMERGED	AMBIENT	100	PVC	TEST RAW SEWAGE SAMPLER AT 10-H
SECONDARY EFFLUENT	SE	7.5-H	≤24	15001-02	BURIED	AMBIENT	5	CLDI	
SUPERNATANT	SUP	15-H	6	15001-02	SUBMERGED/ BURIED	AMBIENT	GRAVITY	CLDI	
UNDERDRAIN	UD		≤8	15001-21	BURIED	AMBIENT	GRAVITY	CLDI, CONC, AC, PVC	PERFORATED BENEATH SAND DRYING BEDS
UTILITY PUMP DISCHARGE	UPD	25-H	8	15001-02	OUTSIDE/ BURIED	AMBIENT	15	CLDI	
VENT	V	5-H	≤4	15001-21	INSIDE	AMBIENT	0	CISP GALV	
WASTE ACTIVATED SLUDGE	WAS	30-H	6	15001-02	INSIDE/ BURIED	AMBIENT	20	CLDI	
NO.1 WATER (POTABLE)	W1	150-H	≤3	15001-17	INSIDE/ BURIED	AMBIENT	120	COPPER	
NO.2 WATER (NONPOTABLE)	W2	150-H	≤2½	15001-17	INSIDE/ BURIED	AMBIENT	120	COPPER	

* TEST TYPE -X=H: HYDROSTATIC TEST
X=P: PNEUMATIC TEST

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER 11/21/84 STATE OF TENNESSEE NO. 18378

CH2MHILL

		NO.	DATE	REVISION	BY	APVD
DSGN	R STAEHLIN					
DR	RE BROWN 3.252, 112521G5					
CHK	M CARRENO		9-9-88	RECORD DRAWINGS	DAT	CNC
APVD	C CRANDALL					

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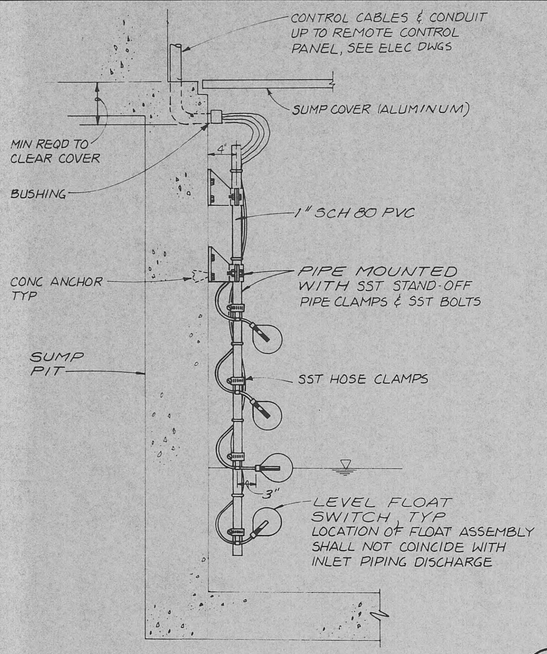
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

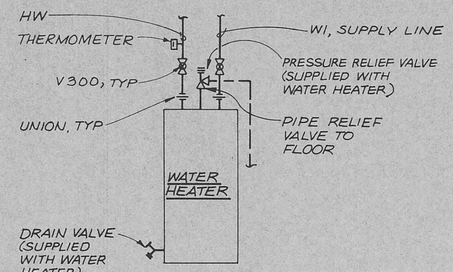
STANDARD DETAILS
PIPING SCHEDULE

SHEET	
DWG NO.	DM-4
DATE	MAY 1986
PROJ NO.	SA21043.A1



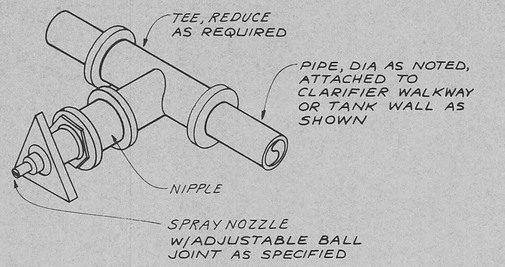
LEVEL SWITCH SUPPORT BRACKET (316)

NTS



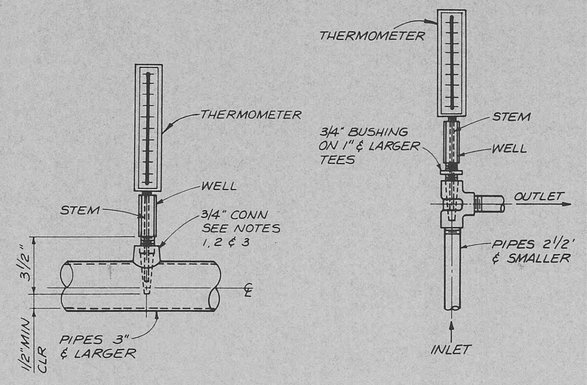
WATER HEATER DETAIL (319)

NTS



SPRAY NOZZLE (320)

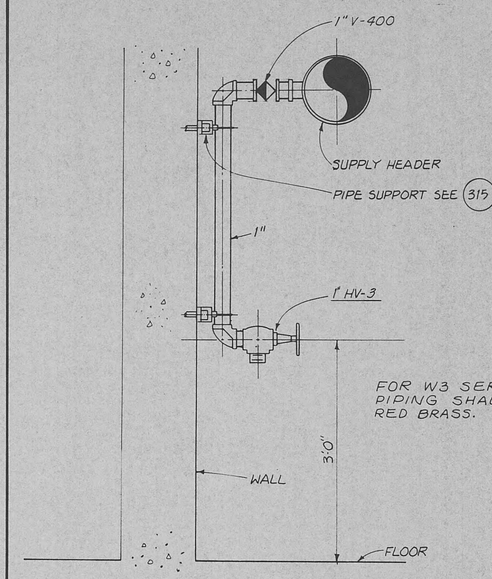
NTS



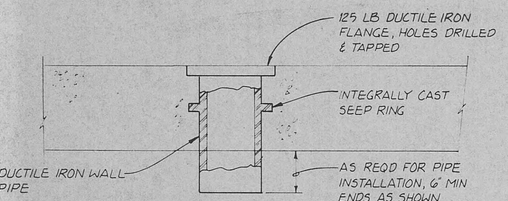
NOTES:
1. FOR STEEL, STAINLESS STEEL, GALV STEEL, & PVC 2½" & SMALLER, USE A 3/4" BUSHING IN TEE.
2. FOR DI & FRP ALL SIZES, USE A 3/4" OUTLET PIPE SADDLE.
3. FOR STL & SST PIPES 3" & LARGER, & PRESSURE VESSELS, USE 3/4" THRED-O-LETS AS SHOWN.

THERMOMETER MOUNTING DETAILS (322)

NTS

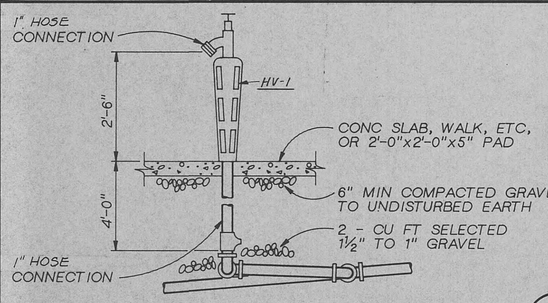


INTERIOR HOSE VALVE DETAIL (324)



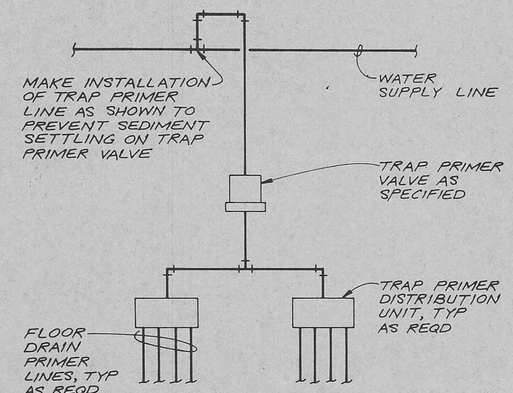
FLUSH WALL OR FLOOR PIPE (317)

NTS



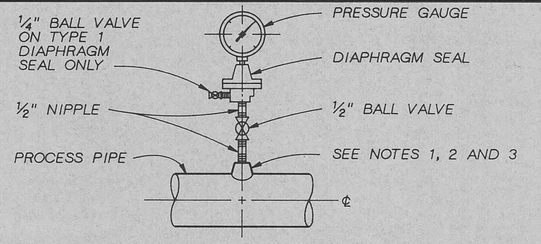
NON-FREEZE POST HYDRANT (318)

NTS

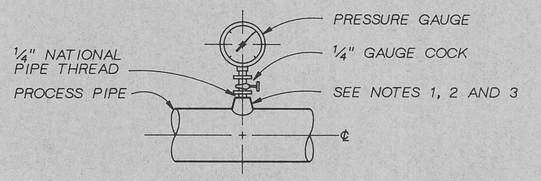


FLOOR DRAIN TRAP PRIMER VALVE DETAIL (321)

NTS



DIAPHRAGM PRESSURE GAUGE

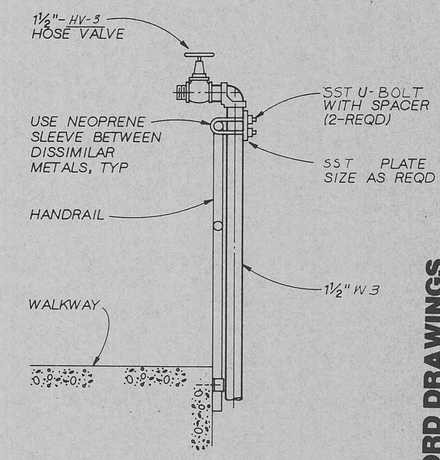


PRESSURE GAUGE

NOTES:
1. FOR STEEL, GALVANIZED STEEL, AND PVC 2½" AND SMALLER USE A BUSHING IN A TEE.
2. FOR DROP INLET AND FIBERGLASS REINFORCED PLASTIC, ALL SIZES, USE PIPE SADDLE WITH BUSHING.
3. FOR STEEL AND STAINLESS STEEL PIPES 3" AND LARGER, AND PRESSURE VESSELS, USE THRED-O-LET AS SHOWN.
4. PROVIDE SNUBBER FOR POSITIVE DISPLACEMENT PUMP INSTALLATIONS.

PRESSURE GAUGE MOUNTING DETAILS (323)

NTS



EXTERIOR HOSE VALVE DETAIL (325)

NTS

RECORD DRAWINGS
Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER AGRICULTURE STATE OF TENNESSEE No. 18313

CH2M HILL

DSGN	M. VEACH
DR	K. ANDERSEN
CHK	M. CARRENO
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CMC

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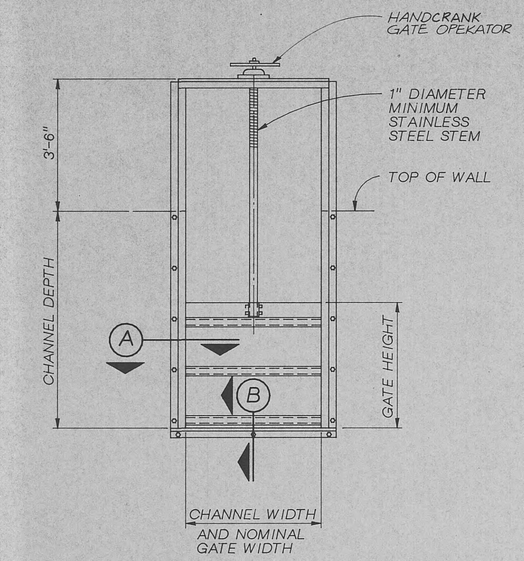
STANDARD DETAILS
MECHANICAL

DWG NO.	DM-3
DATE	MAY 1986
PROJ NO.	SA21043.A1



STYLE A

FABRICATED STAINLESS STEEL SLIDE GATE DETAILS

NOTES FOR FABRICATED STAINLESS STEEL GATES:

1. COAT ALL SURFACES EMBEDDED IN OR IN DIRECT CONTACT WITH CONCRETE WITH SYSTEM 1 ACCORDING TO SPECIFICATIONS.
2. FOR WEIR CUTOUT DIMENSIONS FOR DIFFERENT LOCATIONS, SEE GATE SCHEDULE.
3. OPERATORS SHOWN ARE REPRESENTATIVE AND ARE NOT RELATED TO STYLE OF GATE.
4. FOR FACE-MOUNTED GATE CROSS SECTION PROVIDE BLOCKOUT IN CONCRETE AND FILL WITH GROUT AFTER GATE IS SET.
5. FOR EMBEDDED GATE CROSS SECTION PROVIDE BLOCKOUT IN CONCRETE AND FILL WITH GROUT AFTER GATE IS SET. (230) SEE ALSO STRUCTURAL DRAWINGS. DEPTH OF INVERT BLOCK OUT VARIES.

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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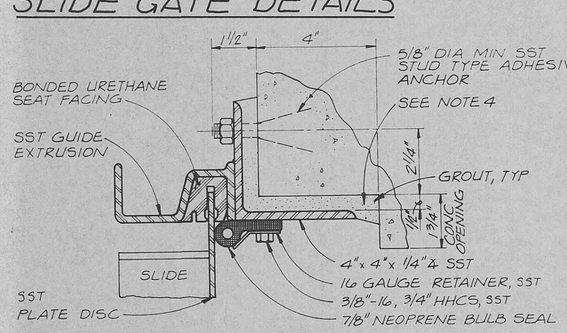
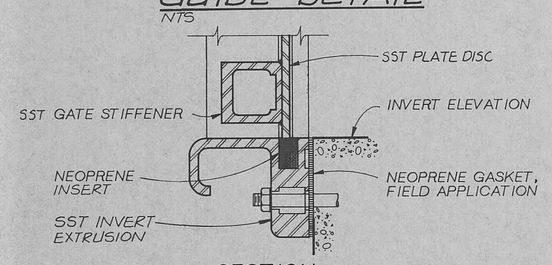


SECTION (A)

GUIDE DETAIL

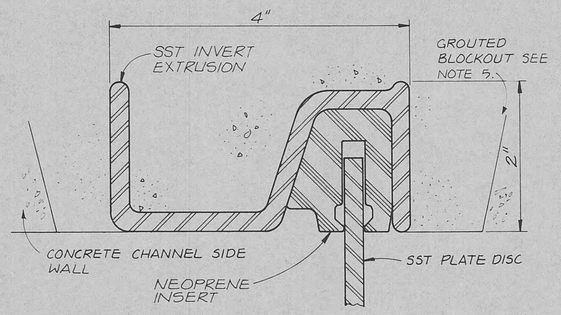
NTS



SECTION (B)

FLUSH INVERT DETAIL

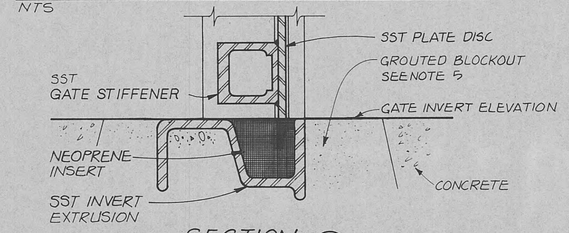
NTS



SECTION (A)

EMBEDDED GUIDE DETAIL

NTS



SECTION (B)

EMBEDDED INVERT DETAIL

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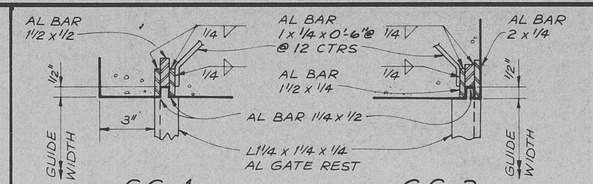
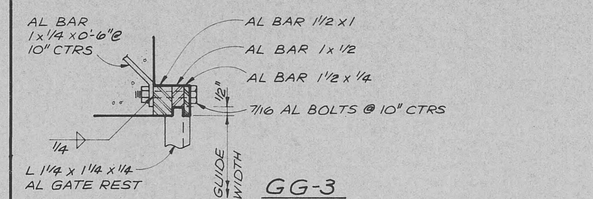
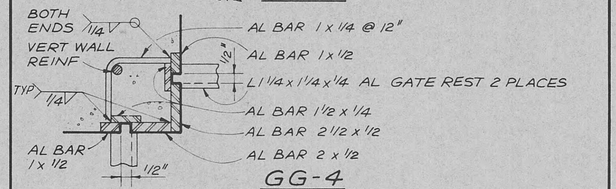
(310)



GG-1 GG-2



GG-3



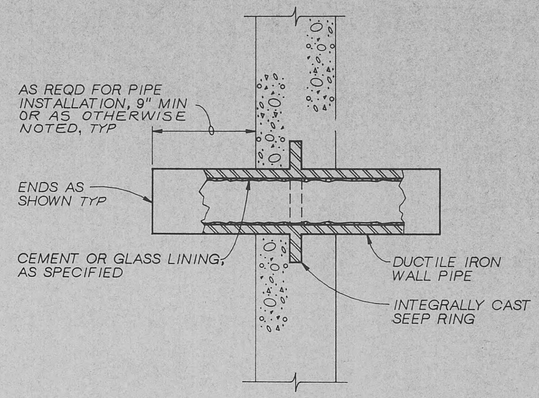
GG-4

NOTE:
WHERE APPLICABLE EXTRUDED GUIDE SECTIONS AS MANUFACTURED BY WASHINGTON ALUMINUM CO, BALTIMORE, MARYLAND MAY BE SUBSTITUTED

GATE GUIDE DETAILS

NTS

(311)

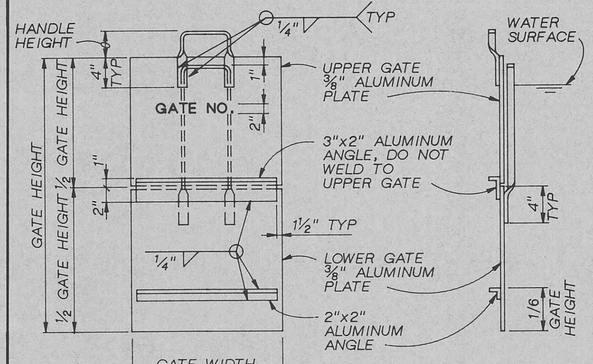


NOTE:
COAT WALL PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

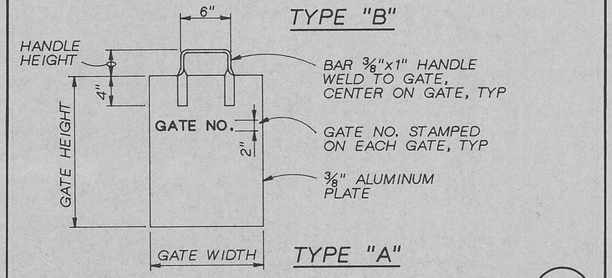
DUCTILE IRON WALL PIPE

NTS

(313)



TYPE "B"

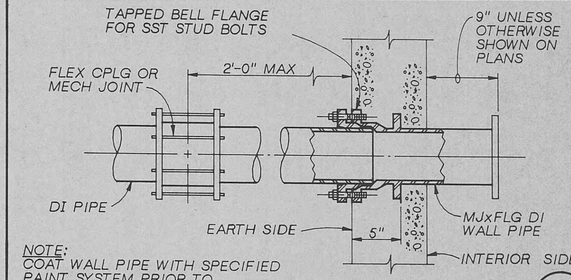


TYPE "A"

SLIDE GATE

NTS

(312)

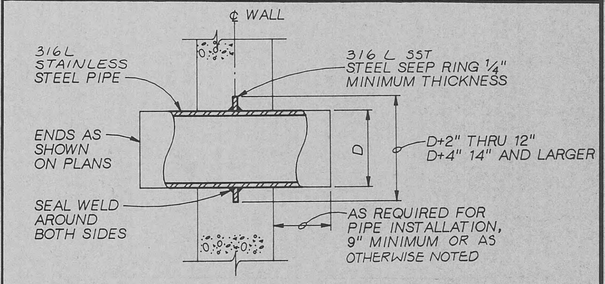


NOTE:
COAT WALL PIPE WITH SPECIFIED PAINT SYSTEM PRIOR TO CONCRETE PLACEMENT.

WALL PIPE

NTS

(314)



STAINLESS STEEL WALL PIPE

NTS

(315)

CHARLES N. CRANDALL REGISTERED ENGINEER 2-26-91 No. 18379 STATE OF TENNESSEE

CH2M HILL

DSGN	DR	CHK	APVD
M. VEACH	A.DURLEY	M. CARRENO	C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
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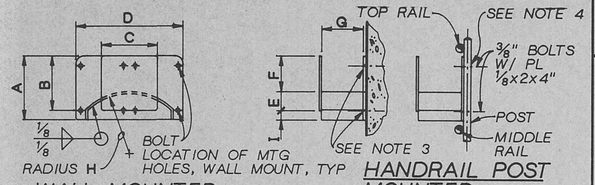
STANDARD DETAILS
MECHANICAL

DWG NO.	DM-2
DATE	MAY 1986
PROJ NO.	SA21043.A1

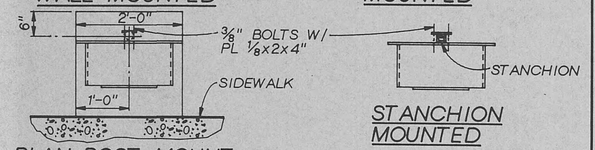
RACK TYPE	DIMENSION IN INCHES								
	A	B	C	D	E	F	G	H	I
TYPE A-¾" & 1" HOSE	10-½	9	9	18	3	6	7-½	9-¾	1-½
TYPE B-1½" HOSE	14	12	12	24	4	8	10	13	2

NOTES:

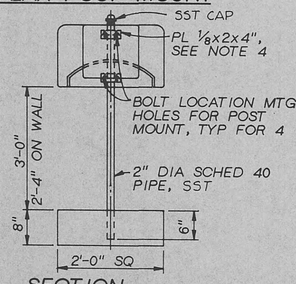
1. EXTERIOR AND INTERIOR UNITS SHALL BE FABRICATED FROM 3/16" 6061-T6 ALUMINUM ALLOY PLATE, ANODIZED.
2. ATTACH TO CONCRETE WALL WITH (4)-¼" STAINLESS STEEL STUD TYPE WEDGE ANCHORS.
3. ATTACH TO VERTICAL HANDRAIL OR INDIVIDUAL POST WITH PLATES AND (4)-¼" STAINLESS STEEL BOLTS.
4. ATTACH TO STEEL COLUMN WITH (4)-¼" ROUND HEAD SST BOLTS, ONE IN EACH CORNER. INSERT DOUBLE SPACER NUTS BETWEEN COLUMN AND HOSE RACK.



WALL MOUNTED — HANDRAIL POST MOUNTED



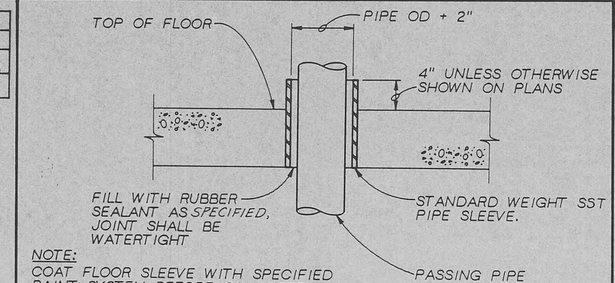
PLAN-POST MOUNT — STANCHION MOUNTED



SECTION

HOSE RACK DETAILS
NTS

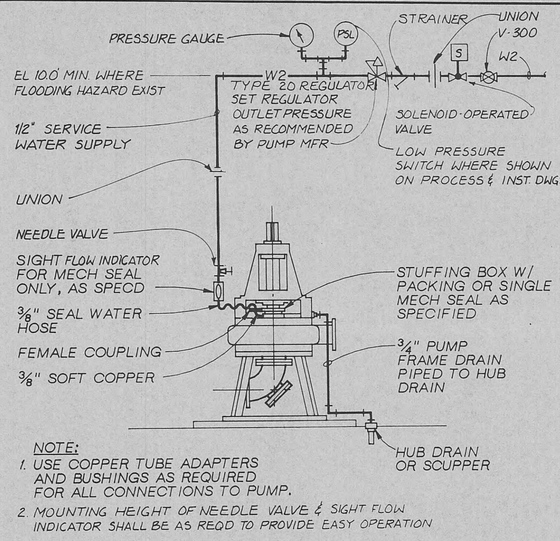
(300)



NOTE:
COAT FLOOR SLEEVE WITH SPECIFIED PAINT SYSTEM BEFORE CONCRETE PLACEMENT.

FLOOR SLEEVE
NTS

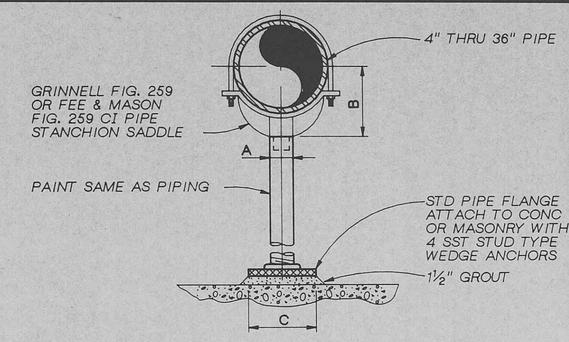
(302)



NOTE:
1. USE COPPER TUBE ADAPTERS AND BUSHINGS AS REQUIRED FOR ALL CONNECTIONS TO PUMP.
2. MOUNTING HEIGHT OF NEEDLE VALVE & SIGHT FLOW INDICATOR SHALL BE AS REQD TO PROVIDE EASY OPERATION

VERTICAL CENTRIFUGAL PUMP SEAL WATER PIPING
NTS

(303)

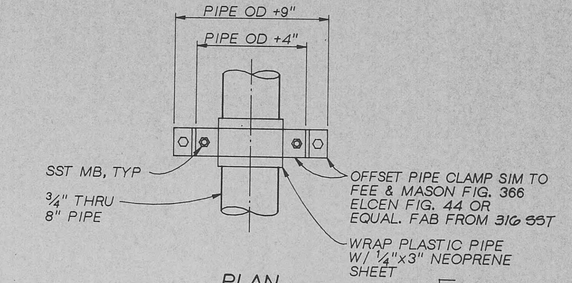


NOTES:
1. PROVIDE HALF ROUND RIGID INSULATION AND INSULATION PROTECTION SHIELD, SIMILAR TO GRINNELL FIGURE 167 OR ELCEN FIGURE 219, WHERE PIPING IS INSULATED.
2. PROVIDE NEOPRENE WAFFLE ISOLATION PAD, SIMILAR TO MASON TYPE 'W' OR KORFUND KORPAD 40, UNDER SUPPORT FOOT WHEN PIPING IS ISOLATED OR SUPPORT IS ADJACENT TO MECHANICAL EQUIPMENT.
3. FOR BASE, HEIGHT AND FLANGE DIMENSIONS, SEE TABLE.

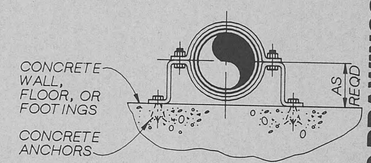
DIMENSION TABLE			
PIPE SIZE	A	B	C
4"	3"	4-3/16"	9"
5"	3"	4-13/16"	9"
6"	3"	5-7/16"	9"
8"	3"	6-15/16"	9"
10"	3"	8-7/16"	9"
12"	3"	9-15/16"	9"
14"	4"	10-15/16"	11"
16"	4"	12-3/8"	11"
18"	4"	13-7/8"	11"
20"	6"	15-3/8"	13-1/2"
22"	6"	16-5/8"	13-1/2"
24"	6"	17-15/16"	13-1/2"
26"	6"	19-1/8"	13-1/2"
30"	6"	21-5/16"	13-1/2"
32"	6"	22-1/2"	13-1/2"
36"	8"	24-1/2"	16"

PIPE SUPPORT
NTS

(305)



PLAN



SECTION

PIPE SUPPORT
NTS

(307)

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Revisions Drawn by DTHOMPSON Date 9.9.88

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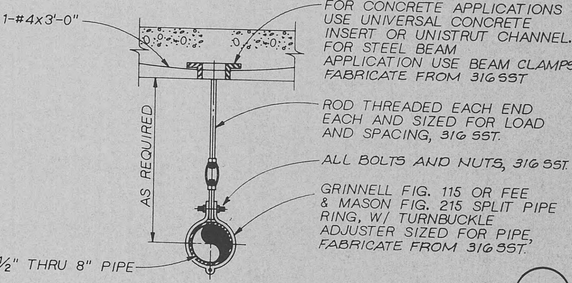
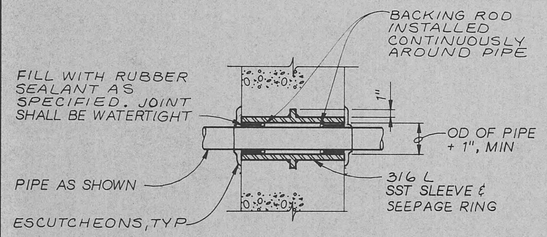


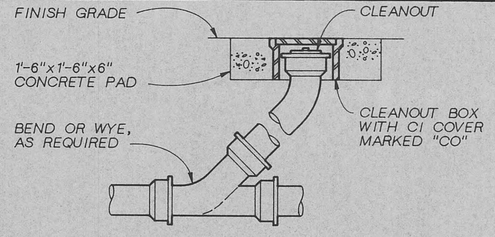
PIPE SUPPORT
NTS

(308)



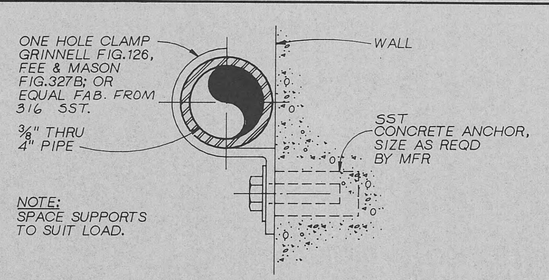
TYPE 'B' PIPE SLEEVE
NTS

(301)



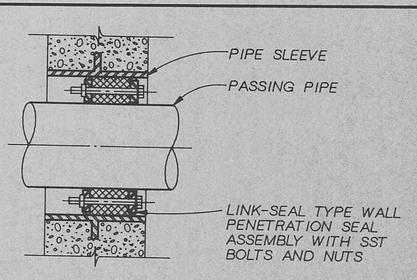
CLEANOUT DETAIL
NTS

(304)



PIPE SUPPORT
NTS

(306)



WALL PENETRATION SEAL DETAIL
NTS

(309)

CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER AGRICULTURE No. 18379 STATE OF TENNESSEE

CH2M HILL

DSGN	M VEACH
DR	M. BUCKNER
CHK	M.CARRENO
APVD	C.CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

STANDARD DETAILS
MECHANICAL

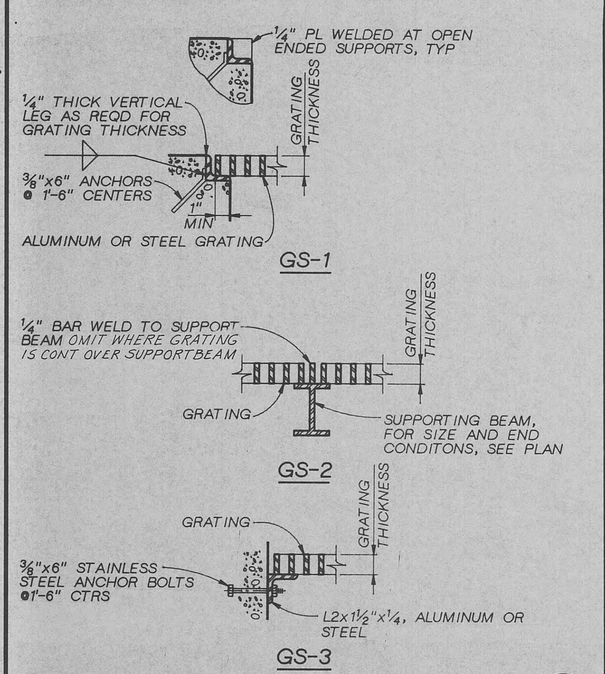
DWG NO.	DM-1
DATE	MAY 1986
PROJ NO.	SA21043.A1

GRATING NOTES

1. EXTEND GRATING CONTINUOUSLY OVER GATE GUIDES AND GATES.
2. NOTCH GRATING SUPPORTS AT GATES AS REQUIRED.
3. GRATING SPAN ⟷ SEE PLAN.
4. WIDTH OF GRATING SECTIONS SHALL NOT EXCEED 3'-0".
5. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER BASED ON FIELD DIMENSIONS PRIOR TO FABRICATION.
6. MATERIAL FOR SUPPORTS OF STEEL AND ALUMINUM GATING TO BE SAME GRATING, EXCEPT METAL SUPPORTS THAT ARE TO BE EMBEDDED IN CONCRETE SHALL BE TYPE 316 STAINLESS STEEL.
7. STEEL GRATING AND SUPPORT TO BE GALVANIZED UNLESS NOTED OTHERWISE ON PLANS.
8. UNLESS NOTED OTHERWISE ON PLANS, GRATING THICKNESS SHALL BE AS TABULATED IN "GRATING THICKNESS TABLE" FOR APPLICABLE TRAFFIC.
9. BEARING BAR THICKNESS FOR GRATING TO BE 3/16" MINIMUM.
10. BAND ALL EDGES WITH 3/16 x DEPTH OF BEARING BAR.
11. PROVIDE MISCELLANEOUS GRATING FASTENERS AS REQUIRED.
12. TYPE OF MATERIAL USED SHALL BE AS SHOWN ON PLANS OR AS SPECIFIED. THIS STANDARD DETAIL INCLUDES 3 TYPES, ALTHOUGH ALL 3 MAY NOT BE INCLUDED IN PROJECT.

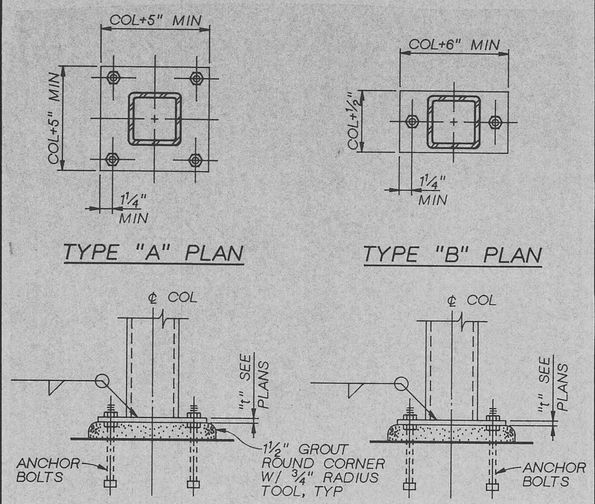
FOOT TRAFFIC
GRATING THICKNESS TABLE

MAXIMUM SPAN	ALUMINUM (IN.)	STEEL (IN.)
3'-6"	1¼"	1"
4'-0"	1½"	NOT USED
4'-6"	1¾"	1¼"
5'-0"	1¾"	1¼"
5'-6"	2"	1½"
6'-0"	2¼"	1½"
6'-6"	2¼"	1½"
7'-0"	2½"	1¾"



GRATING SUPPORT
NTS

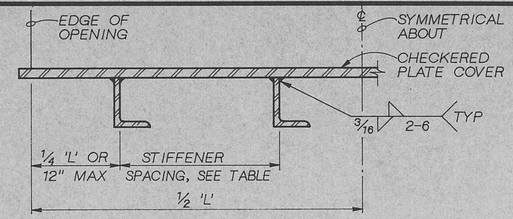
(249)



NOTES:
1. ANCHOR BOLTS SHALL BE ¾" DIA x 1'-0" W/ LEVELING NUTS UNLESS OTHERWISE SHOWN.
2. GROUT SHALL BE NONSHRINK AS PER SPECIFICATIONS, FLOWABLE.

TUBE COLUMN BASE
NTS

(250)



NOTES:
1. STIFFENERS TO BE PLACED LONG LEG VERTICAL.
2. STIFFENER TO BE PARALLEL TO THE SHORT EDGE OF OPENING.
3. DETAILS APPLICABLE TO NORMAL PROCESS LOAD.

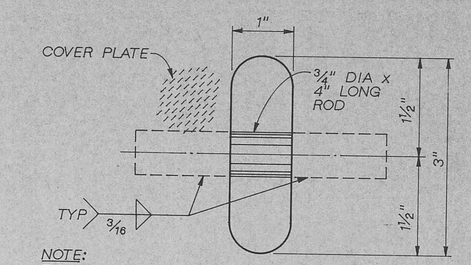
TABLE		
SHORT SPANS	STIFFENER SIZES	MAXIMUM SPACING
3'-0"	L2x1½x¼	1'-6"
3'-6"	L2x1½x¼	1'-6"
4'-0"	L2x1½x¼	1'-3"
4'-6"	L2½x1½x¼	1'-6"
5'-0"	L2½x1½x¼	1'-3"

COVER STIFFENERS

NOTES:
1. COVER PLATE TYPES 'A' AND 'B' AND STIFFENERS ARE ALUMINUM PLATES AND ANGLES. SEE DET (252) AND (253)
2. ALL COVER PLATES TO HAVE APPLICABLE LIFTING EYES AS SHOWN IN LIFTING EYE DETAILS.

SLAB OPENING COVER & SUPPORTS
NTS

(251)



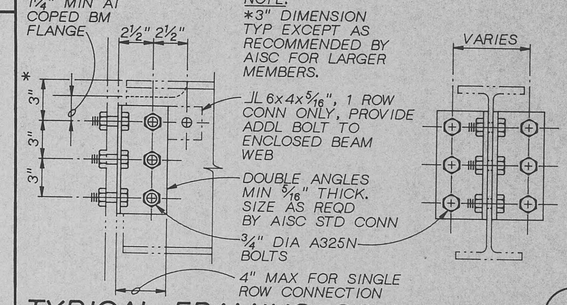
NOTE:
THIS DETAIL APPLIES TO TYPES "A" AND "B" COVERS. DO NOT USE WHERE AIR TIGHTNESS IS REQD

LIFTING EYE DETAIL
NTS

(254)

NOMINAL BEAM DEPTH, INCHES	ROWS OF BOLTS	LENGTH (3) OF ANGLE
36	7	1'-8½"
30-33	6	1'-5½"
24-27	5	1'-2½"
16-21	4	11½"
12-15	3	8½"
8-10	2	5½"
6	1	3"

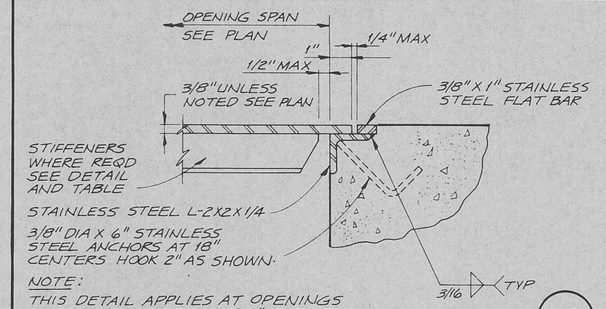
NOTES:
1. NUMBER OF ROWS IS EQUAL TO NUMBER OF BOLTS TO ENCLOSED WEB.
2. ALL FRAMING CONNECTIONS SHALL CONFORM TO SCHEDULE UNLESS DETAILED OTHERWISE ON FRAMING PLANS.
3. ADD 1½" TO ANGLE LENGTH FOR STAGGERED BOLT CONNECTIONS.



NOTE:
*3" DIMENSION TYP EXCEPT AS RECOMMENDED BY AISC FOR LARGER MEMBERS.

TYPICAL FRAMING CONNECTION
NTS

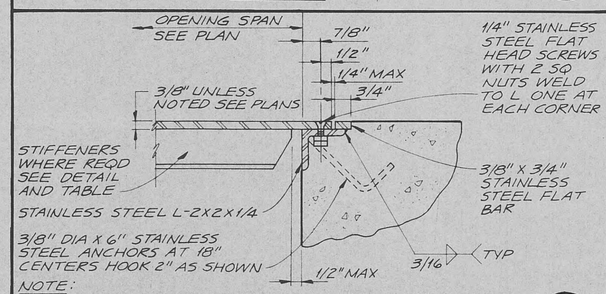
(255)



NOTE:
THIS DETAIL APPLIES AT OPENINGS WHOSE LARGER SIDE IS 2'-6" AND LESS

TYPE "A"

(252)



NOTE:
THIS DETAIL APPLIES AT OPENINGS WHOSE LARGER SIDE IS LARGER THAN 2'-6" AND AIR TIGHTNESS IS NOT REQ'D

TYPE "B"

(253)

256 NOT USED

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CH2M HILL

DSGN S. FREY
DR M. BUCKNER
CHK J. CALL
APVD C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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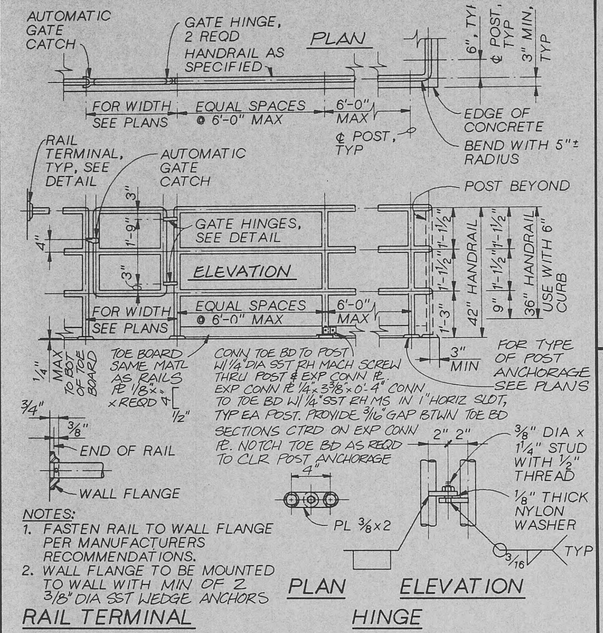
CITY OF HARRIMAN, TENNESSEE

STANDARD DETAILS
STRUCTURAL

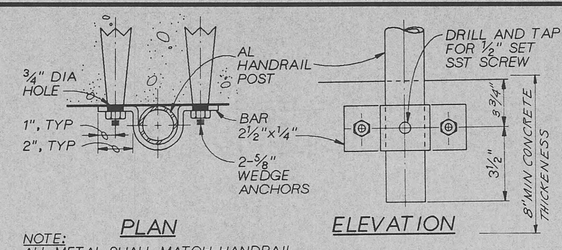
DWG NO. DS-5
DATE MAY 1986
PROJ NO. SA21043.A1



NOTES:
1. FASTEN RAIL TO WALL FLANGE PER MANUFACTURERS RECOMMENDATIONS.
2. WALL FLANGE TO BE MOUNTED TO WALL WITH MIN OF 2 3/8" DIA SST WEDGE ANCHORS

TYPICAL HANDRAIL
NTS

(234)

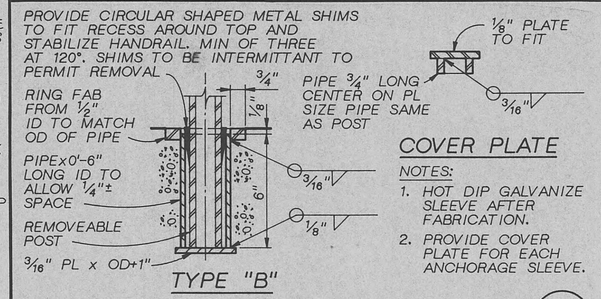


NOTE:
ALL METAL SHALL MATCH HANDRAIL. PROVIDE PROTECTION FOR DISSIMILAR METALS AND CONCRETE PER SPECIFICATIONS.

TYPE "E"

HANDRAIL POST ANCHORAGE
NTS

(237)

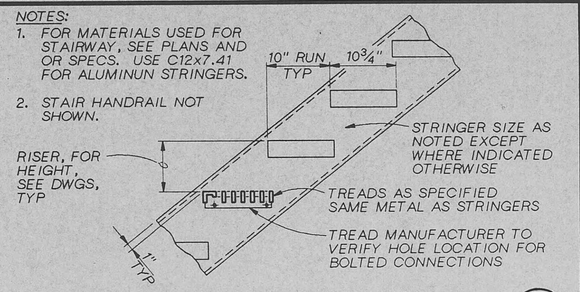


NOTES:
1. HOT DIP GALVANIZE SLEEVE AFTER FABRICATION.
2. PROVIDE COVER PLATE FOR EACH ANCHORAGE SLEEVE.

HANDRAIL POST ANCHORAGE
NTS

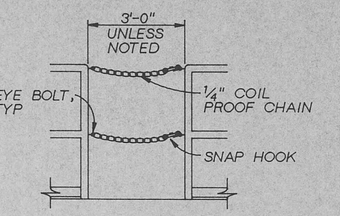
(238)

NOTES:
1. FOR MATERIALS USED FOR STAIRWAY, SEE PLANS AND OR SPECS. USE C12x7.41 FOR ALUMINUN STRINGERS.
2. STAIR HANDRAIL NOT SHOWN.



STAIR DETAIL
NTS

(241)

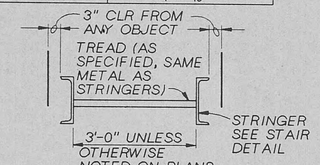


SAFETY CHAIN
NTS

(245)

246 NOT USED

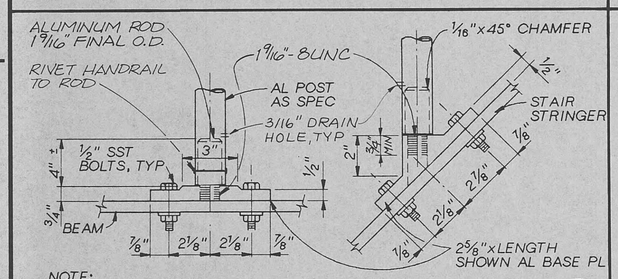
STAIRWAY WIDTH	BEARING BARS ALUMINUM TREAD
2'-3" OR LESS	1"x3/16"
2'-9" OR LESS	1¼"x3/16"
3'-3" OR LESS	1½"x3/16"
4'-7" OR LESS	1¾"x3/16"



STAIR TREADS
NTS

(242)

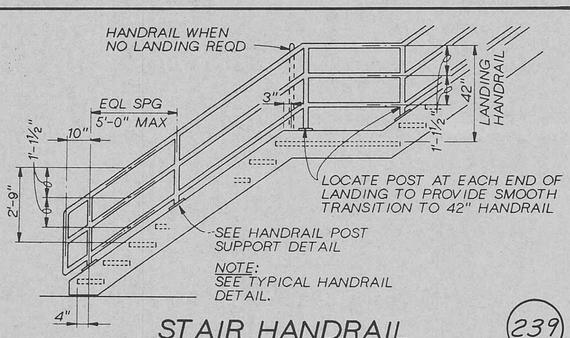
247 NOT USED



NOTE:
PROVIDE PROTECTION FOR DISSIMILAR METALS AND CONCRETE PER SPECIFICATIONS.

HANDRAIL POST ANCHORAGE
NTS

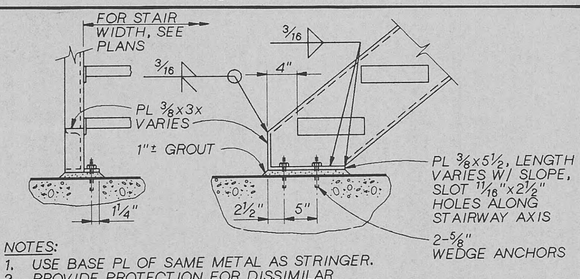
(235)



NOTE:
SEE TYPICAL HANDRAIL DETAIL.

STAIR HANDRAIL
NTS

(239)



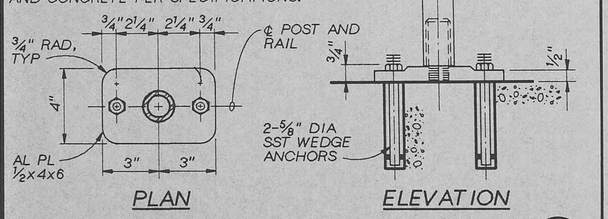
NOTES:
1. USE BASE PL OF SAME METAL AS STRINGER.
2. PROVIDE PROTECTION FOR DISSIMILAR METALS AND CONCRETE AS SPECIFIED.
3. STAIR HANDRAIL NOT SHOWN.

STAIR BOTTOM CONN
NTS

(243)

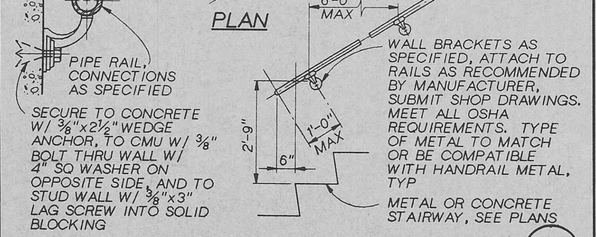
247 NOT USED

NOTE:
BASE PLATE METAL SHALL MATCH HANDRAIL, PROVIDE PROTECTION FOR DISSIMILAR METALS AND CONCRETE PER SPECIFICATIONS.



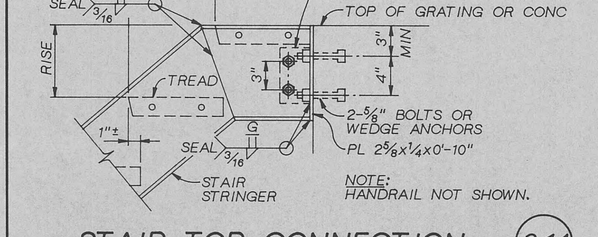
HANDRAIL POST ANCHORAGE
NTS

(236)



WALL HANDRAIL
NTS

(240)



NOTE:
HANDRAIL NOT SHOWN.

STAIR TOP CONNECTION
NTS

(244)

248 NOT USED

RECORD DRAWINGS
Revisions Drawn by D. THOMPSON Date 4-9-88

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CONNECTION SHALL DEVELOP FULL STRENGTH OF PIPE. SUBMIT TEST DATA ON DRAWINGS FOR REVIEW.

CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	SM FREY
DR	M.J. BUCKNER
CHK	J. CALL
APVD	C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	4.9.88	RECORD DRAWINGS		

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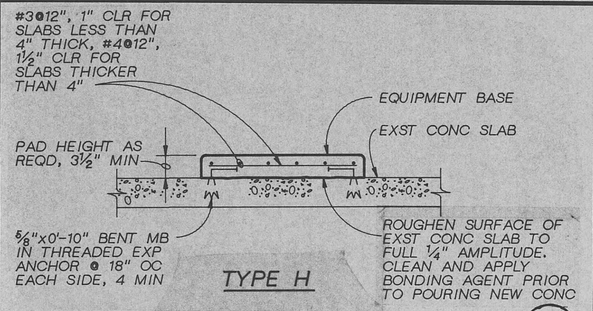
STANDARD DETAILS
STRUCTURAL

DWG NO.	DS-4
DATE	MAY 1986
PROJ NO.	SA21043.A1

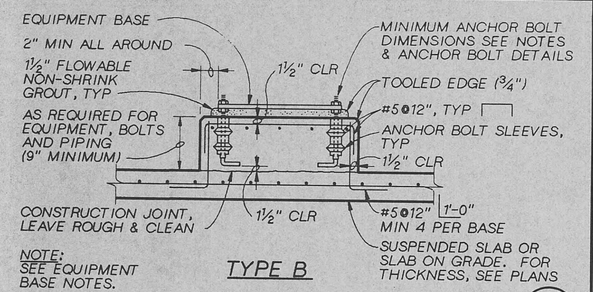


TYPE H

EQUIPMENT PAD

NTS

(222)



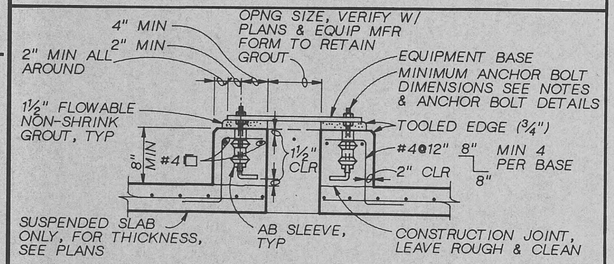
NOTE: SEE EQUIPMENT BASE NOTES.

TYPE B

EQUIPMENT PAD

NTS

(223)



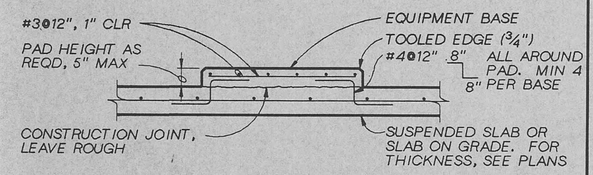
NOTE: SEE EQUIPMENT BASE NOTES.

TYPE C

EQUIPMENT PAD

NTS

(224)



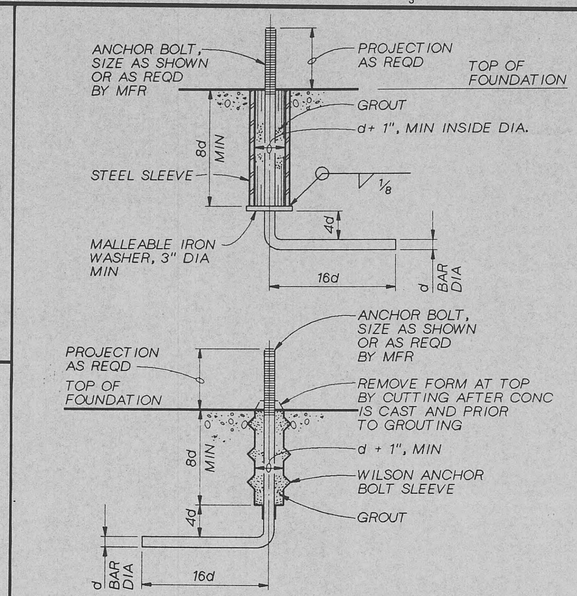
NOTE: SEE EQUIPMENT BASE NOTES.

TYPE F

EQUIPMENT PAD

NTS

(225)



ALTERNATE MACHINERY ANCHOR BOLT

NTS

EQUIPMENT BASE NOTES

1. PAD SIZE SHALL BE MINIMUM INDICATED OR AS SHOWN ON THE PLANS OR AS INDICATED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER.
2. THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS SHALL BE DETERMINED BY THE EQUIPMENT MANUFACTURER, AND SHALL BE AS APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL BE HELD IN POSITION WITH A TEMPLATE WHILE PAD IS BEING POURED.
3. ANCHOR BOLT SLEEVES SHALL BE USED TO PROVIDE THE ANCHOR BOLT A MINIMUM MOVEMENT OF ½" IN ALL DIRECTIONS. THE MINIMUM SLEEVE LENGTH SHALL BE 8 TIMES THE BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT.
4. ANCHOR BOLT SLEEVES SHALL HAVE A MINIMUM INTERNAL DIAMETER 1" GREATER THAN BOLT DIAMETER AND A MAXIMUM INTERNAL DIAMETER 3" GREATER THAN ANCHOR BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT.
5. EQUIPMENT BASES SHALL BE INSTALLED LEVEL UNLESS SPECIFIED OTHERWISE.
6. TYPE "D" DETAIL SHALL BE USED ONLY FOR SLABS ON GRADE AND AT GRADE. THE SURROUNDING FLOOR SLAB SHALL NOT BE PLACED UNTIL THE EXACT SIZE AND LOCATION OF THE PAD IS KNOWN.
7. WEDGES OR SHIMS SHALL BE USED TO SUPPORT THE BASE WHILE THE NON-SHRINK GROUT IS PLACED. TEMPORARY LEVELING NUTS SHALL BE BACKED OFF. IF LEFT IN, THE WEDGES OR SHIMS SHALL NOT BE EXPOSED TO VIEW.

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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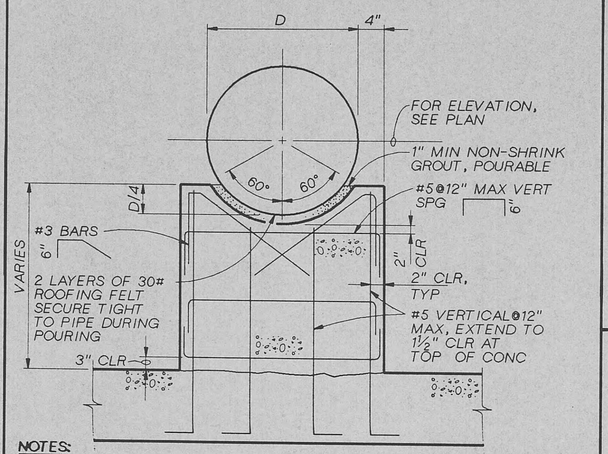
(226)

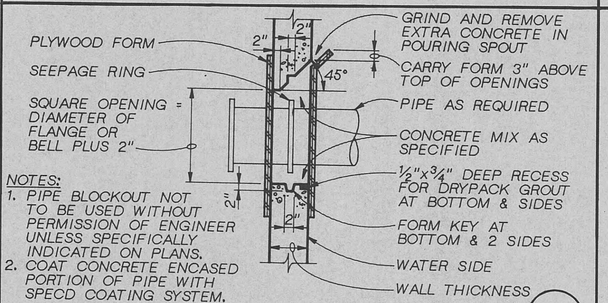


NOTES:
1. THICKNESS "B" OF SADDLE
   B=6" WHEN 24>D
   B=10" WHEN 42>D>24
   B=12" WHEN D>42
2. FOR "B"=10" OR THICKER, USE 2 LAYERS OF REINF

CONCRETE PIPE SUPPORT

NTS

(227)

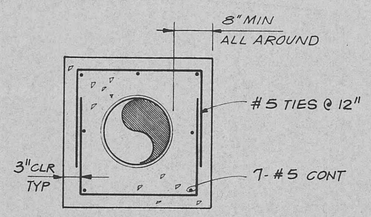


NOTES:
1. PIPE BLOCKOUT NOT TO BE USED WITHOUT PERMISSION OF ENGINEER UNLESS SPECIFICALLY INDICATED ON PLANS.
2. COAT CONCRETE ENCASED PORTION OF PIPE WITH SPECD COATING SYSTEM.

PIPE BLOCKOUT

NTS

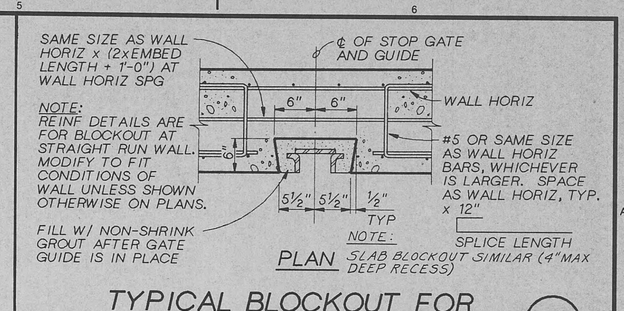
(228)



PIPE ENCASEMENT

NTS

(229)



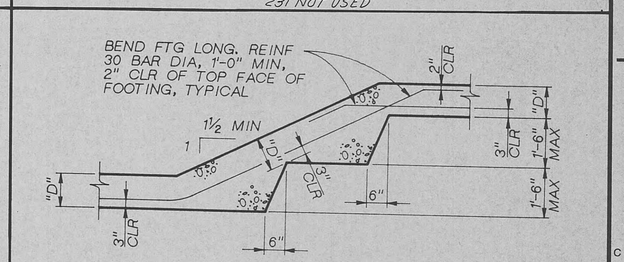
PLAN

TYPICAL BLOCKOUT FOR STOP GATE GUIDE DETAIL

NTS

(230)

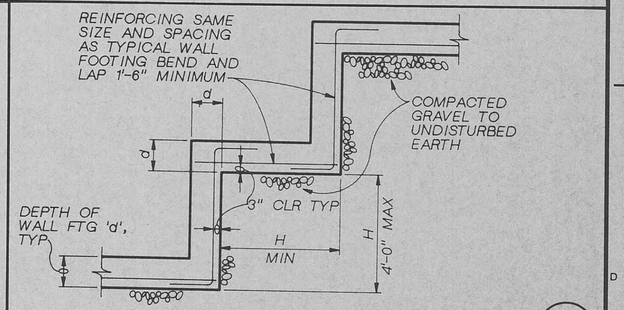
231 NOT USED



STEPPED WALL FOOTING

NTS

(232)



STEPPED FOOTING

NTS

(233)

CHARLES N. CRANDALL REGISTERED ENGINEER No. 18373 STATE OF TENNESSEE

CH2M HILL

DSGN	S.M. FREY
DR	M.J. BUCKNER
CHK	
APVD	

NO.	DATE	REVISION	DAT BY	CNC APVD
	9-9-88	RECORD DRAWINGS		

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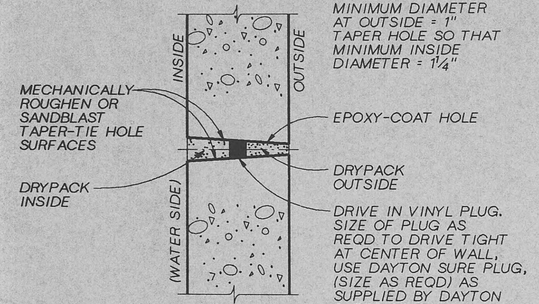
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

STANDARD DETAILS
STRUCTURAL

DWG NO.	DS-3
DATE	MAY 1986
PROJ NO.	SA21043.A1



NOTE:
MINIMUM DIAMETER AT OUTSIDE = 1" TAPER HOLE SO THAT MINIMUM INSIDE DIAMETER = 1¼"

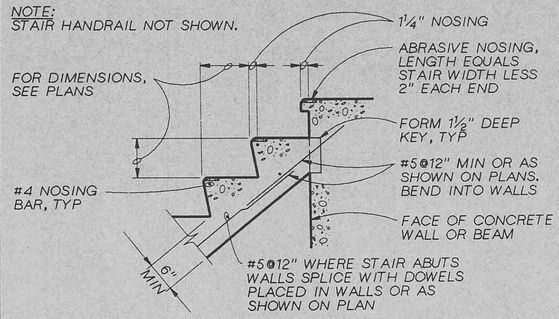
CONSTRUCTION STEPS:

1. SANDBLAST OR MECHANICALLY ROUGHEN WITH ELECTRIC EQUIPMENT.
2. CLEAN SURFACES.
3. DRIVE IN VINYL PLUG.
4. EPOXY COAT INSIDE AND WHILE EPOXY IS TACKY DRYPACK INSIDE.
5. EPOXY COAT OUTSIDE AND WHILE EPOXY IS TACKY DRYPACK OUTSIDE. USE NONMETALLIC, NONSHRINK GROUT AS SPECIFIED.

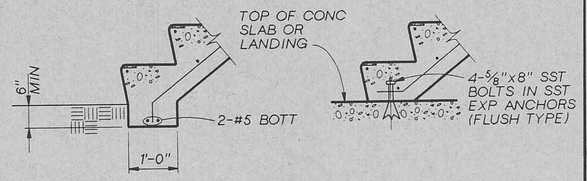
ALTERNATE FORM TIE-THROUGH BOLT
NTS

(210)

NOTE:
STAIR HANDRAIL NOT SHOWN.



TOP CONN



ALTERNATE CONN BOTTOM CONN

CONCRETE STAIR
NTS

(213)

1. MASONRY WALLS SHALL BE REINFORCED AS FOLLOWS UNLESS DETAILED OTHERWISE:

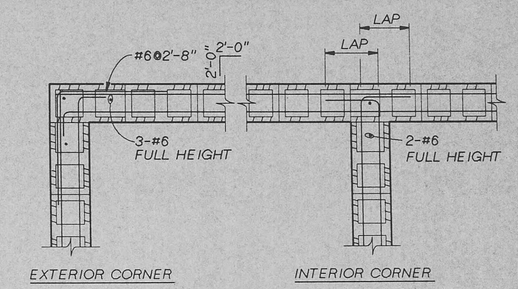
WALL THICKNESS	REINFORCING LOCATION	HORIZONTAL REINFORCING	VERTICAL REINFORCING
8"	CENTER OF WALL	#5@48"	#6@48"
12"	EACH FACE	#4@48"	#6@48"

REINFORCING DETAILED EF SHALL BE PLACED MAXIMUM 1/2" (MINIMUM 1/4") CLR OF THE INSIDE FACE OF BLOCK WALL.

2. REINFORCING BARS SHALL BE LAPPED THE MAXIMUM OF 36 BAR DIAMETERS OR 2'-0" MIN WHERE SPLICED AND SHALL BE WIRE TIED TOGETHER.
3. ALL VERTICAL CMU REINFORCING SHALL BE LAPPED WITH MATCHING DOWELS AT FOUNDATION.
4. PROVIDE 2-#5 CONT IN BOND BEAM AT TOP OF WALLS. FIRST BLOCK COURSE ABOVE FOUNDATION SHALL BE BOND BEAM WITH TYPICAL HORIZONTAL REINFORCING.
5. PROVIDE 2-#6 VERTICAL BARS IN GROUTED CELL FOR FULL WALL HEIGHT AT EACH EDGE OF ALL OPENINGS. FOR REINFORCING AROUND OPENINGS, SEE (220).
6. PROVIDE FULL HEIGHT VERTICAL REINFORCING AT ALL CORNERS AND WALL INTERSECTIONS. ALL HORIZ BARS SHALL BE CONTINUOUS AROUND CORNERS AND THROUGH COLUMN PILASTERS. SEE (219).

CMU WALLS GENERAL NOTES

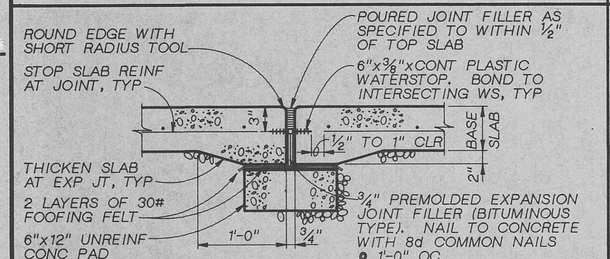
(216)



NOTES:
1. SEE GENERAL NOTES THIS SHEET.
2. LAP=30 BAR DIAMETERS OR 2'-0" MIN UNLESS OTHERWISE NOTED.

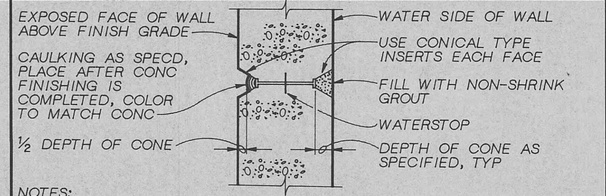
CMU WALL CORNERS
NTS

(219)



BASE SLAB EXPANSION JOINT
NTS

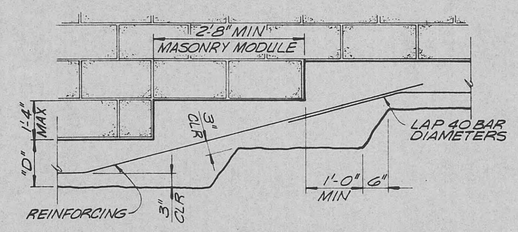
(211)



NOTES:
1. FOR FORM TIE HOLES ON OUTSIDE FACE OF WALL BELOW GRADE, FILL WITH NON-SHRINK GROUT.
2. THE SPACING OF FORM TIES ON EXPOSED PORTIONS OF WALLS SHALL BE APPROXIMATELY EQUAL HORIZONTALLY AND VERTICALLY AND SHALL BE UNIFORM IN EACH DIRECTION. SUBMIT DETAILS FOR REVIEW SHOWING SPACING OF FORM TIES.

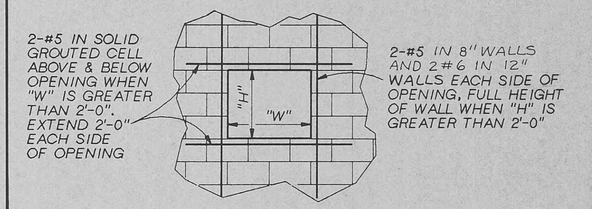
FORM SNAP-TIE HOLE
NTS

(214)



CMU STEPPED FOOTING
NTS

(217)

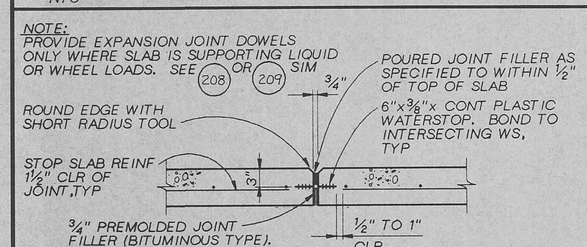


NOTE:
SEE GENERAL NOTES THIS SHEET.

CMU OPENING REINFORCING
NTS

(220)

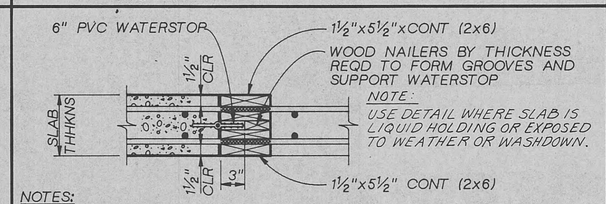
NOTE:
PROVIDE EXPANSION JOINT DOWELS ONLY WHERE SLAB IS SUPPORTING LIQUID OR WHEEL LOADS. SEE (208) OR (209) SIM



NOTE:
2 LAYERS OF REINF DETAIL, SIMILAR.

ELEVATED SLAB EXP JOINT
NTS

(212)



NOTE:
USE DETAIL WHERE SLAB IS LIQUID HOLDING OR EXPOSED TO WEATHER OR WASHDOWN.

NOTES:
1. SPACES BETWEEN STOCK MATERIAL WHERE REINFORCING BARS DO NOT PENETRATE BULKHEAD SHALL BE FILLED WITH STYROFOAM CUT TO FIT. (xxxxxxxx)THICKNESS OF REINFORCING BARS.
2. REINFORCING BARS AT CONSTRUCTION JOINTS SHALL NOT BE SPLICED, CUT, WELDED OR OTHERWISE ALTERED FROM THAT SHOWN ON THE PLANS.
3. STRIP WOOD FORMS ONE DAY FOLLOWING CASTING AND ROUGHEN CONCRETE WITH WIRE BRUSH TO INCREASE BOND CAPACITY OF CONCRETE.

SLAB CONSTRUCTION JOINT
NTS

(215)

RECORD DRAWINGS
Revisions Drawn by D.THOMPSON Date 9.9.88

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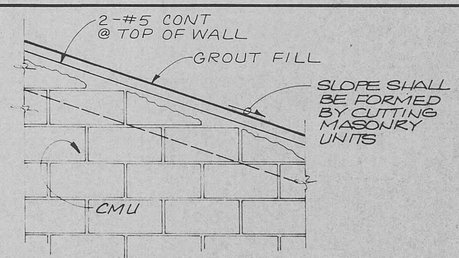
218 NOT USED



ELEVATION

CMU WALL AT RAKE
NTS

(221)

CHARLES N. CRANDALL REGISTERED ENGINEER AGRICULTURE FLORIDA No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	S. FREY
DR	K. ANDERSEN
CHK	J. CALL
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9.9.88	RECORD DRAWINGS	DAT	CMC

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BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

STANDARD DETAILS
STRUCTURAL

DWG NO.	DS-2
DATE	MAY 1986
PROJ NO.	SA21043.A1

GENERAL STRUCTURAL NOTES
REINFORCING DETAILS

1. UNLESS OTHERWISE SHOWN, CONCRETE WALLS AND SLABS SHALL BE REINFORCED AS FOLLOWS: #4@12" EACH WAY @ CENTER OF 6" SECTIONS; #5@12" EACH WAY @ CENTER OF 8" SECTIONS; #4@12" EACH WAY, EACH FACE OF 10" SECTIONS; #5@12" EACH WAY, EACH FACE OF 12" SECTIONS, (SINGLE MAT REINFORCEMENT SHALL BE AT CENTER OF SECTION, UNLESS SHOWN OTHERWISE.)
2. CLEARANCE FOR REINFORCEMENT BARS, UNLESS SHOWN OTHERWISE, SHALL BE:
   - WHEN PLACED ON GROUND:
   - EXPOSED TO WATER, WEATHER OR CONDENSATION:
     - #5 BAR OR SMALLER 1-1/2"
     - #6 BAR OR LARGER 2"
   - INTERIOR DRY SURFACES:
     - SLABS 3/4"
     - BEAMS 1-1/2"
     - COLUMNS 1-1/2"
     - WALLS 1"
3. REFER TO WALL CORNER AND WALL INTERSECTION REINFORCING DETAIL. IN GENERAL, THE WALL CORNER REINFORCING SIZES AND SPACINGS SHALL BE CALLED OUT ON THE PLANS AND REFERENCED TO THESE DETAILS AND THE TYPICAL HORIZONTAL WALL REINFORCING SHALL LAP WITH THE CORNER REINFORCING.
4. ALL BENDS, UNLESS OTHERWISE SHOWN, SHALL BE A 90 DEGREE STANDARD HOOK AS DEFINED IN LATEST EDITION OF ACI 318.
5. UNLESS OTHERWISE NOTED, ALL WALL HORIZONTAL REINFORCEMENT BARS SHALL BE CONTINUOUS AROUND CORNERS AND THROUGH COLUMNS OR PILASTERS. REINFORCEMENT SHALL BE EXTENDED INTO CONNECTING WALLS AND LAPPED ON THE OPPOSITE FACE OF THE CONNECTING WALLS. VERTICAL WALL BARS SHALL BE LAPPED WITH DOWELS FROM BASE SLABS AND EXTENDED INTO THE TOP FACE OF ROOF SLABS AND LAPPED WITH TOP SLAB REINFORCEMENT. PROVIDE A MINIMUM OF 2-#5 VERTICAL BARS AT ALL WALL ENDS AND WALL INTERSECTIONS. UNLESS INDICATED OTHERWISE, CONTRACTOR MAY SPLICE CONTINUOUS SLAB BARS AT LOCATIONS OF HIS CHOOSING, EXCEPT THAT TOP BAR SPLICES SHALL BE LOCATED AT MIDSPAN AND BOTTOM BAR SPLICES SHALL BE LOCATED AT SUPPORTS. ALL REINFORCEMENT BENDS AND LAPS, UNLESS OTHERWISE NOTED, SHALL SATISFY THE FOLLOWING MINIMUM REQUIREMENT:

DETAIL OF REINFORCEMENT ** — LAP LENGTHS							
BAR SIZE		#6 OR SMALLER	#7	#8	#9	#10	#11
CONC DESIGN STRENGTH		4000 PSI					
GR40	TOP BAR*	32 DIA, MIN 1'-6"	2'-6"	3'-3"	4'-0"	5'-0"	6'-4"
	OTHER BAR	22 DIA, MIN. 1'-0"	1'-9"	2'-4"	3'-0"	3'-8"	4'-6"
GR60	TOP BAR*	45 DIAM, MIN 2'-0"	3'-8"	4'-9"	6'-0"	7'-8"	9'-6"
	OTHER BAR	32 DIA, MIN 1'-6"	2'-8"	3'-6"	4'-4"	5'-6"	6'-9"

* 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 BAR, IN ANY SINGLE POUR. HORIZONTAL WALL BARS ARE CONSIDERED TOP BARS.

**LAP LENGTHS SHOWN ARE FOR BARS AT 6" OR GREATER O.C. IF BARS ARE PLACED AT LESS THAN 6" O.C., INCREASE LAP LENGTHS 20%.

6. CONTINUOUS WATERSTOPS AS SPECIFIED SHALL BE INSTALLED IN ALL CONSTRUCTION JOINTS IN WALLS OF WATER HOLDING BASINS, BASEMENTS, AND CHANNELS, EXCEPT WHERE INDICATED OTHERWISE.
7. PROVIDE AND INSTALL SELECT GRANULAR MATERIAL AS SPECIFIED UNDER ALL SLABS AND FOOTINGS TO UNDISTURBED EARTH WITH MINIMUM THICKENSS EQUAL TO 6", UNLESS OTHERWISE NOTED.

RECORD DRAWINGS
Revisions Drawn by DTHOMPSON Date 9-9-88

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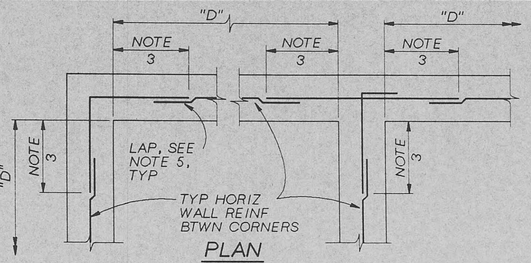
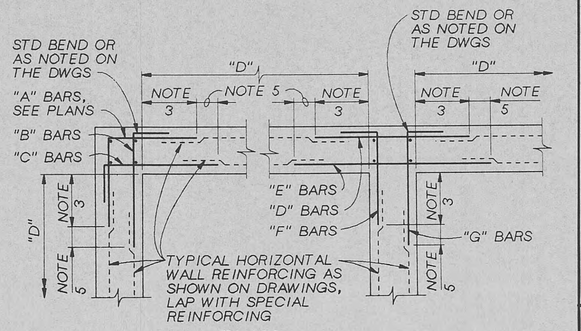
200



PLAN

TYPICAL SINGLE MAT CORNER AND INTERSECTION REINFORCING
NTS



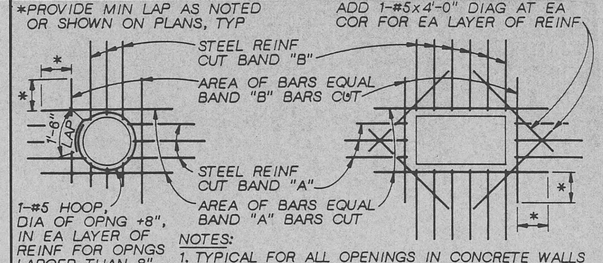
PLAN

TYPICAL DOUBLE MAT CORNER AND INTERSECTION REINFORCING
NTS (SEE PLANS FOR SIZE AND SPACING)

CORNER AND INTERSECTION REINFORCING DETAILS

1. TYPICAL HORIZONTAL WALL REINFORCING LAYOUT IS SHOWN TO AVOID CONGESTION AND PERMIT PROPER PLACEMENT. FOR SIZE AND SPACING SEE PLANS. ALL HORIZONTAL REINFORCING AT CORNERS AND INTERSECTIONS SHALL BE FABRICATED AND PLACED WITH SPLICES SHOWN REGARDLESS OF SIZE AND SPACING.
2. WHERE THE CORNER OR INTERSECTION REINFORCING SIZE AND SPACING IS NOT SHOWN, NOTED OR TABULATED ON THE PLANS, THE SIZE AND SPACING SHALL BE THE SAME AS THE TYP WALL HORIZONTAL REINFORCING SHOWN ON THE WALL SECTIONS OR AS NOTED FOR THE REINFORCING BETWEEN THE CORNERS OR INTERSECTIONS.
3. EXCEPT WHERE OTHERWISE SHOWN ON THE DRAWINGS, THE LENGTH INDICATED AS "NOTE 3" SHALL BE THE LESSER OF D/4, 10 FEET, OR 1.0 TIMES THE HEIGHT OF THE WALL, EXCEPT THAT IN NO CASE SHALL IT BE LESS THAN 2.0 FEET.
4. D = LENGTH OF WALL PARALLEL TO THE BAR LENGTH IN QUESTION.
5. EXCEPT WHERE OTHERWISE SHOWN ON THE DRAWINGS, THE LENGTH INDICATED AS "NOTE 5" SHALL BE EQUAL TO ONE "LAP LENGTH" AS REQUIRED BY THE GENERAL STRUCTURAL NOTES. USE THE LAP LENGTH AS REQUIRED BY THE SMALLER OF THE TYPICAL HORIZONTAL WALL REINFORCING BARS OF THE WALL BEING CONSIDERED.
6. UNLESS OTHERWISE NOTED, "B" AND "C" BARS ARE THE SAME SIZE AND SPACING AND, "F" AND "G" BARS ARE THE SAME SIZE AND SPACING.

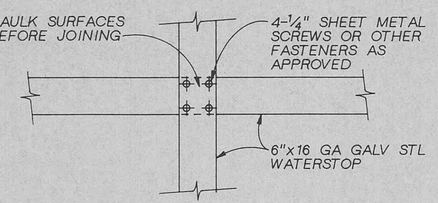
201



NOTES:
1. TYPICAL FOR ALL OPENINGS IN CONCRETE WALLS AND SLABS UNLESS INDICATED OTHERWISE ON PLANS.
2. DO NOT WELD REINFORCEMENT TO PIPE SLEEVES AND INSERTS.

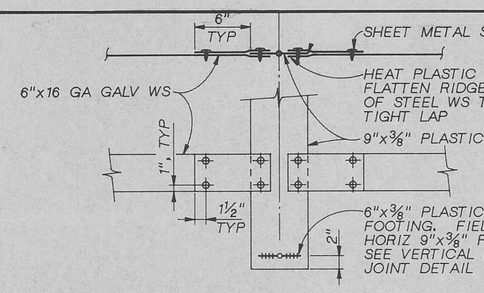
OPENING REINFORCING
NTS

202



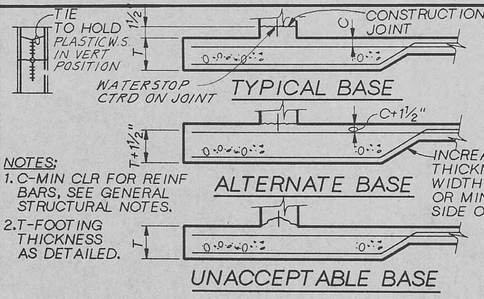
STEEL-STEEL WS SPLICE
NTS

203



STEEL-PLASTIC WS SPLICE
NTS

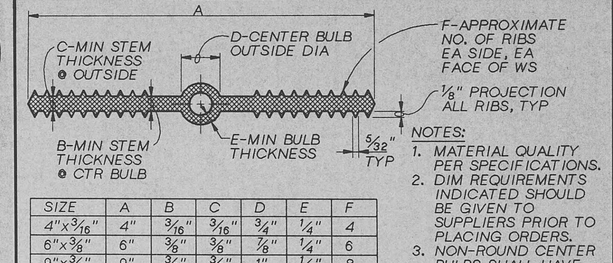
204



NOTES:
1. C-MIN CLR FOR REINF BARS, SEE GENERAL STRUCTURAL NOTES.
2. T-FOOTING THICKNESS AS DETAILED.

WALL BASE CONSTRUCTION JOINT
NTS

205

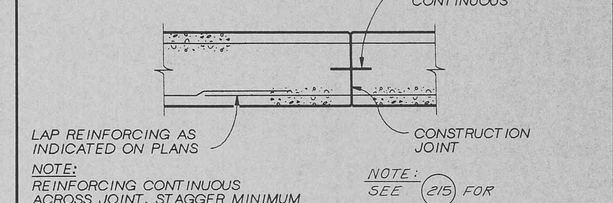


SIZE	A	B	C	D	E	F
4"x3/16"	4"	3/16"	3/16"	3/4"	1/4"	4
6"x3/8"	6"	3/8"	3/8"	7/8"	1/4"	6
9"x3/8"	9"	3/8"	3/8"	1"	1/4"	8

NOTES:
1. MATERIAL QUALITY PER SPECIFICATIONS.
2. DIM REQUIREMENTS INDICATED SHOULD BE GIVEN TO SUPPLIERS PRIOR TO PLACING ORDERS.
3. NON-ROUND CENTER BULBS SHALL HAVE A MIN OUTSIDE DIM OF 'D'.

PLASTIC WATERSTOP
NTS

206

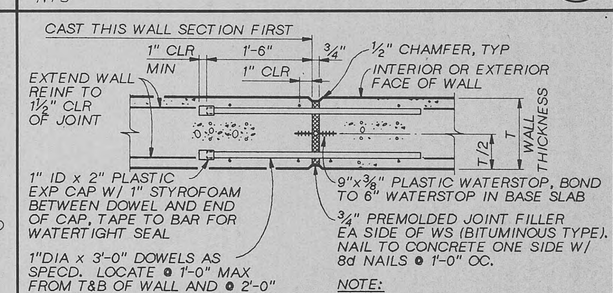


NOTE: REINFORCING CONTINUOUS ACROSS JOINT. STAGGER MINIMUM 40 BAR DIAMETERS UNLESS INDICATED OTHERWISE.

NOTE: SEE (215) FOR SLAB C.J.

VERTICAL CONSTRUCTION JOINT
NTS

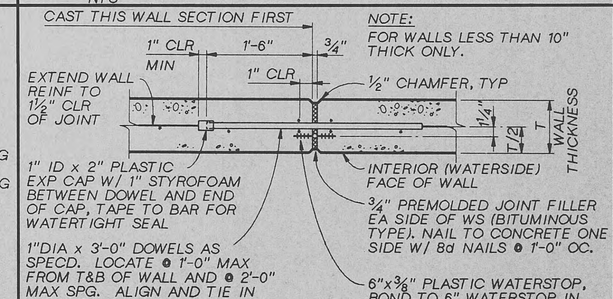
207



NOTE: FOR WALLS 10" AND THICKER ONLY.

VERTICAL EXPANSION JOINT
NTS

208



VERTICAL EXPANSION JOINT
NTS

209

CHARLES N. CRANDALL REGISTERED ENGINEER No. 18372 STATE OF TENNESSEE

CH2M HILL

DSGN	S.M.FREY				
DR	K.A. ANDERSEN				
CHK	J. CALL				
APVD	C. CRANDALL				
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1	9.9.88	RECORD DRAWINGS	DAT	CNC	

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0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

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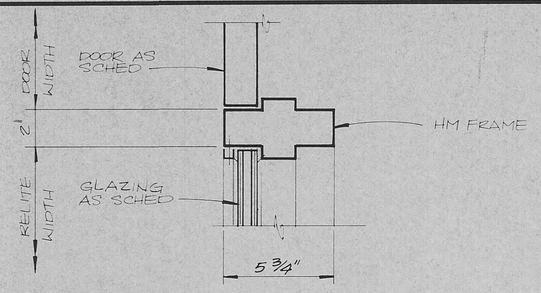
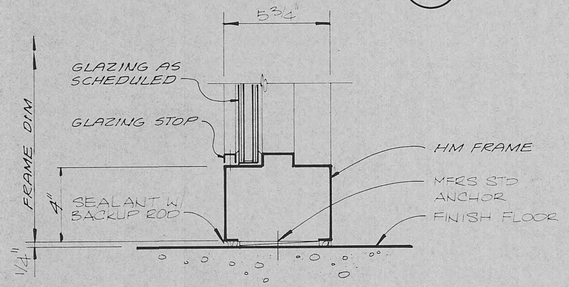
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

STANDARD DETAILS
STRUCTURAL

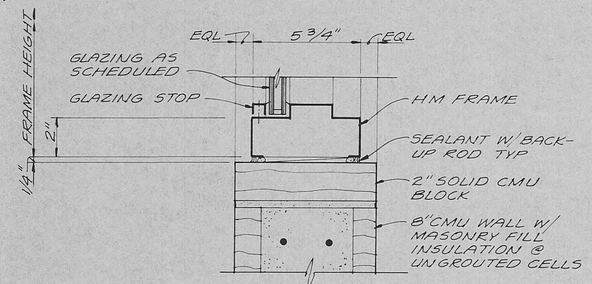
DWG NO.	DS-1
DATE	MAY 1986
PROJ NO.	SA21043.A1



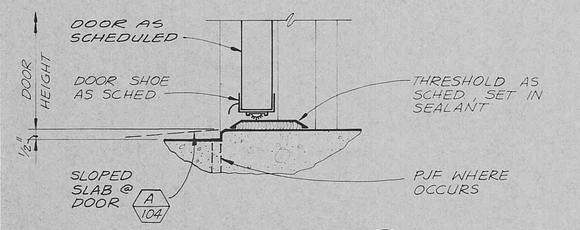
JAMB 113



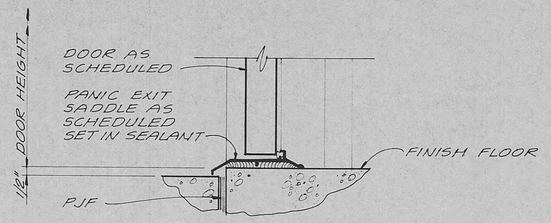
SILL 114



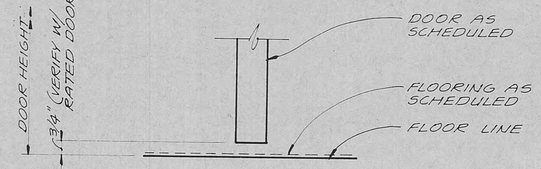
WINDOW SILL 115
3"=1'-0"



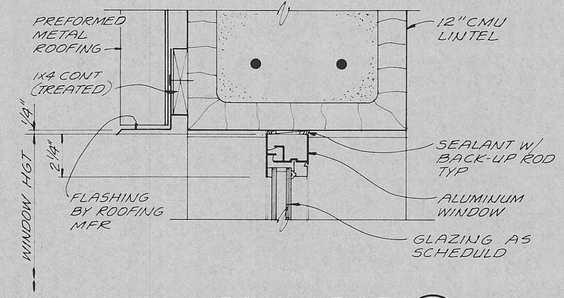
DOOR SILL 116
3" = 1'-0"



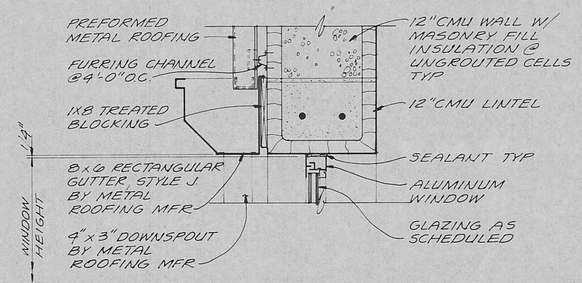
DOOR SILL 117
3"=1'-0"



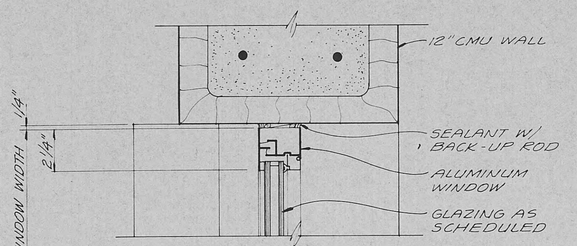
SILL DETAIL 118
3"=1'-0"



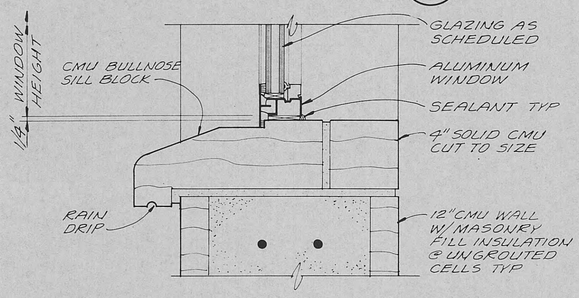
WINDOW HEAD 119
3"=1'-0"



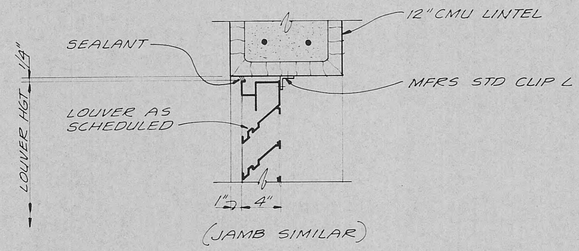
WINDOW HEAD 120
1 1/2" = 1'-0"



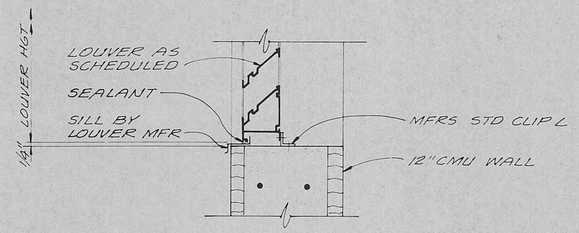
WINDOW JAMB 121
3"=1'-0"



WINDOW SILL 122
3"=1'-0"



LOUVER HEAD 123
1 1/2" = 1'-0"



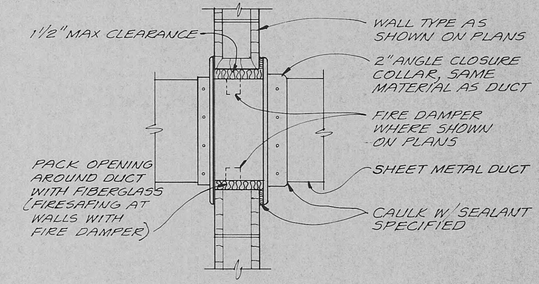
LOUVER SILL 124
1 1/2" = 1'-0"



SIGN DETAIL 125



SIGN DETAIL 126



HVAC DUCT WALL PENETRATION 127
NTS

RECORD DRAWINGS
Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18379 — STATE OF TENNESSEE

CH2M HILL

DSGN	JE CAVE				
DR	TW McINTYRE				
CHK					
APVD					
		9.9.88	RECORD DRAWINGS	DAT	CNC
		NO. DATE	REVISION	BY	APVD

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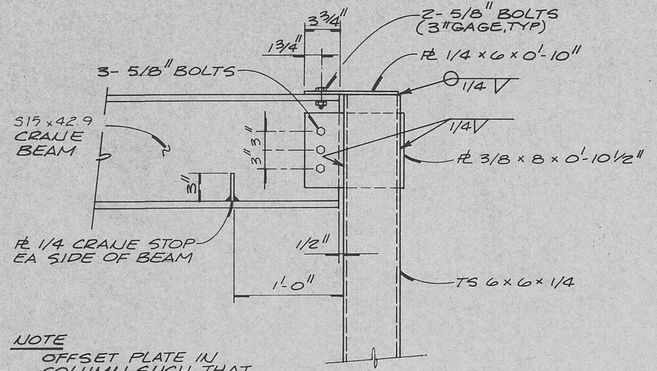
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

STANDARD DETAILS – ARCHITECTURAL

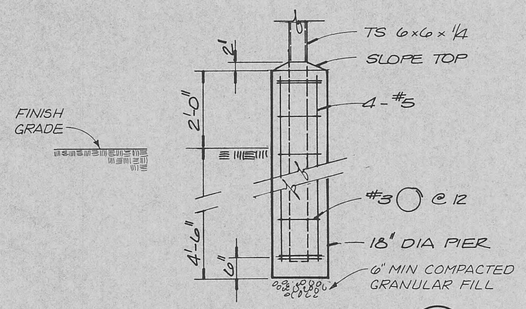
DWG NO. DA-2
DATE MAY 1986
PROJ NO. SA21043.A1

DESIGNED BY | DRAWN BY | CHECKED BY | FILM KE | PRINTED | FORMAT 2324MC | COMPOSITE | OVERLAY | SCREEN | OVERLAY IDENTIFICATION | PROJ NO. | CONTR. JT

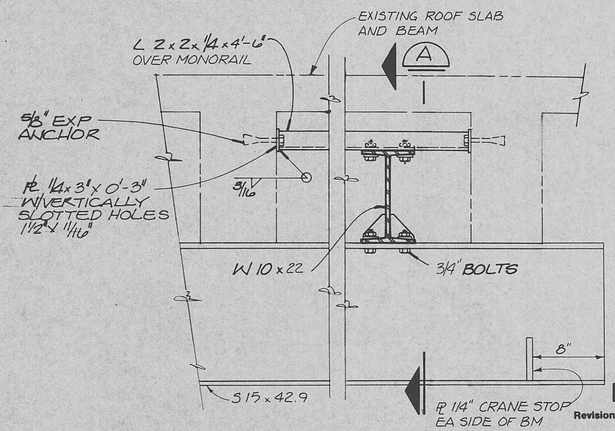


NOTE
OFFSET PLATE IN COLUMN SUCH THAT COLUMN & BEAM ℄ INTERSECT

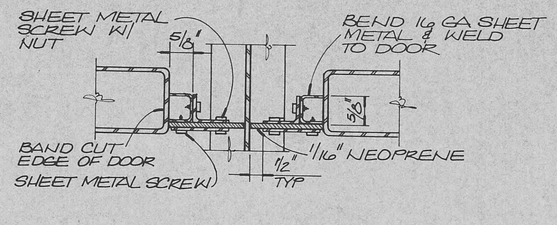
COLUMN TOP DETAIL (1)
1 1/2" = 1'-0" M-7



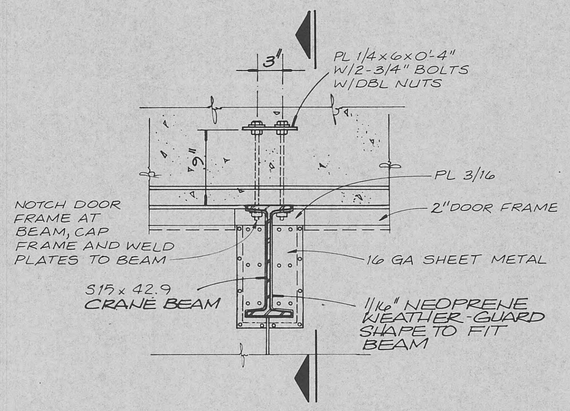
COLUMN PIER DETAIL (2)
1 1/2" = 1'-0" M-6, M-7



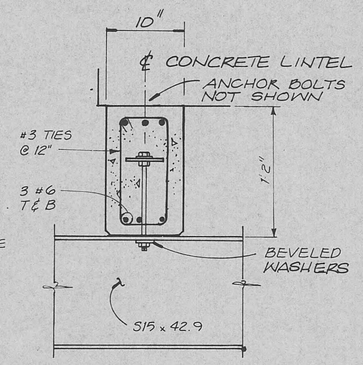
BRACE DETAIL (3)
1 1/2" = 1'-0" M-7



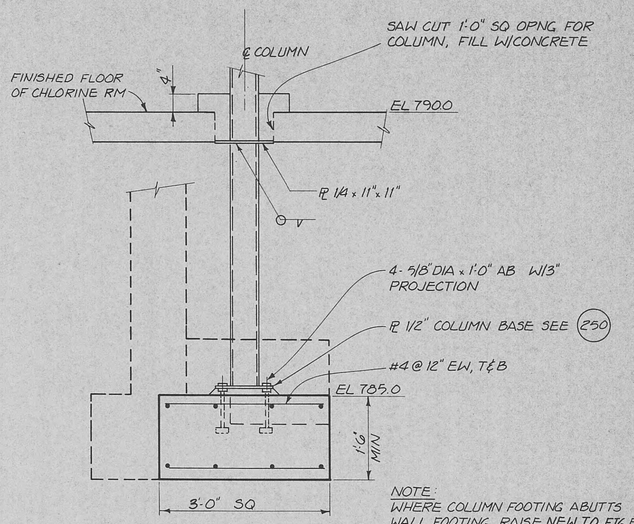
PLAN



ELEVATION

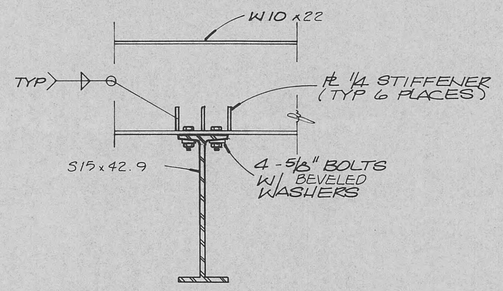


SECTION



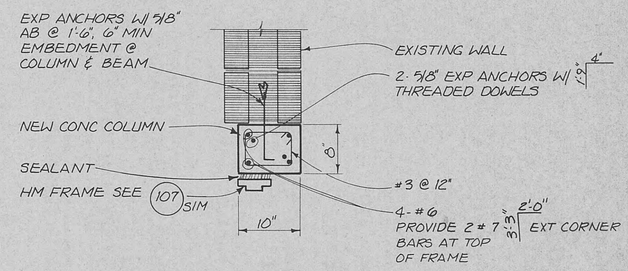
NOTE:
WHERE COLUMN FOOTING ABUTTS WALL FOOTING, RAISE NEW T.O. FTG EL 1'-0" ABOVE EXST FTG AND POUR AROUND AS DASHED

SECTION (D)
3/4" = 1'-0" M-6



SECTION (A)
1 1/2" = 1'-0" M-6

WALL DETAIL (4)
1 1/2" = 1'-0" M-7



SECTION (C)
1" = 1'-0" M-6

RECORD DRAWINGS
Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER 11-21-80 No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	S. HIDA
DR	A. DURLEY
CHK	J. CALL
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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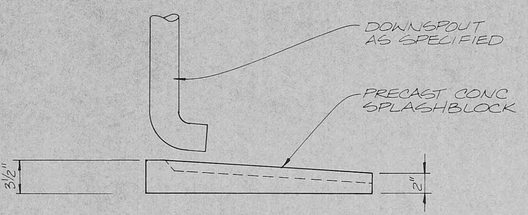
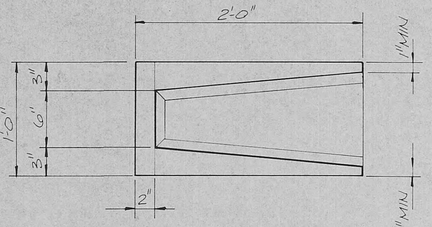
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CHLORINATION — SECTIONS AND DETAILS

DWG NO.	M-8
DATE	MAY 1986
PROJ NO.	SA21043.A1



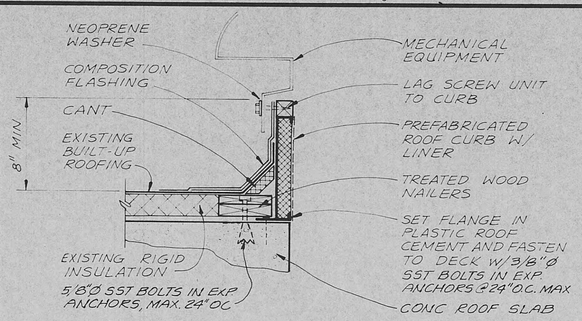
ELEVATION



PLAN

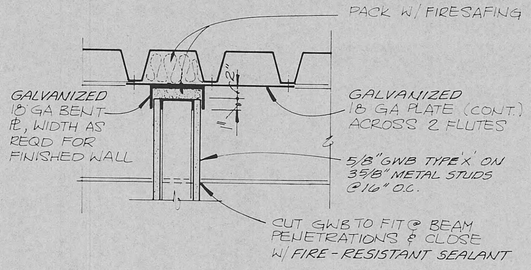
SPLASHBLOCK DETAIL 100

1½"=1'-0"



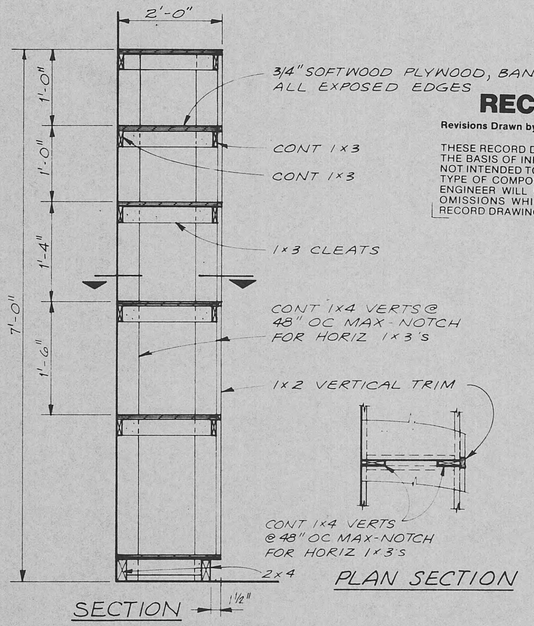
ROOF CURB DETAIL 102

1½"=1'-0"



ROOF DECKING PARALLEL TO WALL

NTS



SECTION PLAN SECTION

STORAGE SHELVES 101

1" = 1'-0"

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9.9.88

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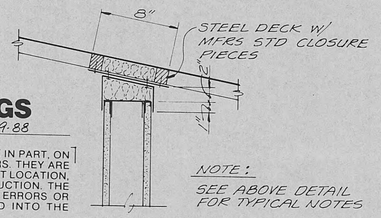
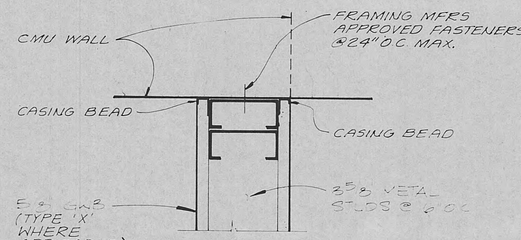


NOTE: SEE ABOVE DETAIL FOR TYPICAL NOTES

ROOF DECKING PERPENDICULAR TO WALL

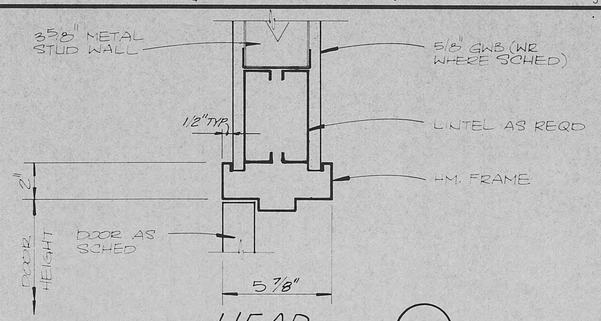
DETAIL 103

1½"=1'-0"



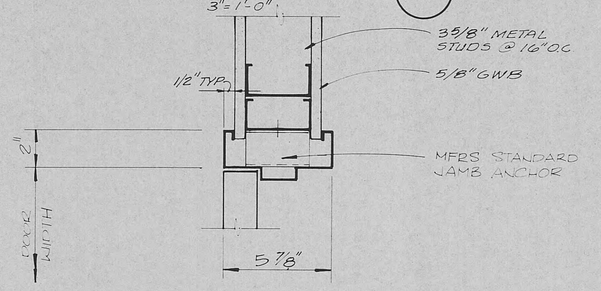
WALL DETAIL 104

3" = 1'-0"



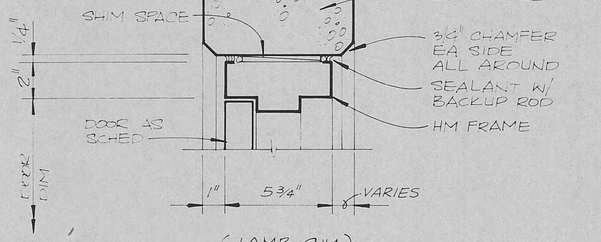
HEAD 105

3"=1'-0"



JAMB 106

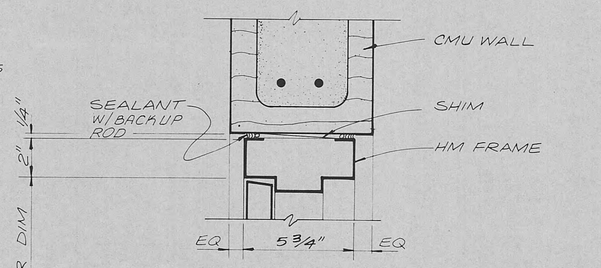
3" = 1'-0"



(JAMB SIM.)

HEAD 107

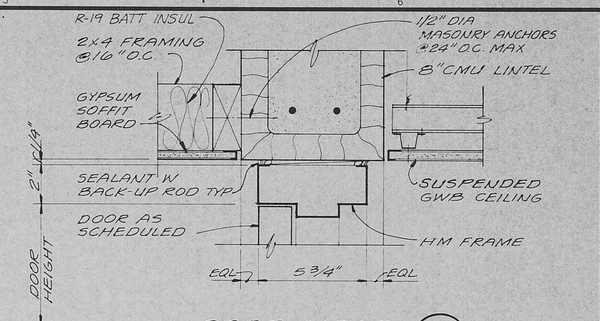
3" = 1'-0"



JAMB SIMILAR

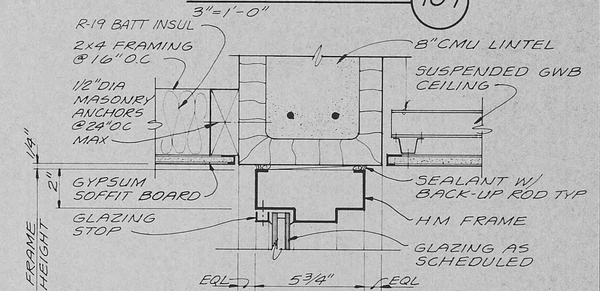
HEAD 108

3"=1'-0"



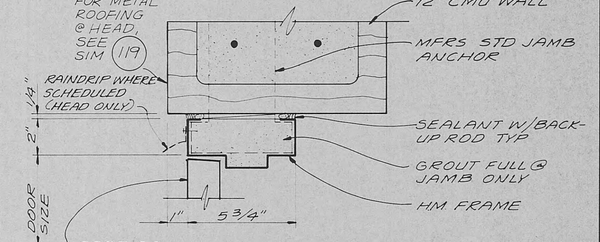
DOOR HEAD 109

3"=1'-0"



RELITE HEAD 110

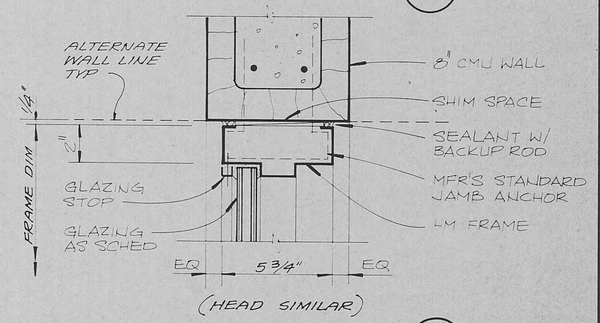
3"=1'-0"



HEAD SIMILAR

DOOR JAMB 111

3"=1'-0"



(HEAD SIMILAR)

JAMB 112

3" = 1'-0"

CHARLES N. CRANDALL REGISTERED ENGINEER 12-31-88 STATE OF TENNESSEE

CH2M HILL

DSGN JE CAVE						
DR TW McINTYRE						
CHK L GRANDE						
APVD C CRANDALL	NO.	DATE	REVISION	BY	APVD	
		9.9.88	RECORD DRAWINGS	DAT	CNC	

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

STANDARD DETAILS – ARCHITECTURAL

DWG NO.	DA-1
DATE	MAY 1986
PROJ NO.	SA21043.A1

PRINTED 1:1 FORMAT 22"x34"mc FILM KE DESIGNED BY DRAWN BY CHECKED BY

OVERLAY IDENTIFICATION COMPOSITE OVERLAY SCREEN PROJ NO. CONTRACT

INTERIOR FINISH SCHEDULE

STRUCTURE	SPACE NO.	SPACE NAME	FLOOR SUBFLOOR	FLOOR FINISH	FLOOR COLOR	BASE AND WAINSCOT HEIGHT	BASE MATL	BASE FINISH	BASE COLOR	WAINSCOT WALLS	NORTH WALL MATL	NORTH WALL FINISH	NORTH WALL COLOR	EAST WALL MATL	EAST WALL FINISH	EAST WALL COLOR	SOUTH WALL MATL	SOUTH WALL FINISH	SOUTH WALL COLOR	WEST WALL MATL	WEST WALL FINISH	WEST WALL COLOR	CEILING HEIGHT	CEILING MATL	CEILING FINISH	CEILING COLOR	MISCELLANEOUS ITEM	MISC MATL	MISC FINISH	MISC COLOR	REMARKS
CONTROL BUILDING	100	MECHANICAL ROOM	CONC	HDNR	CLEAR	—	—	—	—	—	CMU/ CONC	109/113	A-2	CMU/ CONC	109/113	A-2	CMU	109	A-2	CMU/ CONC	109/113	A-2	VARIES	EXPOSED INSUL	FCTY	FCTY	BEAMS	STEEL	7	A-1	
	101	TOILET ROOM	CONC	SH VIN	B-3	* 4"	SH VIN	FCTY	B-3	N,E,W	WR GWB	116	A-3	WR GWB	116	A-3	①SH VIN	FCTY	B-3	WR GWB	116	A-3	8'-0"	SUSP GWB	116	A-3					* INTEGRAL BASE
	102	JANITOR/STORAGE	CONC	SH VIN	B-3	* 4"	SH VIN	FCTY	B-3	ALL	WR GWB	116	A-3	WR GWB	116	A-3	CMU	117	A-3	WR GWB	116	A-3	8'-0"	SUSP GWB	116	A-3	SHELVING	WOOD	102	A-3	* INTEGRAL BASE
	103	CORRIDOR	CONC	RUB T	B-5	4"	RUBBER	FCTY	B-7	ALL	GWB	115	A-3	CMU	109	A-3	GWB	115	A-3	—	—	—	8'-0"	SUSP GWB	115	A-3					
	104	ENTRY/CORRIDOR	CONC	RUB T	B-5	4"	RUBBER	FCTY	B-7	ALL	CMU	109	A-3	GWB	115	A-3	CMU	109	A-3	CMU	113	A-3	8'-0"	SUSP GWB	115	A-3					
	105	STAIRWELL	CONC	RUB T	B-5	4"	RUBBER	FCTY	B-7	ALL	CONC	113	A-3	CONC	113	A-3	CONC	113	A-3	CONC	113	A-3	VARIES	②CONC	②113	A-3	STAIR TREADS AND RISERS/STRINGERS	RUBBER	FCTY	B-6/B-7	HANDRAIL, AL, FCTY, CLEAR
	106	CONTROL ROOM	CONC	RUB T	B-5	4"	RUBBER	FCTY	B-7	ALL	CMU	109	A-3	CMU	109	A-3	GWB	115	A-3	GWB	115	A-3	10'-0"	SUSP GWB	115	A-3					
	107	LABORATORY	CONC	VIN T	B-4	4"	RUBBER	FCTY	B-7	ALL	CMU	109	A-3	CMU	109	A-3	CMU	109	A-3	CMU	109	A-3	10'-0"	ACT	FCTY	B-1	COUNTERTOPS	EPOXY	FCTY	B-2	CASEWORK, P LAM, FCTY, B-10
CHLORINE ROOM	200	CHLORINE ROOM	EXISTING	—	—	—	—	—	—	—	BRICK	28	A-2	BRICK	28	A-2	BRICK	28	A-2	BRICK	28	A-2	10'-0"±	CONC	28	A-3	MONORAIL BEAM	STEEL	7	A-1	

① SHEET VINYL FULL HEIGHT OF WALL.

② SUSP. GWB, 115, AT UPPER LEVEL.

EXTERIOR FINISH SCHEDULE

LOCATION	MATERIAL	FINISH	COLOR	REMARKS
WALLS *	CONCRETE	110	CLEAR	* CONTROL BUILDING
WALLS *	CMU	110	CLEAR	* CONTROL BUILDING
ROOF *	ALUMINUM	FCTY	B-9	* CONTROL BUILDING
HANDRAILS	ALUMINUM	FCTY	CLEAR	
GUARDPOSTS	STEEL	7	A-1	
DOORS & FRAMES	HM	7	A-1	
SOFFIT *	GYPSUM BOARD	116A	A-2	* CONTROL BUILDING

COLOR LEGEND

A-1 AMERITONE, 298C GRAY FOX
A-2 AMERITON, 298H GRAY CLOUD
A-3 AMERITONE, 299-5J CHAMPAGNE WHITE

B-1 MANUFACTURER'S STANDARD OFF-WHITE
B-2 BLACK
B-3 ARMSTRONG, CUSTOM CORLON 86010 WEATHERED GRAY
B-4 FLEXCO, MC-5 GRAY
B-5 FLEXCO, LR-3 FRENCH GRAY
B-6 FLEXCO, 3 FRENCH GRAY
B-7 FLEXCO, 3 CHARCOAL
B-8 HUNTER DOUGLAS FLEXALUM DECOR I, 748 SHADOW GRAY
B-9 CONSTRUCTION SPECIALTIES, MUSKET GRAY
B-10 COLOR TO BE SELECTED BY ENGINEER FROM MANUFACTURER'S STANDARD COLOR RANGE

ABBREVIATIONS

ACT	ACOUSTICAL TILE
AL	ALUMINUM
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
FCTY	FACTORY
GWB	GYPSUM WALLBOARD
HDNR	HARDENER/SEALER
HM	HOLLOW METAL
INSUL	INSULATION
P LAM	PLASTIC LAMINATE
RUB T	RUBBER TILE
SH VIN	SHEET VINYL
SUSP GWB	SUSPENDED GYPSUM WALLBOARD
VIN T	VINYL TILE
WR GWB	WATER-RESISTANT GYPSUM WALLBOARD

NOTES:

1. NUMBER DESIGNATION IN "FINISH" COLUMN REFERS TO PAINT SYSTEMS IN SPECIFICATION SECTION 09900, PAINTING.
2. LETTER/NUMBER DESIGNATION IN "COLOR" COLUMN REFERS TO COLOR LEGEND, THIS SHEET.
3. MECHANICAL AND ELECTRICAL ITEMS NOT SPECIFICALLY NOTED SHALL BE PAINTED THE COLOR OF THE SURFACE TO WHICH THEY ARE ADJACENT (EXAMPLE: EXPOSED ELECTRICAL CONDUIT AT CEILING SHALL BE PAINTED SAME COLOR AS CEILING). ALUMINUM, STAINLESS STEEL AND NON-METALLIC SURFACES SHALL NOT BE PAINTED UNLESS REQUIRED IN SECTION 09900, PAINTING.
4. FOR PAINTING AND COLOR CODING OF PROCESS PIPING AND EQUIPMENT, SEE SPECIFICATIONS SECTION 09900, PAINTING.
5. THE USE OF PROPRIETARY NAMES ON THE COLOR LEGEND DOES NOT INDICATE PREFERENCE. MANUFACTURER'S NAMES ARE USED SOLELY TO ESTABLISH QUALITY OF COLOR.

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL 21-80 REGISTERED ENGINEER STATE OF TENNESSEE No. 18378

CH2M HILL

DSGN	JE CAVE
DR	TD TRUEAX 2521A1
CHK	L GRANDE
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING
INTERIOR & EXTERIOR
FINISH SCHEDULES

SHEET
DWG NO. AS-25
DATE MAY 1986
PROJ NO. SA21043.A1

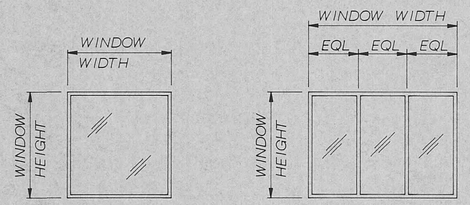
OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE
OVERLAY
SCREEN
FORMAT 2234MC
FILM KE
PRINTED
DESIGNED BY
DRAWN BY
CHECKED BY

DOOR AND HARDWARE SCHEDULE

STRUCTURE	ROOM	DOOR	OPENING: DOOR SIZE: WIDTH	HEIGHT	THKNS	DOOR: MATL	TYPE	FINISH	COLOR	FRAME: MATL	TYPE	FINISH	COLOR	DETAILS: HEAD	JAMB	SILL	MISCELLANEOUS: RATING	GLASS	Llouver	HARDWARE: HINGE	LOCK	CLOSER	PUSH PULL	STOP HOLDER	BOLT	KICK	THRESH-HOLD	WEATHER-STRIP	MISCEL-LANEOUS	REMARKS
CONTROL BUILDING	100	A	3'-0"	7'-2"	1¾"	HM	G	7	A-1	HM	F-1	7	A-1	111 SIM	111	116	——	T-R.G.	——	H1	L2	C2	——	S6	——	K1	T1	W1	——	——
	100	B	6'-4"(PR)	7'-10"	1¾"	HM	G	7	A-1	HM	F-1	7	A-1	111 SIM	111	117	——	T-R.G.	——	H1	X2	C2	——	S6	——	K1	T6	W1	——	——
	101	A	3'-0"	7'-2"	1¾"	HM	F	7	A-1	HM	F-1	7	A-1	105	106	118	——	——	——	H1	L7	C3	——	S2	——	K1	——	——	M2*	* TOILET
	102	A	3'-0"	7'-2"	1¾"	HM	F	7	A-1	HM	F-1	7	A-1	105	106	118	——	——	——	H1	L3	C3	——	S2	——	K1	——	——	M1*	* JANITOR/STORAGE
	103	A	3'-0"	7'-2"	1¾"	HM	G	7	A-1	HM	F-1	7	A-1	111 SIM	111	116	——	T-R.G.	——	H1	L2	C2	——	S1	——	K1	T1	W1	——	——
	104	A	3'-0"	7'-10"	1¾"	HM	F	7	A-1	HM	F-2	7	A-1	109	113	116	——	——	——	H1	L1	C4	——	S2	——	K1	T1	W2	M3	——
	105	A	3'-0"	7'-2"	1¾"	HM	G	7	A-1	HM	F-1	7	A-1	107	107 SIM	118	——	W.G.	——	H1	L4	C1	——	S2	——	K1	——	——	M1*	* STAIRS
	106	A	3'-0"	7'-10"	1¾"	HM	G	7	A-1	HM	F-1	7	A-1	105	106	118	20 MIN	W.G.	——	H1	L3	C1	——	S2	——	K1	——	——	M1*	* CONTROL ROOM
	107	A	3'-0"	7'-2"	1¾"	HM	G	7	A-1	HM	F-1	7	A-1	111 SIM	111	116	——	T.G.	——	H1	L2	C2	——	S6	——	K1	T1	W1	——	——
	107	B	3'-0"	7'-2"	1¾"	HM	F	7	A-1	HM	F-1	7	A-1	108	108 SIM	118	20 MIN	——	24"x36" **	H1	L3	C4	——	S2	——	K1	——	——	M1*	* LABORATORY **FUSIBLE LINK
CHLORINE BUILDING																														
	200	A	7'-4"(PR)	9'-8" ± **	1¾"	HM	FS-1	7	A-1	HM	F-3	7	A-1	107	107 SIM	117**	——	——	——	H1	X2	C2	——	S1,S2	——	K1	T6	W1	M1*	* CHLORINE ROOM **VERIFY EXISTING

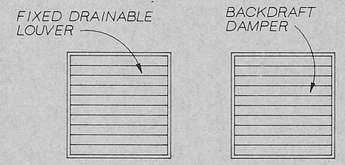
WINDOW/LOUVER SCHEDULE

STRUCTURE	NO.	OPENING: SIZE: WIDTH	HEIGHT	THKNS	WINDOW/LOUVER: MATL	TYPE	RATING	FINISH	COLOR	FRAME: MATL	TYPE	FINISH	COLOR	DETAILS: HEAD	JAMB	SILL	REMARKS
CONTROL BUILDING	W1	6'-8"	3'-8"	2" ±	GLASS	I.G.-R	——	FCTY	BRONZE	AL	WF-1	FCTY	CLEAR	120	121	122	
	W2	3'-4"	3'-0"	2" ±	GLASS	I.G.	——	——	CLEAR	AL	WF-1	FCTY	CLEAR	119	121	122	WINDOW BLINDS, ALUM, FCTY, B-7
	W3	6'-8"	3'-0"	2" ±	GLASS	I.G.	——	——	CLEAR	AL	WF-1	FCTY	CLEAR	119	121	122	WINDOW BLINDS, ALUM, FCTY, B-7
	W4	12'-0"	3'-8"	2" ±	GLASS	I.G.-R	——	——	BRONZE	AL	WF-2	FCTY	CLEAR	119 SIM	121	122	WINDOW BLINDS, ALUM, FCTY, B-7
	W5	5'-4"	3'-10"	5¾"	GLASS	I.G.	——	——	CLEAR	HM	WF-1	7	A-1	112	112 SIM	115	
	L1	5'-4"	2'-8"	4"	AL	L-1	——	FCTY	CLEAR	——	——	——	——	123	123 SIM	124	MIN. FREE AREA 6 SQ. FT.
	L2	2'-0"	1'-4"	4"	AL	L-1	——	FCTY	CLEAR	——	——	——	——	123	123 SIM	124	MIN. FREE AREA 1 SQ. FT.
	L3	2'-0"	2'-0"	4"	AL	L-1	——	FCTY	CLEAR	——	——	——	——	123	123 SIM	124	MIN. FREE AREA 1.5 SQ. FT.
	L4	5'-4"	4'-0"	4"	AL	L-1	——	FCTY	CLEAR	——	——	——	——	123	123 SIM	124	MIN. FREE AREA 10.5 SQ. FT.
	L5	4'-0"	3'-4"	4"	AL	L-1	——	FCTY	CLEAR	——	——	——	——	123	123 SIM	124	MIN. FREE AREA 5.5 SQ. FT.
	BD1	3'-4"	3'-4"	1½"	AL	BD-1	——	FCTY	CLEAR	——	——	——	——	123	123 SIM	124	BACKDRAFT DAMPER
CHLORINE BUILDING																	
	L1	5'-0"	2'-0"	4"	AL	L-1	——	FCTY	CLEAR	——	——	——	——	123 SIM	123 SIM	124 SIM	MIN. FREE AREA 4.2 SQ. FT.
																	INSTALL IN EXISTING BRICK WALL



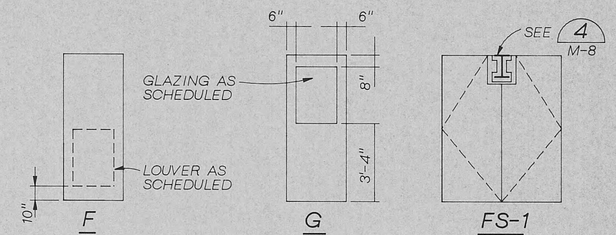
WF-1 WF-2

WINDOW TYPES



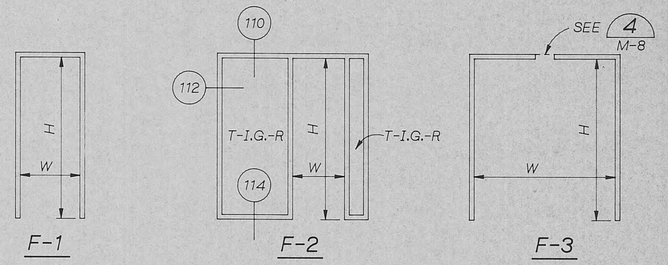
L-1 BD-1

LOUVER TYPES



F G FS-1

DOOR TYPES



F-1 F-2 F-3

FRAME TYPES

NOTES:

1. NUMBER DESIGNATION IN "FINISH" COLUMN REFERS TO PAINT SYSTEMS IN SPECIFICATION SECTION 09900, PAINTING.
2. LETTER/NUMBER DESIGNATION IN "COLOR" COLUMN REFERS TO COLOR LEGEND ON DWG NO. AS-25.
3. FOR DETAILS, SEE DWG NO.'S DA-1 THROUGH DA-2.
4. FOR HARDWARE, SEE SPECIFICATION SECTION 08710, FINISH HARDWARE.
5. FOR GLASS TYPES, SEE SPECIFICATION SECTION 08800, GLAZING.
6. FOR WINDOWS, SEE SPECIFICATION SECTION 08520, ALUMINUM WINDOWS.
7. FOR LOUVERS, SEE SPECIFICATION SECTION 10200, LOUVERS.
8. FOR BACKDRAFT DAMPER, SEE SPECIFICATION SECTION 15500.

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9.9.88

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CHARLES W. CRANDALL REGISTERED AGRICULTURE ENGINEER STATE OF TENNESSEE

CH2M HILL

DSGN	JE CAVE
DR	DL MONK 2521A2
CHK	L GRANDE
APVD	C CRANDALL

NO.	DATE	REVISION	BY	APVD
	9.9.88	RECORD DRAWINGS	DAT	CNC

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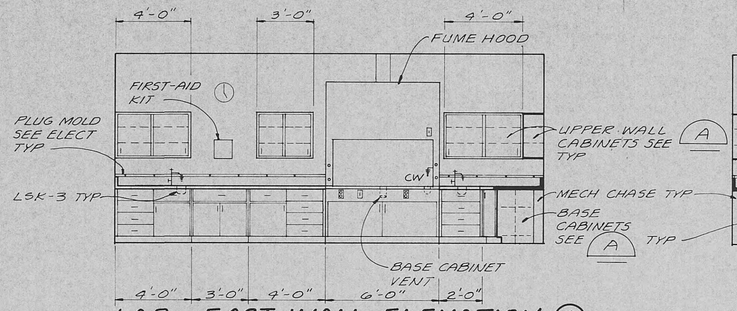
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

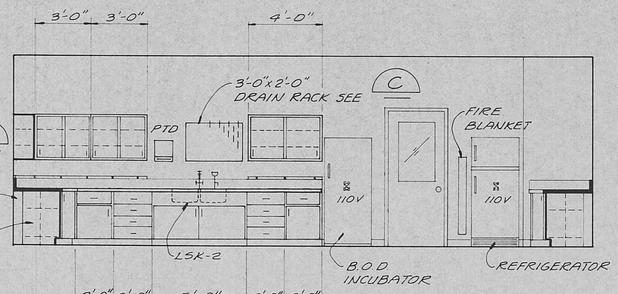
CONTROL BUILDING
DOOR & HARDWARE,
WINDOW/LOUVER SCHEDULES

SHEET
DWG NO. AS-24
DATE MAY 1986
PROJ NO. SA21043.A1



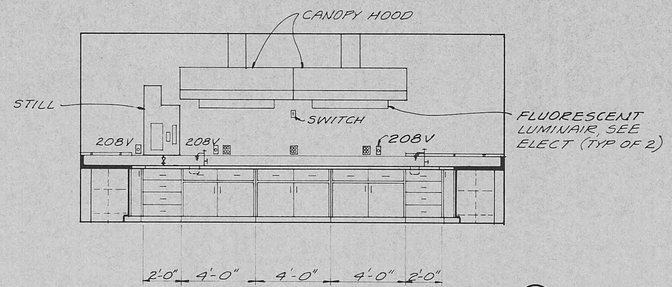
LAB - EAST WALL ELEVATION (A)

1/4"=1'-0"



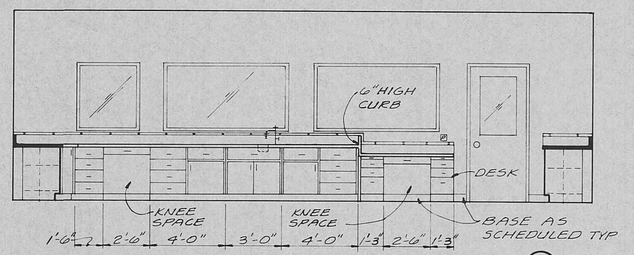
LAB - SOUTH WALL ELEVATION (B)

1/4"=1'-0"



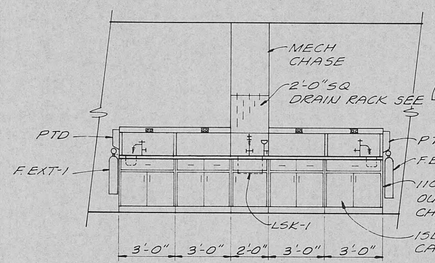
LAB - WEST WALL ELEVATION (C)

1/4"=1'-0"



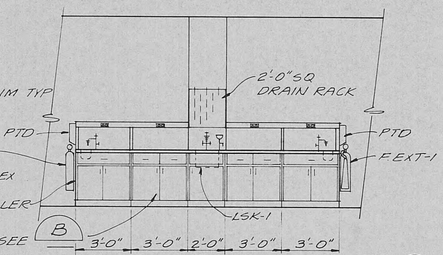
LAB-NORTH WALL ELEVATION (D)

1/4"=1'-0"



ISLAND - SOUTH ELEVATION (E)

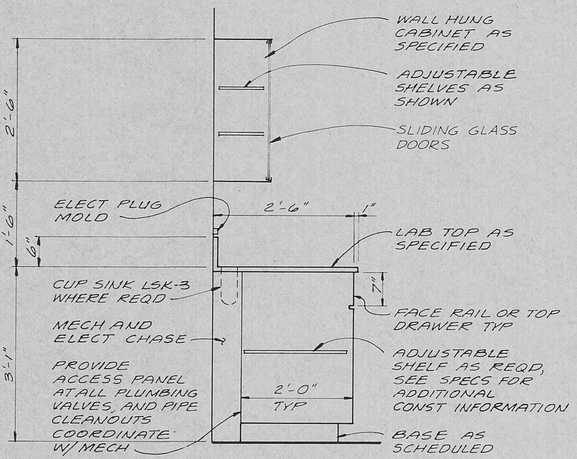
1/4"=1'-0"



ISLAND-NORTH ELEVATION (F)

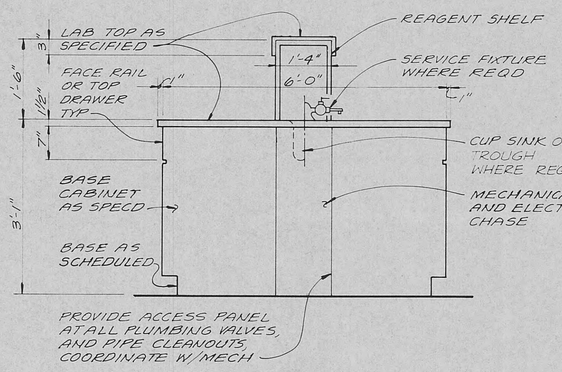
1/4"=1'-0"

NOTE:
CABINET MANUFACTURER SHALL VERIFY ALL ROOM DIMENSIONS PRIOR TO FABRICATION OF UNITS. DIMENSIONS OF UNITS SHOWN ON THE ELEVATIONS & PLANS ARE FOR ESTABLISHING GENERAL CONFIGURATION REQUIRED



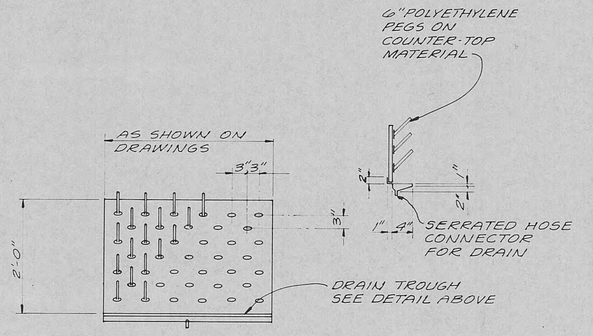
CABINET SECTION (A)

3/4"=1'-0"



CABINET SECTION (B)

N.T.S



DRAIN RACK (C)

3/4"=1'-0"

FIXTURE LEGEND

SYMBOL	DESCRIPTION
	HOT & COLD MIXING FAUCET
	EYE WASH (HAND HELD)
	COLD H_2O & CUP SINK
	110V, 4-PLEX RECEPTACLE
D	DESIGNATED ELEC. CIRCUIT (SEE ELEC DRAWINGS)
	110V, PLUG MOULD
P	TELEPHONE JACK
L	CLOCK
	BALL VALVE

RECORD DRAWINGS

Revisions Drawn by D.THOMPSON Date 9.9.88

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MARLIN RANDALL 12 REGISTERED ARCHITECT No. 1833 STATE OF TENNESSEE

CH2M HILL

DSGN	E.A. HADFIELD II
DR	T.W. McINTYRE
CHK	L.L. GRANDE
APVD	C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	9.9.88	RECORD DRAWINGS		

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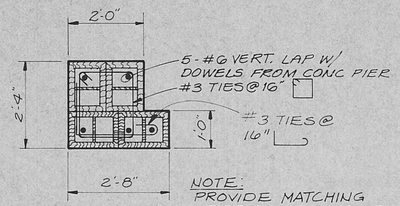
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — LABORATORY ELEVATIONS AND DETAILS

DWG NO. AS-23
DATE MAY 1986
PROJ NO. SA21043.A1

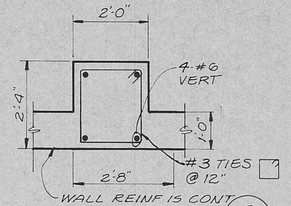
CHECKED BY
DRAWN BY
DESIGNED BY
PRINTED
FILM KE
FORMAT 2234MC
COMPOSITE
OVERLAY
SCREEN
OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT



NOTE:
PROVIDE MATCHING VERTICAL DOWEL BARS AT CONCRETE PIER

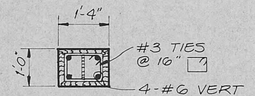
CMU PIER DETAIL (1)

1/2"=1'-0" AS-16



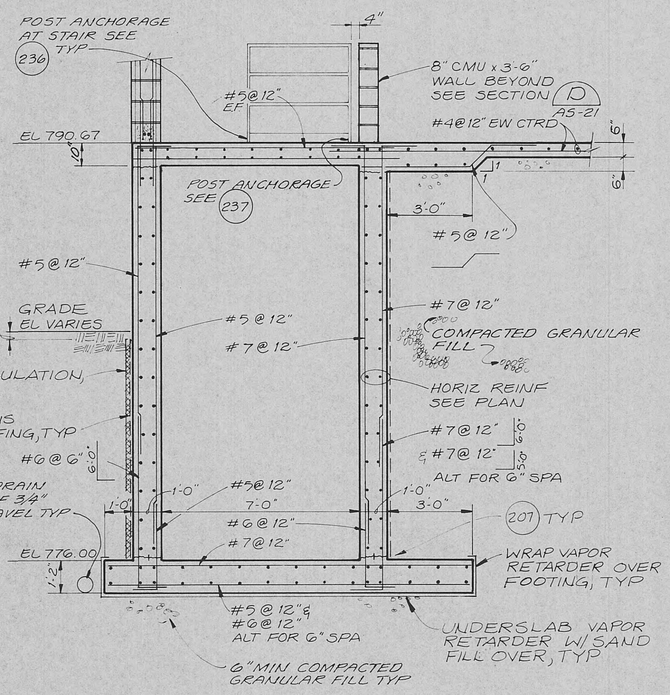
CONC FDN PIER DETAIL (2)

1/2"=1'-0" AS-16



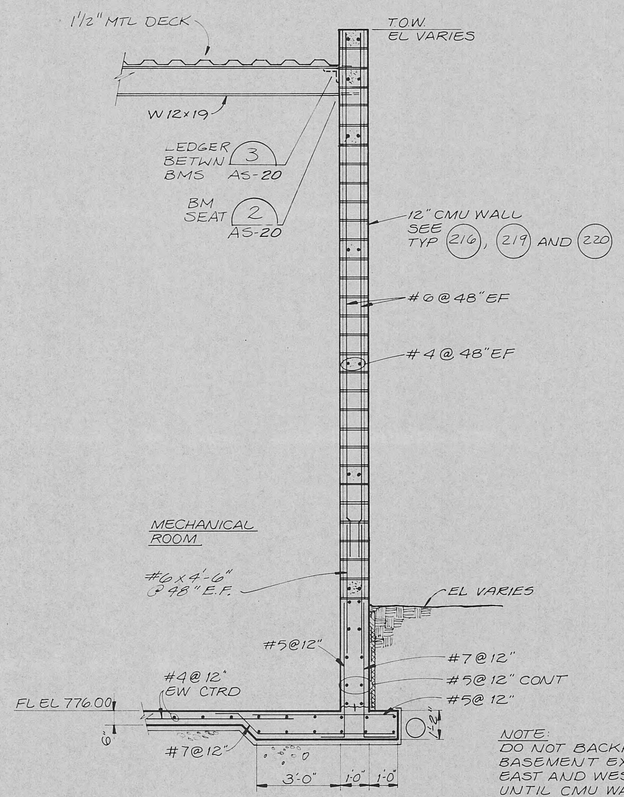
CMU PIER DETAIL (3)

1/2"=1'-0" AS-15 AS-16



STAIR AT LANDING SECTION (H)

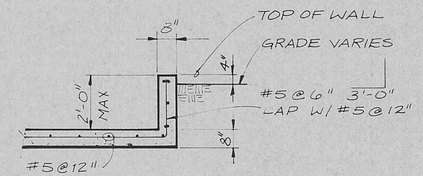
3/8"=1'-0" AS-16 AS-17



NOTE:
DO NOT BACKFILL BASEMENT EXTERIOR EAST AND WEST WALLS UNTIL CMU WALLS AND ROOF SYSTEMS ARE INSTALLED AND COMPLETE

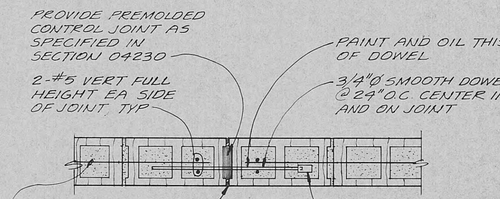
EAST/WEST WALL AT BASEMENT SECTION (J)

3/8"=1'-0" AS-16 AS-17 AS-20



EXTERIOR EQPT PAD (L)

3/8"=1'-0" AS-17 AS-18



PLAN

NOTES:
1. PROVIDE TOP DOWEL @ 12" ± BELOW TOP OF WALL
2. PROVIDE ADDITIONAL DOWEL AT 4" ABOVE OPENING ADJACENT TO JOINTS.

CONTROL JOINT DETAIL (4)

1"=1'-0" AS-17 AS-18

RECORD DRAWINGS

Revisions Drawn by D.THOMPSON Date 9-9-88

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COMPOSITE
OVERLAY
SCREEN

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT

CHARLES N. CRANDALL REGISTERED ENGINEER 17121 PROFESSIONAL No. 18313 STATE OF TENNESSEE

CH2M HILL

DSGN S. FREY					
DR D. McPHERSON					
CHK J. CALL					
APVD C. CRANDALL	9.9.88	RECORD DRAWINGS	DAT	CHC	
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WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — WALL SECTIONS AND DETAILS

DWG NO. AS-22
DATE MAY 1986
PROJ NO. SA21043.A1

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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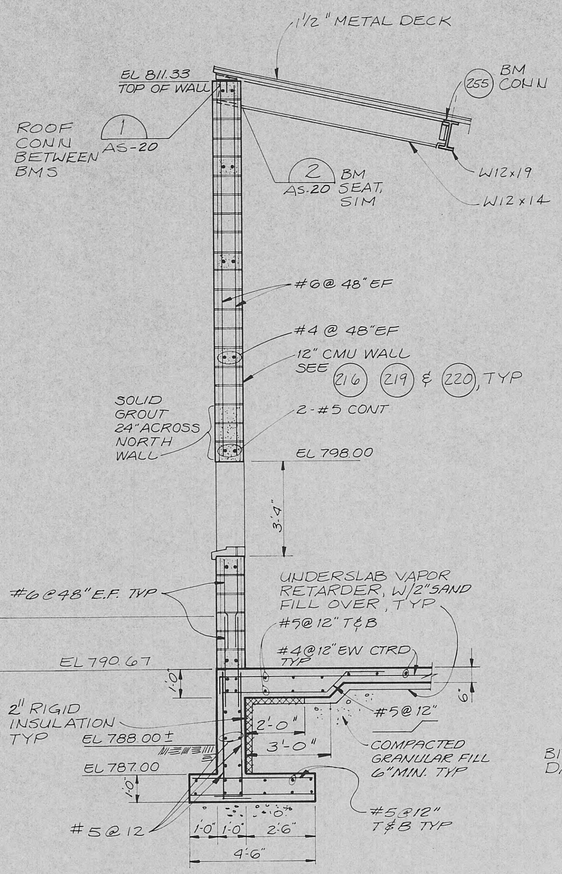
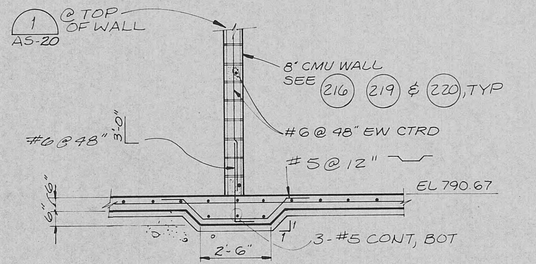


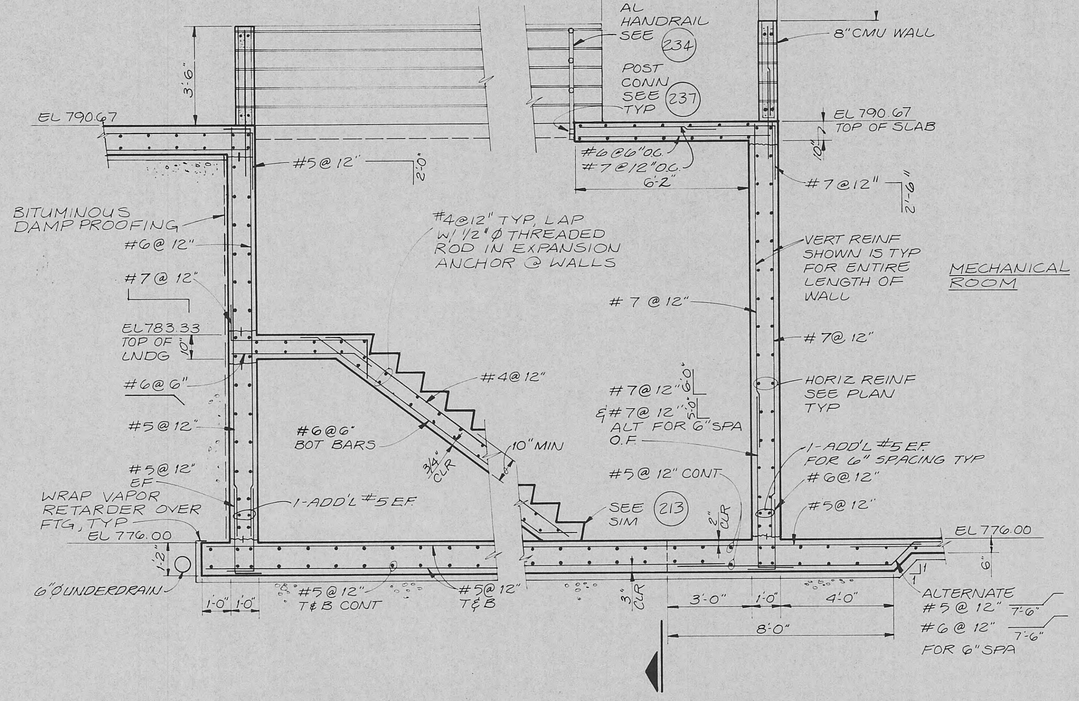
NORTH WALL SECTION (C)

3/8"=1'-0" AS-16 AS-17 AS-20



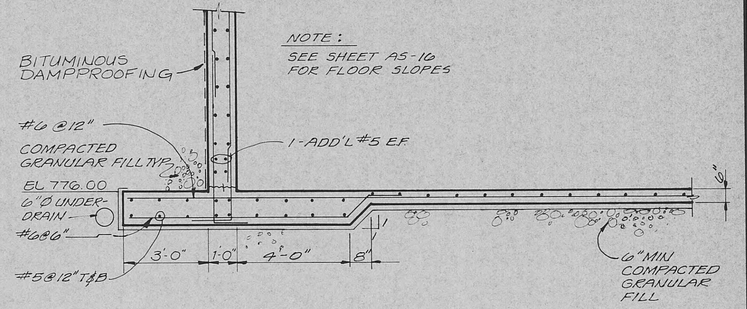
INTERIOR WALL SECTION (F)

3/8"=1'-0" AS-17



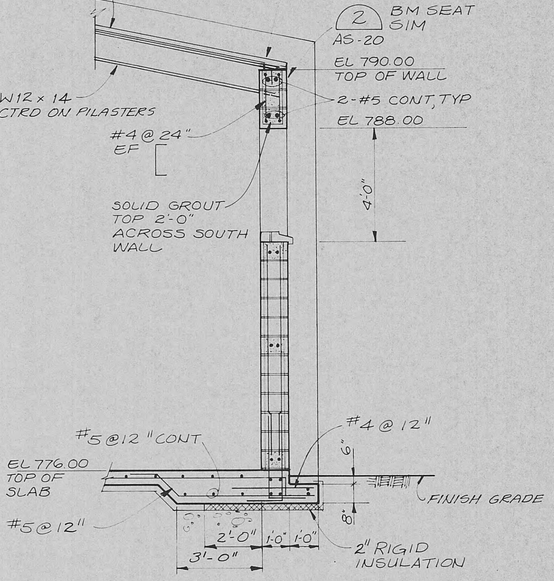
STAIRCASE WALL AT WINDOW SECTION (D)

3/8"=1'-0" AS-16, AS-20 AS-17 AS-19



RETAINING WALL AND TRENCH SECTION (G)

3/8"=1'-0" AS-16



SOUTH WALL SECTION (E)

3/8"=1'-0" AS-16 AS-17 AS-20

CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18375 — STATE OF TENNESSEE

CH2M HILL

DSGN	S FREY				
DR	D McPHERSON				
CHK	J CALL				
APVD	C CRANDALL	NO.	DATE	REVISION	BY / APVD
		1	9-9-88	RECORD DRAWINGS	DAT / CNC

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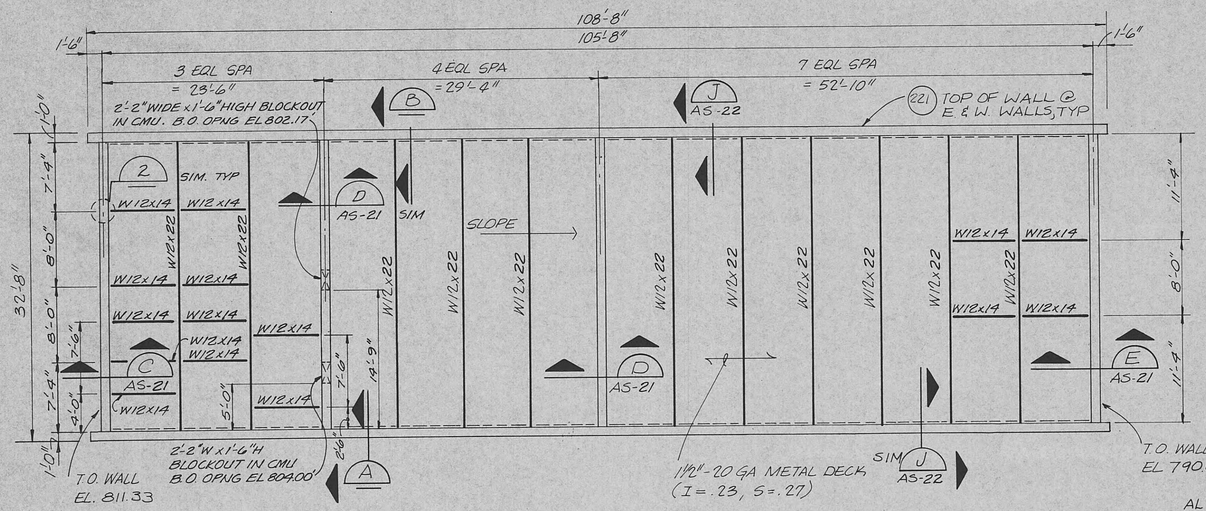
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — WALL SECTIONS

DWG NO.	AS-21
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION — COMPOSITE / OVERLAY / SCREEN
PROJ NO.
CONTRACT

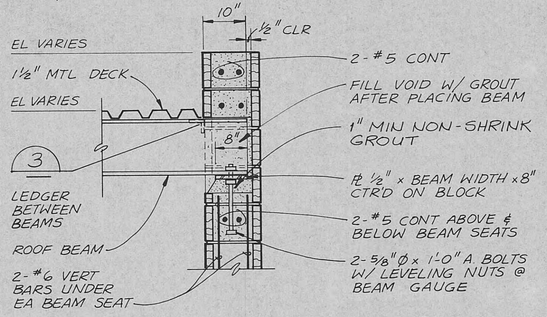


NOTES:

1. TOP OF STEEL ELEVATION VARIES
2. GALVANIZED STEEL ROOF DECKING SHALL BE FASTENED TO STEEL SUPPORTING MEMBERS PERPENDICULAR TO DECKING SPAN WITH A MINIMUM OF 3-½" ROUND PUDDLE WELDS PER 24" PANEL WIDTH AND TO ALL SUPPORTS PARALLEL TO DECKING WITH MIN ½" ROUND PUDDLE WELDS AT 24" O.C., SEAMS SHALL BE BUTTON PUNCHED AT 18" O.C. MAXIMUM. DECKING ATTACHMENT SHALL DEVELOP 310 LB/FT OF SHEAR CAPACITY.

ROOF FRAMING PLAN

1/8" = 1'-0"



BEAM SEAT DETAIL (2)

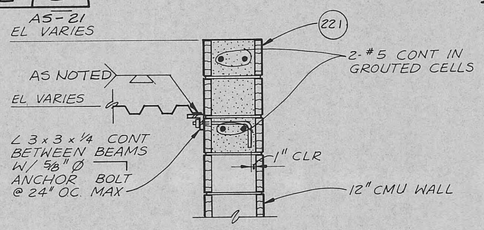
3/4" = 1'-0"

AS-21

ROOF CONN DETAIL (1)

3/4" = 1'-0"

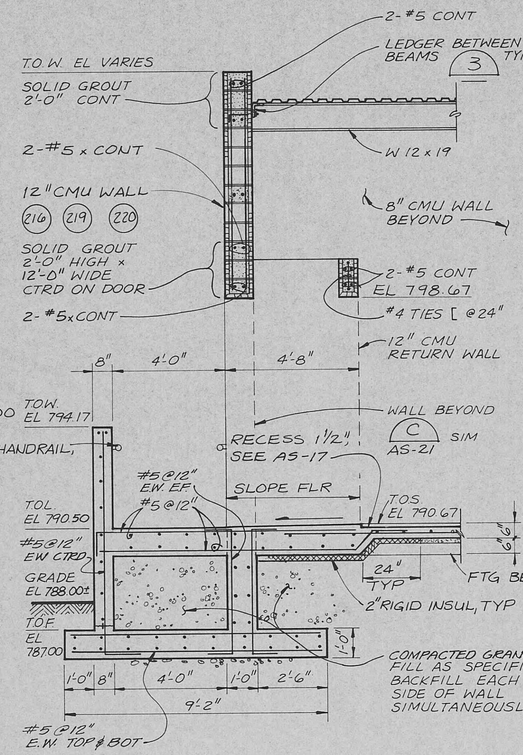
AS-21



ROOF LEDGER DETAIL (3)

3/4" = 1'-0"

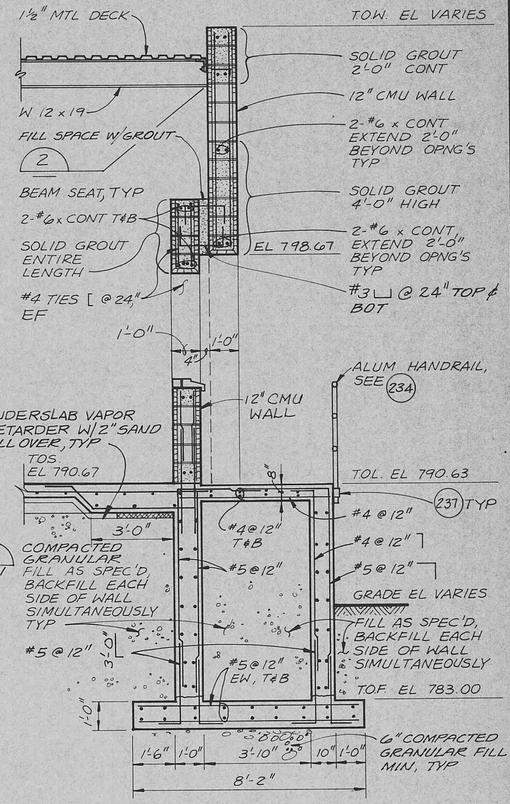
AS-22



WEST WALL SECTION (A)

3/8" = 1'-0"

AS-16
AS-17



EAST WALL SECTION (B)

3/8" = 1'-0"

AS-16
AS-17

RECORD DRAWINGS

Revisions Drawn by DTHOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER No. 18379 STATE OF TENNESSEE

CH2M HILL

DSGN S.M. FREY					
DR J. HOSTETLER					
CHK J. CALL	9-9-88	RECORD DRAWINGS			
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD

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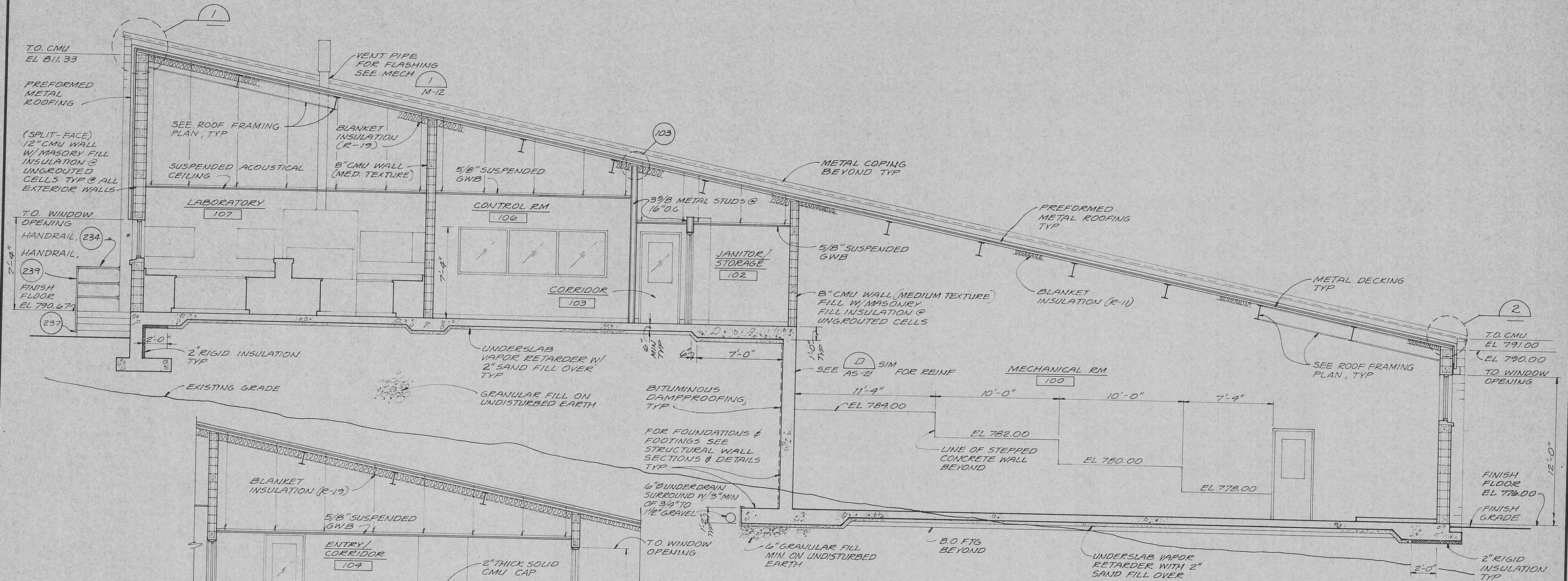
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

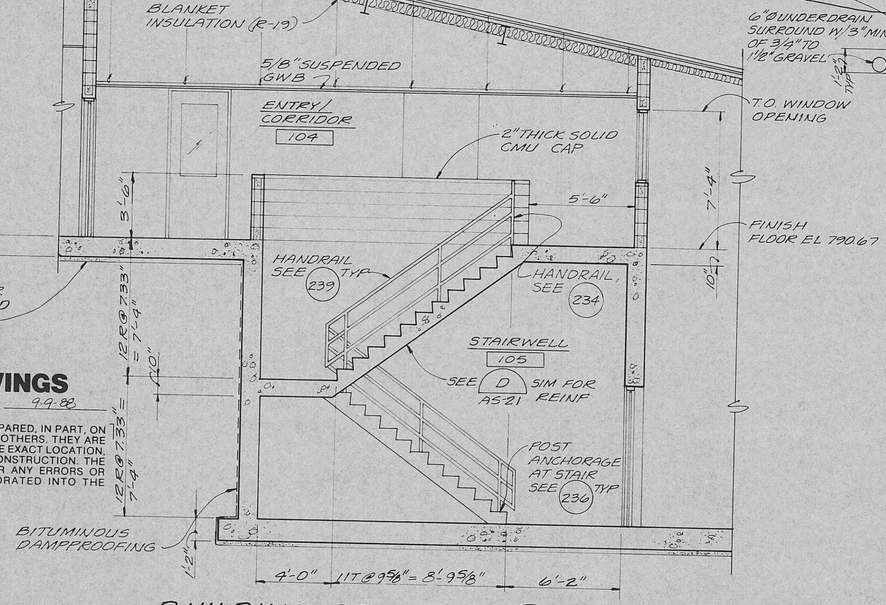
CONTROL BUILDING — ROOF FRAMING PLAN, WALL SECTIONS AND DETAILS

DWG NO.	AS-20
DATE	MAY 1986
PROJ NO.	SA21043.A1



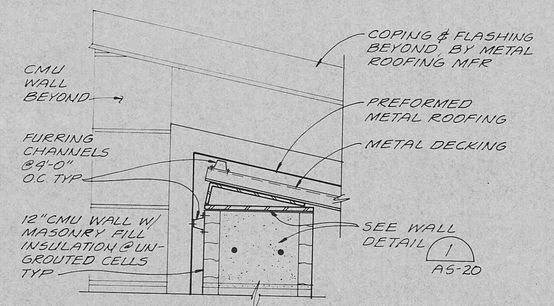
BUILDING SECTION A

1/4"=1'-0" AS-17



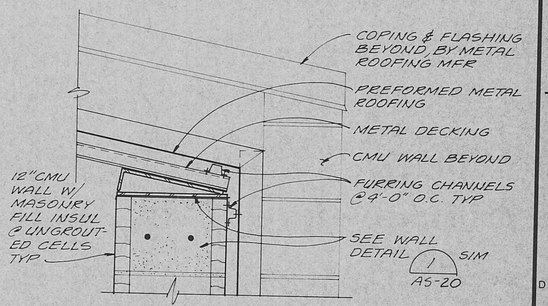
BUILDING SECTION B

1 1/4"=1'-0" AS-17



RIDGE DETAIL 1

1 1/2"=1'-0"



EAVE DETAIL 2

1 1/2"=1'-0"

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER STATE OF TENNESSEE NO. 18125

CH2M HILL

DSGN	J.E. CAVE				
DR	T.W. MCINTYRE				
CHK	L. GRANDE				
APVD	C. CRANDALL	NO.	DATE	REVISION	DAT BY / CNC APVD
		1	9-9-88	RECORD DRAWINGS	

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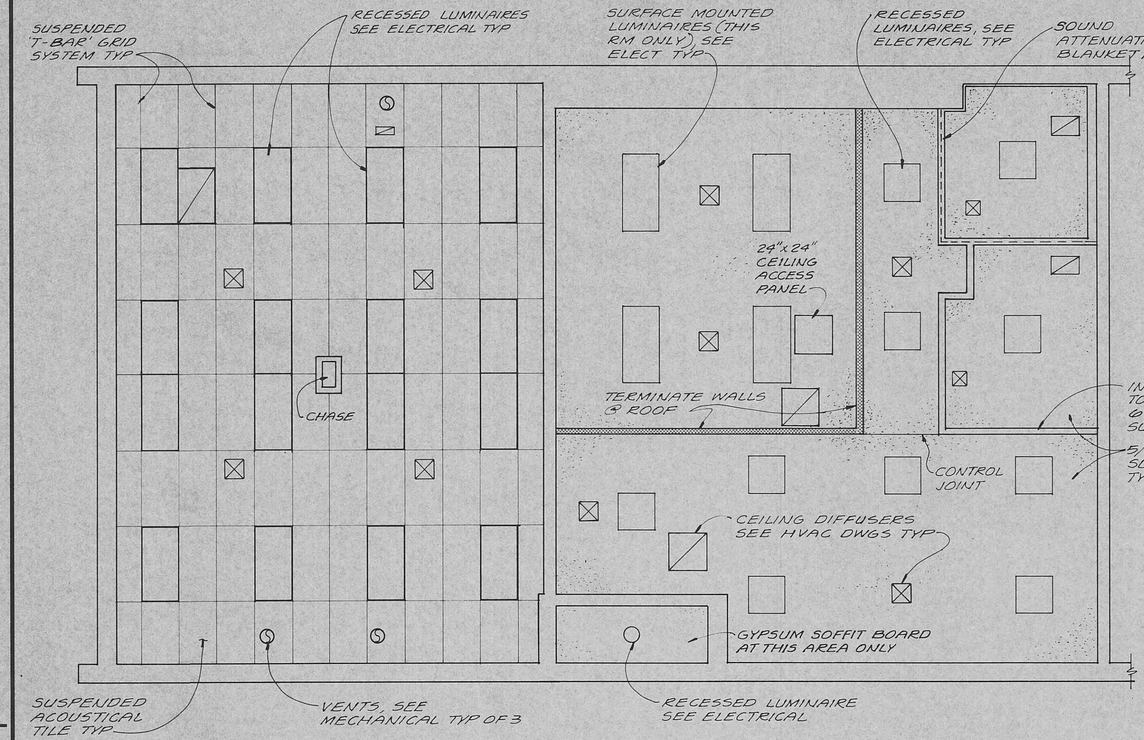
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — BUILDING SECTIONS

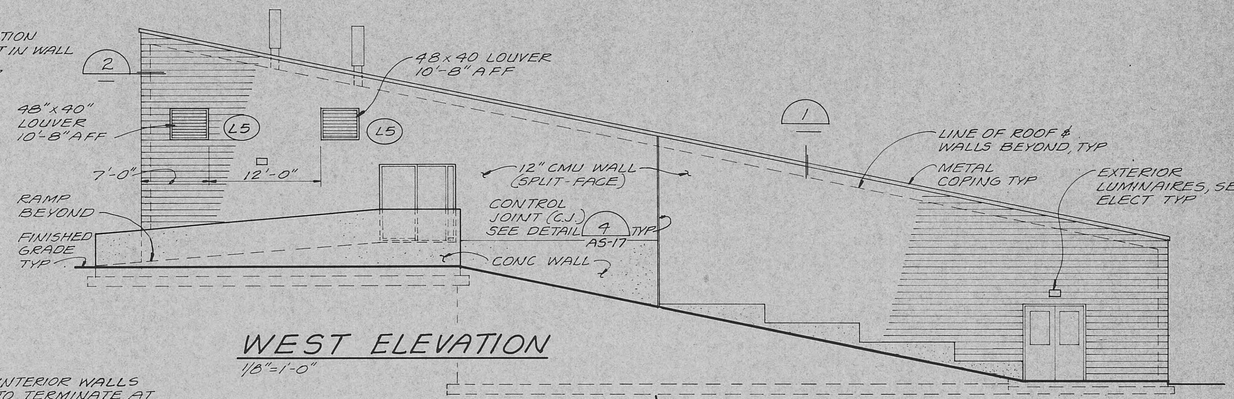
DWG NO. AS-19
DATE MAY 1986
PROJ NO. SA21043.A1

CHECKED BY
DRAWN BY
OVERLAY SCREEN
CONTRACT



REFLECTED CEILING PLAN

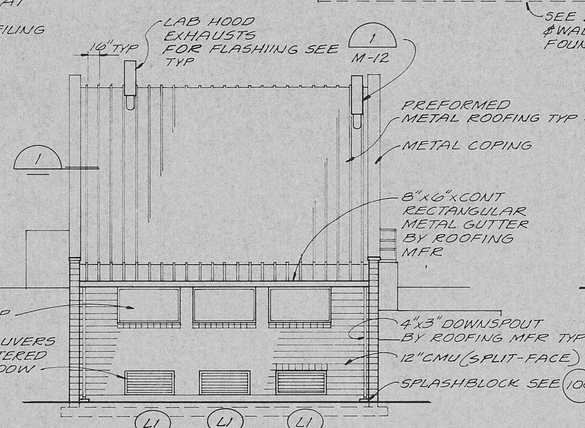
1/4"=1'-0"



WEST ELEVATION

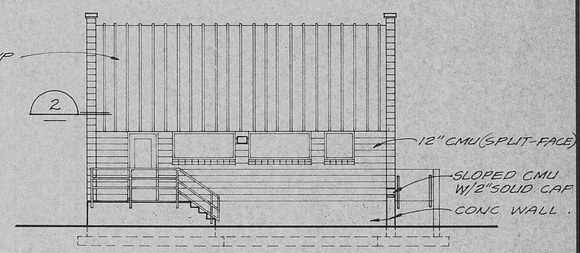
1/8"=1'-0"

SEE PLANS, BUILDING SECTIONS & WALL SECTIONS FOR FOUNDATION & FOOTINGS TYP



SOUTH ELEVATION

1/8"=1'-0"



NORTH ELEVATION

1/8"=1'-0"

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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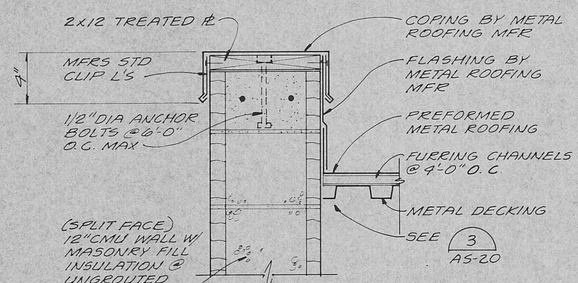
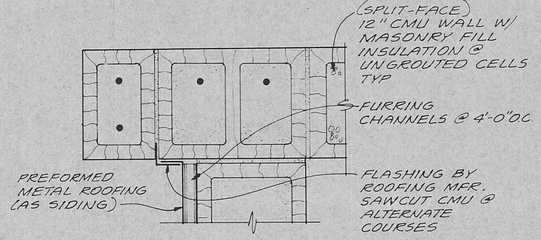


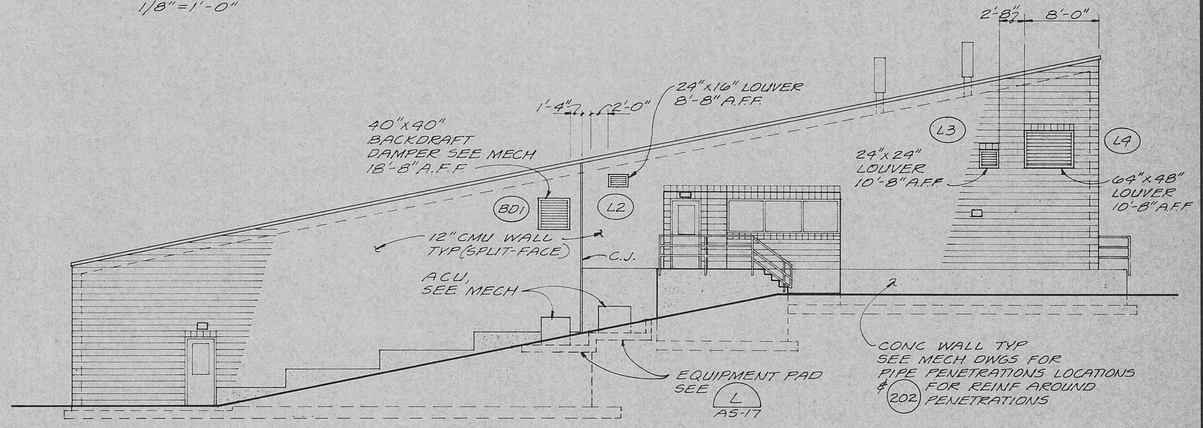
COPING DETAIL 1

1 1/2"=1'-0"



CORNER DETAIL 2

1 1/2"=1'-0"



EAST ELEVATION

1/8"=1'-0"

CHARLES N. CRANDALL 11-21-88 REGISTERED PROFESSIONAL ENGINEER STATE OF TENNESSEE

CH2M HILL

DSGN J.E. CAVE					
DR T.W. MCINTYRE					
CHK L. GRANDE					
APVD C. CRANDALL					
	NO.	DATE	REVISION	BY	APVD
	1	9-9-88	RECORD DRAWINGS	DAT	CNC

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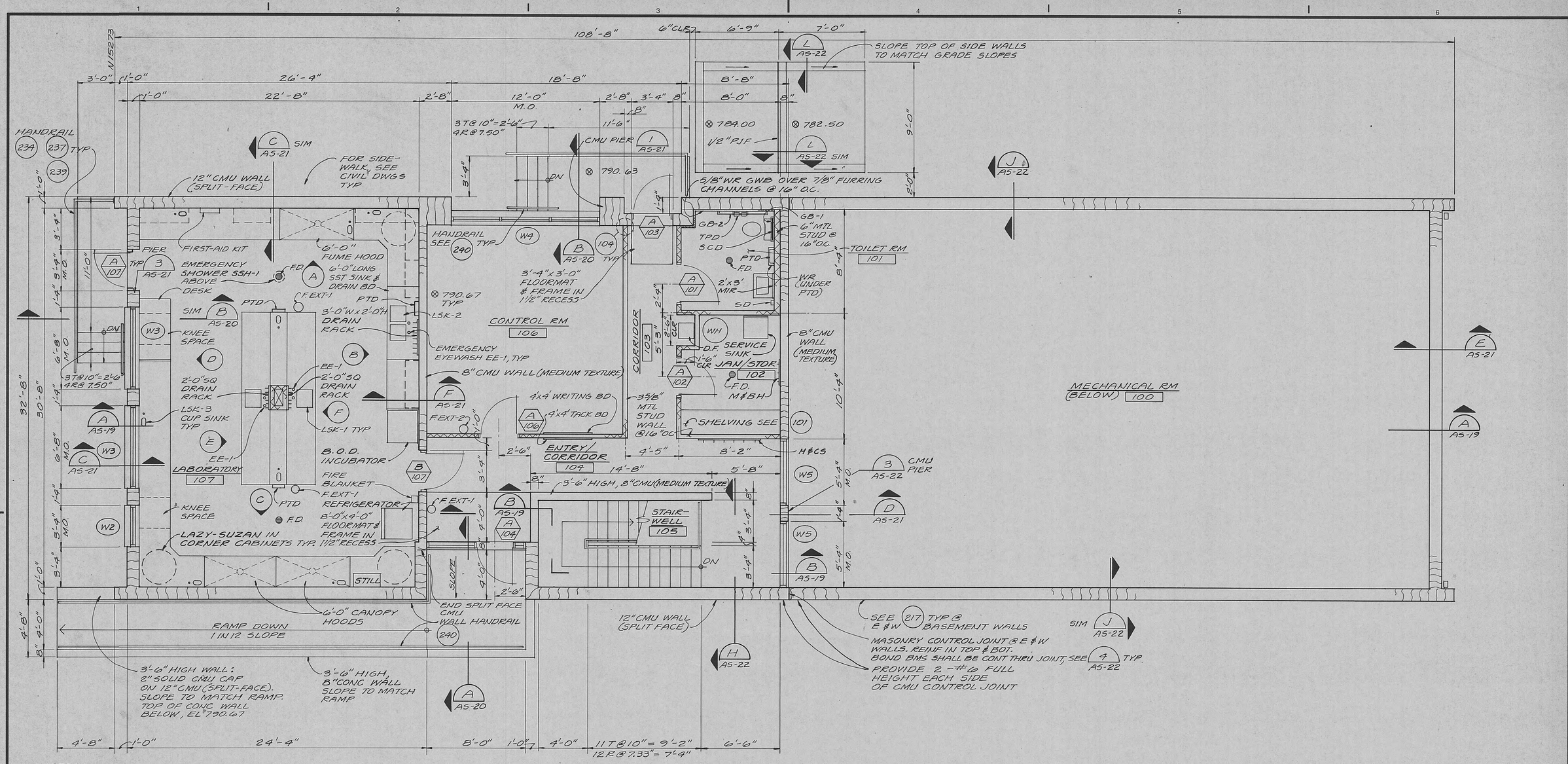
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — ELEVATIONS AND REFLECTED CEILING PLAN

DWG NO.	AS-18
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION: COMPOSITE / OVERLAY / SCREEN
PROJ. NO.:
CONTRACT:



NOTES:

1. ALL STUD PARTITIONS TO HAVE 5/8" GWB (WR WHERE SPECIFIED) EACH SIDE.
2. CONTROL ROOM STUD PARTITIONS SHALL HAVE 5/8" TYPE 'X' GWB EACH SIDE.
3. FURRED WALLS SHALL HAVE 5/8" WR GWB ON ROOM SIDE
4. FOR LABORATORY ELEVATIONS, SEE DWG AS-22
5. SEE SECTIONS FOR CONCRETE SLAB THICKNESS

UPPER LEVEL PLAN

1/4" = 1'-0"

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — AGRICULTURAL — CIVIL — STRUCTURAL — No. 18315 — STATE OF TENNESSEE

CH2M HILL

DSGN J.E.CAVE/S.M.FREY					
DR T.W. MCINTYRE					
CHK L. GRANDE					
APVD C. CRANDALL	9.9.88	RECORD DRAWINGS	DAT	CNC	
	NO. DATE	REVISION	BY	APVD	

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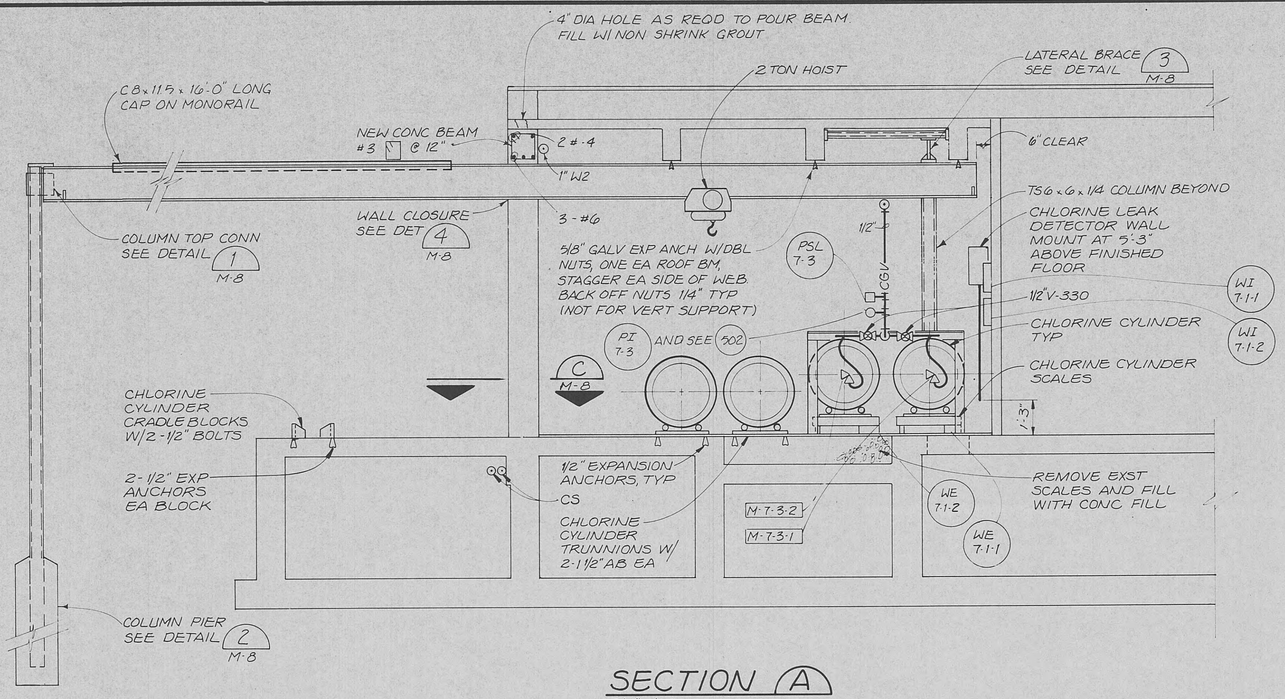
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — UPPER LEVEL PLAN

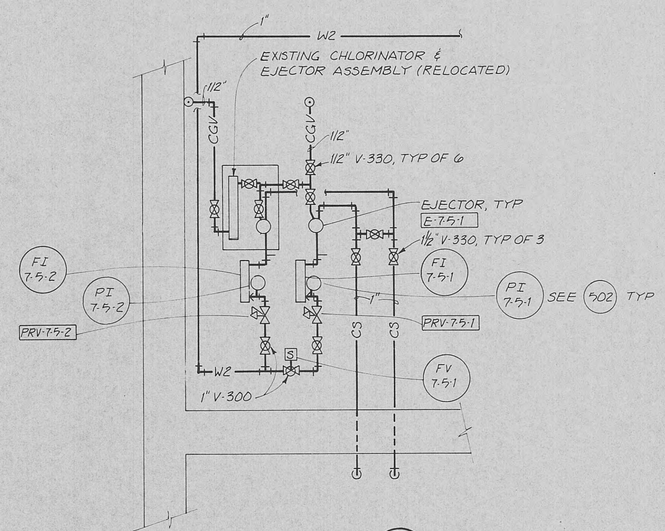
DWG NO. AS-17
DATE MAY 1986
PROJ NO. SA21043.A1

CHECKED BY / DRAWN BY / DESIGNED BY

PRINTED 8.5 1:1 FILM KE 2934MC FORMAT COMPOSITE AS-16 OVERLAY AS-16 SCREEN OVERLAY IDENTIFICATION PROJ NO CONTRACT



SECTION A
3/8" = 1'-0" M-6



SECTION B
1/2" = 1'-0" M-6

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN K. HOWE					
DR D. McPHERSON					
CHK K. CLANCY		9-9-88	RECORD DRAWINGS	RDJ	CNC
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD

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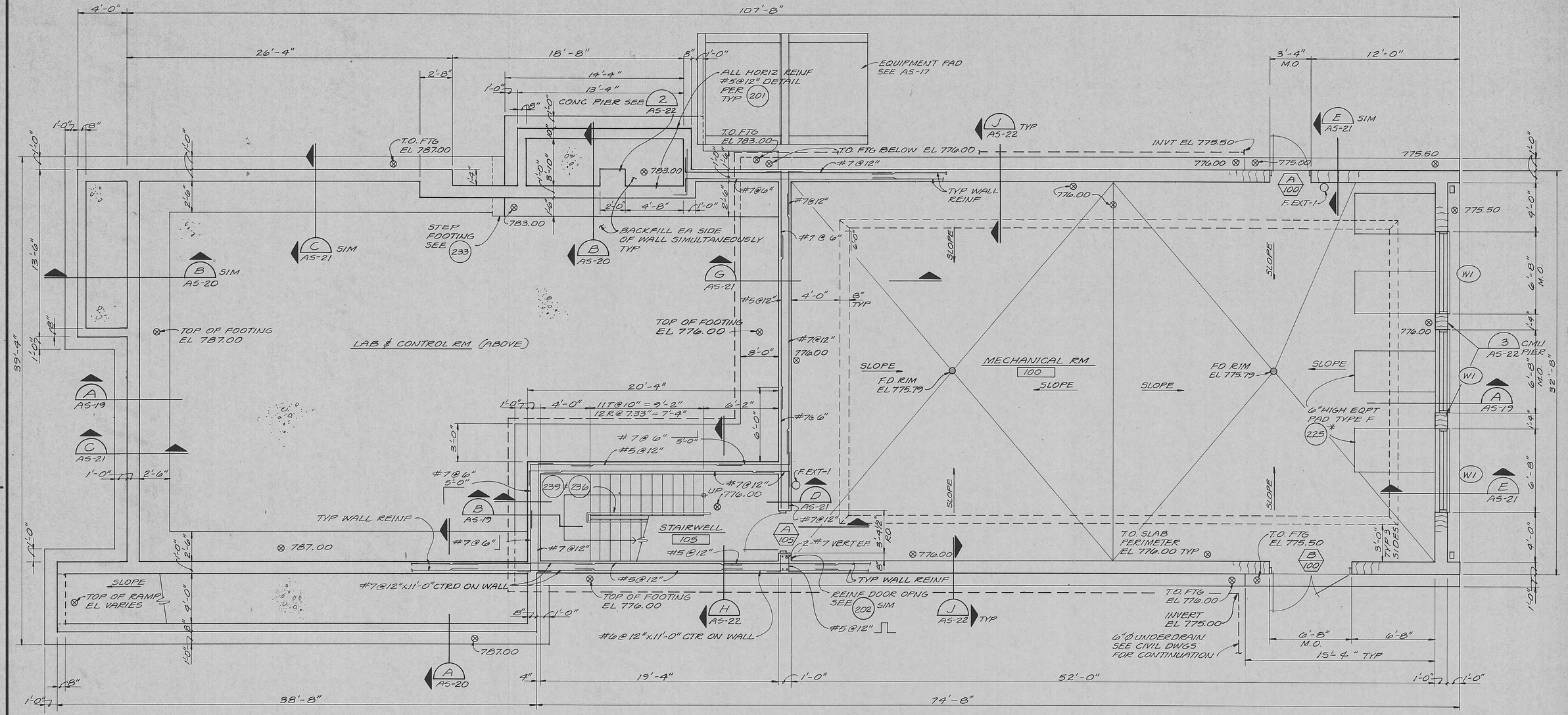
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CHLORINATION — SECTIONS AND DETAILS

DWG NO.	M-7
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION: COMPOSITE, OVERLAY, SCREEN, PROJ. 3, CONTRACT



LOWER LEVEL PLAN

1/4"=1'-0"

DESIGN LOADINGS:

WIND ——— 20 PSF (80 MPH)

SEISMIC ——— SOUTHERN STANDARD BUILDING CODE ZONE 1

ROOF LIVE LOAD — 20 PSF

NOTES:

1. * VERIFY PAD SIZE & LOCATION WITH EQUIPMENT SUPPLIED
2. SEE GENERAL STRUCTURAL NOTES DWG DS-1 AND DS-2
3. FOR CONCRETE PIPE SUPPORTS, SEE MECH DWGS FOR LOCATION AND 227
4. CMU REINF, SEE 216, 219, 220 TYP

RECORD DRAWINGS

Revisions Drawn by D.THOMPSON Date 9-9-88

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CHARLES N. GRANDALL REGISTERED 21 PROFESSIONAL ENGINEER No. 18317 STATE OF TENNESSEE

CH2M HILL

DSGN J.E.CAVE/S.M.FREY
DR T.W. MCINTYRE
CHK L.GRANDE/J.CALL
APVD C.GRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
1	9-9-88	RECORD DRAWINGS		

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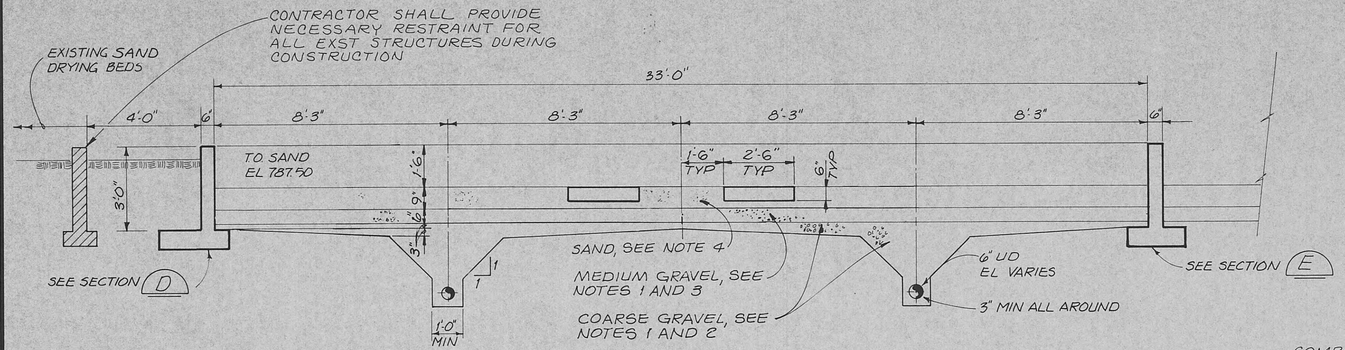
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — LOWER LEVEL PLAN

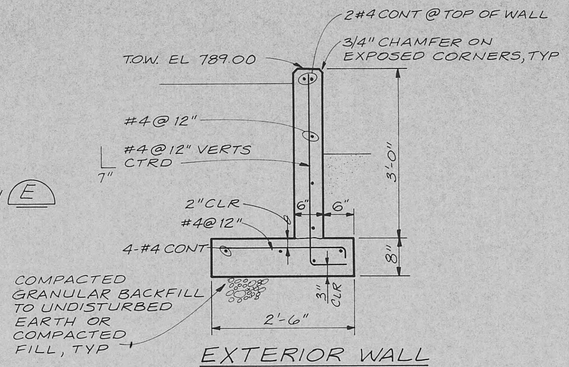
DWG NO. AS-16
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
COMPOSITE AS-15
OVERLAY AS-15
SCREEN
PROJ NO.
CONTRACT

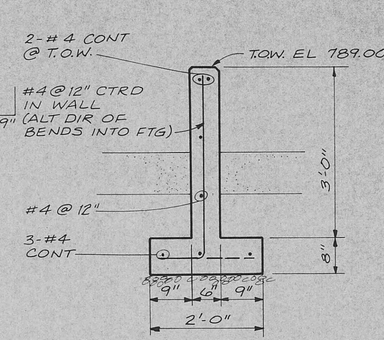
CHECKED BY
DRAWN BY
DESIGNED BY
PRINTED
FILM KE
FORMAT 2234MC



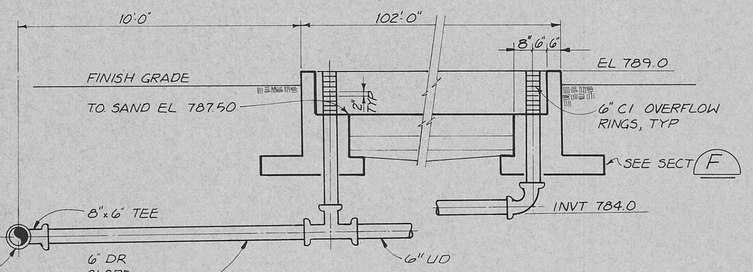
SECTION A
3/8"=1'-0" AS-14



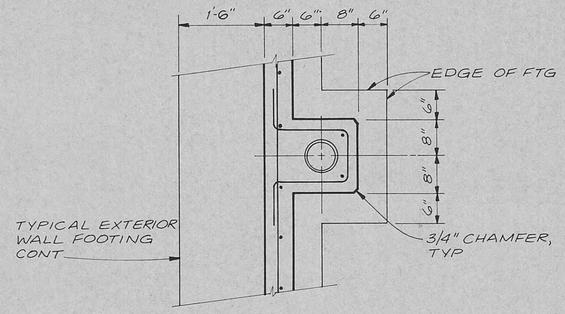
EXTERIOR WALL
SECTION D
3/4"=1'-0" AS-14



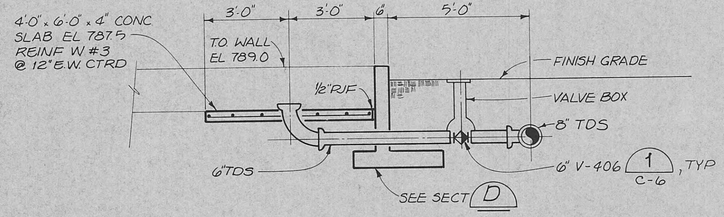
INTERIOR WALL
SECTION E
3/4"=1'-0" AS-14



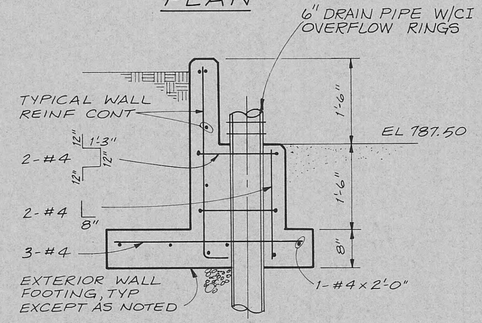
SECTION B
3/8"=1'-0" AS-14



PLAN



SECTION C
3/8"=1'-0" AS-14



SECTION
SECTION F
3/4"=1'-0" AS-14

NOTES:
1. SAND DRYING BED GRAVEL SHALL BE CLEAN, HARD, DURABLE GRAVEL FREE FROM DIRT AND ORGANIC MATERIAL.
2. GRADATION OF THE COARSE GRAVEL SHALL BE SUCH THAT 100 PERCENT BY WEIGHT PASSES THE 2 INCH SCREEN, 90 TO 100 PERCENT PASS THE 1 1/2 INCH SCREEN, AND LESS THAN 5 PERCENT BY WEIGHT PASSES THE 1/2 INCH SCREEN.
3. MEDIUM GRAVEL SHALL CONFORM TO THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
1 INCH	100
3/4 INCH	90-100
3/8 INCH	15-100
NO. 4	0-45
NO. 8	0-5

4. NATURAL SAND OR SAND PRODUCED FROM CRUSHED GRAVEL OR ROCK FREE FROM CLAY AND ORGANIC MATERIAL AND CONFORMING TO THE FOLLOWING GRAIN SIZE DISTRIBUTION

SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
3/8 INCH	100
1/4 INCH	75-100
NO. 4	65-90
NO. 8	40-60
NO. 16	20-40
NO. 30	0-15
NO. 50	0-5

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	DR	CHK	APVD
K. HOWE / D. LEEK	A. DURLEY	J. CALL	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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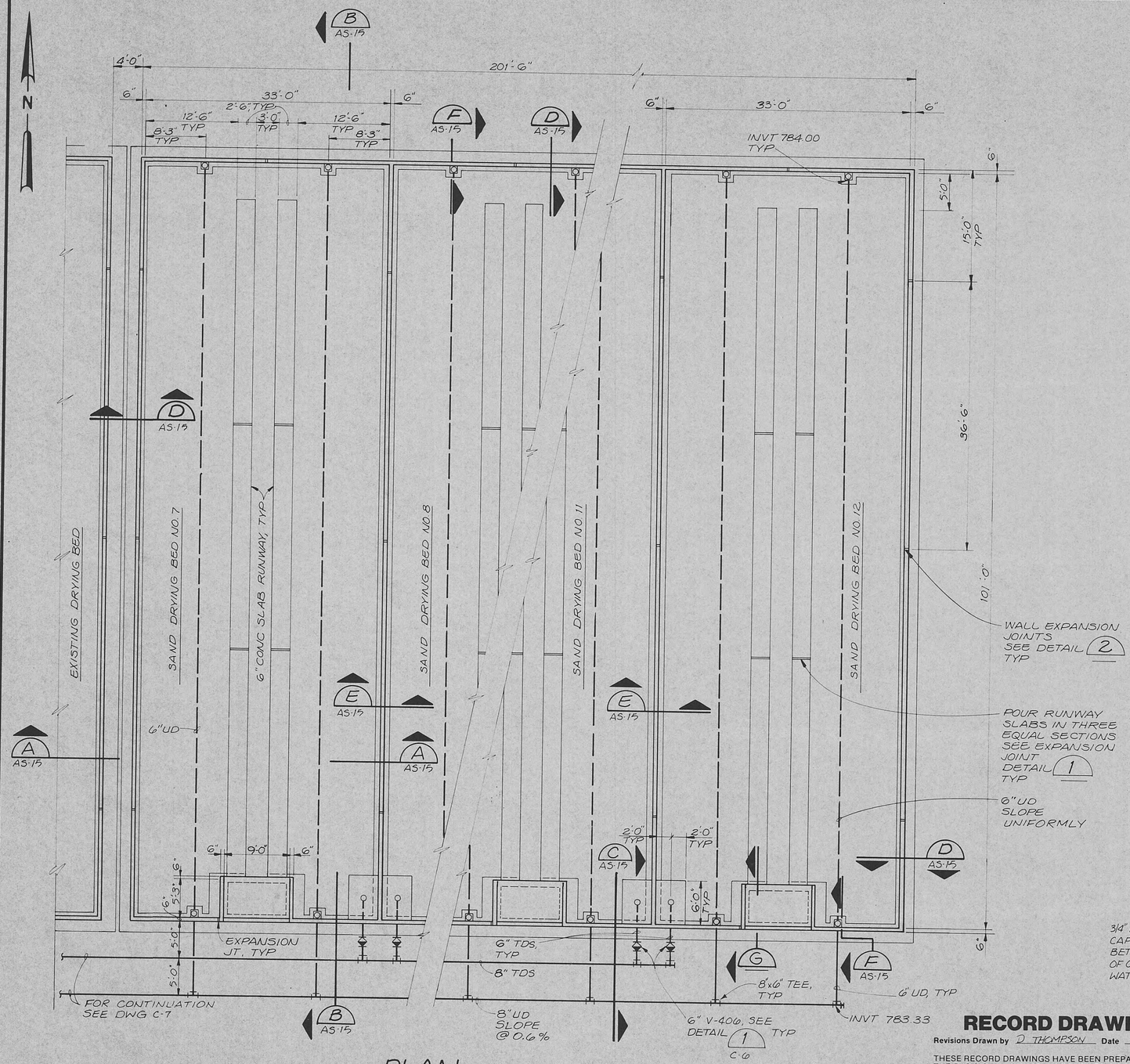
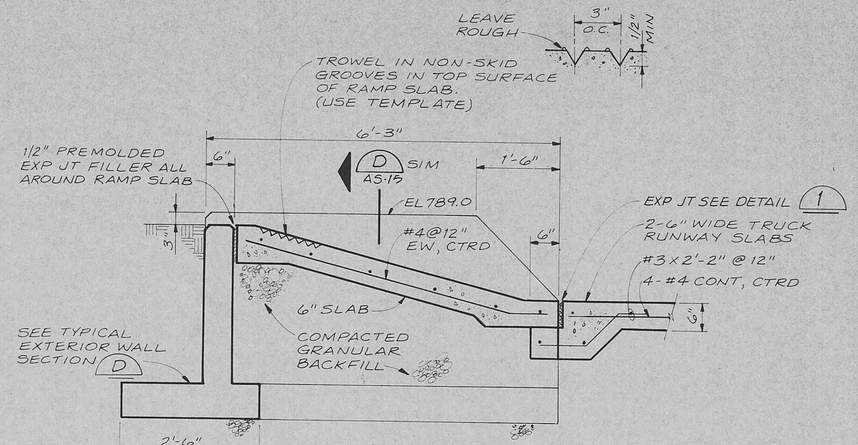
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

SAND DRYING BEDS-SECTIONS AND DETAILS

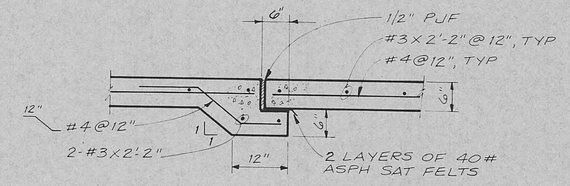
DWG NO.	AS-15
DATE	MAY 1986
PROJ NO.	SA21043.A1



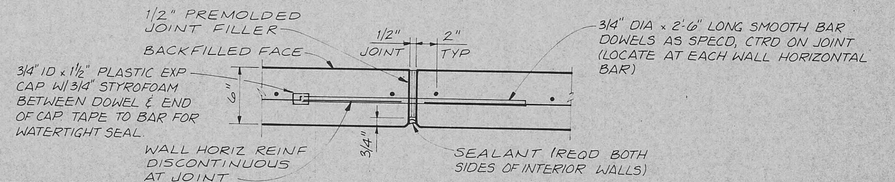
PLAN
1/8" = 1'-0"



TRUCK RAMP
SECTION G
3/4" = 1'-0"



RUNWAY SLAB EXP JT DETAIL 1
3/4" = 1'-0"



PLAN
WALL EXP JT DETAIL 2
1 1/2" = 1'-0"

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	K. HOWE
DR	D. McPHERSON
CHK	J. CALL / K. CLANCY
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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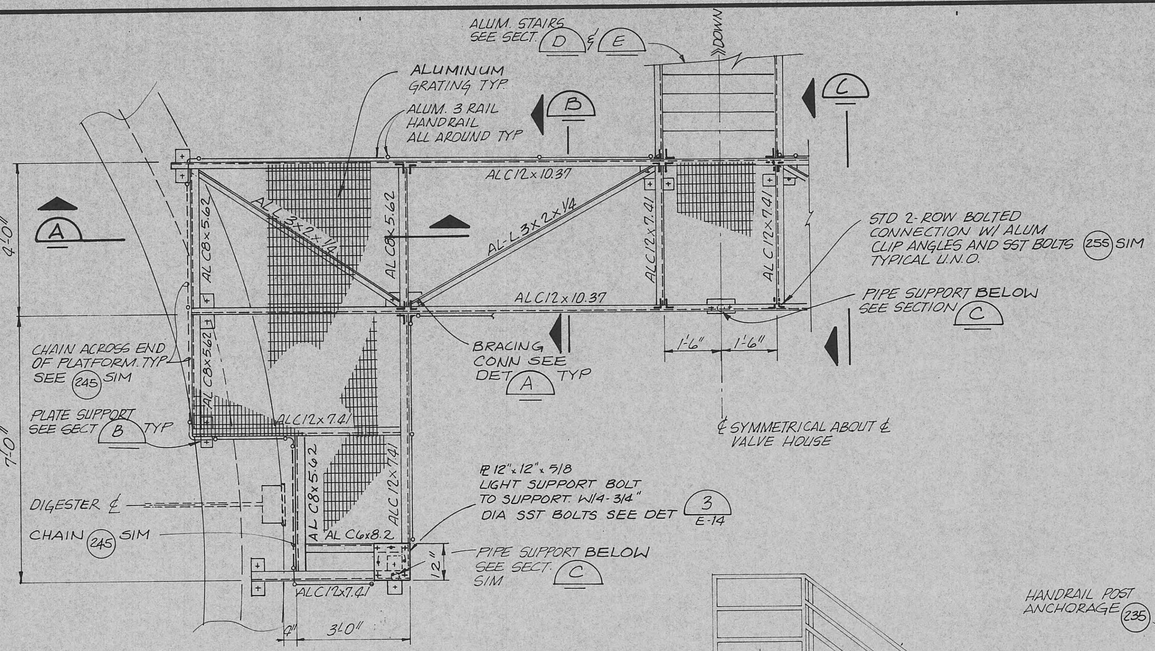
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

SAND DRYING BEDS-PLAN

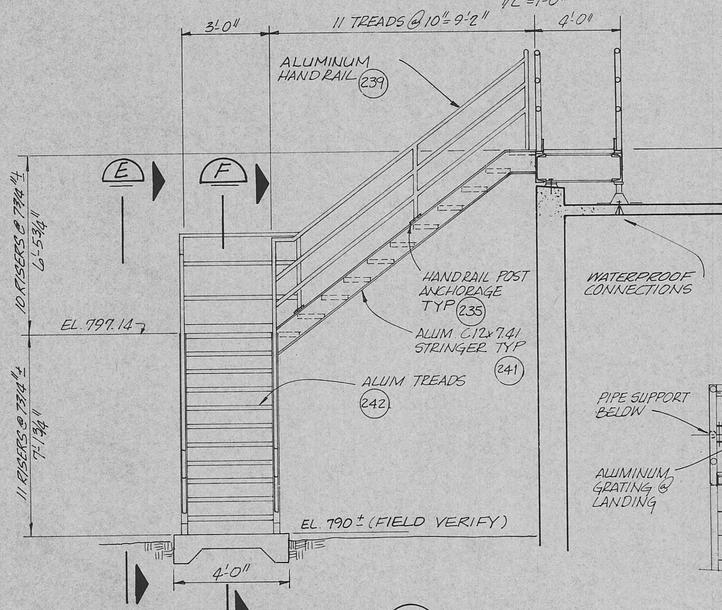
DWG NO.	AS-14
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE
OVERLAY
SCREEN



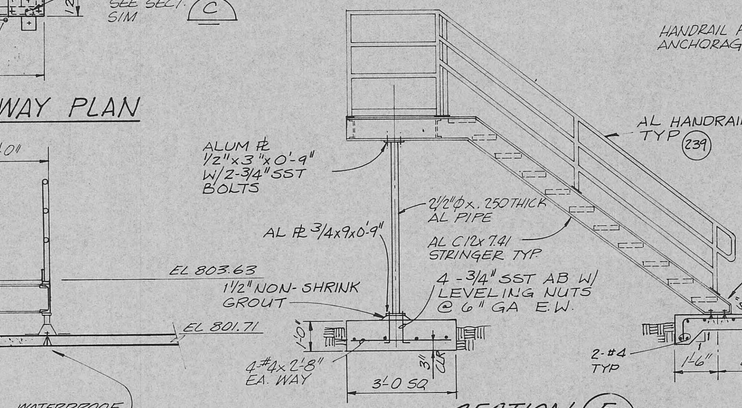
WALKWAY PLAN

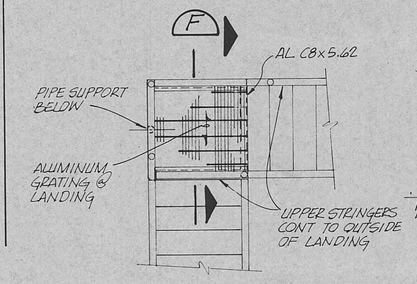
1/2"=1'-0"



SECTION D

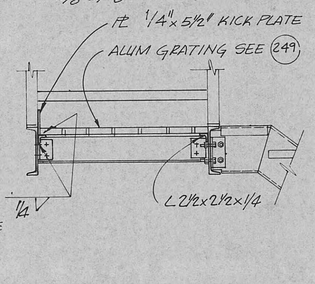
3/8"=1'-0" AS-12





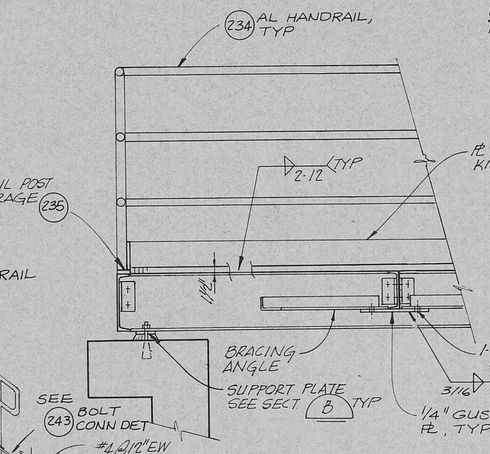
DETAIL 1

3/8"=1'-0"



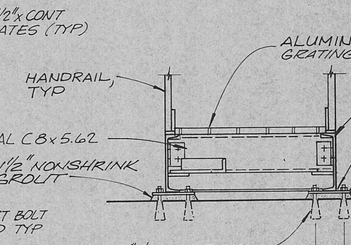
SECTION E

3/4"=1'-0"



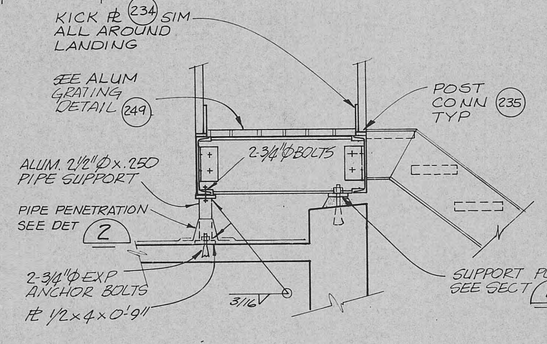
SECTION A

3/4"=1'-0"



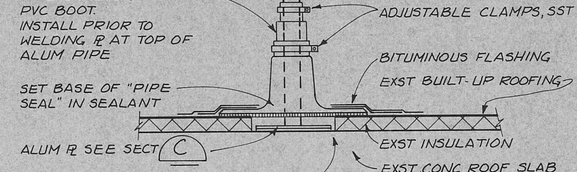
SECTION B

3/4"=1'-0"



SECTION C

3/4"=1'-0"



PIPE PENETRATION DETAIL (2)

NTS

NOTE:
ALL STAIRS AND WALKWAY FRAMING TO BE ALUMINUM AS SPECIFIED UNLESS SPECIFICALLY DESIGNATED OTHERWISE.

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER STATE OF TENNESSEE NO. 18305

CH2M HILL

DES. D LEEK
DR. R.L.R.
CHK. J CALL
APPD. C CRANDALL

NO.	DATE	REVISION	BY	APPD.
	9-9-88	RECORD DRAWINGS	DAT	CNC

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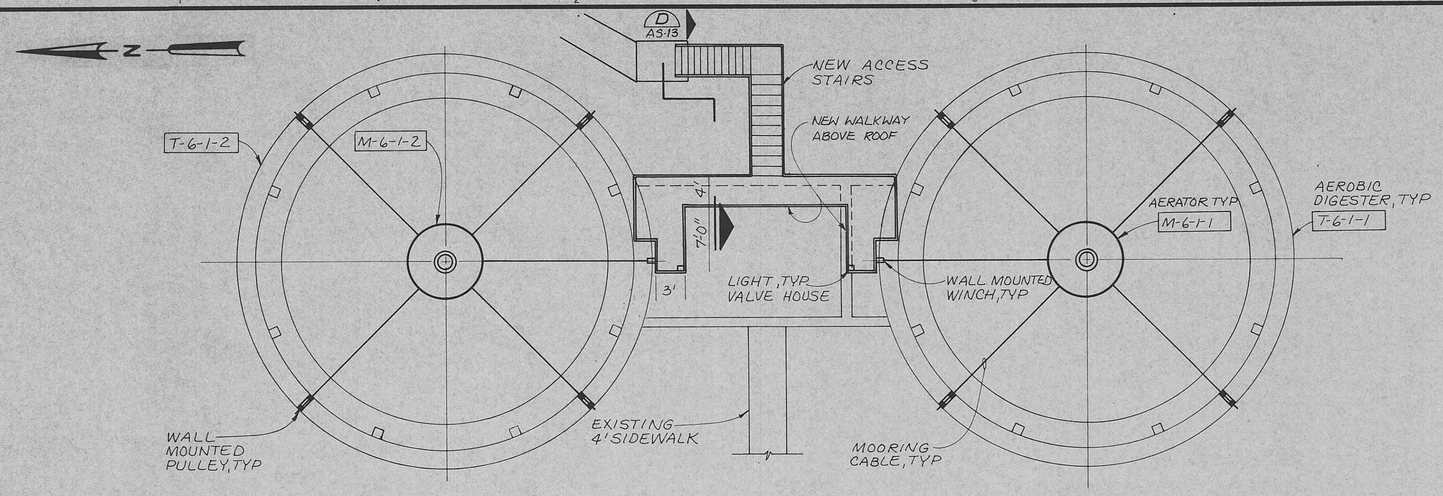
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

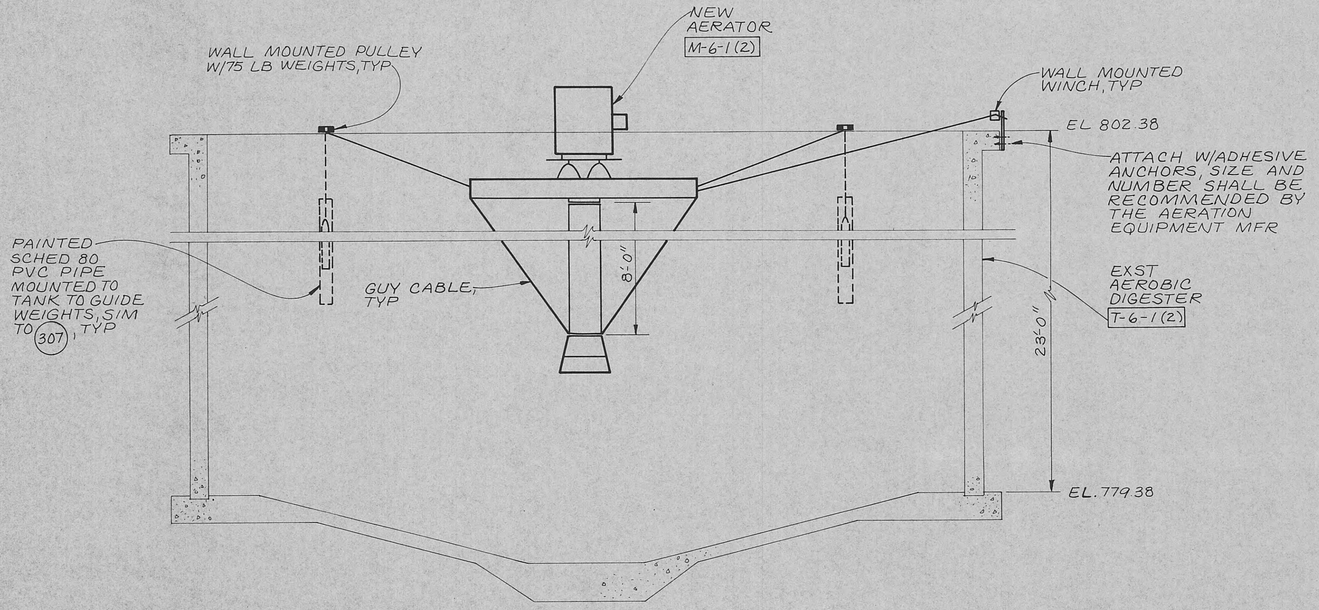
DIGESTER — SECTIONS AND DETAILS

DWG NO. AS-13
DATE MAY 1986
DWG. NO. SA21043.A1



PLAN-SLUDGE DIGESTERS

NTS



TYPICAL SECTION

NTS

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Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED PROFESSIONAL ENGINEER — No. 18375 — STATE OF TENNESSEE — 7-2-86

CH2M HILL

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DR	D.F SHARP
CHK	K. CLANCY
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD

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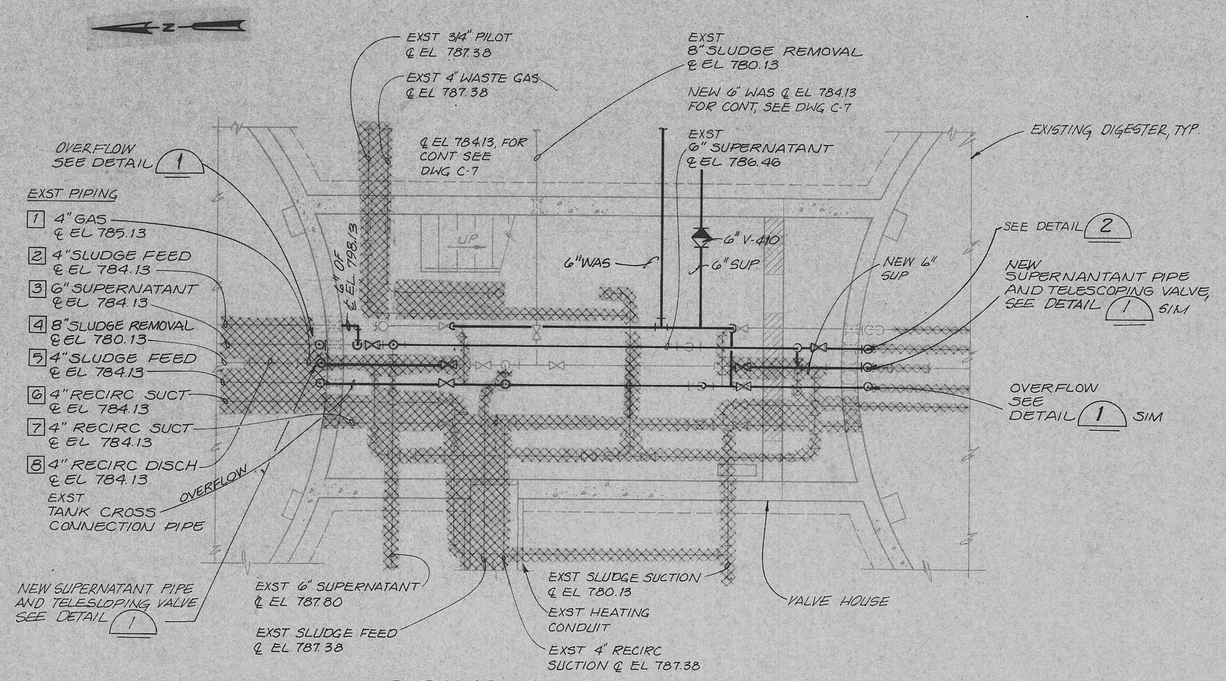
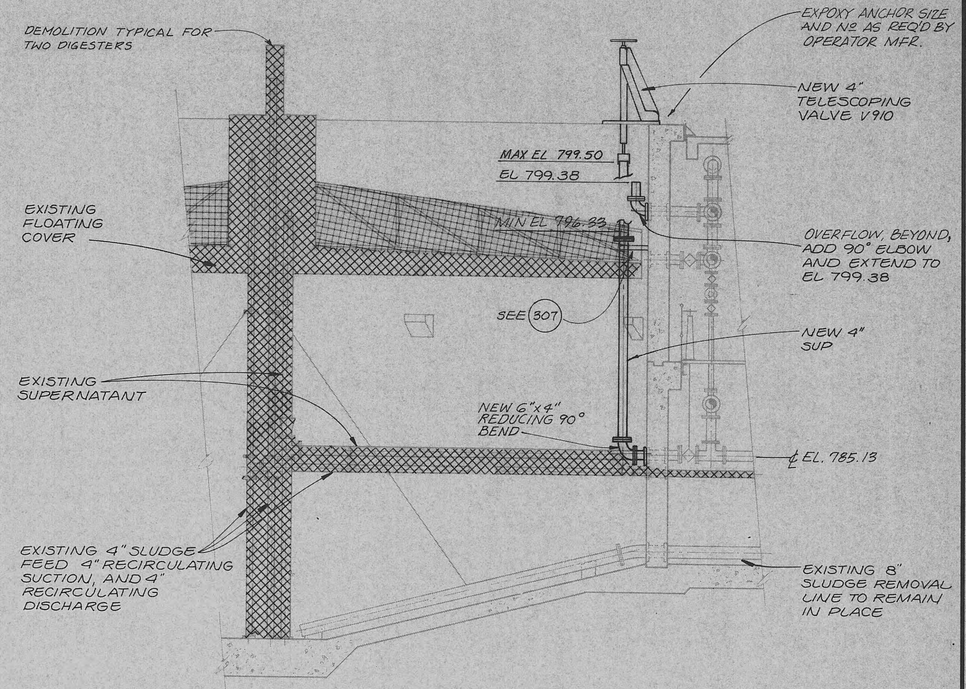
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

DIGESTER — AERATOR INSTALLATION AND ACCESS PLANS

DWG NO.	AS-12
DATE	MAY 1986
PROJ NO.	SA21043.A1



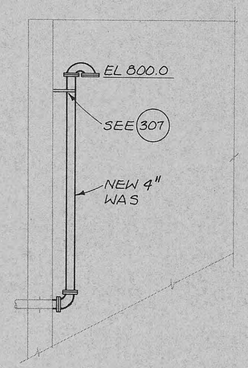
PIPING PLAN
NTS



DIGESTER PIPING DETAIL 1
NTS

AEROBIC DIGESTERS EXISTING PIPE SCHEDULE

PIPE NO.	NAME	ACTION
1	GAS	NORTH TANK — REMOVE IN TANK AND VALVE HOUSE, INSTALL BLIND FLANGE AT TANK WALL — EA. SIDE. SOUTH TANK — SEE ACTION FOR PIPE NO. 3, SUPERNATANT
2	SLUDGE FEED	TANKS-REMOVE PIPE TO EXISTING FLANGED CONNECTION. VALVE HOUSE — CONNECT TO NEW 6-INCH FEED AND REMOVE SECTIONS AS SHOWN
3	SUPERNATANT	NORTH TANK — REMOVE PIPE TO EXISTING FLANGED CONNECTION, ADD NEW SUPERNATANT PIPE, REDUCER AND TELESCOPING VALVE. SEE DETAIL 1 SOUTH TANK — ADD NEW 4-INCH SUPERNATANT PIPE AND TELESCOPING VALVE, CONNECT TO EXISTING 4-INCH GAS LINE WALL PENETRATION, CONNECT TO EXISTING 6-INCH SUPERNATANT PIPE. SEE DETAIL 1 SIM. VALVE HOUSE — REMOVE EXISTING SUPERNATANT PIPING AS SHOWN. ADD NEW SUPERNATANT PIPING AS SHOWN.
4	SLUDGE REMOVAL	TANKS-PIPE TO REMAIN IN SERVICE VALVE HOUSE — MAKE CHANGES AS SHOWN
5	SLUDGE FEED	TANKS — REMOVE PIPE TO EXISTING FLANGED CONNECTION VALVE HOUSE — MAKE CHANGES, AS SHOWN
6	RECIRCULATION SUCTION	REMOVE PIPE IN TANKS AND VALVE HOUSE. ADD BLIND FLANGE AT EACH WALL — EACH SIDE
7	RECIRCULATION SUCTION	SAME AS ABOVE
8	RECIRCULATION DISCHARGE	SAME AS ABOVE



WAS PIPING DETAIL 2
NTS

RECORD DRAWINGS
Revisions Drawn by D THOMPSON Date 9-9-88

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CH2M HILL

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W. CHAPMAN	D. MCPHERSON	K. CLANCY	C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	9-9-88	RECORD DRAWINGS		

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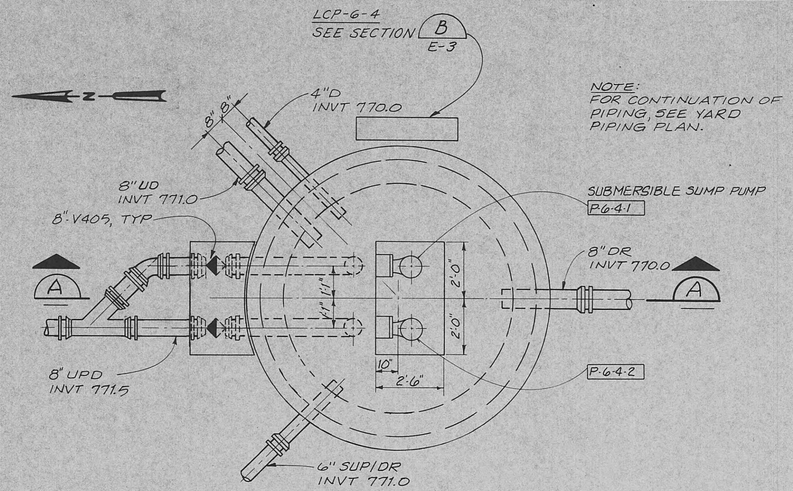
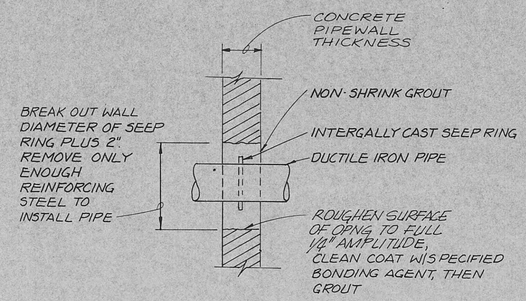
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

DIGESTER — DEMOLITION AND PIPING PLANS

DWG NO.	AS-11
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE
OVERLAY
SCREEN
FORMAT 2334MC M.1.1 M.1.1 8.11 S
FILM KE M.1.1A M.1.1A
DESIGNED BY
DRAWN BY
CHECKED BY
PRINTED



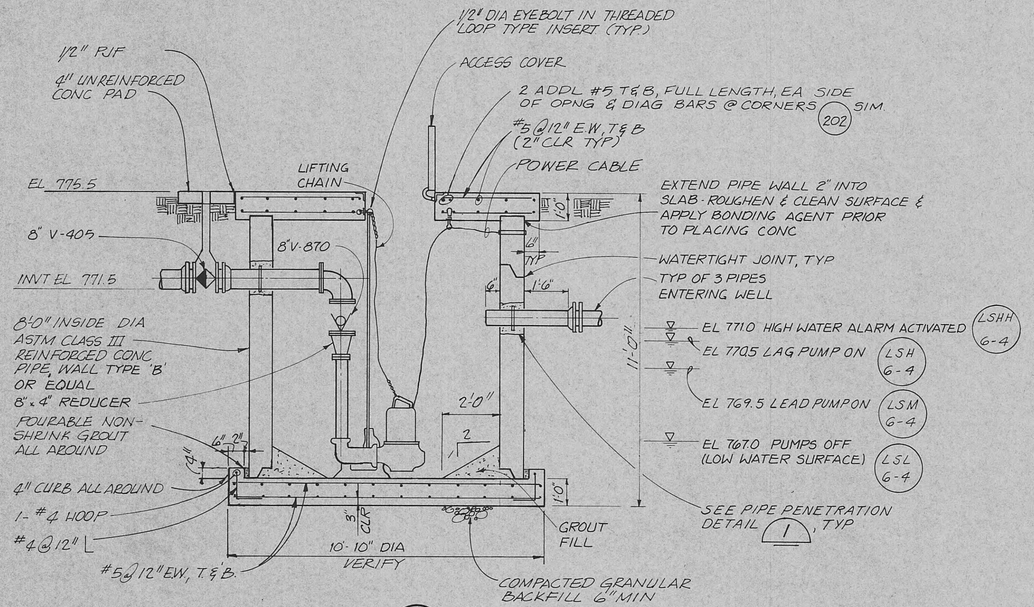


PIPE PENETRATION DETAIL (1)

NTS

UTILITY PUMP STATION PLAN

3/8" = 1'-0"



SECTION (A)

3/8" = 1'-0"

NOTE:
MOUNT PUMP SEQUENCE FLOATS ADJACEMENT TO ACCESS COVER, SEE (316)

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	DR	CHK	APVD
K. HOWE	A. DURLEY	K. CLANCY	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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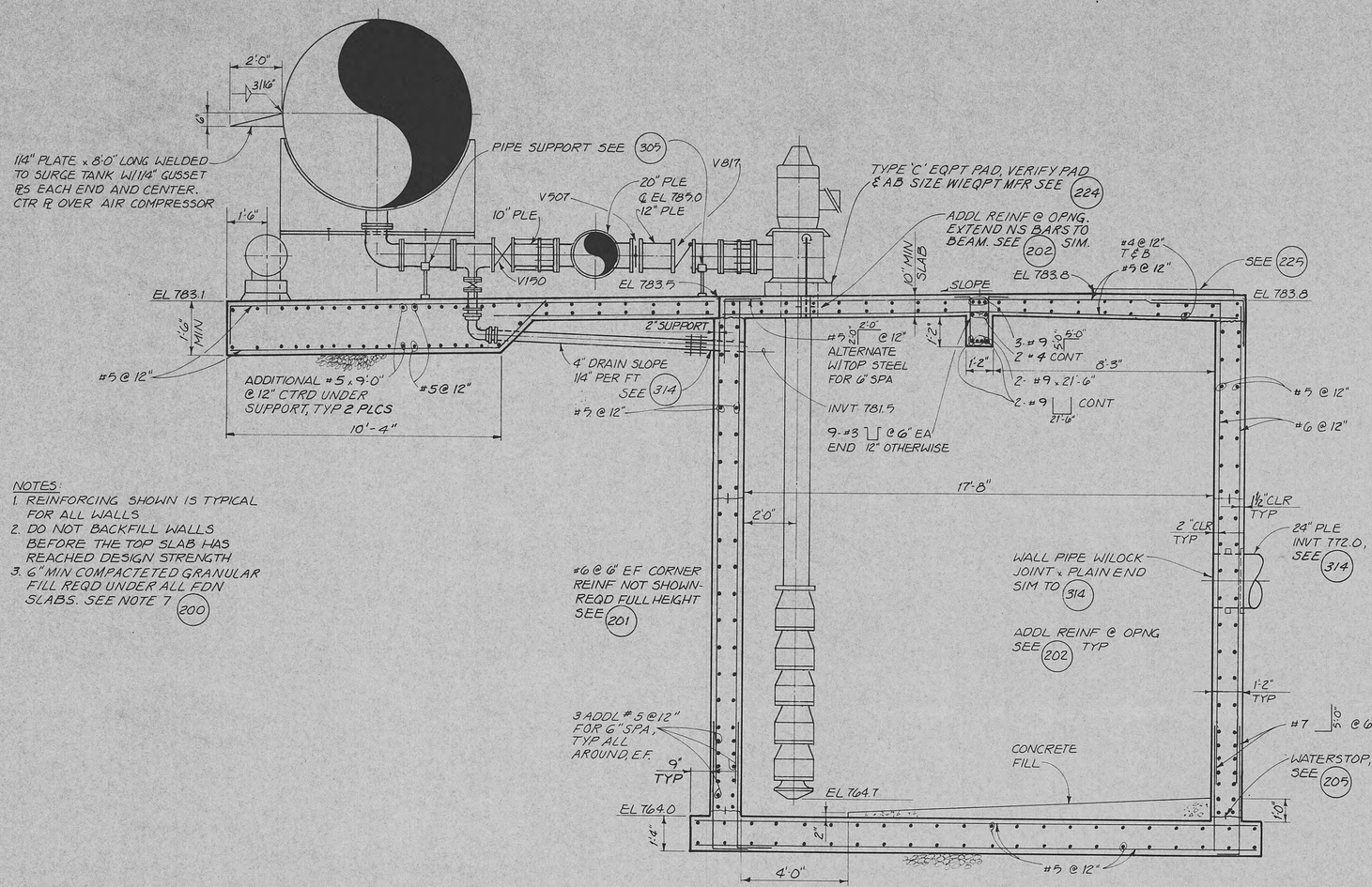
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

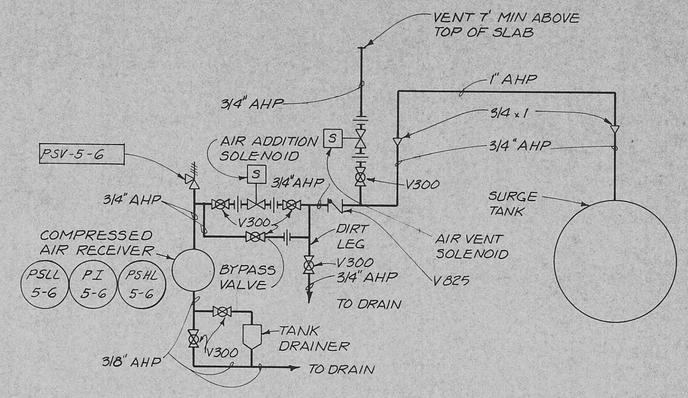
UTILITY PUMP STATION
PLAN SECTION AND DETAILS

DWG NO.	AS-10
DATE	MAY 1986
PROJ NO.	SA21043.A1

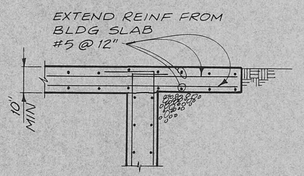


NOTES:
1. REINFORCING SHOWN IS TYPICAL FOR ALL WALLS
2. DO NOT BACKFILL WALLS BEFORE THE TOP SLAB HAS REACHED DESIGN STRENGTH
3. 6" MIN COMPACTETED GRANULAR FILL REQD UNDER ALL FDN SLABS. SEE NOTE 7 (200)

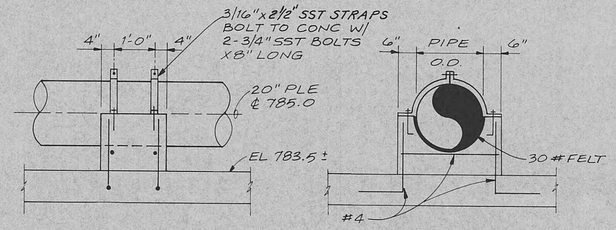
SECTION (C)
3/8" = 1'-0" AS-8



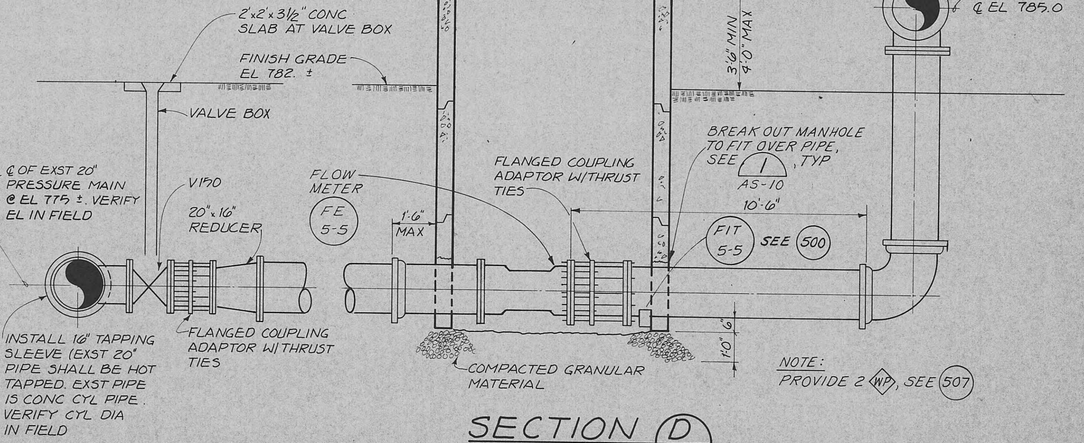
LEVEL CONTROL PIPING SCHEMATIC DETAIL (3)
NTS AS-8



SECTION (E)
3/8" = 1'-0" AS-8



PIPE SUPPORT DETAIL (4)
1/2" = 1'-0" AS-8



NOTE: PROVIDE 2 (WP), SEE (507)

SECTION (D)
3/8" = 1'-0" AS-8

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18375 — STATE OF TENNESSEE

CH2M HILL

DSGN	R. STAEHLIN
DR	A. DURLEY
CHK	W. CALL/M. CARRENO
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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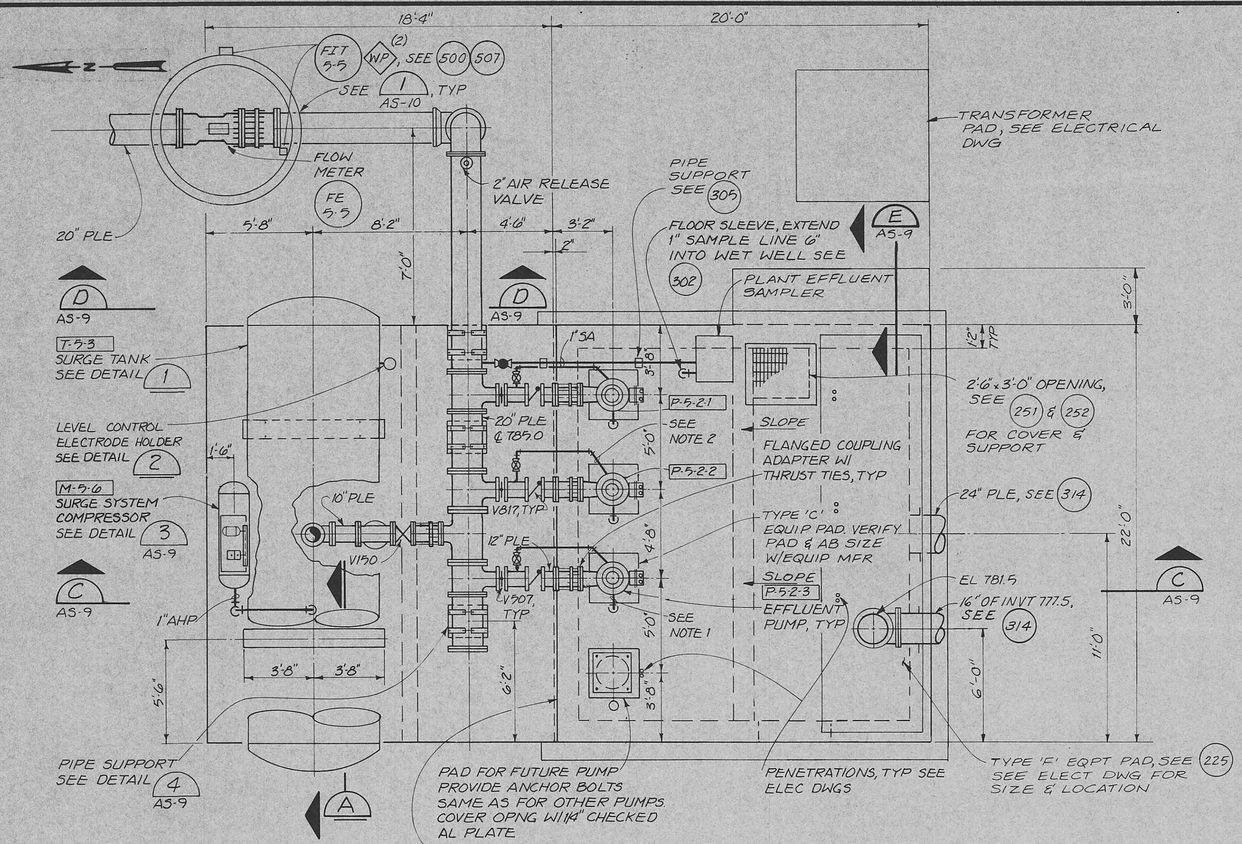
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

EFFLUENT PUMP STATION-SECTIONS AND DETAILS

DWG NO.	AS-9
DATE	MAY 1986
PROJ NO.	SA21043.A1

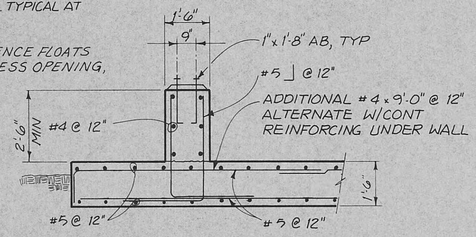


PLAN

1/4" = 1'-0"

NOTES:

1. EXTEND 3/4" COPPER (TYPE L) DRAIN LINE INTO WET WELL THROUGH FLOOR SLEEVE. SEE 302 TYPICAL AT EACH PUMP
2. PROVIDE 3/4" COPPER (TYPE L) EFFLUENT WATER SEAL TO PUMP. PROVIDE TYPE V307 BALL VALVE IN LINE. TYPICAL AT EACH PUMP.
3. MOUNT PUMP SEQUENCE FLOATS ADJACENT TO ACCESS OPENING, SEE 316



SECTION A

3/8" = 1'-0"

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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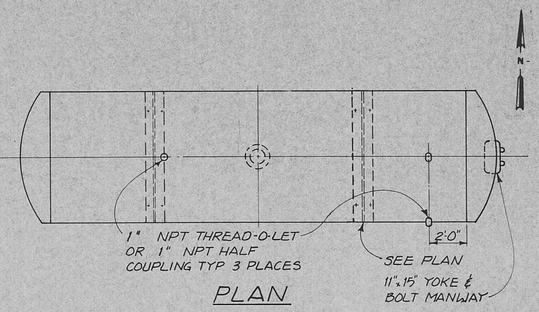
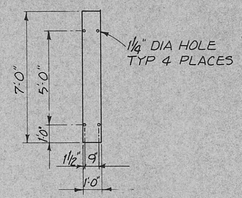
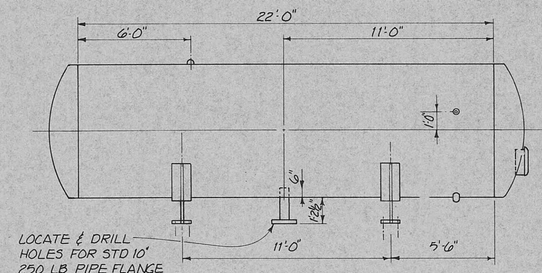


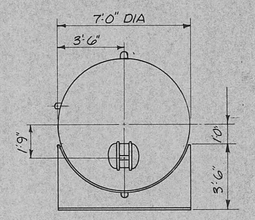
PLAN



PLAN



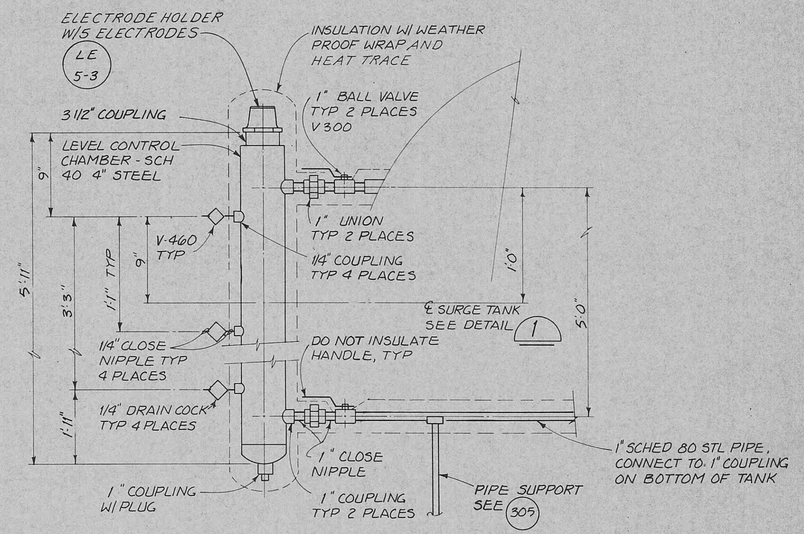
ELEVATION



END OF ELEVATION

SURGE TANK DETAIL 1

1/4" = 1'-0"



LEVEL CONTROL ELECTRODE HOLDER DETAIL 2

1/8" = 1"

CHARLES N. CRANDALL REGISTERED ENGINEER NO. 18315 STATE OF TENNESSEE

DSGN	R. STAEHLIN					
DR	A. DURLEY					
CHK	J.CALL/M.CARRENO					
APVD	C. CRANDALL	1	9-9-88	RECORD DRAWINGS	DAT	CNC
		NO.	DATE	REVISION	BY	APVD

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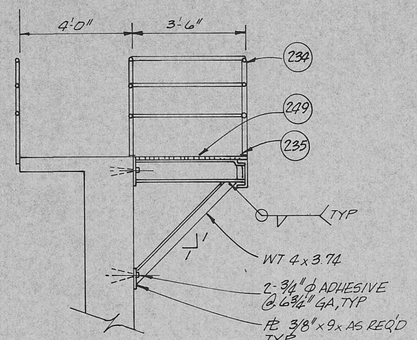
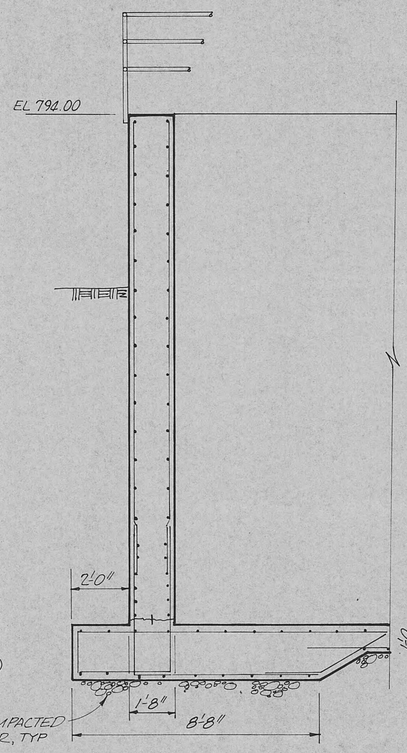
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

EFFLUENT PUMP STATION-FOUNDATION AND TOP PLAN

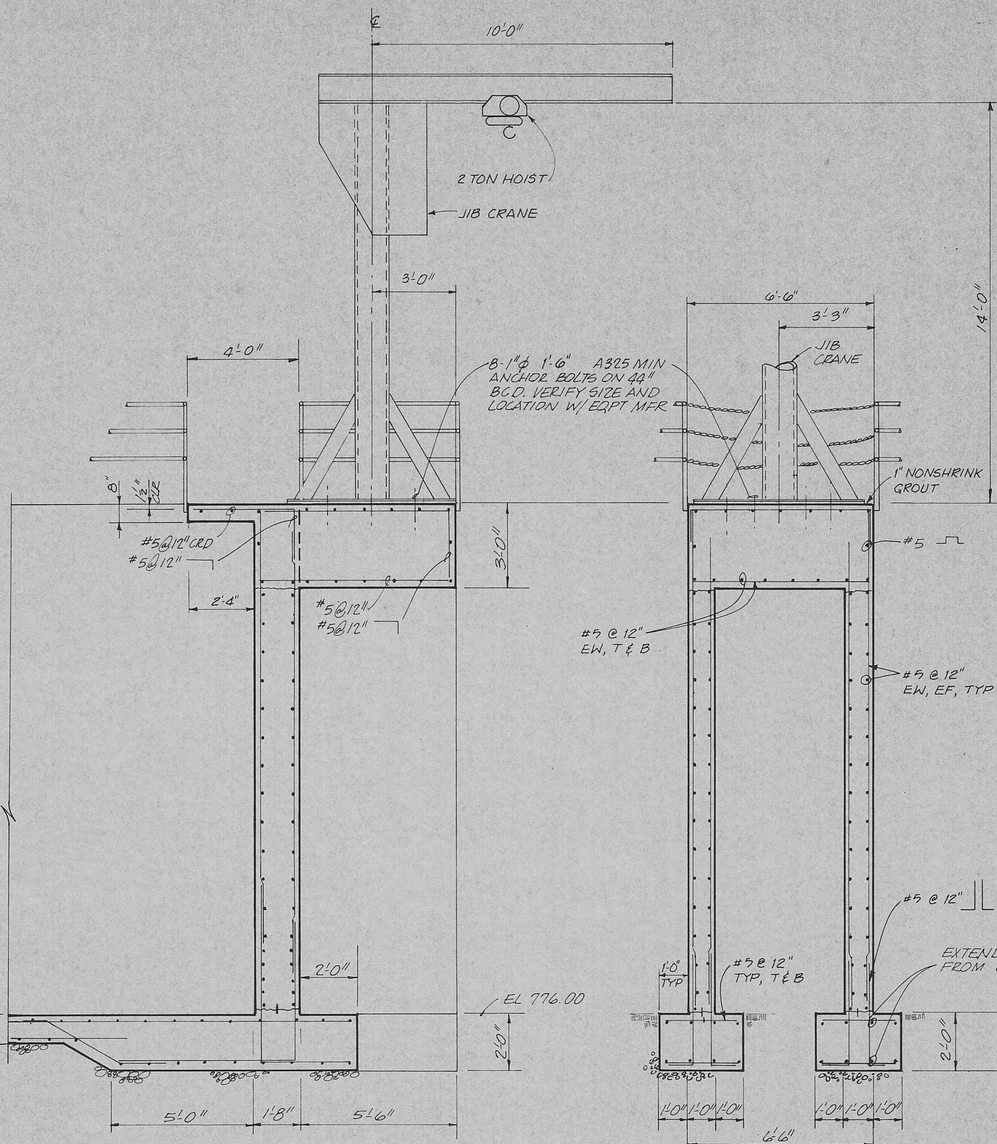
DWG NO.	AS-8
DATE	MAY 1986
PROJ NO.	SA21043.A1



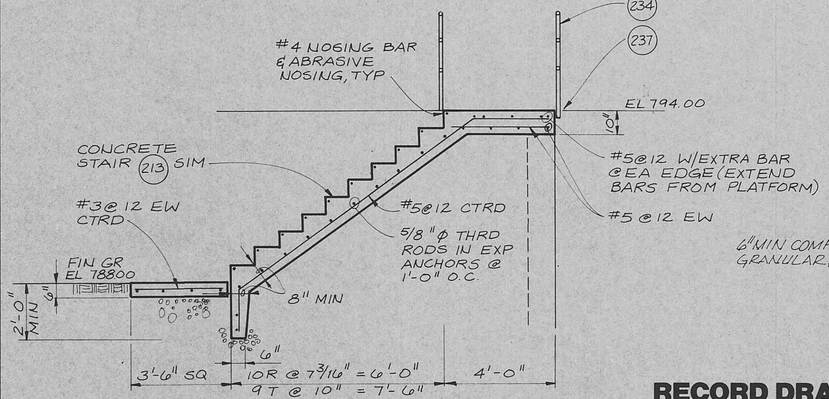
SECTION E
3/8"=1'-0" AS-5



SECTION B
3/8"=1'-0" AS-5



SECTION F
3/8"=1'-0" AS-5



SECTION C
3/8"=1'-0" AS-5

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED PROFESSIONAL ENGINEER — NO. 18375 — STATE OF TENNESSEE

CH2M HILL

DSGN S.E. HIDA					
DR L.A. OLSON					
CHK J. CALL					
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD
	1	9-9-88	RECORD DRAWINGS	DAT	CNC

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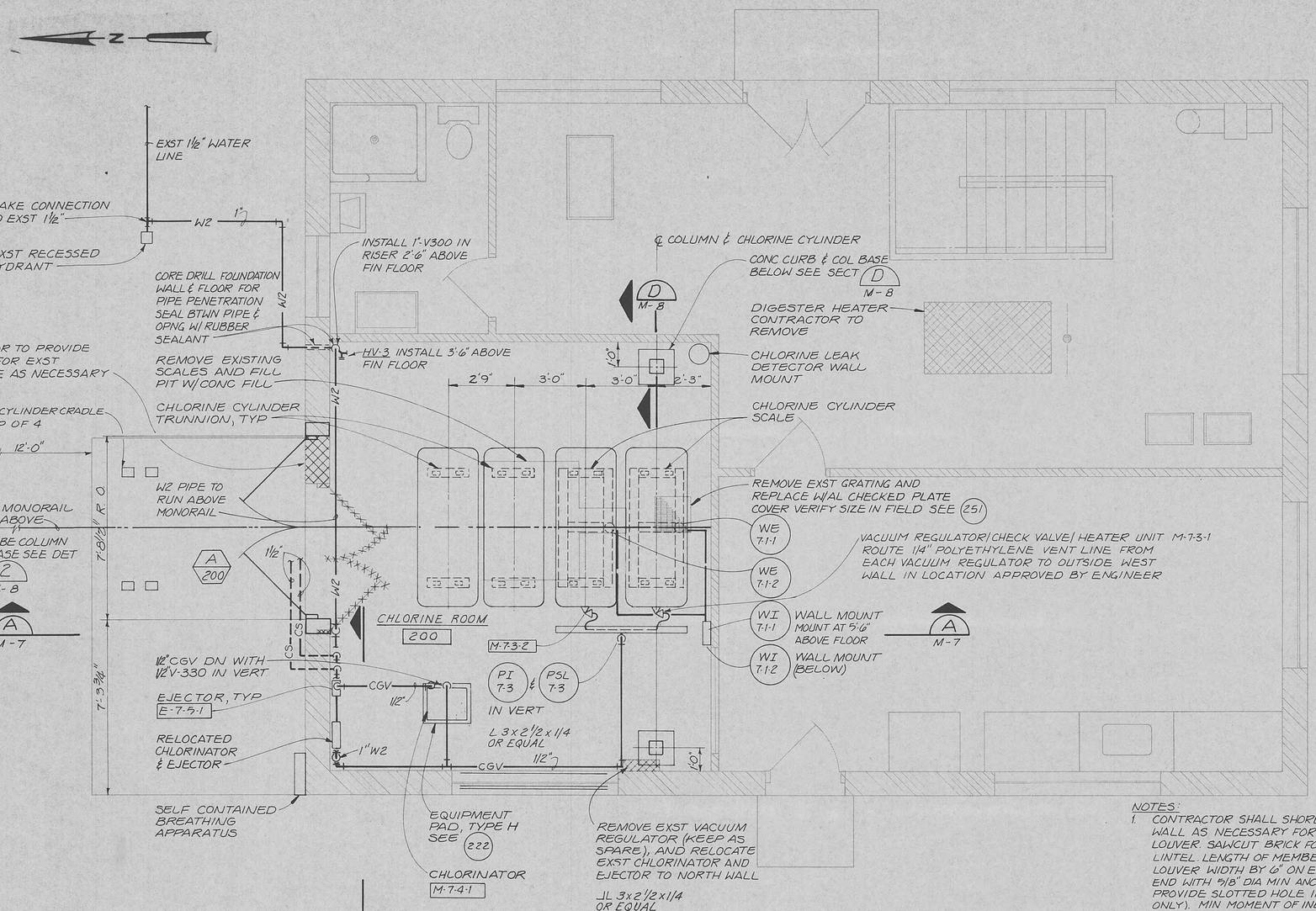
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

SBR — SECTIONS AND DETAILS

SHEET	
DWG NO.	AS-7
DATE	MAY 1986
PROJ NO.	SA21043.A1



FLOOR PLAN

3/8"=1'-0"

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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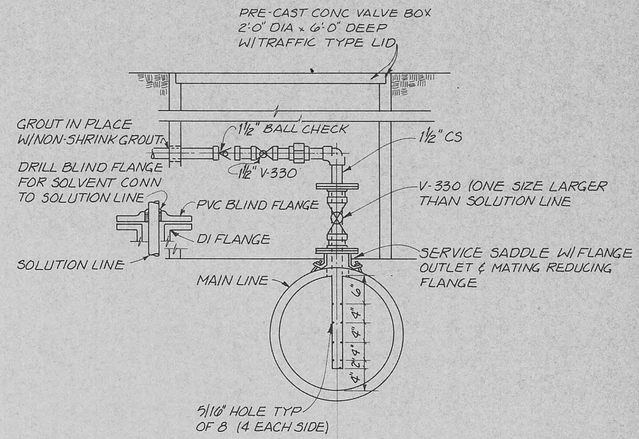

CHLORINE SOLUTION FEED DETAIL (1)

NTS C-7

NOTES:

1. CONTRACTOR SHALL SHORE EXST BRICK WALL AS NECESSARY FOR INSTALLATION OF LOUVER. SAWCUT BRICK FOR STRUCT STEEL LINTEL. LENGTH OF MEMBER SHALL EXCEED LOUVER WIDTH BY 6" ON EA SIDE. FASTEN EACH END WITH 5/8" DIA MIN ANCHOR BOLT TO BRICK. PROVIDE SLOTTED HOLE IN LINTEL (ONE END ONLY). MIN MOMENT OF INERTIA FOR STEEL LINTEL SHALL BE 2.00 IN.^{4}
2. INSTALLATION OF ROOF CURB:
   - A. CUT BACK EXST BUILT-UP ROOFING AND RIGID INSULATION AND CLEAN OFF GRAVEL TOPPING AS NECESSARY FOR INSTALLATION OF EF-6.
   - B. PROVIDE AND INSTALL ROOF CURB AS SPECIFIED IN SECTION 10999, MISC SPECIALTIES.
   - C. PROVIDE AND INSTALL FIBER CANT, COMPOSITION FLASHING, ROOFING CEMENT, ASPHALT AND ALL OTHER BUILT-UP ROOFING ACCESSORY MATERIALS NECESSARY TO COMPLETE THE WORK, COMPATIBLE WITH EXST ROOFING

CHLORINE ROOM HEATING & VENTILATING PLAN

3/8" = 1'-0"

CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER AGRICULTURE TENNESSEE NO. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	K. HOWE
DR	D. McPHERSON
CHK	K. CLANCY
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	RDJ	CNC

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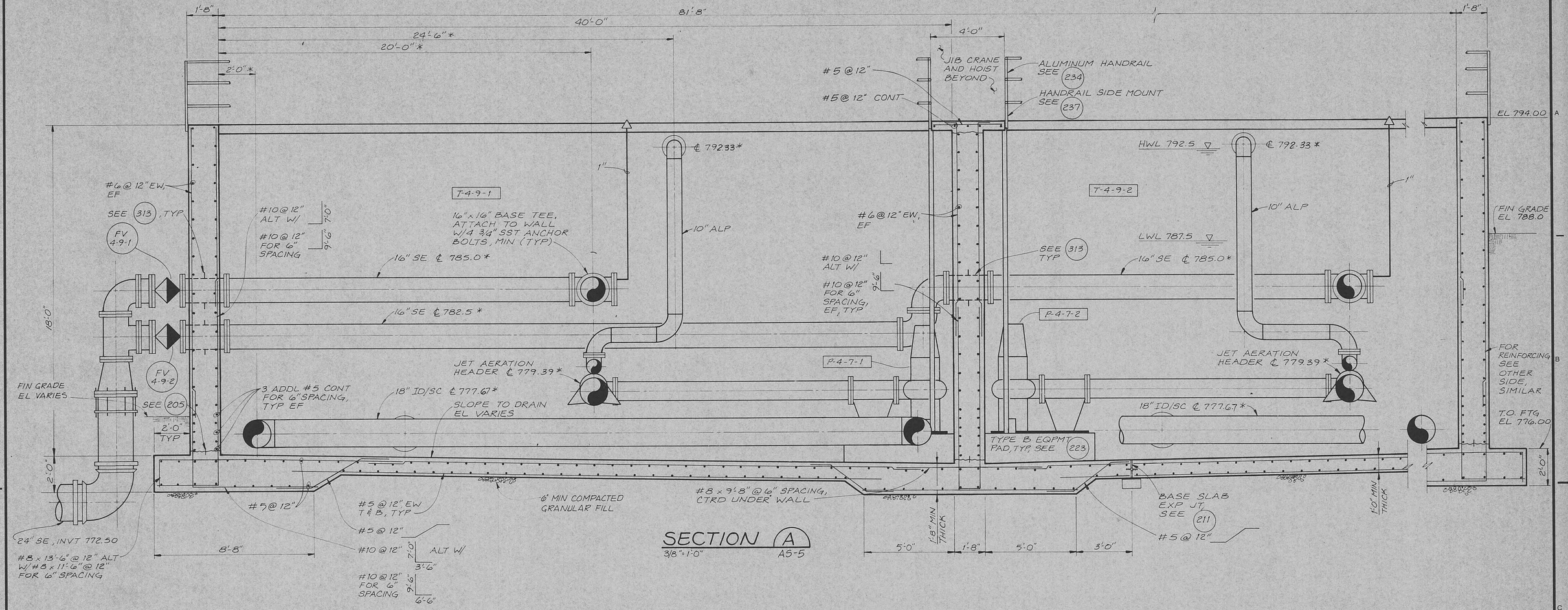
CITY OF HARRIMAN, TENNESSEE

CHLORINATION — PLAN AND DETAIL

DWG NO.	M-6
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION: COMPOSITE / OVERLAY SCREEN / PROJ NO. / CONTRACT
100-1 100-7 S 100-11 100-111 100-1111



SECTION A
3/8" = 1'-0"
AS-5

NOTES - MECHANICAL

1. THIS DRAWING AND ALL CORRESPONDING DRAWINGS ARE INTENDED TO DEPICT THE DIMENSIONS AND CONSTRAINTS FOR THE SBR EQUIPMENT AND PIPING WITHIN THE TANKS.
2. THE SBR EQUIPMENT AND PIPING SHOWN IS ONLY TO INDICATE THE ORIENTATION DESIRED BY THE OWNER. SPACING AND SIZING SHALL BE AS REQUIRED BY THE SBR EQUIPMENT SUPPLIER TO MEET SPECIFIED PERFORMANCE REQUIREMENTS.
3. SBR PIPING AND EQUIPMENT SUPPORTS ARE NOT SHOWN BUT SHALL BE INCLUDED IN THE SBR SYSTEM, AS SPECIFIED.

* TO BE VERIFIED BY SBR EQUIPMENT MANUFACTURER.

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL, REGISTERED ENGINEER, No. 18375, STATE OF TENNESSEE

CH2M HILL

DSGN	S. HIDA					
DR	D. McPHERSON					
CHK	J. CALL		9-9-88	RECORD DRAWINGS	DAT	CNC
APVD	C. CRANDALL	NO.	DATE	REVISION	BY	APVD

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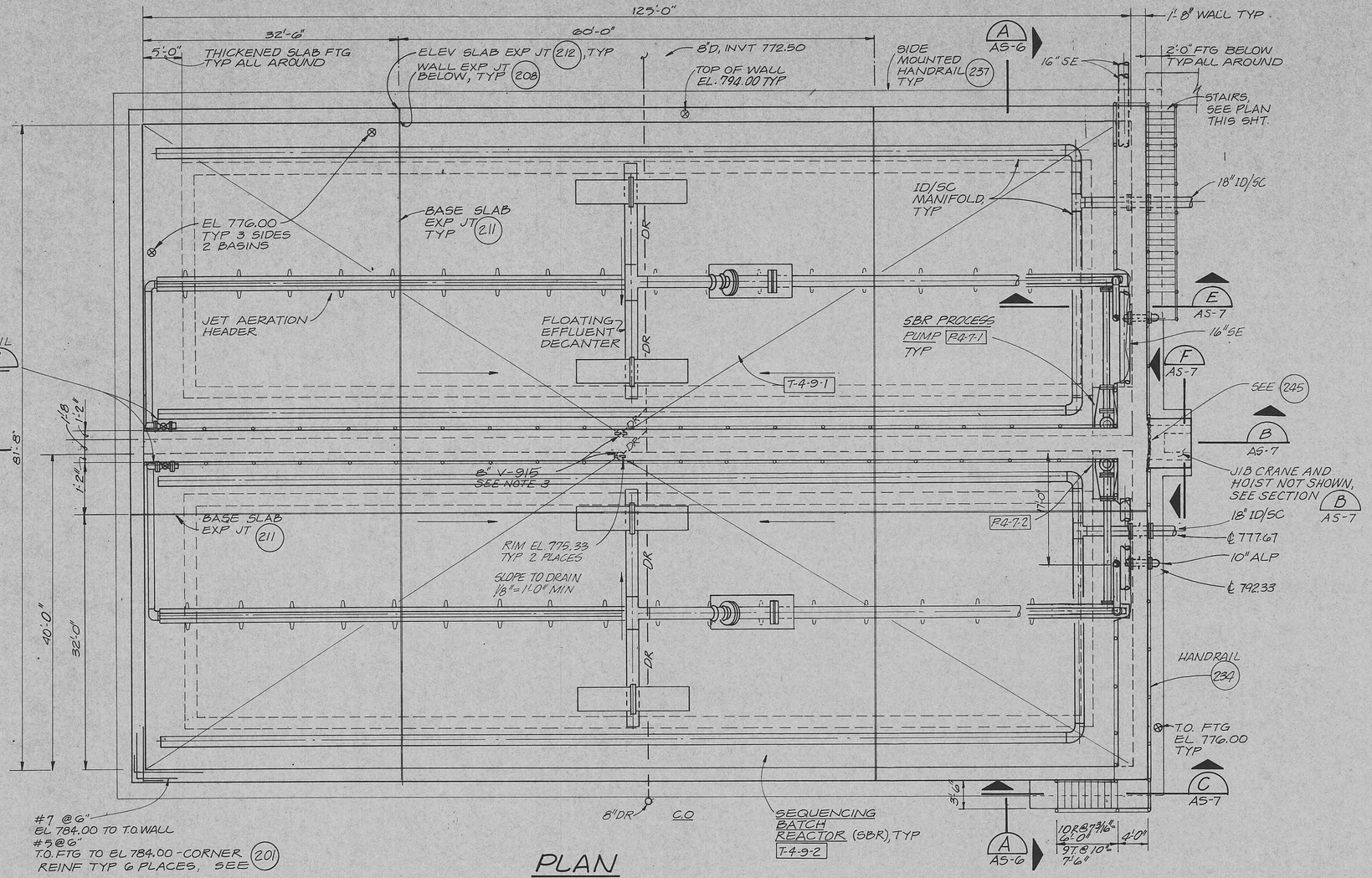
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

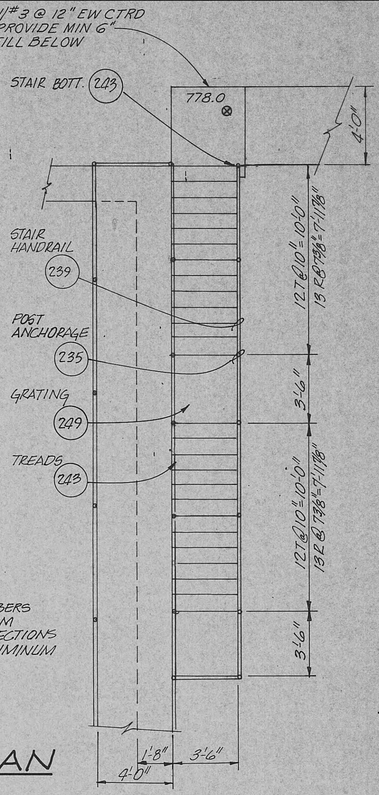
SBR — SECTION

DWG NO.	AS-6
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION: COMPOSITE, OVERLAY, SCREEN, PROJ NO., CONTRACT

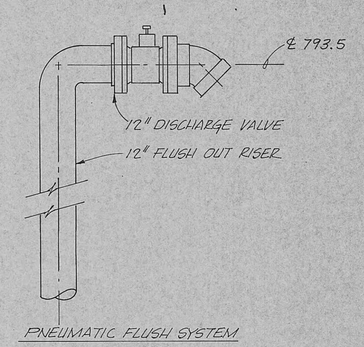


PLAN
1/8"=1'-0"



STAIR PLAN
1/4"=1'-0"

NOTES - STRUCTURAL:
1. FABRICATED METAL & FRAMING MEMBERS FOR STAIRS & PLATFORM AS SHOWN ON PLANS SECTIONS SHALL BE MADE FROM ALUMINUM AS SPECIFIED.



DETAIL 1
NTS

NOTES - MECHANICAL

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3. FURNISH AND INSTALL MUD VALVE EXTENSION STEM, W/OPERATING NUT, TO EL 794.0. PROVIDE NECESSARY INTERMEDIATE STEM SUPPORTS.
4. SBR PIPING & EQUIPMENT SUPPORTS ARE NOT SHOWN BUT SHALL BE INCLUDED IN THE SBR SYSTEM, AS SPECIFIED.

RECORD DRAWINGS
Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18379 STATE OF TENNESSEE 2-28-86

CH2M HILL

DSGN S. HIDA/K. RITTER					
DR D. McPHERSON					
CHK J. CALL					
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD
	1	9-9-88	RECORD DRAWINGS	DAT	CNC

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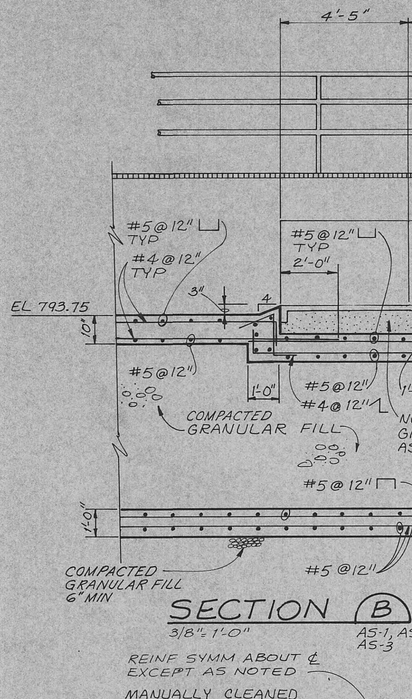
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

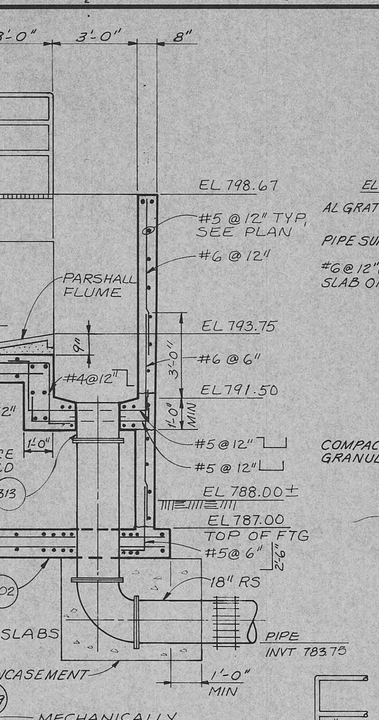
SBR — PLAN

DWG NO. AS-5
DATE MAY 1986
PROJ NO. SA21043.A1

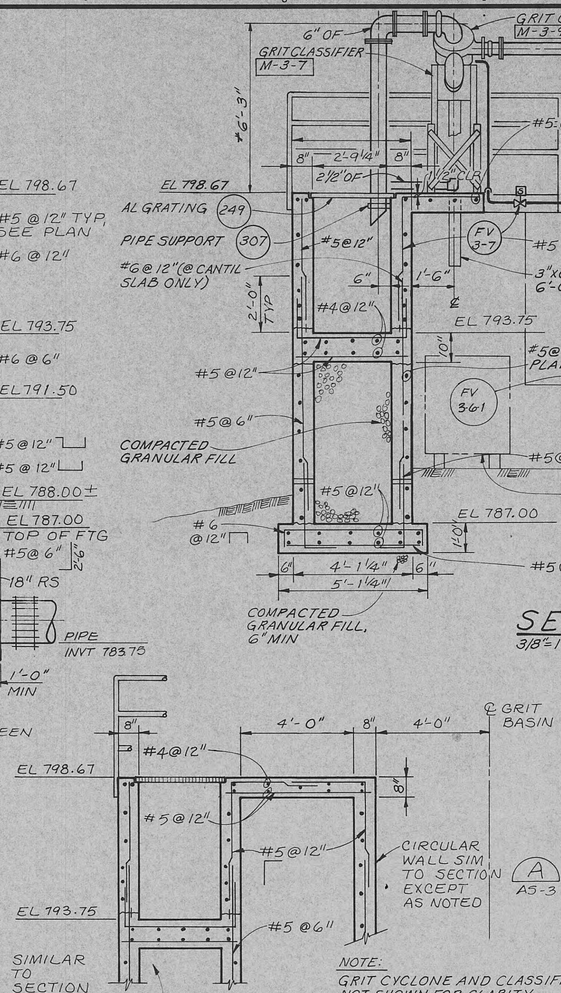
OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE 80-1
OVERLAY 80-1
SCREEN
FORMAT 2323 MC 80-1 80-1.1 AS-5 AS-6
FILM KE
PRINTED
DESIGNED BY
DRAWN BY
CHECKED BY



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



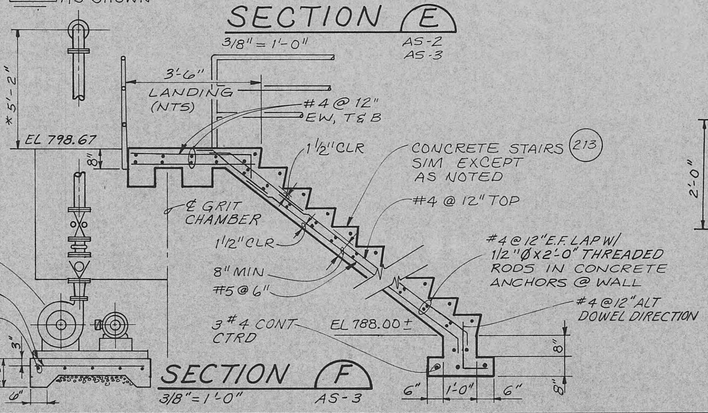
SECTION C
3/8"=1'-0" AS-1 AS-2 AS-3



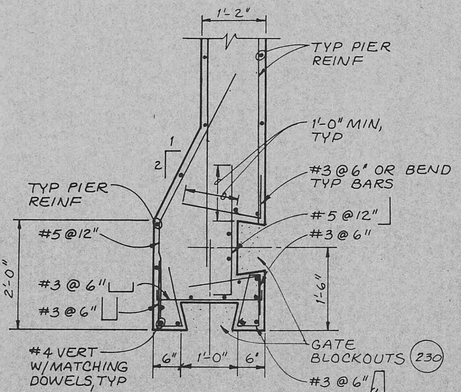
SECTION D
3/8"=1'-0" AS-1, AS-2, AS-3

* VERIFY DIMENSIONS W/ MFR'S EQUIPMENT

SECTION E
3/8"=1'-0" AS-2 AS-3

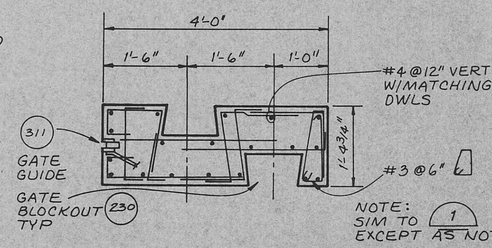


SECTION F
3/8"=1'-0" AS-3



PLAN

PIER DETAIL 1
3/4"=1'-0" AS-2



PLAN

PIER DETAIL 2
3/4"=1'-0" AS-2

RECORD DRAWINGS

Revisions Drawn by D.THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED PROFESSIONAL ENGINEER 19375 STATE OF TENNESSEE

CH2M HILL

DSGN	FREY/CHAPMAN
DR	K ANDERSEN
CHK	J.CALL/K.CLANCY
APVD	C.CRANDALL

NO.	DATE	REVISION	DAT	CNC
	9-9-88	RECORD DRAWINGS		

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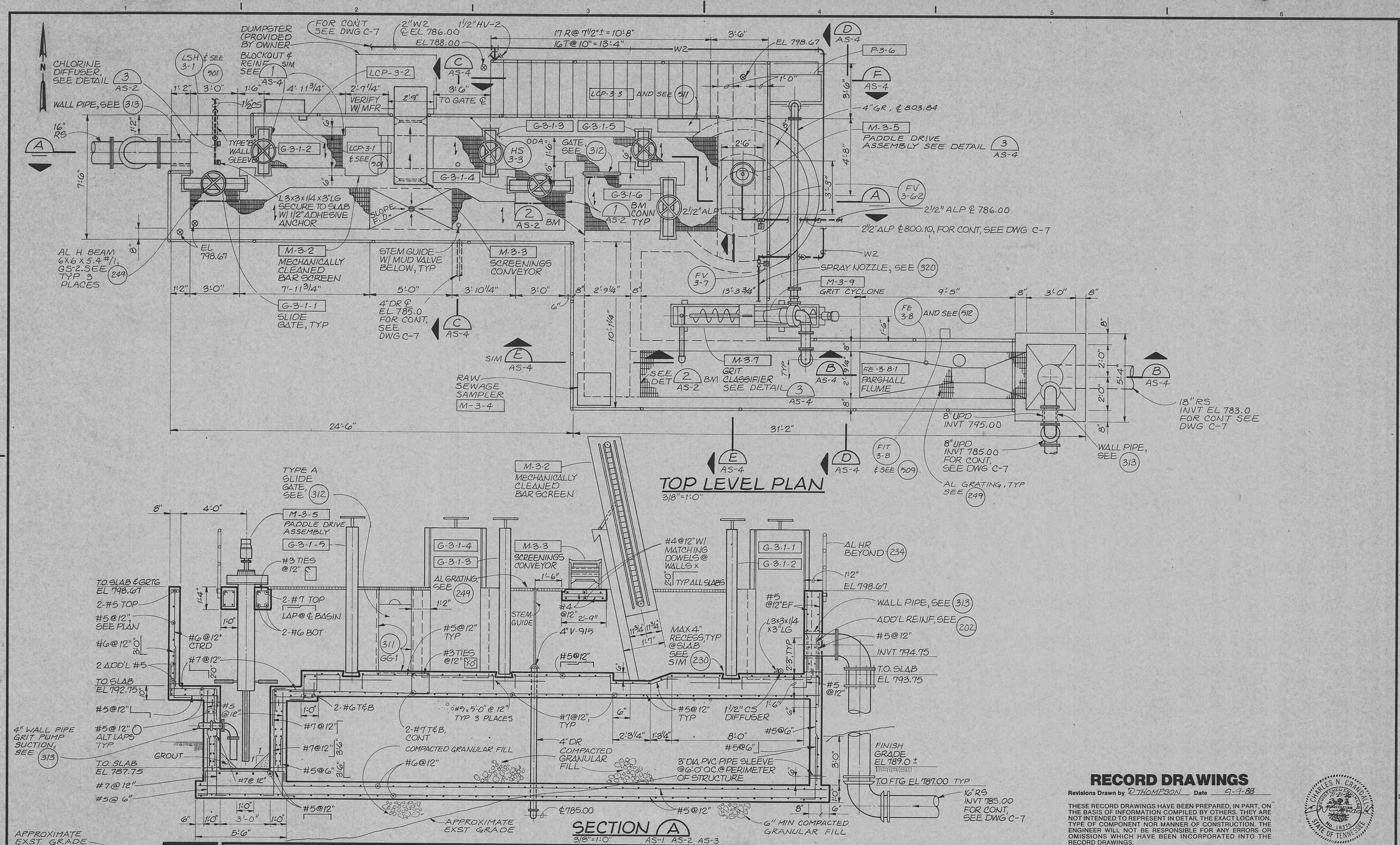
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

HEADWORKS-STRUCTURAL AND MECHANICAL DETAILS

DWG NO. AS-4
DATE MAY 1986
PROJ NO. SA21043.A1



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Revisions Drawn by D THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — 11-21-86 — No. 18218 — STATE OF TENNESSEE

CH2M HILL

DSGN CHAPMAN/FREY
DR KL McCOY
CHK J.CALL/K.CLANCY
APVD C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	9-9-88	RECORD DRAWINGS		

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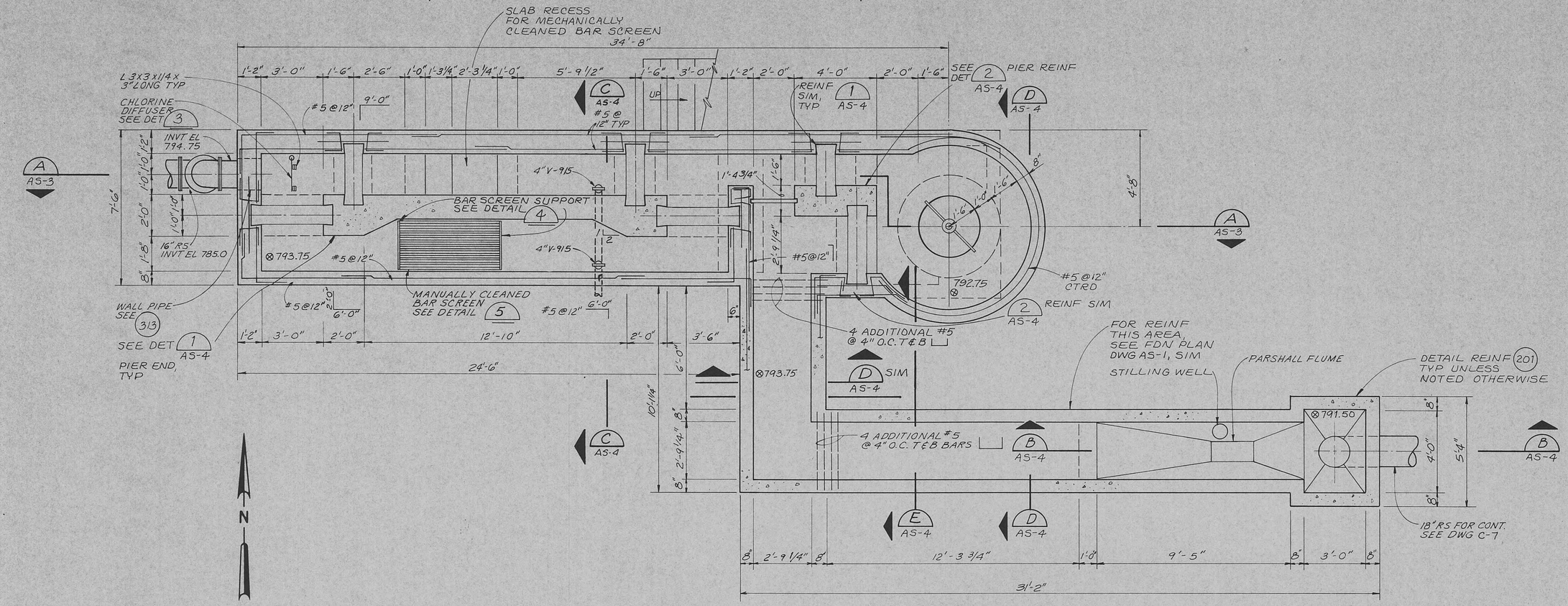
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

HEADWORKS — TOP PLAN AND SECTION

DWG NO. AS-3
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE SM-A SM-1 SM-2
OVERLAY SM-A SM-1 SM-2
SCREEN
FORMAT 22x34 MC
FILM KE
PRINTED 2
CHECKED BY:
DRAWN BY:
DESIGNED BY:



CHANNEL BOTTOM PLAN

3/8" = 1'-0"

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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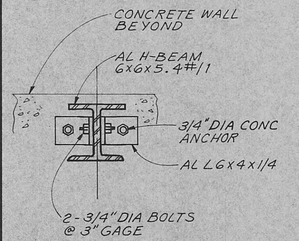
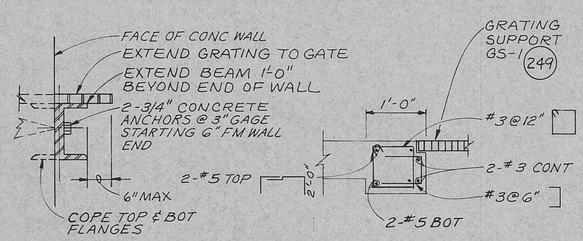
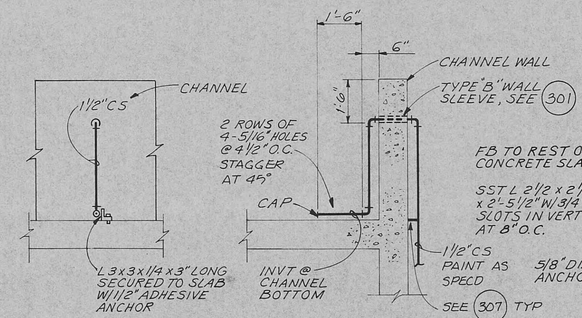


GRATING SUPPORT BEAM CONNECTION 1 AS-3



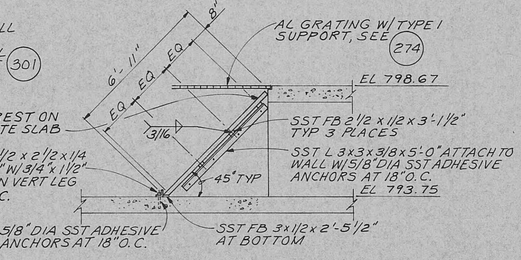
BEAM DETAIL 2 AS-3

SECTION



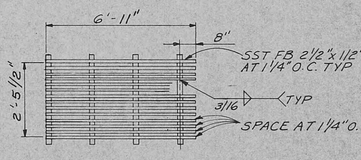
CHLORINE DIFFUSER DETAIL 3 AS-3

3/8" = 1'-0"



BAR SCREEN SUPPORT DETAIL 4

NTS



BAR SCREEN DETAIL 5

NTS

CHARLES N. CRANDALL REGISTERED ENGINEER No. 18319 STATE OF TENNESSEE 11-21-88

CH2M HILL

DSGN CHAPMAN/FREY						
DR M. J. BUCKNER						
CHK J. CALL						
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD	
	1	9.9.88	RECORD DRAWINGS	DAT	CNC	

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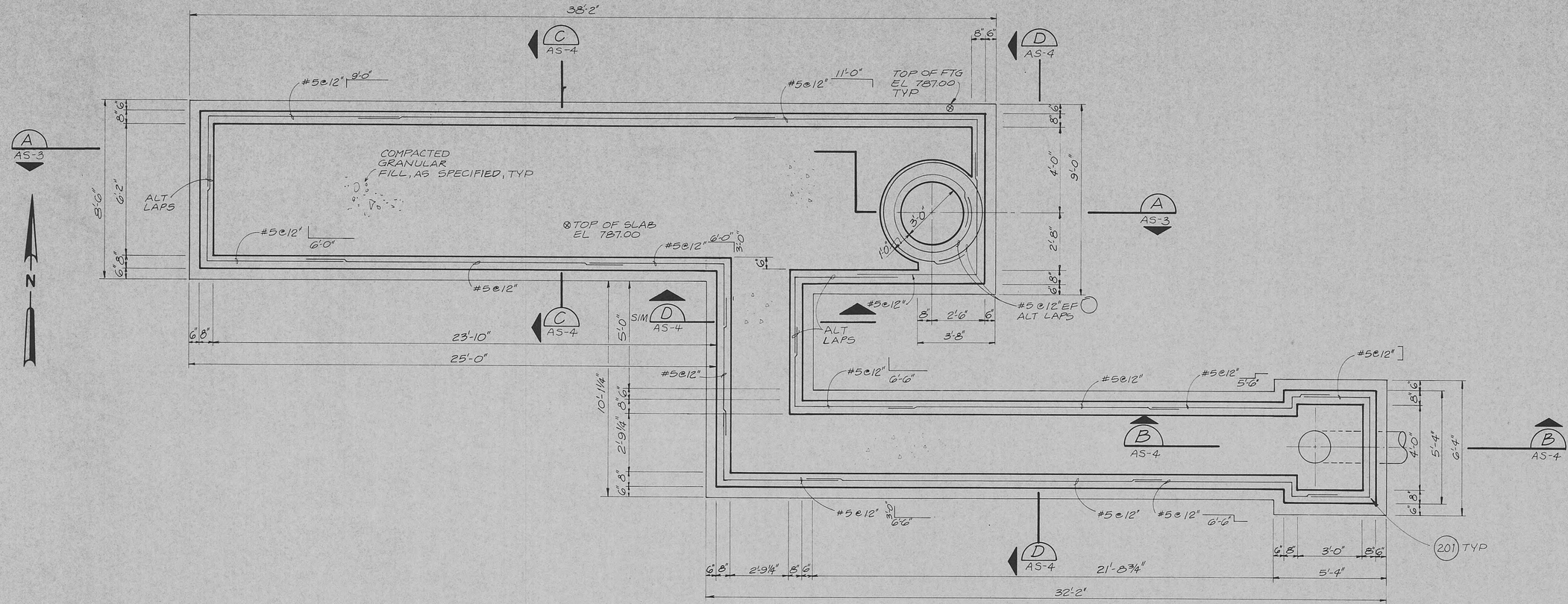
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

HEADWORKS-INTERMEDIATE PLAN AND DETAILS

DWG NO. AS-2
DATE MAY 1986
PROJ NO. SA21043.A1



FOUNDATION PLAN

3/8" = 1'-0"

NOTES:

1. SEE GENERAL STRUCTURAL NOTES (200)
2. REINF AROUND OPNG (202)
3. SEE STRUCTURAL DETAILS DS-1 AND DS-2.

RECORD DRAWINGS

Revisions Drawn by D.THOMPSON Date 9-9-88

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CH2M HILL

DSGN S.M. FREY						
DR K.J. RITTER						
CHK J.CALL						
APVD C. CRANDALL	NO.	DATE	REVISION	DAT BY	CNC APVD	
	1	9-9-88	RECORD DRAWINGS			

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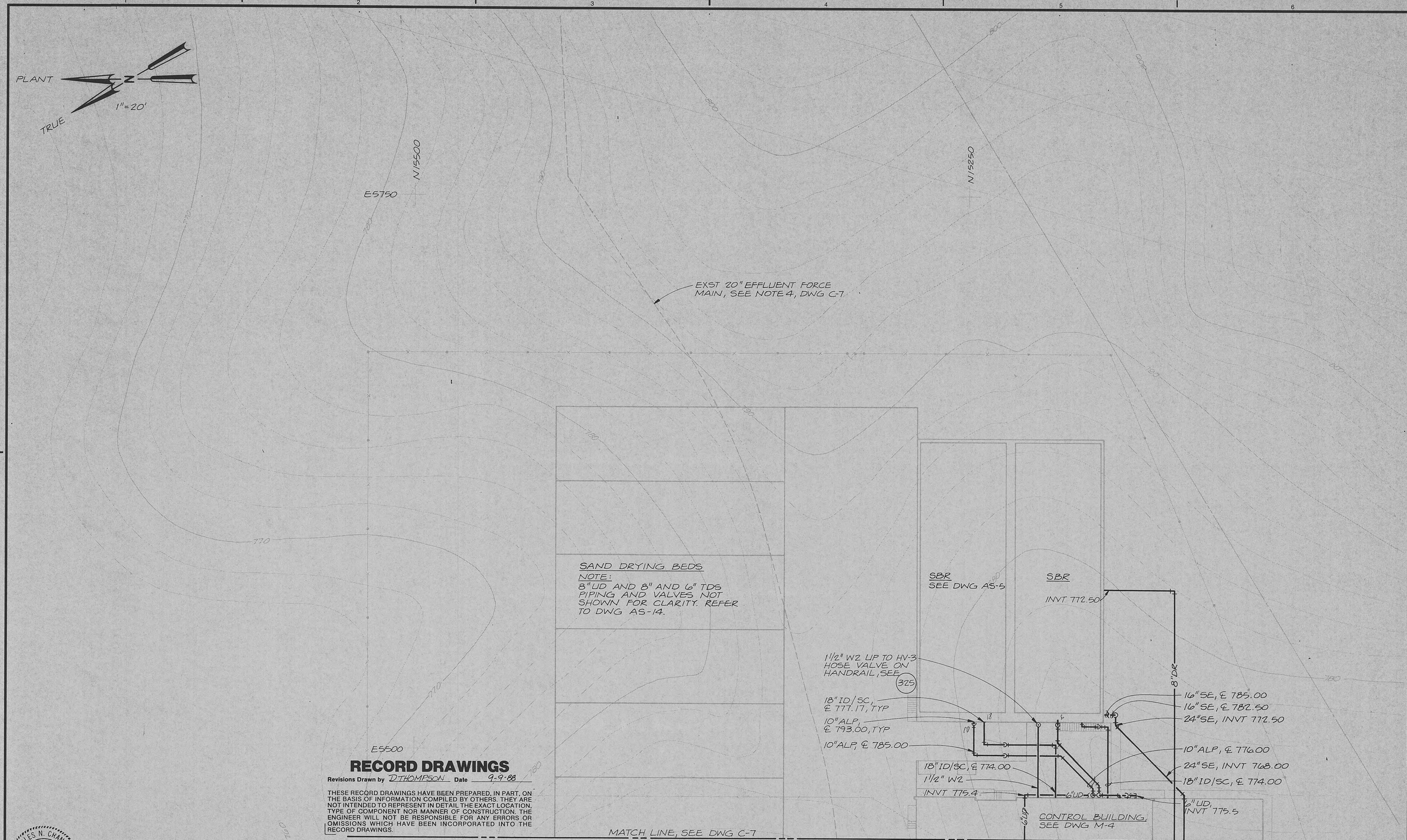
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

HEADWORKS-FOUNDATION PLAN

DWG NO. AS-1
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION | COMPOSITE | OVERLAY | SCREEN
PROJ NO.
CONTRACT



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CHARLES N. CRANDALL REGISTERED ENGINEER 11-21-86 No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	D. PETERSON
DR	R. BEYER
CHK	K. CLANCY
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	DAT	RECORD DRAWINGS	DAT	CNC

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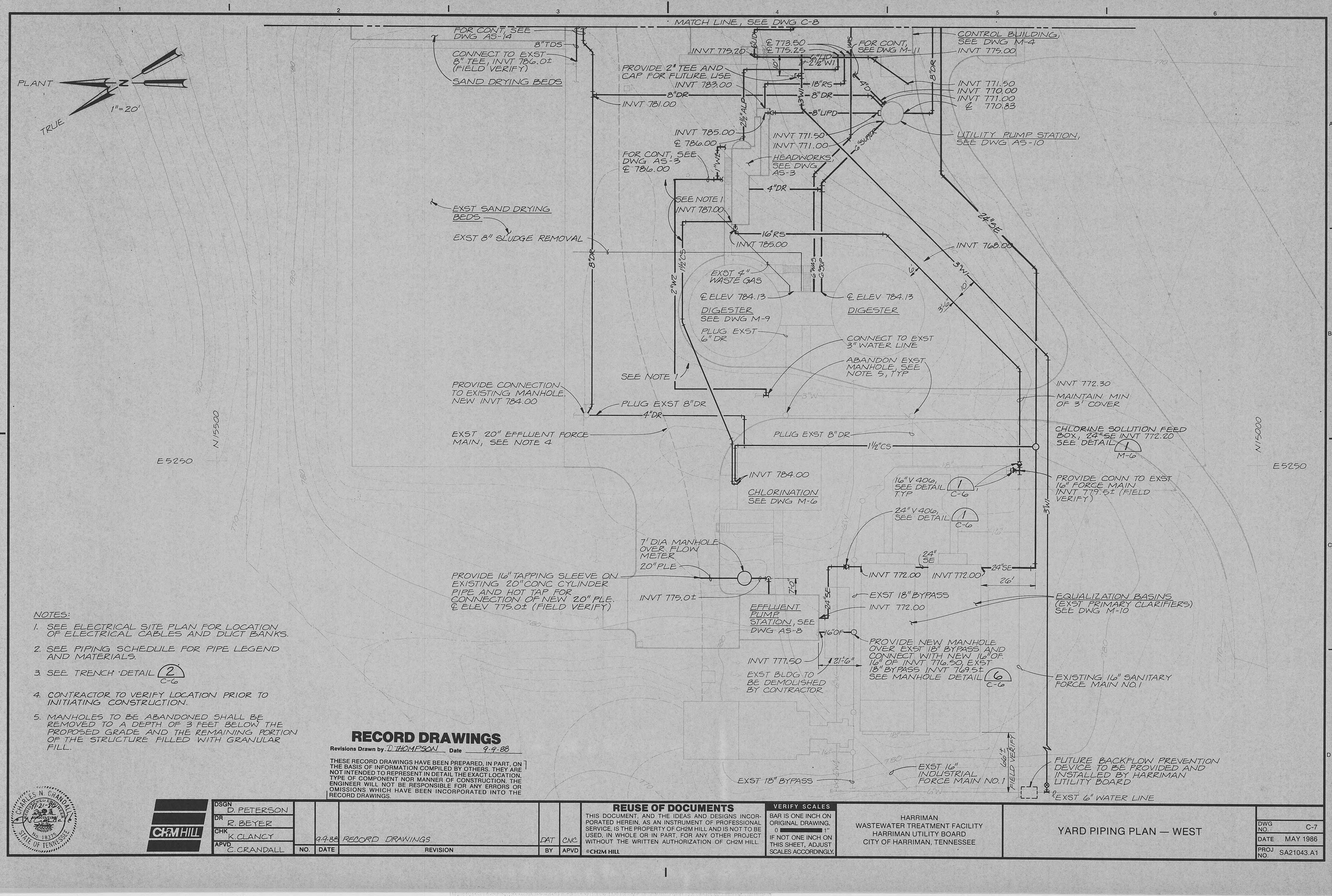
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

YARD PIPING PLAN — EAST

DWG NO.	C-8
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION	COMPOSITE	4-BT	C-8	4-NS	4-NP
PROJ NO.	OVERLAY	4-BT	C-8	4-NS	4-NP
CONTRACT	SCREEN	S		S	



NOTES:

1. SEE ELECTRICAL SITE PLAN FOR LOCATION OF ELECTRICAL CABLES AND DUCT BANKS.
2. SEE PIPING SCHEDULE FOR PIPE LEGEND AND MATERIALS.
3. SEE TRENCH DETAIL 2 C-6
4. CONTRACTOR TO VERIFY LOCATION PRIOR TO INITIATING CONSTRUCTION.
5. MANHOLES TO BE ABANDONED SHALL BE REMOVED TO A DEPTH OF 3 FEET BELOW THE PROPOSED GRADE AND THE REMAINING PORTION OF THE STRUCTURE FILLED WITH GRANULAR FILL.

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9.9.88

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CHARLES N. CRANDALL REGISTERED ENGINEER AGRICULTURAL & CIVIL No. 18315 STATE OF TENNESSEE 11-21-88

CH2M HILL

DSGN	D. PETERSON
DR	R. BEYER
CHK	K. CLANCY
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9.9.88	RECORD DRAWINGS	DAT	CNC

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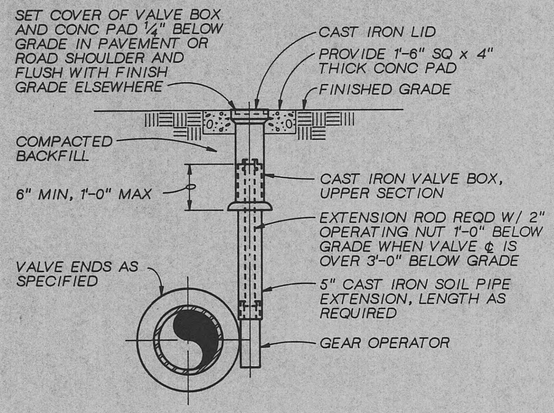
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

YARD PIPING PLAN — WEST

DWG NO.	C-7
DATE	MAY 1986
PROJ NO.	SA21043.A1

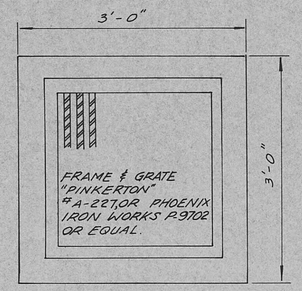
DESIGNED BY | DRAWN BY | CHECKED BY | PRINTED 2 | FILM KE | FORMAT 2334MC

| | | |



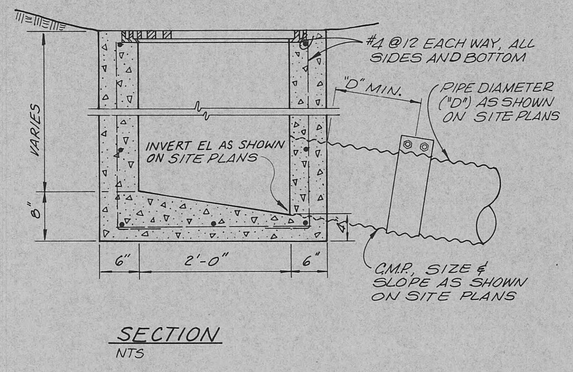
BURIED PLUG VALVE BOX SETTING DETAIL (1)

NTS C-7



PLAN

N.T.S.

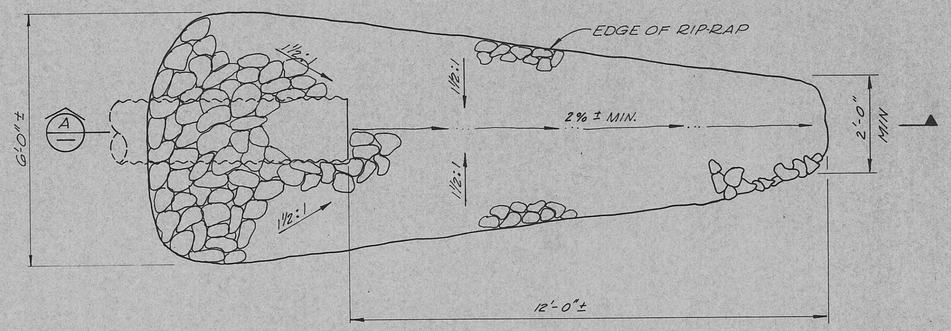


SECTION

NTS

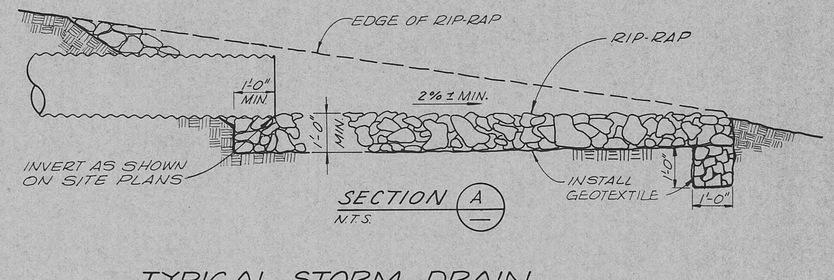
DRAIN INLET DETAIL (3)

NTS C-3



PLAN

N.T.S.

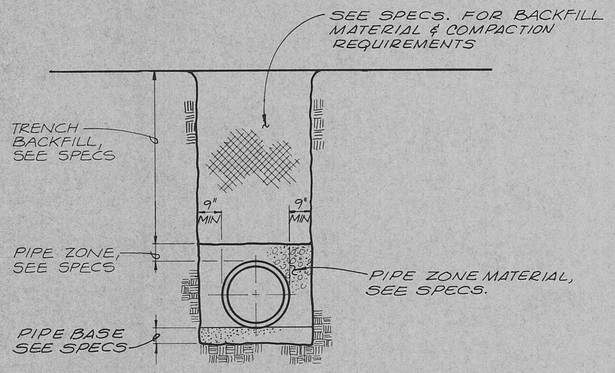


SECTION (A/—)

N.T.S.

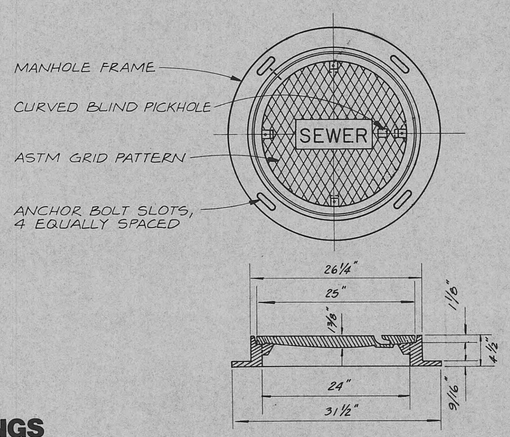
TYPICAL STORM DRAIN DISCHARGE DETAIL (5)

NTS C-3 C-4



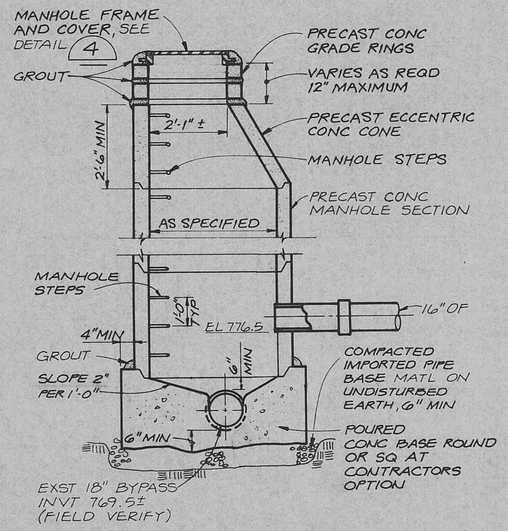
TRENCH DETAIL (2)

NTS C-7 C-8



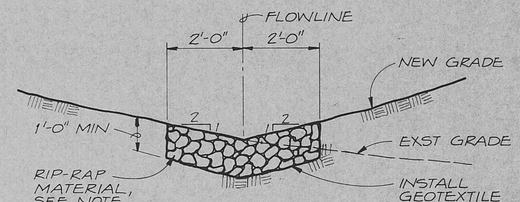
MANHOLE FRAME AND COVER DETAIL (4)

NTS



MANHOLE DETAIL (6)

NTS C-7



NOTE:

RIP-RAP MATERIAL SHALL BE AS SPECIFIED EXCEPT STONE SHALL BE LESS THAN 6 INCHES AND 90% GREATER THAN 1 INCH IN SIZE.

DETAIL (7)

NTS

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Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — 9/21/88 — No. 18315 — STATE OF TENNESSEE

CH2M HILL

DSGN	DR	CHK	APVD
W. WAGNER	A. DURLEY	S. NEWTON	C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	9.9.88	RECORD DRAWINGS		

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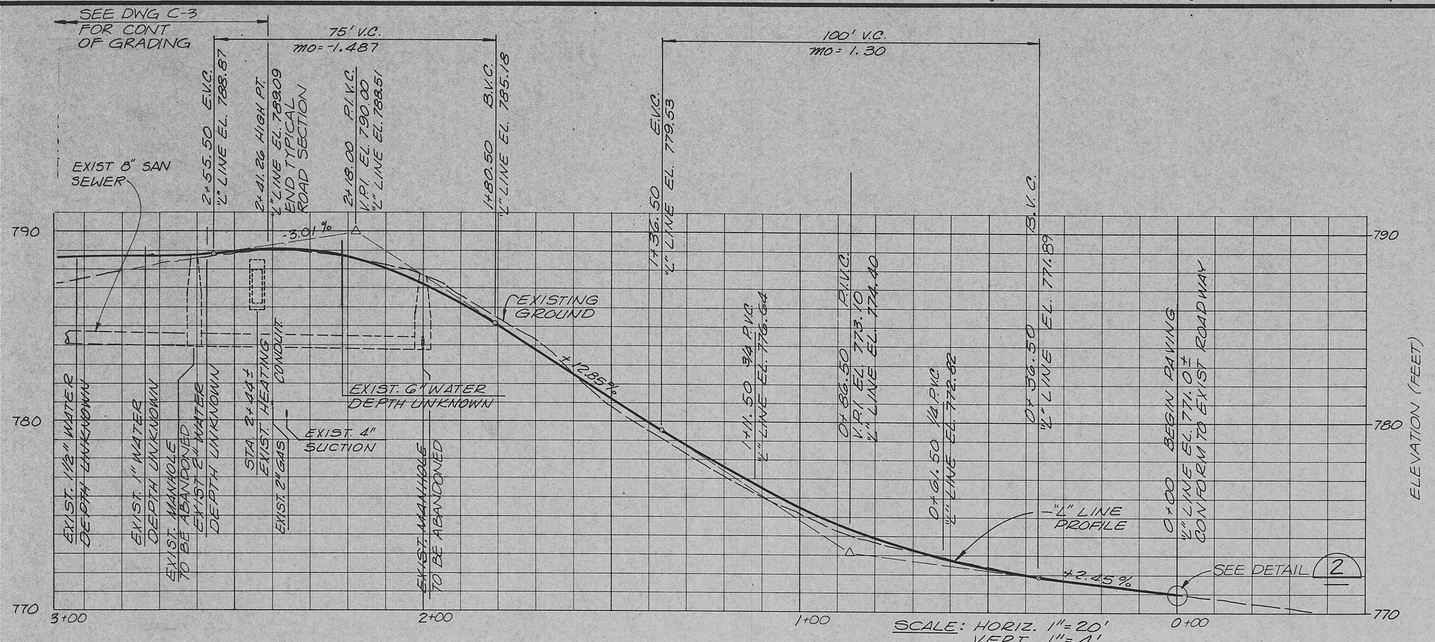
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

SITE DETAILS

DWG NO.	C-6
DATE	MAY 1986
PROJ NO.	SA21043.A1

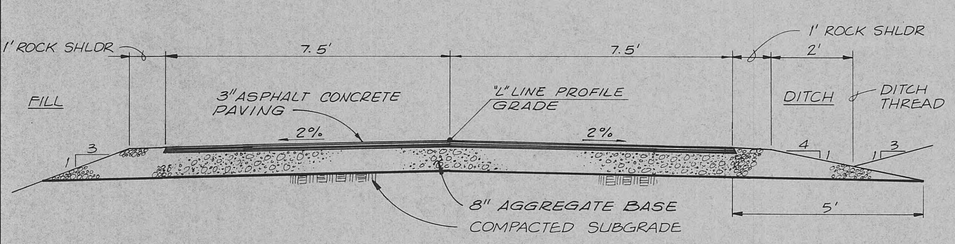


SCALE: HORIZ. 1"=20'
VERT. 1"=4'

ENTRANCE ROAD "L" LINE PROFILE

HORIZ 1" = 20'
VERT 1" = 4'

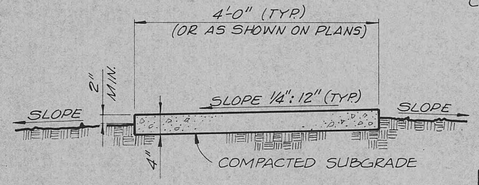
SEE DWG C-3



ENTRANCE ROAD SECTION (A)

NTS

C-3
C-4

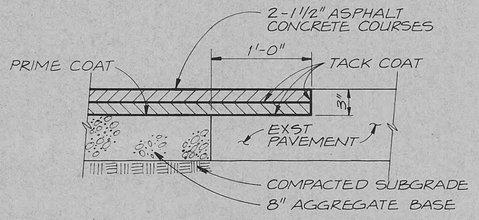


NOTES:
1. INSTALL EXPANSION JOINTS ON 16'-0" MAX. CENTERS.
2. PROVIDE TOOL JOINTS ON 4'-0" MAX. CENTERS.

CONCRETE SIDEWALK DETAIL (1)

NTS

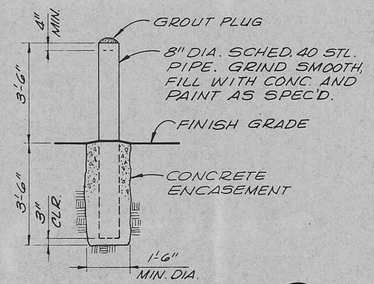
C-3
C-4



DETAIL (2)

NTS

C-3



GUARD POST DETAIL (3)

NTS

C-3
C-4

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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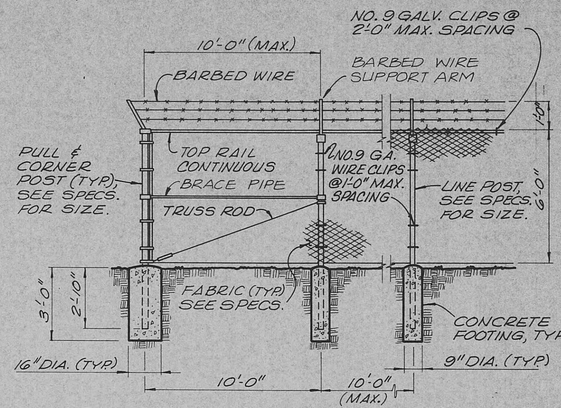
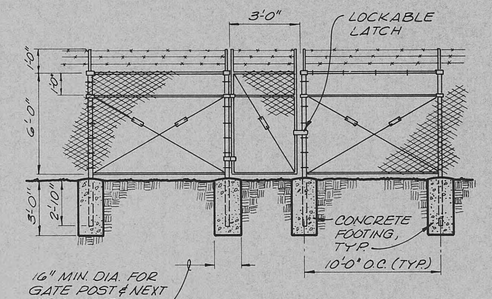


PERIMETER CHAIN LINK FENCE DETAIL (4)

NTS

C-2

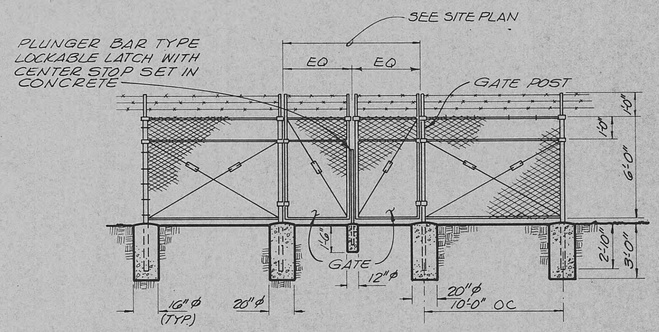


NOTE:
GATE LATCHES SHALL BE ARRANGED FOR LOCKING. ALL GATES SHALL HAVE KEEPERS CONSISTING OF A MECH DEVICE FOR SECURING THE FREE END OF THE GATE WHEN IT IS IN THE FULL OPEN POSITION

SINGLE SWING GATE DETAIL (5)

NTS

C-2



ENTRANCE OR DOUBLE SWING GATE DETAIL (6)

NTS

C-2

CHARLES N. CRANDALL REGISTERED ENGINEER 12/31/88 No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	DR	CHK	APVD
W WAGNER	A. DURLEY	S. NEWTON	C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	9-9-88	RECORD DRAWINGS		

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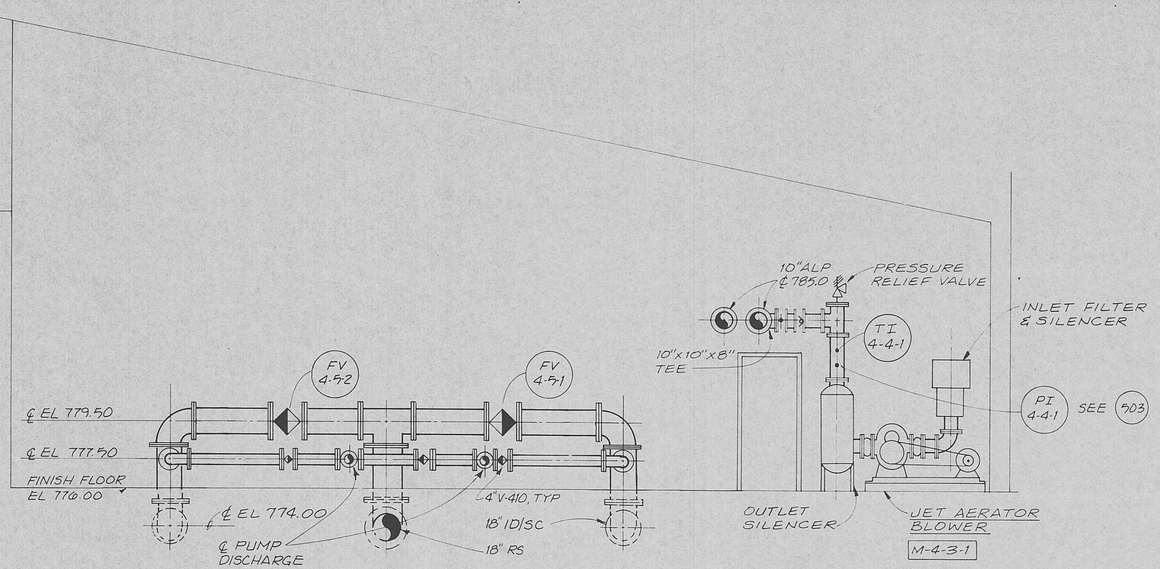
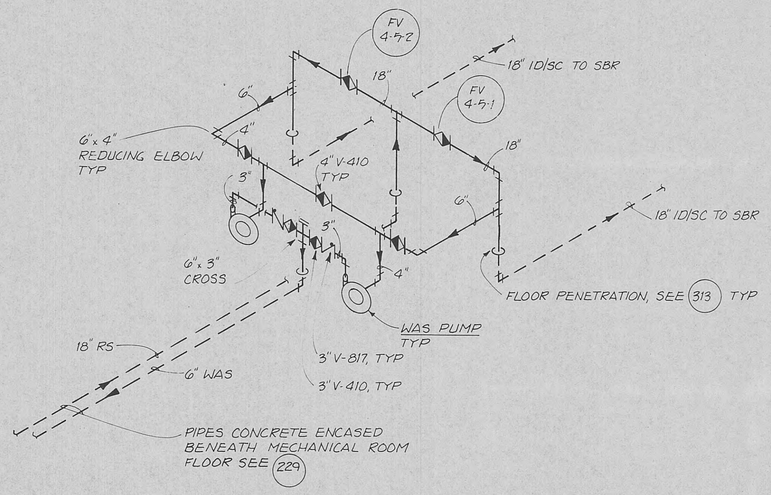
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

ENTRANCE ROAD AND SITE DETAILS

DWG NO.	C-5
DATE	MAY 1986
PROJ NO.	SA21043.A1



SECTION A
1/4"= 1'-0" M-4



PIPING SCHEMATIC

NTS

NOTE:

THE EQUIPMENT AND PIPING SHOWN IS ONLY TO INDICATE THE ORIENTATION DESIRED BY THE OWNER. SPACING AND SIZING SHALL BE AS REQUIRED BY THE SBR EQUIPMENT SUPPLIER TO MEET SPECIFIED PERFORMANCE REQUIREMENTS.

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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OVERLAY IDENTIFICATION | COMPOSITE | OVERLAY SCREEN
PROJ NO.
CONTRACT

CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18378 — STATE OF TENNESSEE

CH2M HILL

DSGN M. VEACH					
DR S. BEYER					
CHK K. CLANCY					
APVD C. CRANDALL	9-9-88	RECORD DRAWINGS	RDJ	CHK	
	NO. DATE	REVISION	BY	APVD	

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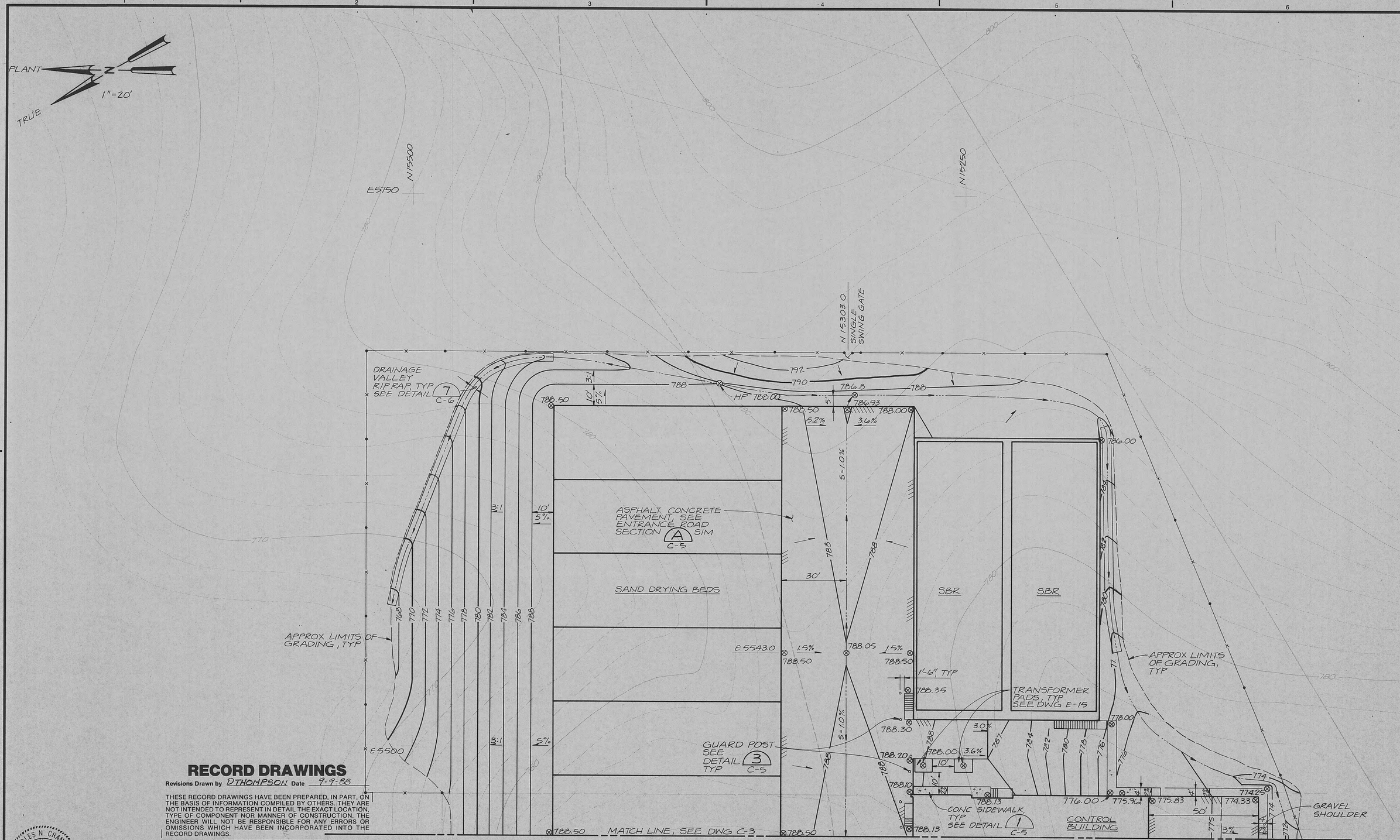
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING —
SECTIONS AND ISOMETRIC

DWG NO.	M-5
DATE	MAY 1986
PROJ NO.	SA21043.A1



RECORD DRAWINGS

Revisions Drawn by DTHOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	W. WAGNER
DR	R. BEYER
CHK	S. NEWTON
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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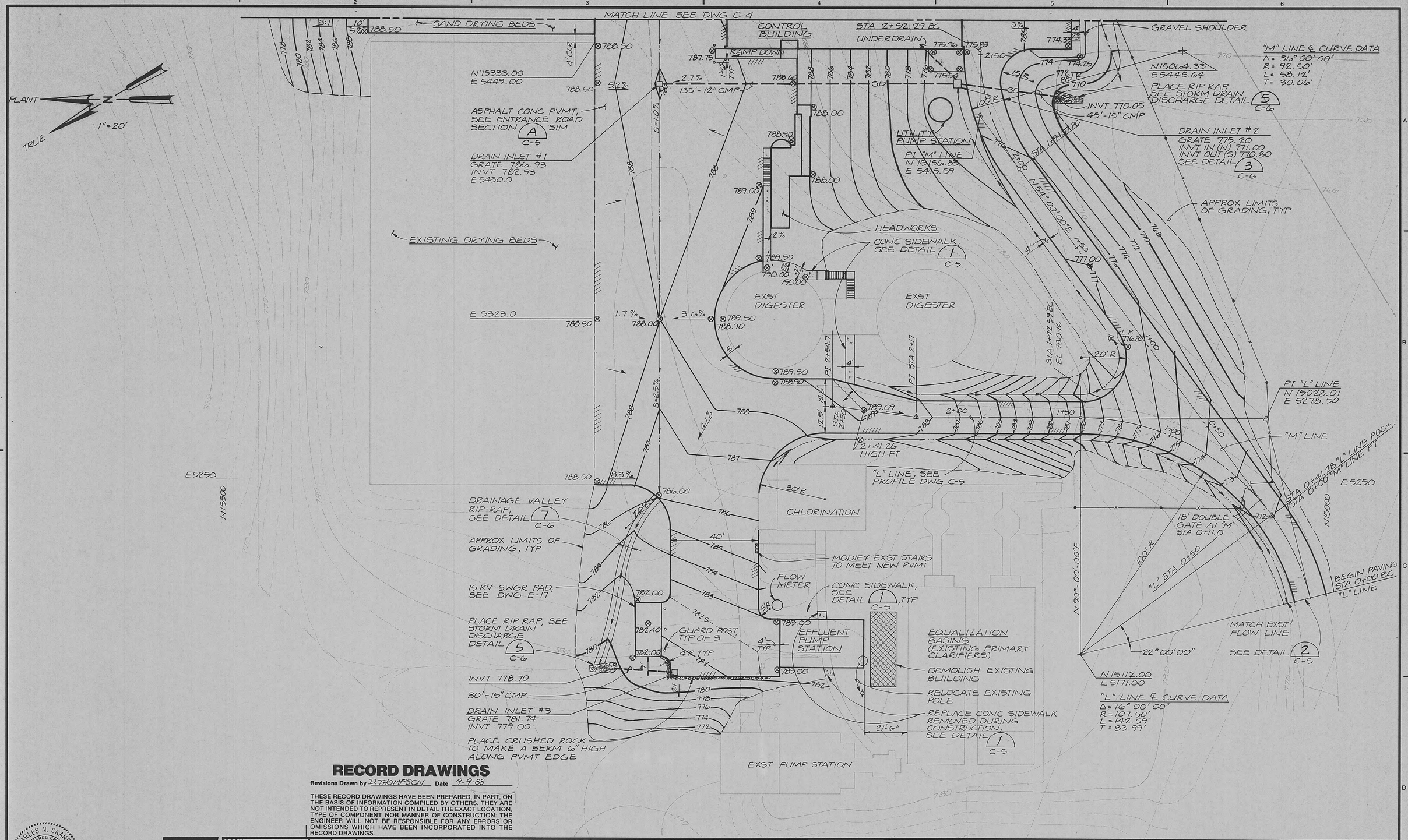
CITY OF HARRIMAN, TENNESSEE

SITE PLAN — EAST

DWG NO.	C-4
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT

COMPOSITE	4-BT	C-4	4-NC	4-NS	
OVERLAY	4-BT	C-4	4-NC	4-NS	
SCREEN	S				



RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN W. WAGNER					
DR R. BEYER					
CHK S. NEWTON		9-9-88	RECORD DRAWINGS	DAT	CNC
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD

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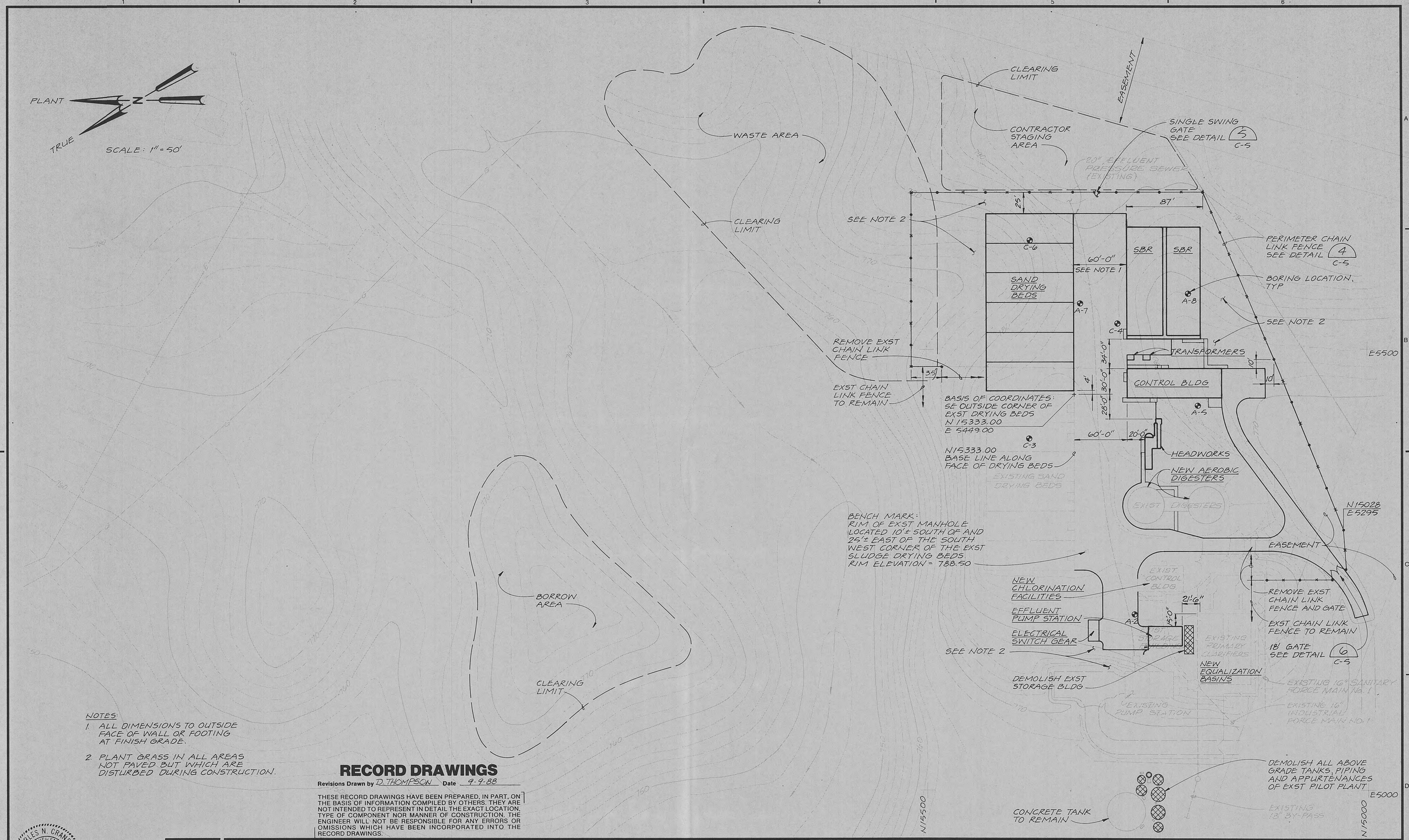
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

SITE PLAN — WEST

DWG NO.	C-3
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION					
PROJ NO.	COMPOSITE	3-BT	C-3	3-NC	3-NS
CONTRACT	OVERLAY	3-BT	C-3	3-NC	3-NS
	SCREEN	S			



NOTES:

1. ALL DIMENSIONS TO OUTSIDE FACE OF WALL OR FOOTING AT FINISH GRADE.
2. PLANT GRASS IN ALL AREAS NOT PAVED BUT WHICH ARE DISTURBED DURING CONSTRUCTION.

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER 11-21-86 CONSULTING ENGINEERS No. 18375 STATE OF TENNESSEE

CH2M HILL

DSGN	W. WAGNER
DR	L. MC CALL
CHK	S. NEWTON
APVD	C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	CNC

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

OVERALL SITE PLAN

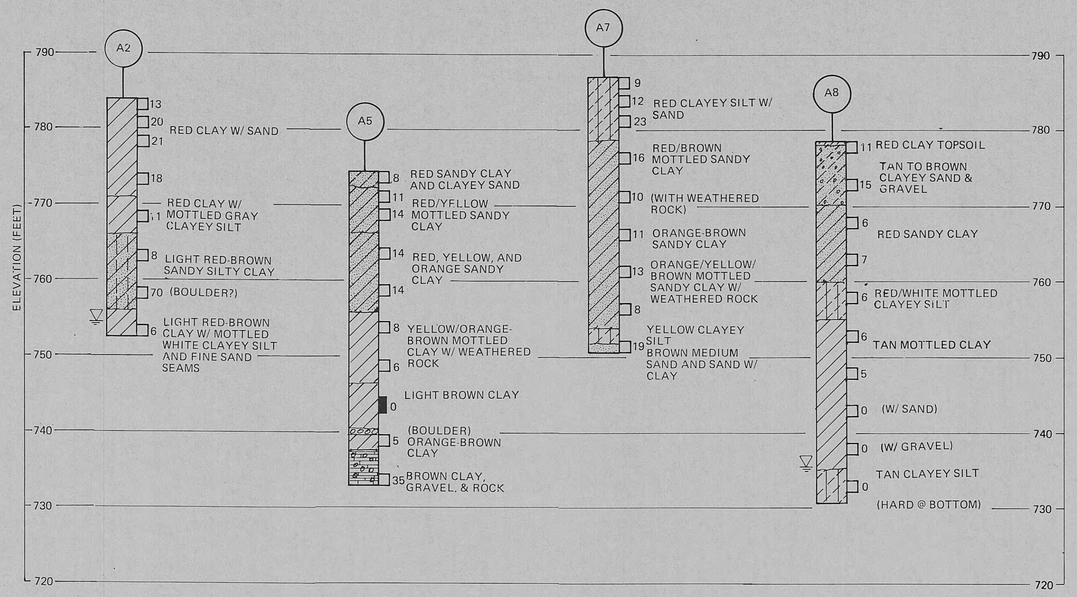
DWG NO.	C-2
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT

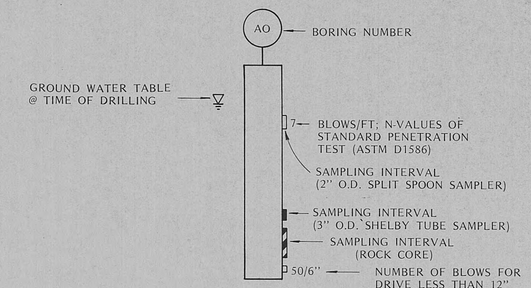
COMPOSITE	2-BT	C-2	2-NS
OVERLAY	2-BT	C-2	2-NS
SCREEN	S		

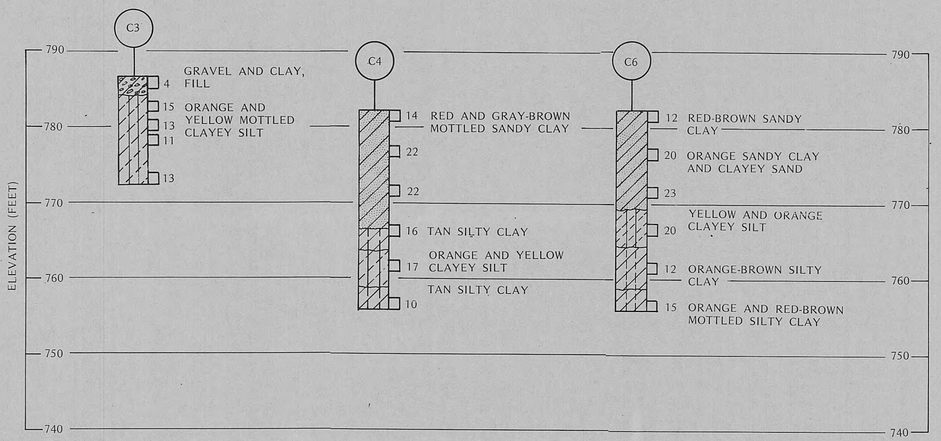
CIVIL LEGEND

- FINISH GRADE ELEVATION
- 780 — FINISH CONTOUR LINE — WHOLE FOOT
- FINISH CONTOUR LINE — HALF FOOT
- EXISTING CONTOUR LINE
- CATCH BASIN OR DRAIN INLET
- GUARD POST
- EXISTING UTILITY POLE
- 772 — APPROXIMATE LIMITS OF GRADING
- MATCH LINE
- CENTER LINE
- EXISTING ROAD
- EXISTING FACILITY
- BUILDING OR STRUCTURE TO BE DEMOLISHED BY CONTRACTOR
- NEW STRUCTURE
- DRAINAGEWAY OR DITCH
- 18'GATE — EXISTING FENCE
- NEW FENCE AND GATES WITH SIZE INDICATED
- 90'-15" CMP SD — STORM DRAIN CULVERT — SIZE AND LENGTH INDICATED
- CONCRETE
- RIP RAP
- GRASS
- ASPHALT CONCRETE PAVEMENT
- N1000.00 E1000.00 — LOCATION POINT COORDINATES
- BORING NUMBER AND LOCATION



LEGEND





NOTES:

1. BORINGS A-2, A-5, A-7 AND A-8 DRILLED BY GEOLOGIC TESTING, INC., OF ATLANTA, GEORGIA FROM APRIL 30 THROUGH MAY 3, 1980.
2. BORINGS C-3, C-4 AND C-6 DRILLED BY GEOLOGIC ASSOCIATES, INC., OF KNOXVILLE, TENNESSEE ON JULY 2-3, 1980.
3. ALL BORINGS DRILLED USING A CME-55 TRUCK MOUNTED DRILLING RIG WITH HOLLOW STEM AUGERS.
4. THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
5. THE DEPTHS OF INDICATED INTERFACES BETWEEN SOIL TYPES ARE APPROXIMATE, AND TRANSITION BETWEEN DIFFERENT SOIL TYPES MAY BE GRADUAL.
6. GROUND-WATER ELEVATIONS SHOWN WERE OBSERVED IMMEDIATELY AFTER BORINGS WERE COMPLETED, OR NOT OBSERVED DUE TO OBSTRUCTIONS IN BOREHOLES.
7. SEE DRAWING C-2 FOR BORING LOCATIONS.

RECORD DRAWINGS

Revisions Drawn by D.THOMPSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18326 STATE OF TENNESSEE

CH2M HILL

DSGN W. WAGNER
DR R. BEYER
CHK S. NEWTON
APVD C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWINGS	DAT	ONC

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WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CIVIL LEGEND AND BORING LOGS

DWG NO. C-1
DATE MAY 1986
PROJ NO. SA21043.A1

OVERLAY IDENTIFICATION
PROJ NO.
CONTRACT
COMPOSITE LEGEND C-1
OVERLAY LEGEND C-1
SCREEN S
FORMAT 2234MC
FILM KE
PRINTED 2
DESIGNED BY
DRAWN BY
CHECKED BY

8-MAY-86 08:31252,112521G3 .DGN;1

ABBREVIATIONS

@	AT
A/B	AERATION BASIN
AB	ANCHOR BOLT
ABDN	ABANDONED
ACBD	ACOUSTICAL BOARD
ACST	ACOUSTICAL TILE
ACT	ACOUSTICAL
AD	AREA DRAIN
ADDL	ADITIONAL
ADJ	ADJACENT
AHR	ANCHOR
AL	ALUMINUM
ALTN	ALTERNATE
ANOD	ANODIZED
APPROX	APPROXIMATE
APVD	APPROVED
ARCH	ARCHITECTURAL
ASSY	ASSEMBLY
AVG	AVERAGE
BC	BOTTOM OF CURB
BD	BOARD
BETW	BETWEEN
BF	BOTTOM FACE
BLDG	BUILDING
BM	BEAM
BOD	BOTTOM OF DUCT
BOD_5	BIOCHEMICAL OXYGEN DEMAND (5 DAY TEST)
BOL	BOTTOM OF LINE
BOT	BOTTOM
BRG	BEARING
CAB.	CABINET
C/C	CHLORINE CONTACT
CEM PLAS	CEMENT PLASTER
CHEM	CHEMICAL
CHKD	CHECKERED
CFM	CUBIC FEET PER MINUTE
CJ	CONSTRUCTION JOINT
C	CENTER LINE
CI	CAST IRON
CL_2	CHLORINE
CLG	CEILING
CLP	CLAY PIPE
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONARY UNITS
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
COR	CORNER
CP	CONCRETE PIPE
CPLG	COUPLING
CPVC	CHLORINATED POLYVINYL CHLORIDE
C TO C	CENTER TO CENTER
CTR	CENTER
CTRD	CENTERED
CU FT	CUBIC FEET
Δ	CENTRAL ANGLE
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DECHLOR	DECHLORINATION
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DIR	DIRECTION
DISCH	DISCHARGE
DS	DOWNSPOUT
DN	DOWN
DRWR	DRAWER
DWG	DRAWING
DWL	DOWEL
E	EAST
E	EXTERNAL
EA	EACH
ELB	ELBOW
ECC	ECCENTRIC
EF	EACH FACE
EFL	EFFLUENT
EL	ELEVATION
ELEC	ELECTRICAL
EQL	EQUAL
EQL SP	EQUALLY SPACED
EQPT	EQUIPMENT
EW	EACH WAY
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
EXST	EXISTING
FAB	FABRICATION
F FL EL	FINISHED FLOOR ELEVATION
FACIL	FACILITY
FCTY, FACT.	FACTORY
FEXT	FIRE EXTINGUISHER
FD	FLOOR DRAIN
FDN	FOUNDATION
FLL	FLOW LINE ELEVATION
FLEX	FLEXIBLE
FLG	FLANGE
FLR	FLOOR
FNSH	FINISH
GA	GAUGE
GB	GRAB BAR
GAL	GALLON
GALV	GALVANIZED
GALVS	GALVANIZED STEEL
GPD	GALLONS PER DAY
GVL	GRAVEL
GWB	GYPSUM WALLBOARD
GYP PLAS	GYPSUM PLASTER
H.A.S	HEADED ANCHOR STUD
HD	HUB DRAIN
HDNR	HARDNER
HDR	HEADER
HGT	HEIGHT
HORIZ	HORIZONTAL
HM	HOLLOW METAL
HR	HOUR
I&C	INSTRUMENTATION AND CONTROL
ID	INSIDE DIAMETER
IF	INSIDE FACE
INFL	INFLUENT
INSTL	INSTALL
INSUL	INSULATION
INVT	INVERT ELEVATION
ITG	INSULATED TEMPERED GLASS
JT	JOINT
L	LENGTH OF CURVE
LB	POUNDS
LB/D	POUNDS PER DAY
LG	LONG
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LONG	LONGITUDINAL
LT	LIGHT
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MG/L	MILLIGRAMS PER LITRE
MH	MANHOLE
MIN	MINIMIM
MISC	MISCELLANEOUS
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
MLVSS	MIXED LIQUOR VOLATILE SUSPENDED SOLIDS
MO	MONTH
MO	MASONARY OPENING
MON	MONUMENT
MTG	MOUNTING
MTL	METAL
MTRG	METERING
N	NORTH
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NORM	NORMAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OF	OUTSIDE FACE
O/H	OVERHEAD
O TO O	OUT TO OUT
OPNG	OPENING
OPP	OPPOSITE
PC	POINT OF CURVATURE
P/C	PRIMARY CLARIFIERS
PI	POINT OF INTERSECTION
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
PJF	PREMOLDED JOINT FILLER
PL	PLATE
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
POC	POINT ON CURVE
POT	POINT ON TANGENT
PR	PAIR
PRCST	PRECAST
PS	PUMP STATION
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PTD	PAPER TOWEL DISPENSER
PTD/R	PAPER TOWEL DISPENSER/RECPTACLE
PVC	POINT OF VERTICAL CURVATURE
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY
QDRNT	QUADRANT
R	R-VALUE (INSULATION)
R OR RAD	RADIUS
R	RISER
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RDCR	
REHAB	
REINF	REINFORCE
REQD	REQUIRED
RESIL	RESILIENT
RM	ROOM
RO	ROUGH OPENING
RR	REDUCER
RST	REINFORCING STEEL
S	SOUTH
SAT	SUSPENDED ACOUSTICAL TILE
S/C	SECONDARY CLARIFIERS
SCHED	SCHEDULE
SD	SOAP DISPENSER
SECT	SECTION
SG	SAFETY GLASS
SH	SHEET
SHTG	SHEETING
SIM	SIMILAR
SLV	SHORT LEG VERTICAL
S.O.	SHUTOFF
SPECD	SPECIFIED
SPECS	SPECIFICATIONS
SPG	SPACING
SQ	SQUARE
SST	STAINLESS STEEL
STA	STATION
STD	STANDARD
STIF	STIFFENER
STOR	STORAGE
STR	STRAIGHT
STRUCT	STRUCTURAL
STL	STEEL
SYMM	SYMMETRICAL
T	TINTED
T	TANGENT LENGTH
T&B	TOP AND BOTTOM
TC	TOP OF CONCRETE
TC	TOP OF CURB
TEMP	TEMPERED
TF	TOP FACE
TG	TEMPERD GLASS
THK	THICK
THRD	THREADED
T.O.	TOP OF
TPD	TONS PER DAY
TPI	TURNOUT POINT OF INTERSECTION
TRANSV	TRANSVERSE
TRD	TREAD
TSS	TOTAL SUSPENDED SOLIDS
TST	TOP OF STEEL
TTD	TOILET TISSUE DISPENSER
TW	TOP OF WALL
TYP	TYPICAL
V	VENT
VAT	VINYL ASBESTOS TILE
VERT	VERTICAL
VCP	VITRIFIED CLAY PIPE
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	WEST
W/	WITH
WD	WOOD
WG	WIRE GLASS
WK	WEEK
WR GWB	WATER RESISTANT GYPSUM WALLBOARD
WR	WASTE RECEPTACLE
WS	WATER STOP OF WATERSURFACE
WS	WELDED STEEL
WWM	WELDED WIRE MESH
XFMR	TRANSFORMER
YR	YEAR

NOTE:
FOR PIPING CALL OUTS ALSO SEE FLOW STREAM IDENTIFICATIONS THIS DRAWING

FLOW STREAM IDENTIFICATION

LEGEND	SERVICE
—AI—	AIR, INSTRUMENT
—ALP—	AIR, LOW PRESSURE PROCESS
—ARD—	ACID RESISTANT DRAIN
—ARV—	ACID RESISTANT VENT
—CG—	CHLORINE GAS (PRESSURE)
—CGV—	CHLORINE GAS (VACUUM
—CS—	CHLORINE SOLUTION
—D—	DRAIN
—DR—	PROCESS DRAIN
—DS—	DIGESTED SLUDGE
—G—	GRIT
—HW—	HOT WATER
—OD—	OVERFLOW DRAIN
—OF—	OVERFLOW
—PD—	PLANT DRAIN
—PE—	PRIMARY EFFLUENT
—PI—	PRIMARY INFLUENT
—PLE—	PLANT EFFLUENT
—RD—	ROOF DRAIN
—RS—	RAW SEWAGE
—SA—	SAMPLE
—SD—	STORM DRAIN
—SE—	SECONDARY EFFLUENT
—SM—	SCUM
—SPD—	SUMP PUMP DISCHARGE
—SW—	SEAL WATER
—TDS—	THICKENED DIGESTER SLUDGE
—UD—	UNDERDRAIN
—UF—	UNDERFLOW
—UPD—	UTILITY PUMP DISCHARGE
—V—	VENT
—VAC—	VACUUM
—WAS—	WASTE ACTIVATED SLUDGE
—W1—	NO.1 WATER (POTABLE)
—W2—	NO.2 WATER (NON POTABLE)

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-88

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NOTE:
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CHARLES N. CRANDALL REGISTERED ENGINEER 9-9-88 No. 18315 STATE OF TENNESSEE

CH2M HILL

DSGN
DR RE BROWN 31252.112521G3
CHK
APVD

NO.	DATE	REVISION	DAT BY	CNC APVD
	9-9-88	RECORD DRAWINGS		

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HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

ABBREVIATIONS AND FLOW STREAM IDENTIFICATION

SHEET
DWG NO. G-5
DATE MAY 1986
PROJ NO. SA21043.A1

WASTEWATER FLOW,MGD	START-UP	DESIGN
ADF	0.90	1.50
PMF	1.20	2.00
PDF	2.50	4.10

WASTEWATER CHARACTERISTICS,MG/L	BOD5	TSS	NH3-N
ADF	185	185	20
PMF	220	220	30
PDF	220	220	30

START-UP LOADING,LBS/DAY	BOD5	TSS	NH3-N
ADF	1389	1389	150
PMF	2202	2202	300
PDF	4587	4587	625

DESIGN LOADING,LBS/DAY	BOD5	TSS	NH3-N
ADF	2314	2314	250
PMF	3670	3670	500
PDF	7523	7523	1026

INFLUENT SCREENING

MECHANICALLY CLEANED SCREEN

NUMBER	1
CAPACITY,MGD	4.9
WIDTH,INCHES	24
CLEAR OPENING,INCHES	0.375
INCLINATION ANGLE, DEG	80

MANUALLY CLEANED BACKUP

NUMBER	1
CAPACITY,MGD	4.9
WIDTH,INCHES	30
CLEAR OPENING,INCHES	0.75
INCLINATION ANGLE,DEG	45

GRIT REMOVAL

TYPE	VORTEX CONCENTRATOR
NUMBER	1
RATING	85% REMOVAL 80 MESH @ 4.0 MGD
CHAMBER DIAMETER,FT	8 (3 FT GRIT HOPPER)

AIR SCOUR

SOURCE	PLANT AIR
PRESSURE,PSIG	10

GRIT PUMPS

NUMBER	1
TYPE	VORTEX
CAPACITY,GPM X TDH (FT)	250 X 33

CYCLONE 1

CLASSIFIER

NUMBER	1
TYPE	SCREW CONVEYOR

INFLUENT FLOW MEASUREMENT

TYPE	PARSHALL FLUME
CAPACITY,MGD	10.4
THROAT,INCHES	12

SEQUENCING BATCH REACTORS

DESIGN CONDITIONS

F/M (PMF @ HWL)	0.12
MLSS (@HWL),MG/L	3000

BASINS

NUMBER	2
L X W X D,FT	125 X 40 X 18
MAXIMUM SWD,FT	16
MINIMUM SWD,FT	11
VOLUME EACH,CF(GAL)	80,000(598,400)
TOTAL VOLUME,CF(GAL)	160,000(1,196,800)

RETENTION TIME,HRS	START-UP	DESIGN		
ADF	32	19		
PMF	24	14		
PDF	11	7		
OPERATION,HRS @ %ADF	50%	75%	100%	133%
ANOXIC FILL	3.20	3.20	1.80	0.90
AERATED FILL	0.80	0.80	1.20	1.35
REACT	0.80	1.60	1.20	0.90
SETTLE	0.50	0.50	0.50	0.50
DECANT	0.50	0.75	0.75	0.75
IDLE	2.20	1.15	0.55	0.10
TOTAL CYCLE	8.00	8.00	6.00	4.50
AERATION,HRS/CYCLE	1.60	2.40	3.00	2.25
TOTAL AERATION,HRS/DAY	9.60	14.4	19.20	24.00
OPERATION,HRS @ %ADF	150%	200%	250%	300%
ANOXIC FILL	0.80	0.30	0.00	0.00
AERATED FILL	1.20	1.20	1.20	1.00
REACT	0.90	0.40	0.15	1.00
SETTLE	0.50	0.50	0.50	0.50
DECANT	0.70	0.70	0.70	0.50
FILL/DECANT	0.10	0.10	0.15	1.00
TOTAL CYCLE	4.20	3.20	2.70	4.00
AERATION,HRS/CYCLE	2.10	1.60	1.35	2.00
TOTAL AERATION,HRS/DAY	24.00	24.00	24.00	24.00

AERATION SYSTEM DESIGN

GENERAL CRITERIA

LBS O2/LBS BOD5	1.2
LBS O2/LBS NH3-N	4.6

AOR,LBS/DAY	START-UP	DESIGN
ADF	2357	3927
PMF	4022	6704
PDF	8379	13747

ALPHA	0.6
BETA	0.9
THETA	1.024
TEMP,DEG C (F)	27(80)
ELEVATION,FT	800
Csw,MG/L	9.15
C'sw,MG/L	8.08
C,MG/L	1.00

SOR,LBS/DAY	START-UP	DESIGN
ADF	4969	8280
PMF	8480	14135
PDF	17660	28984

SIZING CRITERIA

INLET TEMPERATURE, DEG F	100
INLET PRESSURE,PSI	14.7
SYSTEM LOSSES,PSI	6.5
BLOWER EFFICIENCY,%	65
ABSORPTION EFFICIENCY,%	18.2

TOTAL AIR REQUIRED,SCFM	STARTUP	DESIGN
ADF	1091	1818
PMF	1860	3104
PDF	3879	6366

TOTAL HP REQUIRED	STARTUP	DESIGN
ADF	41.8	69.6
PMF	71.2	118.8
PDF	148.5	243.6

BLOWER SELECTION

NUMBER	4
TYPE	POSITIVE DISPLACEMENT
AIR FLOW (EACH), SCFM	1000 @ 1100 RPM 500 @ 650 RPM
NPHP	50 (V-BELT DRIVE)
NORMAL OPERATION	2 (2 STANDBY)
PEAK LOADING OPERATION	3 (1 STANDBY)

JET HEADERS/JETS

NUMBER	2 (1 PER BASIN @ CENTERLINE)
DIAMETER, INCHES	16
JETS PER HEADER	36
JET GASSING RATE,SCFM/EA	28 (58 MAX)

JET PUMPS

NUMBER	2
TYPE	SUBMERSIBLE
CAPACITY,GPM	6500 (EACH)
HEAD,TDH	20
NPHP	60
PUMPING RATE,GPM/JET	180
FLUID:GAS RATIO	6.5:1 (3.3:1 MAX)

EFFLUENT EQUALIZATION (EXISTING PRIMARY CLARIFIERS)

NUMBER	4
L X W X D,FT	56.5 X 12 X 12
SWD,FT	
MAX	9.5
MIN	0.0
MAX WORKING VOLUME,CF(GAL)	25,800 (193,000)

EFFLUENT PUMP STATION

WET WELL

L X W X D,FT	19.67 X 17.67 X 18.67
SWD,FT	
MAX	15
MIN	6
MAX WORKING VOLUME,CF(GAL)	3,128 (23,400)

PUMPS

NUMBER	3
TYPE	VERTICAL TURBINE
STAGES	
CAPACITY (EACH)	
GPM	2950
TDH	250
RPM	1770
NPHP	250

SURGE TANK

NUMBER	1
L X OD,FT	25 X 7
WORKING VOLUME,CF(GAL)	933 (6,980)

EFFLUENT FLOW MEASUREMENT

TYPE	VENTURI
SIZE,IN	20 (12 IN THROAT)
CAPACITY,MGD	4 TO 8

CHLORINATION

CHLORINATORS

NUMBER	2(1 EXIST TO BE USED AS STANDBY)
MAXIMUM CAPACITY,LBS/DAY	
NEW	500
EXIST	500
ROTAMETER SIZE,LBS/DAY	
NEW	500
EXIST	
MAXIMUM SECONDARY EFFLUENT (@ MAX DECANT RATE OF 4155 GPM)	CHLORINE DOSAGE,MG/L 10

EJECTORS

NUMBER	2(1 EXIST TO BE USED AS STANDBY)
CAPACITY,LBS/DAY	
NEW	500
EXIST	
REQD W2 SUPPLY,GPM X PSI	32 X 32

STORAGE

TOTAL NO. 1 TON CYLINDERS	4
CYLINDERS ON LINE	1
STANDBY CYLINDERS	1

CHLORINE CONTACT (EQUALIZATION ONLY),MIN (@ MAX DECANT RATE OF 4155 GPM)	46

AEROBIC DIGESTERS

GENERAL CRITERIA

NUMBER	2(CONVERT EXIST ANAEROBIC UNITS)
OD X D,FT	43 X 23
MIN FREEBOARD,FT	2
WORKING VOLUME,CF(GAL)	
EACH	26390(197390)
TOTAL	52780(394780)

VOLATILE SOLIDS LOADING	STARTUP	DESIGN
LBS/DAY	1000	1664
LBS/CF/DAY	0.02	0.03

HYDRAULIC RETENTION TIME,DAYS	
STARTUP	25
DESIGN	15
SOLIDS RETENTION TIME,DAYS	
STARTUP	34
DESIGN	20

AERATORS

SIZING CRITERIA

DESIGN AOR,LBS O2/LBS VSS	2
PERCENT VSS DEST.	40
DESIGN FTR,LBS O2/HP/HR	1.8

UNITS

NUMBER	2(1 PER DIGESTER)
TYPE	HIGH SPEED FLOATING MECHANICAL
NPHP(EA)	40
DRAFT TUBE,FT	6
POWER DENSITY,HP/1000 CF	1.38

SAND DRYING BEDS

NUMBER	12(6 EXISTING)
L X W (EACH),FT	100 X 33
AREA,SF	
EACH	3300
TOTAL	39600
LOADING RATE,LBS/SF/YEAR	
STARTUP	8.6
DESIGN	14.3
AVAIL DRYING PERIOD,DAYS (12 INCH DRAW OF 2% SOLIDS)	
STARTUP	53
DESIGN	32

UTILITY PUMP STATION

WET WELL

OD X D,FT	9.5 X 11.0
DEPTH,FT (MAX/MIN)	5.0/1.5
WORKING VOLUME,GAL	1320

PUMPS

NUMBER	2
TYPE	SUBMERSIBLE
CAPACITY (EACH)	
GPM	445
TDH	30
NPHP	5
RPM	1750

SAMPLERS

INFLUENT
EFFLUENT

NOTE:
THIS TABLE FOR CONSULTANT COORDINATION ONLY. REFER TO DETAILED DRAWINGS AND SPECIFICATIONS FOR REQUIREMENTS

RECORD DRAWINGS

Revisions Drawn by D THOMPSON Date 9-9-86

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CHARLES N. CRANDALL — REGISTERED PROFESSIONAL ENGINEER — NO. 18375 — STATE OF TENNESSEE

CH2M HILL

DSGN C.CRANDALL
DR M.VEACH
CHK K.CLANCY
APVD C.CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	9-9-86	RECORD DRAWINGS		

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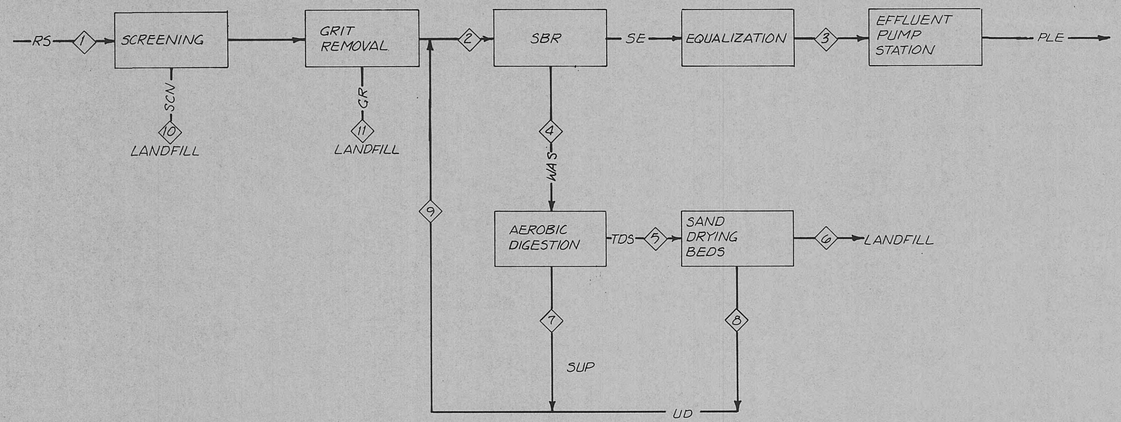
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

DESIGN DATA SUMMARY

DWG NO. G-4
DATE MAY 1986
PROJ NO. SA21043.A1



PROCESS SCHEMATIC

NTS

NOTES:

(a) FLOW PER 201 AMENDMENT (1985).

(b) INFLUENT ADF BOD_5/TSS/NH_3-N @ 185/185/20 mg/l; PMF AND PDF BOD_5/TSS/NH_3-N @ 220/220/30 mg/l PER 201.

(c) SCREENINGS AND GRIT QUANTITIES ASSUMED TO BE 5 CF PER $(10)^6$ GALLONS, EACH.

(d) SBR EFFLUENT BOD_5/TSS ASSUMED TO BE ± 20/20 mg/l; NH_3-N ± O mg/l.

(e) SBR SLUDGE YIELD ASSUMED TO BE 0.8 LBS VSS/LB BOD_5 REMOVED; VSS ASSUMED TO BE 75% OF TSS.

(f) DIGESTER ASSUMED TO ACHIEVE 40% VSS DESTRUCTION.

(g) CAKE ASSUMED TO BE 30% SOLIDS, S.G.OF 1.06 (66.1 LBS/CF)

(h) SBR WASTE SLUDGE CONCENTRATION ASSUMED TO BE 8,500 mg/l (0.85%); THICKENED, DIGESTED SLUDGE CONCENTRATION ASSUMED TO BE 20,000 mg/l (2.0%). BOD_5/TSS/NH_3-N ASSUMED TO BE 100/200/100 mg/l FOR SUPERNATANT.

(i) DRYING BED FREE DRAINAGE ASSUMED TO BE 20% OF APPLIED VOLUME AND BOD_5/TSS/NH_3-N @ 100/200/100 mg/l.

ABBREVIATIONS

ADF	AVERAGE DAY FLOW
GR	GRIT
PDF	PEAK DAY FLOW
PLE	PLANT EFFLUENT
PMF	PEAK MONTH FLOW
RS	RAW SEWAGE
SBR	SEQUENCING BATCH REACTOR
SCN	SCREENINGS
SE	SECONDARY EFFLUENT
SUP	SUPERNATANT
TDS	THICKENED DIGESTER SLUDGE
UD	UNDERDRAIN
WAS	WASTE ACTIVATED SLUDGE

FLOW BALANCE

	INITIAL			DESIGN YEAR		
	ADF	PMF	PDF	ADF	PMF	PDF
1 RAW SEWAGE, mgd(a)	0.90	1.20	2.50	1.50	2.00	4.10
2 SBR, mgd	0.91	1.22	2.55	1.52	2.04	4.18
4 WASTE SLUDGE, gpd	18,778	30,348	63,225	31,296	50,580	103,688
5 DIGESTED SLUDGE, gpd	5,586	9,029	18,809	9,311	15,047	30,847
7 SUPERNATANT, gpd	13,191	21,319	44,416	21,985	35,533	72,841
8 SUBNATANT, gpd	1,117	1,806	3,762	1,862	3,010	6,170
9 PLANT DRAINS, gpd	14,308	23,125	48,178	23,847	38,543	79,011

INITIAL MASS BALANCE

	BOD_5, lbs/day			TSS, lbs/day		
	ADF	PMF	PDF	ADF	PMF	PDF
1 RAW SEWAGE(b)	1389	2202	4587	1389	2202	4587
2 SBR INFLUENT	1400	2221	4627	1412	2240	4667
3 FINAL EFFLUENT(d)	152	204	425	150	204	425
4 WASTE SLUDGE(e)				1332	2151	4482
5 THICKENED DIGESTED SLUDGE(f)				932	1506	3137
6 DEWATERED SLUDGE, CF/day(g)				46	74	154
7 SUPERNATANT(h)	11	18	37	22	36	74
8 SUPERNATANT(i)	1	2	3	2	3	6
9 PLANT DRAINS	12	20	40	23	39	80
10 SCREENINGS, CF/day(c)				4.5	6.0	12.5
11 GRIT, CF/day(c)				4.5	6.0	12.5

DESIGN YEAR MASS BALANCE

	BOD_5, lbs/day			TSS, lbs/day		
	ADF	PMF	PDF	ADF	PMF	PDF
1 RAW SEWAGE(b)	2314	3670	7523	2314	3670	7523
2 SBR INFLUENT	2334	3702	7588	2354	3733	7653
3 FINAL EFFLUENT(d)	254	340	697	254	340	697
4 WASTE SLUDGE(e)				2219	3586	7351
5 THICKENED DIGESTED SLUDGE(f)				1553	2510	5145
6 DEWATERED SLUDGE, CF/day(g)				76	123	253
7 SUPERNATANT(h)	18	30	61	37	59	122
8 SUPERNATANT(i)	2	3	5	3	5	10
9 PLANT DRAINS	20	33	66	40	64	132
10 SCREENINGS, CF/day(c)				7.5	10.0	20.5
11 GRIT, CF/day(c)				7.5	10.0	20.5

RECORD DRAWINGS

Revisions Drawn by D. THOMPSON Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED ENGINEER — No. 18375 — STATE OF TENNESSEE

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APVD C. CRANDALL

NO.	DATE	REVISION	DAT BY	CNC APVD
	9-9-88	RECORD DRAWINGS		

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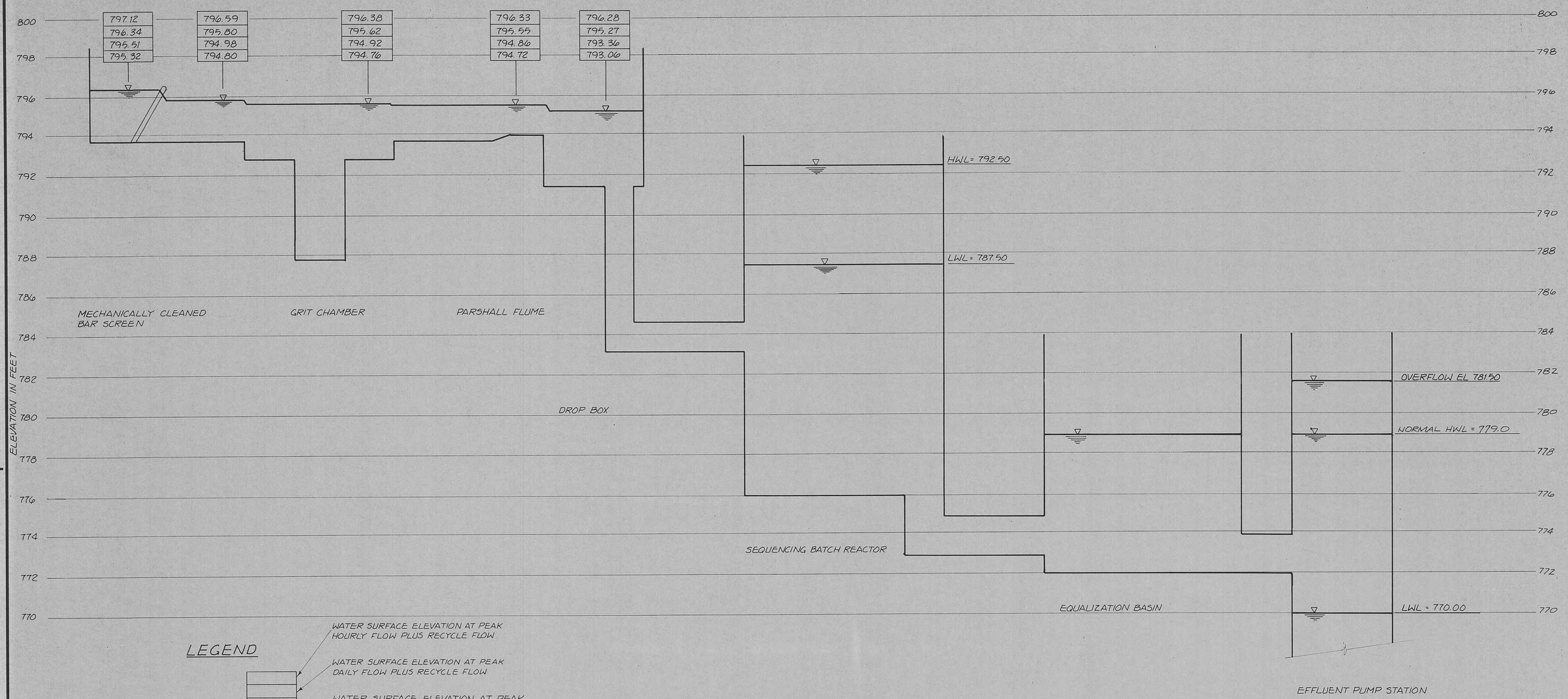
HARRIMAN
WASTEWATER TREATMENT FACILITY
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

FLOW AND MASS BALANCES

DWG NO. G-3
DATE MAY 1986
PROJ NO. SA21043.A1



LEGEND

- WATER SURFACE ELEVATION AT PEAK HOURLY FLOW PLUS RECYCLE FLOW
- WATER SURFACE ELEVATION AT PEAK DAILY FLOW PLUS RECYCLE FLOW
- WATER SURFACE ELEVATION AT PEAK MONTHLY FLOW PLUS RECYCLE FLOW
- WATER SURFACE ELEVATION AT AVERAGE DAILY FLOW PLUS RECYCLE FLOW

PEAK HOURLY FLOW	4.9 MGD
PEAK DAILY FLOW	4.1 MGD
PEAK MONTHLY FLOW	2.0 MGD
AVERAGE DAILY FLOW	1.5 MGD
RECYCLE FLOW	0.57 MGD

HYDRAULIC PROFILE

RECORD DRAWINGS

Revisions Drawn by R. RATLIFF Date 9-9-88

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CHARLES N. CRANDALL — REGISTERED PROFESSIONAL ENGINEER — No. 18335 — STATE OF TENNESSEE

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DSGN K. HOWE
DR A. DURLEY
CHK K. CLANCY
APVD C. CRANDALL

NO.	DATE	REVISION	BY	APVD
	9-9-88	RECORD DRAWING	RDR	

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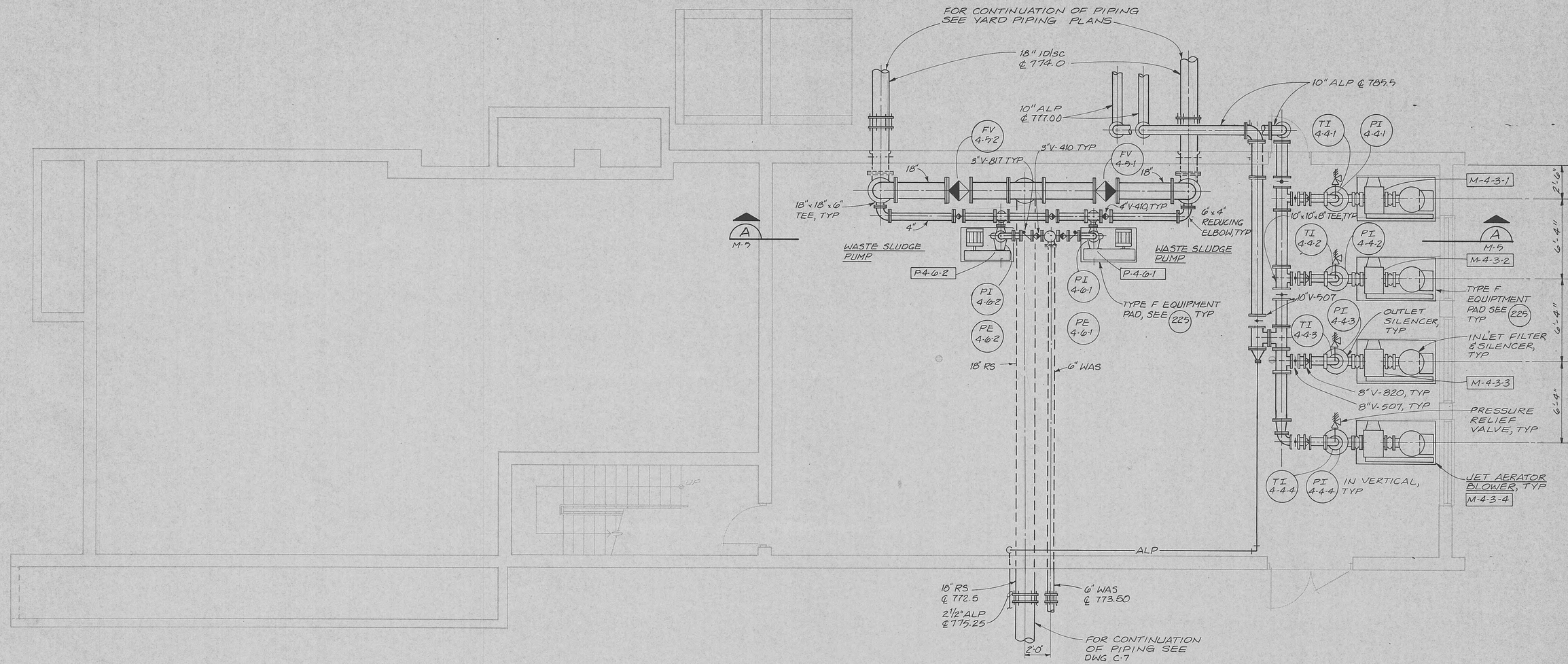
HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

HYDRAULIC PROFILE

DWG NO. G-2
DATE MAY 1986
PROJ NO. SA21043.A1



MECHANICAL ROOM PLAN

1/4"=1'-0"

NOTES:

1. THE EQUIPMENT AND PIPING SHOWN IS ONLY TO INDICATE THE ORIENTATION DESIRED BY THE OWNER. SPACING AND SIZING SHALL BE AS REQUIRED BY THE SBR EQUIPMENT SUPPLIER TO MEET SPECIFIED PERFORMANCE REQUIREMENTS.
2. SOME TAG NUMBERS HAVE BEEN OMITTED FOR CLARITY. REFER TO P & ID'S FOR TAG NUMBERS.
3. CONCRETE ENCASEMENT OF 18" RS AND 6" WAS BENEATH THE MECHANICAL ROOM FLOOR IS REQUIRED. SEE 229
4. FOR GRIT PUMP SEAL WATER PIPING SEE M-10 AND 303

RECORD DRAWINGS

Revisions Drawn by R. JACKSON Date 9-9-88

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CHARLES N. CRANDALL REGISTERED ENGINEER No. 18375 STATE OF TENNESSEE

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DR S. BEYER					
CHK C. CRANDALL		9-9-88	RECORD DRAWINGS	RDJ	CNC
APVD C. CRANDALL	NO.	DATE	REVISION	BY	APVD

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HARRIMAN UTILITY BOARD
CITY OF HARRIMAN, TENNESSEE

CONTROL BUILDING — MECHANICAL ROOM PLAN

DWG NO.	M-4
DATE	MAY 1986
PROJ NO.	SA21043.A1

OVERLAY IDENTIFICATION | PROJ NO. | CONTRACT | COMPOSITE | OVERLAY | SCREEN | FORMAT | FILM | PRINTED | DESIGNED BY | DRAWN BY | CHECKED BY