CITY OF PORTSMOUTH

PORTSMOUTH, NEW HAMPSHIRE

CONSTRUCTION DRAWINGS FOR

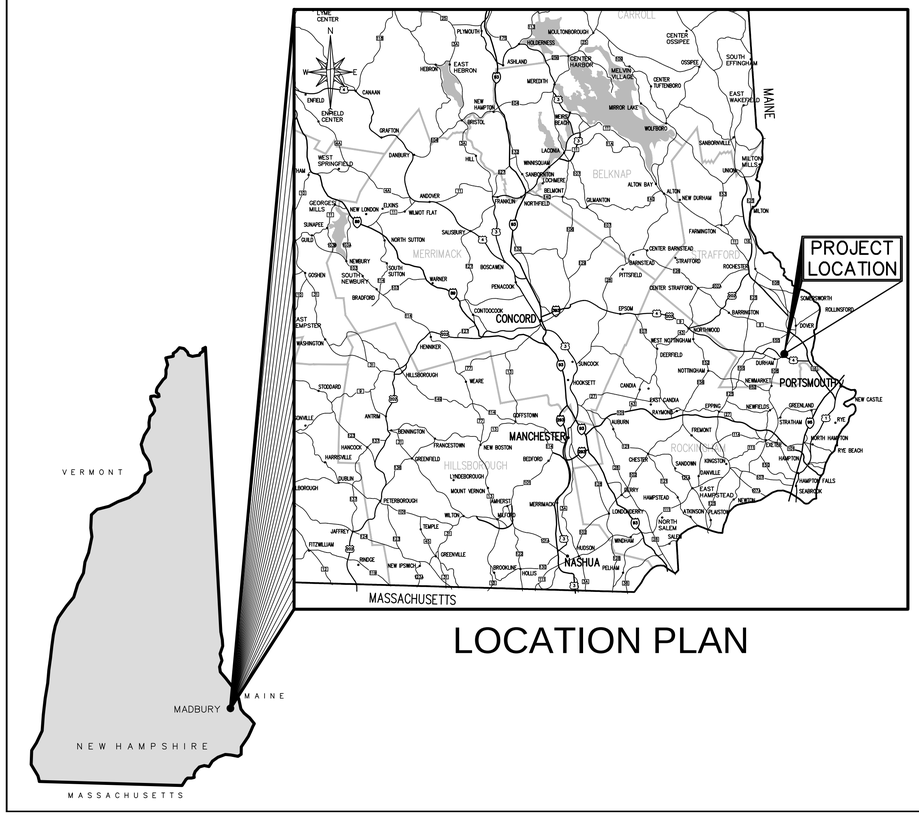
MADBURY WELLS #2, #3, #4 AND #5 UPGRADE

PREPARED BY

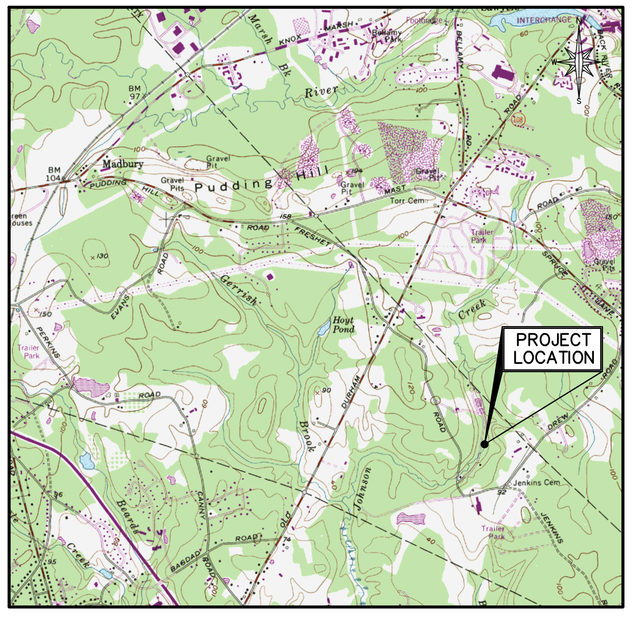
UNDERWOOD ENGINEERS, INC.

CONCORD, NEW HAMPSHIRE

JUNE 2021



LOCATION PLAN



VICINITY MAP

UE #1841

UNDERWOOD engineers

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ABBREVIATIONS:

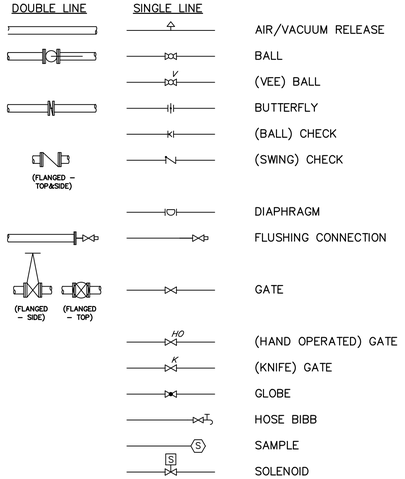
AB	ABANDONED
AIR	AIR
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AVG	AVERAGE
B	BORING
℄	BASELINE
BLDG	BUILDING
CB	CATCH BASIN
CFS	CUBIC FEET PER SECOND
CI	CAST IRON PIPE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CONST	CONSTRUCT
CONT	CONTINUOUS, CONTINUATION
CPE	CORRUGATED POLYETHYLENE
D	DRAIN
DI	DUCTILE IRON
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DMH	DRAINAGE MANHOLE
DN	DOWN
EL	ELEVATION
EMER	EMERGENCY
ENGR	ENGINEER
EOP	EDGE OF PAVEMENT
EXIST	EXISTING
FDN	FOUNDATION
FF	FINISHED FLOOR
FM	FORCE MAIN
FT	FOOT OR FEET
GAS	PROPANE GAS
GEN	GENERATOR
GHWC	GAS & HOT WATER CONDUIT
GND	GROUND
GPM	GALLONS PER MINUTE
FM	FORCE MAIN
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
IN	INCH
INV	INVERT ELEVATION
LB	POUND
LF	LINEAR FEET
LGT	LIGHT
LP	LIGHT POLE
LPA	LOW PRESSURE AIR
MJ	MECHANICAL JOINT
MON	MONUMENT
MW	MUNICIPAL WATER
NA OR N/A	NOT APPLICABLE
NET	NEW ENGLAND TELEPHONE COMPANY
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NHEC	NEW HAMPSHIRE ELECTRIC COOPERATIVE
N/F	NOW OR FORMERLY
N/R	NO REFUSAL
OD	OUTSIDE DIAMETER
OS	OUTLET STRUCTURE
PCF	POUNDS PER CUBIC FOOT
PK	SURVEYOR'S NAIL
PL	PROPERTY LINE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSNH	PUBLIC SERVICE COMPANY OF N.H.
PT	PRESSURE TREATED
PVC	POLYVINYL CHLORIDE SDR 35
PVCU	PVC UNDERDRAIN
PVDR	PVC DRAIN RETURN
PVMT	PAVEMENT
PVSA	PVC SAMPLE LINE
PVSL	PVC SUCTION LINE
R	REFUSAL
R (RAD)	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RD	ROAD
REF	REFER OR REFERENCE
REQD	REQUIRED
RS	RAW SEWAGE
ROW	RIGHT OF WAY
S	MUNICIPAL SEWER OR SEPTIC TANK
S	SLOPE (I.E., FT. PER FT.) IN PROFILES
SA	SAMPLE LINE
SCH	SCHEDULE
SD	SUMP DISCHARGE
SED	SEDIMENTATION
SEW	SEWAGE
SF	SQUARE FEET
SHT	SHEET
SMH	SEWER MANHOLE
ST	STEEL
STA	STATION
STD	STANDARD
STRL	STRUCTURAL
STRS	STAIRS
SW	SEAL WATER
SYMM	SYMMETRICAL
TBM	TEMPORARY BENCH MARK
TD	TANK DRAIN
THK	THICKNESS
TRANS	TRANSFORMER
TYP	TYPICAL
U/P	UTILITY POLE
V	VENT
VCD	VC DRAIN
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
W	WATER
W	WALL
WD	WOOD
W/	WITH

1. THIS IS A STANDARD LEGEND SHEET, THEREFORE SOME ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT ON THE DRAWINGS.

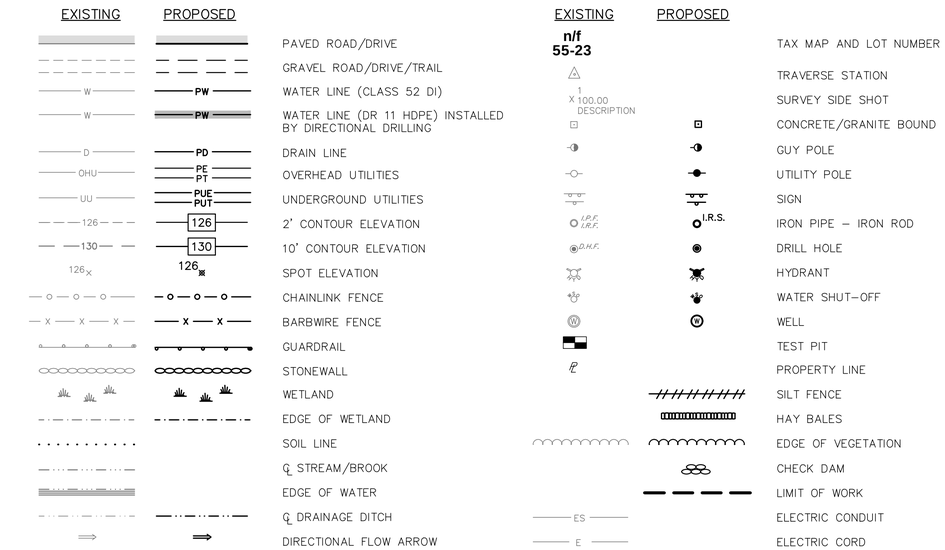
2. CONTACT ENGINEER FOR ABBREVIATIONS USED BUT NOT SHOWN ON THESE DRAWINGS.

VALVE SYMBOLS

(SEE GENERAL ABBREVIATIONS FOR PIPE MATERIAL IDENTIFICATION)



SITE LEGEND:



CONTACTS:

OWNER: TOWN OF PORTSMOUTH (603) 427-5030
PETER RICE, DIRECTOR OF PUBLIC WORKS
AL PRATT, WATER RESOURCE MANAGER
680 PEVERLY HILL ROAD, PORTSMOUTH, NH 03801

CIVIL ENGINEER: UNDERWOOD ENGINEERS, INC. (603) 230-9898
LYNNETTE CARNEY, P.E., PROJECT MANAGER
99 NORTH STATE STREET, CONCORD, NH 03301

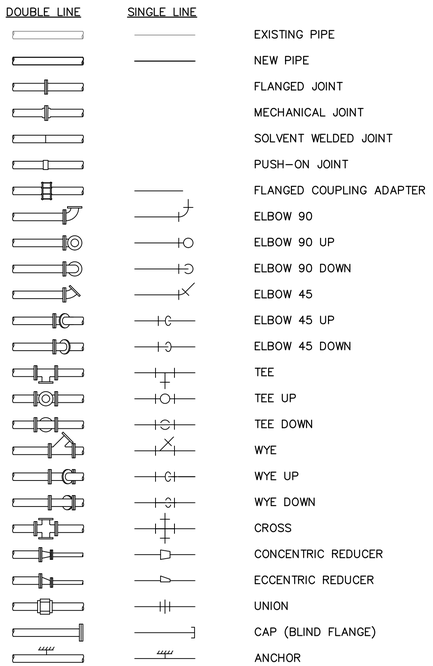
UTILITIES:

ELECTRIC:	PSNH	(800) 662-7764
TELEPHONE:	FAIRPOINT COMMUNICATIONS	(866) 984-2001
PROPANE:	DOWNEAST ENERGY	(603) 742-1565

PIPE AND FITTING SYMBOLS

(SEE GENERAL ABBREVIATIONS FOR PIPE MATERIAL IDENTIFICATION)

1. ALL PIPE SIZES ARE SHOWN AS NOMINAL SIZES
2. PIPE SIZES 2 1/2" AND LESS ARE SHOWN AS SINGLE LINES
3. PIPE SIZES 3" AND ABOVE ARE ARE SHOWN AS DOUBLE LINES



GENERAL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION, PROTECTION AND REPAIR (IF DAMAGED) OF ALL EXISTING UTILITY MAINS AND SERVICES. THE LOCATIONS OF KNOWN SEWER AND WATER MAINS SERVICES, SHOWN ON THESE DRAWINGS, ARE APPROXIMATE. NOTIFY DIG-SAFE PRIOR TO COMMENCING CONSTRUCTION. (1-888-344-7233). CONTRACTOR SHALL GIVE ADEQUATE NOTICE TO THE ENGINEER OF CONFLICTS OF PROPOSED WORK WITH MARKED UTILITIES PRIOR TO CONSTRUCTING THE PROPOSED WORK.

2. THE OWNER/ENGINEER/SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN ON THE PLANS COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE OWNER/ENGINEER/SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED.

3. THE WELLS AND WTP ARE PART OF AN OPERATIONAL FACILITY WHICH MUST REMAIN IN OPERATION THROUGHOUT CONSTRUCTION.

4. ALL EQUIPMENT AND MATERIAL SHALL BE STORED AT A LOCATION DETERMINED BY THE WTP STAFF.

5. THIS SET OF PLANS HAS BEEN CREATED TO BE USED IN CONJUNCTION WITH A TECHNICAL SPECIFICATION ENTITLED "PROJECT MANUAL, MADBURY WELLS #2, #3, #4R AND #5 UPGRADE, CITY OF PORTSMOUTH, NH".

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL SURPLUS EARTH, LEDGE, BOULDERS, CONCRETE, GRAVELS, PIPE AND DAMAGED SEWER OR DRAIN STRUCTURES EXCAVATED DURING CONSTRUCTION, UNLESS MATERIALS ARE CLAIMED BY THE OWNER AS INDICATED IN THE SPECIFICATIONS OR THE DRAWINGS. THE CONTRACTOR IS ALSO RESPONSIBLE FOR FURNISHING AND INSTALLING REPLACEMENT MATERIALS.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROPERTY RESTORATION. UTILITIES DAMAGED AS A RESULT OF THE CONTRACTORS OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

8. PAVEMENT REPAIRS ARE SUBSIDIARY AND WILL NOT BE MEASURED FOR PAYMENT.

9. ALL OVERHEAD WIRES AND WIRE DROPS TO BUILDINGS ARE NOT SHOWN. THE CONTRACTOR SHALL ANTICIPATE THEIR EXISTENCE IN ALL OPERATIONS.

10. THE CONTRACTOR IS RESPONSIBLE FOR LOCATION, INSTALLATION, INSPECTION, AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES.

11. REFER TO SUMMARY OF WORK IN THE PROJECT MANUAL.

12. ALL WORK NOTED ABOVE SHALL BE CONSIDERED SUBSIDIARY TO THE NOTED BID ITEMS UNLESS A SPECIFIC BID ITEM HAS BEEN ESTABLISHED FOR THE NOTED WORK.

GENERAL

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CONSTRUCTION SEQUENCE (GENERAL):

PERFORM WORK IN ACCORDANCE WITH GENERALLY ACCEPTED INDUSTRY ORDER OF OPERATIONS UNLESS OTHERWISE APPROVED IN WRITING BY THE ENGINEER.

1. PRIOR TO THE START OF CONSTRUCTION PROVIDE A WRITTEN NARRATIVE OF THE CONSTRUCTION METHODS TO BE USED AND INCLUDE A PRELIMINARY SCHEDULE OF KEY MILESTONES AS REQUIRED BY THE CONTRACT DOCUMENTS.

2. REFER TO SECTION 01010 (SUMMARY OF WORK) FOR ADDITIONAL SCHEDULE AND SEQUENCE RESTRICTIONS. ONLY ONE WELL MAY BE REMOVED FROM SERVICE AT A TIME. CONSTRUCTION SHALL BEGIN WITH WELL #5, THEN WELL #4, AND THEN WELLS #2 AND #3.

3. INSTITUTE EXPLORATORY EXCAVATION PROGRAM IN THE PRESENCE OF THE ENGINEER TO CONFIRM LOCATION OF EXISTING UTILITIES WHEN CRITICAL TO THE INSTALLATION OF NEW WORK.

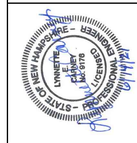
4. DISPOSE OF LOGS, STUMPS AND DEBRIS IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS.

5. INSTALL AND MAINTAIN TEMPORARY AND PERMANENT EROSION CONTROL DEVICES THROUGHOUT CONSTRUCTION.

6. IMMEDIATELY STABILIZE DISTURBED AREAS AFTER CONDUIT AND PIPE INSTALLATION AND REESTABLISH TEMPORARY EROSION CONTROL DEVICES MOVED DURING CONSTRUCTION.

NO.	REVISIONS	APP'D
	ISSUE FOR APPROVAL Date 6/14/2021 By LEC	
	CONSTRUCTION Date 6/21/2021 By LEC	
	RECORD DRAWING Date By	

Drawn/Chk HAV
Designed LEC
Checked PJP
Approved MBM
Date JUNE 14, 2021
Book No. 1841
Project No. 1841GEN
Dwg. ID AS SHOWN
Scale AS SHOWN



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DRAWING INDEX/LEGEND/NOTES

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO G-1

SHEET 1 OF 47

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N

WELL #3

WELL #2

ELECTRIC HAND HOLE

WELL #4

FINISHED WATER PUMP STATION (FWPS)

RESIDUAL DRYING BEDS

TOWN LINE DOVER MADBURY

CLEARWELL

WELL #4R

PROPOSED NEW WELL #4R/5 BUILDING

RECYCLE WASH WATER BASIN

FLOW METER AND CHEMICAL INJECTION VAULTS

WELL #1 BUILDING

WELL #5

RESIDUAL DRYING BEDS

WATER TREATMENT PLANT AND ADMINISTRATIVE BUILDING (WTP)

FRESHET ROAD

NOTE:
1. PLAN FROM "MADBURY WTP UPGRADE DRAWINGS" DATED JULY 2013, BY HAZEN AND SAWYER.

100 0 100 200
SCALE: 1 INCH = 100 FT.

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CONSTRUCTION
Date 6/21/2021 By LEC
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Dwg. ID 1841SITE
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PROJECT LOCATION MAP

MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO G-2
SHEET 2 OF 47

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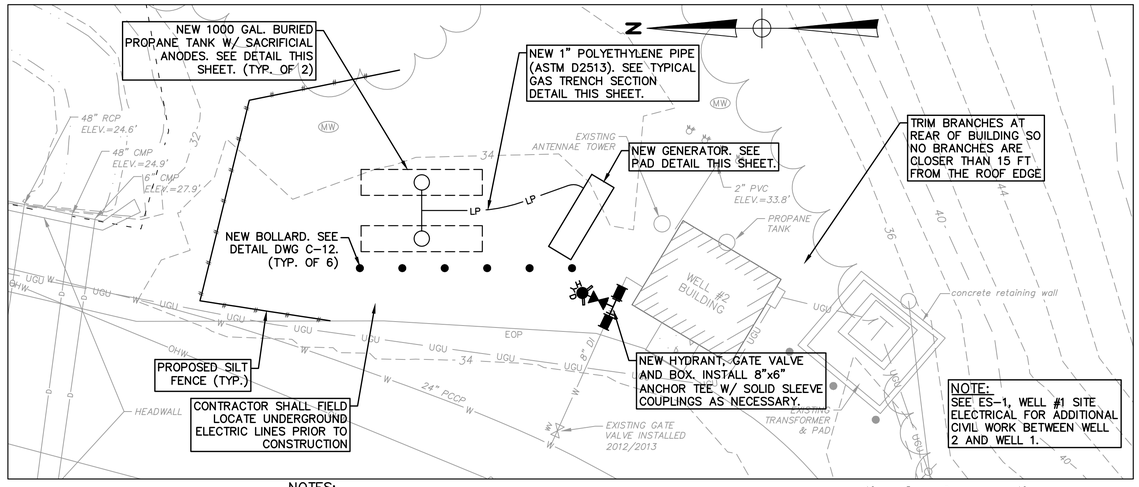


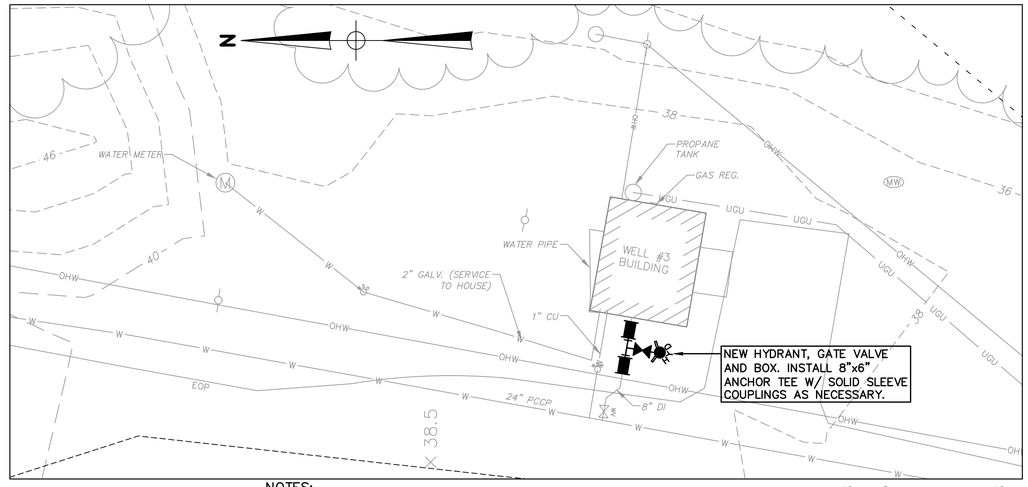
NOTES:

1. LOCATION OF ALL UTILITIES ARE APPROXIMATE.
2. BURIED PIPE SIZES AND LOCATIONS ARE UNKNOWN AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS.
3. RESTORE PAVEMENT AS NECESSARY.

10 5 0 10
SCALE: 1 INCH = 10 FT.

WELL #2 SITE PLAN

SCALE: 1"=10'



NOTES:

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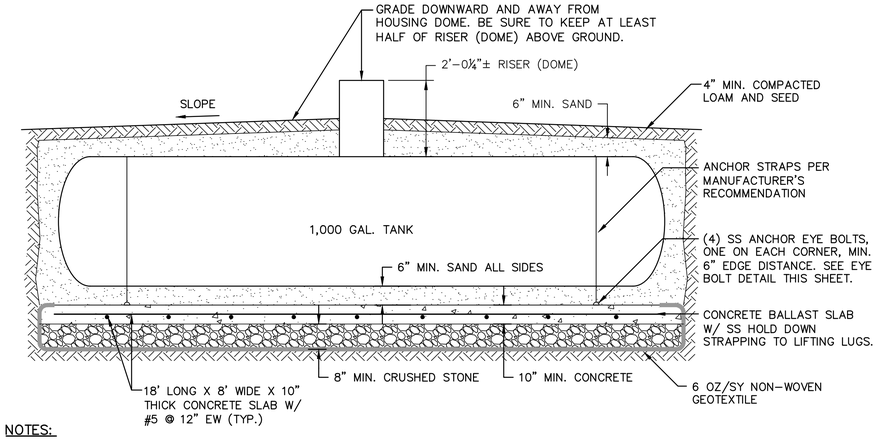
3. RESTORE PAVEMENT AS NECESSARY.

10 5 0 10
SCALE: 1 INCH = 10 FT.

WELL #3 SITE PLAN

SCALE: 1"=10'

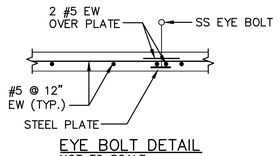


NOTES:

1. TANK MUST BE 10 FEET FROM ANY BUILDING OR PROPERTY LINE.
2. PRIOR TO BACKFILLING PROVIDE (2) 17 POUND ANODE BAGS CONNECTED TO TANK PER MANUFACTURERS REQUIREMENTS. PLACE AT LEAST 2 FEET AWAY FROM TANK AND LOW IN THE HOLE. POUR 1 GALLON OF WATER ON BAG AND IMMEDIATELY COVER WITH SAND.
3. PRIOR TO BACKFILLING TOUCH UP ANY SCRATCHES OR MARKS ON TANKS OR LIFTING LUGS WITH MANUFACTURER APPROVED COATING MATERIALS.
4. TANK TO BE OWNED BY THE CITY OF PORTSMOUTH. CONTRACTOR SHALL COORDINATE THE PURCHASE AND INSTALLATION OF THE TANK AND APPURTENANCES, PIPING, REGULATORS, ETC. BETWEEN THE OWNER AND PROPANE SUPPLIER AND INSTALL IN ACCORDANCE WITH THE PROPANE SUPPLIER REQUIREMENTS. COORDINATE ALL NECESSARY INSTALLATION INSPECTIONS WITH THE SUPPLIER.
5. THE CITY'S PROPANE SUPPLIER IS DOWNEAST ENERGY.
6. TANKS SHALL CONFORM TO LATEST EDITION OF ASME RULES FOR CONSTRUCTION OF PRESSURE VESSELS, SECTION VIII, DIVISION 1, AND NFPA 58 AND SHALL HAVE READY TO BURY EPOXY COATING.

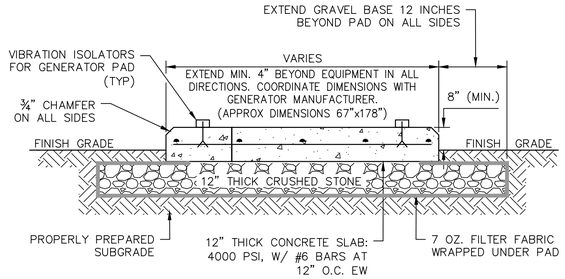
BURIED LP TANK DETAIL

NOT TO SCALE



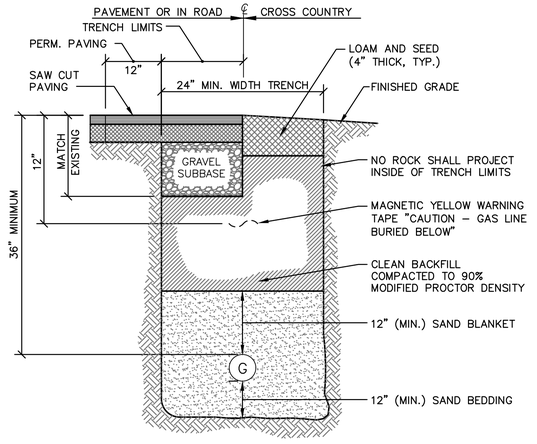
EYE BOLT DETAIL

NOT TO SCALE



GENERATOR PAD DETAIL

NOT TO SCALE



SUBSURFACE WORK NOTE:

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR IT'S REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT "DIG SAFE" AT 1(888)344-7233 (1(888)DIG-SAFE) AND COORDINATE ACTIVITIES PRIOR TO ANY EXCAVATIONS.

TYPICAL TRENCH SECTION – GAS PIPING

SCALE: NOT TO SCALE

ISSUE FOR

	By	APP'D
APPROVAL Date 6/14/2021	LEC	
CONSTRUCTION Date 6/21/2021	LEC	
RECORD DRAWING Date	By	

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Date JUNE 14, 2021
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Project No. 1841SITE2
Dwg. ID
Scale AS SHOWN

STATE OF NEW HAMPSHIRE – LICENSED PROFESSIONAL ENGINEER – LINDSEY E. CHESLEY 14741 – 6/14/2021

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

WELL #2 AND WELL #3 SITE PLANS AND DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO C-1

SHEET 3 OF 47

N

JOHNSON'S CREEK

DOVER

MADBURY

TOWN LINE

APPROXIMATE FLOOD ZONE LINE PER FIRM PANEL

delineated wetland line/ 100 year flood zone as defined by Oak Hill Environmental Services

FEMA FLOOD ZONE "A"

FEMA FLOOD ZONE "X"

15' BUILDING SETBACK

approx. location 20" PCCP rw

TBM 4360D
"x" cut in bolt over main outlet
elev.=45.20'

4" ci elev.=35.5'

1½" PVC pump discharge on ground

purge/drain connection well #4 building

2½" conduit

6" cpp elev.=35.6'

4" ci elev.=36.5'

50'± wooden mast pole (no #)

2" conduit

10" DI

(2) 3" conduits encased in concrete

2" conduit

2½" blowoff

MW

ep

exist. 10" tee & valve (inoperable) (leaking)

cb #1226
rim=43.0'
(1236) 12" hdpe=38.1"
(a) 12" hdpe=37.5'

24" PCCP

1" galv.

valve pit w/ automatic pressure relief & 4" drain

exist. 24" cap & thrust block (5' to top of pipe)

WELL 4R (TOC 47.53)

MW15

MW4-1

B-1

12" hdpe inv.=41.7'

approx. location 4" drain from under ftw/ww basin liner

cb #1236
rim=43.7'
(1226) 12" hdpe=41.3'

12" hdpe inv.=42.6'

water meter in pit

Limit of ground survey by Doucette Survey, January 15, 2016, "Topographic Plan at Madbury Well #5

20" PCCP RW per city gps main @ edge of road

20" PCCP RW per city gps main @ excavation point

6" unk. inv.=46.4'

exist. fence

20" PCCP RW per city gps main @ mid channel

wooden bridge with wooden safety rails

6" unk. inv.=50.0'

TAX MAP 10, LOT 12

exist. gravel access road

approx. location 20" PCCP from wtp plan

20" PCCP RW per city gps main @ edge of road

20" PCCP RW per city gps main @ center of road

MW13

MW

WELL 5 (TOC 54.7)

B-2

P-1

limit of ground base surface/aerial surface

approx. location 2" galv. Freshet Rd service line

delineated wetland line/ 100 year flood zone as defined by Oak Hill

SCALE: 1 INCH = 20 FT.

20 0 20 40

NOTES:

1. TOPOGRAPHY NOT SHOWN WITHIN GROUND SURVEY AREA FOR CLARITY.
2. SURVEY OUTSIDE OF GROUND SURVEY AREA IS FROM "CITY OF PORTSMOUTH, NH, MADBURY WTF UPGRADE AND BELLAMY RESERVOIR IMPROVEMENTS" MAY 2009, SURVEY PLAN BY DOUCET SURVEY, DATED JAN/FEB 2007.
3. BENCHMARK REFERENCES NAVD 88.

SURVEY NOTES:

1. FIELD GROUND SURVEY PERFORMED BY J.M.L. & L.P.S. OF DOUCET SURVEY DURING DECEMBER 2015 USING A TRIMBLE 5603 TOTAL STATION WITH A TRIMBLE TSC3 DATA COLLECTOR AND A SOKKIA B21 AUTO LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
2. JURISDICTIONAL WETLANDS AND 100 YEAR FLOOD ZONE DELINEATED BY OAK HILL ENVIRONMENTAL SERVICES DURING DECEMBER 2015 IN ACCORDANCE WITH 1987 CORPS OF ENGINEERS WETLANDS DELINEATIONS MANUAL, TECHNICAL REPORT Y-87-1.
3. FLOOD HAZARD ZONES: "A" & "X" PER F.I.R.M. MAP #33017C0320E, REVISED 9/30/05.
4. HORIZONTAL DATUM BASED ON NEW HAMPSHIRE STATE PLANE(2800) NAD83(2011) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
5. VERTICAL DATUM BASED ON NAVD88(GEOID12A) DERIVED FROM STATIC GPS OBSERVATIONS PROCESSED BY THE NATIONAL GEODETIC SURVEY ON-LINE POSITIONING USER SERVICE (OPUS). SAID DATUM IS CONSISTENT WITH PRIOR WORK ON THIS SITE BY DOUCET SURVEY, INC.

ISSUE FOR
APPROVAL — By LEC — Date 6/14/2021
CONSTRUCTION — By LEC — Date 6/21/2021
RECORD DRAWING — By — Date

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Drawn/Chk HAV
Designed LEC
Checked PJP
Approved MBM
Date JUNE 14, 2021
Book No.
Project No. 1841
Dwg. ID 1841SITE4
Scale AS SHOWN

STATE OF NEW HAMPSHIRE — LYNNETTE L. SEELEY — 14,970 — LICENSED PROFESSIONAL ENGINEER — 6/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

WELL #4 AND #5 EXISTING CONDITIONS PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO C-2

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N

JOHNSON'S CREEK

DOVER

MADBURY

TOWN LINE

APPROXIMATE FLOOD ZONE LINE PER FIRM PANEL

delineated wetland line/ 100 year flood zone as defined by Oak Hill Environmental Services

400' WELL #4R SPA

FEMA FLOOD ZONE "A"

FEMA FLOOD ZONE "X"

15' BUILDING SETBACK

approx. location 20" PCCP rw

NATURAL STONE AT INLET AND OUTLET

BOLLARD (TYP. OF 5)

10" DIP (TYP.)

100+00

101+00

102+00

103+00

104+00

105+00

BP= 100+00.00

EP= 160+76.00

wooden bridge with wooden safety rails

exist. gravel access road

MW13

WELL 5 (TOC 54.7)

10"x6" REDUCER

6" GATE VALVE AND BOX

6" DIP

NEW HYDRANT
NEW GATE AND VALVE AND BOX
NEW 6"X6" ANCHOR TEE

ELECTRICAL DISCONNECTS MOUNTED TO POST

NEW EDGE OF GRAVEL

REMOVE EXISTING BRIDGE AND RETURN STEEL PLATES TO OWNER. CONSTRUCT NEW 63"x43" STEEL ARCH PIPE W/ HEADWALL. SEE DETAIL DWG C-7.

UNDERGROUND ELECTRIC TO BE CONCRETE ENCASED AT STREAM CROSSING. SEE 'E' DWGS.

10" DI BENDS AS NEEDED TO ROUTE WATER PIPE AROUND END OF CULVERT

approx. location 2" galv. Freshet Rd service line

delineated wetland line/ 100 year flood zone as defined by Oak Hill

PROPOSED SILT FENCE (TYP.)

NEW SILTFENCE (TYP.)

LIMIT OF CLEARING SHALL BE MINIMIZED TO THE GREATEST POSSIBLE EXTENT (TYP.)

ELECTRIC DUCT BANK
2-4" (POWER AND SPARE)
2-3" (SIGNAL AND SPARE)
(TYP.)

PROPOSED APPROX. LOCATION OF ELECTRICAL PULL BOXES. SEE 'E' DWGS. (TYP. OF 2 PER LOCATION)

DIELECTRIC COUPLING TO EXISTING GALV.

CAP AND ABANDON EXISTING 2" GALV. SERVICE AFTER NEW SERVICE IS CONNECTED

RAISE ROAD GRADE AS NECESSARY AND INSULATE TO INSTALL NEW 10" DIP OVER EXISTING 20" PCCP

TAX MAP 10, LOT 12

400' WELL #5 SPA

approx. location 20" PCCP from wtp plan

NEW 10" DIP IN NEW TRENCH WITH WATER SERVICE

PROPOSED INSULATION WHERE DEPTH OF COVER IS LESS THAN 5.5'

CUT AND REMOVE FENCE AS NECESSARY. MINIMIZE REMOVAL TO ONLY LENGTH NECESSARY.

NEW 2" HDPE SERVICE IN NEW TRENCH WITH WATER MAIN

PROPOSED APPROX. LOCATION OF ELECTRICAL PULL BOXES. SEE DWG ES-2. (TYP. OF 2 PER LOCATION)

SEE DWG C-5 FOR DETAIL

REMOVE EXISTING METER AND PIT AFTER NEW SERVICE IS ON-LINE

NEW 4R/5 BUILDING FF=44.6

151' OF 6" DIP @ -10.0%

TBM 4.360D
"x" cut in bolt over main outlet elev.=45.20'

valve pit w/ automatic pressure relief & 4" drain

exist. 24" cap & thrust block (5' to top of pipe)

WELL 4R (TOC 47.53)

MW4

12" hdpe inv.=41.7'

4" ci elev.=35.5'

4" ci elev.=36.5'

50'± wooden mast=37.7' pole (no #)

2" conduit

2½" blowoff

1½" PVC purge & discharge conduit

purge/drain connection

well #4 building

2½" conduit

6" cpp elev.=35.6'

(2) 3" conduits encased in concrete

24" PCCP

cb #1226
rim=43.0'
(1236) 12" hdpe=38.1'
(a) 12" hdpe=37.5'

LIMIT OF PAVEMENT OVERLAY

approx. location 4" drain from under ftw/www basin liner

cb #1236
rim=43.7'
(1226) 12" hdpe=41.3'

12" hdpe inv.=42.6'
water meter in pit

exist. fence

6" unk. inv.=46.1'

6" unk. inv.=50.0'

NOTES:

1. CONTOURS NOT SHOWN FOR CLARITY.
2. 20" PCCP RAW WATER MAIN SHOWN IS FROM A COMBINATION OF WTP DRAWINGS, RECORD DRAWINGS, AND FIELD LOCATIONS BY THE CITY. CONTRACTOR TO FIELD VERIFY ANY WORK NEAR THE EXISTING PIPE.
3. WETLANDS PERMIT #2017-01211 ISSUED 8/9/17 FOR CULVERT REPLACEMENT. STREAM DIVERSION DEWATERING PLAN MUST BE APPROVED BY NHDES.
4. RETAIN WATER SERVICE TO FRESHET RD SERVICE AT ALL TIMES EXCEPT LIMITED SHUT DOWN PERMITTED FOR RECONNECTIONS. PROVIDE TEMPORARY WATER IF NECESSARY, COORDINATE ALL (BRIEF) SHUTDOWNS WITH THE CITY AND FRESHET RD RESIDENTS.

20 0 20 40
SCALE: 1 INCH = 20 FT.

ISSUE FOR		
APPROVAL	By	LEC
Date	6/14/2021	
CONSTRUCTION	By	LEC
Date	6/21/2021	
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Date		

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Checked PJP
Approved MBM
Date JUNE 14, 2021
Book No. 1841
Project No. 18415ITE4
Dwg. ID
Scale AS SHOWN

STATE OF NEW HAMPSHIRE - LICENSED PROFESSIONAL ENGINEER - LEE E. CARBONNEAU - 13241 - REGISTERED

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

WELL #4 AND #5 OVERALL SITE PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO C-3

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N

TBM 4360D
"x" cut in bolt
over main outlet
elev.=45.20'

LIMIT OF PAVEMENT OVERLAY

PROTECT CATCH BASIN FROM EROSION DEBRIS

NEW 4R/5 BUILDING FF=44.6

WELL 4R (TOC 47.53)

JOHNSON'S CREEK

DOVER

MADBURY

TOWN LINE

APPROXIMATE FLOOD ZONE LINE PER FIRM PANEL

400' WELL #4R SPA

FEMA FLOOD ZONE "A"

FEMA FLOOD ZONE "X"

15' BUILDING SETBACK

N=239913.00
E=1191693.00
per city gps
main at edge of rd

N=239927.00
E=1191692.00
per city gps
main at excavation pnt

N=240061.00
E=1191658.00
per city gps
main at mid channel

CONTRACTOR TO CONDUCT TEST PITS TO LOCATE RAW WATER MAIN IN THE VICINITY OF THE CULVERT TO ENSURE HEADWALL IS NOT CONSTRUCTED OVER TOP OF THE RAW WATER MAIN. COORDINATE WITH THE ENGINEER FOR CULVERT DESIGN ALTERATIONS IF NECESSARY. CONTRACTOR TO MAINTAIN 5' (MIN.) CLEARANCE BETWEEN THE RAW WATER MAIN AND ANY NEW STRUCTURES.

BP: 100+00.00

EP: 100+75.00

REMOVE EXISTING BRIDGE AND RETURN STEEL PLATES TO OWNER. CONSTRUCT NEW 63"x43" STEEL ARCH PIPE W/ HEADWALL. SEE DETAIL DWG C-7.

LINE SWALE WITH HAYBALES. SEE DETAIL DWG C-13. (TYP.)

RAISE ROAD GRADE AS NECESSARY AND INSULATE TO INSTALL NEW 10" DIP OVER EXISTING 20" PCCP. MAINTAIN 12" MIN. CLEAR SEPARATION.

TAX MAP 10, LOT 12

N=239880.00
E=1191705.00
per city gps
main at edge of rd

N=239899.00
E=1191699.00
per city gps
main at center of rd

400' WELL #5 SPA

Limit of ground survey by Doucette Survey, January 15, 2016, "Topographic Plan at Madbury Well #5

limit of ground base surface/aerial surface

SCALE: 1 INCH = 20 FT.

NOTES:

1. LOCATION OF ALL UTILITIES ARE APPROXIMATE.
2. BURIED PIPE SIZES AND LOCATIONS ARE UNKNOWN AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS BY PERFORMING TEST PITS AS NECESSARY.
3. CONTRACTOR TO USE SURVEY TO DETERMINE FINAL FINISH GRADE AND TOP OF CASING ELEVATION FOR WELL 4R.
4. CONTRACTOR TO RETAIN THE SERVICES OF A QUALIFIED PCCP SERVICE CONTRACTOR TO FIELD VERIFY PIPE SIZE, TYPE, AND JOINT END PRIOR TO ORDERING PIPE MATERIALS. EXCAVATE TO EXPOSE PIPE AS NECESSARY TO LOCATE EXISTING JOINTS AND FIELD LOCATE TIE-IN LOCATIONS. INSTALL CONCRETE THRUST BLOCKS AS NECESSARY FOR LINE STOP AND BULKHEAD CAP. INSTALL CAP TO BE REMOVED IN THE FUTURE FOR LINE EXTENSION.
5. MAINTAIN METERED WATER SERVICE TO RESIDENCE ON FRESHET RD. COORDINATE REPLACEMENT OF 1" GALV. SERVICE LINE WITH 2" HDPE AND METER AND PROVIDE TEMPORARY SERVICE AND METER AS NECESSARY.
6. CONTOURS SHOWN OUTSIDE THE LIMIT OF 1/15/16 GROUND SURVEY AREA ARE FROM "CITY OF PORTSMOUTH, NH, MADBURY WTF UPGRADE AND BELLAMY RESERVOIR IMPROVEMENTS" MAY 2009, SURVEY PLAN BY DOUCET SURVEY, DATED JAN/FEB 2007.
7. 20" PCCP RW MAIN FIELD LOCATED BY CITY OF PORTSMOUTH USING RTK TRIMBLE GPS UNIT WITH SUB-INCH ACCURACY.

ISSUE FOR		
APPROVAL	By	LEC
Date 6/14/2021		
CONSTRUCTION	By	LEC
Date 6/21/2021		
RECORD DRAWING	By	
Date		

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Drawn/Chk. HAV
Designed LEC
Checked PJP
Approved MBM
Date JUNE 14, 2021
Book No. 1841
Project No. 1841SITE4
Dwg. ID AS SHOWN
Scale AS SHOWN

STATE OF NEW HAMPSHIRE - LINCOLN E. CLARK - 13241 - REGISTERED PROFESSIONAL ENGINEER - 6/21/2021

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

WELL #5 ACCESS ROAD GRADING

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO	SHEET
C-4	6 OF 47

NOTES:

1. LOCATION OF ALL UTILITIES ARE APPROXIMATE.
2. BURIED PIPE SIZES AND LOCATIONS ARE UNKNOWN AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS BY PERFORMING TEST PITS AS NECESSARY.
3. CONTRACTOR TO USE SURVEY TO DETERMINE FINAL FINISH GRADE AND TOP OF CASING ELEVATION FOR WELL 4R.
4. CONTRACTOR TO RETAIN THE SERVICES OF A QUALIFIED PCCP SERVICE CONTRACTOR TO FIELD VERIFY PIPE SIZE, TYPE, AND JOINT END PRIOR TO ORDERING PIPE MATERIALS. EXCAVATE TO EXPOSE PIPE AS NECESSARY TO LOCATE EXISTING JOINTS AND FIELD LOCATE TIE-IN LOCATIONS. INSTALL CONCRETE THRUST BLOCKS AS NECESSARY. A QUALIFIED PCCP SERVICE CONTRACTOR SHALL PERFORM THE TAP OF THE PCCP WATER MAIN.
5. MAINTAIN METERED WATER SERVICE TO RESIDENCE ON FRESHET RD. COORDINATE REPLACEMENT OF 1" GALV. SERVICE LINE WITH 2" HDPE AND METER AND PROVIDE TEMPORARY SERVICE AND METER AS NECESSARY.
6. CONTOURS SHOWN OUTSIDE THE LIMIT OF 1/15/16 GROUND SURVEY AREA ARE FROM "CITY OF PORTSMOUTH, NH, MADBURY WTF UPGRADE AND BELLAMY RESERVOIR IMPROVEMENTS" MAY 2009, SURVEY PLAN BY DOUCET SURVEY, DATED JAN/FEB 2007.

CONNECT NEW 2" HDPE SERVICE (MAINTAIN EXISTING SERVICE UNTIL NEW SERVICE IS OPERATIONAL)

CUT AND CAP EXISTING SERVICE

SEE DETAIL THIS SHEET

NEW JUNCTION BOX. SEE DWG ES-2.

NEW ELECTRIC AND FIBER OPTIC DUCT BANK
NOTE: CONCRETE ENCASE NEW CONDUITS FROM WELL #4 BLDG TO NEW WELL #4R/#5 BLDG

CORE CB AND GROUT IN (2) 4" PVC DRAINS
INV=39.2 (a)
INV=39.1 (b)

4" PVC DRAIN SLOPE @ 0.014 FT/FT

NEW 24"x10" TAPPING SLEEVE AND VALVE. SEE NOTE 4.

REMOVABLE BOLLARDS FOR WELL 4R (TYP.)

POST MOUNTED JUNCTION BOX. SEE DWG E-8.

1" CORP. W/ TAPPING SADDLE

4" PVC DRAIN SLOPE @ 0.03± FT/FT MAINTAIN 12" (MIN.) CLEARANCE OVER WATER MAIN.

CONDUIT MAY CONTAIN SILT AND MAY NEED TO BE JETTED CLEAN. PAID BE ALLOWANCE.

LIMIT OF PAVEMENT OVERLAY

1" PAVEMENT OVERLAY AT END OF CONSTRUCTION

EXIST. 2" PVC MONITORING WELL. EXTEND TO SAME ELEVATION AS PRODUCTION WELL #4R AND INSTALL 6" PROTECTIVE CASING W/ CONCRETE BASE (SLOPED TO DRAIN) AND LOCKING CAP. SEE DETAIL DWG C-11)

CORE CB AND GROUT IN 4" PVC DRAIN
INV IN=42.0

NEW HYDRANT
NEW GATE VALVE AND BOX
NEW 10"x6" ANCHOR TEE

NEW EOP

INV EL=40.0

NEW 4R/5 BUILDING
FF=44.6
INV OUT=41.5

15" CPE
INV OUT =42.0

EXISTING MW4-1
EXISTING 1" PVC TOC 44.0
CONSTRUCT ROAD BOX.
SEE DETAIL DWG C-11.

REMOVE EXISTING METER AND PIT AFTER NEW SERVICE IS ON-LINE

15" CPE
INV IN =42.6

RECONSTRUCTED GRAVEL ROAD (TYP.)

DRIP EDGE W/ 4" PERFORATED FRENCH DRAIN. SEE DETAIL DWG C-12.

4" PERFORATED DRAIN. EXTEND STONE TRENCH TO SURFACE BEYOND DRIP EDGE TO CREATE FRENCH DRAIN

NEW HYDRANT
NEW GATE VALVE AND BOX
NEW 10"x6" ANCHOR TEE

NEW CLEAN OUT

4" PERFORATED FOUNDATION DRAIN LAID FLAT EL=40.0

Limit of ground survey by Doucette Survey, January 15, 2016, "Topographic Plan at Madbury Well #5

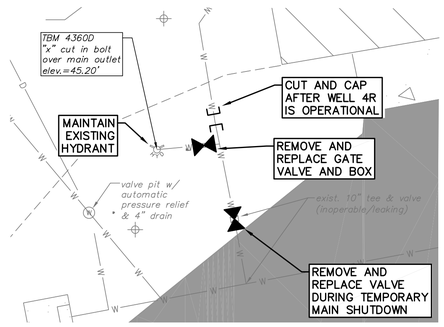
NEW 2" HDPE SERVICE IN NEW TRENCH WITH WATER MAIN

CUT AND REMOVE FENCE AS NECESSARY. MINIMIZE REMOVAL TO ONLY LENGTH NECESSARY.

NEW 10" DIP IN NEW TRENCH WITH WATER SERVICE

400' WELL #5 SPA

SCALE: 1 INCH = 10 FT.



BLOW-UP DETAIL
SCALE: 1"=5'

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APPROVAL	By	LEC
Date	6/14/2021	
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Date		

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Project No. 1841
Dwg. ID 1841SITE4
Scale AS SHOWN

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
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WELL #4R/#5 BUILDING SITE PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
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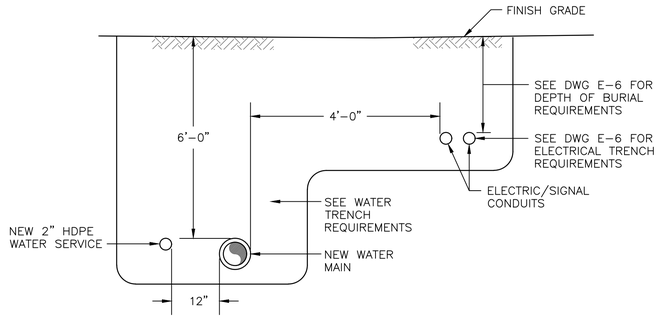
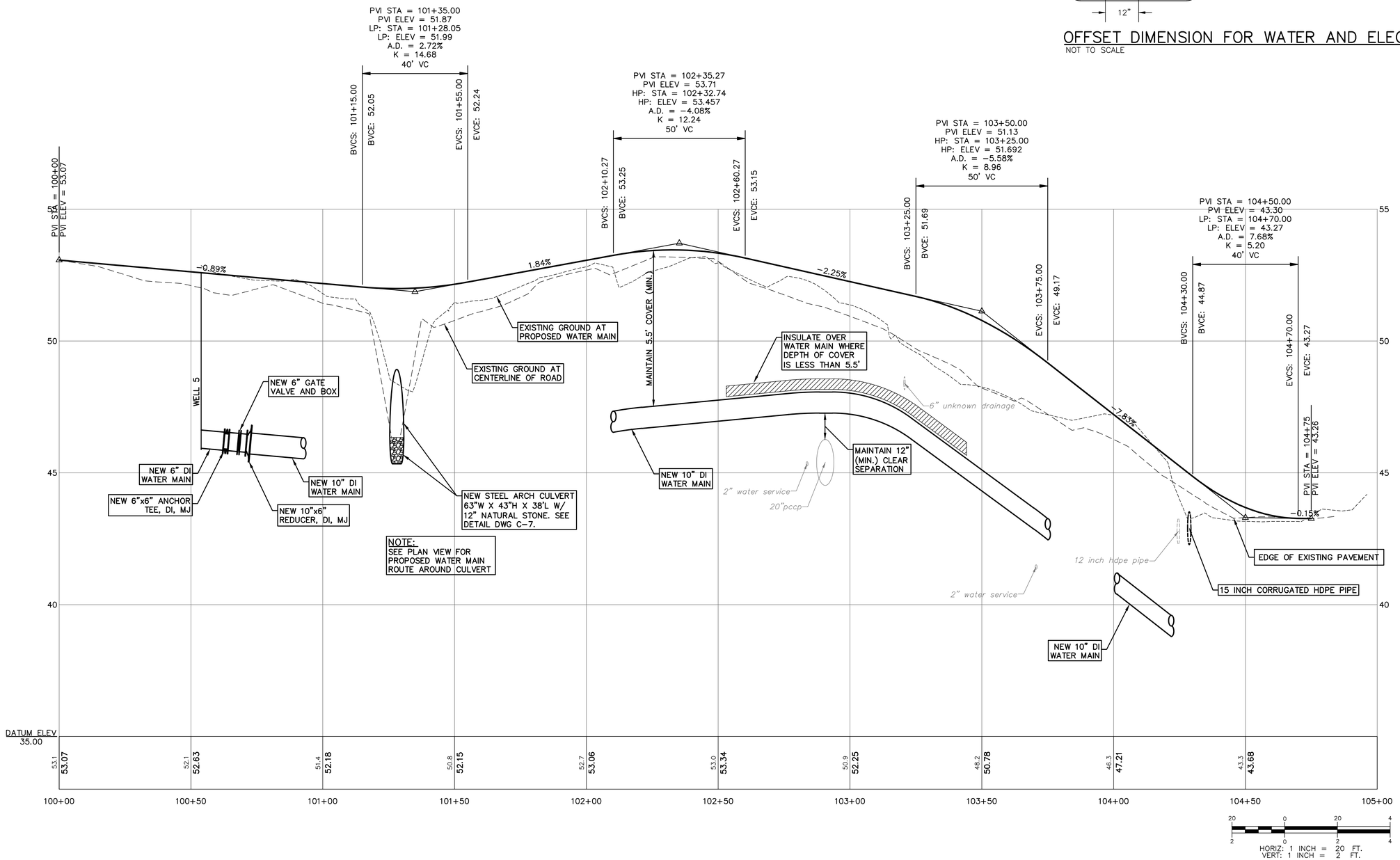


OFFSET DIMENSION FOR WATER AND ELECTRIC

NOT TO SCALE



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	CONSTRUCTION Date 6/21/2021 By LEC	
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LYNETTE C. LAMEY NUMBER 13170 - STATE OF NEW HAMPSHIRE - LICENSED PROFESSIONAL ENGINEER 6/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

WELL #5 ACCESS ROAD PROFILE

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

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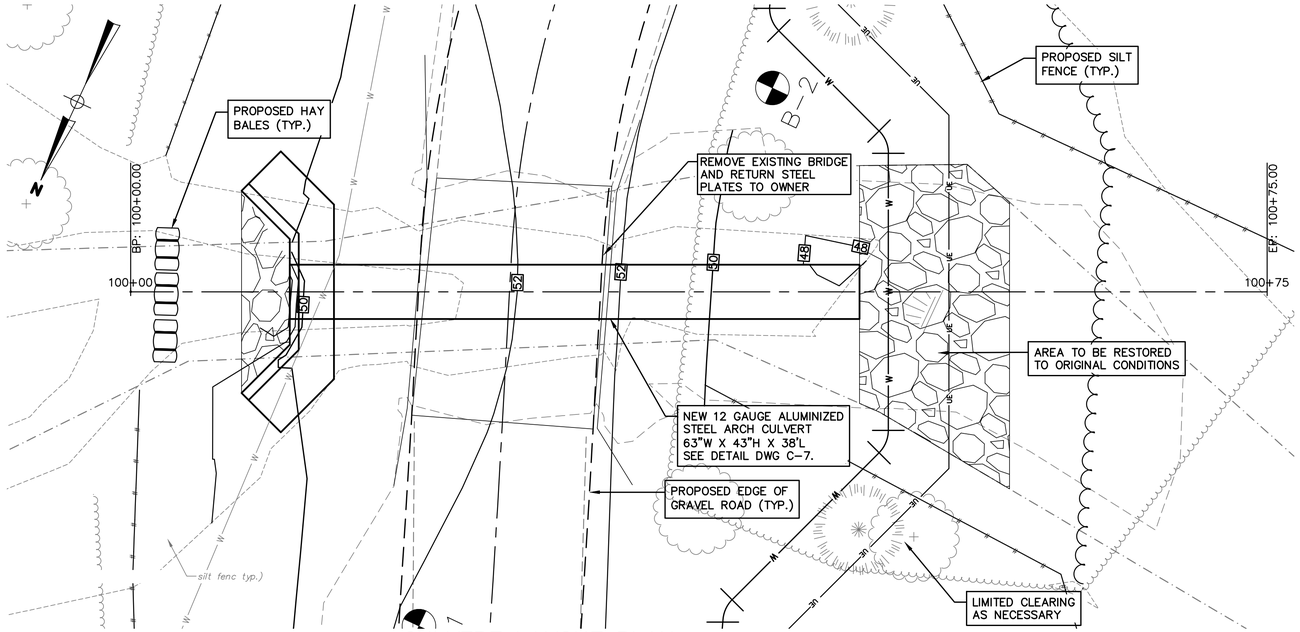
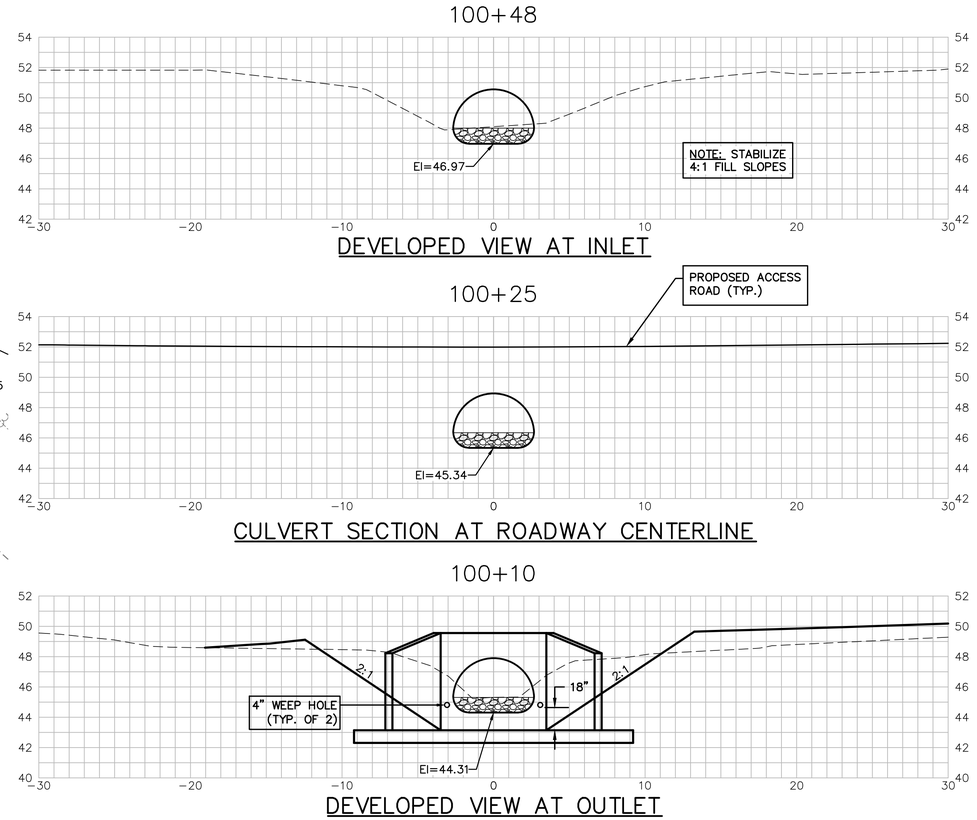
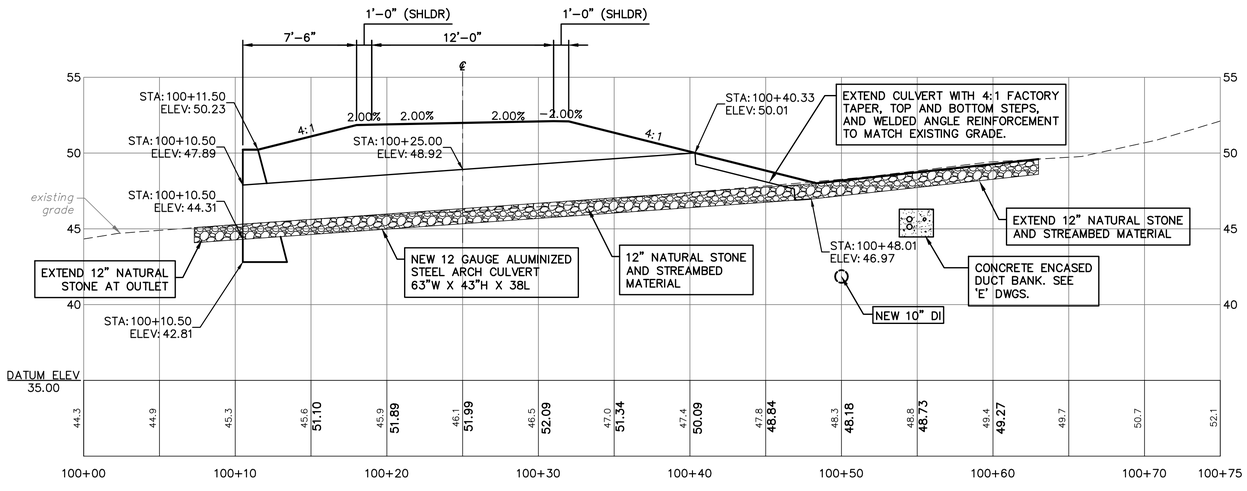


CULVERT LAYOUT PLAN

SCALE: 1"=5'





SECTION AT STEEL ARCH CULVERT

SCALE: 1"=5' (H&V)

HORIZ: 1 INCH = 5 FT.
VERT: 1 INCH = 5 FT.

NOTES:

1. CONTRACTOR TO INSTALL AND MAINTAIN BEST MANAGEMENT PRACTICES PER SWPPP.
2. THE PROJECT AREA IS NOT WITHIN THE FLOOD ZONE.
3. THE CULVERT IS SIZED TO ACCOMMODATE THE 50-YEAR STORM FLOW OF 15 CFS. THE WATERSHED SIZE IS 11.7 ACRES.
4. REFER TO WETLANDS PERMIT #2017-01211 ISSUED 8/9/17 INCLUDED IN THE CONTRACT DOCUMENTS FOR CONSTRUCTION REQUIREMENTS DURING THE CULVERT REPLACEMENT.
5. STREAM DIVERSION AND DEWATERING PLANS MUST BE APPROVED BY NHDES.
6. CONCRETE PRECAST HEADWALL SHALL MEET NHDOT STANDARD SPECIFICATION SECTIONS 520 AND 544.

ISSUE FOR
APPROVAL By LEC Date 6/14/2021
CONSTRUCTION By LEC Date 6/21/2021
RECORD DRAWING By Date

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Date JUNE 14, 2021
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Project No. 1841CULV
Dwg. ID
Scale AS SHOWN

STATE OF NEW HAMPSHIRE - LICENSED PROFESSIONAL ENGINEER - LYNETTE L. CLOUTIER 14,836 - 6/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

CULVERT SECTION AND LAYOUT PLAN
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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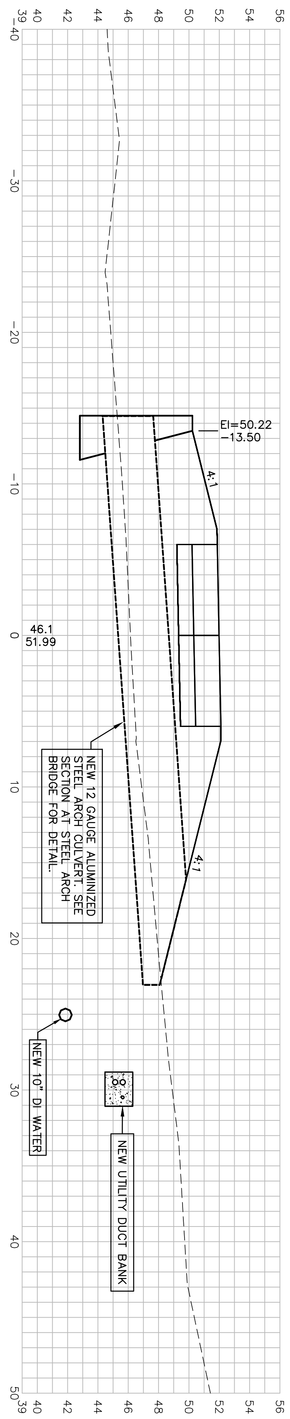

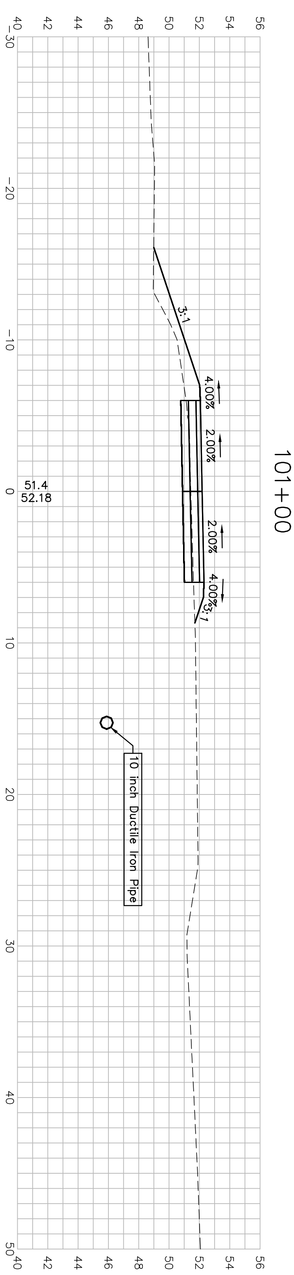

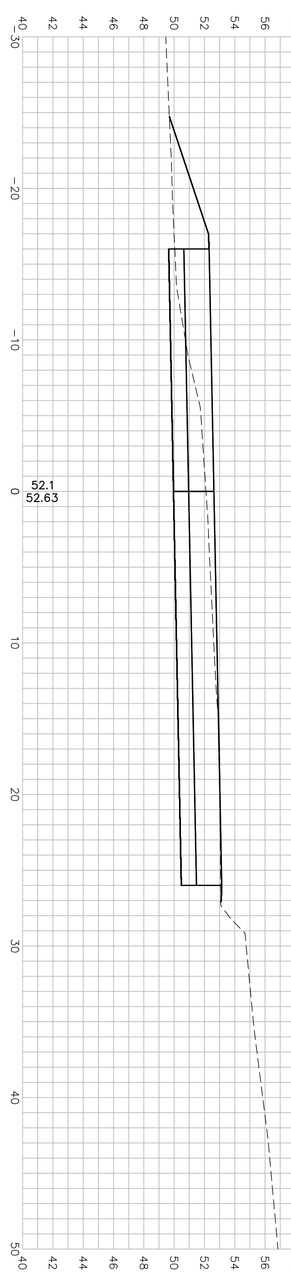

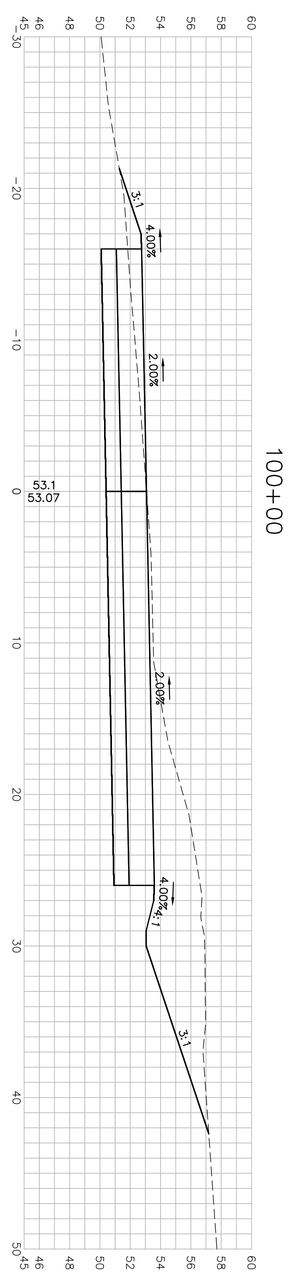

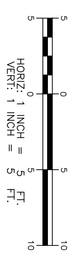

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DWG NO C-8

SHEET 10 OF 47

WELL #5 ACCESS ROAD CROSS SECTIONS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

STATE OF NEW HAMPSHIRE – LYNNETTE E. CLOUTIER – No. 9176 – LICENSED PROFESSIONAL ENGINEER
6/14/21

Drawn/Chk
Designed
Checked
Approved
Date JUNE 14, 2021
Book No.
Project No. 1841
Dwg. ID 1841XSEC
Scale AS SHOWN

NO.	REVISIONS	APP'D
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ISSUE FOR
APPROVAL Date 6/14/2021 By LEC
CONSTRUCTION Date 6/21/2021 By LEC
RECORD DRAWING Date By

101+50

102+00

102+50

103+00

103+50

104+00

104+45

HORIZ: 1 INCH = 5 FT.
VERT: 1 INCH = 5 FT.

ISSUE FOR	By	Date
APPPROVAL	LEC	6/14/2021
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WELL #5 ACCESS ROAD CROSS SECTIONS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO C-9

SHEET 11 OF 47

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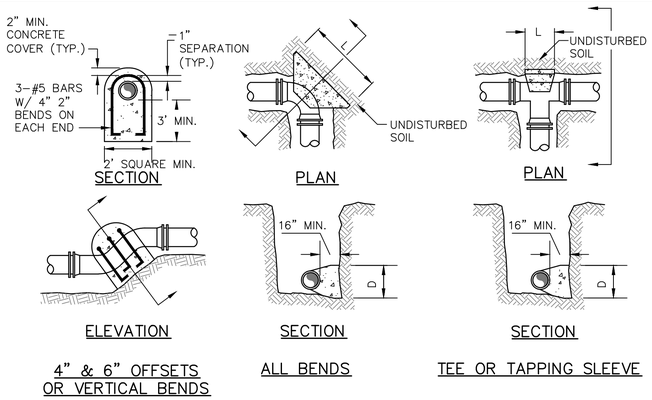


4" & 6" OFFSETS OR VERTICAL BENDS

ALL BENDS

TEE OR TAPPING SLEEVE

THRUST BLOCK SCHEDULE

MINIMUM BEARING AREA (SQUARE FEET)

Nominal Dia. (in)	PIPE SIZE 4	6	8	10	12	16	20	24
Tees, Caps, Plugs, & Tapping Sleeves	1.05	2.32	4.15	6.37	9.15	16.23	25.44	36.58
90 Degree Bends	1.48	3.29	5.86	9.01	12.93	22.96	35.97	51.73
45 Degree Bends	0.80	1.78	3.17	4.88	7.00	12.42	19.47	28.00
22½ Degree Bends	0.41	0.91	1.62	2.49	3.57	6.33	9.92	14.27
11¼ Degree Bends	0.21	0.46	0.81	1.25	1.79	3.18	4.99	7.17

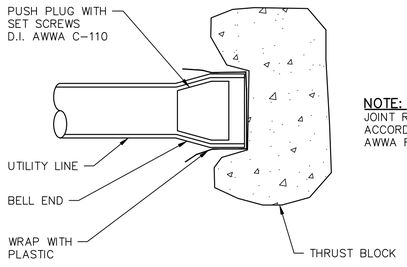
System Pressure: 100 psi
Safety Factor: 1.5
Soil Bearing Capacity: 2,000 psf

THRUST BLOCK NOTES:

1. THE MINIMUM BEARING AREAS NOTED IN THRUST BLOCK SCHEDULE ARE BASED ON A SYSTEM PRESSURE OF 100 psi. IF THE SYSTEM PRESSURE IS ABOVE 100 psi, INCREASE THE NOTED AREAS PROPORTIONAL TO THE ACTUAL SYSTEM PRESSURE. FOR EXAMPLE, IF THE ACTUAL SYSTEM PRESSURE IS 160 psi, MULTIPLY THE ABOVE VALUES BY 160%.
2. THRUST BLOCKS ARE REQUIRED ON ALL FITTINGS. USE OF THRUST BLOCKS DOES NOT ELIMINATE THE REQUIREMENT OF RETAINER GLANDS.
3. PLACE THRUST BLOCKS SUCH THAT THE LENGTH (L) OF THE BLOCK IS APPROX. TWICE AS LONG AS THE DEPTH (D).
4. PLACE 2 LAYERS OF POLYETHYLENE OR ROOFING PAPER AROUND FITTINGS (INCLUDING GLANDS & BOLTS) PRIOR TO PLACEMENT OF THE CONCRETE TO CREATE A BOND BREAK & PROTECT THE BOLTS.
5. PLACE THRUST BLOCKS AGAINST UNDISTURBED SOIL.
6. PLACE THRUST BLOCKS ALONG THE FULL LENGTH OF THE FITTING TO MAXIMIZE BEARING AREA.
7. COAT ALL THREADED RODS, NUTS, AND BOLTS WITH BITUMINOUS PAINT.
8. PLACE A SOLID CONCRETE BLOCK BETWEEN CAP/PLUGS AND THRUST BLOCKS.
9. PLACE A 12" LONG STEEL HORSESHOE-SHAPED PICKUP HOOK IN ALL PLUG AND CAP THRUST BLOCKS. DIAMETER OF HOOK SHALL BE A MINIMUM OF 5/8".

TYPICAL THRUST BLOCK DETAILS

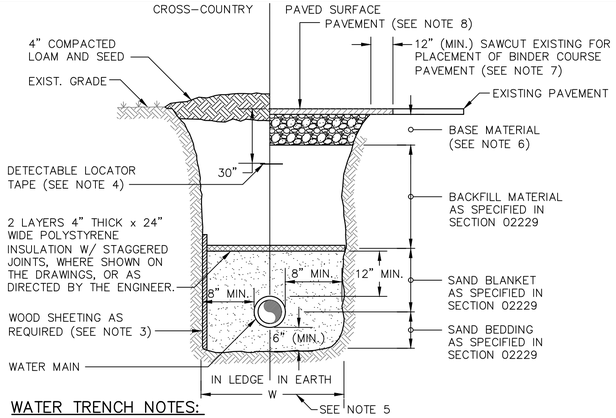
NOT TO SCALE



NOTE: JOINT RESTRAINT IN ACCORDANCE WITH AWWA REQUIREMENTS.

TYPICAL CAP AND PLUG

NOT TO SCALE

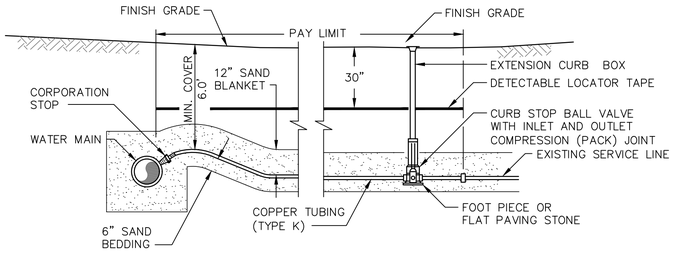


WATER TRENCH NOTES:

1. ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE: BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN ON THE DRAWINGS.
2. MINIMUM COVER: SHALL NOT BE LESS THAN 6.0 FEET. PIPE SHALL BE INSTALLED DEEPER THAN THE NOTED MINIMUM COVER TO AVOID CONFLICTS WITH EXISTING AND PROPOSED UTILITIES.
3. WOOD SHEETING, IF REQUIRED: WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID-DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, BUT NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE.
4. LOCATOR TAPE TO BE 6" WIDE TERRA TAPE SENTRY LINE 1350 OR EQUAL.
5. W = MAXIMUM ALLOWABLE TRENCH PAYMENT WIDTH: FOR PIPES EQUAL TO OR LESS THAN 15" NOMINAL DIAMETER, 'W' SHALL BE NO MORE THAN 36". FOR PIPES GREATER THAN 15" DIAMETER, 'W' SHALL BE 24" PLUS OUTSIDE PIPE DIAMETER (O.D.).
6. ROAD BASE MATERIAL: CRUSHED GRAVEL TO MATCH EXISTING GRAVEL THICKNESS OR 12" MINIMUM, WHICHEVER IS GREATER.
7. SAWCUTTING EXISTING PAVEMENT: SAWCUT THE EXISTING PAVEMENT AT LEAST 12" BEYOND THE EDGE OF THE TRENCH. THE FINAL CUT SHALL BE SMOOTH, WITH NO JAGGED EDGES. REMOVE AND DISPOSE OF EXISTING PAVEMENT FROM THE TRENCH CUT.
8. PAVEMENT: 2" BINDER (¾" MIX) AND 1" WEARING (½"MIX) MINIMUM OR MATCH EXISTING, WHICHEVER IS GREATER.

TRENCH – WATER

NOT TO SCALE

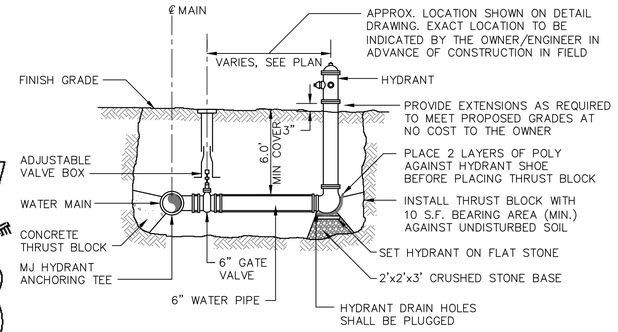


TYPICAL SERVICE CONNECTION NOTES:

1. TAPS TO BE MADE AT APPROX. 3:00 AND 9:00. SEE SPECIFICATIONS FOR SADDLE REQUIREMENTS.
2. PROVIDE NEW LINE USING A CONTINUOUS LENGTH OF COPPER TUBING. NO COUPLING ALLOWED IN ROADWAY WITHOUT APPROVAL OF ENGINEER.
3. PROVIDE FOR SERVICE LINE CONTRACTION AND EXPANSION BY INSTALLING THE SERVICE LINE IN AN "S" SHAPE.
4. IF THE EXISTING SERVICE HAS LESS THAN THE ABOVE NOTED MINIMUM COVER, THE WATER SERVICE SHALL BE CONSTRUCTED WITH THE MINIMUM COVER UP TO AND INCLUDING THE NEW CURB STOP. A SHORT SECTION OF NEW SERVICE PIPE SHALL BE INSTALLED AFTER THE CURB STOP AND AT A SLOPE TO THE EXISTING SERVICE PIPE.
5. IF THE ENGINEER ALLOWS THE SERVICE TO BE INSTALLED WITH LESS THAN THE ABOVE NOTED MINIMUM COVER, INSULATE OVER LINE.
6. CONNECT CURB STOP TO EXISTING SERVICE LINE AT PROPERTY LINE OR AT LOCATION APPROVED BY THE ENGINEER AFTER SUCCESSFUL PRESSURE TESTING AND DISINFECTION.
7. SERVICE SIZE SHALL BE AS NOTED ON THE DRAWINGS OR ¾" MINIMUM.

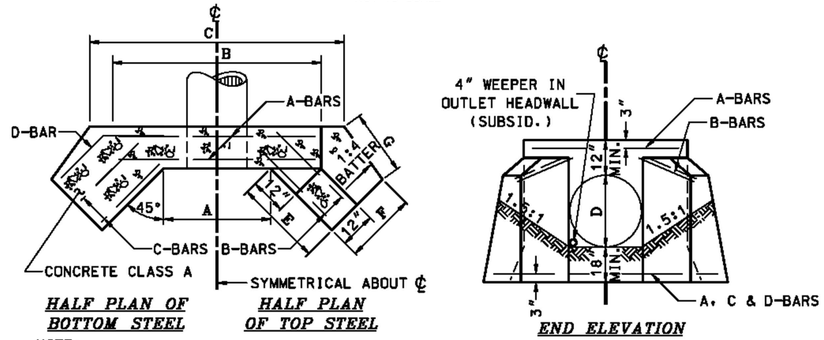
TYPICAL SERVICE CONNECTION

NOT TO SCALE



TYPICAL HYDRANT ASSEMBLY

NOT TO SCALE



NOTE:
ALL LIKE BARS IN EACH HEADWALL ARE THE SAME SIZE.
EACH STD. HEADER HAS 4 A, B & C-BARS, AND 2 D-BARS.

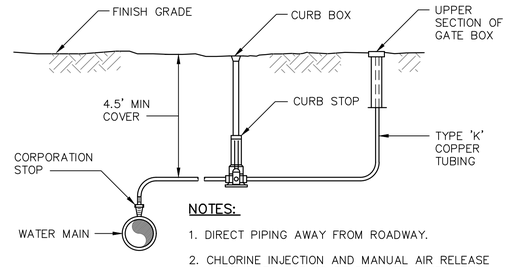
NOTE: 63"x43" ARCH CULVERT IS 54" DIAMETER EQUIVALENT.

2:1 SLOPE

DIAMETER D INCHES	QUANTITIES PER HEADER CONC. CU. YD.	STEEL LB.	EXC. FOR 1' DEPTH CU. YD.	DIMENSIONS A	B	C	E	F	G	H	I	J	REINFORCING STEEL SIZE	LENGTH A BARS	B BARS	C BARS	D BARS	D-BARS, a	D-BARS, b
24	1.50	32	1.36	2'-3"	5'-1"	6'-0"	2'-5"	1'-11"	1'-9"	4'-6"	4'-0"	3'-6"	#4	4'-9"	2'-7"	2'-5"	3'-11"	2'-4"	1'-7"
30	2.01	37	1.63	2-9	5-7	6-10	3-0	1-11	2-3	5-0	4-6	3-10	#4	5-3	3-3	3-1	4-7	2-7	2-0
36	2.62	42	1.88	3-3	6-1	7-8	3-7	2-0	2-9	5-6	5-0	4-1	#4	5-9	3-10	3-6	5-2	2-8	2-6
42	3.31	47	2.18	3-9	6-7	8-6	4-2	2-1	3-3	6-0	5-6	4-4	#4	6-3	4-5	4-1	5-10	2-10	3-0
48	4.11	123	2.42	4-4	7-2	9-5	4-10	2-2	3-9	6-6	6-0	4-8	#6	6-10	5-1	4-8	7-8	4-0	3-8
60	5.98	146	3.04	5-4	8-2	11-0	6-0	2-4	4-8	7-6	7-0	5-3	#6	7-10	6-3	5-8	8-11	4-6	4-5
72	8.33	171	3.69	6'-5"	9'-3"	12'-9"	7'-3"	2'-5"	5'-8"	8'-6"	8'-0"	5'-10"	#6	8'-11"	7'-6"	6'-9"	10'-4"	4'-10"	5'-6"
4:1 SLOPE																			
24	1.93	37	1.60	2'-3"	5'-1"	6'-2"	3'-2"	2'-0"	2'-6"	4'-6"	4'-3"	3'-10"	#4	4'-9"	3'-6"	3'-2"	4'-10"	2'-7"	2'-3"
30	2.62	44	1.93	2-9	5-7	7-0	3-11	2-1	3-2	5-0	4-9	4-3	#4	5-3	4-3	3-10	5-9	2-10	2-11
36	3.44	50	2.25	3-3	6-1	7-10	4-8	2-2	3-10	5-6	5-3	4-7	#4	5-9	5-1	4-7	6-5	2-10	3-7
42	4.39	56	2.60	3-9	6-7	8-8	5-6	2-3	4-5	6-0	5-9	5-0	#4	6-3	5-10	5-3	7-4	3-0	4-4
48	5.49	144	2.96	4-4	7-2	9-7	6-3	2-4	5-1	6-6	6-3	5-4	#6	6-10	6-6	6-0	9-2	4-1	5-1
60	8.10	172	3.70	5-4	8-2	11-3	7-9	2-6	6-5	7-6	7-3	6-1	#6	7-10	8-0	7-6	10-8	4-3	6-5
72	11.36	202	4.51	6'-5"	9'-3"	13'-0"	9'-4"	2'-8"	7'-8"	8'-6"	8'-3"	6'-9"	#6	8'-11"	9'-6"	9'-1"	12'-3"	4'-6"	7'-9"

CONCRETE HEADWALL DETAIL W/ 45° WING WALLS

NOT TO SCALE



NOTES:

1. DIRECT PIPING AWAY FROM ROADWAY.
2. CHLORINE INJECTION AND MANUAL AIR RELEASE ASSEMBLIES ARE TO BE REMOVED IMMEDIATELY FOLLOWING A SUCCESSFUL BACTERIA TEST. LEAVE THE CORPORATION STOP AND 12" LENGTH OF TUBING (WITH A CRIMPED END) IN PLACE.
3. SIZE AS NOTED ON PLAN OR 1" MINIMUM.

TYPICAL CHLORINE INJECTION TAP AND/OR MANUAL AIR RELEASE ASSEMBLY

NOT TO SCALE

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LYNNETTE E. LEE 13978 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

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WATER DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO C-10

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WELL FIELD DESIGN INFORMATION:

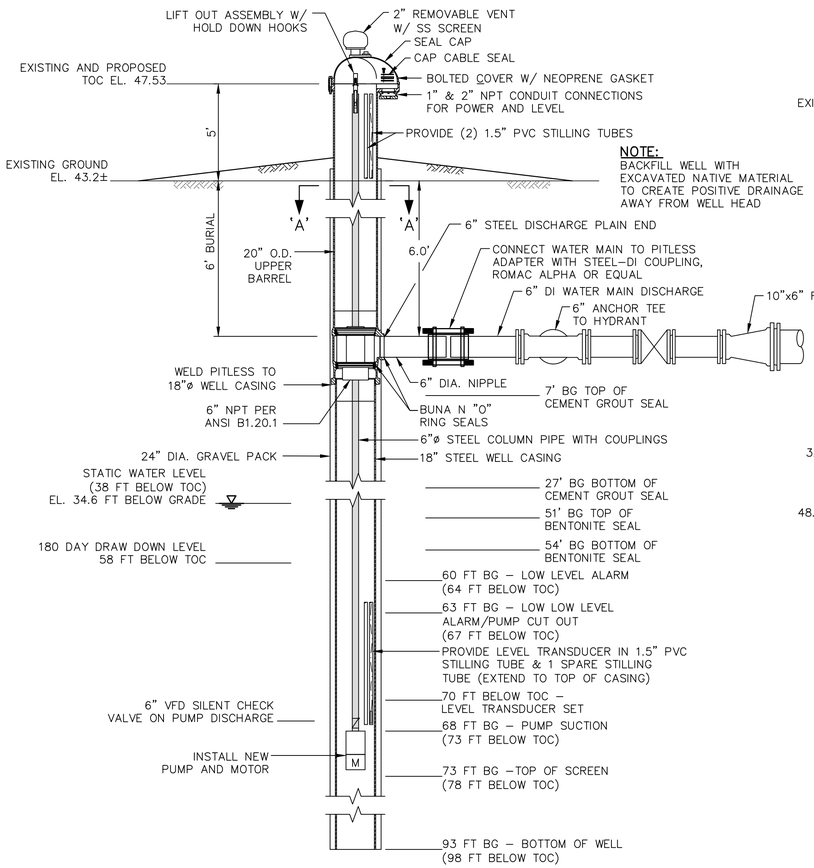
MAX. 1,500,000 GPD PERMITTED WITHDRAWAL FROM MADBURY WELL FIELD

TYPICAL HISTORICAL OPERATION:

WELL #2: 200 – 250 GPM
CURRENTLY 40 HP PUMP
300 GPM @ 253 FT TDH
WELL #3: 300 – 350 GPM
CURRENTLY 30 HP PUMP
350 GPM @ 254 FT TDH
WELL #4: 200 – 425 GPM
CURRENTLY NO PUMP
LAST PUMP 40 HP PUMP
425 GPM @ 230 FT TDH

WELL #4R DESIGN INFORMATION:

PERMITTED PRODUCTION VOLUME: 482 GPM/ 694,080 GPD
WATER LEVEL AT END OF 3 DAY PUMPING TEST = 49 FT BELOW TOC
180 DAY DRAWN DOWN = 58 FT BELOW TOC
18"x24" WELL

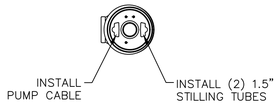


NOTE:
BACKFILL WELL WITH EXCAVATED NATIVE MATERIAL TO CREATE POSITIVE DRAINAGE AWAY FROM WELL HEAD

NOTES:

1. PITLESS ADAPTER TO BE BAKER MONITOR STANDARD INDUSTRIAL PITLESS UNIT SUITABLE FOR 18" DIA. WELL CASING OR EQUAL.
2. SEE ELECTRICAL DRAWINGS FOR POWER AND SIGNAL REQUIREMENTS.

WELL #4R WELL DETAIL
NOT TO SCALE



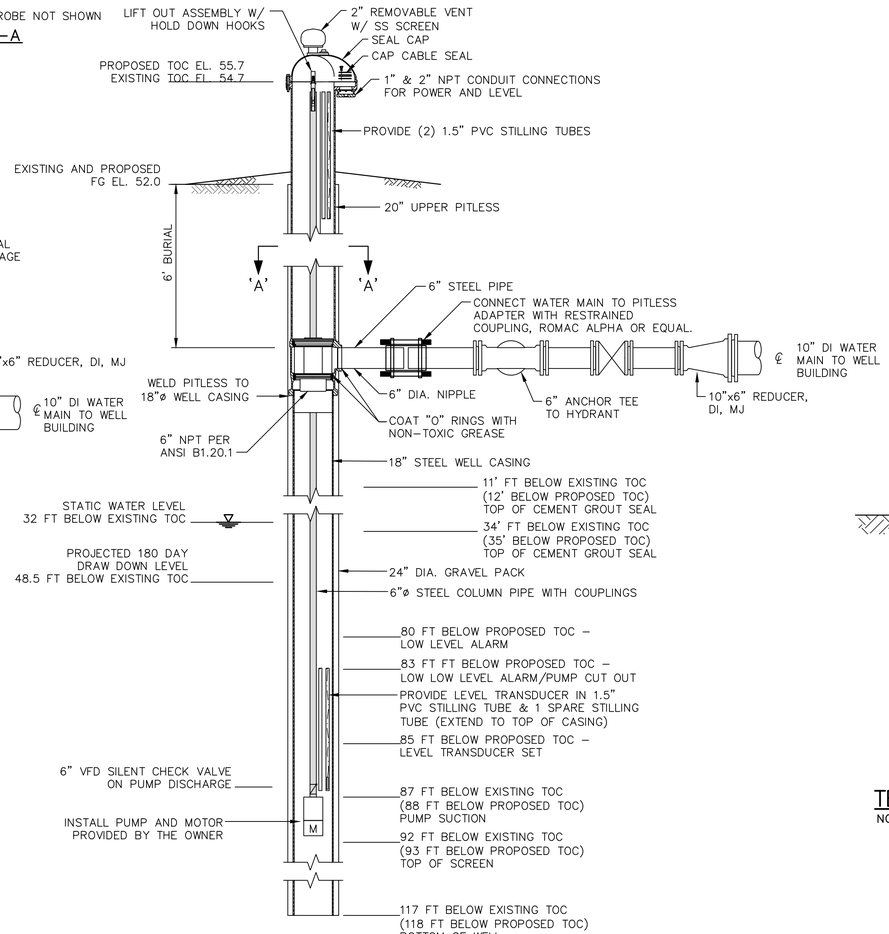
SECTION A–A

WELL #5 DESIGN INFORMATION:

PERMITTED PRODUCTION VOLUME: 500 GPM/ 720,000 GPD
WATER LEVEL AT END OF 5 DAY PUMPING TEST = 41 FT BELOW EXISTING TOC
180 DAY DRAWN DOWN = 48.5 FT BELOW EXISTING TOC
18"x24" WELL

DESIGN NOTES:

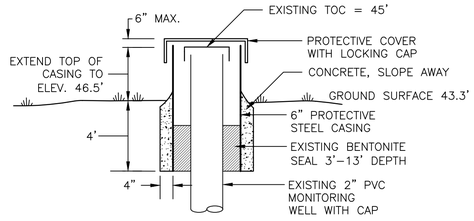
1. TOC WAS NOTED AT 4 FT AFG ON WELL LOG, BUT 2 FT AFG ON SURVEY. ALL ELEVATIONS HAVE BEEN CONVERTED TO REFERENCE TOC TO ELIMINATE CONFLICT.
2. THE PUMP, MOTOR, PUMP CABLE, 6" CHECK VALVE, 6" COLUMN PIPE, AND TWO 1.5" PVC STILLING TUBES ARE EXISTING. THIS EQUIPMENT SHALL BE REMOVED AND REINSTALLED AFTER THE INSTALLATION OF THE PITLESS. CONTRACTOR SHALL FURNISH AND INSTALL PITLESS AND LEVEL TRANSDUCER AND PROVIDE STARTUP AND TESTING SERVICES.



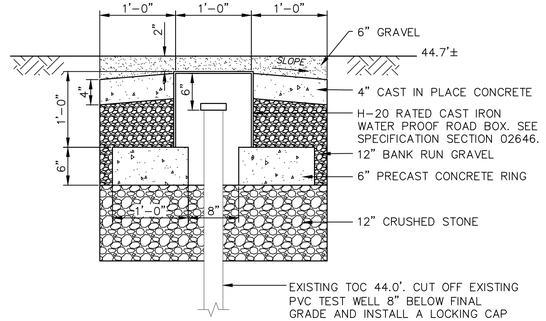
NOTES:

1. PITLESS ADAPTER TO BE BAKER MONITOR STANDARD INDUSTRIAL PITLESS UNIT SUITABLE FOR 18" DIA. WELL CASING OR EQUAL.
2. SEE ELECTRICAL DRAWINGS FOR POWER AND SIGNAL REQUIREMENTS.

WELL #5 WELL DETAIL
NOT TO SCALE



MONITORING WELL M–15 EXTENSION
NOT TO SCALE



TEST WELL MW4–1 AND ROAD BOX DETAIL
NOT TO SCALE

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WELL DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
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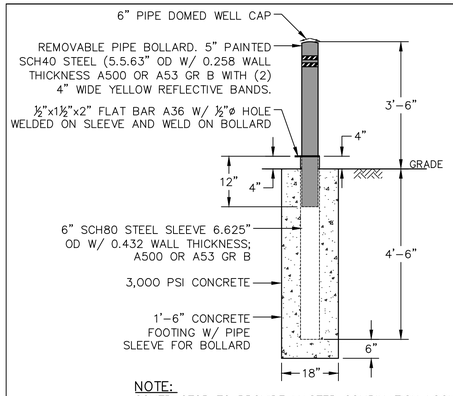
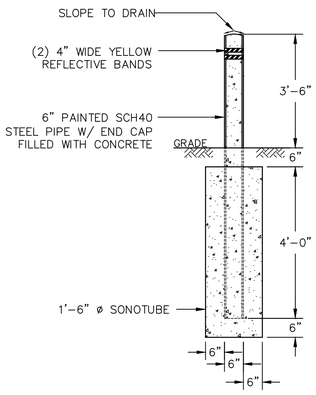
SHEET 13 OF 47



NOTE:
CONTRACTOR TO PROVIDE MASTER COMBINATION LOCK MODEL NO. 175 D FOR EACH INSTALLED REMOVABLE PIPE BOLLARD.

REMOVABLE STEEL BOLLARD DETAIL
NOT TO SCALE



STEEL BOLLARD DETAIL
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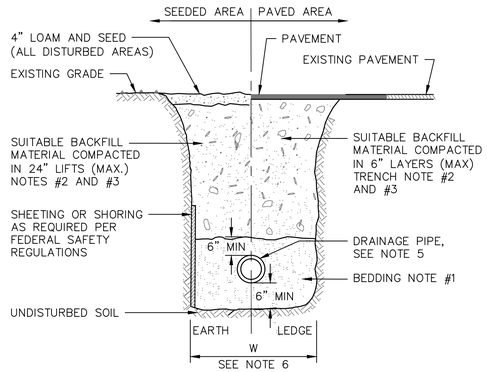
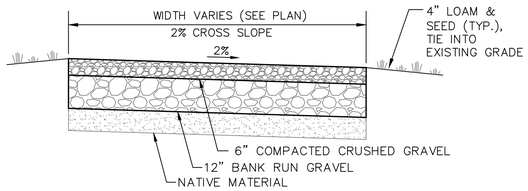


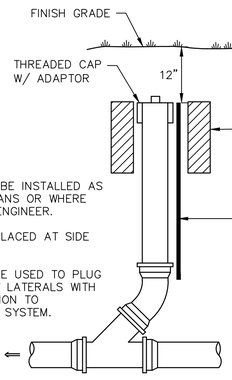
TRENCH DETAIL – STORM DRAIN
NOT TO SCALE

TRENCH NOTES – STORM DRAIN:

1. BEDDING: BEDDING FOR PIPES SHALL CONSIST OF PREPARING THE BOTTOM OF THE TRENCH TO SUPPORT THE ENTIRE LENGTH OF THE PIPE AT A UNIFORM SLOPE AND ALIGNMENT. CRUSHED GRAVEL (NHDOT ITEM 304.3) OR CRUSHED STONE SHALL BE USED TO BED THE PIPE TO THE ELEVATION SHOWN ON THE DRAWINGS.
2. COMPACTION: ALL BACKFILL SHALL BE COMPACTED AT OR NEAR OPTIMUM MOISTURE CONTENT BY PNEUMATIC TAMPERS, VIBRATORY COMPACTORS OR OTHER APPROVED MEANS. BACKFILL BENEATH PAVED SURFACES SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT OF AASHTO T99, METHOD C (STANDARD PROCTOR).
3. SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ROCKS OVER 6 INCHES IN LARGEST DIMENSION; FROZEN EARTH AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. IN SEEDED AREAS, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, ROCKS UNDER 12", FROZEN EARTH OR CLAY, IF HE/SHE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE PIPE WILL BE PRESERVED.
4. BASE COURSE AND PAVEMENT: SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES – DIVISIONS 300 AND 400 RESPECTIVELY.
5. DRAINAGE PIPE: PIPE MATERIALS SHALL BE EITHER POLYVINYL CHLORIDE (PVC) REINFORCED CONCRETE (RC) OR CORRUGATED POLYETHYLENE (CPE). THE OWNER RESERVES THE RIGHT TO DETERMINE WHICH PIPE MATERIALS ARE USED FOR THE PROJECT.
6. W=MAXIMUM ALLOWABLE TRENCH WIDTH: FOR ROCK EXCAVATION, FOR ORDERED EXCAVATION BELOW GRADE AND HANDLING OF EXCAVATED CONTAMINATED SOILS. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 15 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O.D.)



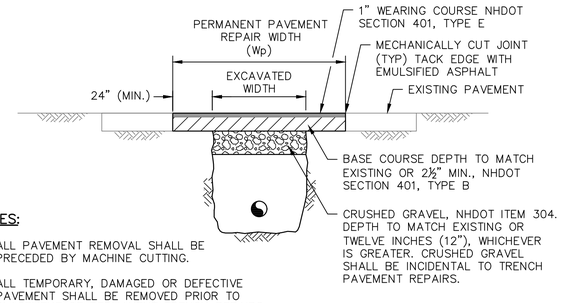
TYPICAL GRAVEL ACCESS ROAD SECTION
NOT TO SCALE



NOTES:

1. CLEANOUTS SHALL BE INSTALLED AS SHOWN ON THE PLANS OR WHERE DIRECTED BY THE ENGINEER.
2. REBAR SHALL BE PLACED AT SIDE OF CLEANOUT.
3. CLEANOUT SHALL BE USED TO PLUG AND TEST ALL NEW LATERALS WITH MINIMAL INTERRUPTION TO OPERATION OF THE SYSTEM.

UTILITY PIPE CLEANOUT
NOT TO SCALE



NOTES:

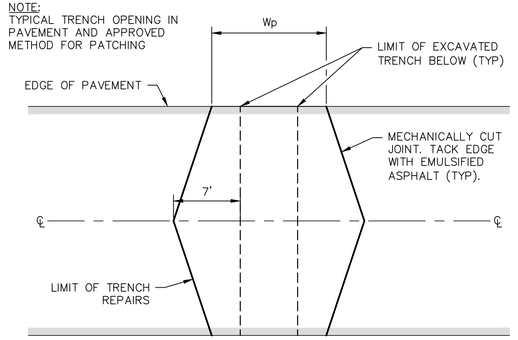
1. ALL PAVEMENT REMOVAL SHALL BE PRECEDED BY MACHINE CUTTING.
2. ALL TEMPORARY, DAMAGED OR DEFECTIVE PAVEMENT SHALL BE REMOVED PRIOR TO PLACEMENT OF PERMANENT TRENCH REPAIRS.
3. DIAMOND PATCHES (SEE DETAIL) SHALL BE REQUIRED FOR ALL TRENCHES CROSSING ROADWAY. DIAMOND PATCHES SHALL MEET NHDOT REQUIREMENTS.
4. SEE TABLE IN "TEMPORARY TRENCH PAVEMENT REPAIRS" FOR MINIMUM TRENCH WIDTHS.

PIPE I.D.	Wt (INCHES)	Wp (INCHES)
1–21 INCHES	72	108
24–30 INCHES	84	120
> 30 INCHES	96	132

MINIMUM TRENCH PAVEMENT WIDTHS

PERMANENT TRENCH PAVEMENT REPAIRS
NOT TO SCALE

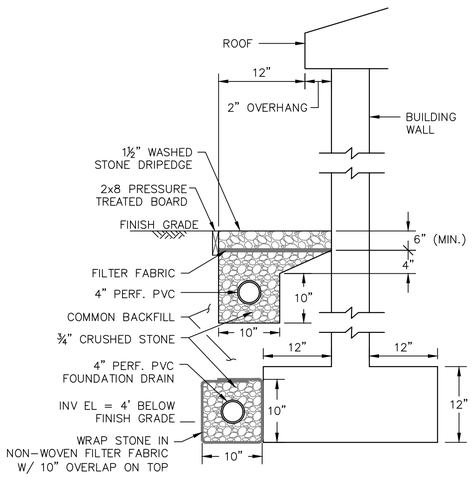
NOTE:
TYPICAL TRENCH OPENING IN PAVEMENT AND APPROVED METHOD FOR PATCHING



NOTES:

SEE PERMANENT TRENCH REPAIRS FOR THICKNESS REQUIREMENTS FOR GRAVELS AND BITUMINOUS PAVEMENTS.

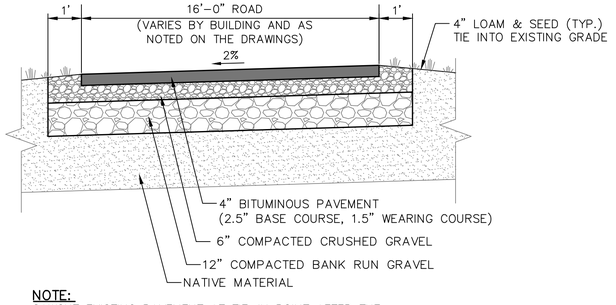
TYPICAL DIAMOND TRENCH PATCH DETAIL
NOT TO SCALE



NOTES:

1. CONSTRUCT DRIP EDGE AND FRENCH DRAIN ALONG BACK OF BUILDING ONLY. EXTEND INFILTRATION TRENCH TO CB 1236. DECREASE WIDTH OF 1.5" WASHED STONE LAYER TO WIDTH OF TRENCH DRAIN BETWEEN BUILDING AND CATCH BASIN.
2. CONSTRUCT FOUNDATION DRAIN AROUND PERIMETER OF BUILDING AT A DEPTH OF 4' BELOW GRADE. NOTE: THIS MAY BE ABOVE THE FOOTING WHERE FOOTING IS STEPPED DOWN FOR PIPE PENETRATIONS.

DRIP EDGE AND FOUNDATION DRAIN DETAIL
NOT TO SCALE

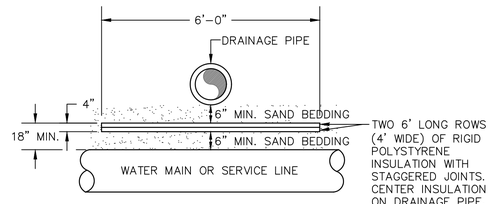


NOTE:
SAWCUT EXISTING PAVEMENT AT TIE-IN POINT AFTER THE GRAVEL IS PLACED AND JUST BEFORE PAVEMENT IS PLACED. PLACE EMULSIFIED ASPHALT ON EXISTING PAVEMENT BEFORE AND AFTER (WITH SAND COVER) NEW PAVEMENT IS PLACED.

NOTES:

1. REMOVE EXISTING 9"–16" OF CRUSHED STONE AND GRAVEL FOR REUSE.
2. REMOVE 12" OF NATIVE MATERIAL BELOW EXISTING ROAD.
3. INSTALL GEOTEXTILE FABRIC.
4. INSTALL 12" OF EXISTING ROAD BED MATERIAL (STOCKPILED).
5. INSTALL 12" NEW BANK RUN GRAVEL, 8" NEW CRUSHED GRAVEL W/ GEOTEXTILE FABRIC BETWEEN.

TYPICAL PAVEMENT SECTION
NOT TO SCALE



NOTES:

1. INSULATION TO BE USED WHERE PIPE SEPARATION IS 24" OR LESS.
2. INSTALL 22½° MJ BENDS WITH RESTRAINED JOINT FITTINGS IF NECESSARY TO ADJUST WATER MAIN PROFILE.
3. THIS DETAIL PERTAINS TO CROSSINGS WHERE THE WATER PIPE IS EITHER BELOW OR ABOVE THE DRAINAGE PIPE.

DRAINAGE CROSSING DETAIL
NOT TO SCALE

ISSUE FOR	Date	By
APPROVAL	6/14/2021	LEC
CONSTRUCTION	6/21/2021	LEC
RECORD DRAWING	Date	By

NO.	REVISIONS	APP'D

Drawn/Chk. ____
Designed ____
Checked ____
Approved ____
Date JUNE 14, 2021
Book No. ____
Project No. 1841
Dwg. ID 1841DET
Scale AS SHOWN

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

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WATER, DRAINAGE, AND MISCELLANEOUS DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO C-12

SHEET 14 OF 47

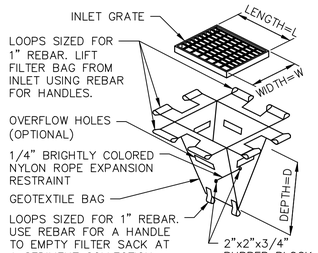
M:\Real Numbers\PORTSMOUTH\1841 Madbury Wells\c3d_1841DET.dwg, 6/15/2021 3:50:02 PM

NOTES:

1. ACCEPTED MANUFACTURERS:
   A. "SILT SACK" INLET SEDIMENT CONTROL DEVICE BY "ACF ENVIRONMENTAL, INC" 2831 CARDWELL RD., RICHMOND VA 23234, (800)448-3636
   B. "DANDY SACK" BY "DANDY PRODUCTS, INC.", P.O. BOX BOX 1980, WESTERVILLE, OH 43086", (800) 591-2284.
2. ALTERNATIVE CATCH BASIN INLET PROTECTION MEASURES MAY INCLUDE THE NHDES "BLOCK AND GRAVEL METHOD" PER THE NH STORMWATER MANUAL (VOL. 3).
3. EMPTY FILTER SACK WHEN BRIGHTLY COLORED EXPANSION RESTRAINT CAN NO LONGER BE SEEN.
4. GEOTEXTILE WILL BE A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS REQUIREMENTS IN THE SPECIFICATIONS TABLE.
5. AN OIL ADSORBENT PAD OR PILLOW CAN BE USED WHEN OIL SPILLS ARE A CONCERN.
6. INSPECT PER REGULATORY REQUIREMENTS.
7. THE WIDTH, "W", OF THE FILTER SACK WILL MATCH THE INSIDE WIDTH OF THE CATCH BASIN FRAME.
8. THE DEPTH, "D", OF THE FILTER SACK WILL BE BETWEEN 18 INCHES AND 36 INCHES.
9. THE LENGTH, "L", OF THE FILTER SACK WILL MATCH THE INSIDE LENGTH OF THE CATCH BASIN FRAME.

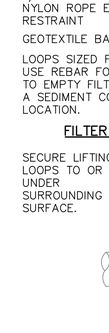
CATCH BASIN INLET FILTER

NOT TO SCALE UE

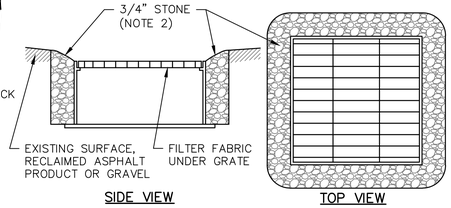


FILTER SACK-ISOMETRIC VIEW

TYPE HF MODERATE TO HIGH FLOW GOETEXTILE FABRIC SPECIFICATATION TABLE		
PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20%
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90%
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE SIZE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

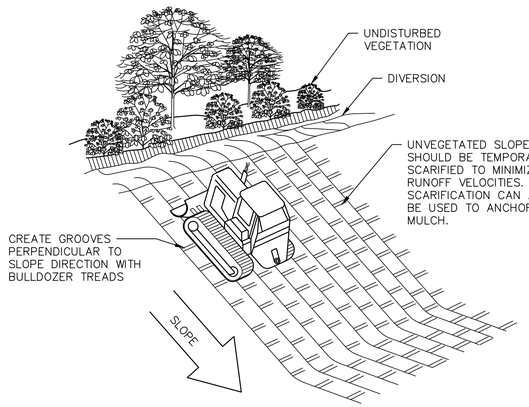


FILTER SACK-INSTALLED CROSS-SECTION VIEW



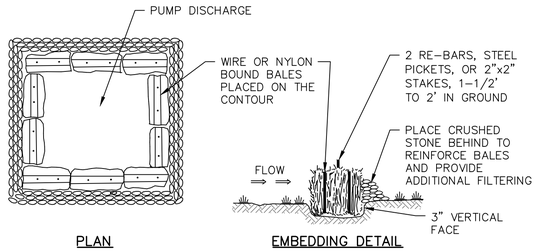
CATCH BASIN PROTECTION DETAIL

NOTES:
1. INSPECT AND MAINTAIN STONE & FILTER FABRIC AFTER 1/2" RAIN EVENT OR WEEKLY
2. WHEN EXISTING CATCH BASIN IS NOT BEING MODIFIED (RAISED, LOWERED, ETC.), CONSTRUCT 4" HIGH x 6" WIDE STONE BERM AROUND PERIMETER OF GRATE.



BANK STABILIZATION DETAIL

NOT TO SCALE UE



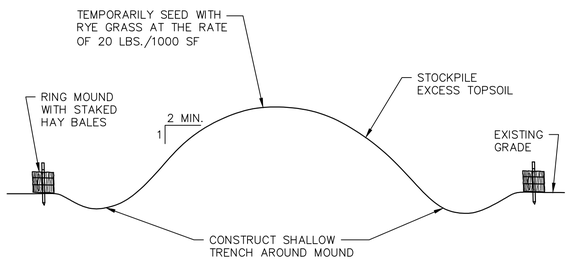
HAY BALE BARRIER CONSTRUCTION SPECIFICATIONS:

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY BUTTED.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 3".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

(SUBSIDIARY TO ITEM 645.7)

PUMP DISCHARGE SEDIMENT TRAP

NOT TO SCALE UE



TOPSOIL STOCKPILE MOUND

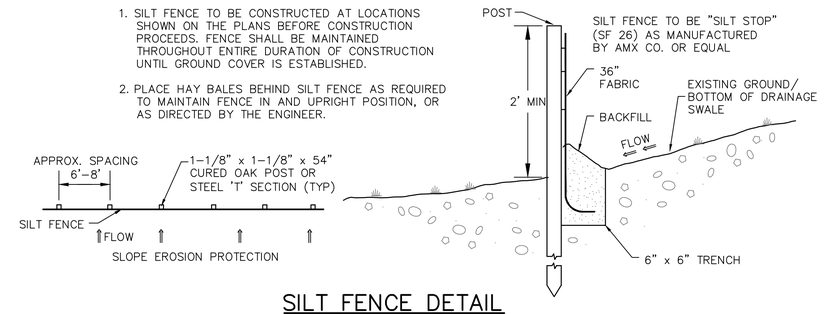
NOT TO SCALE UE

STORMWATER MANAGEMENT, EROSION & SEDIMENT CONTROL NOTES:

1. THE CONTRACTOR MUST SUBMIT A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) TO THE OWNER AND A NOTICE OF INTENT (NOI) TO THE USEPA REGION ONE FOR CONSTRUCTION ACTIVITY IF GREATER THAN 1 ACRE IS DISTURBED AT ANY TIME. THE SWPPP IS TO BE PREPARED IN ACCORDANCE WITH USEPA REQUIREMENTS.
2. THE CONTRACTOR SHALL SUBMIT, FOR REVIEW AND APPROVAL, A SCHEDULE TO INCLUDE ALL EARTHWORK ACTIVITIES.
3. EXCAVATION AND EARTHWORK SHALL BE CONDUCTED IN A MANNER THAT WILL MINIMIZE EFFECTS OF EROSION THROUGHOUT CONSTRUCTION.
4. THE CONTRACTOR SHALL, TO THE EXTENT POSSIBLE, PHASE EARTHWORK ACTIVITIES SO THAT THE SMALLEST PRACTICAL LAND AREA IS EXPOSED AT ANY GIVEN TIME, FOR THE SHORTEST PRACTICAL PERIOD OF TIME.
5. THE CONTRACTOR SHALL LOAM, SEED, AND MULCH ALL CUT SLOPES IMMEDIATELY FOLLOWING FINAL GRADING. TEMPORARY SEEDING AND MULCH SHALL BE APPLIED AT ALL UNVEGETATED AREAS THAT WILL BE EXPOSED FOR A PERIOD EXCEEDING TWENTY (20) DAYS. AREAS TO BE SEEDED SHALL BE ROUGH GRADED AND COVERED WITH LOAM 4 INCHES DEEP AFTER LIGHT ROLLING AND CONFORMING WITH EXISTING LINE AND GRADES.
6. SHALLOW SLOPES (SHALLOWER THAN 3:1) NOT SHOWN TO BE OTHERWISE COVERED SHALL BE SEEDED WITH PARK MIXTURE, SECTION 02935.
7. STEEP SLOPES (STEEPER THAN 3:1) NOT SHOWN TO BE OTHERWISE COVERED SHALL BE EITHER SODDED OR SEEDED WITH A SLOPE MIXTURE, SECTION 02935. AFTER SEEDING, STEEP SLOPES SHALL BE MULCHED WITH EXCELSIOR OR EQUAL AND A CHEMICAL TACKIFIER SHALL BE APPLIED TO ALL SIDE SLOPES STEEPER THAN 3:1. RATE OF APPLICATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
8. HAYBALES, SILT FENCING, AND EROSION STONE SHALL BE INSTALLED WHERE NECESSARY TO MINIMIZE THE EFFECTS OF EROSION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ANY ADDITIONAL MEASURES WHICH MAY BE REQUIRED WHERE NECESSARY TO OBTAIN THE OBJECTIVES DESCRIBED HEREIN. ALL WORK SHALL BE COMPLETED IN CONFORMANCE WITH THE LATEST ADDITION OF "STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL HANDBOOK FOR URBAN AND DEVELOPING AREAS IN NEW HAMPSHIRE". PREVENT THE DEGRADATION OF DOWNSTREAM PROPERTIES AND DRAINAGE.
9. DRAINAGE SWALES SHALL BE MONITORED AND MAINTAINED THROUGHOUT CONSTRUCTION. SILT SHALL BE PERIODICALLY REMOVED FROM SWALES AS NECESSARY TO PREVENT MIGRATION.
10. HAY BALE BARRIERS SHALL BE INSTALLED ALONG SWALES AT 100 FOOT INTERVALS, AROUND CATCH BASINS, AND AT ALL AREAS WHERE STORMWATER OR TRENCHWATER IS CONCENTRATED.
11. ALL EROSION CONTROL MEASURES, INCLUDING HAY BALE BARRIERS AND SEDIMENT TRAPS, ARE TO BE MAINTAINED AND KEPT CLEAN UNTIL ALL EXPOSED AREAS HAVE A HEALTHY STAND OF GROUND COVER, AT WHICH TIME TEMPORARY MEASURES ARE TO REMOVED. CONTRACTOR IS RESPONSIBLE FOR PROPER DISPOSAL OF TEMPORARY MATERIALS REMOVED AND SILT.
12. ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED. MINIMUM DEPTH OF LOAM SHALL BE FOUR (4) INCHES.
13. PROVIDE SEED (PARK AND SLOPE MIXTURES), LIME, FERTILIZER, AND MULCH PER THE SPECIFICATIONS.

SILT FENCE CONSTRUCTION NOTES:

1. SILT FENCE TO BE CONSTRUCTED AT LOCATIONS SHOWN ON THE PLANS BEFORE CONSTRUCTION PROCEEDS. FENCE SHALL BE MAINTAINED THROUGHOUT ENTIRE DURATION OF CONSTRUCTION UNTIL GROUND COVER IS ESTABLISHED.
2. PLACE HAY BALES BEHIND SILT FENCE AS REQUIRED TO MAINTAIN FENCE IN AND UPRIGHT POSITION, OR AS DIRECTED BY THE ENGINEER.



SILT FENCE DETAIL

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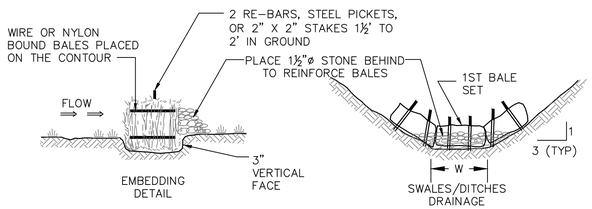
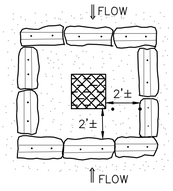


HAY BALE BARRIER CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY BUTTED.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 3".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED, WHEN THEY HAVE SERVED THEIR PURPOSE, SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. BARRIERS SHALL BE SPACED AT 100' ALONG DRAINAGE SWALES/ DITCHES.



HAY BALE DETAIL

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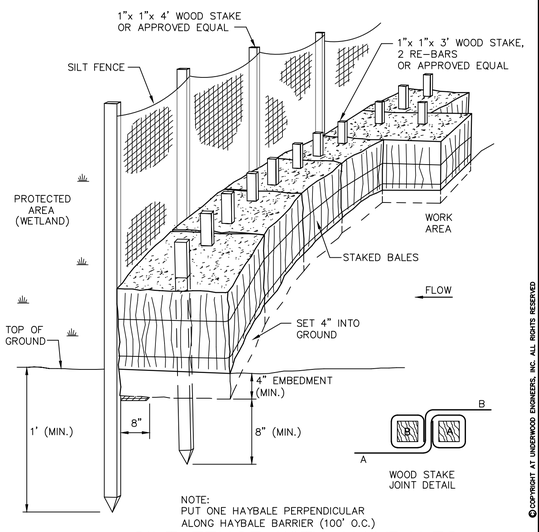

NOTE:
PUT ONE HAYBALE PERPENDICULAR ALONG HAYBALE BARRIER (100' O.C.)

SILT FENCE WITH HAYBALES

NOT TO SCALE

ISSUE FOR			
APPROVAL	By	LEC	
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Date 6/21/2021			
RECORD DRAWING	By		
Date			

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Project No. 1841DET
Dwg. ID 1841DET
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LYNNETTE E. LABONTE 13978 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

EROSION CONTROL DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO C-13

SHEET 15 OF 47

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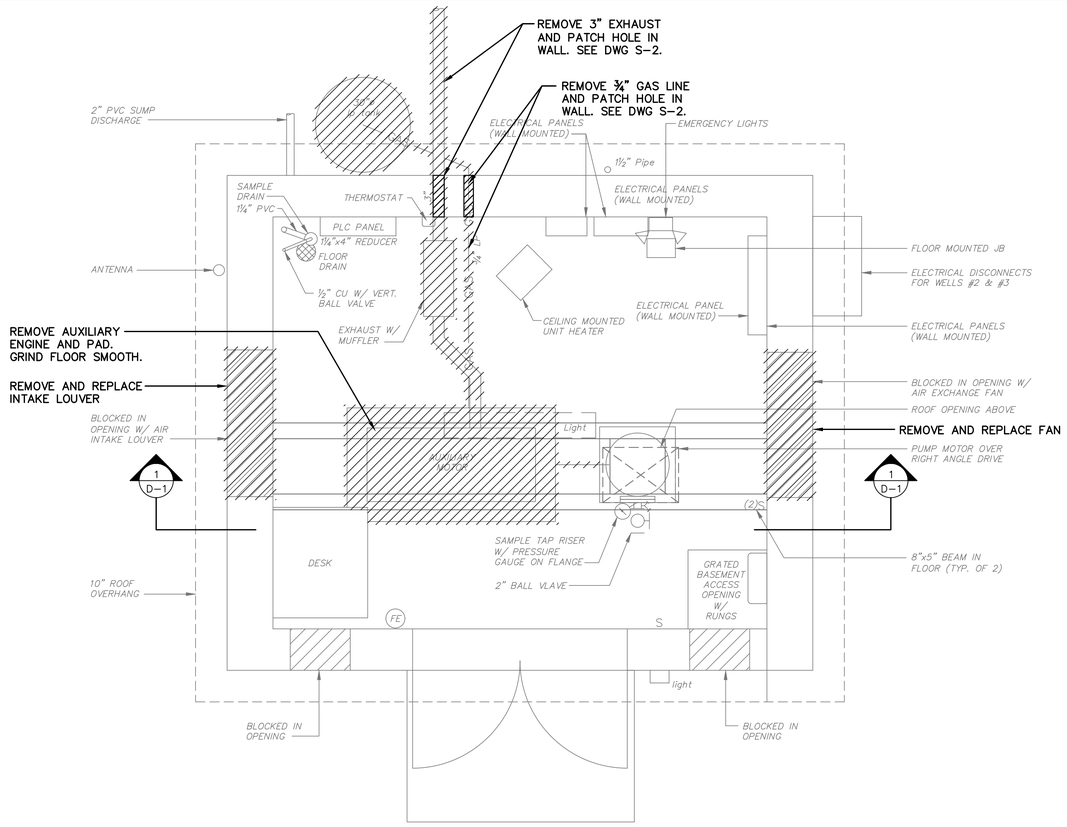
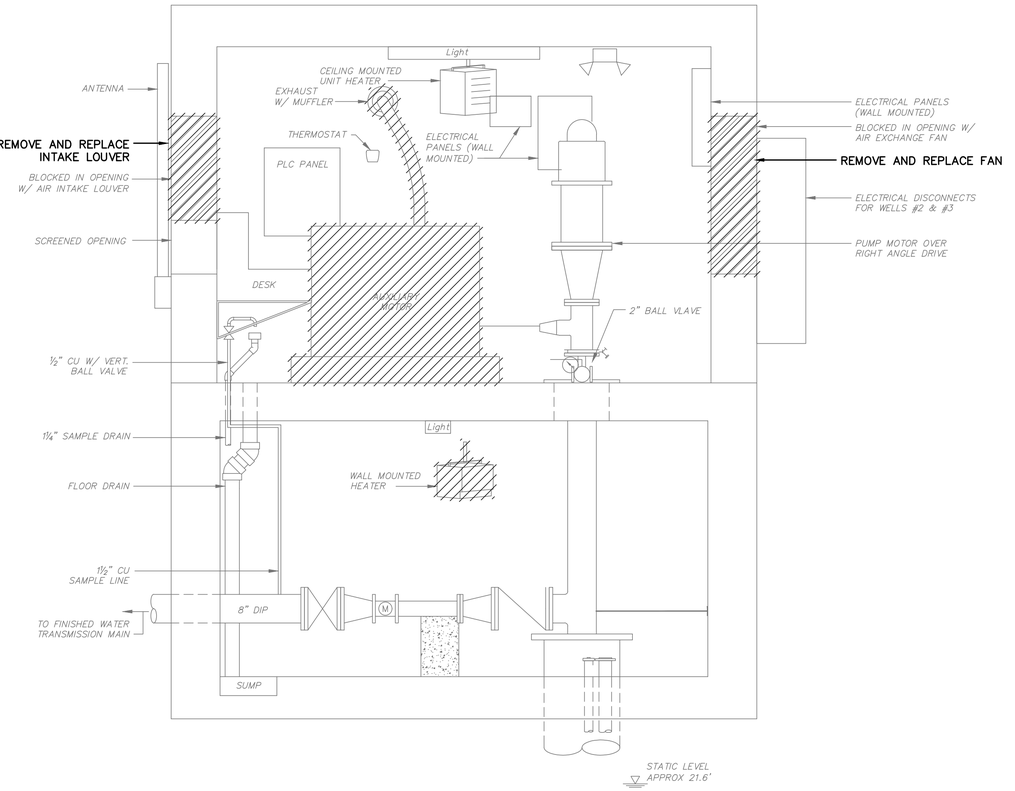
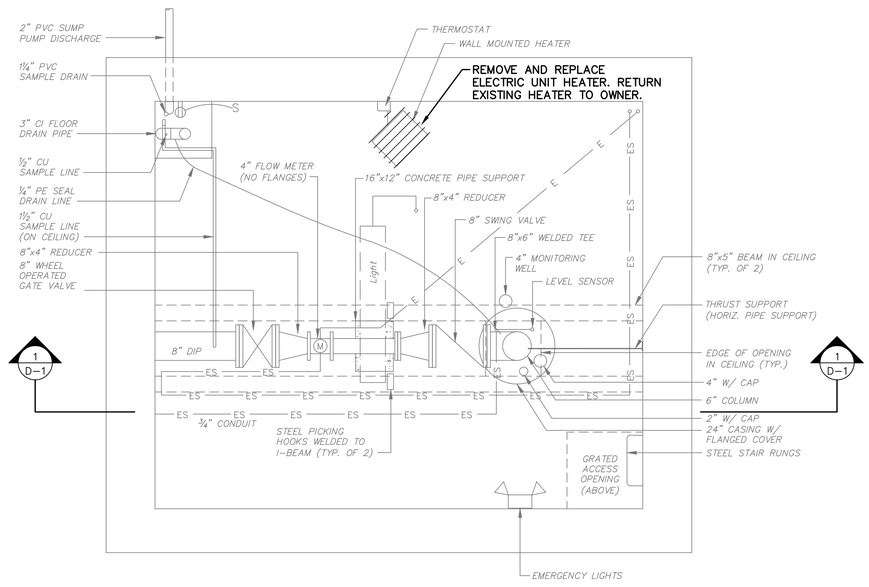


WELL #2 FIRST FLOOR DEMOLITION PLAN
SCALE: 1/2"=1'-0"



1/D-1 WELL #2 DEMOLITION ELEVATION
SCALE: 1/2"=1'-0"



WELL #2 LOWER LEVEL DEMOLITION PLAN
SCALE: 1/2"=1'-0"

NOTE:

1. THE CITY MAY CHOOSE TO KEEP VARIOUS MECHANICAL/ELECTRICAL ITEMS FOR SPARES RATHER THAN HAVE THE CONTRACTOR DISPOSE OF THEM. VERIFY WITH THE CITY PRIOR TO DISPOSAL OF: PUMPS, MOTORS, VFDS, UNIT HEATERS, DEHUMIDIFIERS, FLOW METERS, VALVES AND LEVEL SENSORS.

NO.	REVISIONS	APP'D
	ISSUE FOR APPROVAL Date 6/14/2021 By LEC	
	CONSTRUCTION Date 6/21/2021 By LEC	
	RECORD DRAWING Date By	

Drawn/Chk.
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Approved
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Project No. 1841DEMO
Dwg. ID 1841DEMO
Scale AS SHOWN

STATE OF NEW HAMPSHIRE - LICENSED PROFESSIONAL ENGINEER - LYNNETTE C. LEE NO. 9978

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WELL #2 DEMOLITION PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO D-1

SHEET 16 OF 47

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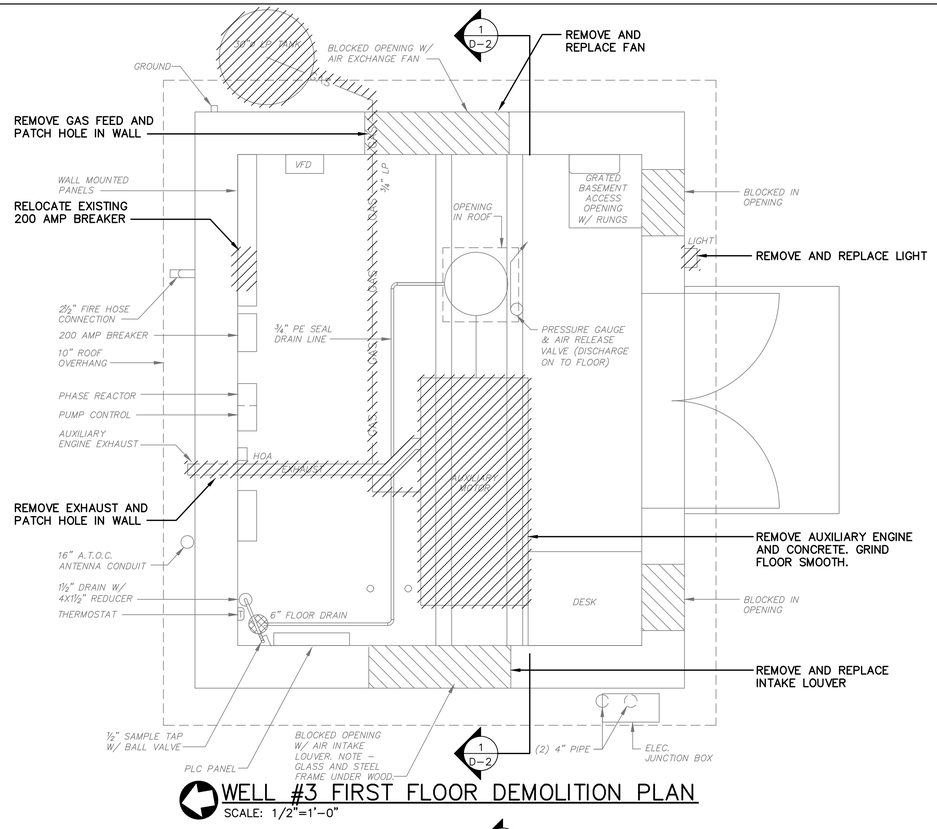
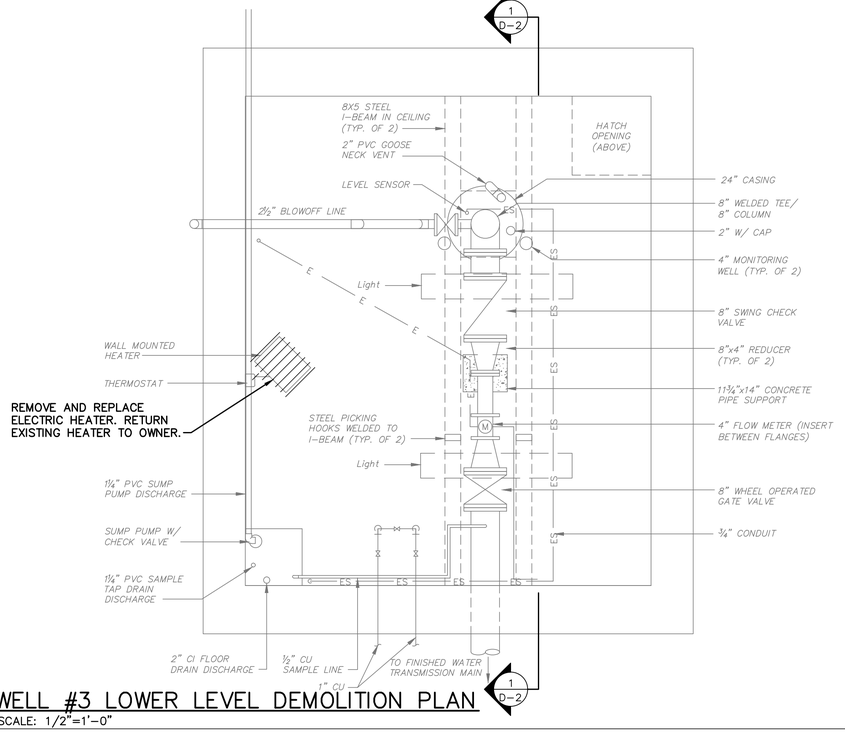


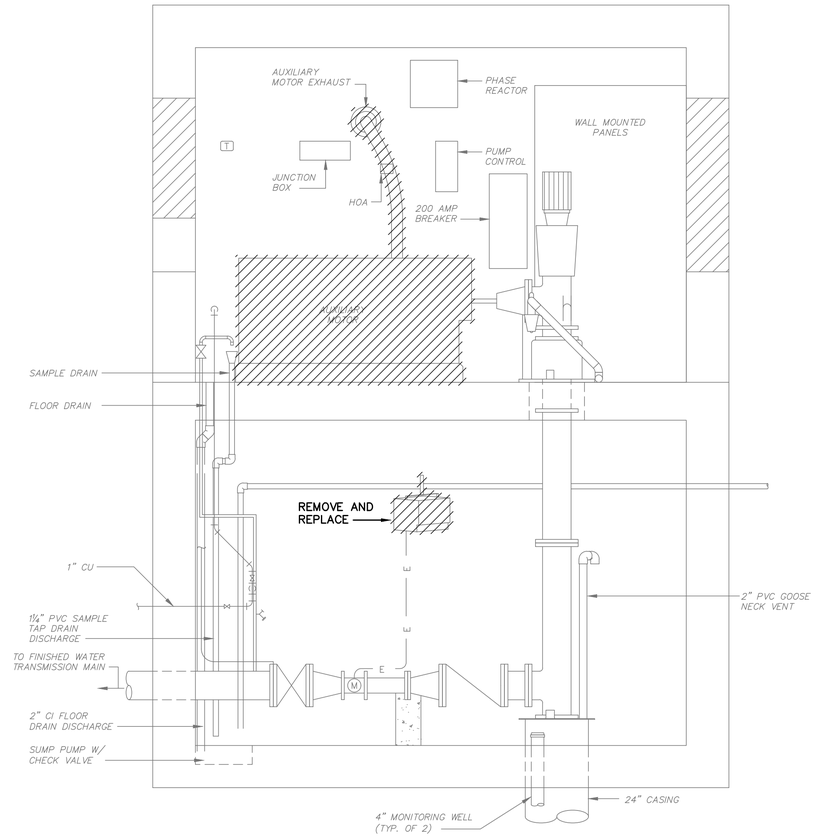
WELL #3 FIRST FLOOR DEMOLITION PLAN

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



WELL #3 LOWER LEVEL DEMOLITION PLAN

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



WELL #3 DEMOLITION ELEVATION

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

NOTE:

1. THE CITY MAY CHOOSE TO KEEP VARIOUS MECHANICAL/ELECTRICAL ITEMS FOR SPARES RATHER THAN HAVE THE CONTRACTOR DISPOSE OF THEM. VERIFY WITH THE CITY PRIOR TO DISPOSAL OF: PUMPS, MOTORS, VFDS, UNIT HEATERS, DEHUMIDIFIERS, FLOW METERS, VALVES AND LEVEL SENSORS.

NO.	REVISIONS	APP'D

ISSUE FOR
APPROVAL
Date 6/14/2021 By LEC
CONSTRUCTION
Date 6/21/2021 By LEC
RECORD DRAWING
Date By

Drawn/Chk.
Designed
Checked
Approved
Date JUNE 14, 2021
Book No. 1841
Project No. 1841DEMO
Dwg. ID
Scale AS SHOWN

STATE OF NEW HAMPSHIRE – LICENSED PROFESSIONAL ENGINEER – LYNNETTE L. E. CLOUTIER 9978

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WELL #3 DEMOLITION PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO D-2

SHEET 17 OF 47

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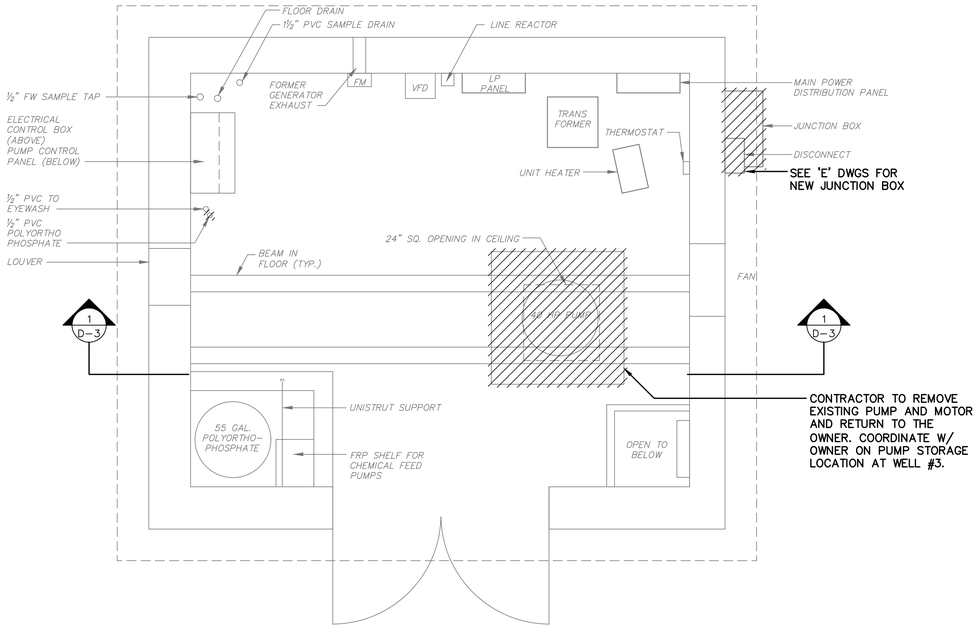
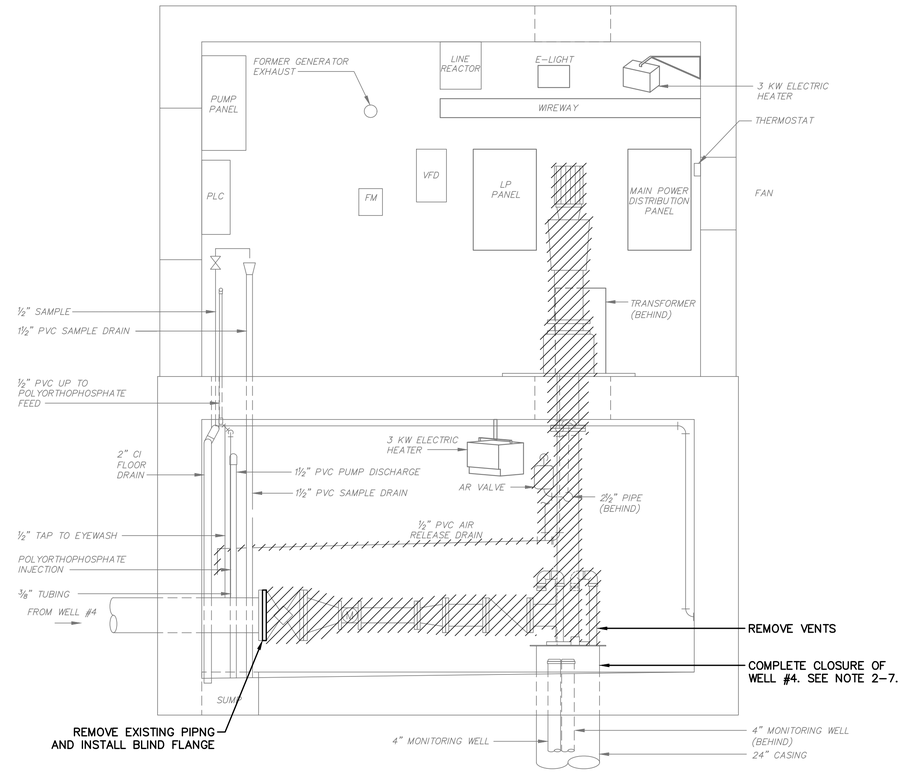
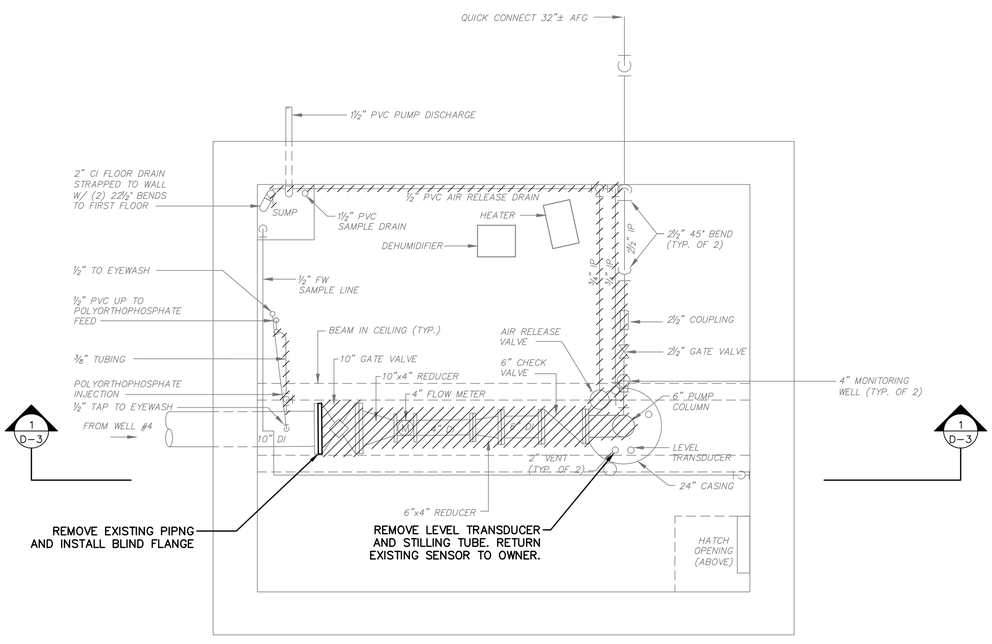


WELL #4 FIRST FLOOR DEMOLITION PLAN
SCALE: 1/2"=1'-0"



1 D-3 WELL #4 DEMOLITION ELEVATION
SCALE: 1/2"=1'-0"



WELL #4 LOWER LEVEL DEMOLITION PLAN
SCALE: 1/2"=1'-0"

NOTES:

1. THE CITY MAY CHOOSE TO KEEP VARIOUS MECHANICAL/ELECTRICAL ITEMS FOR SPARES RATHER THAN HAVE THE CONTRACTOR DISPOSE OF THEM. VERIFY WITH THE CITY PRIOR TO DISPOSAL OF ANY EQUIPMENT.
2. CONTRACTOR SHALL CLOSE AND GROUT WELL #4 IN ACCORDANCE WITH NHDES REGULATIONS. ALL WORK TO CONNECT THE NEW WELL (4R) (NEW PUMP, CONTROLS, WIRING, BURIED PIPING, ETC.) SHALL BE COMPLETED PRIOR TO TAKING WELL #4 AND PUMP OUT OF SERVICE TO MINIMIZE DOWN TIME.
3. WELL DECOMMISSIONING SHALL BE PERFORMED IN ACCORDANCE WITH PART WE 604 OF THE NH CODE OF ADMINISTRATIVE RULES.
4. FILL WELL TO 5 FT ABOVE THE SCREEN WITH COARSE SAND AND/OR GRAVEL.
5. INSTALL A 4 FT THICK BENTONITE PLUG USING BENTONITE CHIPS ON TOP OF THE SAND/GRAVEL.
6. REMAINDER OF THE WELL SHALL BE FILLED TO THE GROUND SURFACE WITH GROUT OR OTHER SEALING MATERIAL IN ACCORDANCE WITH WE 604.05(F).
7. WELL SHALL BE SEALED BY THE PRESSURE GROUT METHOD WITH THE USE OF A CONDUCTOR PIPE. OTHERWISE KNOWN AS A TREMIE PIPE, FROM THE BOTTOM OF THW WELL TO THE TOP WITH A GROUT MIXTURE OF PORTLAND CEMENT WITH 2 TO 10 PERCENT HIGH SOLIDS BENTONITE CLAY MIXED ACCORDING TO THE WATER-TO-CEMENT RATIO IN THE FOLLOWING TABLE:

PERCENT BENTONITE (BY WEIGHT)	MAXIMUM MIX-WATER REQUIREMENTS GALLONS/SACK	SLURRY WEIGHT (DENSITY) POUNDS/GALLON
2	6.5	14.7
4	7.8	14.1
6	9.1	13.5
8	10.4	13.1
10	11.7	

8. IN ADDITION TO THE REQUIREMENTS OF NOTE 2 ABOVE, COMMERCIALLY AVAILABLE PREMIXED BENTONITE GROUTS DESIGNED FOR SEALING WELLS MAY BE USED WITH PRIOR APPROVAL FROM THE ENGINEER.
9. COMMERCIALLY AVAILABLE PREMIXED BENTONITE GROUTS SHALL BE MIXED WITH WATER ACCORDING TO THE MANUFACTURERS SPECIFICATIONS.
10. WELL DECOMMISSIONING SHALL BE PERFORMED BY A LICENSED NEW HAMPSHIRE WATER WELL CONTRACTOR.

NO.	REVISIONS	APP'D

ISSUE FOR
APPROVAL By LEC Date 6/14/2021
CONSTRUCTION By LEC Date 6/21/2021
RECORD DRAWING By Date

Drawn/Chk.
Designed
Checked
Approved
Date JUNE 14, 2021
Book No. 1841
Project No. 1841DEMO
Dwg. ID
Scale AS SHOWN

UNDERWOOD engineers
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WELL #4 DEMOLITION PLAN
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO D-3
SHEET 18 OF 47

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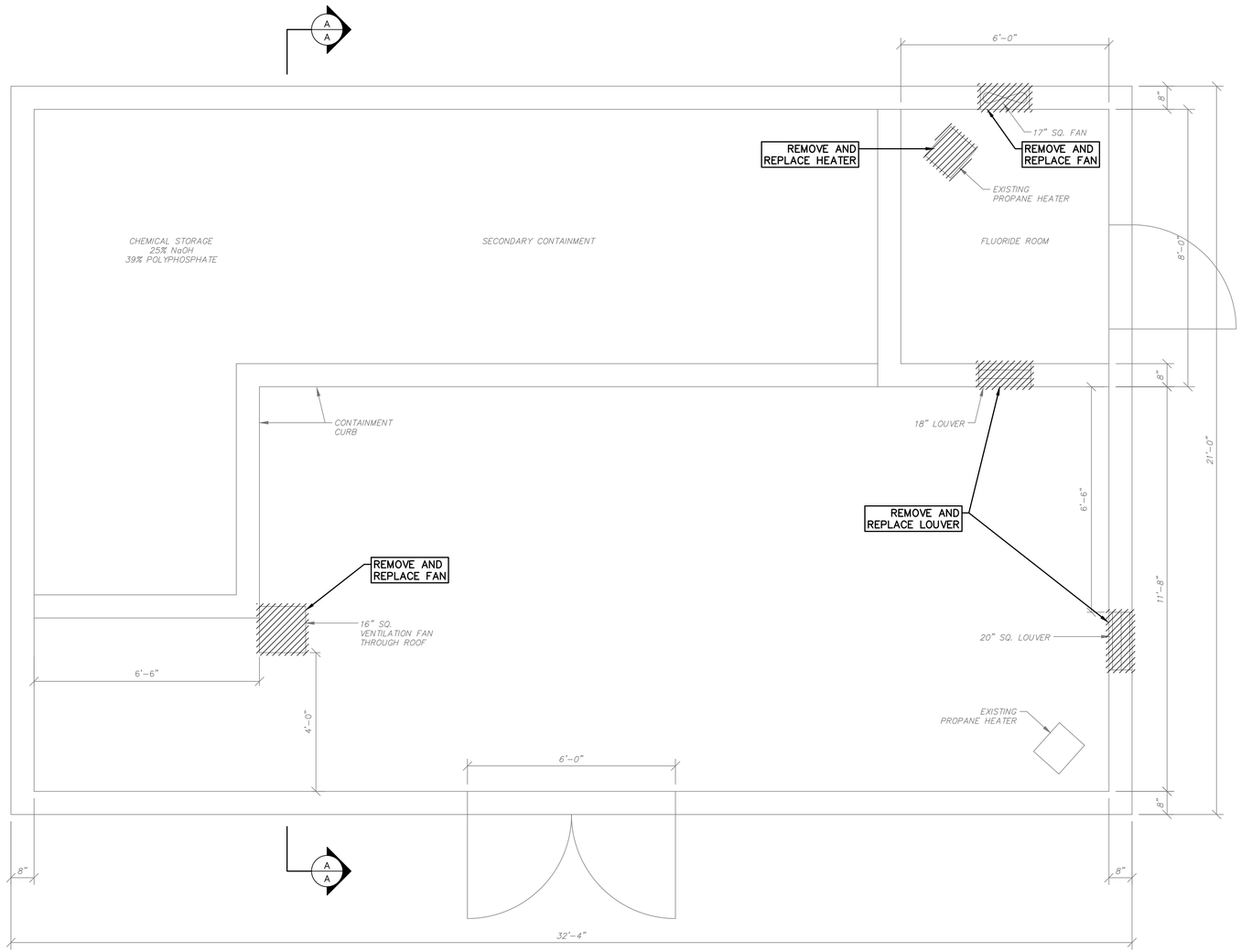
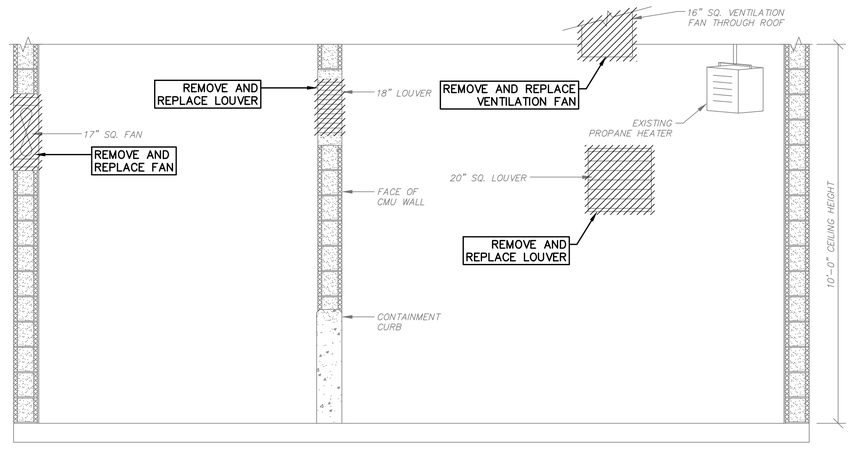


WELL #1 BUILDING PLAN

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



A
A SECTION

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

NO.	REVISIONS	APP'D

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APPROVAL
Date 6/14/2021 By LEC
CONSTRUCTION
Date 6/21/2021 By LEC
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Date JUNE 14, 2021
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Project No. 1841WELL1
Dwg. ID 1841WELL1
Scale AS SHOWN

STATE OF NEW HAMPSHIRE – LICENSED PROFESSIONAL ENGINEER – LYNNETTE C. LEE NO. 9978

UNDERWOOD engineers
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WELL #1 BUILDING DEMOLITION PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

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PORTSMOUTH, NEW HAMPSHIRE

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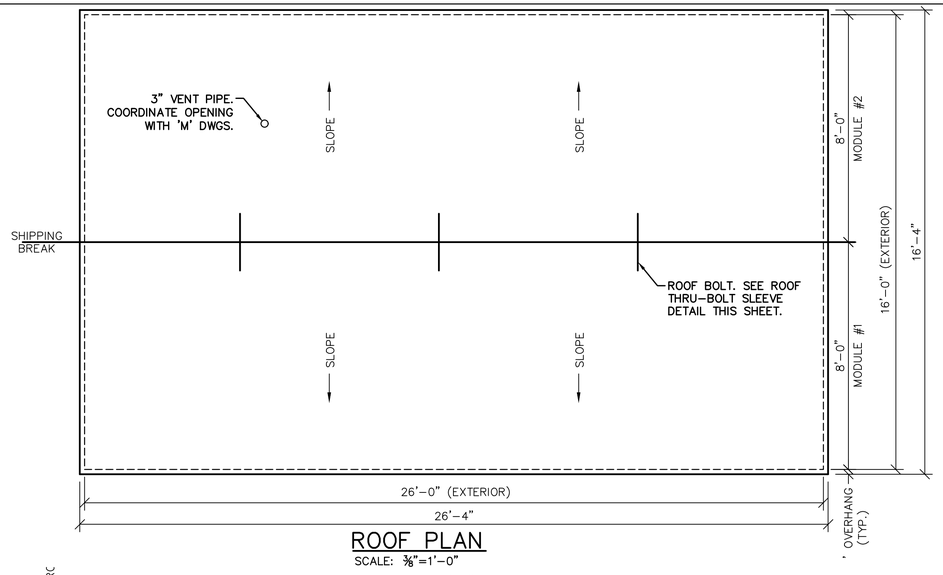
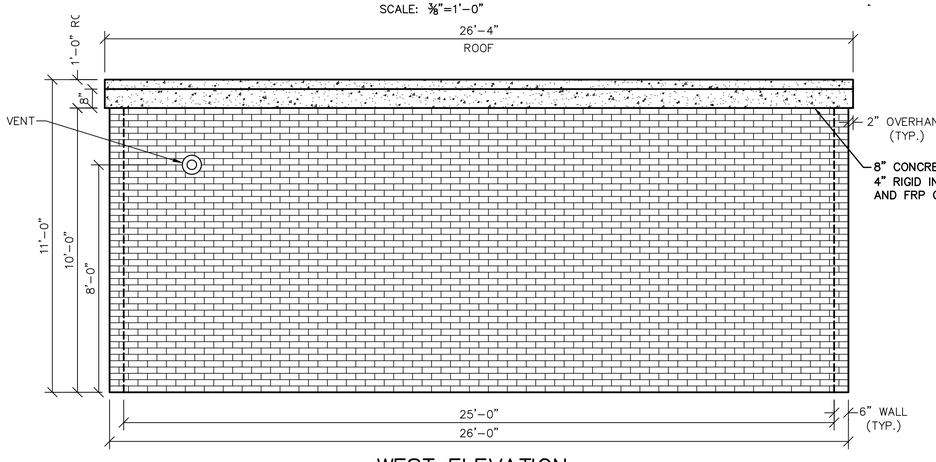


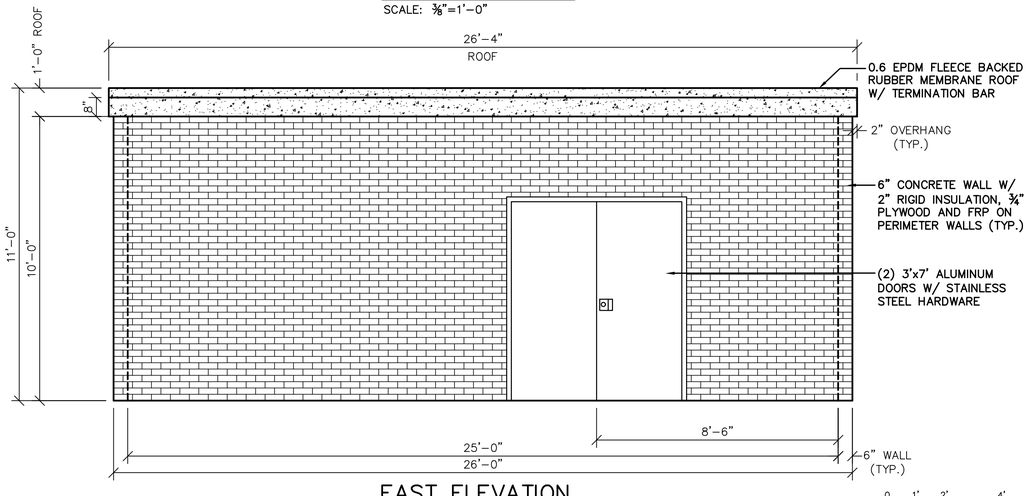
ROOF PLAN

SCALE: ⅜"=1'-0"



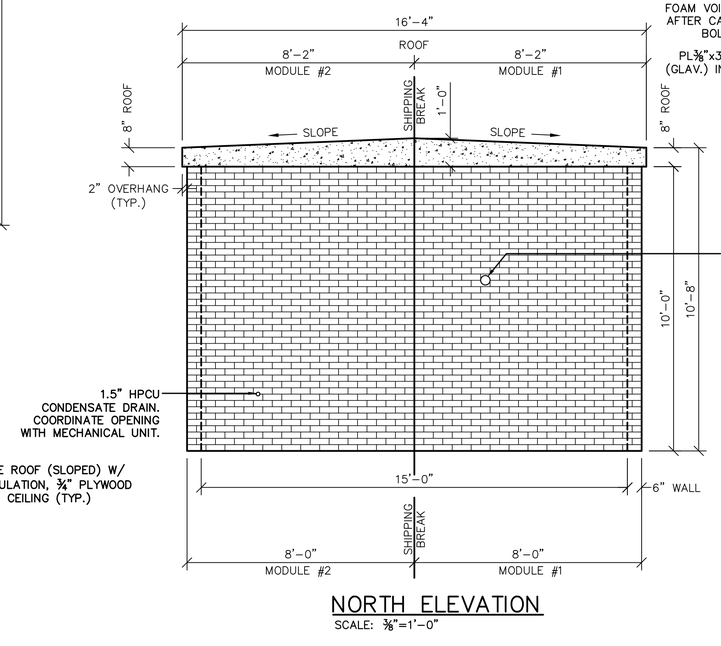
WEST ELEVATION

SCALE: ⅜"=1'-0"



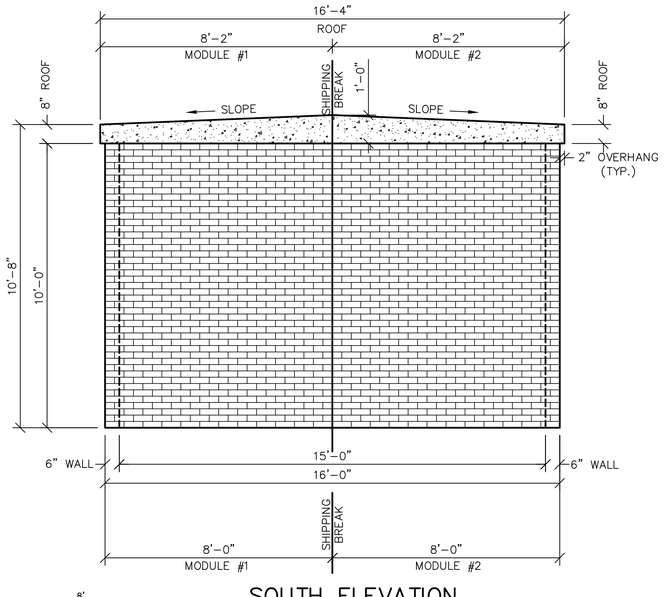
EAST ELEVATION

SCALE: ⅜"=1'-0"



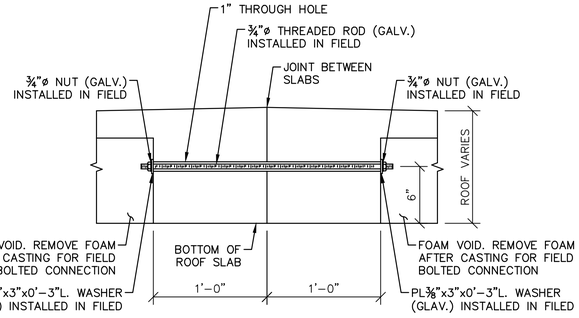
NORTH ELEVATION

SCALE: ⅜"=1'-0"



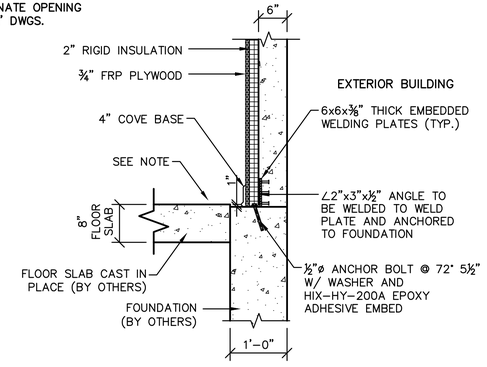
SOUTH ELEVATION

SCALE: ⅜"=1'-0"



ROOF THRU-BOLT DETAIL

NOT TO SCALE



NOTES:

1. FLOOR SLAB (BY OTHERS) SHALL BE 1" ABOVE FOUNDATION WALL TO WALL JOINT. FILL W/ NON SHRINK GROUT AFTER ½"ø ANCHOR BOLS W/ HIX-HY 200A EPOXY ADHESIVE ARE INSTALLED. FINISH NON-SHRINK GROUT TO MATCH SURROUNDING SLAB. FINISH FLOOR TO BE EPOXY (BY OTHERS).
2. TO MAINTAIN THE REQUIRED THERMAL BREAK, RIGID INSTALLATION WILL NEED TO BE INSTALLED BY THE CONTRACTOR TO THE JOINT OF THE PRECAST BUILDING AND CONCRETE FLOOR.

TYPICAL BUILDING PINNING CONNECTION DETAIL

NOT TO SCALE

NOTE:

1. CONTRACTOR SHALL COORDINATE BUILDING OPENINGS WITH OTHER SYSTEMS PRIOR TO ORDERING BUILDING TO VERIFY OPENING SIZES AND LOCATIONS.

0 1' 2' 4' 8'
SCALE: 3/8" = 1'-0"

NO.	REVISIONS	APP'D	Date
	ISSUE FOR APPROVAL By LEC		Date 6/14/2021
	CONSTRUCTION By LEC		Date 6/21/2021
	RECORD DRAWING By		Date

Drawn/Chk.
Designed
Checked
Approved
Date JUNE 14, 2021
Book No. 1841
Project No. 1641WELLS
Dwg. ID
Scale AS SHOWN

STATE OF NEW HAMPSHIRE – LICENSED PROFESSIONAL ENGINEER – LYNNETTE E. CLOUSE – 13170 – 9/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

WELL #4R/#5 BUILDING ELEVATIONS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO B-1

SHEET 20 OF 47

1 GENERAL

1.1 ALL MATERIALS, WORKMANSHIP, AND DETAILS SHALL CONFORM TO THE NEW HAMPSHIRE STATE BUILDING CODE, THE 2015 INTERNATIONAL BUILDING CODE AND THE REFERENCE STANDARDS INCLUDED THEREIN THAT ARE APPLICABLE TO THIS PROJECT.

1.2 THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE CONTRACT DRAWINGS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER BEFORE PROCEEDING WITH THE AFFECTED WORK. ANY VARIATIONS OR SUBSTITUTIONS OF MATERIALS OR DETAILS FROM THOSE INDICATED ON THE DRAWINGS MAY ONLY BE MADE WITH PRIOR APPROVAL OF THE STRUCTURAL ENGINEER. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY AND ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, SHORING AND SAFETY PROGRAMS REQUIRED TO COMPLETE THE WORK OF THIS CONTRACT.

1.3 ALL STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE PROCESS, CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS. VERIFY LOCATION AND DIMENSIONS OF CHASES, INSERTS, OPENINGS, SLEEVES, WASHES, DRIPS, REVEALS, DEPRESSIONS, AND OTHER PROJECT REQUIREMENTS NOT SHOWN ON THE STRUCTURAL DRAWINGS. VERIFY AND COORDINATE ALL DIMENSIONS RELATED TO THIS PROJECT.

1.4 SHOP DRAWINGS ARE REQUIRED TO BE SUBMITTED FOR THE FOLLOWING STRUCTURAL COMPONENTS. SEE INDIVIDUAL MATERIAL SECTIONS FOR ADDITIONAL SUBMITTAL REQUIREMENTS.

STRUCTURAL FILL SIEVE ANALYSIS AND PROCTOR RESULTS
REINFORCING STEEL (INCLUDING ALL ACCESSORIES)
CONCRETE MIX DESIGNS INCLUDING ALL ADDITIVES
PRECAST CONCRETE INCLUDING NH P.E. STAMPED CALCULATIONS

SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER AND A STAMPED APPROVAL RECEIVED BEFORE FABRICATION CAN PROCEED. THE CONTRACTOR SHALL REVIEW AND STAMP ALL SHOP DRAWINGS PRIOR TO SUBMITTAL FOR ENGINEERING REVIEW. SUBMITTED SHOP DRAWINGS WHICH HAVE NOT BEEN REVIEWED AND APPROVED BY THE CONTRACTOR SHALL BE RETURNED UNCHECKED TO THE CONTRACTOR FOR THEIR REVIEW AND APPROVAL. FAILURE TO SUBMIT SHOP DRAWINGS FOR THE REQUIRED MATERIALS SHALL RELIEVE THE ENGINEER OF RESPONSIBILITY AND LIABILITY FOR THOSE PARTS OF THE STRUCTURE AND ANY OTHER PART AFFECTED BY THE UNSUBMITTED PARTS. STRUCTURAL DESIGN DRAWINGS MAY NOT BE USED AS THE SHOP DRAWINGS AND WILL BE IMMEDIATELY REJECTED AND RETURNED IF SO SUBMITTED.

1.5 UNLESS OTHERWISE INDICATED, DETAILS SHOWN ON ANY DRAWING ARE TO BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS.

1.6 NO MAIN FRAMING OR STRUCTURAL MEMBERS ARE TO BE MODIFIED, ALTERED, OR CUT WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.

1.7 THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY SHORING REQUIRED TO COMPLETE THE WORK OF THIS CONTRACT.

1.8 THESE DRAWINGS HAVE BEEN COMPILED FROM THE BEST AVAILABLE INFORMATION AND ARE NOT INTENDED TO LIMIT THE SCOPE OF THE WORK. THE CONTRACTOR MAY ENCOUNTER HIDDEN OR UNCOVERED CONDITIONS, NOT SHOWN ON THESE DRAWINGS, REQUIRING ADDITIONAL WORK FOR THE COMPLETION OF THIS CONTRACT. IT WILL BE ASSUMED THAT THE CONTRACTOR HAS INSPECTED THE SITE PRIOR TO BIDDING AND VERIFIED THE INFORMATION HEREIN SUPPLIED.

2 DESIGN LIVE LOADS

2.1 RISK CATEGORY– IV

2.2 ROOFS – GROUND SNOW LOAD: 60 PSF AT ELEVATION 200 FT
BALANCED FLAT SNOW ROOF SNOW LOAD: 50.4 PSF
THERMAL FACTOR, Ct: 1.0
SNOW EXPOSURE FACTOR, Ce: 1.0
IMPORTANCE FACTOR, I: 1.2
ADJUSTMENT FOR ROOF SLOPE PERMITTED
NON–SLIPPERY ROOF SURFACE
MAXIMUM UNBALANCED SNOW LOAD PER ASCE 7–2010
MINIMUM UNBALANCED SNOW LOAD PER ASCE 7–2010

2.3 BAR GRATING: 350 PSF, OR 1,500 LBS ON A CIRCULAR AREA OF 4.27 SQ. FT.

2.4 WIND – BASIC WIND SPEED: 130 MPH (3 SECOND GUST), EXPOSURE B

2.5 SEISMIC: SITE CLASS – E
Sms = 0.664 (SITE CLASS E), Sds = 0.443
Sm1 = 0.285 (SITE CLASS E), Sd1 = 0.19
SEISMIC DESIGN CATEGORY – D
SEISMIC IMPORTANCE FACTOR – 1.5
PERMITTED BUILDING SEISMIC FORCE RESISTING SYSTEM –
BEARING WALL SYSTEM
SPECIAL REINFORCED CONCRETE SHEAR WALLS
INTERMEDIATE PRECAST CONCRETE SHEAR WALLS
VALUES FOR R, Cd AND Ω0 SHALL BE TAKEN FROM ASCE 7 FOR THE SEISMIC FORCE RESISTING SYSTEM BEING USED

2.6 SUPERIMPOSED DEAD LOAD FOR PRECAST CONCRETE BUILDING @ WELL #5: 15 PSF FOR ROOF MEMBRANE, INSULATION AND MISCELLANEOUS DEAD LOADS

3 FOUNDATIONS

3.1 THE "REPORT OF GEOTECHNICAL EVALUATION FOR WELL #4 AND #5 INFRASTRUCTURE IMPROVEMENTS, MADBURY, NEW HAMPSHIRE", DATED DEC. 12, 2016, AND PREPARED BY R.W. GILLESPIE & ASSOCIATES, INC., IS HEREBY INCORPORATED INTO THESE CONSTRUCTION DOCUMENTS FOR USE IN SOIL PREPARATIONS FOR FOUNDATIONS. THE CONTRACTOR SHALL READ AND FOLLOW THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.

3.2 FOUNDATIONS SHALL BEAR ON RE–COMPACTED NATURAL MATERIAL HAVING AN ALLOWABLE BEARING PRESSURE OF 1500 PSF.

3.3 CONTROLLED STRUCTURAL FILL SHALL CONSIST OF CLEAN GRANULAR MATERIAL FREE OF ORGANIC OR OTHER DELETERIOUS MATTER AND CONFORM TO A SIEVE ANALYSIS WHICH PRODUCES A GRAIN SIZE DISTRIBUTION CURVE FALLING ENTIRELY WITHIN THE FOLLOWING LIMITS, AS DETERMINED BY LABORATORY ANALYSIS:

SCREEN OR SIEVE SIZE	PERCENT PASSING BY WEIGHT
6"	100%
3"	70–100%
NO. 4	35–70%
NO. 40	5–35%
NO. 200	0–5%

THE MAXIMUM SOIL PARTICLE SIZE SHALL NOT EXCEED 3" FOR SOILS PLACED WITHIN 2'–0" OF FOUNDATION WALLS, FOOTINGS AND FLOOR SLABS.

FILL MATERIAL SHOULD BE PLACED IN LIFTS NOT EXCEEDING 6" IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HAND OPERATED VIBRATORY PLATE COMPACTORS. PRIOR TO COMPACTION, EACH LAYER SHOULD BE MOISTENED OR AERATED AS NECESSARY TO PROVIDE OPTIMUM MOISTURE CONTENT. EACH LAYER SHALL BE COMPACTED TO 95% OF OPTIMUM DRY DENSITY AS DETERMINED BY A LABORATORY PERFORMED MODIFIED PROCTOR DENSITY TEST, ASTM D–1557. EACH LAYER OF COMPACTED STRUCTURAL FILL SHALL BE FIELD TESTED WITH A MINIMUM OF THREE (3) COMPACTION TESTS PER LAYER.

3.4 EXCAVATE TO LINES AND GRADES REQUIRED TO PROPERLY INSTALL THE FOUNDATIONS ON RE–COMPACTED NATURAL SOIL. REMOVE ALL TOPSOIL AND ORGANIC MATERIAL FROM UNDER SLABS ON GRADE. ALL EXCAVATIONS SHALL BE DRY BEFORE PLACING ANY CONCRETE. RE–COMPACT THE BOTTOM OF ALL EXCAVATIONS WITH A HAND OPERATED VIBRATORY PLATE COMPACTOR.

3.5 EXTERIOR WALL FOOTINGS ARE TO BE PLACED ON NATURAL SOIL AT A MINIMUM DEPTH OF 4'–0" BELOW THE LOWEST ADJACENT GROUND SURFACE EXPOSED TO FREEZING. ANY ADJUSTMENT OF ELEVATIONS OF FOOTINGS DUE TO FIELD CONDITIONS MUST HAVE THE EXPRESSED APPROVAL OF THE STRUCTURAL ENGINEER.

3.6 BACKFILLING AGAINST FOUNDATION WALLS SHALL BE DONE ONLY AFTER WALLS ARE BRACED TO PREVENT MOVEMENT OR SHALL BE DONE EQUALLY ON BOTH SIDES OF THE WALL.

3.7 BACKFILL INSIDE THE FOUNDATION WALLS WITH APPROVED STRUCTURAL FILL PLACED IN 6 INCH LAYERS AND COMPACTED TO 95% DENSITY AT OPTIMUM MOISTURE CONTENT AS DEFINED BY ASTM D1557, METHOD D.

3.8 INSTALL PERIMETER FOUNDATION DRAINS AROUND THE NEW WELL #4R/5 BUILDING AT A DEPTH OF 4'–0" BELOW GRADE USING 4" MINIMUM DIAMETER PERFORATED PIPE BEDDED IN 2 CUBIC FEET OF NHI #57 STONE COMPLETELY WRAPPED IN MIRAFI 140N FILTER FABRIC, OR APPROVED EQUAL, PER FOOT OF PIPE LENGTH.

3.9 [XXX'–X"] INDICATES BOTTOM OF FOOTING ELEVATION.

4 CAST–IN–PLACE CONCRETE

4.1 CONCRETE WORK SHALL CONFORM TO THE LATEST EDITIONS OF: BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318), SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI 301), AND STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING (ACI 306.1).

4.2 CONCRETE SHALL BE NORMAL WEIGHT, APPROVED, READY–MIXED CONCRETE HAVING AN ULTIMATE COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS FOR ALL CONCRETE. SLUMP SHALL BE 2–4 INCHES PRIOR TO THE ADDITION OF WATER REDUCING ADMIXTURES AND SHALL BE MEASURED AT THE POINT OF DISCHARGE FROM PUMP OR TRUCK CLOSEST TO THE PLACEMENT LOCATION.

4.3 CONCRETE WHICH WILL BE EXPOSED AND/OR SUBJECT TO FREEZING AND THAWING SHALL BE AIR ENTRAINED WITH 4–6% AIR BY VOLUME. INTERIOR SLABS NOT SUBJECT TO FREEZE – THAW CYCLES DURING CONSTRUCTION OR SERVICE LIFE NEED NOT BE AIR ENTRAINED.

4.4 ABSOLUTELY NO CALCIUM CHLORIDE MAY BE USED IN ANY CONCRETE.

4.5 REINFORCING SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60.

4.6 DETAILING, FABRICATION, AND ERECTION OF REINFORCEMENT, UNLESS OTHERWISE NOTED, SHALL CONFORM TO ACI DETAILING MANUAL (SP–66) IN ADDITION TO THE ABOVE CODES AND SPECIFICATIONS.

4.7 PLACE CONCRETE BY APPROVED METHODS OF ACI 304, RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE. CONSOLIDATE CONCRETE BY MECHANICAL VIBRATION. DO NOT USE VIBRATORS FOR MOVING CONCRETE IN FORMS.

4.8 PLACE REINFORCING USING STANDARD BAR SUPPORTS TO PROVIDE PROPER CLEARANCE AND PREVENT DISPLACEMENT DURING CONCRETE OPERATIONS.

4.9 MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE:
* UNFORMED SURFACES IN CONTACT WITH GROUND OR EXPOSED TO WEATHER ..... 3 INCHES
* FORMED SURFACES IN CONTACT WITH GROUND OR EXPOSED TO WEATHER ..... 2 INCHES
* SLABS ON GRADE ..... 1 1/2 INCHES

4.10 PROPERLY BRACE AND SHORE FORMWORK TO MAINTAIN ALIGNMENT AND TOLERANCES IN ACCORDANCE WITH ACI 347.

4.11 LAP ALL REINFORCING BARS 48 BAR DIAMETERS UNLESS NOTED OTHERWISE.

4.12 INSTALLATION OF REINFORCEMENT SHALL BE COMPLETED AT LEAST 24 HOURS PRIOR TO SCHEDULED CONCRETE PLACEMENT. NOTIFY ENGINEER OF COMPLETION AT LEAST 24 HOURS PRIOR TO SCHEDULED REINFORCEMENT PLACEMENT COMPLETION.

4.13 ALL CONCRETE SLABS SHALL BE MOIST (WATER) CURED FOR A PERIOD OF NO LESS THAN 7 DAYS FOLLOWING PLACEMENT OF THE CONCRETE. CURING COMPOUNDS SHALL BE APPLIED TO THE SLABS FOLLOWING THE INITIAL 7 DAY WATER CURING PERIOD.

4.14 CONCRETE REPAIR MATERIALS SHALL BE AS SPECIFIED ON THE DRAWINGS.

5 PRECAST CONCRETE BUILDING FOR WELL #4R/5

5.1 THE CONTRACTOR SHALL SUPPLY A SINGLE STORY PRECAST CONCRETE BUILDING WITH OUTSIDE PLAN DIMENSIONS AND CLEAR INTERIOR HEIGHT AS SHOWN ON PLAN.

5.2 THE PRECAST CONCRETE MANUFACTURER SHALL BE A MEMBER OF THE NATIONAL PRECAST CONCRETE ASSOCIATION AND THE PRECAST/PRESTRESSED CONCRETE INSTITUTE WITH NO LESS THAN 10 YEARS IN THE DESIGN AND MANUFACTURE OF PRECAST CONCRETE BUILDINGS.

5.3 THE PRECAST CONCRETE BUILDING SHALL BE DESIGNED FOR THE GRAVITY AND LATERAL LOADS DEFINED IN PARAGRAPH 2 ABOVE, IN ADDITION TO THE DEAD WEIGHT OF THE BUILDING.

5.4 SUBMIT SHOP DRAWINGS FOR THE PRECAST CONCRETE BUILDING SHOWING ALL BUILDING DIMENSIONS, REINFORCING STEEL AND CONNECTION DETAILS. SUBMIT CALCULATIONS FOR THE DESIGN OF THE PRECAST BUILDING, STAMPED BY A NH LICENSED PROFESSIONAL ENGINEER.

5.5 THE PRECAST DESIGNER AND MANUFACTURER SHALL PROVIDE CONNECTION DETAILS FOR THE PRECAST CONCRETE WALLS TO CAST IN PLACE CONCRETE FOUNDATION WALLS TO THE STRUCTURAL ENGINEER OF RECORD PRIOR TO THE CONSTRUCTION OF THE FOUNDATION WALLS IN ORDER TO PERMIT TIME FOR ANY MODIFICATIONS TO THE FOUNDATION TO ACCOMMODATE CONNECTION DETAILS. THE INTERIOR FLOOR SLAB OF THE BUILDING SHALL NOT BE USED TO ANCHOR THE PRECAST BUILDING SINCE THE SLAB IS NOT TIED TO THE FOUNDATION WALLS.

5.6 EXTERIOR FINISH ON THE WALLS SHALL BE AS CALLED FOR ON THE ARCHITECTURAL OR PROCESS DRAWINGS.

6 MASONRY

6.1 MASONRY WORK SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES"– ACI–ASCE 530 AND "SPECIFICATION FOR MASONRY STRUCTURES" ACI–ASCE 530.1.

6.2 HOLLOW LOAD BEARING CONCRETE BLOCK SHALL BE NORMAL WEIGHT AND CONFORM TO ASTM C90 GRADE N–1. THE MINIMUM COMPRESSIVE STRENGTH OF MASONRY UNITS SHALL BE 1900 PSI, BASED ON NET CROSS SECTIONAL AREA. UNITS SHALL BE 2 CELL, 50% SOLID.

6.3 MORTAR SHALL CONFORM TO ASTM C270, TYPE S. MIX PROPORTIONS BY VOLUME SHALL BE: 1 PART PORTLAND CEMENT (ASTM C150 TYPE 1), MINIMUM 1/4 TO MAXIMUM 1/2 PARTS HYDRATED LIME, AND NOT LESS THAN 2 1/4 AND NOT MORE THAN 3 TIMES THE SUM OF CEMENT AND LIME VOLUMES FOR DAMP LOOSE AGGREGATE (ASTM C144) FOR ALL CONCRETE BLOCK MASONRY.

6.4 GROUT SHALL CONFORM TO ASTM C476, PORTLAND CEMENT TYPE II, FINE AGGREGATE (ASTM C404) WITH A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI.

6.5 REINFORCING SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60. JOINT REINFORCEMENT SHALL CONFORM TO ASTM A82, DEFORMED, AND ZINC COATED. PROVIDE PREFABRICATED CORNERS AND TEES.

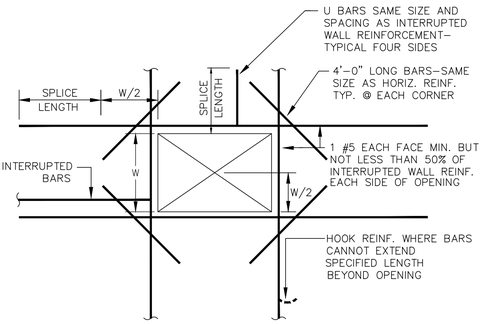
6.6 HOLLOW CONCRETE UNITS SHALL BE LAID IN RUNNING BOND UNLESS OTHERWISE NOTED. PROVIDE FULL MORTAR BED FOR FIRST COURSE. PROVIDE MORTAR ON WEBS OF CORES CARRYING GROUT TO PREVENT LEAKAGE. ALL EXPOSED JOINTS SHALL BE TOOLED CONCAVE. UNEXPOSED JOINTS SHALL BE STRUCK FLUSH.

6.7 REINFORCEMENT SHALL BE PLACED IN REQUIRED POSITION, SECURING FROM DISPLACEMENT WITH PROPER CHAIRS OR WIRE TIES. LAP CONTINUOUS BARS 48 DIAMETERS.

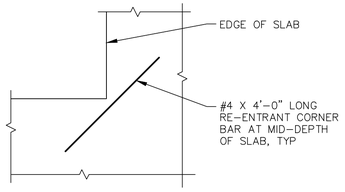
6.8 WHERE GROUT IS SPECIFIED ON THE DRAWINGS OR IN THE SPECIFICATIONS, MORTAR IS NOT ACCEPTABLE. USE LOW LIFT (MANUAL PLACEMENT) GROUTING TECHNIQUE ONLY, ASSURING CONSOLIDATION OF GROUT IN BLOCK CELLS.

7 ABBREVIATIONS

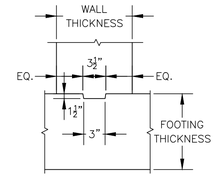
ALUM.	ALUMINUM
B.E.W.	BOTTOM EACH WAY
BM.	BEAM
C–C	CENTER TO CENTER
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CONT.	CONTINUOUS
CTRD.	CENTERED
DIMEN.	DIMENSION
DWGS.	DRAWINGS
E.F.	EACH FACE
E.S.	EQUAL SPACES
E.W.	EACH WAY
EA.	EACH
ELEV	ELEVATION
EMBED.	EMBEDMENT
EX. OR EXIST.	EXISTING
F.D.	FLOOR DRAIN
FIN.	FINISH
FLG	FLANGE
FTG	FOOTING
HDG	HOT DIP GALVANIZED
HORIZ	HORIZONTAL
LLV	LONG LEG VERTICAL
M.O.	MASONRY OPENING
MIN.	MINIMUM
N.T.S.	NOT TO SCALE
O.F.	OUTSIDE FACE
O.H.	OPPOSITE HAND
O/C	ON CENTER
PL	PLATE
REINF	REINFORCING
RENOV.	RENOVATION
REQ'D	REQUIRED
SECT.	SECTION
SHT	SHEET
SIM	SIMILAR
STD	STANDARD
STL	STEEL
STRUCT	STRUCTURE
T.O.	TOP OF
T.O.W.	TOP OF WALL
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
V.I.F.	VERIFY IN FIELD
VERT	VERTICAL
W/	WITH



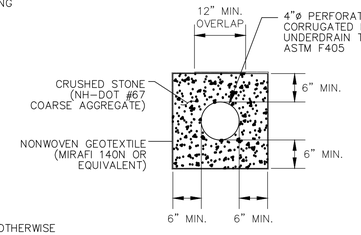
REINF. AT RECT. OPENINGS IN REINF. CONCRETE WALLS



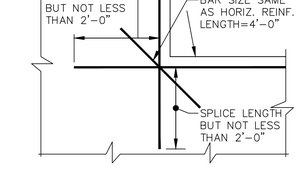
TYPICAL RE–ENTRANT CORNER BAR DETAIL



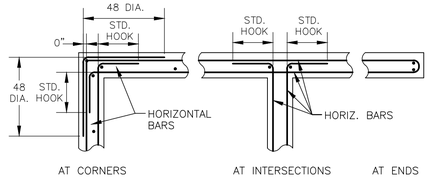
FOUNDATION WALL BEVELED KEY



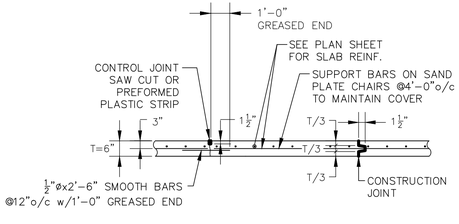
TYPICAL SLAB & FOOTING SUBDRAIN DETAIL



HORIZ. REINF. AT CONCRETE WALL STEP



PLAN OF 12" CONCRETE WALL HORIZONTAL REINF.



SLAB ON GRADE DETAIL

ISSUE FOR	APPROVAL	CONSTRUCTION	RECORD DRAWING	APP'D
	By LEC	By LEM	By –	
	Date 6/14/2021	Date 6/21/2021	Date –	

NO.	REVISIONS

Drawn/Chk ___
Designed ___
Checked ___
Approved ___
Date JUNE 14, 2021
Book No. –
Project No. 1841
Dwg. ID –
Scale AS SHOWN

STATE OF NEW HAMPSHIRE – LINDA K. McNAIT-PERRY, No. 9276 – LICENSED PROFESSIONAL ENGINEER – 5/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603–230–9898 Fax. 603–230–9899

GENERAL NOTES & DETAILS
WELLS 2, 3, 4 & 5

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO S–1

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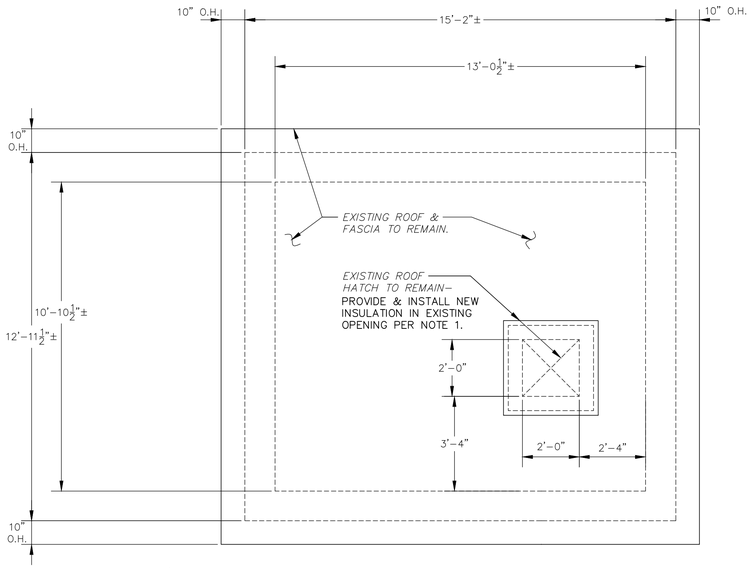
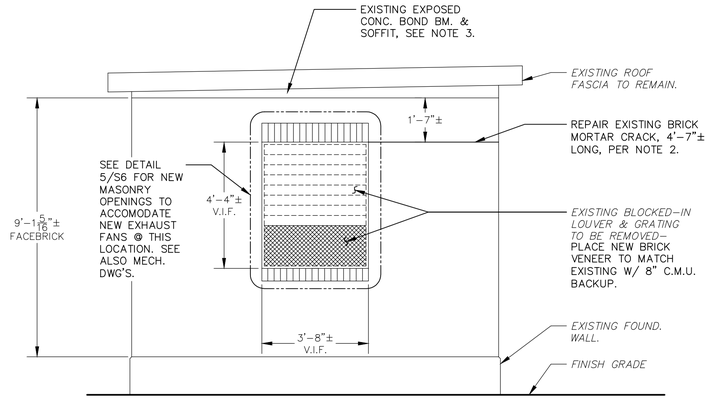


ROOF FRAMING PLAN @ WELL #2

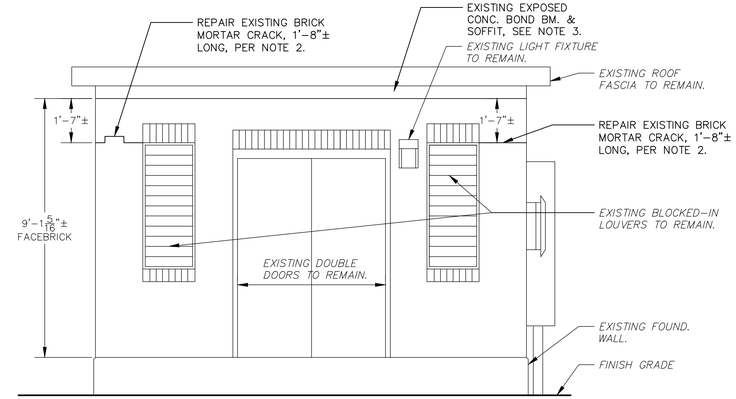
3/8" = 1'-0"

PROJECT NORTH



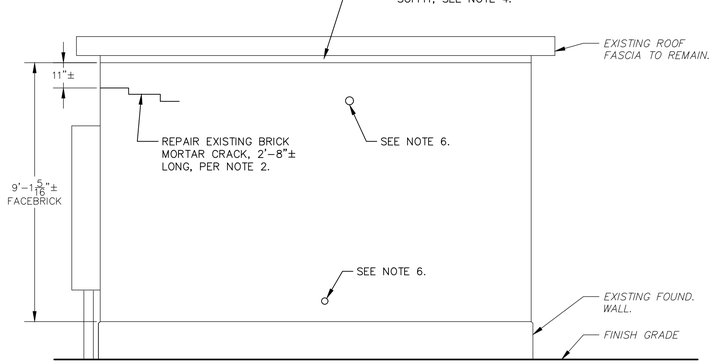
NORTH ELEVATION

3/8" = 1'-0"



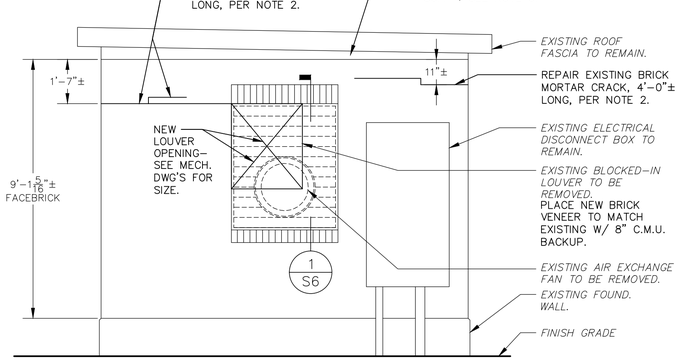
WEST ELEVATION

3/8" = 1'-0"



EAST ELEVATION

3/8" = 1'-0"



SOUTH ELEVATION

3/8" = 1'-0"

NOTES:

1. CUT TO FIT AND PLACE 3 LAYERS OF 2" CLOSED CELL RIGID INSULATION FROM THE BOTTOM SIDE OF THE 2'-0" X 2'-0" OPENING THROUGH THE CONCRETE ROOF SLAB. LAYERS SHOULD BE IN TIGHT CONTACT WITH EACH OTHER AND SHOULD FIT TIGHTLY WITHIN THE OPENING, SO THAT NO RESTRAINTS ARE REQUIRED TO HOLD THE INSULATION IN PLACE.
2. SAW CUT AND GRIND OUT THE EXISTING CRACKED MORTAR JOINT. TUCK POINT THE EMPTY AND CLEANED JOINT WITH NEW MORTAR TO MATCH THE EXISTING MORTAR COLOR.
3. REMOVE EXISTING DETERIORATED CONCRETE FORMING THE EXTERIOR FACE OF THE BOND BEAM AND THE SOFFIT OF THE ROOF SLAB, BY CHIPPING AND GRINDING. ALL EDGES OF REMOVED CONCRETE SHALL BE NO LESS THAN 1/8" DEEP. FILL AREAS OF REMOVED CONCRETE WITH SIKATOP 123 PLUS POLYMER MODIFIED, CEMENTITIOUS, NON-SAG REPAIR MORTAR BY SIKA CORP., IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE REPAIR MORTAR SHALL BE TROWELED TO FORM A SMOOTH FLAT SURFACE ON THE WALL OR ROOF SOFFIT. CURE THE REPAIR MORTAR FOR NO LESS THAN SEVEN (7) DAYS BY KEEPING THE REPAIR MORTAR CONTINUOUSLY MOIST.
4. WHERE CRACKED BRICK MORTAR JOINTS ARE REPAIRED ON THE OUTSIDE OF THE BUILDING WALLS, SAW CUT AND TUCK POINT CORRESPONDING CMU WALL JOINTS ON THE INSIDE FACE OF THE WALLS TO REPAIR MORTAR JOINT CRACKS.
5. CUT AND REMOVE ALL TREE BRANCHES WITHIN 15 FEET OF THE BUILDING ROOF.
6. REMOVE ANY SLEEVE THROUGH WALL AND FILL HOLE COMPLETELY THROUGH WALL THICKNESS WITH HYDRAULIC REPAIR CEMENT, SIKASET PLUG BY SIKA CORP. OR QUIKCRETE HYDRAULIC WATER-STOP CEMENT OR APPROVED EQUAL. FINISH EXPOSED SURFACES OF REPAIR CEMENT SMOOTH AND FLUSH WITH THE WALL SURFACE. CURE CEMENT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

NO.	REVISIONS	APP'D
	ISSUE FOR APPROVAL Date 6/14/2021 By LEC	
	CONSTRUCTION Date 6/21/2021 By LEC	
	RECORD DRAWING Date – By –	

Drawn/Chk –
Designed –
Checked –
Approved JUNE 14, 2021
Date –
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Scale AS SHOWN

STATE OF NEW HAMPSHIRE
LINDA K. McNAIR-PERRY
No. 9276
LICENSED PROFESSIONAL ENGINEER
6/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
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1ST FLOOR & ROOF PLAN
WELL #2

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO S-2

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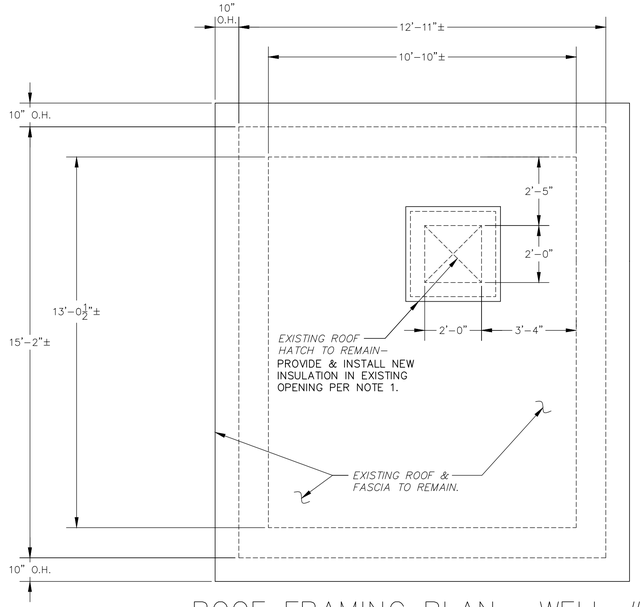
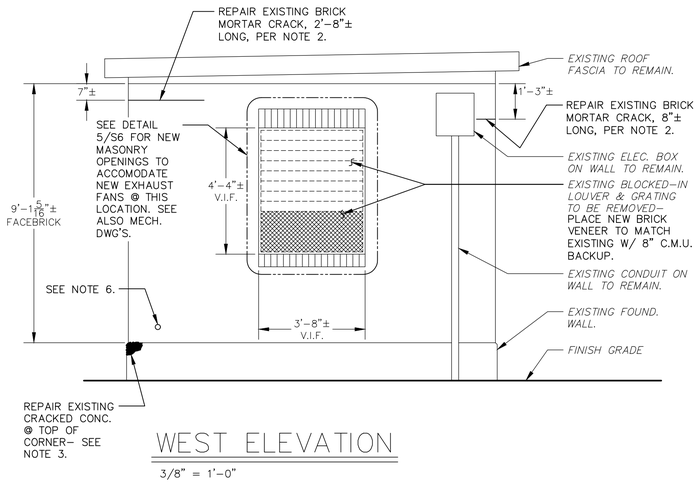


PROJECT NORTH

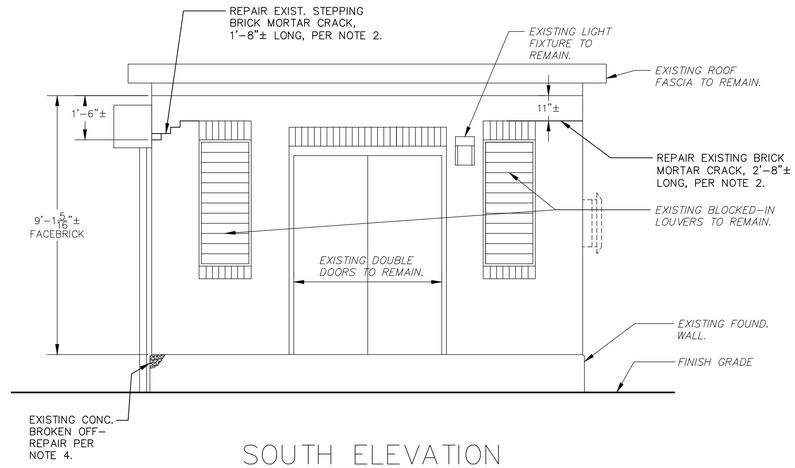
ROOF FRAMING PLAN— WELL #3

3/8" = 1'-0"



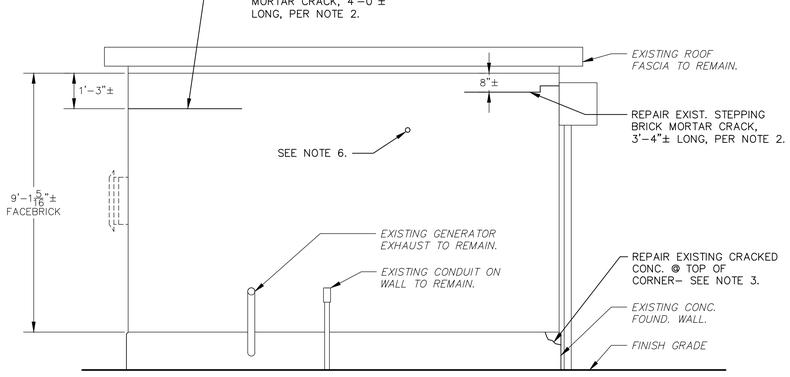
WEST ELEVATION

3/8" = 1'-0"



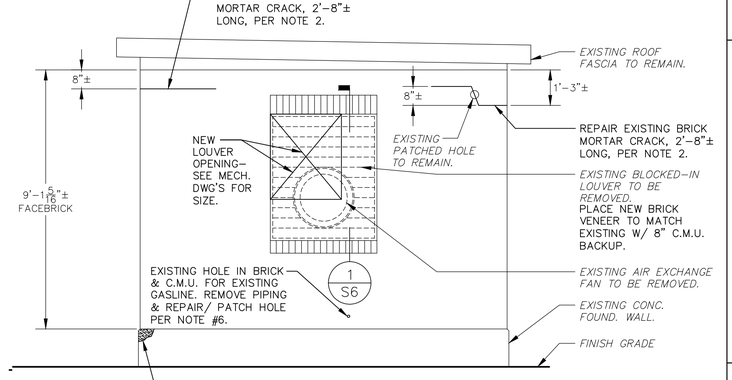
SOUTH ELEVATION

3/8" = 1'-0"



NORTH ELEVATION

3/8" = 1'-0"



EAST ELEVATION

3/8" = 1'-0"

NOTES:

1. CUT TO FIT AND PLACE 3 LAYERS OF 2" CLOSED CELL RIGID INSULATION FROM THE BOTTOM SIDE OF THE 2'-0" X 2'-0" OPENING THROUGH THE CONCRETE ROOF SLAB. LAYERS SHOULD BE IN TIGHT CONTACT WITH EACH OTHER AND SHOULD FIT TIGHTLY WITHIN THE OPENING, SO THAT NO RESTRAINTS ARE REQUIRED TO HOLD THE INSULATION IN PLACE.
2. SAW CUT AND GRIND OUT THE EXISTING CRACKED MORTAR JOINT. TUCK POINT THE EMPTY AND CLEANED JOINT WITH NEW MORTAR TO MATCH THE EXISTING MORTAR COLOR.
3. CHIP OUT AND REMOVE EXISTING CRACKED CONCRETE AT THE TOP OF THE FOUNDATION WALL CORNER. SAW CUT EDGES TO FORM 1/4" DEPTH OF SQUARE EDGE. FILL THE AREA OF REMOVED CONCRETE WITH SIKATOP 123 PLUS POLYMER MODIFIED, CEMENTITIOUS, NON-SAG REPAIR MORTAR BY SIKA CORP., IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE REPAIR MORTAR SHALL BE TROWELED TO FORM A SMOOTH FLAT SURFACE, IN PLANE WITH THE ADJOINING WALL SURFACES. CURE THE REPAIR MORTAR FOR NO LESS THAN SEVEN (7) DAYS BY KEEPING THE REPAIR MORTAR CONTINUOUSLY MOIST.
4. CHIP OUT AND REMOVE ANY REMAINING EXISTING CRACKED CONCRETE AT THE TOP OF THE FOUNDATION WALL CORNER. SAW CUT EDGES TO FORM 1/4" DEPTH OF SQUARE EDGE. FILL THE AREA OF REMOVED CONCRETE WITH SIKATOP 123 PLUS POLYMER MODIFIED, CEMENTITIOUS, NON-SAG REPAIR MORTAR BY SIKA CORP., IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE REPAIR MORTAR SHALL BE TROWELED TO FORM A SMOOTH FLAT SURFACE, IN PLANE WITH THE ADJOINING WALL SURFACES. CURE THE REPAIR MORTAR FOR NO LESS THAN SEVEN (7) DAYS BY KEEPING THE REPAIR MORTAR CONTINUOUSLY MOIST.
5. WHERE CRACKED BRICK MORTAR JOINTS ARE REPAIRED ON THE OUTSIDE OF THE BUILDING WALLS, SAW CUT AND TUCK POINT CORRESPONDING CMU WALL JOINTS ON THE INSIDE FACE OF THE WALLS TO REPAIR MORTAR JOINT CRACKS.
6. REMOVE ANY SLEEVE THROUGH WALL AND FILL HOLE COMPLETELY THROUGH WALL THICKNESS WITH HYDRAULIC REPAIR CEMENT, SIKASET PLUG BY SIKA CORP. OR QUIKCRETE HYDRAULIC WATER-STOP CEMENT OR APPROVED EQUAL. FINISH EXPOSED SURFACES OF REPAIR CEMENT SMOOTH AND FLUSH WITH THE WALL SURFACE. CURE CEMENT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

ISSUE FOR	By	Date
APPROVAL	LEC	6/14/2021
CONSTRUCTION	LEC	6/21/2021
RECORD DRAWING	-	-

NO.	REVISIONS	APP'D

Drawn/Chk. —
Designed —
Checked —
Approved JUNE 14, 2021
Date —
Book No. 1841
Project No. —
Dwg. ID AS SHOWN
Scale

STATE OF NEW HAMPSHIRE — LINDA K. McNAIR-PERRY — No. 9275 — LICENSED PROFESSIONAL ENGINEER

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1ST FLOOR & ROOF PLAN
WELL #3

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO S-3

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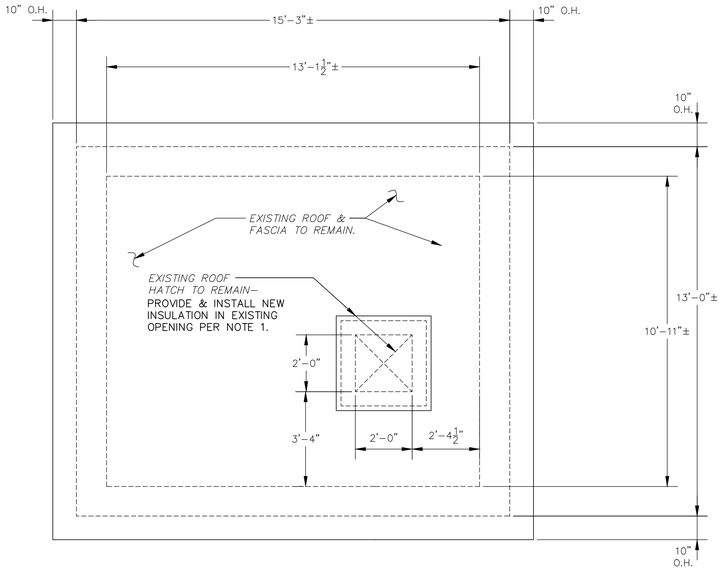
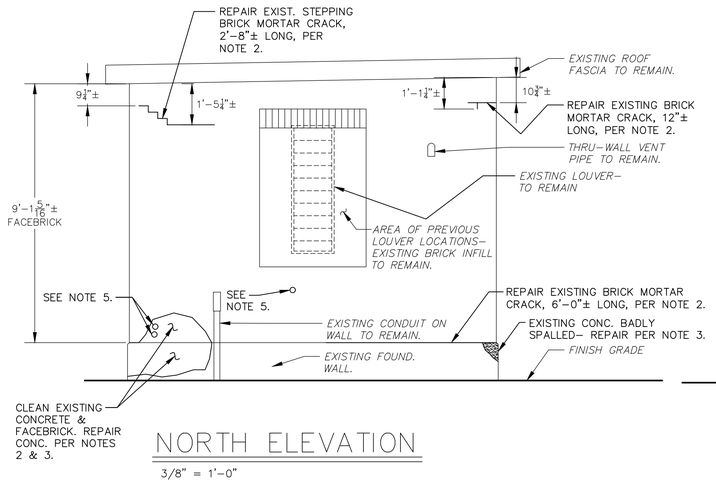


ROOF FRAMING PLAN- WELL #4

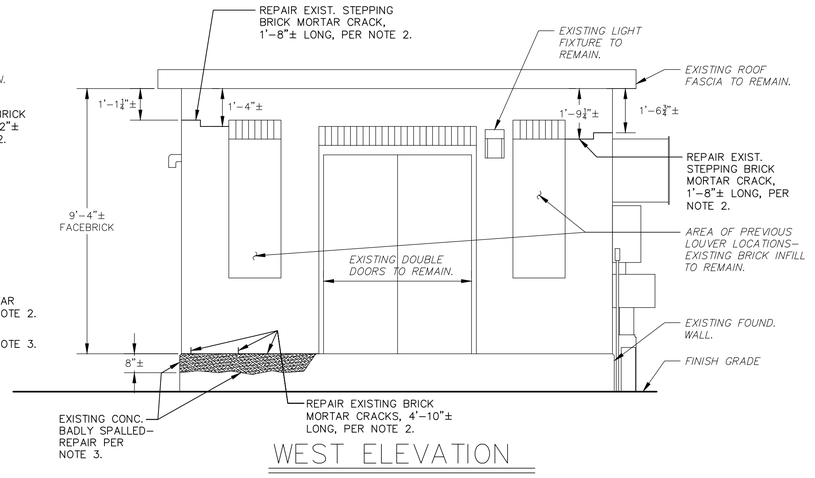
PROJECT NORTH

3/8" = 1'-0"



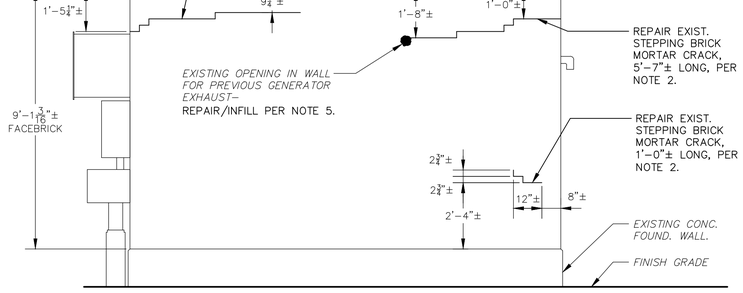
NORTH ELEVATION

3/8" = 1'-0"



WEST ELEVATION

3/8" = 1'-0"



EAST ELEVATION

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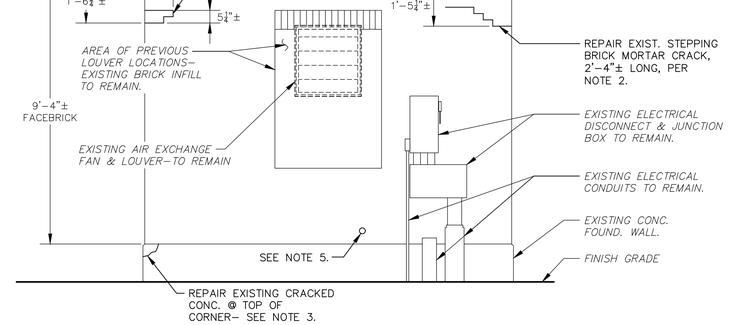

SOUTH ELEVATION

3/8" = 1'-0"

NOTES:

1. CUT TO FIT AND PLACE 3 LAYERS OF 2" CLOSED CELL RIGID INSULATION FROM THE BOTTOM SIDE OF THE 2'-0" X 2'-0" OPENING THROUGH THE CONCRETE ROOF SLAB. LAYERS SHOULD BE IN TIGHT CONTACT WITH EACH OTHER AND SHOULD FIT TIGHTLY WITHIN THE OPENING, SO THAT NO RESTRAINTS ARE REQUIRED TO HOLD THE INSULATION IN PLACE.
2. SAW CUT AND GRIND OUT THE EXISTING CRACKED MORTAR JOINT. TUCK POINT THE EMPTY AND CLEANED JOINT WITH NEW MORTAR TO MATCH THE EXISTING MORTAR COLOR.
3. CHIP OUT AND REMOVE EXISTING CRACKED AND SPALLED CONCRETE. SAW CUT EDGES TO FORM 1/4" DEPTH OF SQUARE EDGE. FILL THE AREA OF REMOVED CONCRETE WITH SIKATOP 123 PLUS POLYMER MODIFIED, CEMENTITIOUS, NON-SAG REPAIR MORTAR BY SIKA CORP., IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE REPAIR MORTAR SHALL BE TROWELED TO FORM A SMOOTH FLAT SURFACE ON THE FLOOR, LEVEL WITH THE ADJOINING FLOOR. CURE THE REPAIR MORTAR FOR NO LESS THAN SEVEN (7) DAYS BY KEEPING THE REPAIR MORTAR CONTINUOUSLY MOIST.
4. WHERE CRACKED BRICK MORTAR JOINTS ARE REPAIRED ON THE OUTSIDE OF THE BUILDING WALLS, SAW CUT AND TUCK POINT CORRESPONDING CMU WALL JOINTS ON THE INSIDE FACE OF THE WALLS TO REPAIR MORTAR JOINT CRACKS.
5. REMOVE ANY SLEEVE THROUGH WALL AND FILL HOLE COMPLETELY THROUGH WALL THICKNESS WITH HYDRAULIC REPAIR CEMENT, SIKASET PLUG BY SIKA CORP. OR QUIKCRETE HYDRAULIC WATER-STOP CEMENT OR APPROVED EQUAL. FINISH EXPOSED SURFACES OF REPAIR CEMENT SMOOTH AND FLUSH WITH THE WALL SURFACE. CURE CEMENT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

ISSUE FOR APPROVAL Date 6/14/2021 By LEC
CONSTRUCTION Date 6/21/2021 By LEC
RECORD DRAWING Date - By -

NO.	REVISIONS	APP'D

Drawn/Chk. ___
Designed ___
Checked ___
Approved ___
Date JUNE 14, 2021
Book No. -
Project No. 1841
Dwg. ID -
Scale AS SHOWN

STATE OF NEW HAMPSHIRE · LINDA K. McNAIR-PERRY, P.E. No. 9276 · LICENSED PROFESSIONAL ENGINEER · 6/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

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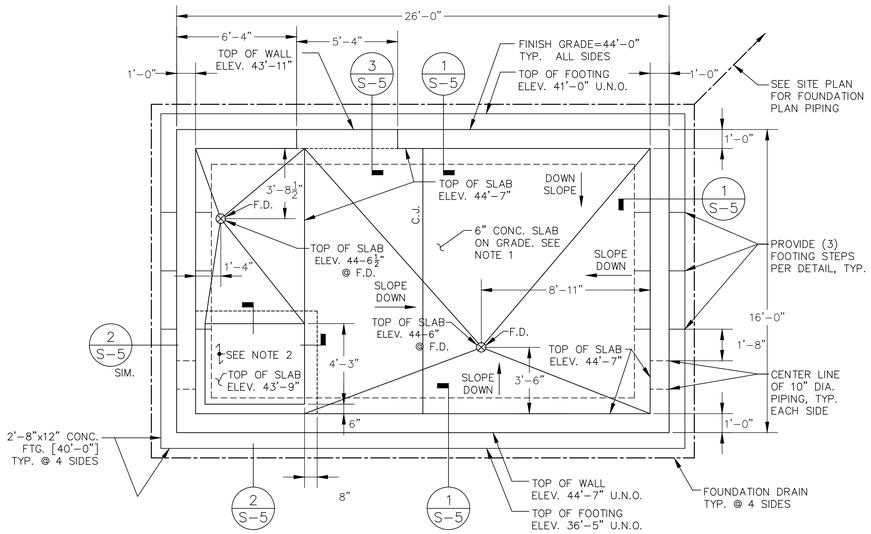
1ST FLOOR & ROOF PLAN
WELL #4

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO S-4

SHEET 24 OF 47



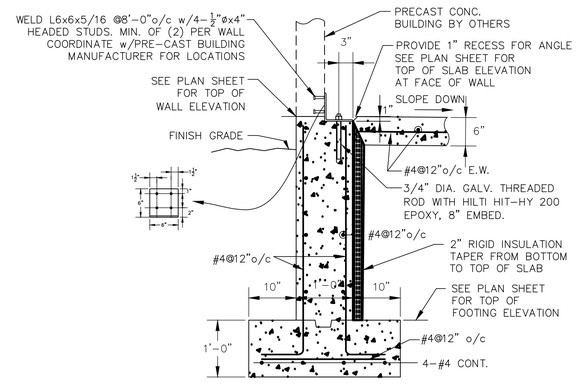
PROJECT NORTH

FOUNDATION PLAN @ WELL #4R/5

1/4" = 1'-0"

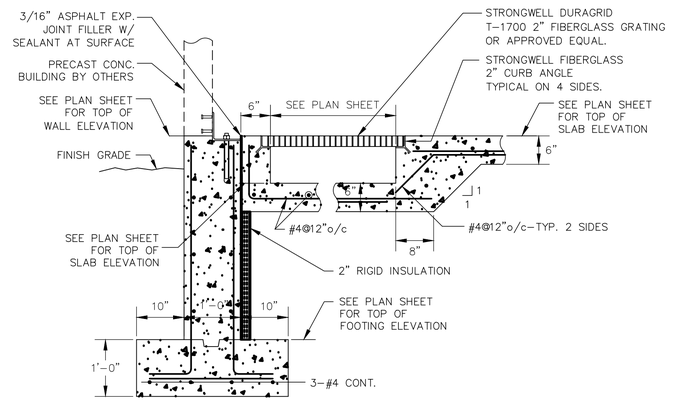
NOTES:

1. THE 6" CONCRETE FLOOR SLAB SHALL BE REINFORCED WITH #4 @ 12" O/C EACH WAY, LOCATED AT MID-DEPTH OF THE SLAB. THE TOP OF SLAB ELEVATION = 44'-7" UNLESS NOTED OTHERWISE. SLABS SHALL SLOPE UNIFORMLY TO FLOOR DRAINS.
2. ⟿ INDICATES THE SPAN DIRECTION OF FRP GRATING, SEE DETAILS FOR MORE INFORMATION.
3. COORDINATE PRECAST CONCRETE SUPERSTRUCTURE BUILDING CONNECTION REQUIREMENTS WITH THE CAST IN PLACE CONCRETE FOUNDATIONS. ALL PRECAST CONCRETE WALL CONNECTIONS SHALL BE MADE TO THE FOUNDATION WALLS, NOT THE FLOOR SLAB. IF NECESSARY, THICKEN FOUNDATION WALLS TOWARDS THE INTERIOR OF THE BUILDING IN ORDER TO PROVIDE FOR THE PRECAST CONCRETE WALL CONNECTIONS.
4. SEE CIVIL DRAWINGS FOR FOOTING DRAIN DETAILS AND REQUIREMENTS.
5. PROVIDE 12" COMPACTED STRUCTURAL FILL BELOW SLAB ON GRADE. PER DIVISION 2 SPECS.
6. PROVIDE VAPOR BARRIER UNDER SLAB PER DIVISION 3 SPECS.
7. COAT FLOOR IN ACCORDANCE WITH SECTION 09900 IN THE SPECS.



1 SECTION

3/4"= 1'-0"



2 SECTION

3/4"= 1'-0"

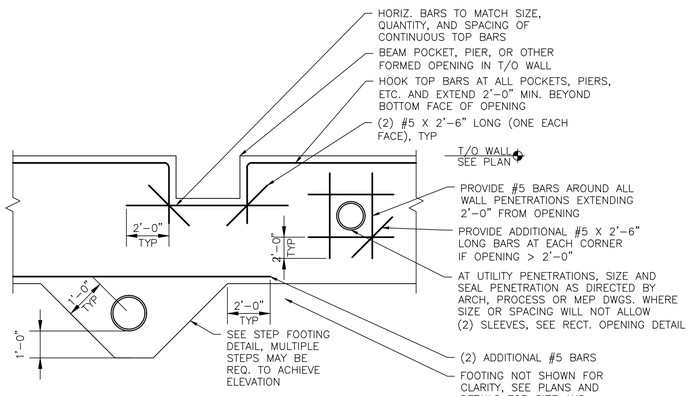
3 FOUNDATION AT DOOR

3/4" = 1'-0"

NOTES:
T = FOOTING THICKNESS
H = STEP HEIGHT (MAX. 24")

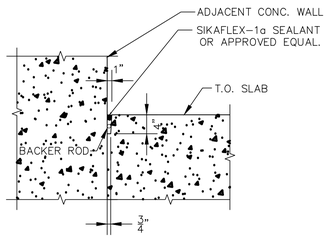
4 STEP FOOTING

3/4"= 1'-0"



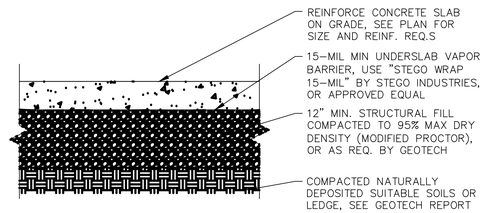
5 TYP. WALL REINF. DETAILS AT POCKETS, PIERS, & PENETRATIONS

N.T.S.



6 JOINT SEAL AT WALL

N.T.S.



TYP. MAT SLAB ON GRADE SUBGRADE PREPARATION WITHOUT INSULATION

7

N.T.S.

NO.	REVISIONS	APP'D

ISSUE FOR
APPROVAL By LEC Date 6/14/2021
CONSTRUCTION By LEC Date 6/21/2021
RECORD DRAWING By – Date –

Drawn/Chk. ___
Designed ___
Checked ___
Approved ___
Date JUNE 14, 2021
Book No. –
Project No. 1841
Dwg. ID –
Scale AS SHOWN

STATE OF NEW HAMPSHIRE
LINDA K. McNAFFERY-PERRY
No. 9279
LICENSED PROFESSIONAL ENGINEER
6/14/21

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
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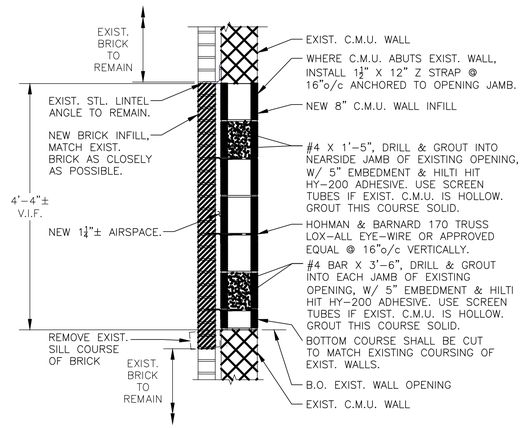
FOUNDATION PLAN & SECTIONS
WELL #4R/5

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

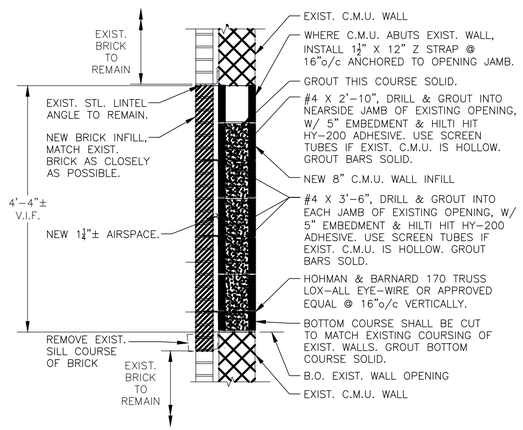
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO S-5

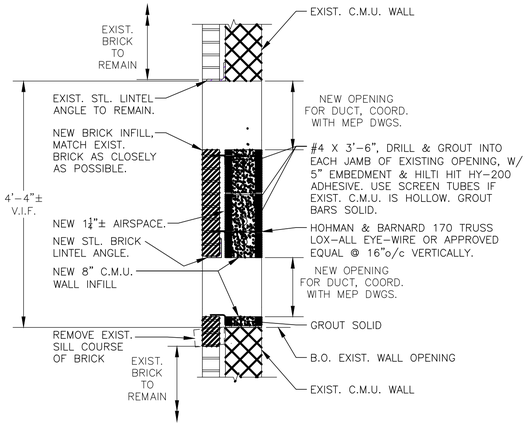
SHEET 25 OF 47



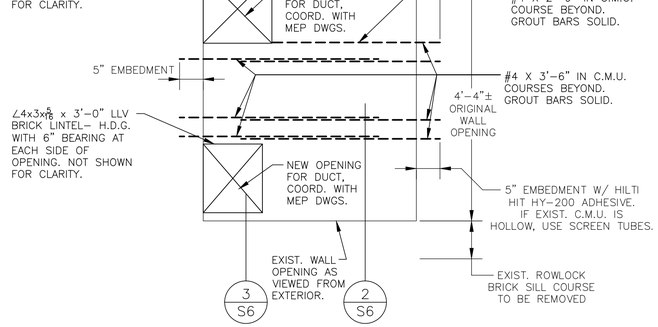
1 SECTION
3/4"= 1'-0"



2 SECTION
3/4"= 1'-0"



3 SECTION
3/4"= 1'-0"



4 ELEVATION @ MODIFIED MASONRY OPENING
3/4"= 1'-0" (WELLS #2 & 3 ONLY.)

ISSUE FOR		
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CONSTRUCTION	By	LEC
Date 6/21/2021		
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Date		-

REVISIONS	APP'D

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Dwg. ID -
Scale AS SHOWN

STATE OF NEW HAMPSHIRE
LINDA K. McMARR-PERRY
No. 9276
LICENSED PROFESSIONAL ENGINEER
6/21/21

UNDERWOOD engineers
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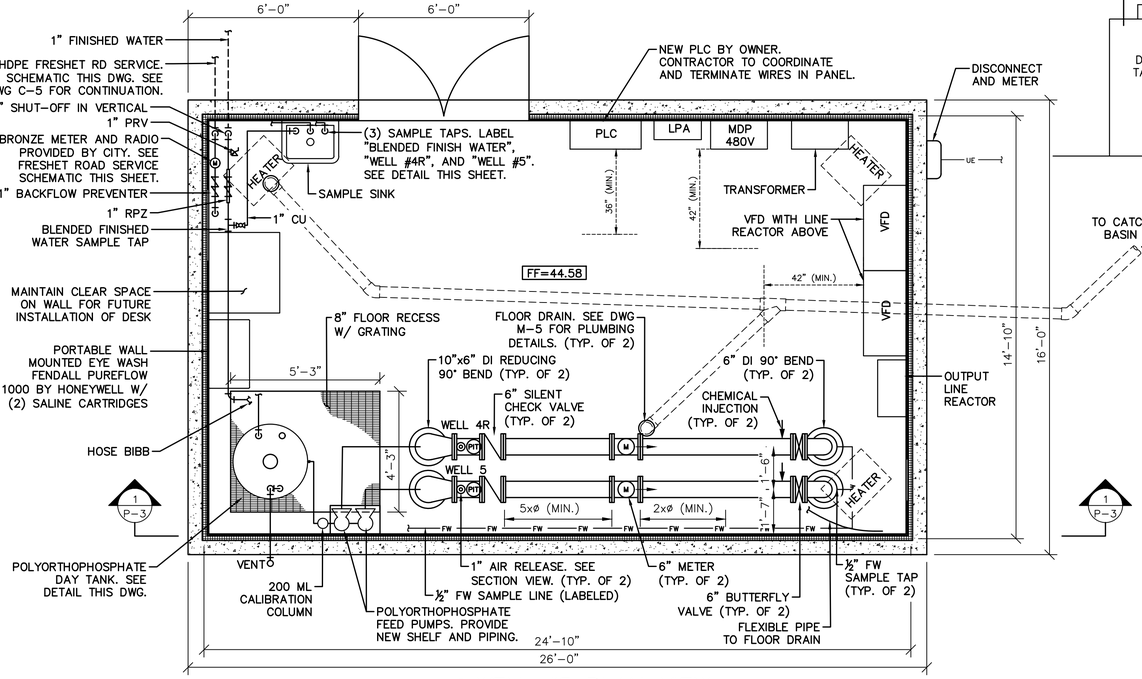
SECTIONS
WELLS 2, 3 & 4

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

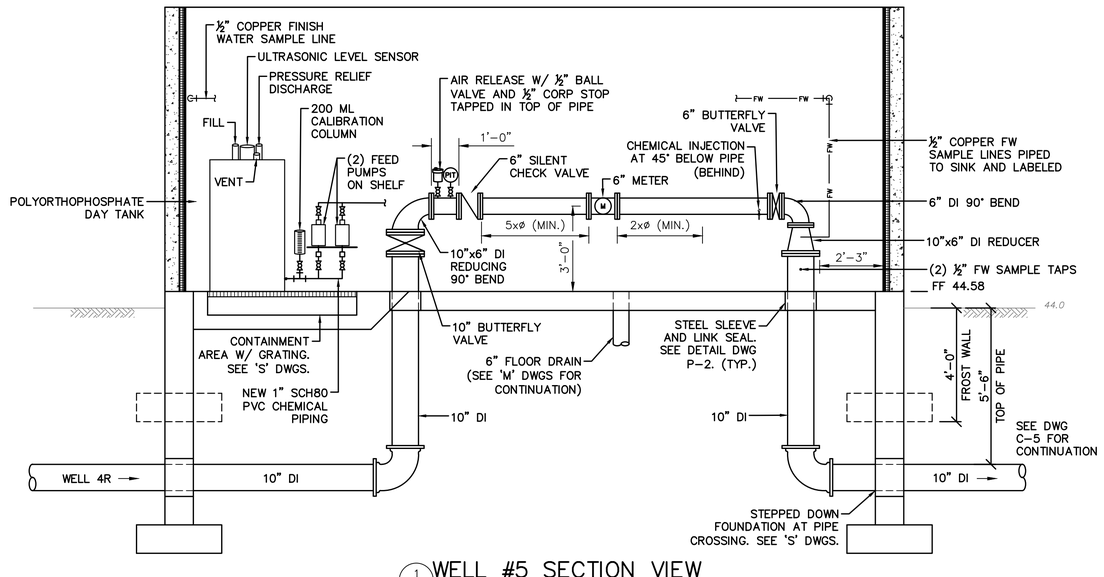
DWG NO S-6

SHEET 26 OF 47



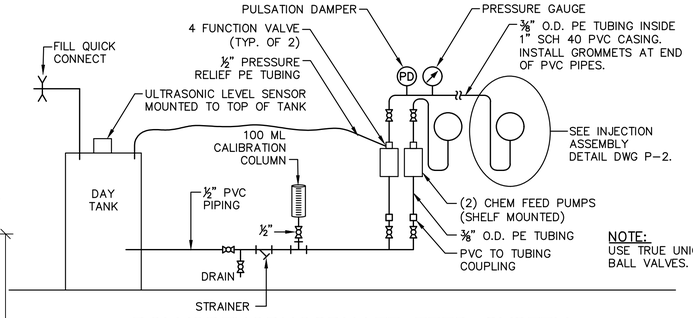
WELL #5 PLAN VIEW

SCALE: ⅜"=1'-0"



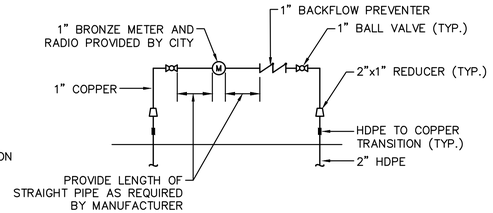
WELL #5 SECTION VIEW

SCALE: ⅜"=1'-0"



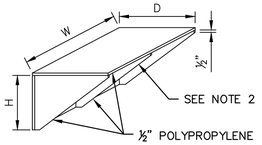
POLYORTHOPHOSPHATE FEED SYSTEM

NOT TO SCALE



FRESHET ROAD SERVICE SCHEMATIC

NOT TO SCALE

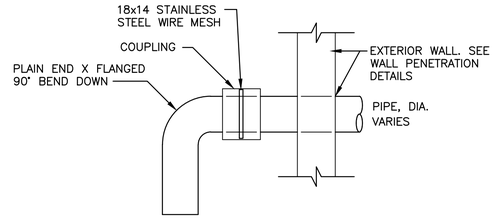


NOTES:

1. SHELF SIZE DESCRIPTION 30"W X 12"D X 12"H. SIZE TO FIT PUMPS
2. A THIRD SUPPORT BRACKET IS NEEDED IF W IS GREATER THAN OR EQUAL TO 20"

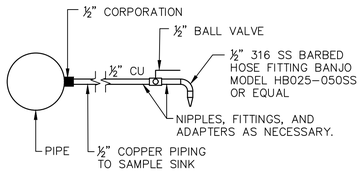
CHEMICAL FEED PUMP SHELF DETAIL

NOT TO SCALE



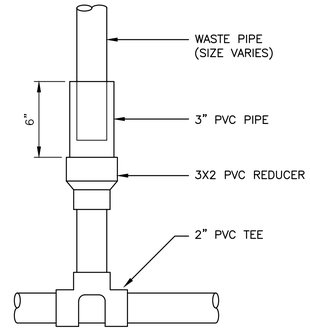
INSECT PROOF SCREEN DETAIL AT CHEMICAL TANK VENT

NOT TO SCALE



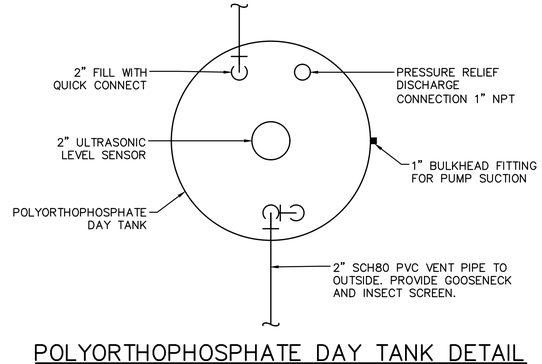
SAMPLE TAP DETAIL

NOT TO SCALE



AIR GAP DETAIL

NOT TO SCALE



POLYORTHOPHOSPHATE DAY TANK DETAIL

SCALE: ⅜"=1'-0"

ISSUE FOR	By	Date
APPROVAL	LEC	6/14/2021
CONSTRUCTION	LEC	6/21/2021
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Book No. 1841
Project No. 1641WELLS
Dwg. ID
Scale AS SHOWN

LYNETTE E. CARNEY — 13790 — STATE OF NEW HAMPSHIRE — REGISTERED PROFESSIONAL ENGINEER — 6/14/21

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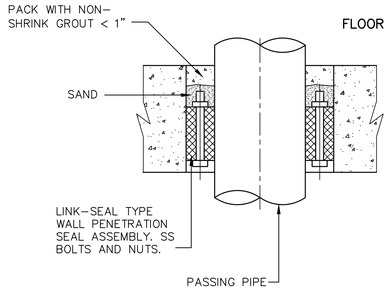
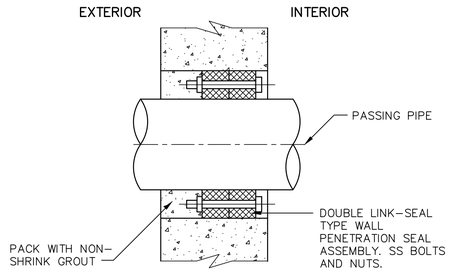
WELL #4R/#5 BUILDING
PLAN AND SECTION VIEWS
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

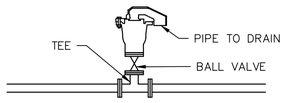
DWG NO P-1
SHEET 27 OF 47



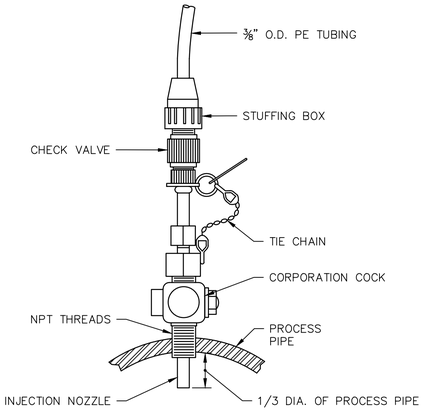
TYP. CONCRETE FLOOR PENETRATION
NOT TO SCALE (WHERE DESIGNATED)



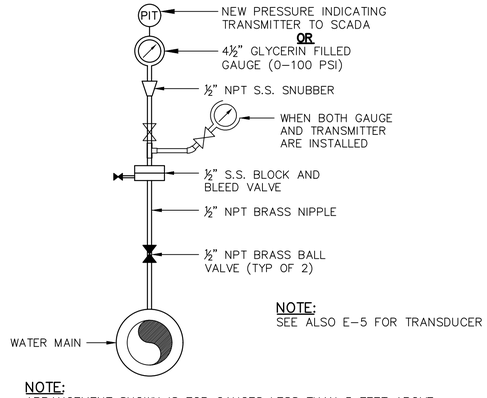
TYP. CONCRETE WALL PENETRATION
NOT TO SCALE (WHERE DESIGNATED)



AIR RELEASE ASSEMBLY
NOT TO SCALE

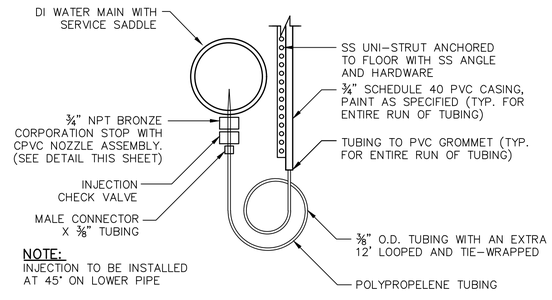


CHEMICAL INJECTION NOZZLE
NOT TO SCALE



NOTE:
ARRANGEMENT SHOWN IS FOR GAUGES LESS THAN 5 FEET ABOVE FINISH FLOOR GRADE FOR HORIZONTAL PROCESS PIPE. FOR VERTICAL PROCESS PIPE ASSEMBLIES OR IF THE GAUGE IS OVER 5 FEET, PRESSURE GAUGE PIPE SHALL CONNECT TO PROCESS PIPE AT 9 OR 3 O'CLOCK AND A 90° BEND SHALL BE ADDED SUCH THAT THE GAUGE IS LEVEL WHEN READING.

PRESSURE GAUGE & TRANSMITTER ASSEMBLY DETAIL
NOT TO SCALE



NOTE:
INJECTION TO BE INSTALLED AT 45° ON LOWER PIPE

TYPICAL INJECTION ASSEMBLY
NOT TO SCALE

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Project No. 1841DETP
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PROCESS PIPING DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO P–2
SHEET 28 OF 47

M:\Real Numbers\PORTSMOUTH\1841 Madbury Wells\c3d_1841DETP.dwg, 6/15/2021 3:59:37 PM

HVAC LEGEND

CIRCULATOR PUMP	SUPPLY AIR	REMOVE/DEMOLISH EQUIPMENT/PIPING SHOWN DASHED ON DEMO PLANS)		B.F.C	BELOW FINISHED CEILING
BALL VALVE	RETURN OR EXHAUST AIR			BHP	BRAKE HORSE POWER
PRESSURE GAUGE	SUPPLY & RETURN AIR TURN DOWN	XX–1	EQUIPMENT TAG	CD	CONDENSATE DRAIN
CHECK VALVE	MANUAL BALANCING DAMPER	A 48x12 1000	RGD TAG, NECK SIZE, CFM	C	CONDENSATE
PRV SAFETY RELIEF VALVE	SUPPLY AIR FLOW	LAT	LEAVING AIR TEMPERATURE	COP	COEFFICIENT OF PERFORMANCE
THERMOMETER	RETURN/EXHAUST AIR FLOW	LF	LINEAL FOOT	EA	EXHAUST AIR
THERMOSTAT / AQUASTAT	CONNECT TO EXISTING	LWT	LEAVING WATER TEMPERATURE	EAT	ENTERING AIR TEMPERATURE
OCCUPANCY SENSOR	POINT OF DEMOLITION	MCA	MINIMUM CIRCUIT AMPACITY	EER	ENERGY EFFICIENCY RATIO
TEMPERATURE SENSOR	FLEX CONNECTOR	RA	RETURN AIR	ESP	EXTERNAL STATIC PRESSURE
DIFFERENTIAL PRESSURE SENSOR	PIPE TEE AND 90 ELBOW	SA	SUPPLY AIR	EWT	ENTERING WATER TEMPERATURE
WALL SWITCH	MECHANICAL EQUIPMENT	EA	EXHAUST AIR	FLA	FULL LOAD AMPS
METHANE SENSOR	MANUAL BALANCING VALVE	SC	SENSIBLE COOLING CAPACITY	FO	FLAT OVAL DUCT
HYDROGEN SULFIDE SENSOR	2–WAY CONTROL VALVE	TC	TOTAL COOLING CAPACITY	CFF	CAPPED FOR FUTURE
OXYGEN SENSOR	3–WAY CONTROL VALVE	WPD	WATER PRESSURE DROP	AWT	AVERAGE WATER TEMPERATURE
PIPE RISE & PIPE DROP	PRESSURE RELIEF VALVE	BDD	BACKDRAFT DAMPER	VFD	VARIABLE FREQUENCY DRIVE
PIPE OR DUCT REDUCER	TMV THERMOSTATIC MIXING/ DIVERTING VALVE	A.F.F.	ABOVE FINISHED FLOOR	CAR	CONSTANT AIRFLOW REGULATOR
FIRE DAMPER		APD	AIR PRESSURE DROP	AD	ACCESS DOOR
SMOKE DAMPER	BUTTERFLY VALVE	S.L.	SKYLIGHT	C.M.	CONSTRUCTION MANAGER
MOTORIZED CONTROL DAMPER	CIRCUT SENSOR	SD	SMOKE DAMPER	A.H.J.	AUTHORITY HAVING JURISDICTION
BDD BACK DRAFT DAMPER	FLOW SENSOR	ACV	AUTOMATIC CONTROL VALVE	FPF	FINS PER FOOT
RETURN UNDER ENCLOSURE	AUTOMATIC BALANCING VALVE	SCV	SELF CONTAINED CONTROL VALVE	G.C.	GENERAL CONTRACTOR
		HWS/R	HOT WATER SUPPLY & RETURN	M.C.	MECHANICAL CONTRACTOR
		ACD	AUTOMATIC CONTROL DAMPER	P.C.	PLUMBING CONTRACTOR
		W.C.	WATER COLUMN	(E)	EXISTING

PLUMBING LEGEND

UNDERSLAB SANITARY DRAIN PIPING		MECHANICAL EQUIPMENT	
ABOVE GROUND SANITARY DRAIN PIPING		PUMP	
LAUNDRY WASTE PIPING		PIPE REDUCER	
SHOWER WASTE PIPING		METER	
SANITARY VENT PIPING		WATER METER	
DOMESTIC HOT WATER SUPPLY PIPING		PRESSURE REDUCING VALVE	
DOMESTIC COLD WATER SUPPLY PIPING		SAFETY RELIEF VALVE	
DOMESTIC HOT WATER RECIRCULATION PIPING		MIXING VALVE	
DOMESTIC TEPID WATER SUPPLY PIPING		THERMOMETER	
LIQUEFIED PROPANE GAS PIPING		STRAINER	
DIRECTION OF FLOW		VENT THROUGH ROOF	
DIRECTION OF PITCH		ROOF DRAIN	
DROP IN PIPE		FLOOR DRAIN	
RISE IN PIPE	CFF	PIPE CAP FOR FUTURE CONNECTION	
PIPE TEE DOWN		PIPE CONNECTION TO FIXTURE	
PIPE TEE UP		PRESSURE GUAGE	
PIPE CONTINUATION		TEMPERATURE SENSOR	
WCO/CO WALL/END CLEANOUT	CD	CONDENSATE DRAIN	
FCO FLOOR CLEANOUT	RD / SD	ROOF DRAIN	
CHECK VALVE	S	SANITARY SEWER	
BALL VALVE/ ISOLATION VALVE	I.E.	INVERT ELEVATION	
BACKFLOW PREVENTION VALVE	FP	FIRE PROTECTION PIPING	
PIPE UNION	U.O.N.	UNLESS OTHERWISE NOTED	
DRAIN VALVE, GATE VALVE	SGV	SOIL GAS VENT	
BUTTERFLY VALVE	DTW	DOMESTIC TEMPERED WATER	
BALANCE VALVE	DTWR	DOMESTIC TEMPERED WATER RETURN	
DRAIN VALVE, GATE VALVE	W.C.	WATER COLUMN	
REMOVE/DEMOLISH (EQUIPMENT/PIPING SHOWN DASHED ON DEMO PLANS)	(E)	EXISTING	

CONTROL SEQUENCES

FOR HVAC SYSTEMS CONTROLLED BY SCADA, THE CONTRACTOR SHALL COMMUNICATE AND COORDINATE WITH THE OWNER TO HAVE THE SCADA SYSTEM PROGRAMMING COMPLETED FOR TESTING AND START–UP. PROVIDE AT LEAST TWO WEEKS NOTICE PRIOR TO NEEDING THE PROGRAMMING WORK COMPLETED.

WELL #1:

1. EXHAUST FAN EF–6 SHALL BE CONTROLLED BY A HAND–OFF (ON/OFF) SWITCH (BY ELECTRICAL).
 1.1. WHEN THE HAND–OFF SWITCH IS IN THE "HAND" POSITION, THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–6, AT TRANSFER DUCT AND LOUVER L–4 SHALL BE OPEN AND EXHAUST FAN EF–6 SHALL OPERATE.
2. EXHAUST FAN EF–7 SHALL BE CONTROLLED BY A HAND–OFF–AUTO (HOA) SWITCH (BY ELECTRICAL).TEMPERATURE TRANSMITTER (BY OWNER) AND SCADA (BY OWNER).
 2.1. WHEN THE HAND–OFF–AUTO SWITCH IS ON "HAND" POSITION, THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–7 AND LOUVER L–4 SHALL OPEN AND EXHAUST FAN EF–7 SHALL OPERATE.
 2.2. WHEN THE HAND–OFF–AUTO SWITCH IS ON "AUTO" POSITION, OPERATIONS SHALL BE PER # 2.3 BELOW.
 2.3. UPON A RISE IN TEMPERATURE IN SPACE TO 85ºF (ADJUSTABLE), THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–7 AND LOUVER L–4 SHALL OPEN AND EXHAUST FAN EF–7 SHALL OPERATE.
3. ELECTRIC UNIT HEATER (BY ELECTRICAL) IN SPACE SHALL BE CONTROLLED BY A REMOTE THERMOSTAT (BY ELECTRICAL) TO MAINTAIN SPACE TEMPERATURE OF 45ºF (ADJUSTABLE).

WELL #2:

1. EXHAUST FAN EF–1 SHALL BE CONTROLLED BY A HAND–OFF–AUTO SWITCH (BY ELECTRICAL), TEMPERATURE TRANSMITTER (BY OWNER) AND SCADA (BY OWNER).
 1.1. WHEN THE HAND–OFF–AUTO SWITCH IS ON "HAND" POSITION, THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–1 AND LOUVER L–1 SHALL OPEN AND EXHAUST FAN EF–1 SHALL OPERATE.
 1.2. WHEN THE HAND–OFF–AUTO SWITCH IS ON "AUTO" POSITION, OPERATIONS SHALL BE PER #1.3 BELOW.
 1.3. UPON A RISE IN TEMPERATURE IN SPACE TO 85ºF (ADJUSTABLE), THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–1 AND LOUVER L–1 SHALL OPEN AND EXHAUST FAN EF–1 SHALL OPERATE.
2. EXHAUST FAN EF–2 SHALL BE CONTROLLED BY A HAND–OFF (ON/OFF) SWITCH (BY ELECTRICAL).
 2.1. WHEN THE HAND–OFF SWITCH IS ON "HAND" POSITION, THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–2 AND LOUVER L–1 SHALL OPEN AND EXHAUST FAN EF–2 SHALL OPERATE.
3. ELECTRIC UNIT HEATERS (BY ELECTRICAL) IN SPACE SHALL BE CONTROLLED BY REMOTE THERMOSTATS (BY ELECTRICAL) TO MAINTAIN SPACE TEMPERATURE OF 45ºF (ADJUSTABLE).
4. DEHUMIDIFIER (DH–1) SHALL BE CONTROLLED BY INTEGRAL CONTROLS TO MAINTAIN AN ADJUSTABLE SPACE RELATIVE HUMIDITY SETPOINT.

WELL #3:

1. EXHAUST FAN EF–3 SHALL BE CONTROLLED BY A HAND–OFF–AUTO SWITCH (BY ELECTRICAL), TEMPERATURE TRANSMITTER (BY OWNER) AND SCADA (BY OWNER).
 1.1. WHEN THE HAND–OFF–AUTO SWITCH IS ON "HAND" POSITION, THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–3 AND LOUVER L–2 SHALL OPEN AND EXHAUST FAN EF–3 SHALL OPERATE.
 1.2. WHEN THE HAND–OFF–AUTO SWITCH IS ON "AUTO" POSITION, OPERATIONS SHALL BE PER #1.3 BELOW.
 1.3. UPON A RISE IN TEMPERATURE IN SPACE TO 85ºF (ADJUSTABLE), THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–3 AND LOUVER L–2 SHALL OPEN AND EXHAUST FAN EF–3 SHALL OPERATE.
2. EXHAUST FAN EF–4 SHALL BE CONTROLLED BY A HAND–OFF (ON/OFF) SWITCH (BY ELECTRICAL).
 2.1. WHEN THE HAND–OFF SWITCH IS ON "HAND" POSITION, THE DAMPERS ASSOCIATED WITH EXHAUST FAN EF–4 AND LOUVER L–2 SHALL OPEN AND EXHAUST FAN EF–4 SHALL OPERATE.
3. ELECTRIC UNIT HEATERS (BY ELECTRICAL) IN SPACE SHALL BE CONTROLLED BY REMOTE THERMOSTATS (BY ELECTRICAL) TO MAINTAIN SPACE TEMPERATURE OF 45ºF (ADJUSTABLE).
4. DEHUMIDIFIER (DH–2) SHALL BE CONTROLLED BY INTEGRAL CONTROLS TO MAINTAIN AN ADJUSTABLE SPACE RELATIVE HUMIDITY SETPOINT.

WELL #4R/#5:

1. AIR SOURCE HEAT PUMPS IN SPACE SHALL BE CONTROLLED BY A REMOTE THERMOSTAT (BY MECHANICAL CONTRACTOR) TO MAINTAIN SPACE TEMPERATURE OF 45ºF (ADJUSTABLE) IN HEATING MODE AND 85ºF (ADJUSTABLE) IN COOLING MODE.
2. DEHUMIDIFIER (DH–3) SHALL BE CONTROLLED BY INTEGRAL CONTROLS TO MAINTAIN AN ADJUSTABLE SPACE RELATIVE HUMIDITY SETPOINT.

CODES & STANDARDS

THE FOLLOWING CODES APPLY TO THE DESIGN OF THE MECHANICAL SYSTEM:

BUILDING CODE:	2015 INTERNATIONAL BUILDING CODE (IBC)
MECHANICAL CODE:	2015 INTERNATIONAL MECHANICAL CODE (IMC)
PLUMBING CODE:	2015 INTERNATIONAL PLUMBING CODE (IPC)
VENTILATION:	2015 INTERNATIONAL MECHANICAL CODE (IMC)
ENERGY CODE:	2015 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)

CLIMATE

CLIMATE DATA IS TAKEN FROM NATIONAL CLIMATE DATA CENTER FOR PEASE INT'L TRADEPORT:

WINTER DESIGN CONDITIONS:	OUTDOOR AIR DB:	1.0 ºF (99.6% VALUE)
	INDOOR AIR DB:	50.0 ºF
SUMMER DESIGN CONDITIONS:	OUTDOOR AIR DB:	89.3 ºF (0.4% VALUE)
	OUTDOOR AIR MCWB:	72.7 ºF (0.4% VALUE)
	INDOOR AIR DB:	75.0–100.0 ºF
	INDOOR DEW POINT:	50.0 ºF

SPACE & SYSTEMS DESCRIPTION

WELL #1:

HEAT:
- HEAT FOR CHEMICAL ROOM IS PROVIDED BY AN EXISTING PROPANE UNIT HEATER TO REMAIN.
- HEAT FOR FLUORIDE ROOM IS PROVIDED BY A NEW ELECTRIC UNIT HEATER (BY ELECTRICAL)

VENTILATION:
- CHEMICAL EXHAUST AIR FOR THE FLUORIDE ROOM IS PROVIDED BY A WALL–MOUNTED CENTRIFUGAL EXHAUST FAN (EF–6) AND MAKE–UP AIR LOUVER WITH MOTORIZED DAMPER (L–4).
- CHEMICAL EXHAUST AIR FOR THE CHEMICAL ROOM IS PROVIDED BY A ROOF–MOUNTED CENTRIFUGAL EXHAUST FAN (EF–7) AND MAKE–UP AIR LOUVER WITH MOTORIZED DAMPER (L–4).

WELL #2:

HEAT:
- HEAT FOR THE UPPER LEVEL IS PROVIDED BY AN EXISTING ELECTRIC UNIT HEATER TO REMAIN.
- HEAT FOR THE LOWER LEVEL IS PROVIDED BY A NEW ELECTRIC UNIT HEATER (BY ELECTRICAL).

VENTILATION:
- UPPER LEVEL HEAT RELIEF IS PROVIDED BY A WALL–MOUNTED CENTRIFUGAL EXHAUST AIR FAN (EF–1) AND MAKE–UP AIR LOUVER WITH MOTORIZED DAMPER (L–1).
- LOWER LEVEL CONFINED SPACE VENTILATION IS PROVIDED (12 ACH) BY A WALL–MOUNTED CENTRIFUGAL EXHAUST AIR FAN (EF–2) AND MAKE–UP AIR LOUVER WITH MOTORIZED DAMPER (L–1).

DEHUMIDIFICATION:
- DEHUMIDIFICATION IS PROVIDED BY A STANDALONE PORTABLE DEHUMIDIFIER (DH–1) LOCATED IN THE LOWER LEVEL.
- A SUMP COVER IS PROVIDED OVER THE EXISTING SUMP PIT AS A MEAN FOR ADDITIONAL MOISTURE CONTROL IN THE LOWER LEVEL.

WELL #3:

HEAT:
- HEAT FOR THE UPPER LEVEL IS PROVIDED BY AN EXISTING ELECTRIC UNIT HEATER TO REMAIN.
- HEAT FOR THE LOWER LEVEL IS PROVIDED BY A NEW ELECTRIC UNIT HEATER (BY ELECTRICAL).

VENTILATION:
- UPPER LEVEL HEAT RELIEF IS PROVIDED BY A WALL–MOUNTED CENTRIFUGAL EXHAUST AIR FAN (EF–3) AND MAKE–UP AIR LOUVER WITH MOTORIZED DAMPER (L–2).
- LOWER LEVEL CONFINED SPACE VENTILATION IS PROVIDED (12 ACH) BY A WALL–MOUNTED CENTRIFUGAL EXHAUST AIR FAN (EF–4) AND MAKE–UP AIR LOUVER WITH MOTORIZED DAMPER (L–2).

DEHUMIDIFICATION:
- DEHUMIDIFICATION IS PROVIDED BY A STANDALONE PORTABLE DEHUMIDIFIER (DH–2) LOCATED IN THE LOWER LEVEL.
- A SUMP COVER IS PROVIDED OVER THE EXISTING SUMP PIT AS A MEAN FOR ADDITIONAL MOISTURE CONTROL IN THE LOWER LEVEL.

WELL #4:

HEAT:
- EXISTING TO REMAIN (NO WORK).

VENTILATION:
- EXISTING TO REMAIN (NO WORK).

WELL #4R/#5:

HEATIND AND COOLING:
- HEATING AND COOLING ARE PROVIDED BY AN AIR–SOURCE HEAT PUMP (ASHP) SYSTEM CONSISTING OF (1) INDOOR WALL–MOUNTED CASSETTE CONNECTED TO (1) OUTDOOR UNIT. REFRIGERANT PIPING CONNECTS INDOOR AND OUTDOOR UNITS. A THERMOSTAT IS PROVIDED FOR THE INDOOR UNIT.

DEHUMIDIFICATION:
- DEHUMIDIFICATION IS PROVIDED BY A STANDALONE PORTABLE DEHUMIDIFIER (DH–3).

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Book No.
Project No. 1841
Dwg. ID
Scale AS SHOWN

STATE OF NEW HAMPSHIRE – JAMES F. PETERSEN No. 8139 – LICENSED PROFESSIONAL ENGINEER

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
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HVAC & PLUMBING BASIS OF DESIGN
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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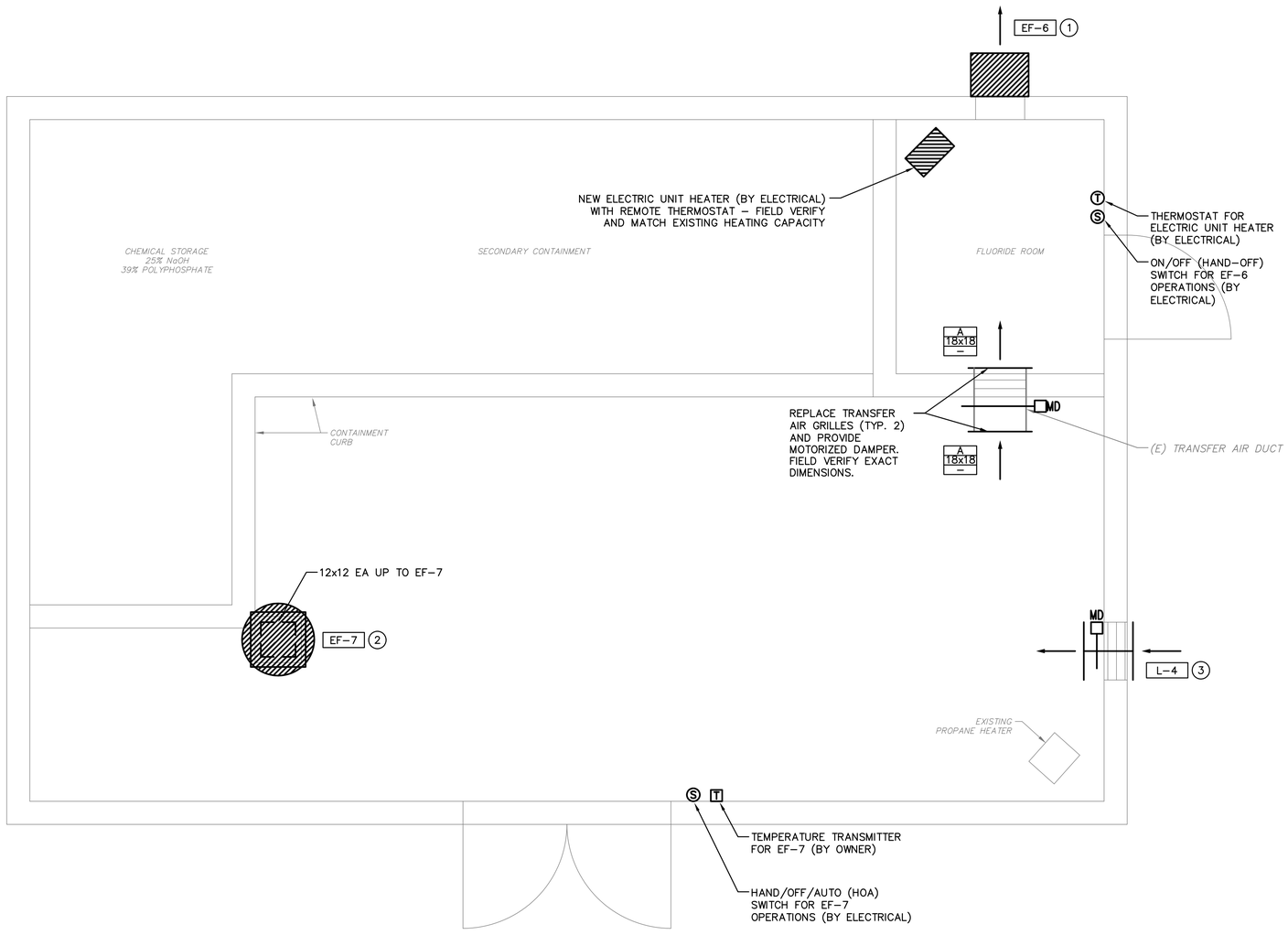
DWG NO M–1
SHEET 29 OF 47

GENERAL NOTES:

1. REFER TO STRUCTURAL DRAWINGS FOR EXACT WALL, FLOOR, CEILING AND ROOF OPENING LOCATIONS.
2. REFER TO ELECTRICAL DRAWINGS FOR ELECTRIC UNIT HEATER REPLACEMENTS.

SHEET NOTES:

1. UTILIZE EXISTING OPENING. COORDINATE WITH STRUCTURAL FOR MASONRY WALL INFILL.
2. MOUNTED ON NEW ROOF CURB. UTILIZE EXISTING ROOF OPENING. COORDINATE WITH STRUCTURAL FOR ROOF INFILL AND NEW ROOF CURB.
3. LOUVER TO MATCH EXISTING OPENING SIZE. FIELD VERIFY EXACT DIMENSIONS.



1/M-2 FLOOR PLAN
SCALE: 1/2" = 1'-0"

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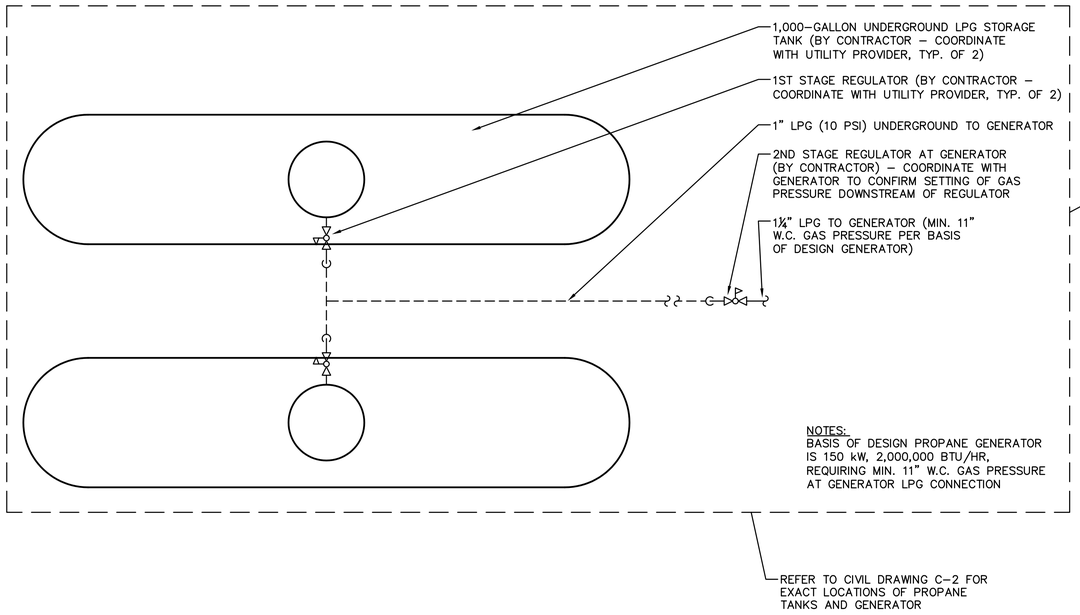
WELL #1 HVAC FLOOR PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO M-2

SHEET 30 OF 47

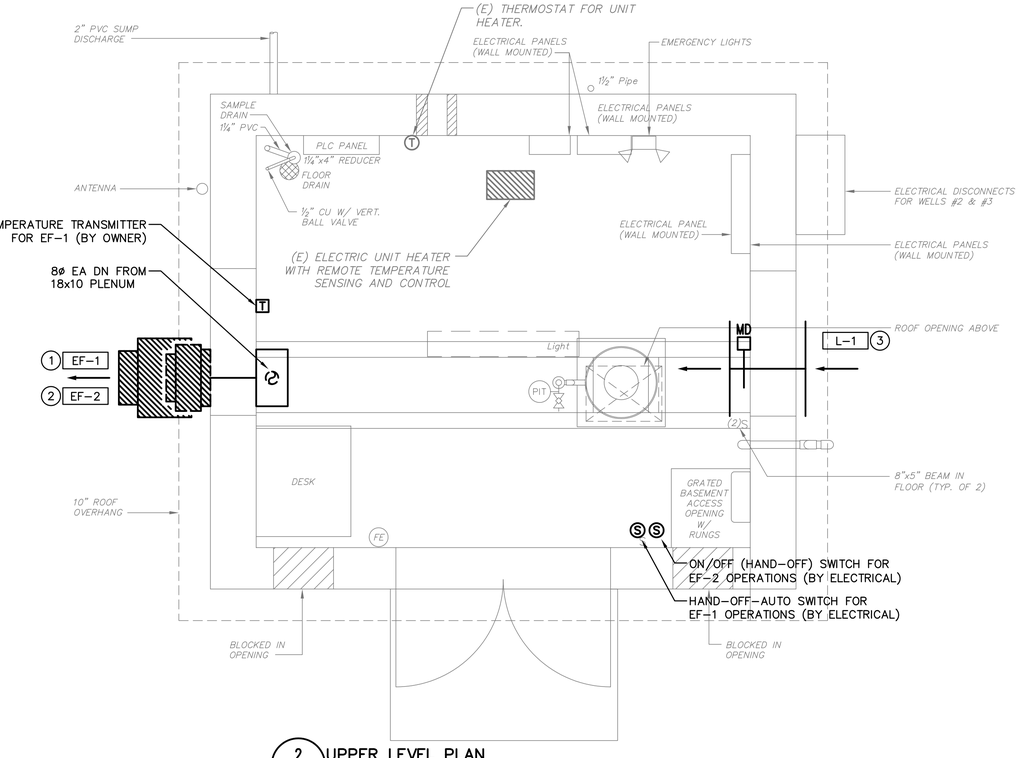


GENERAL NOTES:

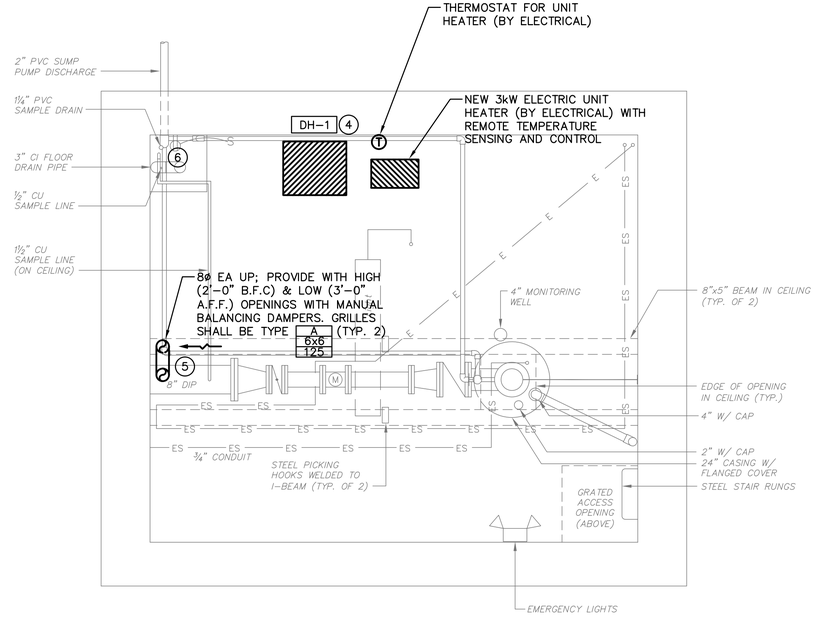
1. REFER TO DEMOLITION DRAWINGS FOR DEMO PLANS.
2. REFER TO STRUCTURAL DRAWINGS FOR EXACT WALL, FLOOR, CEILING AND ROOF OPENING LOCATIONS.
3. REFER TO ELECTRICAL DRAWINGS FOR ELECTRIC UNIT HEATER REPLACEMENTS.

SHEET NOTES:

1. MOUNT HIGH ON WALL IN EXISTING OPENING (COORDINATE WITH STRUCTURAL FOR MASONRY WALL INFILL). TERMINATE INTERIOR WITH SPECIFIED MOTORIZED DAMPER. FAN OPERATION TO INTERLOCK WITH INTEGRAL MOTORIZED DAMPER AND INTAKE MOTORIZED DAMPER AT L-1.
2. MOUNT LOW ON WALL IN EXISTING OPENING (COORDINATE WITH STRUCTURAL FOR MASONRY WALL INFILL). TERMINATE INTERIOR WITH DUCTWORK SHOWN (TO LOWER LEVEL). FAN OPERATION TO INTERLOCK WITH INTEGRAL MOTORIZED DAMPER AND INTAKE MOTORIZED DAMPER AT L-1.
3. IN EXISTING OPENING (COORDINATE WITH STRUCTURAL FOR MASONRY WALL INFILL).
4. DISCHARGE DRAIN FROM DH-1 TO SUMP.
5. OFFSET DUCTWORK AROUND PROCESS PIPING AS REQUIRED.
6. PROVIDE NEW SUMP COVER TO COVER EXISTING OPEN SUMP PIT, TO MINIMIZE EXPOSED WATER SURFACE AREA IN THE PIT THAT CONTRIBUTES TO MOISTURE IN THE LOWER LEVEL – SEE DETAIL ON SHEET M-8.



2 M-3 UPPER LEVEL PLAN
SCALE: 1/2" = 1'-0"



1 M-3 LOWER LEVEL PLAN
SCALE: 1/2" = 1'-0"

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WELL #2 HVAC & PLUMBING FLOOR PLANS
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO M-3
SHEET 31 OF 47

GENERAL NOTES:

1. REFER TO DEMOLITION DRAWINGS FOR DEMO PLANS.
2. REFER TO STRUCTURAL DRAWINGS FOR EXACT WALL, FLOOR, CEILING AND ROOF OPENING LOCATIONS.
3. REFER TO ELECTRICAL DRAWINGS FOR ELECTRIC UNIT HEATER REPLACEMENTS.

SHEET NOTES:

(1) MOUNT HIGH ON WALL IN EXISTING OPENING (COORDINATE WITH STRUCTURAL FOR MASONRY WALL INFILL). TERMINATE INTERIOR WITH SPECIFIED MOTORIZED DAMPER. FAN OPERATION TO INTERLOCK WITH INTEGRAL MOTORIZED DAMPER AND INTAKE MOTORIZED DAMPER AT L–2.

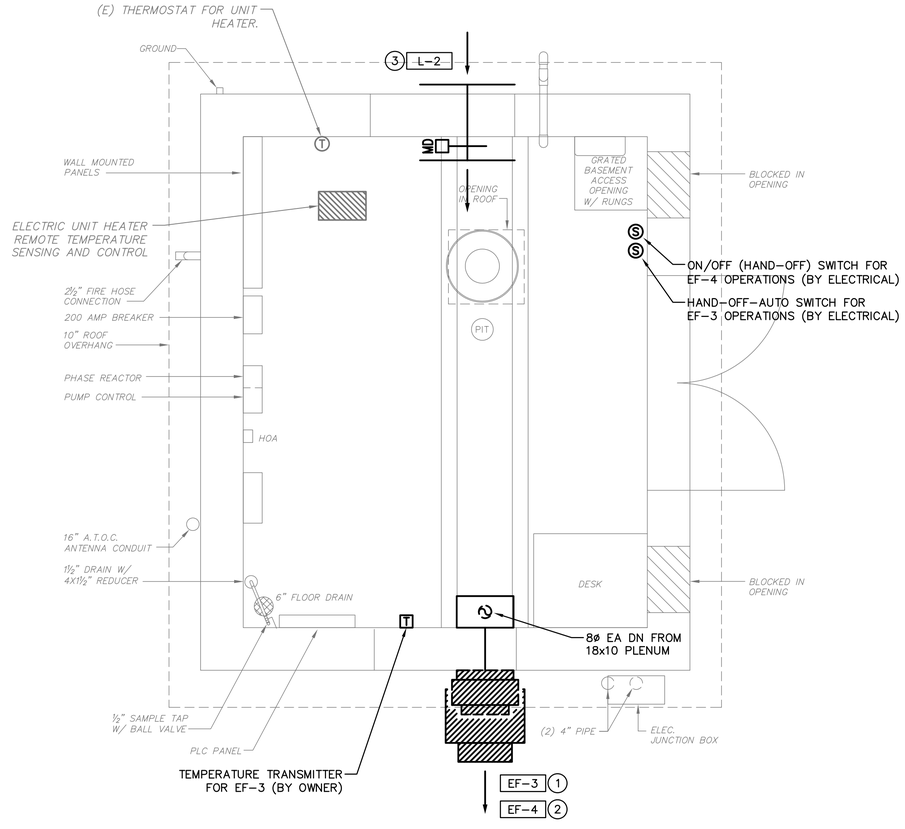
(2) MOUNT LOW ON WALL IN EXISTING OPENING (COORDINATE WITH STRUCTURAL FOR MASONRY WALL INFILL). TERMINATE INTERIOR WITH DUCTWORK SHOWN (TO LOWER LEVEL). FAN OPERATION TO INTERLOCK WITH INTEGRAL MOTORIZED DAMPER AND INTAKE MOTORIZED DAMPER AT L–2.

(3) IN EXISTING OPENING (COORDINATE WITH STRUCTURAL FOR MASONRY WALL INFILL).

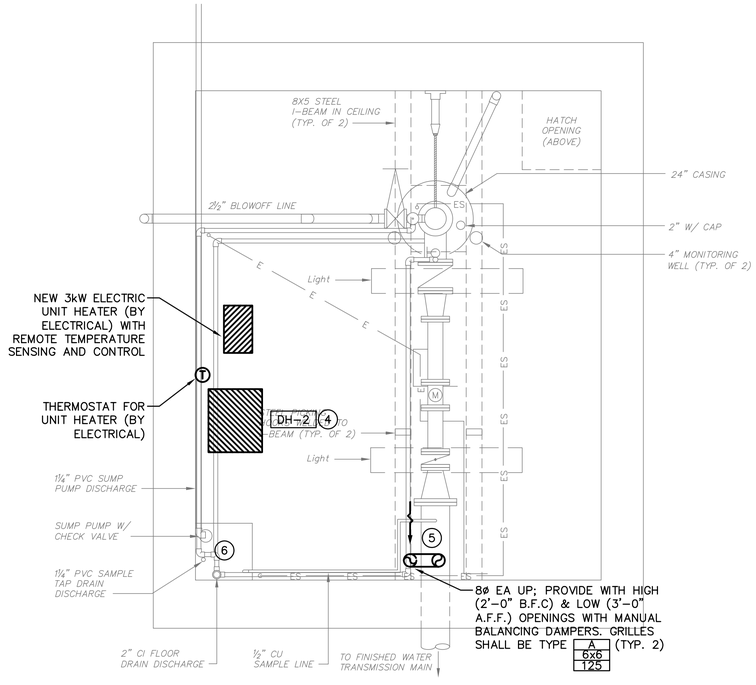
(4) DISCHARGE DRAIN FROM DH–2 TO SUMP.

(5) OFFSET DUCTWORK AROUND PROCESS PIPING AS REQUIRED.

(6) PROVIDE NEW SUMP COVER TO COVER EXISTING OPEN SUMP PIT, TO MINIMIZE EXPOSED WATER SURFACE AREA IN THE PIT THAT CONTRIBUTES TO MOISTURE IN THE LOWER LEVEL – SEE DETAIL ON SHEET M–8.



2 / M–4 UPPER LEVEL PLAN
SCALE: 1/2" = 1'–0"



1 / M–4 LOWER LEVEL PLAN
SCALE: 1/2" = 1'–0"

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WELL #3 HVAC & PLUMBING FLOOR PLANS
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO M–4
SHEET 32 OF 47

GENERAL NOTES:

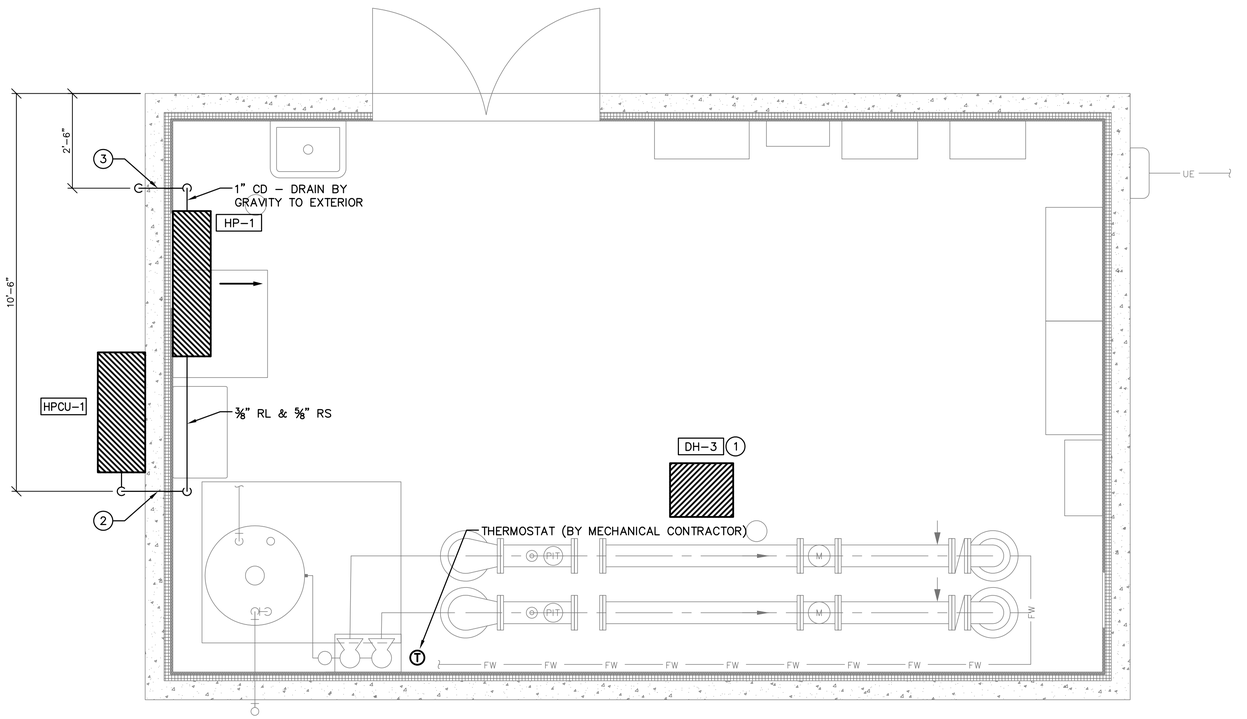
1. REFER TO STRUCTURAL DRAWINGS FOR EXACT WALL, FLOOR, CEILING AND ROOF OPENING LOCATIONS.
2. A SINGLE LINE IS SHOWN ON THIS DRAWING TO INDICATE BOTH THE REFRIGERANT SUCTION (RS) AND REFRIGERANT LIQUID (RL) PIPING FOR CLARITY. PROVIDE BOTH RS & RL PIPING TO CONNECT EQUIPMENT AS SHOWN.
3. REFRIGERANT PIPING IS SHOWN WITH CONCEPTUAL ROUTING ONLY. FIELD VERIFY AND OPTIMIZE EXACT ROUTING PER MANUFACTURER'S LITERATURE.

SHEET NOTES:

(1) DISCHARGE DRAIN FROM DH-3 TO NEAREST FLOOR DRAIN – REFER TO PLUMBING DRAWING.

(2) COORDINATE 4" HOLE THRU WALL 6'-0" ABOVE GRADE TO ACCOMMODATE INSULATED REFRIGERANT LINESET. FILL ANNULAR SPACE WITH APPROPRIATE SEALING MATERIAL.

(3) ROUTE CONDENSATE DRAIN PIPING FROM HEAT PUMP TO EXTERIOR WITH A 1" ELBOW DOWN TERMINATION WITH INSECT SCREEN LOCATED 24" ABOVE GRADE. COORDINATE 1½" HOLE THRU WALL 24" ABOVE GRADE TO ACCOMMODATE CONDENSATE DRAIN PIPE. FILL ANNULAR SPACE WITH APPROPRIATE SEALING MATERIAL.



1 / M-5 FLOOR PLAN
SCALE: 1/2" = 1'-0"

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WELL #4R/#5 HVAC FLOOR PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
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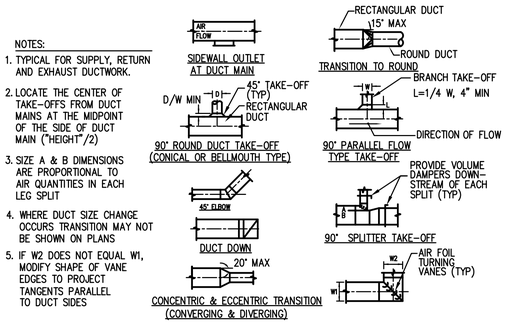
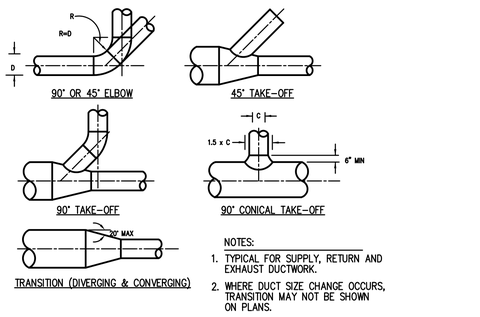
DWG NO M-5

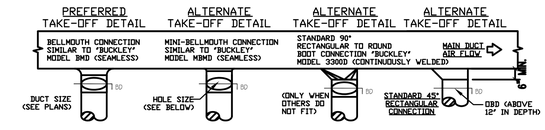
SHEET 33 OF 47



3 M-6 RECTANGULAR DUCT FITTING DETAIL
SCALE: NTS



2 M-6 ROUND DUCT FITTING DETAIL
SCALE: NTS



DUCT SIZE	HOLE SIZE	MINIMUM DUCT HT.	DUCT SIZE	HOLE SIZE	MINIMUM DUCT HT.	DUCT SIZE	HOLE SIZE	MINIMUM DUCT HT.
5"	8"	9"	5"	–	–	5"	5"x10"	–
6"	9"	10"	6"	7"	9"	6"	6"x12"	9"
7"	10"	11"	7"	–	–	7"	6"x12"	–
8"	11"	12"	8"	9"	11"	8"	6½"x12"	11"
9"	12"	13"	9"	–	–	9"	6½"x12"	–
10"	13"	14"	10"	11"	13"	10"	6½"x12"	13"
12"	15"	16"	12"	–	–	12"	6½"x12"	–
14"	17"	18"	14"	–	–	14"	10"x20"	–
15"	19"	20"	15"	–	–	15"	–	–

THIS DETAIL APPLIES TO SINGLE TAKEOFFS TO DIFFUSER AS WELL AS BRANCH TAKEOFFS. IT ALSO APPLIES TO TAKEOFFS IN THE HORIZONTAL AS WELL AS VERTICAL DIRECTION.

ALTERNATE FITTINGS SHALL BE USED WHEN DUCT HEIGHT DOES NOT PERMIT THE USE OF THE PREFERRED FULL SIZE BELLMOUTH.

SUBMIT FITTINGS FOR REVIEW BY ENGINEER PRIOR TO INSTALLATION.

1 M-6 DUCT TAKEOFFS
SCALE: NTS

EXHAUST FAN SCHEDULE

TAG	MAKE	MODEL	CFM	ESP	BHP	MOTOR HP	MOTOR RPM	FAN RPM	VOLTAGE/ PHASE	UNIT WEIGHT	FAN TYPE	ZONE SERVED	FUNCTION	NOTES
EF-1	GREENHECK	CUE-131-VG	1,600	0.25	0.23	½	1,450	1,286	115/1	62	SIDEWALL CENTRIFUGAL	WELL #2	WELL #2 HEAT RELIEF	1, 2, 3
EF-2	GREENHECK	CUE-080-VG	250	0.60	0.07	⅛0	1,725	1,690	115/1	35	SIDEWALL CENTRIFUGAL	WELL #2	WELL #2 CONFINED SPACE	1, 2, 3
EF-3	GREENHECK	CUE-131-VG	1,600	0.25	0.23	½	1,450	1,286	115/1	62	SIDEWALL CENTRIFUGAL	WELL #3	WELL #3 HEAT RELIEF	1, 2, 3
EF-4	GREENHECK	CUE-080-VG	250	0.60	0.07	⅛0	1,725	1,690	115/1	35	SIDEWALL CENTRIFUGAL	WELL #3	WELL #3 CONFINED SPACE	1, 2, 3
EF-5	NOT USED													
EF-6	GREENHECK	CUE-060-VG	100	0.40	0.03	⅛5	1,725	1,693	115/1	24	SIDEWALL CENTRIFUGAL	WELL #1	FLUORIDE ROOM VENTILATION	1, 2, 3
EF-7	GREENHECK	CUE-099-VG	600	0.25	0.06	¼	1,725	1,069	115/1	39	ROOF-MOUNTED CENTRIFUGAL	WELL #1	CHEMICAL ROOM VENTILATION	1, 2

1. VARI-GREEN EC MOTOR. PROVIDE WITH UNIT-MOUNTED POTENTIOMETER DIAL.
2. PROVIDE GREENHECK ICD-45 THERMALLY BROKEN, INSULATED BLADE DAMPER WITH 115V ACTUATOR. SIZE TO MATCH FAN OPENING REQUIREMENT(S).
3. PROVIDE WITH ACCESSORIES FOR SIDEWALL MOUNTING APPLICATION PER MANUFACTURER'S INSTRUCTIONS.

LOUVER SCHEDULE

TAG	MAKE	MODEL	SIZE (WxH)	CFM	FREE AREA (SQ. FT.)	CONSTRUCTION	LOCATION	FINISH	FUNCTION	NOTES
L-1	GREENHECK	ESD-403	30"x36"	1,850	3.45	ALUMINUM	WELL #2	SEE NOTE 1	INTAKE	1, 2
L-2	GREENHECK	ESD-403	30"x36"	1,850	3.45	ALUMINUM	WELL #3	SEE NOTE 1	INTAKE	1, 2
L-3	NOT USED									
L-4	GREENHECK	ESD-403	20"x20"	700	1.15	ALUMINUM	WELL #1	SEE NOTE 1	INTAKE	1, 2

1. COLOR AND FINISH TO BE SPECIFIED BY ARCHITECT.
2. PROVIDE GREENHECK ICD-45 THERMALLY BROKEN, INSULATED BLADE DAMPER WITH 115V ACTUATOR. SIZE TO MATCH LOUVER.

PORTABLE DEHUMIDIFIER SCHEDULE

TAG	MAKE	MODEL	BLOWER CFM	WATER REMOVAL (PINT)	VOLTAGE/ PHASE	FLA (AMPS)	POWER (KW)	DIMENSIONS WxDxH (IN.)	UNIT WEIGHT (LB.)	NOTES
DH-1	THERMA-STOR	HI-E DRY 100	255	106 @ 80°F, 60% RH	115/1	6.6	0.61 @ 80°F, 60% RH	20x17x36	110	1, 2
DH-2	THERMA-STOR	HI-E DRY 100	255	106 @ 80°F, 60% RH	115/1	6.6	0.61 @ 80°F, 60% RH	20x17x36	110	1, 2
DH-3	THERMA-STOR	HI-E DRY 100	255	106 @ 80°F, 60% RH	115/1	6.6	0.61 @ 80°F, 60% RH	20x17x36	110	1, 2

1. POWERED BY A FACTORY INSTALLED 6'-0" POWER CORD.
2. PROVIDE WITH PLEATED MEDIA MERV-8 FILTERS (AND ONE ADDITIONAL SET OF SPARE FILTERS) AND INTEGRAL CONDENSATE PUMP.

AIR SOURCE HEAT PUMP – OUTDOOR UNIT SCHEDULE

TAG	MAKE	MODEL	COOLING CAP. (BTU/H)	HEATING CAP. (MBH) 47F/5F	REF. TYPE	VOLT/PH/CY	MCA (AMPS)	MAX FUSE SIZE (AMPS)	WEIGHT (LBS)	DIMENSIONS (HxWxD)	REFRIG. LINE CONN.	NOTES
HPCU-1	MITSUBISHI	PUZ-HA24NHA1	24,000	28,000/26,000	R410A	240/1/60	17	27	190	38x38x15	⅜" RL & ⅝" RS	1, 2

1. PROVIDE STEEL WALL BRACKETS FOR EXTERIOR WALL MOUNTING, MITSUBISHI MODEL CWMB1, AND MOUNT TO BE ABOVE SNOW.
2. HYPER HEAT MODEL.

AIR SOURCE HEAT PUMP – INDOOR UNIT SCHEDULE

TAG	MAKE	MODEL	COOLING CAP. (BTU/H)	HEATING CAP. (MBH) 47F/5F	REF. TYPE	TOTAL AIR FLOW (CFM)	VOLT/PH/CY	MCA (AMPS)	WEIGHT (LBS)	TYPE	REFRIG. LINE CONN.	NOTES
HP-1	MITSUBISHI	PKA-A24KA7	24,000	28,000/26,000	R410A	775	240/1/60	1.0	46	WALL CASSETTE	⅜" RL & ⅝" RS	1, 2, 3

1. INCLUDE WALL MOUNTED THERMOSTAT/CONTROLLER, MITSUBISHI MODEL MHK-1 REMOTE CONTROLLER (1 PER ZONE) – PROVIDE ON-SITE PROGRAMMING AS DESIRED BY THE OWNER TO LOCK OUT THERMOSTAT FUNCTIONS.
2. INCLUDE DRAIN PAN LEVEL SENSOR (DPLS).
3. INDOOR UNIT IS POWERED DIRECTLY FROM OUTDOOR UNIT.

REGISTER, GRILLE & DIFFUSER SCHEDULE

TAG	MAKE	MODEL	TYPE	FUNCTION	MATERIAL	GRILLE SIZE	NOTES
A	METAL-AIRE	RH	GRILLE	RETURN/EXHAUST	STAINLESS STEEL	SEE NOTE 2	1, 2

1. COORDINATE COLOR WITH ARCHITECT
2. SEE PLAN VIEWS FOR SIZES AND LOCATIONS

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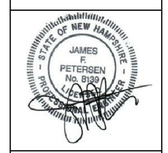

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HVAC
SCHEDULES & DETAILS
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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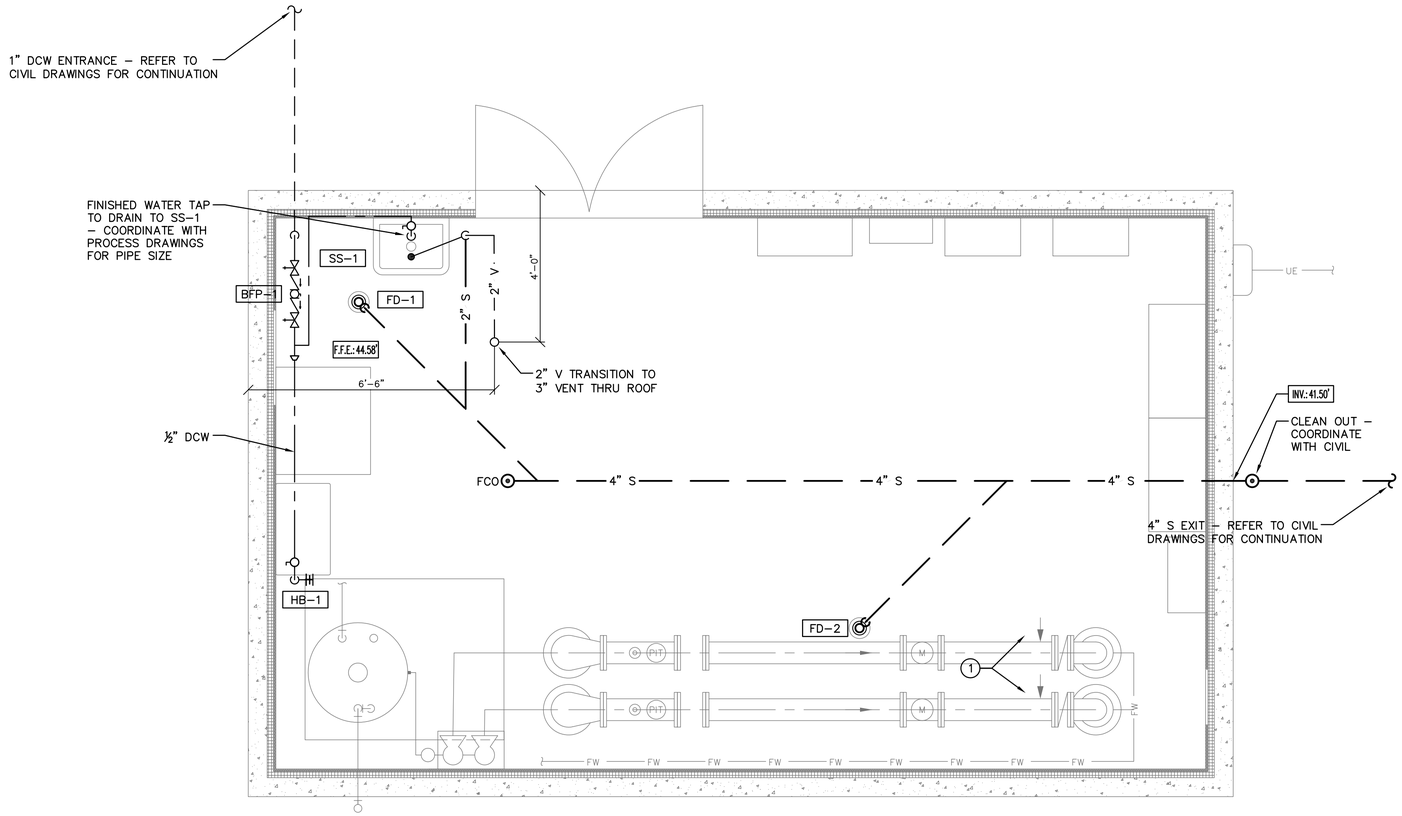
DWG NO M-6
SHEET 34 OF 47

GENERAL NOTES:

1. REFER TO STRUCTURAL DRAWINGS FOR EXACT WALL, FLOOR, CEILING AND ROOF OPENING LOCATIONS.

SHEET NOTES:

(1) RAW WATER SAMPLE TO BE DISCHARGED TO FUNNEL OF FD-2 – COORDINATE WITH PROCESS DRAWINGS.



1 / M-7 FLOOR PLAN
SCALE: 1/2" = 1'-0"

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WELL #4R/#5 PLUMBING FLOOR PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

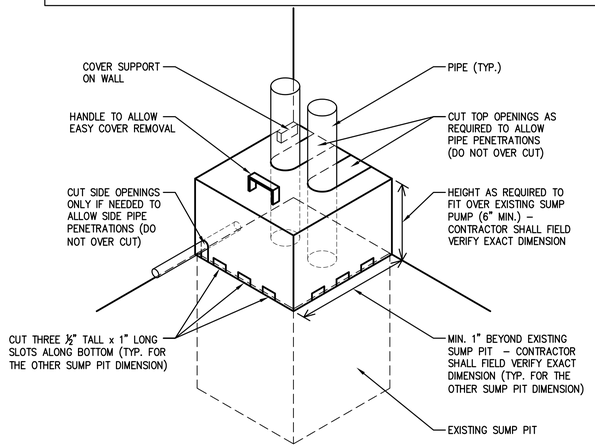
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO M-7

SHEET 35 OF 47

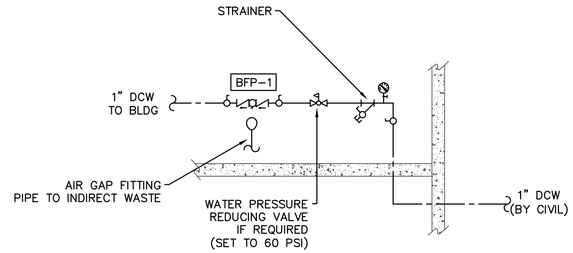
PLUMBING FIXTURE SCHEDULE

TAG	FIXTURE TYPE	MAKE	MODEL	PIPE CONNECTIONS SOIL	CW	HW	TRAP	FITTINGS/ACCESSORIES	WATER USED	ADA COMPLIANT	NOTES
SS–1	SAMPLE SINK	REGENCY	600HS172HDM	1½"	½"	½"	1½"	WALL–MOUNTED STAINLESS STEEL SINK FOR SAMPLE TAP COLLECTION. REFER TO PROCESS DRAWINGS FOR SAMPLE TAPS. PROVIDE WITHOUT FAUCET. PROVIDE PLACARD ABOVE SINK WITH THE FOLLOWING TEXT: "SAMPLE SINK ONLY – DRAINS TO SURFACE WATER"	–	NO	–
HB–1	HOSE BIB	ZURN	Z1341–BFP	–	½"	–	–	WALL FAUCET WITH BACKFLOW PREVENTER. PROVIDE DEDICATED SHUT–OFF VALVE ON COLD WATER PIPING.	–	–	–
FD–1	FLOOR DRAIN	ZURN	Z415B	4"	–	–	4"	ALL TRAPS SHALL BE PROTECTED WITH TRAP PRIMER.	–	–	–
FD–2	FLOOR DRAIN WITH FUNNEL	ZURN	Z415E	4"	–	–	4"	ALL TRAPS SHALL BE PROTECTED WITH TRAP PRIMER.	–	–	–
BFP–1	BACKFLOW PREVENTER	WATTS	LF009	–	1"	–	–	REDUCED PRESSURE ZONE ASSEMBLY. LEAD–FREE MODEL. PROVIDE WITH QUARTER–TURN BALL VALVES AND AIR GAP FITTINGS.	–	–	–



DETAIL NOTE:
1. SUMP COVER SHALL BE MADE OF STAINLESS STEEL, POLYPROPYLENE OR POLYETHYLENE.
2. ALL CUTS SHALL BE SANDED SMOOTH.
3. INSTALL SUPPORT(S) ON WALL(S) TO SUPPORT SUMP COVER.
4. SUMP COVER SHALL BE INSTALLED AS TIGHT TO EXISTING WALLS/FLOOR AND PIPING AS POSSIBLE TO MINIMIZE EXPOSED WATER SURFACE AREA IN THE PIT THAT CONTRIBUTES TO MOISTURE IN THE LOWER LEVEL.

2 / M–8 SUMP PIT COVER DETAIL (TYP. FOR WELL #2 & #3)
SCALE: NTS



1 / M–8 DOMESTIC COLD WATER ENTRANCE DETAIL (WELL #4R/#5)
SCALE: NTS

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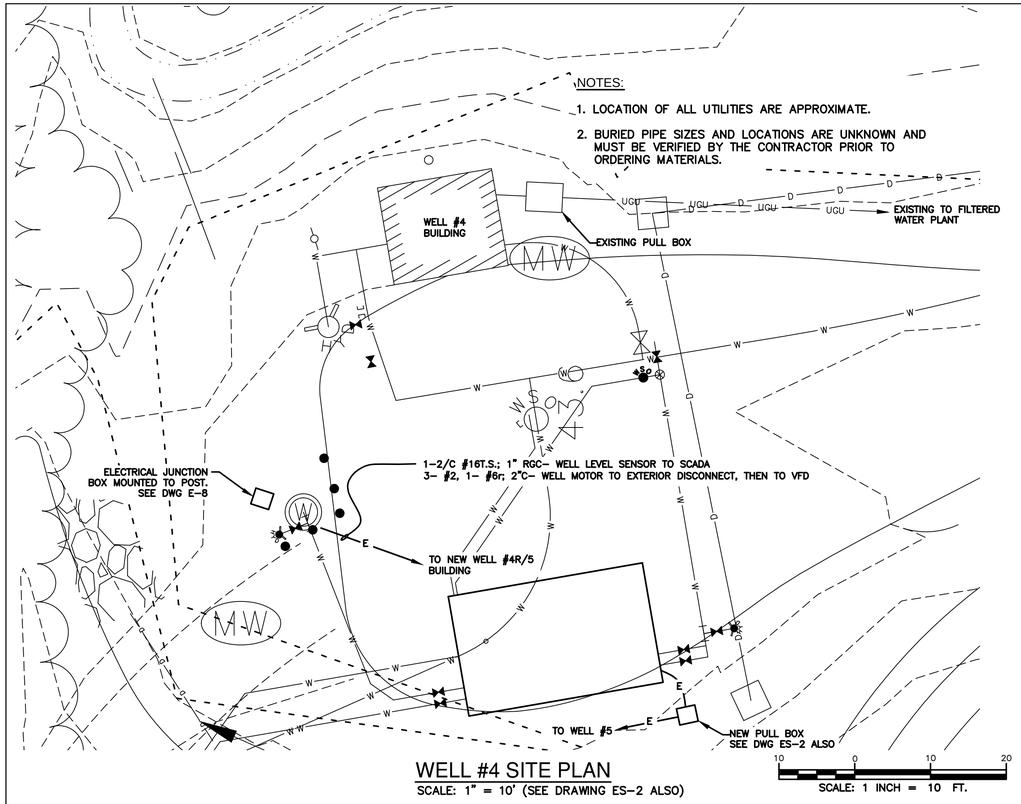
PLUMBING SCHEDULES & DETAILS
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO M–8
SHEET 36 OF 47

NOTES:

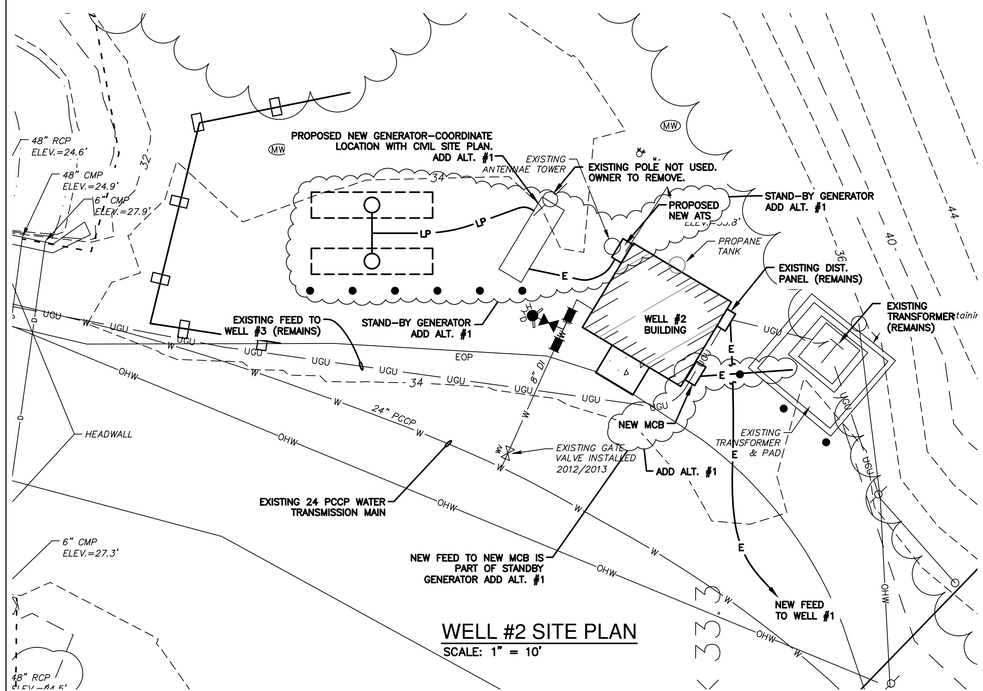
1. LOCATION OF ALL UTILITIES ARE APPROXIMATE.
2. BURIED PIPE SIZES AND LOCATIONS ARE UNKNOWN AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS.



WELL #4 SITE PLAN

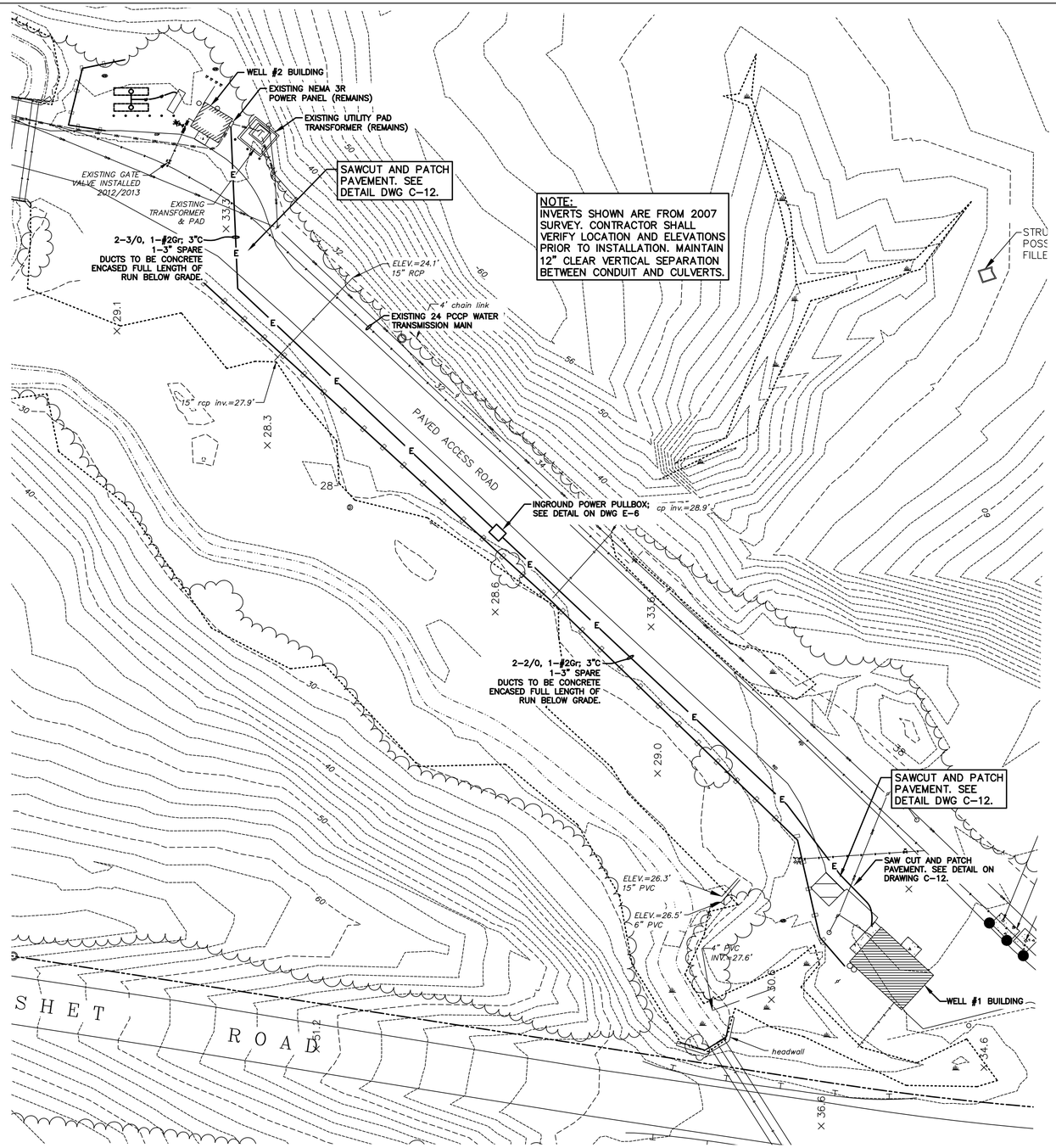
SCALE: 1" = 10' (SEE DRAWING ES-2 ALSO)

SCALE: 1 INCH = 10 FT.



WELL #2 SITE PLAN

SCALE: 1" = 10'



WELL #1 SITE ELECTRICAL

SCALE: 1" = 30'

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WELLS #1, #2, #3 & #4 ELECTRICAL SITE PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

DWG NO ES-1

SHEET 37 OF 47

N

PROVIDE NEW POWER FEED FROM POWER PANEL IN FINISHED WATER PUMP STATION TO NEW WELL #4R/5 CONTROL BUILDING 3–500KCMIL, 1–#2Gr. REMOVE EXISTING WELL #4 FEEDER CONDUCTORS. SEE DWG ES–1 FOR LOCATIONS. ESTIMATE NEW CIRCUIT LENGTH 600 FEET.

NEW JUNCTION BOXES (2) ON BUILDING EXTERIOR (SEE "E" DWGS)

CONNECT TO LINE SIDE OF EXISTING TO EXTERIOR DISCONNECT AND REMOVE EXISTING FEEDER.

50'± wooden mast pole (no #)

USE CAUTION EXCAVATING NEAR WATER MAIN AND OTHER UNDERGROUND INSTALLATIONS.

SEE NOTE A

LIMIT OF PAVEMENT OVERLAY

TBM= 4.360D
"+" cut in bolt over main outlet elev.=45.20'

ELECTRICAL JUNCTION BOXES MOUNTED TO POST (SEE DETAIL ON DWG E–8)

SEE NOTE B

3–#2, 1–#16 OR; 3–3"C; 1–3"C SPARE

TO PANEL P

NEW EOP

1) NEW WELL #4R MOTOR FEEDER 3–#2, 1–#6; 2"C TO NEW DISC. IN WELL #4R/5 BUILDING.
2) 1–2/C#16 T.S.; 1" RGC WELL LEVEL SENSOR TO PLC.

NEW BUILDING FF=44.6

cb #1236
rim=43.7'
(1226) 12" hdpe=41.3'

2–IN GROUND PULL BOXES
1–POWER
1–CONTROL
SEE DETAIL ON DWG E–6

JOHNSON'S CREEK

DOVER
MADBURY

TOWN LINE

APPROXIMATE FLOOD ZONE LINE PER FIRM PANEL

RECONSTRUCTED GRAVEL ROAD (TYP.)

FEMA FLOOD ZONE X
FEMA FLOOD ZONE X

15' BUILDING SETBACK

BP= 100+00.00

100+00

101+00

102+00

103+00

104+00

100+75

BOLLARD (TYP.)

ELECTRICAL JUNCTION BOXES MOUNTED TO POST (SEE DETAIL ON DWG E–8)

NEW EDGE OF GRAVEL

POWER– WELL #5: 3–1/0, 1–#2 IN ONE OF THE 4" DUCTS.
CONTROLS– 1–2/C #16T.S. (WELL LEVEL TRADUCER)
IN ONE OF THE 2" RGC DUCTS.

PROPOSED APPROX. LOCATION OF ELECTRICAL PULL BOXES. SEE "E" DWGS. (TYP. OF 2 PER LOCATION)

ELECTRIC DUCT BANK
2–4"C (POWER AND SPARE)
2–2" RGC (SIGNAL AND SPARE)
(TYP.)

TAX MAP 10, LOT 12

A CONTRACTOR SHALL CLEAN SILT FROM EXISTING CONDUITS FROM FINISHED WATER PUMP STATION TO WELL #4 BUILDING. SEE BID ALLOWANCE.

B NEW CONCRETE ENCASED DUCTS 18" BELOW GRADE.
POWER; 3–500KcMIL, 1–#2, 4"C
3–#2, 1–#6Gr; 2"C
1–4" SPARE
CONTROL; 6–#14, 2–2/C #16T.S. 1–2"C
FIBER OPTIC CABLE 1–3"C

NOTE:
1. 20" PCCP RAW WATER MAIN SHOWN IS FROM A COMBINATION OF WTP DRAWINGS, RECORD DRAWINGS, AND FIELD LOCATIONS BY THE CITY. CONTRACTOR TO FIELD VERIFY ANY WORK NEAR THE EXISTING PIPE.

ELECTRICAL BASE PLAN TAKEN FROM UNDERWOOD ENGINEERS DRAWING C–4

20 0 20 40
SCALE: 1 INCH = 20 FT.

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WELL #5 OVERALL SITE PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE
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PORTSMOUTH, NEW HAMPSHIRE

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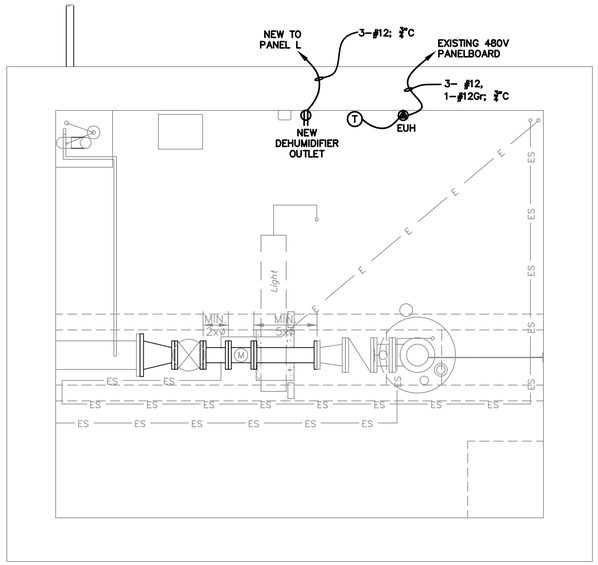
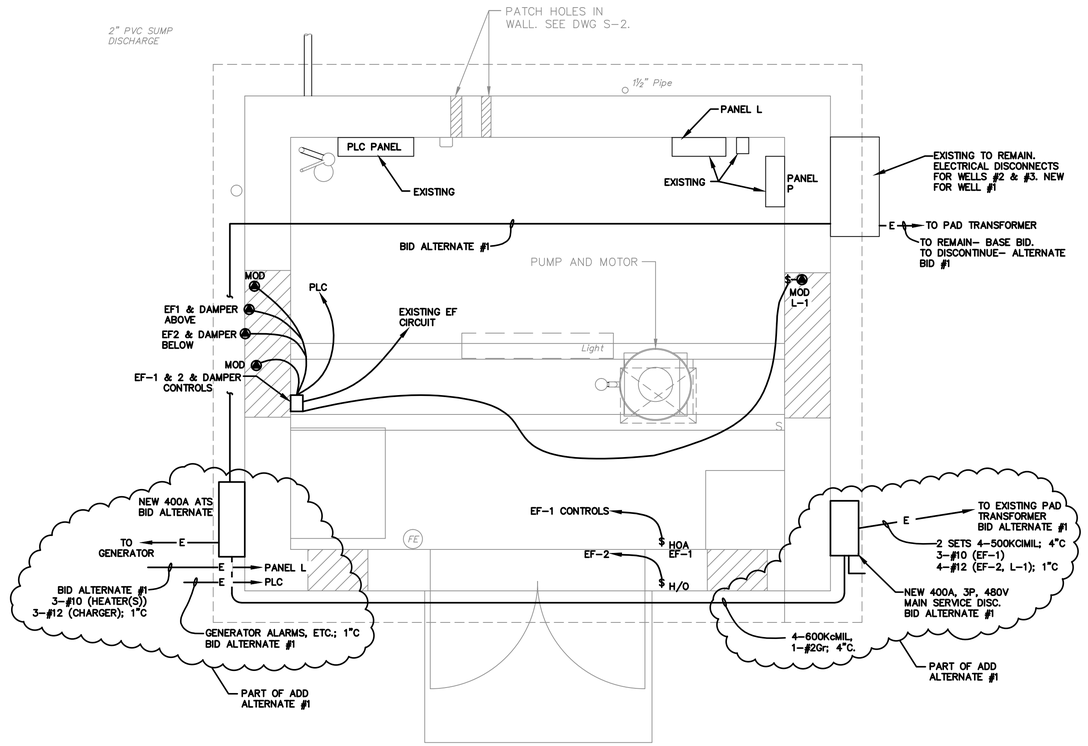
DWG NO	SHEET
ES–2	38 OF 47

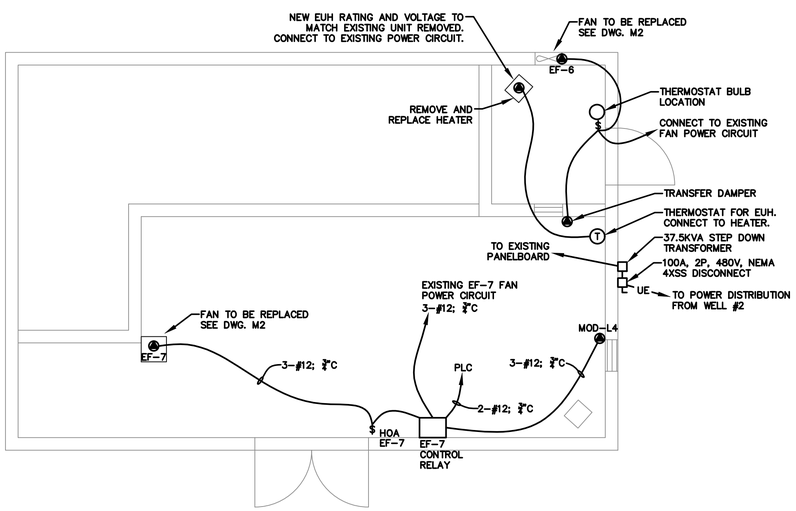


WELL #2 LOWER LEVEL PLAN
SCALE: 1/2"=1'-0"

WELL #2: EXISTING ELECTRICAL IS TO REMAIN "AS-IS" EXCEPT FOR NEW EUH- LOWER LEVEL AND NEW EXHAUST FANS AND DAMPERS. PROVISIONS AND MODIFICATIONS TO ADD STAND BY GENERATOR ARE ALL BID ALTERNATE ITEMS. PROVIDE 1-1P, 20A C/B IN EXISTING PANEL L FOR DEHUMIDIFIER RECEPTACLE.



WELL #2 FIRST FLOOR PLAN
SCALE: 1/2"=1'-0"



WELL #1 BUILDING PLAN
SCALE: 1/4"=1'-0"

ELECTRIC UNIT HEATER SCHEDULE

WELL #1:	QMARK, KW TO MATCH EXISTING, VOLTAGE TO MATCH EXISTING, WITH BUILT IN DISCONNECT FOR POWER, WALL MOUNTING BRACKET, AND WITH NEMA 4X ENCLOSED BULB AND CAPILLARY TYPE THERMOSTAT WITH STAINLESS STEEL CAPILLARY AND BULB. CAPILLARY LENGTH AS REQUIRED BUT NOT LESS THAN 72 INCHES.
WELL #2 AND #3:	QMARK, 3KW MINIMUM, 480V, 3PH, 60HZ (OR TO MATCH VOLTAGE OF EXISTING UNIT BEING REMOVED), WITH REMOTE THERMOSTAT OPTION, OPTIONAL WALL MOUNTING BRACKET, AND BUILT IN DISCONNECT FOR POWER. (ONE UNIT REQUIRED AT EACH LOCATION. EQUIVALENT UNITS MANUFACTURED BY CHROMALOX, BERKO OR MARKEL WILL BE ACCEPTABLE.

0 1' 2' 4' 8'
SCALE: 1/2" = 1'-0"

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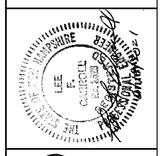

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WELLS #1 & #2 PLAN VIEWS
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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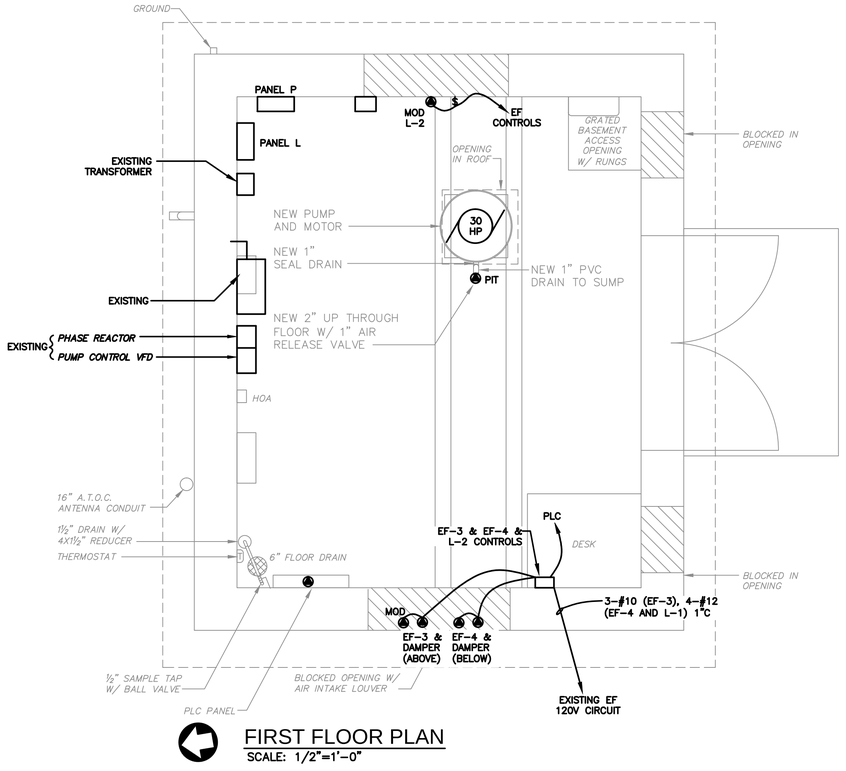
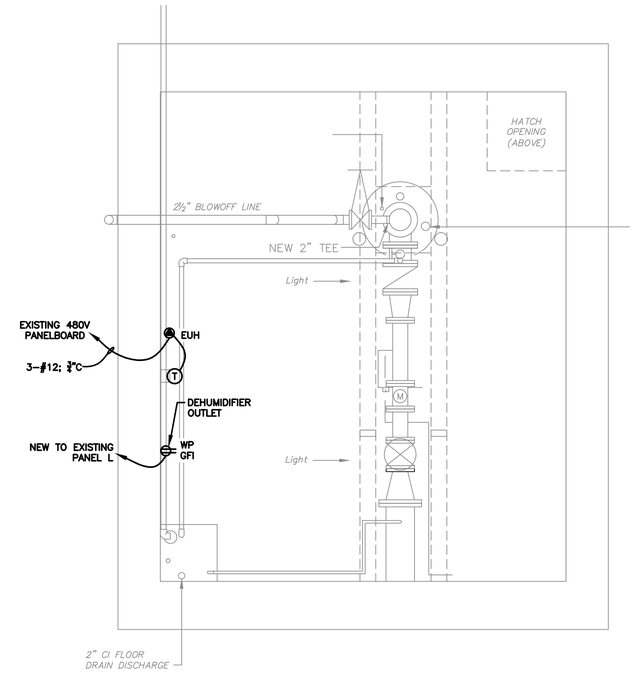
DWG NO E-1
SHEET 39 OF 47



FIRST FLOOR PLAN
SCALE: 1/2"=1'-0"



LOWER LEVEL PLAN
SCALE: 1/2"=1'-0"

SEE DRAWING E-1 FOR ELECTRIC UNIT HEATER SCHEDULE

WELL #3 EXISTING ELECTRICAL IS TO REMAIN "AS-IS" EXCEPT FOR NEW EUH-LOWER LEVEL AND NEW EXHAUST FANS AND DAMPERS. PROVIDE 1-1P, 20A C/B IN EXISTING PANEL L FOR DEHUMIDIFIER RECEPTACLE.

0 1' 2' 4' 8'
SCALE: 1/2" = 1'-0"

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LEE F. CARROLL NEW HAMPSHIRE 10/1/2021

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WELL #3 PLAN VIEW

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

ELECTRICAL DESIGN BY:
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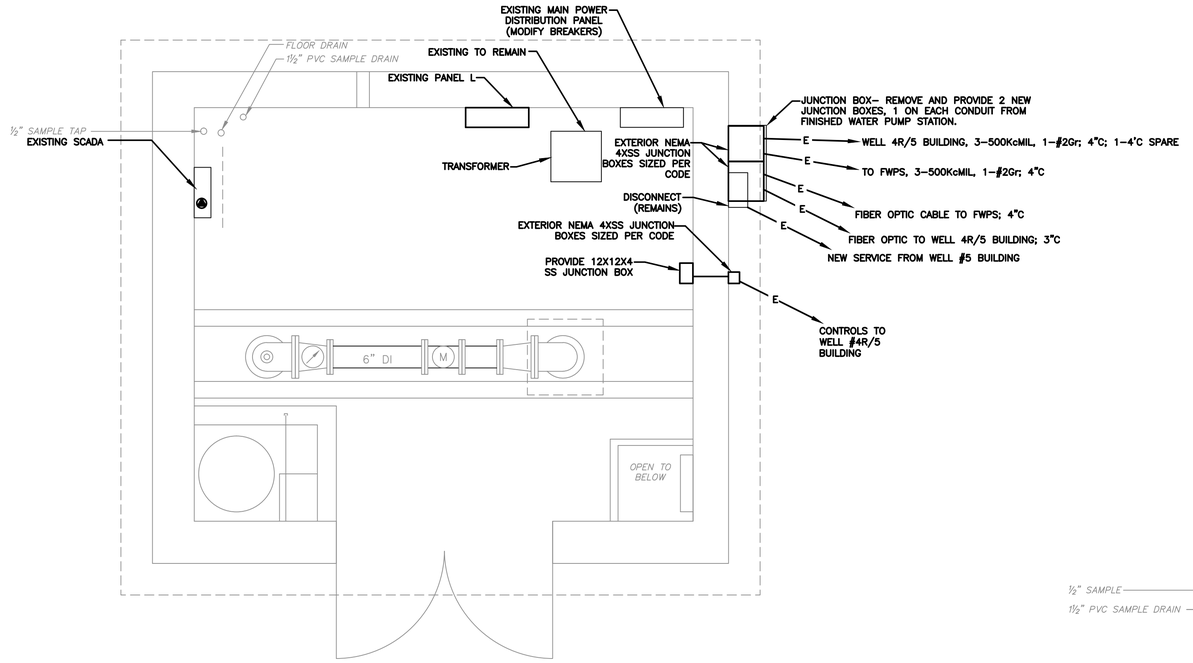
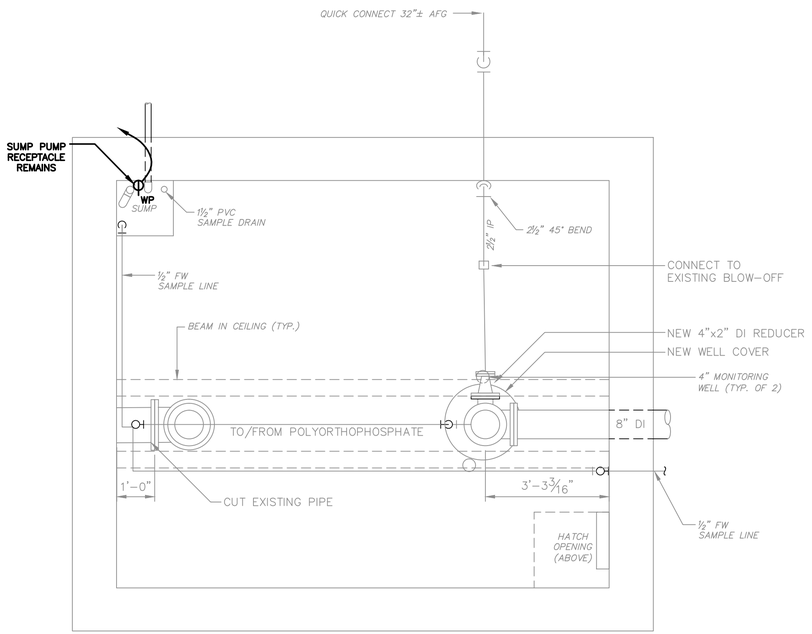
DWG NO E-2

SHEET 40 OF 47

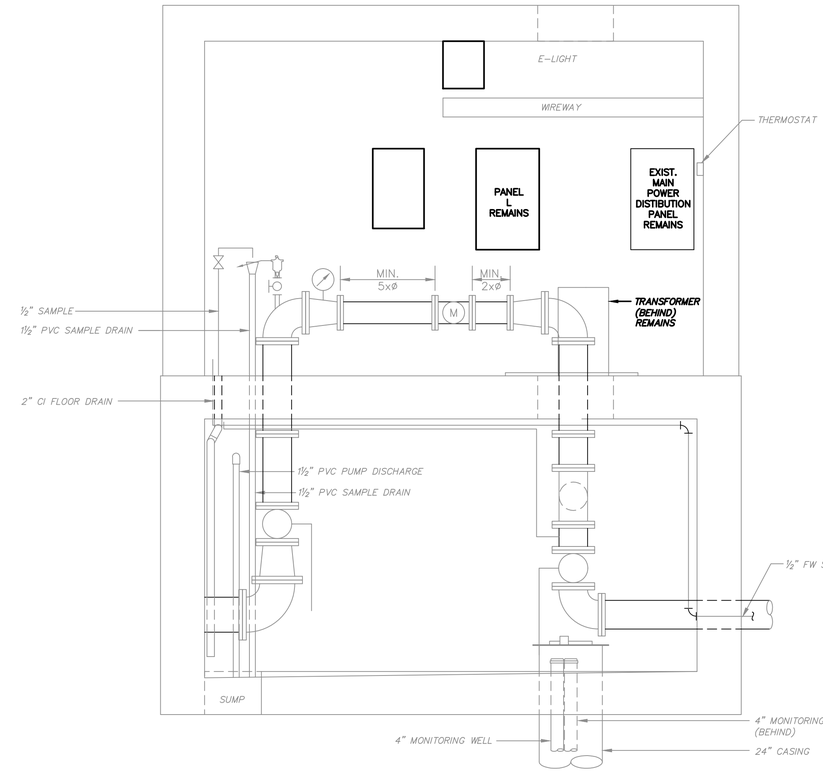


FIRST FLOOR PLAN
SCALE: 1/2"=1'–0"



(NO ELECTRICAL CHANGES – LOWER LEVEL)

LOWER LEVEL PLAN
SCALE: 1/2"=1'–0"



1/E–3 SECTION VIEW
SCALE: 1/2"=1'–0"

EXISTING 480V CIRCUITS AND WIRING FOR TRANSFORMER AND ELECTRIC HEATERS AND CONTROLS SHALL REMAIN IN SERVICE. EXISTING 120V CIRCUITS SHALL BE REUSED WHERE EQUIPMENT IS NOT RELOCATED OR REMOVED. (EX. SUMP PUMP, LIGHTING, GENERAL PURPOSE RECEPTACLES) EXISTING 120V CIRCUITS FOR REMOVED EQUIPMENT SHALL BECOME "SPARES" IN PANEL, WITH ASSOCIATED WIRING AND CONDUITS COMPLETELY REMOVED BY OWNER (EX. FLOW METER, CHEMICAL FEED SYSTEM, WELL PUMP, ETC.)

0 1' 2' 4' 8'
SCALE: 1/2" = 1'–0"

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	CONSTRUCTION Date 6/21/2021 By LEC	
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Project No. 1841
Dwg. ID 1841WELL4
Scale AS SHOWN

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WELL #4 PLAN VIEW
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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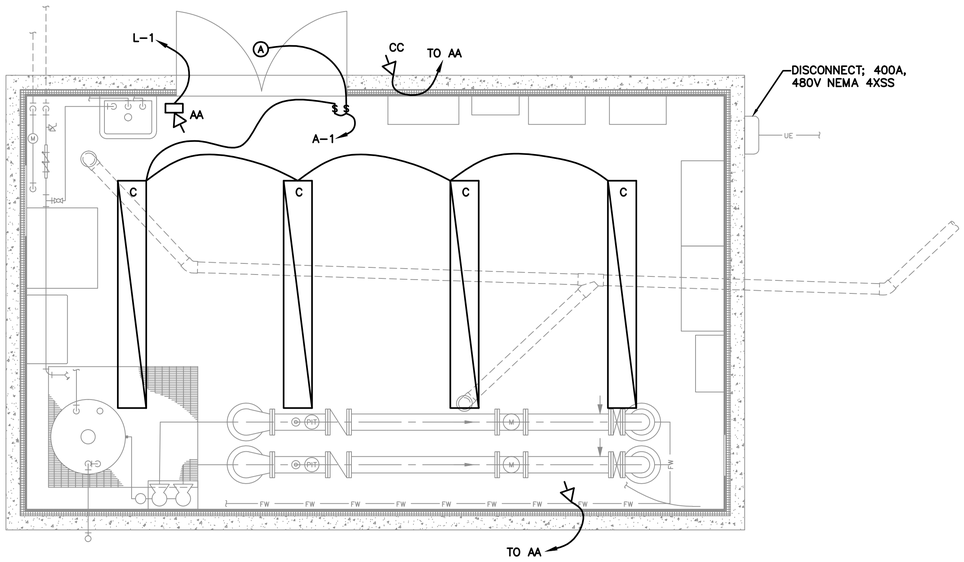
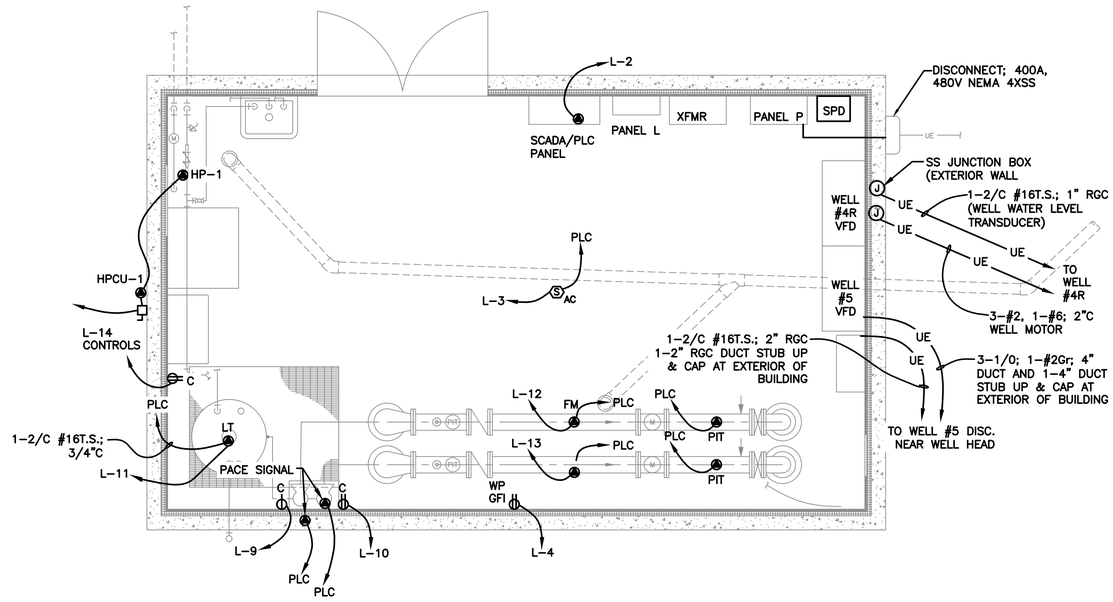
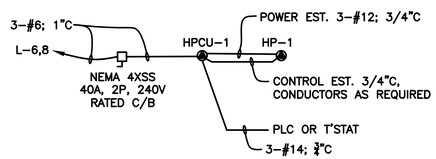


WELL #5 LIGHTING PLAN VIEW
SCALE: 3/8"=1'-0"



WELL #5 POWER PLAN VIEW
SCALE: 3/8"=1'-0"



TYPICAL INTERCONNECTION DIAGRAM
WELL #5 HVAC

0 1' 2' 4' 8'
SCALE: 3/8" = 1'-0"

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CONSTRUCTION	By		
Date 6/21/2021	LEC		
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Date		APP'D	
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WELL #4R/#5 BUILDING PLAN

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

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PORTSMOUTH, NEW HAMPSHIRE

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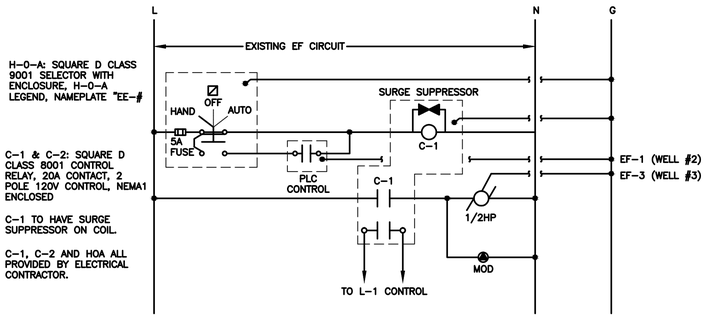
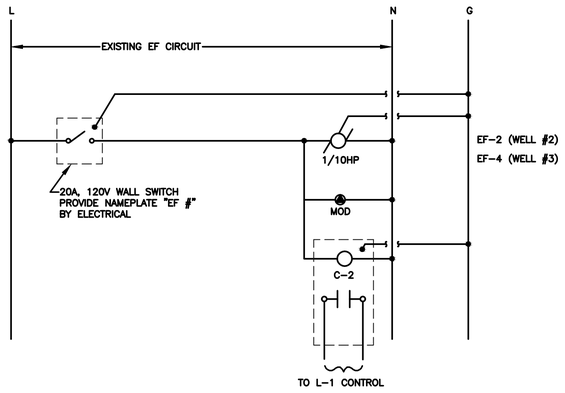
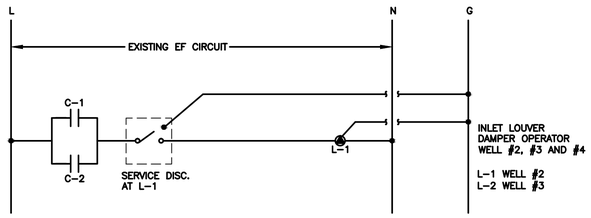




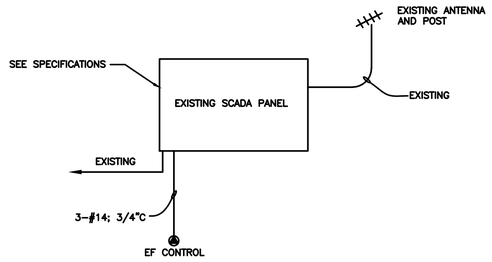


NOTE; PROVIDE NEMA 12 HINGED DOOR ENCLOSURE TO CONTAIN CONTACTORS C-1 AND C-2, WITH EF-1 AND EF-2 SWITCHES ON FRONT DOOR AND TERMINAL STOP FOR CONECTIONS

TYPICAL W/D FOR FANS & LOUVERS

WELLS #2 & #3

NTS

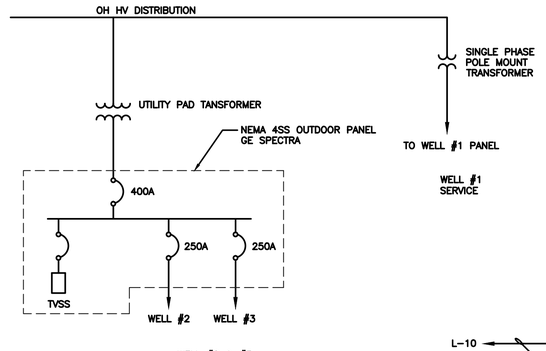


NEW CONNECTIONS ONLY INDICATED

TYPICAL SCADA INTERCONNECTIONS

WELLS #2 & #3

NTS

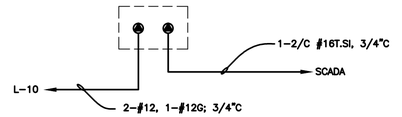


WELL #2 & #3 DISTRIBUTION

APPARENT EXISTING ELECTRICAL SERVICES

WELLS #1, 2 AND 3

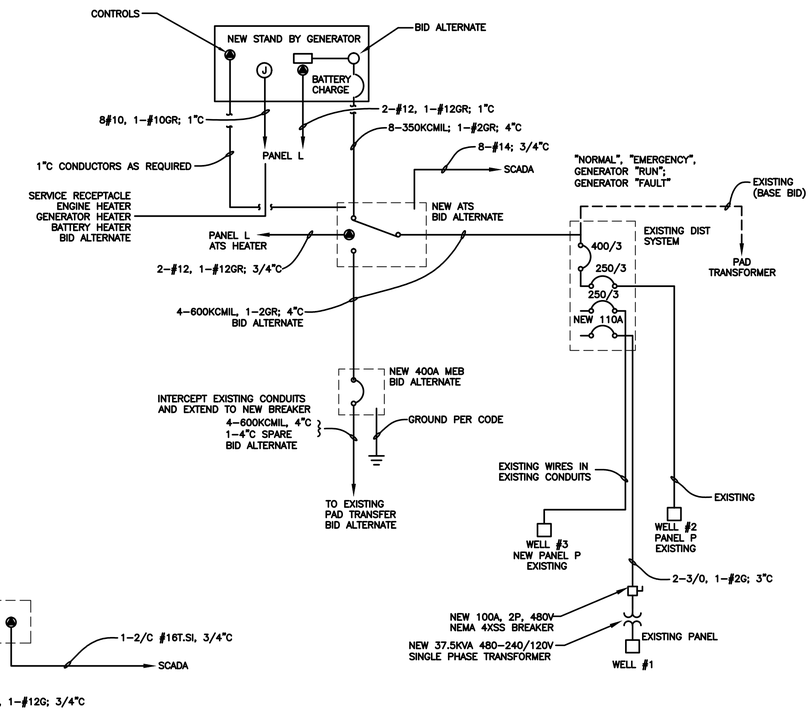
NTS



TYPICAL MAGNETIC FLOW METER INTERCONNECTIONS

WELL #5

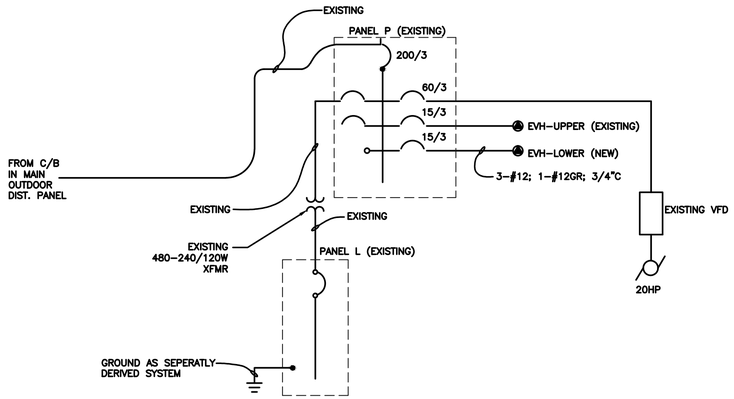
NTS



PROPOSED MODIFIED ELECTRICAL SERVICES

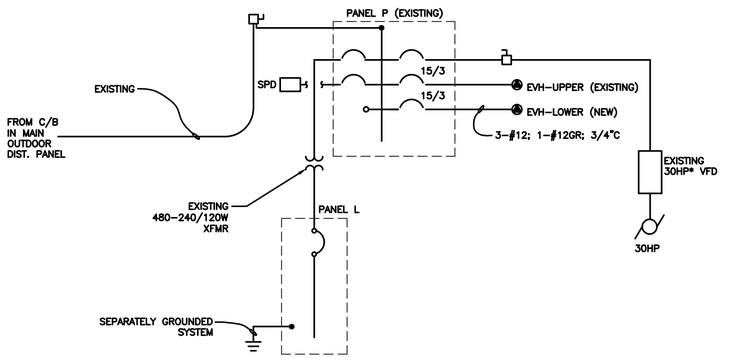
WELLS #1, 2 & 3

NTS



ONE LINE DIAGRAM WELL #2

N.T.S.

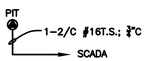


ONE LINE DIAGRAM WELL #3

N.T.S.

ELECTRICAL UNIT HEATER SCHEDULE (TYPICAL FOR WELLS 2, 3

BERKO HUH-348-SA, 3.3KW, 480V, 3PHASE, WITH BUILT IN DS-30 (POWER DISCONNECT SWITCH) AND SW (SUMMER/WINTER FAN SWITCH). PROVIDE WITH WB-1A (WALL MOUNTING BRACKET) AND WT-11 (LINE VOLTAGE WALL THERMOSTAT, 1POLE, 25A, WITH SHEET METAL MOUNTING BOX). UNIT IS TO HAVE BUILT IN CONTROL POWER TRANSFORMER AND CONTACTOR.



TYPICAL PRESSURE TRANSDUCER INTERCONNECTION

WELL #5

NTS

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LEE F. CARROLL NEW HAMPSHIRE 3911 REGISTERED PROFESSIONAL ENGINEER

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ELECTRICAL DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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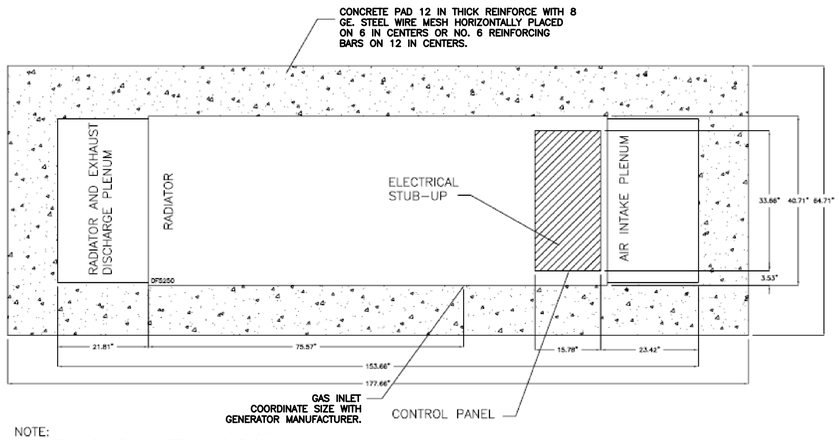
DWG NO E-5

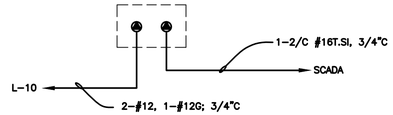
SHEET 43 OF 47



TYPICAL GENERATOR BASE DETAIL - WELL #2- BID ALTERNATE

COORDINATE ACTUAL SIZE WITH GENERATOR MANUFACTURER

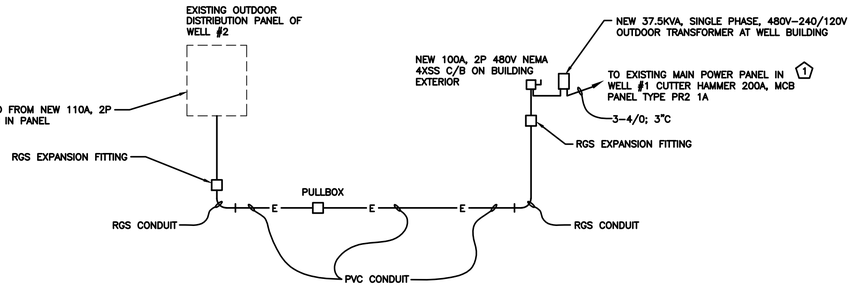
N.T.S.



TYPICAL MAGNETIC FLOW METER INTERCONNECTIONS

WELLS #4R AND #5

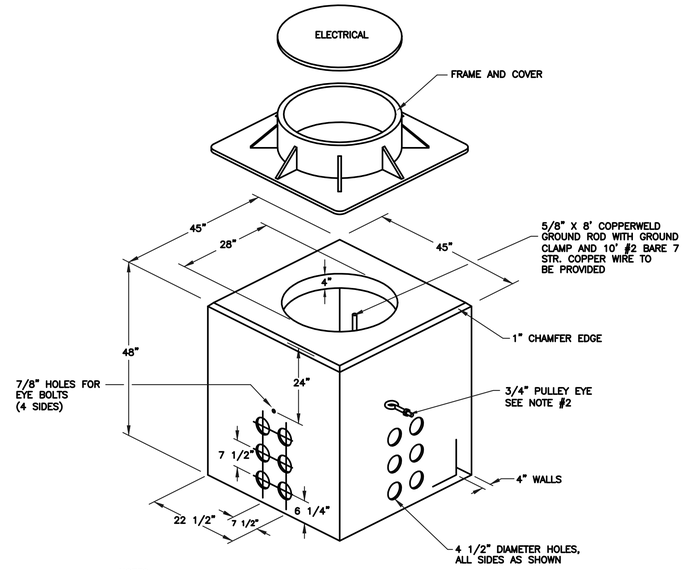
NTS



NOTE:
THE EXISTING CAPABILITY OF CONNECTING A PORTABLE GENERATOR TO THE EXISTING DEDICATED CIRCUITS IS TO BE RETAINED.

NEW POWER SERVICE, WELL #1

N.T.S.



NOTES:

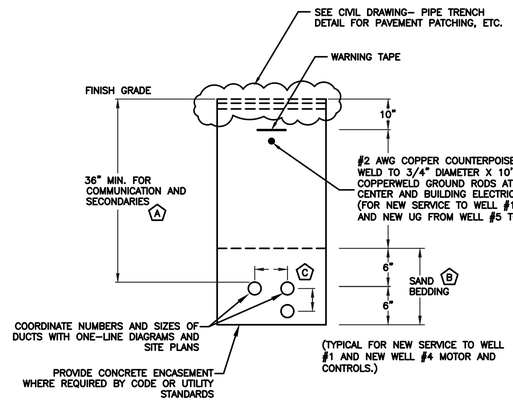
1. CONCRETE TO BE 4000 PSI HIGH EARLY STRENGTH AND VIBRATOR COMPACTED.
2. INSTALL GALVINIZED PULLING EYES, ONE ON EACH WALL (4) 3/4" EYES.
3. CONDUIT OPENING TO HAVE 4" BELL ENDS FLUSH WITH INSIDE WALL.
4. NO MANHOLE SHALL BE BURIED DEEPER THAN 18" BELOW FINISHED GRADE.

SUPPLIER & CATALOG #
FRUEN FE-2A-48
FRUEN FE-2A-36
LINHARES 6-2
ACME PRECAST

ELECTRICAL PULL BOX

WELL #1 POWER & WELL #5 POWER

N.T.S.



DITCH DETAIL

N.T.S.

A MIN 18" TO TOP OF CONDUITS WHERE CROSSING WATER TRANSMISSION MAIN.

B CONCRETE ENCASE CONDUITS BETWEEN WELL #4 AND WELL 4R/5 BUILDINGS AND BETWEEN WELL #2 AND WELL #1 BUILDINGS AND AT WETLAND CROSSING NEAR WELL #5.

C PROVIDE CONDUIT SEPARATIONS OF NOT LESS THAN 12" BETWEEN POWER AND CONTROL AND STANDARD PER MANUFACTURED SEPARATORS BETWEEN POWER CONDUITS.

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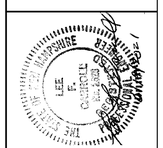

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DETAILS AND PANELS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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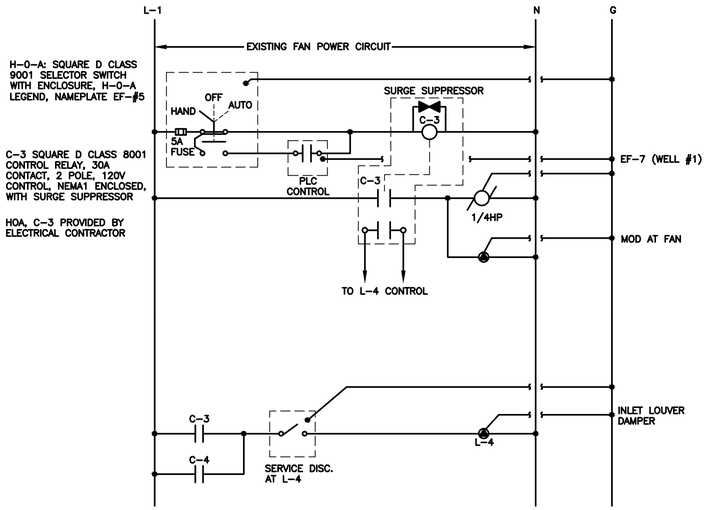
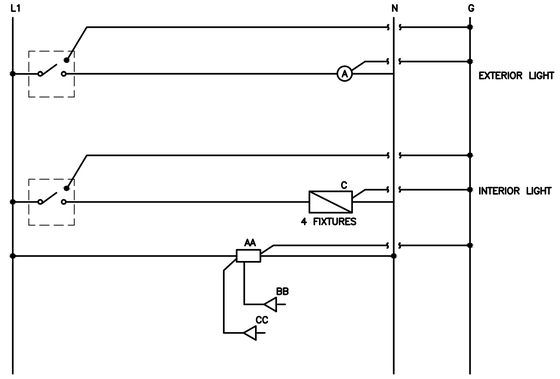
DWG NO E-6

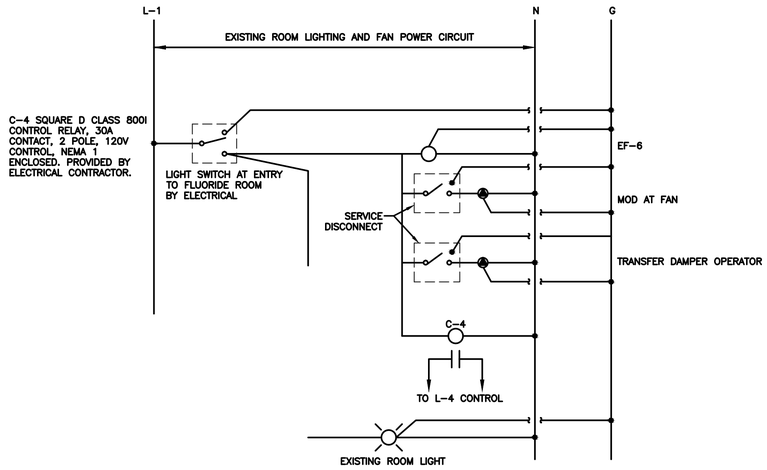
SHEET 44 OF 47



TYPICAL W/D FOR FAN EF-7 AND LOUVER L-4 WELL #1



LIGHTING DIAGRAM-WELL #5



TYPICAL W/D FOR FAN EF-6, WELL #1

LIGHT FIXTURE SCHEDUAL - WELLS # 2 AND #3			
TYPE	FIXTURE MAKE / MODEL	LAMPING	MOUNTING
A	PHILIPS GSM 7T WITH PCB1	LED-INCLUDED	REMOVE EXISTING AND MOUNT NEW
C	LITHONIA T ZLIN-L96-6000LM-FST-MVOLT-40K, 80CRI-WH	LED-INCLUDED	CEILING SURFACE
AA	HIGH-LIGHTS RL-11-5X	2-12W HALOGEN	WALL 12" BELOW CEILING
BB	HIGH-LIGHTS 928-G-6	2-12W HALOGEN	WALL 12" BELOW CEILING
CC	HIGH-LIGHTS 928-G-6	2-12W HALOGEN	FIELD LOCATE ABOVE ENTRY DOOR

LEGEND

	LED LIGHT FIXTURE
	LED LIGHT FIXTURE
	EMERGENCY LIGHT FIXTURE - REMOTE HEAD
	EMERGENCY LIGHT FIXTURE - BATTERY UNIT WITH HEADS
$	SINGLE POLE SWITCH- 48" AFF
T	THERMOSTAT 60" AFF
	DUPLEX (DOUBLE) 20A, 125 RECEPTACLE - 24" AFF
	SIMPLEX (SINGLE) 20A, 125 RECEPTACLE - 24" AFF
	CONNECTION TO FIXED EQUIPMENT
	DISCONNECT SWITCH OR C/B - (AS NOTED)
S AC	AC SMOKE DETECTOR
AFF	ABOVE FINISHED FLOOR
EUH	ELECTRICAL UNIT HEATER
MOD	MOTOR OPERATED DAMPER
L-1	LOUVER (#)
EF	EXHAUST FAN
LS	LEVEL SENSOR-WELL LEVEL
FS	FLOATSWITCH
VFD	VARIABLE FREQUENCY DRIVE
SCADA	SYSTEM CONTROL AND DATA AQUISITION
ATS	AUTOMATIC TRANSFER SWITCH
XFMR	TRANSFORMER
GFI	GROUND FAULT CIRCUIT INTERRUPTER
WP	WATERPROOF
PIT	PRESSURE INDICATING TRANSMITTER
EWH	ELECTRIC WATER HEATER
RGC	RIGID GALVANIZED CONDUIT

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ELECTRICAL DETAILS

MADBURY WELLS #2, #3, #4, & #5 UPGRADE

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SHEET 45 OF 47

PANEL DIAGRAM

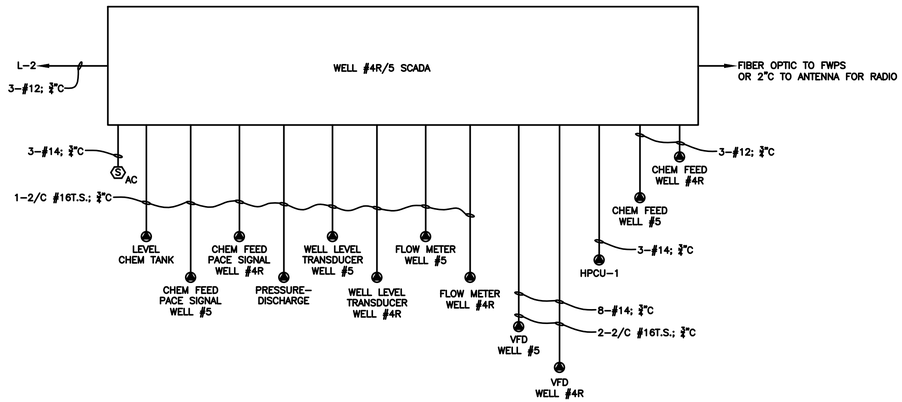
DIRECTORY	KVA LOAD A	KVA LOAD B	KVA LOAD C	AWG SIZE	CKT #	POLES	BRKR	A B C	BRKR	POLES	CKT #	AWG SIZE	KVA LOAD A	KVA LOAD B	KVA LOAD C	DIRECTORY
SPD				**	1	2	*		100	3	2	#2	18			
					3						4			18		WELL#4 VFD, 50HP
					5						6				18	
WELL #5 VFD, 50HP	18				7						8		12.5			
		18		#2	9	3	100		70	2	10	#4		12.5		25KVA XFMR
			18		11						12				1.7	
FEED TO WELL #4 DISC	7				13				15	3	14		1.7			SPARE
		7		#2	15	3	100				16			1.7		
			7		17						18				1.7	
SPACE					19				15	3	20		1.7			SPARE
SPACE					21						22			1.7		
SPACE					23						24					SPACE
SPACE					25						26					SPACE
SPACE					27						28					SPACE
SPACE					29						30					SPACE
SUB-TOTAL					NEUTRAL BUS / GROUND BUS											SUB-TOTAL

VOLTAGE: 480/277 VOLT, 3 PHASE, 4W, 60HZ	NOTE:	PANEL: P
MAIN BREAKER: 300A		
MOUNTING: SURFACE		LOCATION: WELL #5
SC RATING: 35,000 AIC MINIMUM	TOTAL KVA: 164	
NOTES: *PROVIDE WITH HANDLE LOCKS **RATING RECOMMENDED BY SPD MFGR.		FEEDER: 3-500KMIL, 1-#2Gr; 4"C

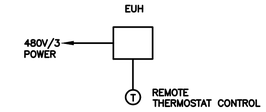
PANEL L -WELL #5 - SURFACE MOUNTED
150AMP MCB, 240/120 VOLT, 1 PHASE, 3 WIRE, 60 HERTZ

CKT. NO.	NO. POLES	RATING	DESCRIPTION	LOAD
1	1	20*	LIGHTS	0.2
2	1	20*	SCADA EST	1.0
3	1	30*	SMOKE DETECTOR	2.0
4	1	20	DEHUMIDIFIER	0.5
5	1	20	SERVICE RECEPTACLE	
6,8	2	50	HPCU-1	5.0
7	1	15*	LOUVER L-5	0.5
9	1	20	WELL #4R CHEM FEED PUMP	0.5
10	1	20	WELL #5 CHEM FEED PUMP	0.5
11	1	15	ULTRASONIC LEVEL-CHEM TANK	
12	1	15	FM-WELL #4R	
13	1	15	FM-WELL #5	
14	1	20	SPARE	

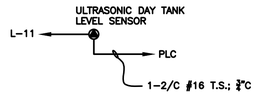
*PROVIDE HANDLE LOCK ON CIRCUITS



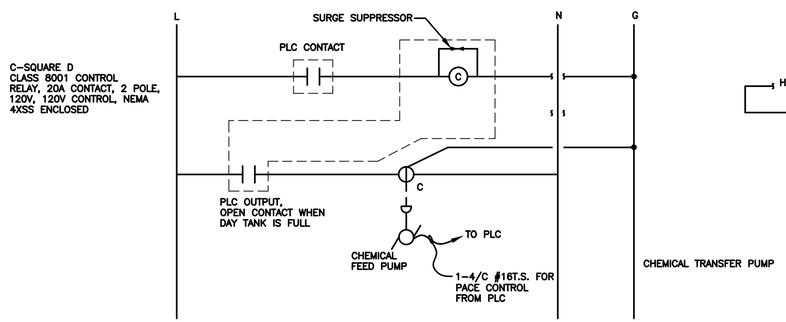
WELL #5 SCADA INTERCONNECTION DIAGRAM



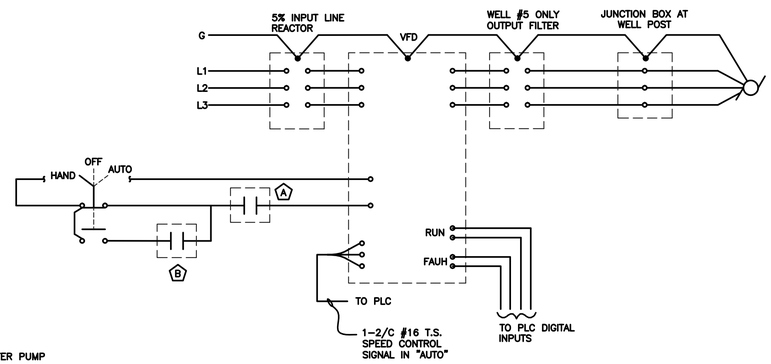
TYPICAL ELECTRIC UNIT HEATER INTERCONNECTIONS
WELLS #2, 3
N.T.S.



TYPICAL DAY TANK LEVEL SENSOR INTERCONNECTIONS
N.T.S.



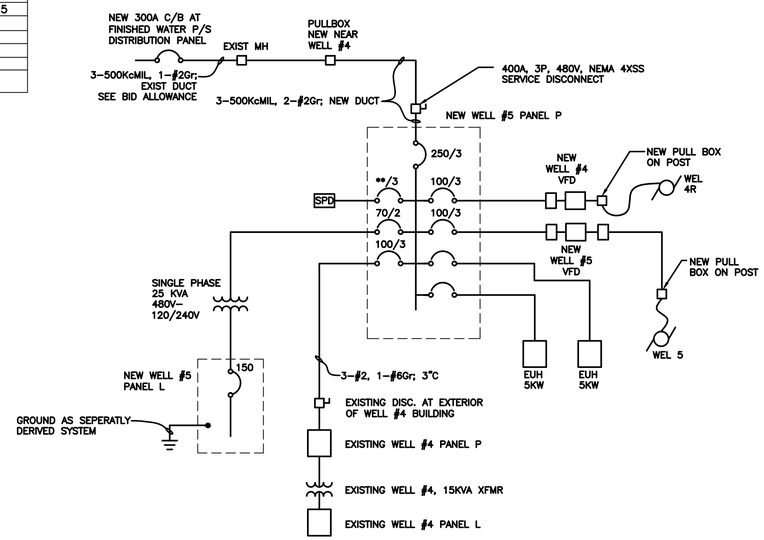
TYPICAL CHEM FEED PUMP W/D - WELL #5
N.T.S.
(2 UNITS)



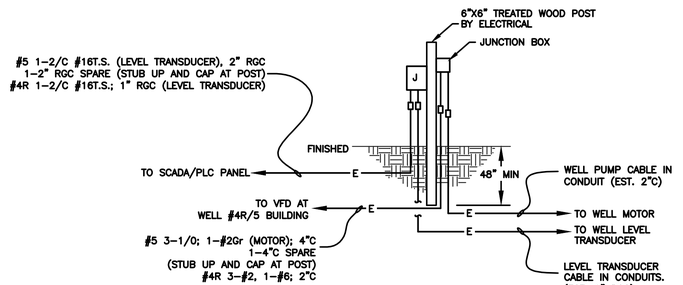
(A) PLC OUTPUT. N.C. OPENS ON LOW WELL WATER LEVEL TO STOP PUMP WHETHER IN "HAND" OR "AUTO" CONTROL

(B) PLC OUTPUT. N.O. CLOSES FOR AUTO OR REMOTE PUMP START. OPENS ON AUTO OR REMOTE PUMP STOP.

TYPICAL VFD INTERCONNECTION DIAGRAM



ONE LINE DIAGRAM WELL #5 WITH FEEDER TO WELL #4
N.T.S.



TYPICAL POST DETAIL AT WELL #4R & #5
N.T.S.

NOTE: POST AT WELL #5 AS SHOWN.
CONDUIT AND WIRE SIZES CHANGE FOR WELL #4R.
SEE ONE-LINE DIAGRAM AND SITE PLAN.

ISSUE FOR	By	Date
APPROVAL	LEC	6/14/2021
CONSTRUCTION	LEC	6/21/2021
RECORD DRAWING		Date

NO.	REVISIONS	APP'D

Drawn/Chk.
Designed
Checked
Approved
Date JUNE 14, 2021
Book No. 1841
Project No. 1841WELL2
Dwg. ID AS SHOWN
Scale AS SHOWN

LEE F. CARROLL NEW HAMPSHIRE

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

WELL #4R/5 DETAILS AND PANELS
MADBURY WELLS #2, #3, #4, & #5 UPGRADE
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

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DWG NO E-8

SHEET 46 OF 47

| DESCRIPTION | | | | FUNCTION | HARDWARE | | | | | | | | | | | | SOFTWARE | | | | | | | | | | | |