CONTRACT DRAWINGS

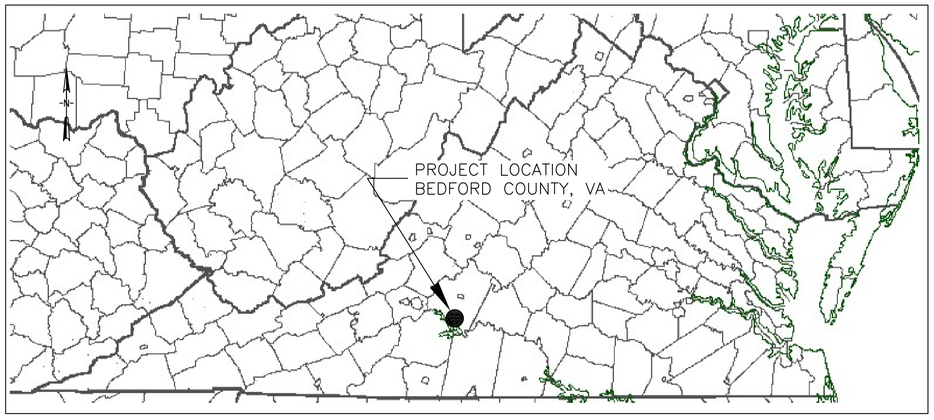
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WATER TREATMENT PLANT EXPANSION

PROJECT NO. 2003 - 028

BEDFORD COUNTY, VIRGINIA

2004

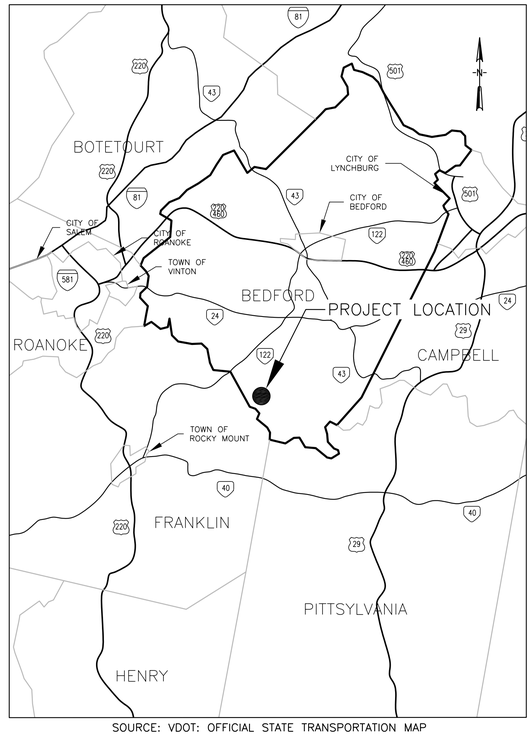


LOCATION MAP

NOT TO SCALE

LIST OF CONTRACT DRAWINGS (2)

SHEET NO.	DWG. NO.	TITLE
2	G-2	SITE LOCATION, ABBREVIATIONS, SYMBOLS NOTES & LEGENDS
3	G-3	EROSION & SEDIMENT CONTROL NOTES LEGEND & DETAILS
4	D-1	SITE DEMOLITION PLAN
5	D-2	RAW WATER PUMP STATION DEMOLITION PLAN
6	C-1	RAW WATER PUMP STATION ELECTRICAL BUILDING SITE PLAN & DETAILS
7	C-2	YARD PIPING & SITE PLAN
8	C-3	GRADING PLAN & SITE LAYOUT
9	C-4	YARD PIPING, STORM DRAIN DETAILS & CALCULATIONS
10	C-5	YARD PIPING CROSS SECTIONS & MISCELLANEOUS DETAILS
11	A-1	PLANS & ELEVATIONS
12	A-2	WALL SECTIONS
13	A-3	DETAILS & SCHEDULES
14	A-4	HEAD, SILL & JAMB DETAILS
15	A-5	RAW WATER PUMP STATION ELECTRICAL BUILDING PLANS, ELEVATIONS & DETAILS
16	S-1	FOUNDATION & ROOF FRAMING PLANS
17	S-2	SECTIONS & DETAILS
18	S-3	STANDARD STRUCTURAL DETAILS
19	M-1	RAW WATER PUMP STATION MECHANICAL
20	M-2	RAW WATER FLOWMETER & STRAINER MECHANICAL LAYOUT, SECTIONS, DETAILS, & FILTERED WATER FLOWMETER LAYOUT
21	M-3	MECHANICAL FLOOR PLAN & CROSS SECTION
22	M-4	MECHANICAL SECTIONS & DETAILS
23	M-5	MECHANICAL SECTIONS & DETAILS
24	M-6	EFM TANK SECTIONS & DETAILS
25	M-7	CHEMICAL FEED SYSTEM & BACKWASH RECOVERY TANKS SECTIONS & DETAILS
26	M-8	MISCELLANEOUS MECHANICAL DETAILS
27	M-9	CHEMICAL FEED SYSTEM, INSTRUMENTATION & SAMPLING DETAILS
28	H-1	HVAC PLANS & DETAILS
29	P-1	PLUMBING PLAN
30	P-2	CARRIER PIPE PLUMBING PLAN & DETAILS
31	E-1	ELECTRICAL LEGEND, ABBREVIATIONS, & SYMBOLS
32	E-2	RAW WATER PUMP STATION PLANS, SCHEDULES & DIAGRAMS
33	E-3	ONE LINE DIAGRAMS & ELECTRICAL DETAILS
34	E-4	POWER, CONTROL & LIGHTING PLANS
35	E-5	CONDUIT RISER DIAGRAM
36	E-6	ELECTRICAL SCHEDULES
37	I-1	PROCESS & INSTRUMENTATION DIAGRAM



SOURCE: VDOT: OFFICIAL STATE TRANSPORTATION MAP

VICINITY MAP

NOT TO SCALE

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6-21-04
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REVISION 1: 6/18/04 VDH COMMENTS

LEGEND

ITEM	APPEARANCE
EXISTING 5' CONTOUR	—855—
EXISTING 1' CONTOUR	—853—
EXISTING WATERLINE	—CW—CW—
EXISTING DRAINAGE LINE	—D—D—
EXISTING SANITARY SEWER AND LATERALS	—EX. SS—
EXISTING FORCE MAIN	—EX. FM—
EXISTING GAS LINE	—EX. GAS—
EXISTING TV CABLE	—EX. TV—
EXISTING UNDERGROUND TELEPHONE/ELECTRIC	—UT—
EXISTING UNDERGROUND FIBER OPTIC CABLE	—UFO—
EXISTING UNDERGROUND ELECTRIC	—UE—
EXISTING OVERHEAD TELEPHONE/ELECTRIC	—OHE—
EXISTING PROPERTY LINE	
EXISTING FENCE OR GUARD RAIL	—X—X—X—X—
EXISTING EDGE OF PAVEMENT	
PROPOSED 5' CONTOURS	—855—
PROPOSED 1' CONTOURS	—853—
PROPOSED WATER MAIN	
PROPOSED WATER SERVICE	
APPROXIMATE STREET RIGHT-OF-WAY	
TEMPORARY EASEMENT	T.E.
PERMANENT EASEMENT	P.E.
EXISTING FIRE HYDRANT	
EXISTING WATER VALVE	
EXISTING POLE WITH GUY	
EXISTING WOODS AND/OR BRUSH	
EXISTING HEMLOCK TREE	
EXISTING FUR TREE	
EXISTING WHITE PINE TREE	
EXISTING HOUSE OR BUILDING	1461
PROPOSED WATER VALVE	
PROPOSED 11-1/4° BEND	
PROPOSED 22-1/2° BEND	
PROPOSED 45° BEND	
PROPOSED 90° BEND	
PROPOSED TEE	
PROPOSED WYE	
PROPOSED REDUCER	
EXISTING BASELINE CONTROL POINT	TS-602SNS
SHEET NO.	C-2
PROPOSED	
EXISTING	
STORM SEWER STRUCTURES & FITTINGS	SD
CLEAN OUT	
PROPOSED CONTROL POINTS	3001
PROPOSED CONTROL POINTS	—GAS—GAS—
PROPOSED STORM DRAIN PIPING	—SD—SD—
PROPOSED FENCE	

ABBREVIATIONS

ADDL	ADDITIONAL
ARV	AIR RELEASE VALVE
ALUM	ALUMINUM
AC	ASBESTOS CEMENT
BSMT	BASEMENT
BM	BENCHMARK OR BEAM
BIT	BITUMINOUS
BOV	BLOW-OFF VALVE
BLDG	BUILDING
CIP	CAST IRON PIPE
CB	CATCH BASIN
℄	CENTERLINE
C.V.	CHECK VALVE
CLR	CLEAR
CAVV	COMBINED AIR RELEASE & VACUUM VALVE
CONC.	CONCRETE
CMU	CONCRETE MASONRY UNIT
CONT	CONTINUOUS
CMP	CORRUGATED METAL PIPE
CSK	COUNTERSUNK
DIP	DUCTILE IRON PIPE
DWG	DRAWING
EA	EACH
EF	EACH FACE
EW	EACH WAY
EOP	EDGE OF PAVEMENT
EL/ELEV	ELEVATION
FRP	FIBERGLASS REINFORCED PLASTIC
FH	FIRE HYDRANT
FIN	FINISH
FF	FINISHED FLOOR
FL/FLR	FLOOR
FTG	FOOTING
FM	FORCE MAIN
FND	FOUNDATION
GALV	GALVANIZED PIPE
G	GAS MAIN
G.V.	GATE VALVE
GRAV	GRAVEL
GP	GUIDE POST
HK	HOOK
HORIZ	HORIZONTAL
HDPE	HIGH DENSITY POLYETHLYENE
INV	INVERT
FIP	IRON PIN
ISO	ISOLATION
JT	JOINT
LP	LAMP POLE
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
MH	MANHOLE
MAS	MASONRY
MCJ	MASONRY CONTROL JOINT
MAX	MAXIMUM
MIN	MINIMUM
MON	MONUMENT
NIC	NOT IN CONTRACT
OC	ON CENTER
OPNG	OPENING
O.F.	OUTSIDE FACE
%	PERCENT GRADE
P.E.	PERMANENT EASEMENT
PE	POLYETHYLENE
PVC	POLYVINYL CHLORIDE
PP	POWERPOLE
ℙ	PROPERTY LINE
RCP	REINFORCED CONCRETE PIPE
REINF	REINFORCING
REQ'D	REQUIRED
ROW	RIGHT-OF-WAY
SANMH	SANITARY MANHOLE
SANSWR	SANITARY SEWER
SS	STAINLESS STEEL
STD	STANDARD
ST	STEEL
STMH	STORM MANHOLE
STMSWR	STORM SEWER
T.E.	TEMPORARY EASEMENT
THK	THICK
T&B	TOP AND BOTTOM
T/	TOP OF
TYP	TYPICAL
UNO/UON	UNLESS OTHERWISE NOTED
WL	WATERLINE
WW	WOVEN WIRE
WWF	WELDED WIRE FABRIC

GENERAL NOTES:

1) THE CONTRACTOR SHALL COORDINATE (WITH THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY STAFF) ALL ACTIVITIES INTERFERING WITH, AFFECTING, AND/OR IMPACTING PLANT OPERATIONS PRIOR TO COMMENCING THESE ACTIVITIES. THE CONTRACTOR SHALL COORDINATE SCHEDULING, SUBMITTALS, AND WORK WITH THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY STAFF TO ENSURE EFFICIENT AND ORDINARY SEQUENCE OF INSTALLATION OF INTERDEPENDENT CONSTRUCTION ELEMENTS. THE CONTRACTOR SHALL SCHEDULE ALL CONSTRUCTION ACTIVITIES WITH THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY STAFF.

2) THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION TO ELIMINATE THE POSSIBILITY OF ANY DISTURBANCE OR DAMAGE TO PUBLIC OR PRIVATELY OWNED UTILITIES, STRUCTURES, OTHER FACILITIES OR OBSTRUCTION RESULTING FROM HIS ACTIVITIES. TO THIS END, CONTRACTOR SHALL, AT NO ADDITIONAL COST TO THE OWNER, TAKE ALL MEASURES NECESSARY TO PROVIDE, AND SHALL BE SOLELY RESPONSIBLE FOR, TEMPORARY SUPPORT AND SHORING, ADEQUATE PROTECTION, AND MAINTENANCE OR CONTINUOUS OPERATION OF ALL UNDER AND ABOVE GROUND UTILITY SERVICES. THE CONTRACTOR SHALL CALL MISS UTILITY AT 1-800-552-7001 48 HOURS PRIOR TO DIGGING. ALL UTILITY TIE-INS ARE TO BE COORDINATED WITH THE APPROPRIATE PUBLIC OR PRIVATE UTILITY AUTHORITY BEFORE COMMENCING WORK ON EXISTING UTILITIES. THE CONTRACTOR SHALL SUPPLY ALL UTILITY COMPANIES WITH APPROVED PLAN COPIES FOR COORDINATION OF EXTENSION AND TIE-IN EFFORTS.

3) SITE CONDITIONS MAY NECESSITATE SLIGHT DEVIATIONS IN ALIGNMENT, GRADE, AND/OR LOCATION OF NEW FACILITIES FROM THE PLAN ALIGNMENT. THE CONTRACTOR SHALL CONSTRUCT THE NEW FACILITIES TO SUCH DEVIATIONS AS DIRECTED BY THE ENGINEER WITHOUT ADDITIONAL COST OR FINE TO THE OWNER. SHOULD PLAN DEVIATIONS BE REQUIRED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO UNDERTAKING ANY REVISION.

4) ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE CURRENT INTERNATIONAL BUILDING CODE AND/OR STATE AND LOCAL BUILDING CODES AS WELL AS THE CONSTRUCTION STANDARDS AND SPECIFICATIONS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION, VIRGINIA DEPARTMENT OF HEALTH, AND VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY.

5) THE CONTRACTOR SHALL MAINTAIN THE CONSTRUCTION AREA IN A SAFE AND ACCEPTABLE MANNER AND SHALL BE RESPONSIBLE FOR REMEDIATING ANY DAMAGES RESULTING FROM HIS FAILURE TO DO SO.

6) THE CONTRACTOR SHALL MAINTAIN LIMITS OF CONSTRUCTION WITHIN THE PROPERTY BOUNDARIES OR EASEMENTS AS INDICATED.

7) AN APPROVED SET OF PLANS SHALL BE KEPT ON THE SITE AT ALL TIMES.

8) ALL CONSTRUCTION DEBRIS SHALL BE CONTAINERIZED IN CONFORMANCE WITH THE VIRGINIA LITTER CONTROL ACT AND DISPOSED OF IN A MANNER AND LOCATION ACCEPTABLE TO THE GOVERNING JURISDICTION. AT LEAST ONE TRASH RECEPTACLE SHALL BE ONSITE DURING CONSTRUCTION.

9) GRADE STAKES SHALL BE SET FOR ROADWAY, CURB & GUTTER, CULVERTS, SANITARY SEWER, AND STORM SEWER.

10) CONTRACTOR SHALL MAINTAIN DRIVEWAY ACCESS AND MAIL SERVICE AT ALL TIMES.

11) CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE OR DISTURBANCE OF INDIVIDUAL PROPERTY CORNER MONUMENTS CAUSED BY CONSTRUCTION ACTIVITIES AND SHALL HAVE THEM REPLACED BY A LAND SURVEYOR LICENSED IN VIRGINIA.

12) CONTRACTOR IS RESPONSIBLE FOR REMEDIATING ANY DAMAGE THAT OCCURS DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF ANY LIVESTOCK, PETS AND/OR DOMESTICATED ANIMALS THAT ARE ENCOUNTERED AT THE PROJECT SITE.

13) FIELD SURVEY TO PROVIDE PLANIMETRIC, TOPOGRAPHIC MAPPING. TOPOGRAPHIC SITE MAPPING AND FIELD LOCATIONS AT THE WTP BUILDING & PROPERTY WAS PERFORMED BY LUMSDEN ASSOCIATES, P.C., ROANOKE, VIRGINIA IN JUNE 2003.

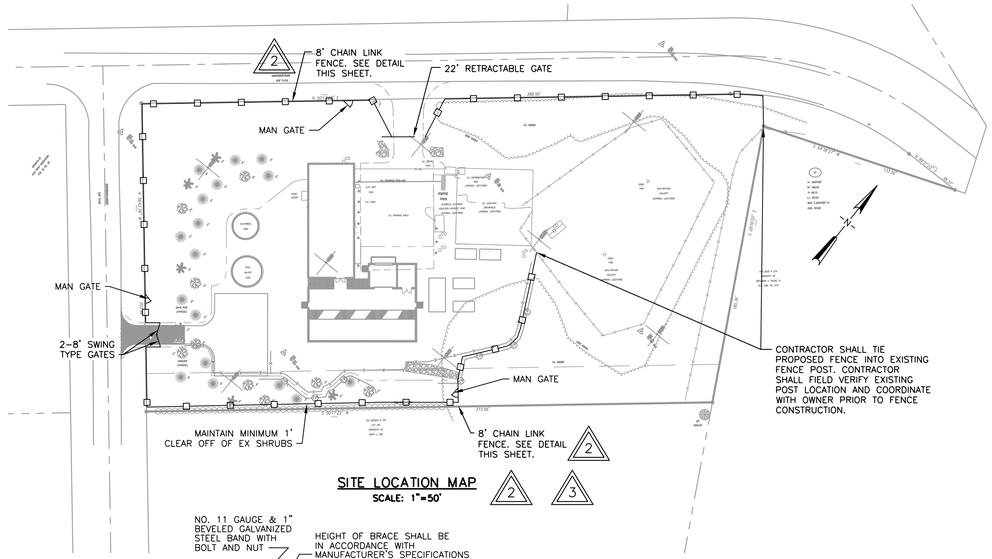
14) ALL EXISTING UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THESE PLANS ARE APPROXIMATE AND DO NOT REPRESENT ALL UNDERGROUND UTILITIES OR SERVICE LINES. CONTRACTOR IS RESPONSIBLE FOR VERIFYING EXACT LOCATION, DEPTH, SIZE, AND TYPE OF UTILITES SHOWN. PRIOR TO EXCAVATION, THE CONTRACTOR SHALL CONTACT THE PERTINENT UTILITY COMPANIES AND/OR UTILITY LOCATING SERVICES TO HAVE ALL UNDERGROUND UTILITIES LOCATED AND MARKED.

15) ALL PIPE, FITTINGS, AND APPURTENANCES SHALL BE RESTRAINED AND ANCHORED IN ACCORDANCE WITH BCPSA MASTER SPECIFICATIONS AND STANDARD DETAILS. THRUST RESTRAINTS ARE REQUIRED FOR ALL BENDS AND TEES. IF MECHANICAL JOINT RESTRAINT SYSTEMS ARE USED, INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS RELATED TO NUMBER OF JOINTS RESTRAINED.

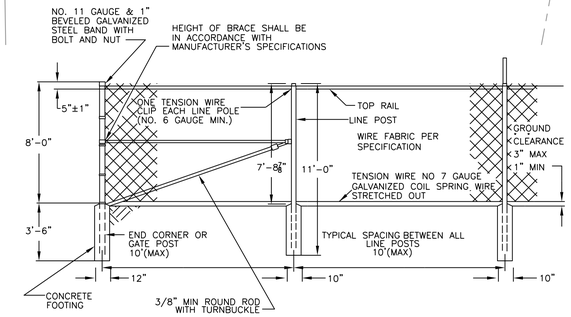
16) CULVERTS OR STORM DRAINS REMOVED OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

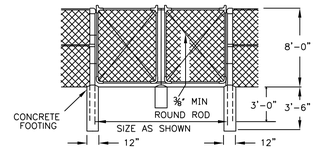
17) ALL DISTURBED AREAS SHALL BE RETURNED TO LIKE OR BETTER CONDITION WHETHER THEY ARE GRASSED, LANDSCAPED, GRAVELED OR OTHER. ANY DISTURBED PLANTINGS SHALL BE REPLACED BY LIKE SPECIES.

18) CONTRACTOR SHALL ADHERE TO THE LIMITS OF CONSTRUCTION AS SHOWN ON THESE PLANS. CONTRACTOR SHALL ACCESS OUTSIDE THE LIMITS OF CONSTRUCTION FOR THE CONSTRUCTION OF THE 8' CHAIN LINK FENCE AS SHOWN ON THESE PLANS. CONTRACTOR SHALL NOT IMPACT ANY ADJACENT PROPERTIES DURING FENCE CONSTRUCTION.

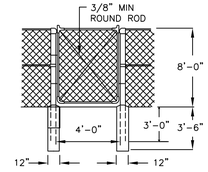


SITE LOCATION MAP
SCALE: 1"=50'

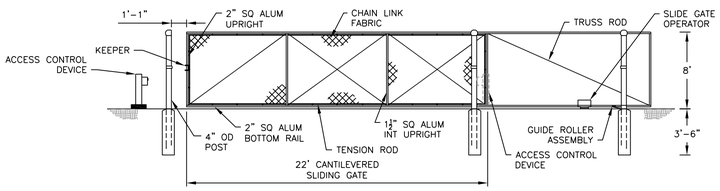




DOUBLE SWING GATE



MAN GATE



SINGLE CANTILEVERED RETRACTABLE GATE

LINE BRACE – SHALL BE USED WHEN VERTICAL ALIGNMENT CHANGES 15°. (MAX SPACING 500')
– SHALL BE USED AT FENCE END (AS SHOWN ABOVE) AND GATE LOCATIONS

CORNER BRACE – SHALL BE USED WHEN HORIZONTAL ALIGNMENT CHANGES 15° OR MORE
– SHALL BE AS DETAILED ABOVE WITH BRACING IN BOTH DIRECTIONS

CHAIN LINK FENCE INSTALLATION
NOT TO SCALE

x-REF: 20280GX1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Gen\

NOTES:
Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	BSR	7/04	WPJ	CMT	RRC	7/09/04
	REVISED PER OWNER COMMENTS					
2	BSR	6/04	WPJ	CMT	RRC	6/21/04
	REVISED PER OWNER & VDH COMMENTS					
1	BSR	11/03	WPJ	CMT	RRC	1/23/04
	FOR APPROVAL					
4	ISSUED FOR CONSTRUCTION					

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
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BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028
SITE LOCATION, ABBREVIATIONS, SYMBOLS, NOTES & LEGENDS

JOB NO.	20280	DRAWING	G-2	SHEET	2 OF 37

EROSION AND SEDIMENT CONTROL LEGEND

NO.	APPEARANCE		DESCRIPTION
3.02		CE	STONE CONTRUCTION ENTRANCE
3.05	—X—X—	SF	SILT FENCE
3.07		IP	INLET PROTECTION
3.18		OP	OUTLET PROTECTION
3.20		CD	ROCK CHECK DAM
3.30	TO	TO	TOPSOILING
3.31	TS	TS	TEMPORARY SEEDING
3.32	PS	PS	PERMANENT SEEDING
3.35	ML	ML	MULCHING
3.36	MULCH	%	SOIL STABILIZATION BLANKETS & MATTING
3.38	TP TP	TP	TREE PROTECTION

EROSION AND SEDIMENT CONTROL NOTES:

1) GENERAL: ALL EROSION CONTROL DEVICES AND PROCEDURES SHALL BE IN ACCORDANCE WITH ALL LOCAL REQUIREMENTS AND THE LATEST EDITION OF VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AS PUBLISHED BY THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION. COPIES OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND EROSION AND SEDIMENT CONTROL PLAN FOR THIS PROJECT SHALL BE KEPT AT THE PROJECT SITE AT ALL TIMES.

2) SILT FENCE: SILT FENCE SHALL BE USED TO PREVENT SEDIMENT LADEN RUNOFF FROM LEAVING THE SITE AND TO REDUCE THE VELOCITY OF THE STORM WATER. (VESCH STANDARDS AND SPEC. 3.05) SILT FENCE CHECKS SHALL BE PLACED IN DITCHES RECIEVING STORM WATER RUNOFF FROM THE AFFECTED WORK AREAS.

3) TREE PRESERVATION AND PROTECTION: PROTECT EXISTING TREES FROM INJURY DURING CONSTRUCTION ACTIVITIES TO ENSURE SURVIVIAL. TREE PROTECTION SHALL BE EFFECTIVE FOR EROSION AND SEDIMENT CONTROL

4) PERMANENT SEEDING: PERMANENT SEEDING SHALL BE USED TO STABILIZE DISTURBED AREAS. (VESCH STANDARDS) DISTURBED AREAS SHALL BE TOPSOILED AND STABILIZED WITH MULCH IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN AND SPECIFICATIONS FOR THIS PROJECT.

5) CONSTRUCTION: NO MORE THAN 500 LINEAR FEET OF TRENCH SHALL BE OPEN AT ONE TIME. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.

6) MAINTENANCE: ALL EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO EARTHMOVING. PERMANENT SEEDING THAT DOES NOT PRODUCE GOOD STRANDS OF GRASS SHALL BE RESEEDED. AREAS WHERE EROSION OCCURS MUST BE REGRADED AND RESEEDED AS QUICKLY AS POSSIBLE. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED AND REPAIRED AS NEEDED AFTER EACH RAINFALL EVENT. PUBLIC ROADS SHALL BE CLEANED ON A DAILY BASIS.

EROSION AND SEDIMENT CONTROL NARRATIVE:

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF SITE GRADING AND SITE PREPARATION FOR A PROPOSED WATER TREATMENT PLANT FOR THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY. IN ADDITION, PROPOSED WATER AND SEWER LINES SHALL BE CONSTRUCTED TO SERVICE THE TREATMENT PLANT. THE SITE IS LOCATED IN THE HIGH POINT COMMUNITY OF BEDFORD COUNTY, VIRGINIA, ACCESSED BY AN EXISTING PAVED PRIVATE DRIVE OFF STATE ROUTE 654. DISTURBED AREA IS APPROXIMATELY 0.5 ACRES.

EXISTING SITE CONDITIONS

THE PROPERTY HAS ACCESS THROUGH AN EXISTING PRIVATE DRIVEWAY. EXISTING ONSITE SLOPES ARE 1.5% TO 7% AND THE PROJECT AREA IS COVERED WITH A YARD GRASS.

SOILS:

EROSION AND SEDIMENT CONTROL MEASURES

STRUCTURAL PRACTICES

1. CONSTRUCTION ENTRANCE – 3.02 SHALL BE INSTALLED AS INDICATED TO REDUCE THE AMOUNT OF MUD TRANSPORTED ONTO PAVED PUBLIC ROADS BY THE CONTRACTOR.

2. SILT FENCE – 3.05 SHALL BE INSTALLED AS INDICATED TO DECREASE VELOCITY OF SHEET FLOWS & PREVENT SEDIMENT FROM LEAVING THE SITE.

3. STORM DRAIN INLET PROTECTION – 3.07 SHALL BE INSTALLED AS INDICATED TO PREVENT SEDIMENT FROM ENTERING STORM DRAINAGE SYSTEMS PRIOR TO PERMANENT STABILIZATION OF THE DISTURBED PROJECT AREA.

4. ROCK CHECK DAMS – 3.20 SHALL BE INSTALLED AS INDICATED TO REDUCE THE VELOCITY OF CONCENTRATED STORMWATER FLOWS THEREBY REDUCING EROSION OF A SWALE OR DITCH.

VEGETATIVE PRACTICES

1. TEMPORARY SEEDING – 3.31 SHALL BE INSTALLED AS INDICATED TO REDUCE EROSION & SEDIMENTATION BY STABILIZING DISTURBED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A PERIOD OF MORE THAN 30 DAYS.

2. PERMANENT SEEDING – 3.32 SHALL BE INSTALLED AS INDICATED TO REDUCE EROSION & DECREASE SEDIMENT YIELD FROM DISTURBED AREAS.

EROSION AND SEDIMENT CONTROL MEASURES:

3. MULCHING – 3.35 SHALL BE INSTALLED AS INDICATED TO PREVENT EROSION BY PROTECTING THE SOIL SURFACE FROM RAINDROP IMPACT AND REDUCING THE VELOCITY OF OVERLAND FLOW.

4. TREE PROTECTION – 3.38 SHALL BE INSTALLED AS INDICATED TO ENSURE THE SURVIVAL OF DESIRABLE TREES WHERE THEY WILL BE EFFECTIVE FOR EROSION & SEDIMENT CONTROL.

5. SOIL STABILIZATION BLANKETS – 3.36 SHALL BE INSTALLED AS INDICATED TO AID IN CONTROLLING EROSION ON CRITICAL AREAS BY PROVIDING A MICROCLIMATE WHICH PROTECTS YOUNG VEGETATION AND PROMOTES ITS ESTABLISHMENT.

EROSION & SEDIMENT CONTROL MANAGEMENT STRATEGIES

1. CLEAR FOR AND INSTALL SILT FENCE AND ALL PERIMETER E&S STRUCTURES PRIOR TO GRADING.

2. INSTALL PROPOSED CULVERT INLET AND OUTLET PROTECTION.

3. REMOVE EROSION CONTROL DEVICES AS DISTURBED AREAS BECOME STABILIZED, WITH PRIOR APPROVAL OF THE INSPECTOR.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION – SEDIMENT CONTROL DEVICES. THE CONTRACTOR SHALL INSPECT AND REPAIR ANY DAMAGED STRUCTURES WITHIN 48 HOURS OF ANY SIGNIFICANT RAINFALL. ALL STRUCTURES SHALL BE INSPECTED FOR UNDERMINING, DETERIORATION OF THE FABRIC, OR OTHER FAILURES. SEDIMENT WILL BE REMOVED WHEN THE LEVEL OF DEPOSITION REACHES HALFWAY TO THE TOP OF THE BARRIERS. ANY MATERIAL SPILLED, WASHED, DROPPED OR TRACKED ONTO ROAD WAY WILL BE REMOVED IMMEDIATELY.

EROSION – SEDIMENT CONTROL NOTES

1. THE EROSION CONTROL NARRATIVE (SEE THIS SHEET) SHALL BE ADHERED TO AS A PART OF THE CONTRACT. ALL EROSION CONTROL DEVICES SHALL BE INSTALLED PER THE NARRATIVE AND PLAN.

2. UNLESS OTHERWISE INDICATED ALL VEGETATIVE AND STRUCTURAL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VA. EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.

3. THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.

4. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED AS THE FIRST STEP IN GRADING.

5. A COPY OF THE APPROVED EROSION CONTROL PLANS SHALL BE KEPT ON SITE AT ALL TIMES.

6. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY INSPECTOR.

7. ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL DEVICES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND UNTIL FINAL STABILIZATION IS ACHIEVED.

8. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DISTURBED AREAS WITHIN SEVEN DAYS OF REACHING FINAL GRADES. TEMPORARY DENUDED AREAS THAT ARE TO BE EXPOSED LONGER THAN THIRTY DAYS SHALL BE SEEDED WITH TEMPORARY VEGETATION.

9. DURING CONSTRUCTION, SOIL STOCKPILES SHALL BE STABILIZED AND PROTECTED WITH SEDIMENT TRAPPING MEASURES AND STABILIZED WITH TEMPORARY VEGETATION IF UNUSED FOR 30 DAYS OR LONGER.

10. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH MAJOR RAINFALL EVENT. ANY REPAIRS NECESSARY SHALL BE MADE IMMEDIATELY TO ENSURE THE PROTECTION OF OFFSITE PROPERTIES.

11. THE CONTRACTOR IS REQUIRED TO REMOVE ALL SILT FROM STREAMS AND DRAINAGE WAYS PRIOR TO BOND RELEASE.

12. TEMPORARY AND PERMANENT SEEDING SHALL ADHERE TO THE SPECIFICATIONS SHOWN HEREON.

13. MINIMUM STANDARD # 3: PERMANENT STABILIZATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE, AND WILL INHIBIT EROSION. AREAS THAT DO NOT BECOME ESTABLISHED WILL REQUIRE ADDITIONAL STABILIZATION MEASURES.

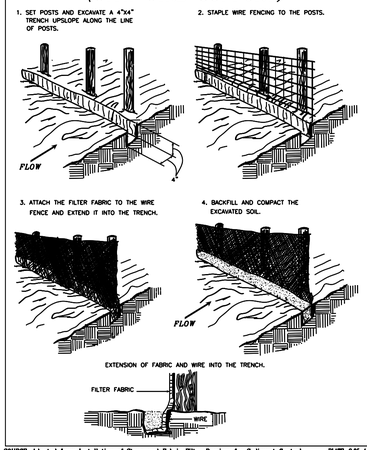
14. MINIMUM STANDARD # 7 & 8: CUT AND FILL SLOPES MUST BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT BEGIN TO ERODE EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION MUST BE PROVIDED WITH ADDITIONAL STABILIZATION UNTIL THE PROBLEM IS CORRECTED.

15. MINIMUM STANDARD # 16: UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:
A. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.
B. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
C. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.
D. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH E&S REGULATIONS.
E. APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.

16. MINIMUM STANDARD # 17: ANY SEDIMENT WHICH IS TRACKED ONTO PUBLIC ROADS MUST BE REMOVED FROM THE ROAD DAILY, BY EITHER SHOVELING OR SWEEPING, AND TRANSPORTED TO AN APPROVED DISPOSAL AREA.

17. MINIMUM STANDARD # 18: TRAPPED SEDIMENT AND DISTURBED AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY PRACTICES MUST BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

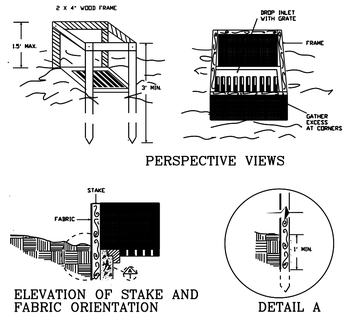
CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)



SOURCE: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood & Wyant

PLATE 3.05-1

SILT FENCE DROP INLET PROTECTION



PERSPECTIVE VIEWS

ELEVATION OF STAKE AND FABRIC ORIENTATION

DETAIL A

SPECIFIC APPLICATION

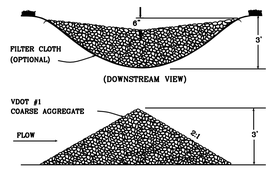
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVERLAND FLOWS (NOT EXCEEDING 1 C.F.S.) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

SOURCE: N.C. Erosion and Sediment Control Planning and Design Manual, 1988

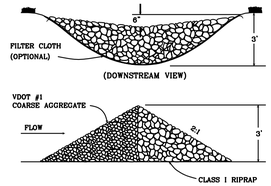
PLATE 3.07-1

ROCK CHECK DAM

2 ACRES OR LESS OF DRAINAGE AREA:



2-10 ACRES OF DRAINAGE AREA:



SOURCE: VA. DSWC

PLATE. 3.20-1

TYPICAL TREATMENT – 1 (SOIL STABILIZATION BLANKET) INSTALLATION CRITERIA

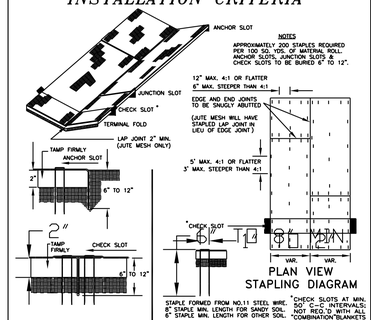
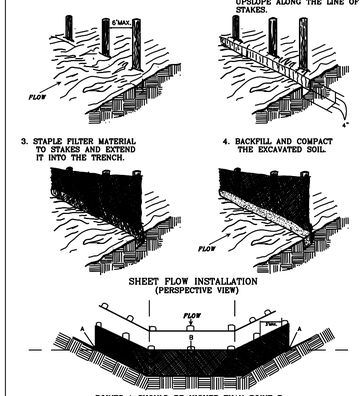


PLATE: 3.36-2

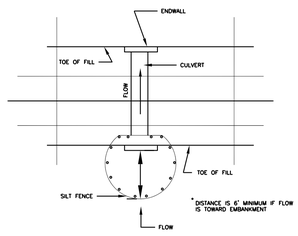
CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)



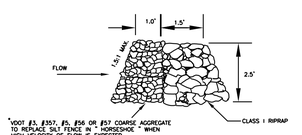
SOURCE: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control,VA DSWC Sherwood and Wyant

PLATE. 3.05-2

SILT FENCE CULVERT INLET PROTECTION



*OPTIONAL STONE COMBINATION

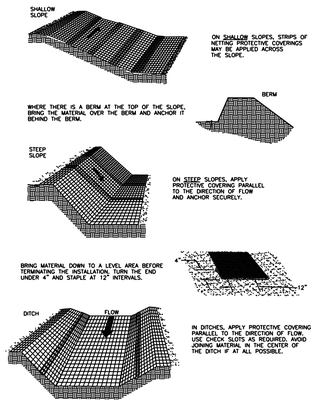


* VDOT #3, #357, #5, #56 OR #57 COARSE AGGREGATE TO REPLACE SILT FENCE IN " HORSESHOE " WHEN HIGH VELOCITY OF FLOW IS EXPECTED

SOURCE: ADAPTED from VDOT Standard Sheets and Va. DSWC

PLATE. 3.08-1

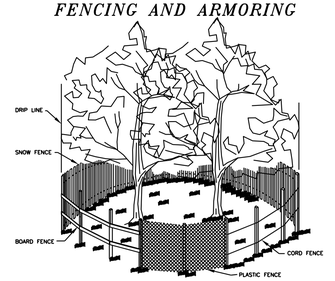
TYPICAL ORIENTATION OF TREATMENT – 1 (SOIL STABILIZATION BLANKET)



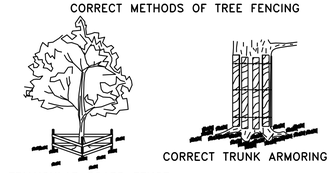
SOURCE: ADAPTED FROM LUDLOW PRODUCTS BROCHURE

PLATE. 3.08-1

FENCING AND ARMORING



CORRECT METHODS OF TREE FENCING



CORRECT TRUNK ARMORING

TRIANGULAR BOARD FENCE

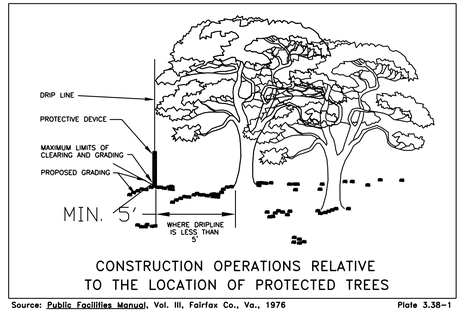
PLATE: 3.36-1 Source: Va. DSCW

Plate 3.38-2

EROSION – SEDIMENT CONTROL NOTES

18. ANY OFFSITE AREAS, SUCH AS BORROW OR WASTE AREAS, THAT ARE TO BE DISTURBED AS A RESULT OF THIS PROJECT, MUST BE ADDRESSED IN THE PLAN AND SUCH ACTIVITY MUST BE CONDUCTED AND STABILIZED ACCORDING TO THE REGULATION OF THE HANDBOOK.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL LAND DISTURBING PERMITS.



CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES

Source: Public Facilities Manual, Vol. III, Fairfax Co., Va., 1976

Plate 3.38-1

X-REF: 20280xs1
11/03, ROANOKE, BSR
P:\20280\301\Drawings\Gen

NOTES:
Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	RE-SEALED				RRC	6/21/04
1	FOR APPROVAL					
	BSR	11/03	WPJ	BSR/CMT	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
PROFESSIONAL ENGINEER
6-21-04

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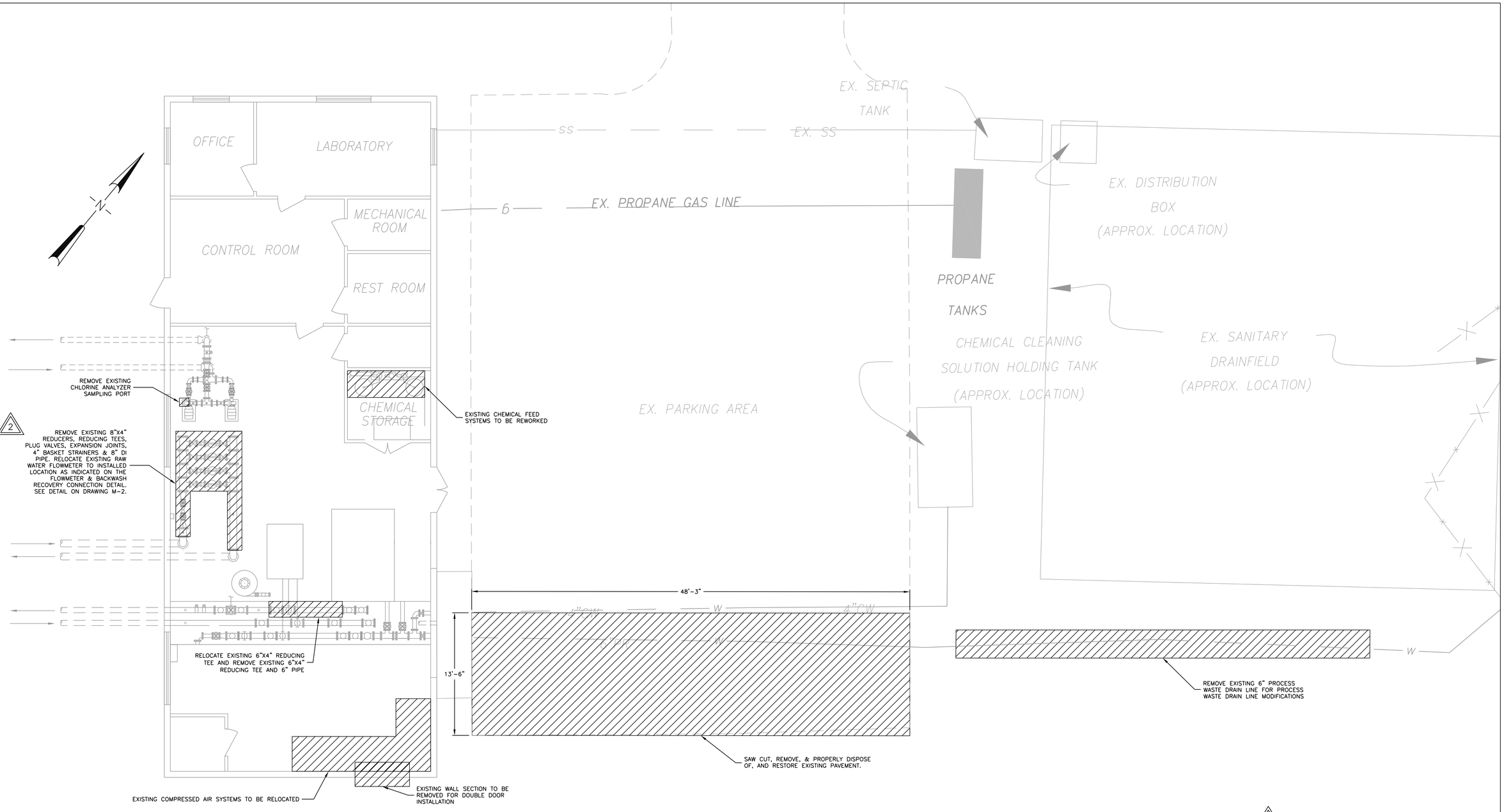
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

EROSION & SEDIMENT CONTROL NOTES, LEGEND & DETAILS

JOB NO.	20280	DRAWING	G-3	SHEET	3 OF 37



DEMOLITION PLAN

SCALE: 3/16"=1'-0"

LEGEND

2 — EQUIPMENT & FACILITIES HATCHED SHOWN TO BE REMOVED/REPLACED/RELOCATED

PROPOSED

EXISTING

NOTE: SEE SITE PLAN FOR LANDSCAPE TREES TO BE TEMPORARILY RELOCATED OR REPLACED UPON COMPLETION OF CONSTRUCTION OPERATIONS.

NOTE: DRAWING OF THE EXISTING BUILDING AND INTERIOR FACILITIES WERE PROVIDED BY THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY (BCPSA).

x-REF: 20280gx1
6/03, ROANOKE, BSR
P:\20280\30\Drawings\Demo\

NOTES:

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2	REVISED PER OWNER & VDH COMMENTS	BSR	6/04	WPJ	CMT	RRC	6/21/04
1	FOR APPROVAL	BSR	11/03	WPJ	CMT	RRC	1/23/04

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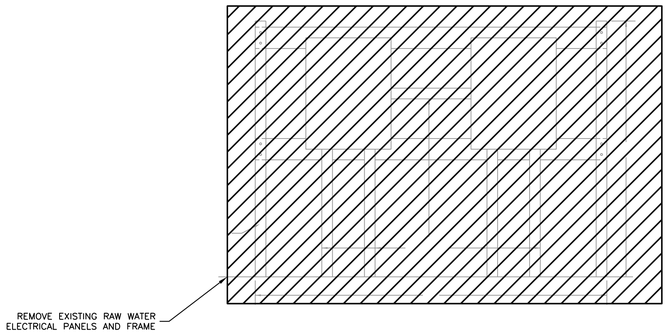
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

SITE DEMOLITION PLAN

JOB NO.	20280	DRAWING	D-1	SHEET	4 OF 37



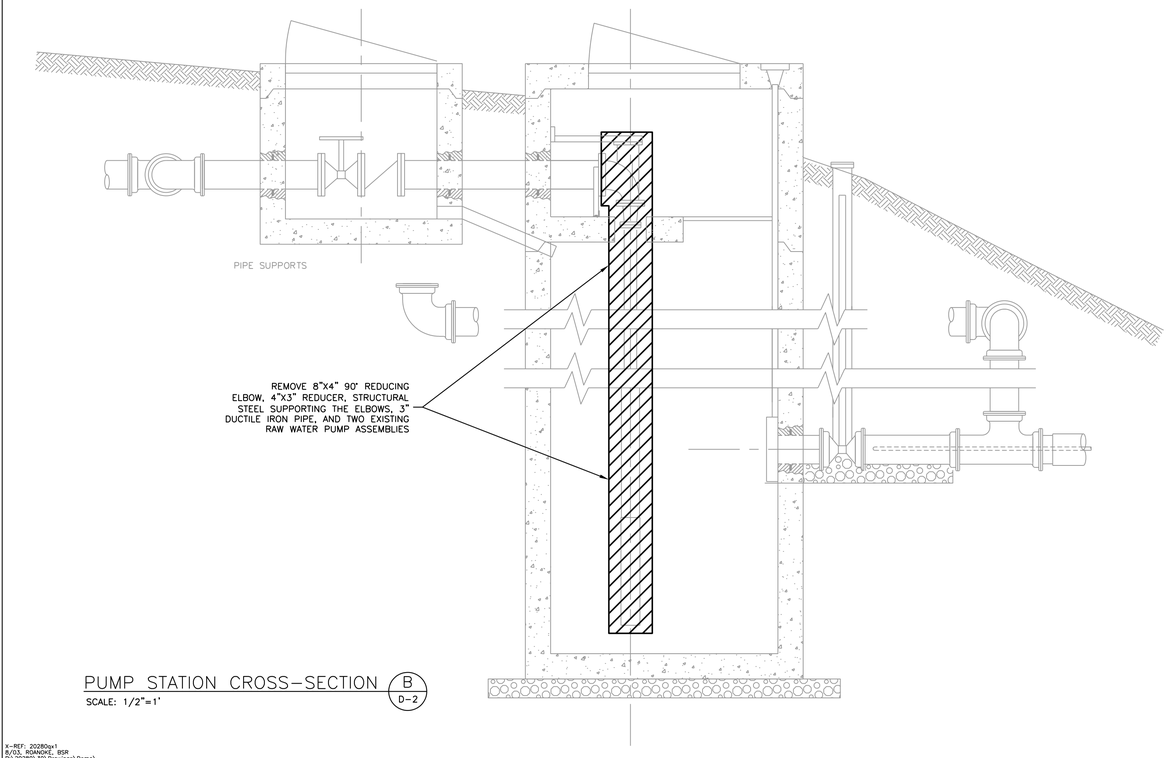
LEGEND (2)

EQUIPMENT & FACILITIES HATCHED SHOWN TO BE REMOVED/REPLACED/RELOCATED

PROPOSED

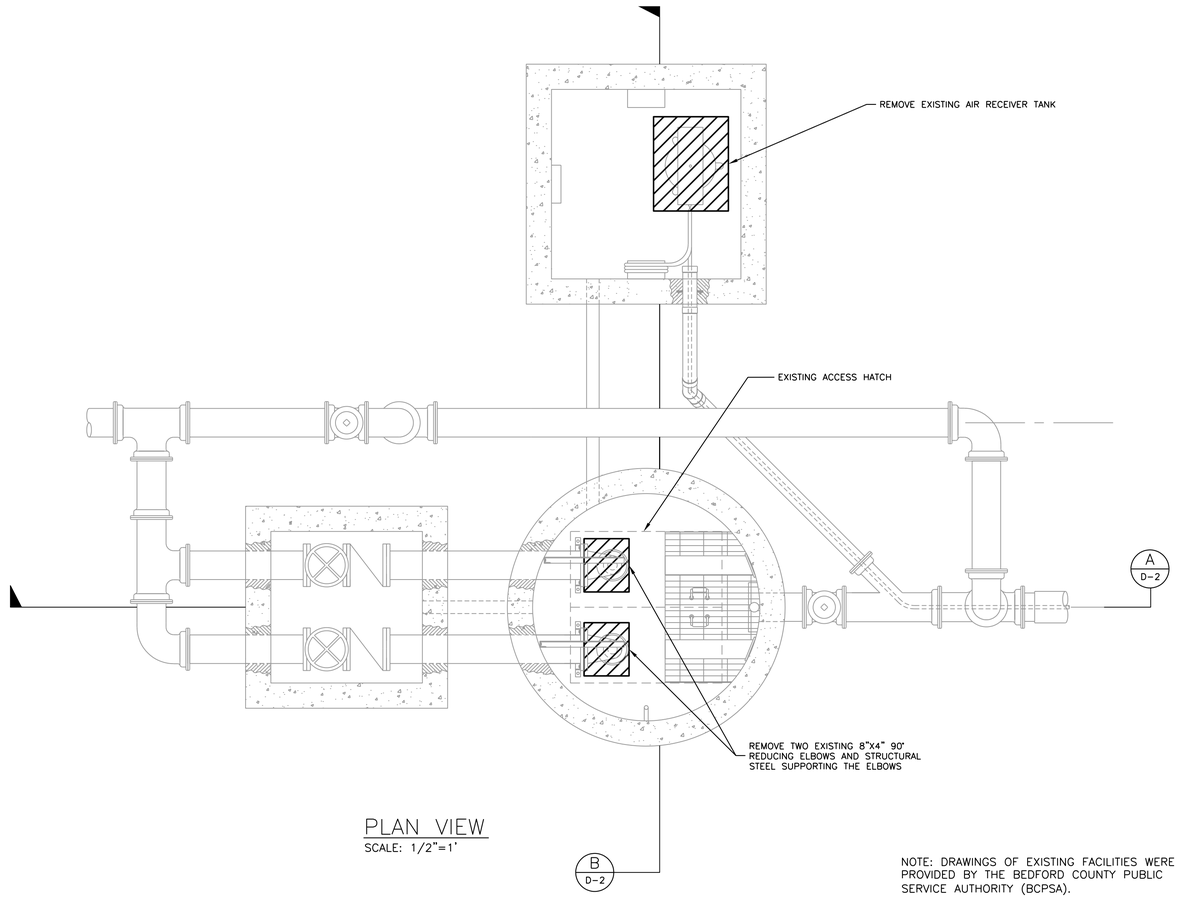
EXISTING

FRAME FOR ELECTRICAL SERVICE
RAW WATER PUMP STATION



PUMP STATION CROSS-SECTION (B / D-2)

SCALE: 1/2"=1'



PLAN VIEW

SCALE: 1/2"=1'

NOTE: DRAWINGS OF EXISTING FACILITIES WERE PROVIDED BY THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY (BCPSA).

x-REF: 20280gx1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Demo\

NOTES:

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PROJECT SUPERVISOR — DEPARTMENT SUPERVISOR

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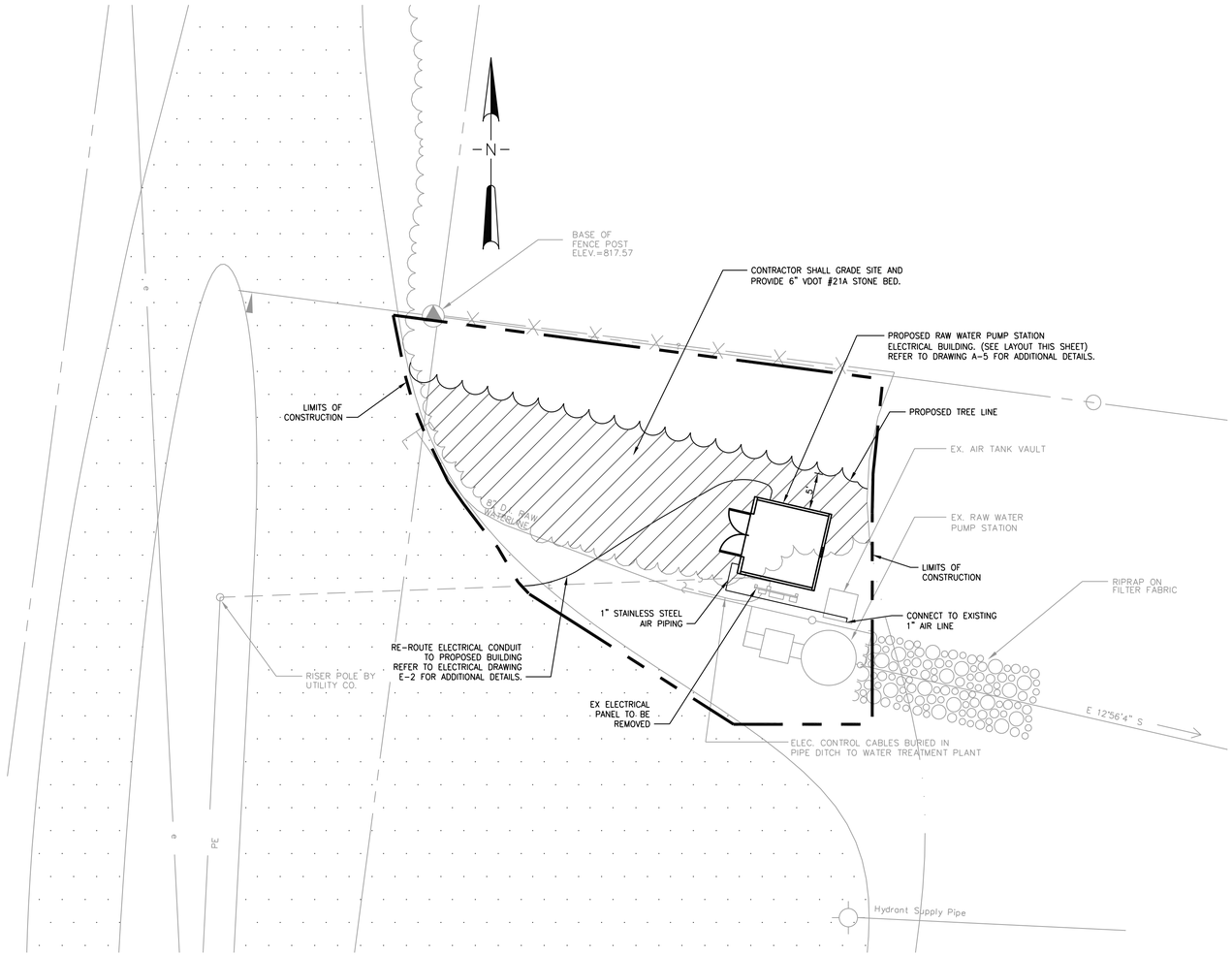
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

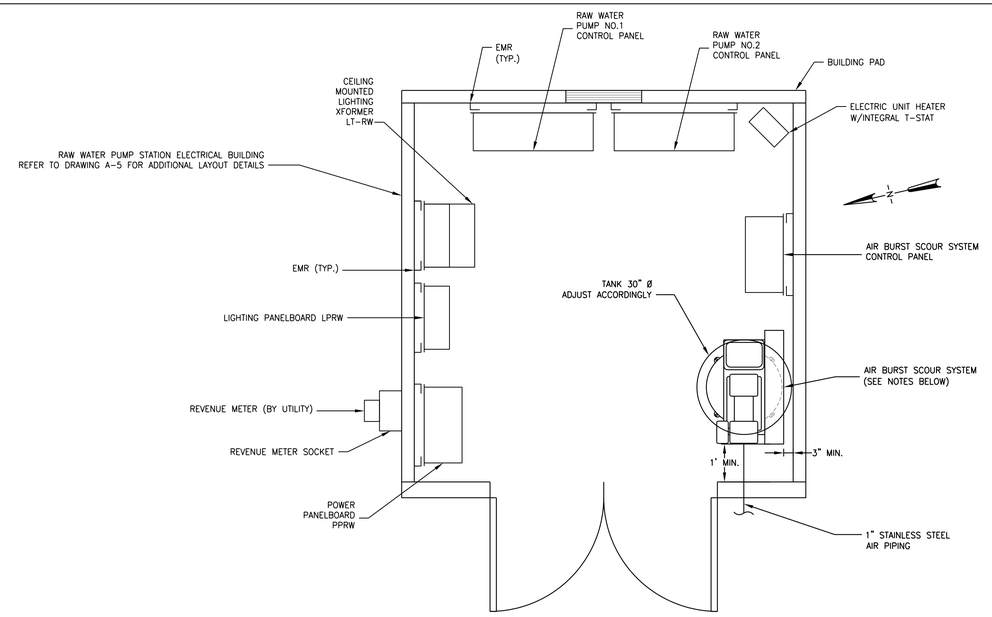
RAW WATER PUMP STATION
DEMOLITION PLAN

JOB NO.	20280	DRAWING	D-2	SHEET	5 OF 37



RAW WATER ELECTRICAL BUILDING SITE PLAN

SCALE: 1"=10'-0"



RAW WATER ELECTRICAL BUILDING LAYOUT

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

AIR BURST SCOUR SYSTEM (ABSS) NOTES: (2)

1. AIR BURST SCOUR SYSTEM SHALL BE COOK LEGACY COATING COMPANY ABSS SYSTEM OR APPROVED EQUAL.
2. AIR BURST SCOUR SYSTEM SHALL PROVIDE A BURST OF 3 SCREEN VOLUMES AT THE SCREEN (LEE COOK INTAKE SCREEN MODEL S-24, 24" DIAMETER X 24" LONG SCREEN) IN NO MORE THAN THREE (3) SECONDS.
3. AIR BURST SCOUR SYSTEM SHALL CONSIST OF THE FOLLOWING:
   - A. MOTOR: MOTOR SHALL BE 5HP, 230/460V, 3 PHASE, 60 HZ.
   - B. COMPRESSOR: INGERSOLL RAND MODEL 2475N5 FULLY PACKAGED AIR COMPRESSOR. THE STARTER SHALL INCLUDE AN AIR COOLED AFTER COOLER AND AN EDV 2000 ELECTRIC DRAIN VALVE. THE COMPRESSOR SHALL BE ABLE TO DELIVER 1.5 ACFM AT 120 PSI.
   - C. RECEIVER: RECEIVER SHALL MEET ASME CODE VESSEL REQUIREMENTS. RECEIVER SHALL BE 120 CALLON VERTICAL TANK OPERATING AT 175 PSIG AND SHALL BE EQUIPPED WITH PRESSURE RELIEF VALVE SIZED TO HANDLE THE FULL DISCHARGE PRESSURE OF THE COMPRESSOR, A 4" DIAL PRESSURE GAGE, AND A FLOAT TYPE AUTOMATIC DRAIN.
   - D. VALVES: VALVES SHALL BE ELECTRICALLY ACTUATED, SPRING LOADED BALL ' OR BUTTERFLY TYPE VALVES.
   - E. ACTUATORS: ACTUATORS SHALL BE PNEUMATIC, DOUBLE ACTING TYPE.
   - F. CONTROL PANEL: CONTROLS SHALL BE ENCLOSED IN A NEMA IV ENCLOSURE. MOTOR STARTER(S) ARE MOUNTED IN THE CONTROL PANEL. ALL PANELS HAVE A POWER ON LIGHT, A TEST/OFF/AUTO SWITCH FOR COMPRESSOR CONTROL, AND A LOCKABLE DISCONNECT. SYSTEM CONTROL LOGIC SHALL BE DETERMINED BY AN ALLEN BRADLEY PLC SYSTEM (SLC 505 AND A PANELVIEW 600). VISUAL DISPLAY SHALL BE A COLOR TOUCH SCREEN. SYSTEM SHALL ALSO INCLUDE PUSH BUTTON VALVE INITIATION (INCLUDES CONTROL AIR RECEIVER AND PNEUMATIC ACTUATORS WITH MANUAL OVER-RIDE. INDICATOR LIGHTS TO INDICATE: "READY FOR BACKWASH," AND "VALVE FAIL TO OPEN." CONTROL PANEL SHALL BE DESIGNED TO BURST ONLY WHEN INTAKE PUMP(S) ARE INACTIVE. PLC SYSTEM FILES (.RSS FILE) AND PASSWORDS SHALL BE PROVIDED BY THE CONTRACTOR FOR OWNER'S USE.
4. FUNCTIONAL SPECIFICATION OF ABSS SYSTEM:
   - A. AUTOMATIC OPERATION
     - i. AUTOMATIC OPERATION OF THE AIR BURST SCOUR SYSTEM IS DETERMINED BY RAW WATER PUMP OPERATION.
     - ii. THE AIR BURST SCOUR CONTROL SYSTEM SHALL INITIATE WHEN THE RAW WATER PUMP(S) HAVE CYCLED OFF.
     - iii. THE LOGIC IN THE AIR BURST CONTROL PANEL WILL LOCKOUT THE ABILITY FOR THE RAW WATER PUMP(S) TO BE STARTED. NOTE: IF THE PLANT PLC SIGNALS THE PUMPS TO START, THE PLANT PLC WILL RECEIVE A PUMP START FAILURE INDICATION.
     - iv. THE AIR BURST CONTROL PANEL WILL SEND A SIGNAL TO THE ACTUATED VALVE(S) TO OPEN THE VALVE(S) AND RELEASE THE COMPRESSED AIR.
     - v. THE VALVE(S) SHALL REMAIN OPEN FOR UP TO 3 SECONDS TO ALLOW 3 SCREEN VOLUMES OF AIR TO BE RELEASED TO THE SCREEN.
     - vi. THE AIR BURST CONTROL PANEL WILL SEND A SECOND SIGNAL BACK TO THE VALVE(S) TO CLOSE THE VALVE(S)
     - vii. ONCE THE VALVE(S) CLOSE, THE RAW WATER PUMPS SHALL BE ENABLED TO BE STARTED.
     - viii. A PRESSURE SWITCH ON THE AIR BURST SYSTEM WILL SENSE LOW PRESSURE AND START THE COMPRESSOR, FILL THE TANK, AND THEN SHUT OFF.
     - ix. THE FILL TIME FOR THE TANK IS APPROXIMATELY 22 MINUTES.
     - x. AIR BURST WILL NOT BE INITIATED UNTIL THE TANK IS FILLED.
     - xi. THE PUMPS SHALL BE ALLOWED TO CYCLE ON AND OFF (OPERATE NORMALLY) WHILE THE COMPRESSOR SYSTEM IS RECHARGING THE RECEIVER TANK.
   - B. MANUAL OPERATION
     - i. MANUAL OPERATION OF THE AIR BURST SCOUR SYSTEM CAN BE INITIATED BY PLACING THE MODE SWITCH ON THE CONTROL PANEL IN THE MANUAL POSITION.
     - ii. THE OPERATOR CAN USE THE PUSHBUTTONS ON THE FACE OF THE AIR BURST PANEL TO OPEN AND CLOSE THE VALVE(S). NOTE: WHILE THE MODE SWITCH IS IN MANUAL, THE LOGIC IN THE AIR BURST CONTROL PANEL WILL LOCK OUT THE ABILITY FOR THE RAW WATER PUMPS TO BE STARTED.
     - iii. ONCE THE VALVE(S) ARE MANUALLY CLOSED, THE MODE SWITCH MUST BE SWITCHED TO AUTO OR TIMED.
     - iv. A PRESSURE SWITCH ON THE AIR BURST SYSTEM WILL SENSE LOW PRESSURE AND START THE COMPRESSOR, FILL THE TANK, AND THEN SHUT OFF.
     - v. THE FILL TIME FOR THE TANK IS APPROXIMATELY 22 MINUTES.
     - vi. AIR BURST WILL NOT BE INITIATED UNTIL THE TANK IS FILLED.
     - vii. THE PUMPS SHALL BE ALLOWED TO CYCLE ON AND OFF (OPERATE NORMALLY) WHILE THE COMPRESSOR SYSTEM IS RECHARGING THE RECEIVER TANK.
   - C. TIMER OPERATION
     - i. THE AIR BURST SCOUR CONTROL SYSTEM SHALL HAVE A PARALLEL TIMER OPERATION WHERE THE CONTROL SYSTEM SHALL HAVE A SEVEN (7) DAY CLOCK TIMER TO INITIATE THE AIR BURST CYCLE. NOTE: IF THE RAW WATER PUMPS ARE RUNNING WHEN THE TIMER IS TRIGGERED, THE AIR BURST WILL NOT TAKE PLACE UNTIL THE PUMPS HAVE CYCLED OFF.
     - ii. A PRESSURE SWITCH ON THE AIR BURST SYSTEM WILL SENSE LOW PRESSURE AND START THE COMPRESSOR, FILL THE TANK, AND THEN SHUT OFF.
     - iii. THE FILL TIME FOR THE TANK IS APPROXIMATELY 22 MINUTES.
     - iv. AIR BURST WILL NOT BE INITIATED UNTIL THE TANK IS FILLED. THE PUMPS SHALL BE ALLOWED TO CYCLE ON AND OFF (OPERATE NORMALLY) WHILE THE COMPRESSOR SYSTEM IS RECHARGING THE RECEIVER TANK.

RAW WATER ELECTRICAL BUILDING NOTES:

1. CONTRACTOR SHALL FIELD VERIFY BUILDING LOCATION & FINISHED FLOOR ELEVATION PRIOR TO CONSTRUCTION.
2. ELECTRICAL BUILDING SHALL BE A PRECAST UTILITY BUILDING AS MANUFACTURED BY THE CLEAR FLOW COMPANY OR APPROVED EQUAL.
3. EXTERIOR BUILDING FINISH TO BE SELECTED BY OWNER PRIOR TO CONSTRUCTION.

NOTE: DRAWINGS OF EXISTING FACILITIES WERE PROVIDED BY THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY (BCPSA).

X-REF: 20280-A-RWPS-PL, 20280-C-RWPS
8/03, ROANOKE, BSR
P:\20280\30\Drawings\Civil\

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ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	REVISED PER OWNER & VDH COMMENTS	BSR	6/04	WPJ	CMT	RRC	6/21/04
1	FOR APPROVAL	BSR	11/03	WPJ	CMT	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

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BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

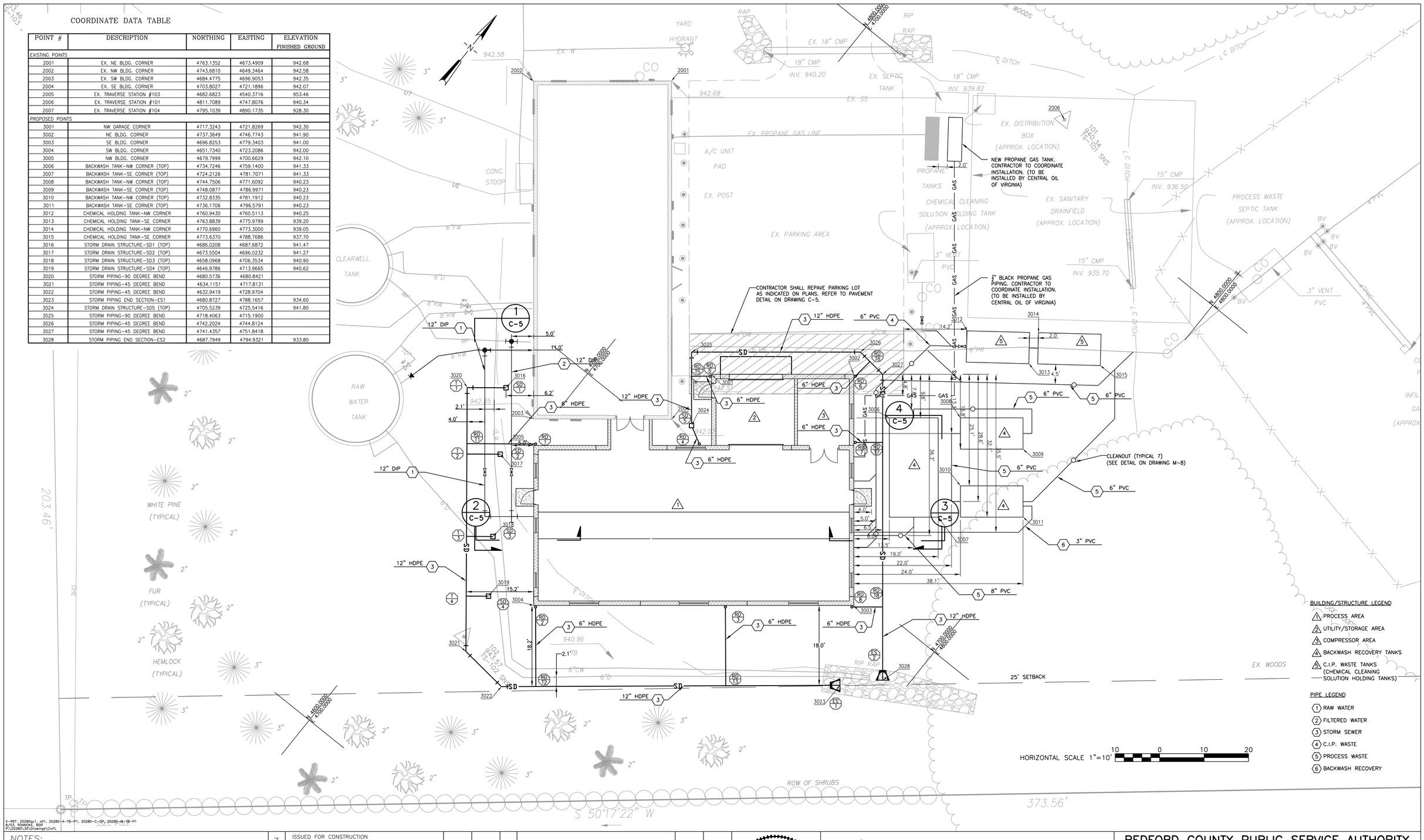
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

RAW WATER PUMP STATION
ELECTRICAL BUILDING SITE
PLAN & DETAILS

JOB NO.	20280	DRAWING	C-1	SHEET	6 OF 37

COORDINATE DATA TABLE

POINT #	DESCRIPTION	NORTHING	EASTING	ELEVATION FINISHED GROUND
EXISTING POINTS				
2001	EX. NE BLDG. CORNER	4763.1352	4673.4909	942.68
2002	EX. NW BLDG. CORNER	4743.6810	4649.3464	942.58
2003	EX. SW BLDG. CORNER	4684.4775	4696.9053	942.35
2004	EX. SE BLDG. CORNER	4703.8027	4721.1896	942.07
2005	EX. TRAVERSE STATION #103	4682.6823	4540.3716	953.46
2006	EX. TRAVERSE STATION #101	4811.7089	4747.8076	940.34
2007	EX. TRAVERSE STATION #104	4795.1039	4890.1735	928.30
PROPOSED POINTS				
3001	NW GARAGE CORNER	4717.3243	4721.8269	942.30
3002	NE BLDG. CORNER	4737.3649	4746.7743	941.90
3003	SE BLDG. CORNER	4696.8253	4779.3403	941.00
3004	SW BLDG. CORNER	4651.7340	4723.2086	942.00
3005	NW BLDG. CORNER	4679.7999	4700.6629	942.10
3006	BACKWASH TANK-NW CORNER (TOP)	4734.7246	4759.1400	941.33
3007	BACKWASH TANK-SE CORNER (TOP)	4724.2126	4781.7071	941.33
3008	BACKWASH TANK-NW CORNER (TOP)	4744.7506	4771.6092	940.23
3009	BACKWASH TANK-SE CORNER (TOP)	4748.0877	4786.9971	940.23
3010	BACKWASH TANK-NW CORNER (TOP)	4732.8335	4781.1912	940.23
3011	BACKWASH TANK-SE CORNER (TOP)	4736.1706	4796.5791	940.23
3012	CHEMICAL HOLDING TANK-NW CORNER	4760.9430	4760.5113	940.25
3013	CHEMICAL HOLDING TANK-SE CORNER	4763.8839	4775.9799	939.20
3014	CHEMICAL HOLDING TANK-NW CORNER	4770.6960	4773.3000	939.05
3015	CHEMICAL HOLDING TANK-SE CORNER	4773.6370	4788.7686	937.70
3016	STORM DRAIN STRUCTURE-SD1 (TOP)	4686.0208	4687.6872	941.47
3017	STORM DRAIN STRUCTURE-SD2 (TOP)	4673.5504	4696.0232	941.27
3018	STORM DRAIN STRUCTURE-SD3 (TOP)	4658.0968	4706.3534	940.90
3019	STORM DRAIN STRUCTURE-SD4 (TOP)	4646.9786	4713.9665	940.62
3020	STORM PIPING-90 DEGREE BEND	4680.5736	4680.8421	
3021	STORM PIPING-45 DEGREE BEND	4634.1151	4717.8131	
3022	STORM PIPING-45 DEGREE BEND	4632.9419	4728.9704	
3023	STORM PIPING END SECTION-ES1	4680.8727	4788.1657	934.60
3024	STORM DRAIN STRUCTURE-SD5 (TOP)	4705.5239	4725.5416	941.80
3025	STORM PIPING-90 DEGREE BEND	4718.4063	4715.1900	
3026	STORM PIPING-45 DEGREE BEND	4742.2024	4744.8124	
3027	STORM PIPING-45 DEGREE BEND	4741.4357	4751.8418	
3028	STORM PIPING END SECTION-ES2	4687.7949	4794.9321	933.80



BUILDING/STRUCTURE LEGEND

1. PROCESS AREA
2. UTILITY/STORAGE AREA
3. COMPRESSOR AREA
4. BACKWASH RECOVERY TANKS
5. C.I.P. WASTE TANKS (CHEMICAL CLEANING SOLUTION HOLDING TANKS)

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

X-REF: 20280xx1, x01, 20280-A-TB-P1, 20280-C-SP, 20280-M-TB-P1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Civil\

NOTES:

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ISSUE NO.	DESCRIPTION	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION						
2	RE-SEALED					RRC	6/21/04
1	FOR APPROVAL	BSR	11/03	WPJ	CMT	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

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310 FIRST STREET, S.W., SUITE 150
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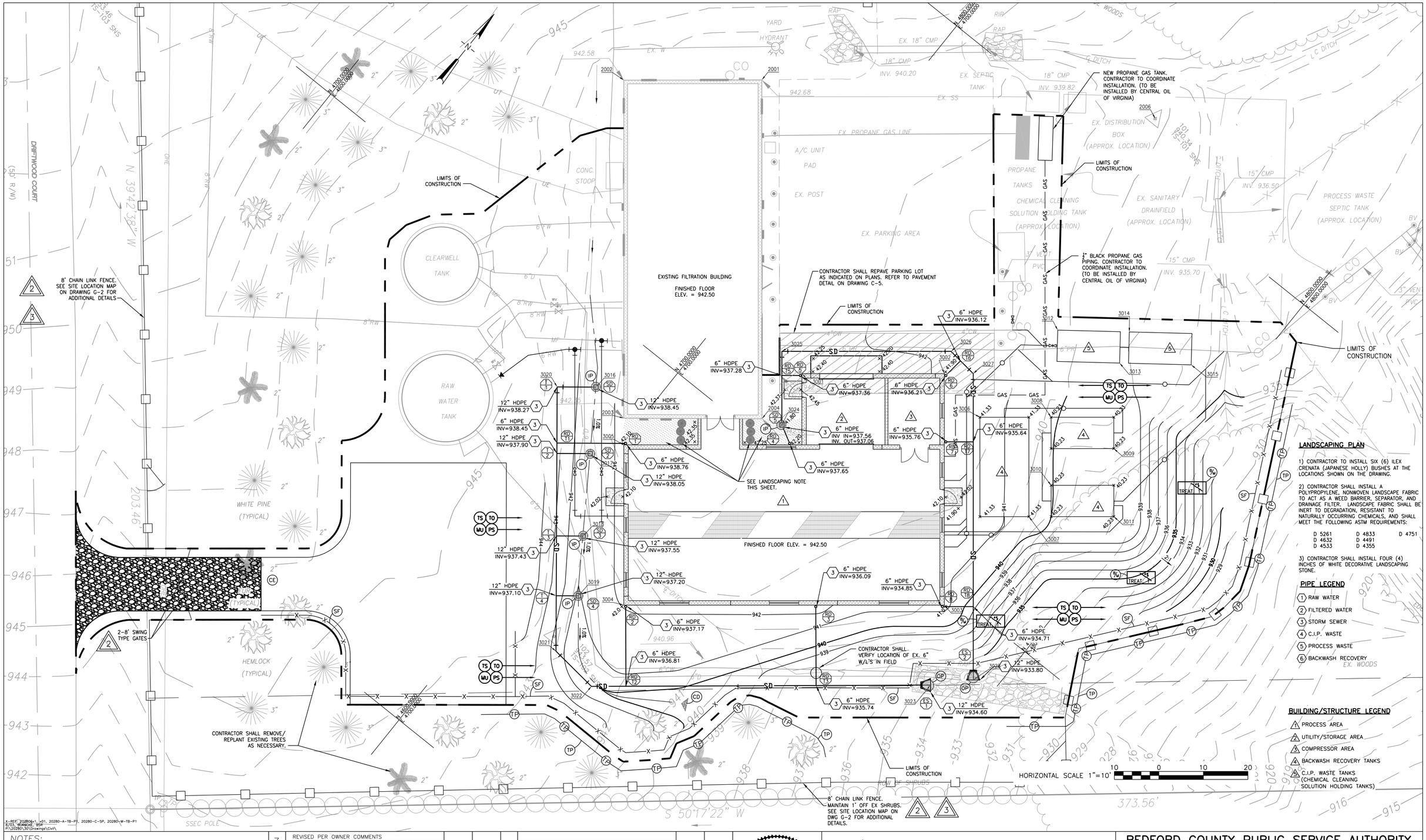
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

YARD PIPING & SITE PLAN

JOB NO.	DRAWING	SHEET
20280	C-2	7 OF 37



LANDSCAPING PLAN

1) CONTRACTOR TO INSTALL SIX (6) ILEX CRENATA (JAPANESE HOLLY) BUSHES AT THE LOCATIONS SHOWN ON THE DRAWING.

2) CONTRACTOR SHALL INSTALL A POLYPROPYLENE, NONWOVEN LANDSCAPE FABRIC TO ACT AS A WEED BARRIER, SEPARATOR, AND DRAINAGE FILTER. LANDSCAPE FABRIC SHALL BE INERT TO DEGRADATION, RESISTANT TO NATURALLY OCCURRING CHEMICALS, AND SHALL MEET THE FOLLOWING ASTM REQUIREMENTS:

D 5261	D 4833	D 4751
D 4632	D 4491	
D 4533	D 4355	

3) CONTRACTOR SHALL INSTALL FOUR (4) INCHES OF WHITE DECORATIVE LANDSCAPING STONE.

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

BUILDING/STRUCTURE LEGEND

1. PROCESS AREA
2. UTILITY/STORAGE AREA
3. COMPRESSOR AREA
4. BACKWASH RECOVERY TANKS
5. C.I.P. WASTE TANKS (CHEMICAL CLEANING SOLUTION HOLDING TANKS)

X-REF: 20280A1_x01, 20280-A-TB-P1, 20280-C-SP, 20280-M-TB-P1
B/03, ROANOKE, BSR
P:\20280\301\Drawings\CivP\

NOTES:

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ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	REVISED PER OWNER COMMENTS	BSR	7/04	WPJ	CMT	RRC	7/09/04
2	REVISED PER OWNER & VDH COMMENTS	BSR	6/04	WPJ	CMT	RRC	6/21/04
1	FOR APPROVAL	BSR	11/03	WPJ	CMT	RRC	1/23/04
4	ISSUED FOR CONSTRUCTION						

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HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

GRADING PLAN & SITE LAYOUT

JOB NO. 20280 | DRAWING C-3 | SHEET 8 OF 37

INLET CALCULATIONS

STORM DRAIN #1		Q(CFS)	K	EFFECTIVE OPENING	CLOGGING FACTOR	HT. (FEET)
WEIR:	H=	0.49	3.00	0.47	0.50	0.79
ORIFICE:	H=	0.49	0.60	2.88	0.50	0.01

NOTE: WEIR HEADWATER COMPUTATION H = [Q/K(EFF. WEIR LENGTH)(CLOGGING FACTOR)]^.6667
ORIFICE HEADWATER COMPUTATION H = [Q/K(EFF. OPEN AREA)(CLOGGING FACTOR)(64.4)^0.5]^2

STORM DRAIN #2		Q(CFS)	K	EFFECTIVE OPENING	CLOGGING FACTOR	HT. (FEET)
WEIR:	H=	0.06	3.00	0.47	0.50	0.19
ORIFICE:	H=	0.06	0.60	2.88	0.50	0.00

NOTE: WEIR HEADWATER COMPUTATION H = [Q/K(EFF. WEIR LENGTH)(CLOGGING FACTOR)]^.6667
ORIFICE HEADWATER COMPUTATION H = [Q/K(EFF. OPEN AREA)(CLOGGING FACTOR)(64.4)^0.5]^2

STORM DRAIN #3		Q(CFS)	K	EFFECTIVE OPENING	CLOGGING FACTOR	HT. (FEET)
WEIR:	H=	0.09	3.00	0.47	0.50	0.25
ORIFICE:	H=	0.09	0.60	2.88	0.50	0.00

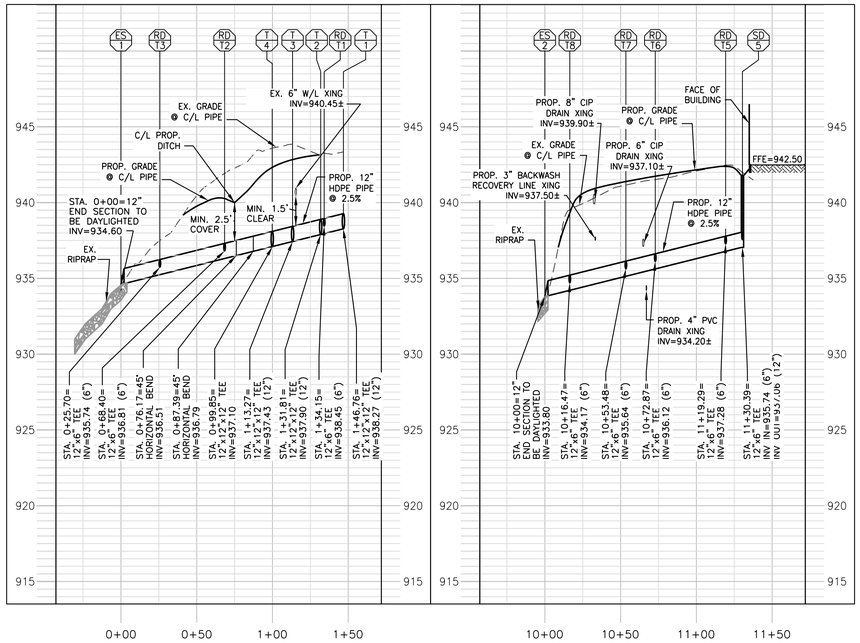
NOTE: WEIR HEADWATER COMPUTATION H = [Q/K(EFF. WEIR LENGTH)(CLOGGING FACTOR)]^.6667
ORIFICE HEADWATER COMPUTATION H = [Q/K(EFF. OPEN AREA)(CLOGGING FACTOR)(64.4)^0.5]^2

STORM DRAIN #4		Q(CFS)	K	EFFECTIVE OPENING	CLOGGING FACTOR	HT. (FEET)
WEIR:	H=	0.06	3.00	0.47	0.50	0.19
ORIFICE:	H=	0.06	0.60	2.88	0.50	0.00

NOTE: WEIR HEADWATER COMPUTATION H = [Q/K(EFF. WEIR LENGTH)(CLOGGING FACTOR)]^.6667
ORIFICE HEADWATER COMPUTATION H = [Q/K(EFF. OPEN AREA)(CLOGGING FACTOR)(64.4)^0.5]^2

STORM DRAIN #5		Q(CFS)	K	EFFECTIVE OPENING	CLOGGING FACTOR	HT. (FEET)
WEIR:	H=	0.01	3.00	0.47	0.50	0.06
ORIFICE:	H=	0.01	0.60	2.88	0.50	0.00

NOTE: WEIR HEADWATER COMPUTATION H = [Q/K(EFF. WEIR LENGTH)(CLOGGING FACTOR)]^.6667
ORIFICE HEADWATER COMPUTATION H = [Q/K(EFF. OPEN AREA)(CLOGGING FACTOR)(64.4)^0.5]^2



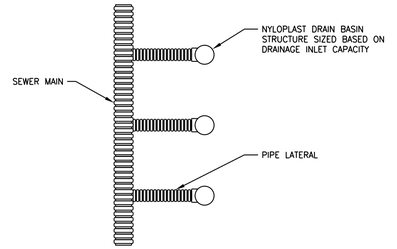
12" HDPE STORM DRAIN PROFILES

SCALE: HORIZ. 1"=50' VERT. 1"=5'

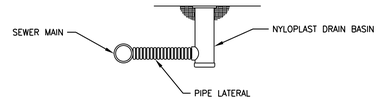
OFFSET STRUCTURE DESIGN CONCEPT

(PER MANUFACTURER SPECS.)

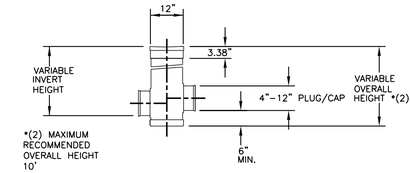
TOP VIEW



SIDE VIEW



NOTE: THIS DETAIL IS FOR REFERENCE PURPOSES ONLY! REFER TO STORM SEWER PROFILE, COMPUTATIONS, AND MANUFACTURER SPECIFICATIONS FOR DETAILS.

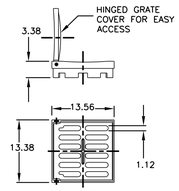


TYPICAL STORM DRAIN DETAIL

(PER MANUFACTURER SPECS.)
NOT TO SCALE

STORM DRAIN CALCULATIONS

FROM POINT	TO POINT	DRAIN. AREA ACRES	RUNOFF COEFF. C	CA INCREM.	CA ACCUM.	INLET TIME MIN.	RAINFALL INTENSITY IN./HR.	Q (RUNOFF) INCREM. C.F.S.	Q (RUNOFF) ACCUM. C.F.S.	INVERT ELEVATIONS UPPER	INVERT ELEVATIONS LOWER	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	n	CAPACITY C.F.S.	VELOCITY F.P.S.	FLOW TIME SEC.	REMARKS
SD1	T1	0.170	0.40	0.068	0.068	5.0	7.25	0.493	0.493	938.45	938.27	8.75	0.0200	12	0.012	5.46	4.27	2.05	
RD1	RD/T1	0.012	0.90	0.011	0.079	5.0	7.25	0.078	0.571	938.76	938.45	15.44	0.0200	6	0.010	1.03	3.03	5.09	
SD2	T2	0.020	0.40	0.008	0.087	5.0	7.25	0.058	0.629	938.05	937.90	7.51	0.0200	12	0.012	5.46	2.01	3.74	
SD3	T3	0.030	0.40	0.012	0.099	5.0	7.25	0.087	0.716	937.55	937.43	5.97	0.0200	12	0.012	5.46	2.42	2.47	
SD4	T4	0.020	0.40	0.008	0.107	5.0	7.25	0.058	0.774	937.20	937.10	5.00	0.0200	12	0.012	5.46	2.01	2.49	
RD2	RD/T2	0.012	0.90	0.011	0.118	5.0	7.25	0.079	0.853	937.17	936.81	17.90	0.0200	6	0.010	1.03	3.03	5.90	
RD3	RD/T3	0.012	0.90	0.011	0.129	5.0	7.25	0.079	0.932	936.09	935.74	17.73	0.0200	6	0.010	1.03	3.03	5.84	
T1	ES1	0.276	0.55	0.152	0.152	5.0	7.25	1.101	1.101	938.27	934.60	146.76	0.0250	12	0.012	6.10	5.80	25.28	
RD4	SD5	0.016	0.90	0.014	0.014	5.0	7.25	0.101	0.101	937.65	937.56	4.49	0.0200	6	0.010	1.03	3.23	1.39	
RD5	RD/T5	0.007	0.90	0.006	0.020	5.0	7.25	0.044	0.145	937.36	937.28	4.16	0.0200	6	0.010	1.03	2.60	1.60	
RD6	RD/T6	0.007	0.90	0.006	0.026	5.0	7.25	0.044	0.189	936.21	936.12	4.66	0.0200	6	0.010	1.03	2.60	1.79	
RD7	RD/T7	0.009	0.90	0.008	0.034	5.0	7.25	0.057	0.245	935.76	935.64	6.17	0.0200	6	0.010	1.03	2.60	2.37	
RD8	RD/T8	0.012	0.90	0.011	0.045	5.0	7.25	0.079	0.324	934.85	934.71	6.92	0.0200	6	0.010	1.03	3.03	2.28	
SD5	ES2	0.003	0.50	0.002	0.046	5.0	7.25	0.011	0.335	937.06	933.80	130.39	0.0250	12	0.012	6.10	1.09	119.18	



STANDARD

APPROX. DRAIN AREA = 60.62 SQ. IN.
APPROX. WEIGHT WITH FRAME = 40.68 LBS.

NYLOPLAST 12" GRATES/COVERS
STANDARD GRATE HAS H-25 HEAVY DUTY RATING
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05 & A48-CLASS 30B
MATERIAL: DUCTILE IRON GRATE W/CAST IRON FRAME
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOCKING DEVICE AVAILABLE UPON REQUEST
PRICE INCLUDES FRAME & GRATE/COVER

TYPICAL STORM DRAIN DETAIL

(PER MANUFACTURER SPECS.)
NOT TO SCALE

X-REF: 20280sx1, 20280-PROFILES
R:\03 HOANOKE BSP
P:\20280\30\Drawings\Civil\

NOTES:

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1	FOR APPROVAL	BSR	11/03	WPJ	CMT	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
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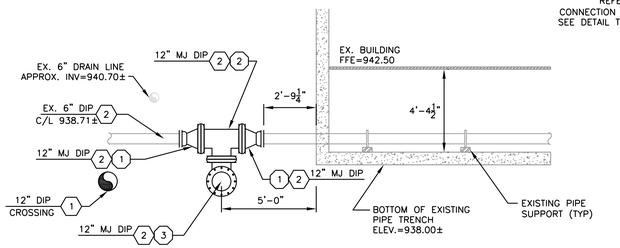
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

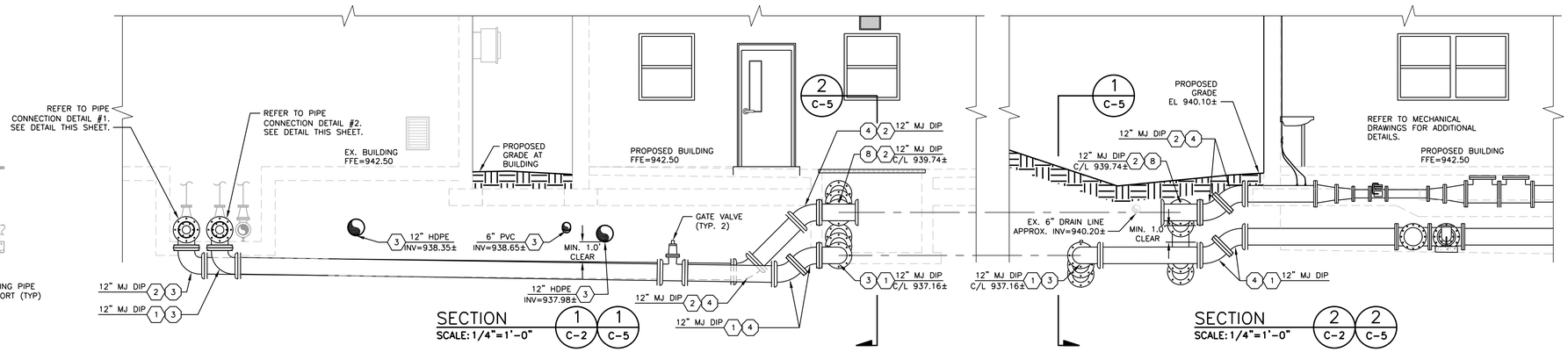
YARD PIPING, STORM DRAIN DETAILS & CALCULATIONS

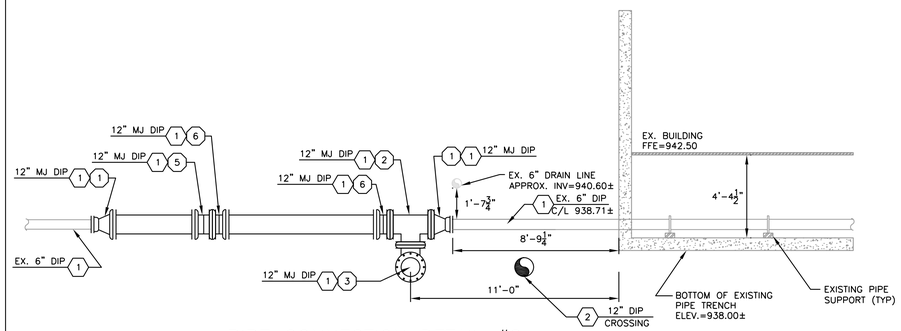
JOB NO.	20280	DRAWING	C-4	SHEET	9 OF 37



PIPE CONNECTION DETAIL #1

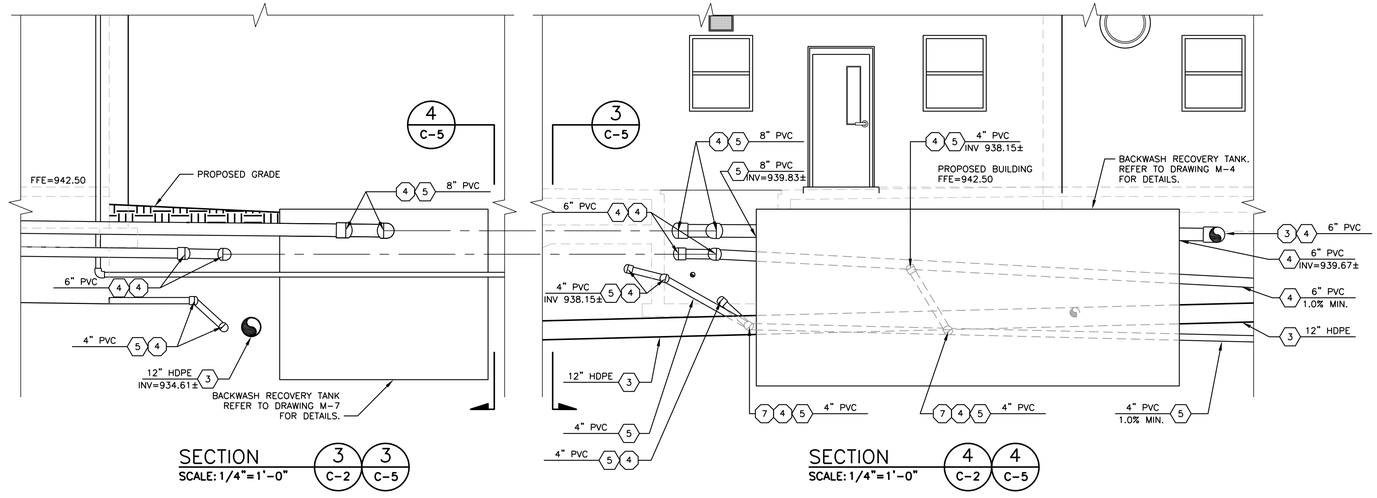
SCALE: 1/4"=1'-0"

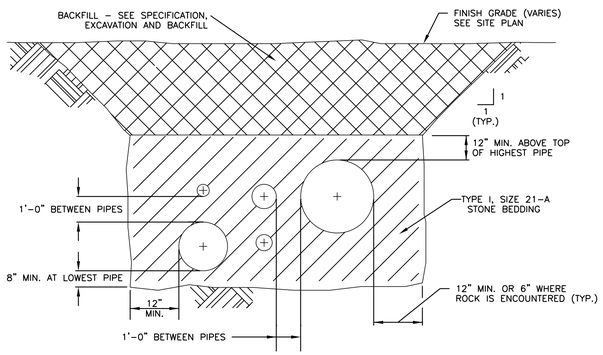




PIPE CONNECTION DETAIL #2

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





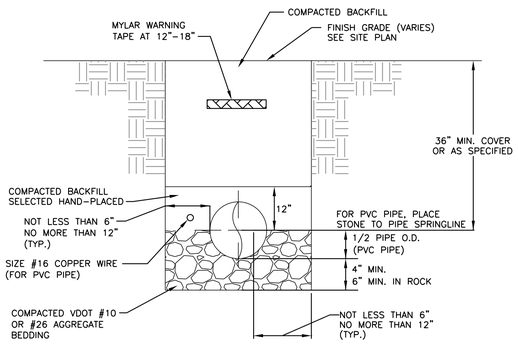
TYPICAL TRENCH SECTION

YARD PIPING

(FOR SINGLE OR MULTIPLE PIPES)

(SEE YARD PIPING PLAN FOR LAYOUT)

N.T.S.



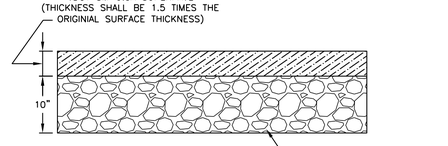
*THIS DETAIL APPLICABLE FOR DEPTHS LESS THAN 14 FEET.
SEE PLANS FOR MODIFICATIONS IN DEEPER TRENCHES.

TYPICAL TRENCH SECTION

FOR WATER PIPES

(SEE YARD PIPING PLAN FOR LAYOUT.)

N.T.S.



PAVEMENT NOTES:

1. PAVEMENT SEAL OR OVERLAY FOR PERPENDICULAR PAVEMENT CUTS SHALL HAVE A MINIMUM WIDTH OF 5 FT. ON EACH SIDE OF THE CUT.
2. REFER TO BCPSA MASTER SPECIFICATIONS (SECTION 02700).

PAVEMENT DETAIL

(SEE GRADING PLAN FOR APPLICABLE PAVEMENT AREAS)

N.T.S.

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

VALVE/FITTING LEGEND

1. REDUCER
2. TEE
3. 90° ELBOW
4. 45° ELBOW
5. 22.5° ELBOW
6. 11.25° ELBOW
7. WYE CONNECTION
8. TEE W/ BLIND FLANGE

X-REF: 20280sy1, YARD PIPING XSECT
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Civil\

NOTES:

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PROJECT SUPERVISOR — DEPARTMENT SUPERVISOR

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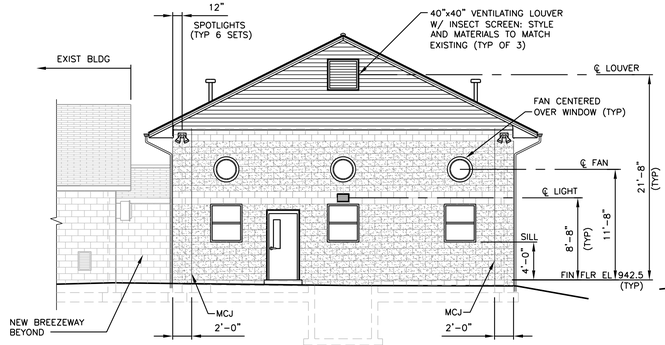
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

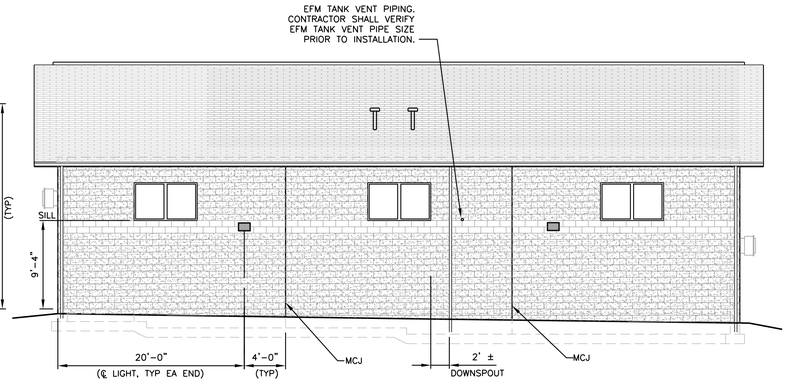
YARD PIPING CROSS SECTIONS & MISCELLANEOUS DETAILS

JOB NO.	20280	DRAWING	C-5	SHEET	10 OF 37



WEST ELEVATION

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



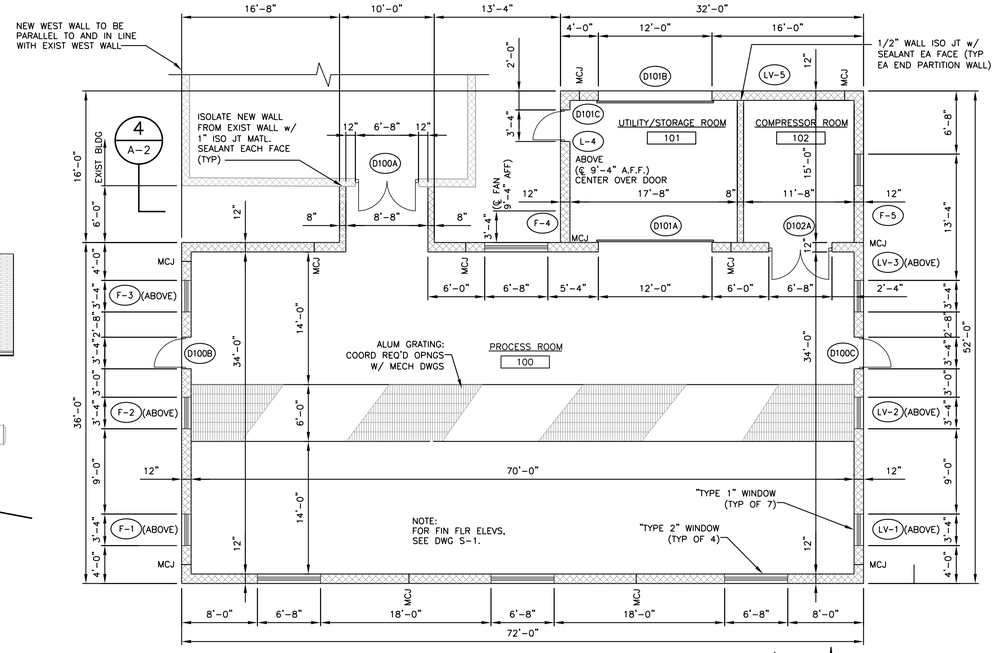
SOUTH ELEVATION

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

2

NOTE:
1. ALL EXTERIOR MASONRY SURFACES (BOTH EXISTING & PROPOSED) TO BE COATED WITH "THOROCOAT A+" BY CHEMREX (OR EQUAL). INSTALL PER MANUF'S WRITTEN INSTRUCTIONS. SUBMIT CUTSHEET FOR APPROVAL.

2. CONTRACTOR SHALL PROVIDE PVC GUTTER WITH "CAREFREE" GUTTER GUARD BY WATERLOOV OR EQUAL TO MATCH PROPOSED GUTTERING ON EXISTING BUILDING. CONTRACTOR SHALL TIE ROOF DRAINS INTO STORM DRAIN SHOWN IN THE DRAWINGS.

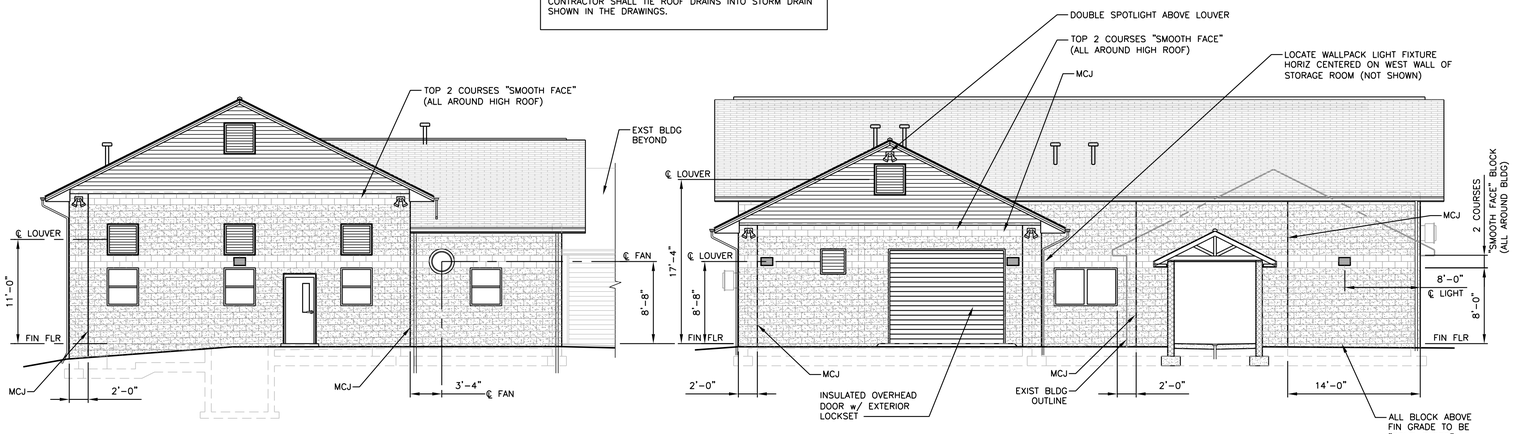


1 A-2 | 2 A-2 | 3 A-2

FLOOR PLAN

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

PLAN

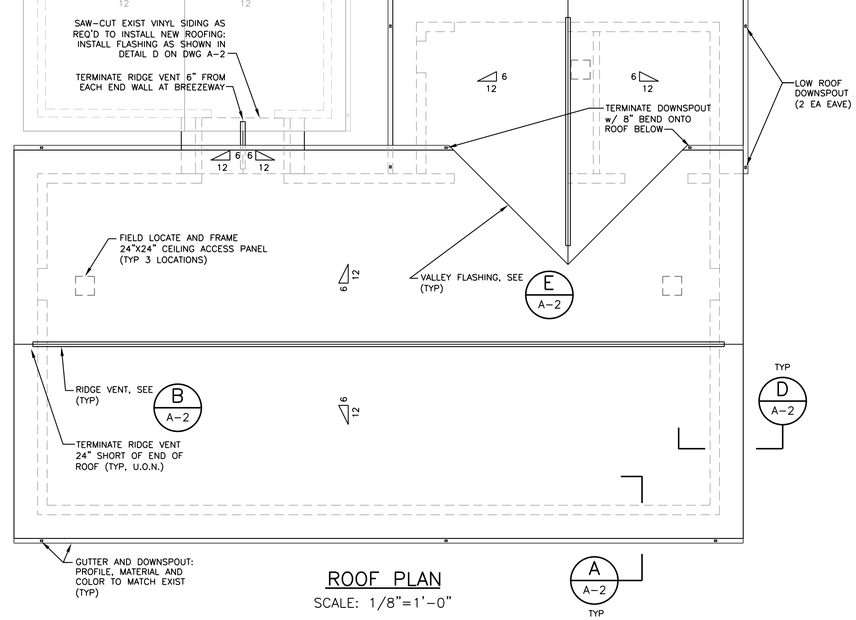


EAST ELEVATION

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

NORTH ELEVATION

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



ROOF PLAN

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

A A-2 TYP

X-REF: 20280gx1 20280-A-TB-EL, 20280-A-TB-P1, 20280-A-TB-RP
8/03; ROANOKE, BSB
P:\20280\30\Drawings\Arch\

NOTES:
Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	REVISED PER OWNER & VDH COMMENTS	SHA	6/04	WPJ	SHA	RRC	6/21/04
1	FOR APPROVAL	SHA	11/03	WPJ	SHA	RRC	1/23/04

PROJECT SUPERVISOR — DEPARTMENT SUPERVISOR

COMMONWEALTH OF VIRGINIA — RHODES R. COPITHORN No. 022719 — PROFESSIONAL ENGINEER — 6-21-04

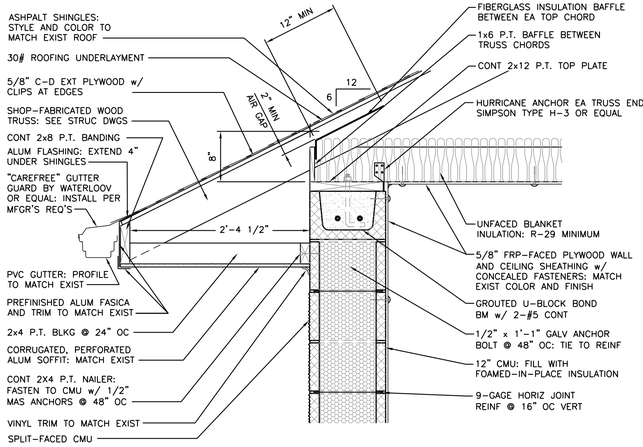
Stearns & Wheler, LLC
Environmental Engineers and Scientists
310 FIRST STREET, S.W., SUITE 150
ROANOKE, VIRGINIA 24011
PHONE: (540) 982-1910 FAX: (540) 982-1913

BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

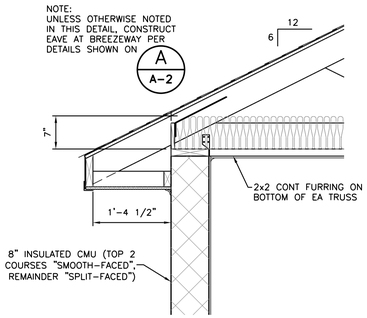
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

PLANS & ELEVATIONS

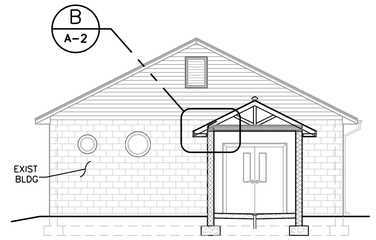
JOB NO. 20280 | DRAWING A-1 | SHEET 11 OF 37



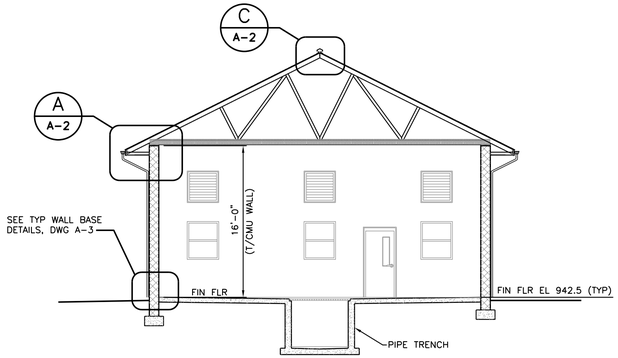
TYP EAVE SECTION — A / A-2
1"=1'-0"



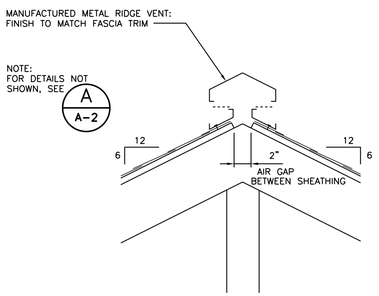
EAVE SECTION – BREEZEWAY — B / A-2
3/4"=1'-0"



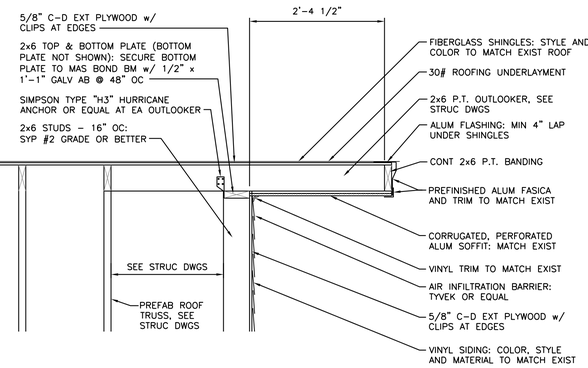
BLDG SECTION — 4 / A-1
1/8"=1'-0"



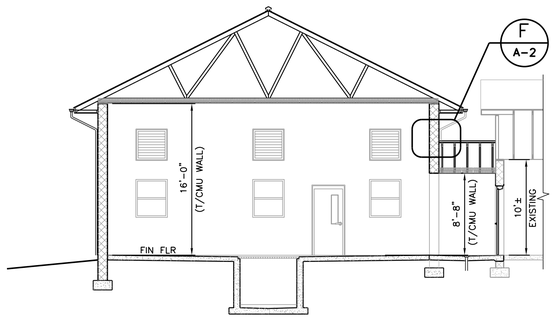
BLDG SECTION — 1 / A-1
SCALE: 1/8"=1'-0"



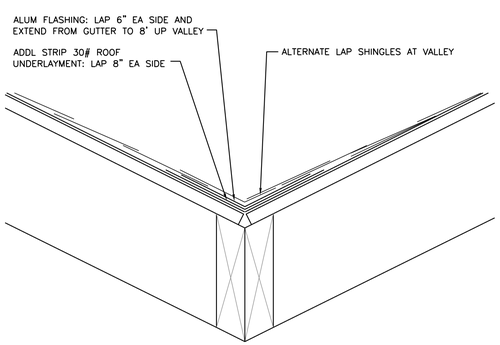
TYP RIDGE VENT — C / A-2
1 1/2""=1'-0"



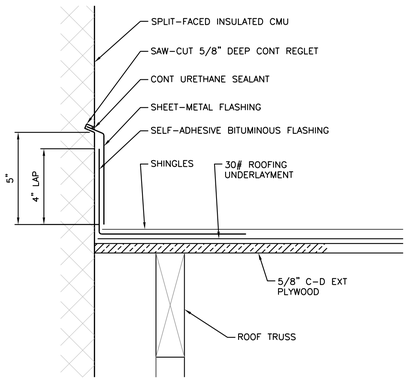
TYP RAKE SECTION — D / A-2
3/4"=1'-0"



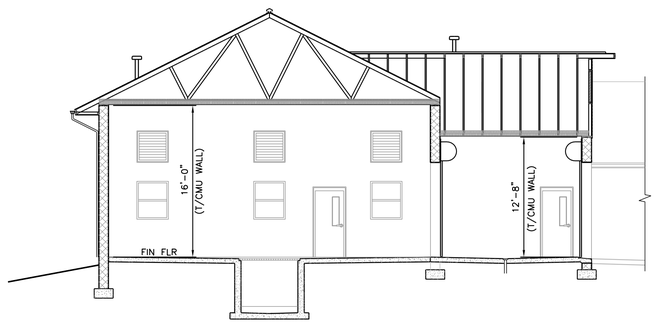
BLDG SECTION — 2 / A-1
SCALE: 1/8"=1'-0"



TYP VALLEY FLASHING — E / A-2
3"=1'-0"



TYP RAKE SECTION — F / A-2
3"=1'-0"



BLDG SECTION — 3 / A-1
SCALE: 1/8"=1'-0"

X-REF: 20280g1, 20280-A-TB-SC
8/03, ROANOKE, BSR
P:\20280\30\Drawings\Arch\

NOTES:
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1	FOR APPROVAL	SHA	11/03	WPJ	SHA	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA — RHODES R. COPITHORN — No. 022719 — 6-21-04 — PROFESSIONAL ENGINEER

Stearns & Wheler, LLC
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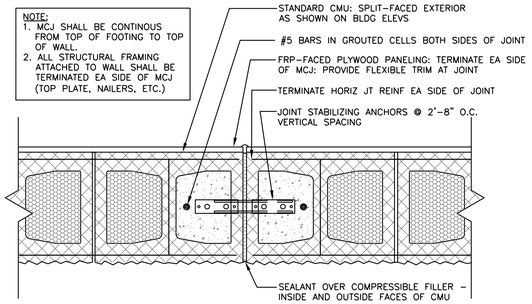
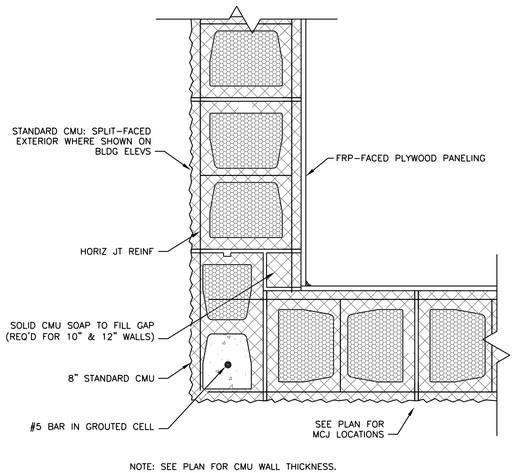
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028
WALL SECTIONS

JOB NO. 20280 | DRAWING A-2 | SHEET 12 OF 37



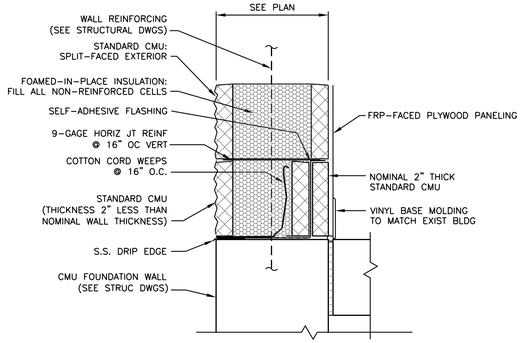
NOTE: SEE PLAN FOR CMU WALL THICKNESS.

CONTROL JOINT DETAIL - INSULATED CMU WALL
NOT TO SCALE



NOTE: SEE PLAN FOR CMU WALL THICKNESS.

CORNER DETAILS - INSULATED CMU WALL
NOT TO SCALE

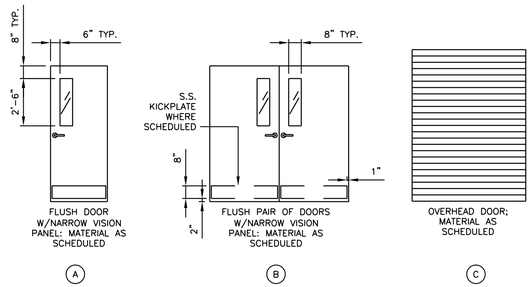


WALL BASE DETAILS - INSULATED CMU WALL
NOT TO SCALE

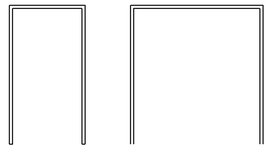
DOOR AND FRAME SCHEDULE

DOOR						FRAME					HARDWARE		PAINT
DOOR No.	MATERIAL	TYPE	SIZE			MATERIAL	ELEV.	DETAILS			SET No.	KEYSIDE	
			WIDTH	HEIGHT	THICK.			HEAD	JAMB	SILL			
D100A	FRP	B	6'-4"	7'-2"	MANF.	FRP	B	H4	J4	S4	MANF.	EXIST RM	FAF
D100B	FRP	A	3'-0"	7'-2"	1 3/4"	FRP	A	H1	J1	S1	1	EXTERIOR	FAF
D100C	FRP	A	3'-0"	7'-2"	1 3/4"	FRP	A	H1	J1	S1	1	EXTERIOR	FAF
D101A	ALUM	C	12'-0"	10'-0"	MANF.	MANF.	-	H2	J2	S2	MANF.	EXTERIOR	FAF
D101B	ALUM	C	12'-0"	10'-0"	MANF.	MANF.	-	H2	J2	S2	MANF.	EXTERIOR	FAF
D101C	FRP	A	3'-0"	7'-2"	1 3/4"	FRP	A	H1	J1	S1	1	EXTERIOR	FAF
D102A	FRP	B	6'-4"	7'-2"	MANF.	FRP	B	H1	J1	-	1	RM 100	FAF

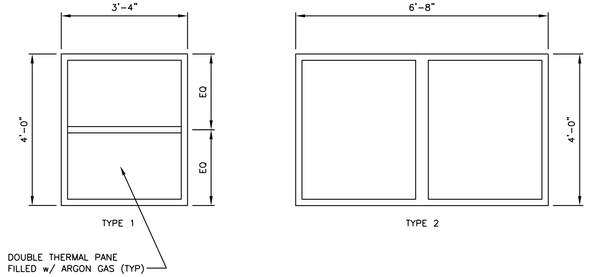
- = NOT REQUIRED
X = REQUIRED
FAF = FACTORY APPLIED FINISH
MANF. = AS SUPPLIED BY MANUFACTURER AND IN CONFORMANCE WITH SPECIFICATIONS
NOTE: NEW LOCKSETS TO MATCH EXISTING. COORD W/ OWNER FOR REQ'D KEYING.



DOOR TYPES
NOT TO SCALE



DOOR FRAME TYPES
NOT TO SCALE



WINDOW TYPES
1/4" = 1'-0"

NOTE:

1. SEE BLEG ELEVS AND PLANS FOR REQ'D LOCATIONS, DWG A-1.
2. WINDOW STYLES, MATERIALS AND CONSTRUCTION TO MATCH EXISTING WINDOWS.
3. DOUBLE WINDOWS ON NORTH AND SOUTH SIDE OF BUILDING SHOWN IN THESE PLANS SHALL BE FIXED WINDOWS AND SHALL MATCH EXISTING WINDOWS.

X-REF: 20280sx1
8/03, ROANOKE, RSR
P:\20280\30\Drawings\Arch\

NOTES:

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PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

Stearns & Wheler, LLC
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310 FIRST STREET, S.W., SUITE 150
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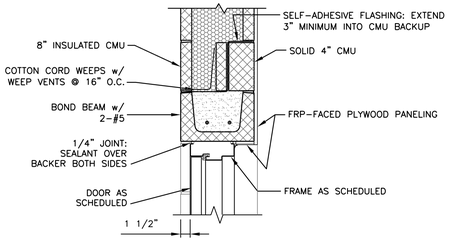
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION - PROJECT NO. 2003 - 028
DETAILS & SCHEDULES

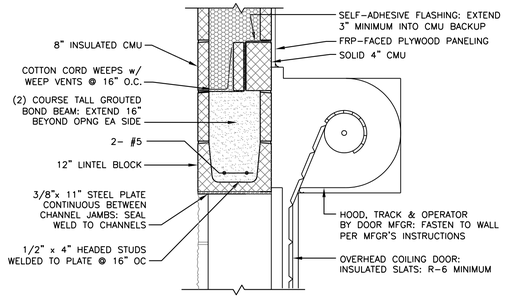
JOB NO. 20280 | DRAWING A-3 | SHEET 13 OF 37

GENERAL HEAD/SILL/JAMB NOTES:

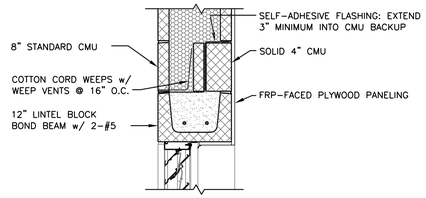
1. ALL NEW EXPOSED WALL AND CEILING SURFACES (INCLUDING RETURNS AROUND DOORS, WINDOWS AND LOUVERS) TO BE COVERED WITH FRP-FACED PLYWOOD WHETHER SHOWN OR NOT. INSTALL VINYL TRIM AT JOINTS TO MATCH EXISTING.
2. SEE BLDG ELEVATIONS ON DWG A-1 FOR LOCATIONS WHERE "SPLIT-FACED" OR "SMOOTH FACED" CMU SHALL BE INSTALLED.
3. FIELD VERIFY EXISTING DIMENSIONS BEFORE FABRICATION OF ANY COMPONENTS THAT ARE TO BE INSTALLED IN OR ON EXISTING CONSTRUCTION. CONSULT WITH ENGINEER OF RECORD IF FIELD CONDITIONS DIFFER FROM WHAT IS SHOWN.
4. DETAILS AT WINDOWS TO BE SIMILAR TO DETAILS AT LOUVERS.



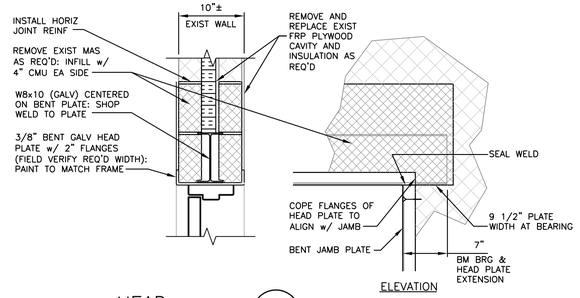
HEAD
SCALE: 1"=1'-0" H1



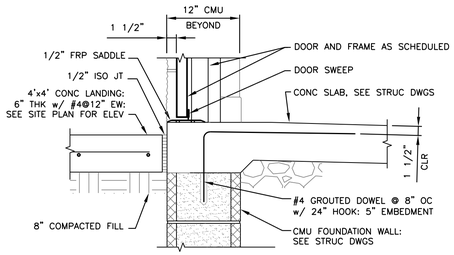
HEAD
SCALE: 1"=1'-0" H2



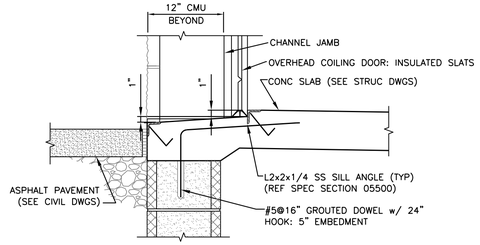
HEAD
SCALE: 1"=1'-0" H3



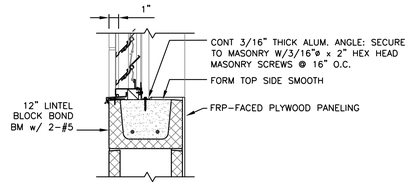
HEAD
SCALE: 1"=1'-0" H4



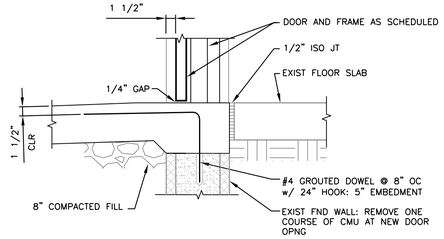
SILL
SCALE: 1"=1'-0" S1



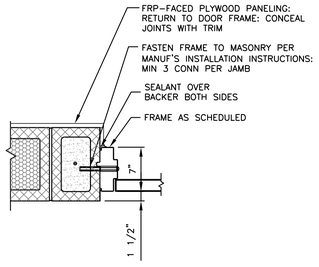
SILL
SCALE: 1"=1'-0" S2



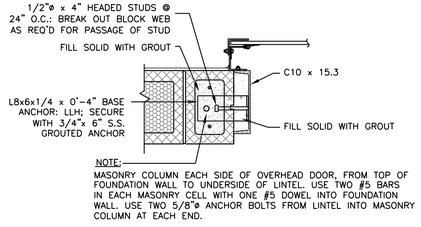
SILL
SCALE: 1"=1'-0" S3



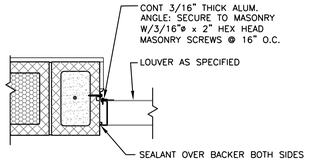
SILL
SCALE: 1"=1'-0" S4



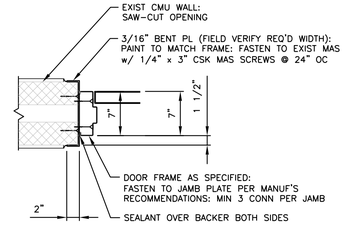
JAMB
SCALE: 1"=1'-0" J1



JAMB
SCALE: 1"=1'-0" J2



JAMB
SCALE: 1 1/2"=1'-0" J3



JAMB
SCALE: 1"=1'-0" J4

1"=1'-0" 1 0 1 2

X-REF: 20280qx1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Arch\

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PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

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COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

Stearns & Wheler, LLC
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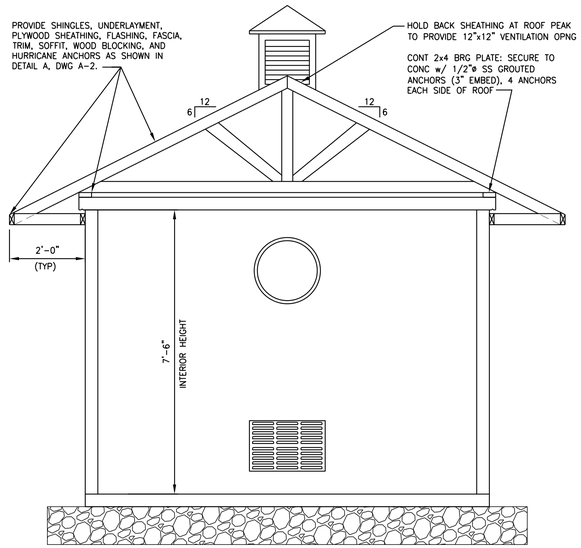
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

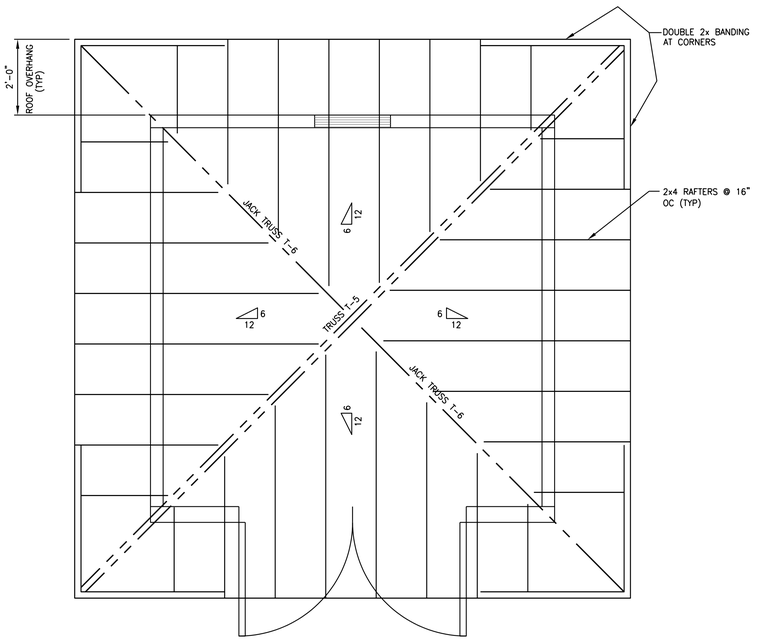
HEAD, SILL & JAMB DETAILS

JOB NO. 20280 | DRAWING A-4 | SHEET 14 OF 37



BLDG SECTION 1/A-5

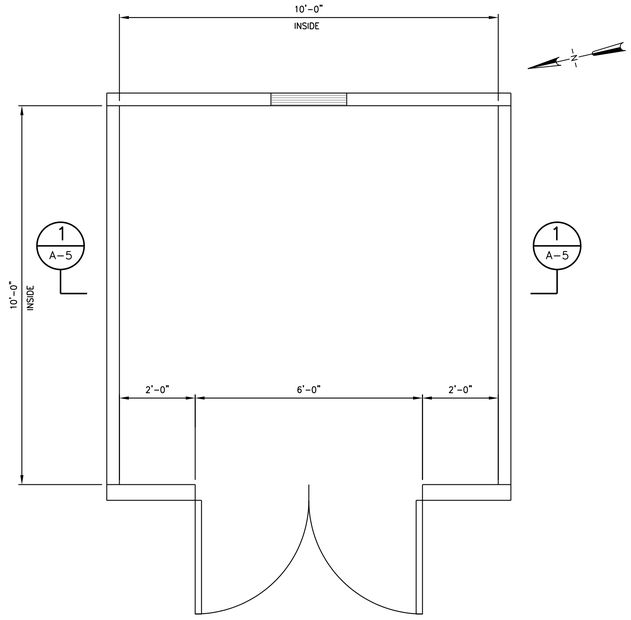
SCALE: 1/2"=1'-0"



ROOF FRAMING PLAN

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

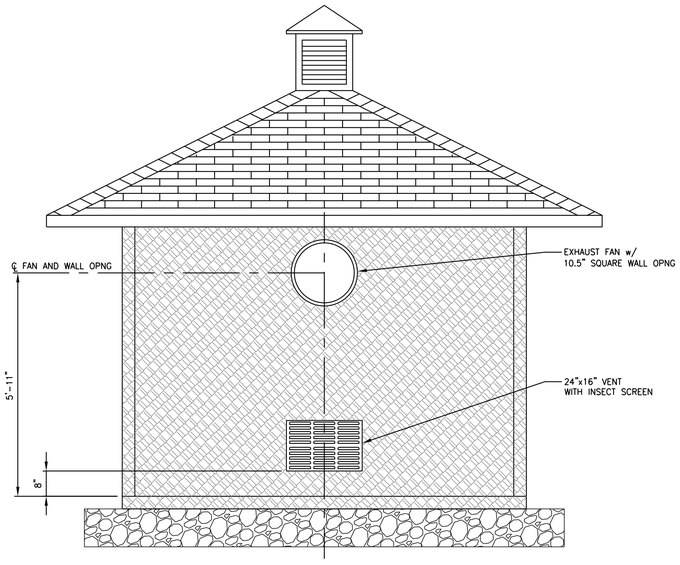
NOTE:
1. SEE DWG S-2 FOR WOOD TRUSS NOTES.
2. PROVIDE MULTIPLE TRUSS T-5 (AND T-6) AS REQ'D BY TRUSS DESIGN.



PLAN

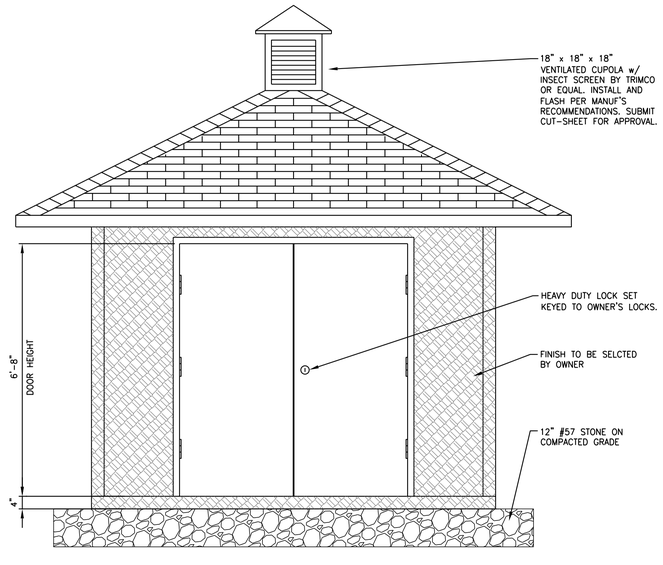
SCALE: 1/2"=1'-0"

NOTE:
1. PRE-ENGINEERED, PRE-CAST CONCRETE BUILDING BY THE CLEAR FLOW CO., WAYNESBORO, VA, (OR EQUAL) 1-800-868-8366. CONTRACTOR MAY SUBMIT FOR ALTERNATE MANUFACTURER.
2. DOORS, LOUVERS AND HARDWARE SHALL BE MANUFACTURER'S STANDARD.
3. PRECAST CONC SHALL HAVE MININUM 5,000 PSI 28-DAY COMPRESSIVE STRENGTH.
4. ROOF SHALL BE CONSTRUCTED "FLAT" TO ACCOMMODATE ROOF FRAMING.



REAR ELEVATION

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



FRONT ELEVATION

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

X-REF: 20280-A-RWPS-PL
8/03, ROANOKE, BSR
P:\20280\30\Drawings\Arch\

NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

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2	RE-SEALED				RRC	6/21/04
1	FOR APPROVAL	SHA	11/03	WPJ	SHA	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

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COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

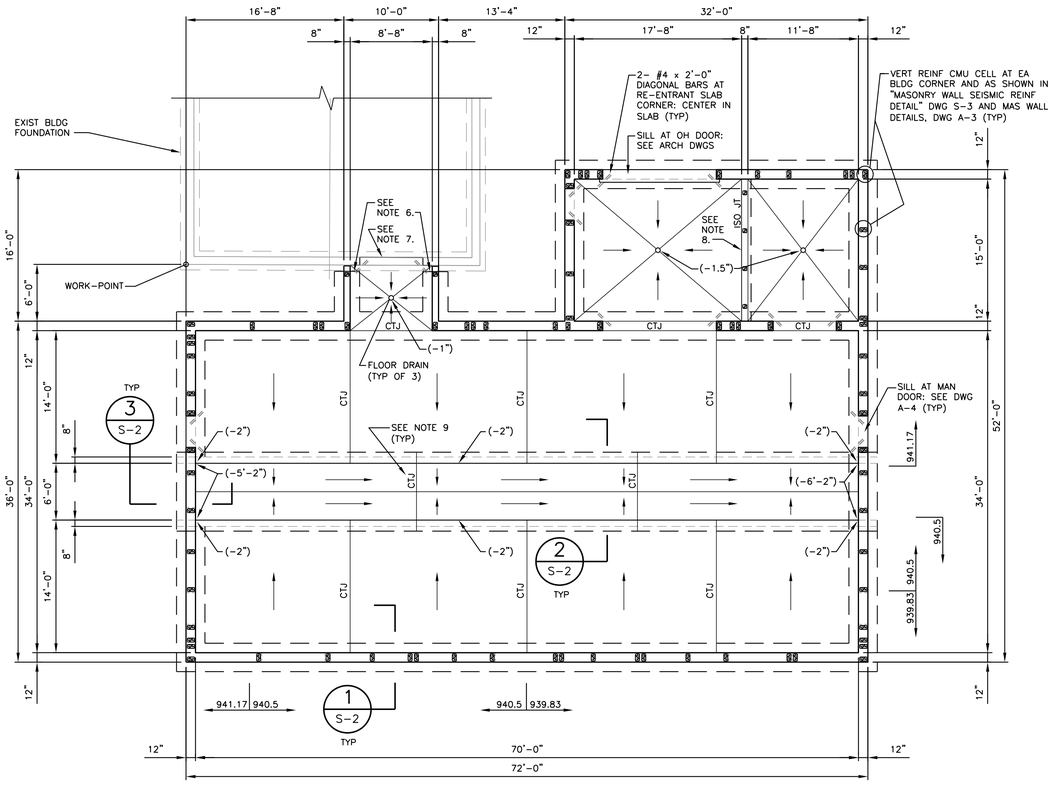
Stearns & Wheler, LLC
Environmental Engineers and Scientists
310 FIRST STREET, S.W., SUITE 150
ROANOKE, VIRGINIA 24011
PHONE: (540) 982-1910 FAX: (540) 982-1913

BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

RAW WATER PUMP STATION
ELECTRICAL BUILDING
PLANS, ELEVATIONS & DETAILS

JOB NO.	20280	DRAWING	A-5	SHEET	15 OF 37

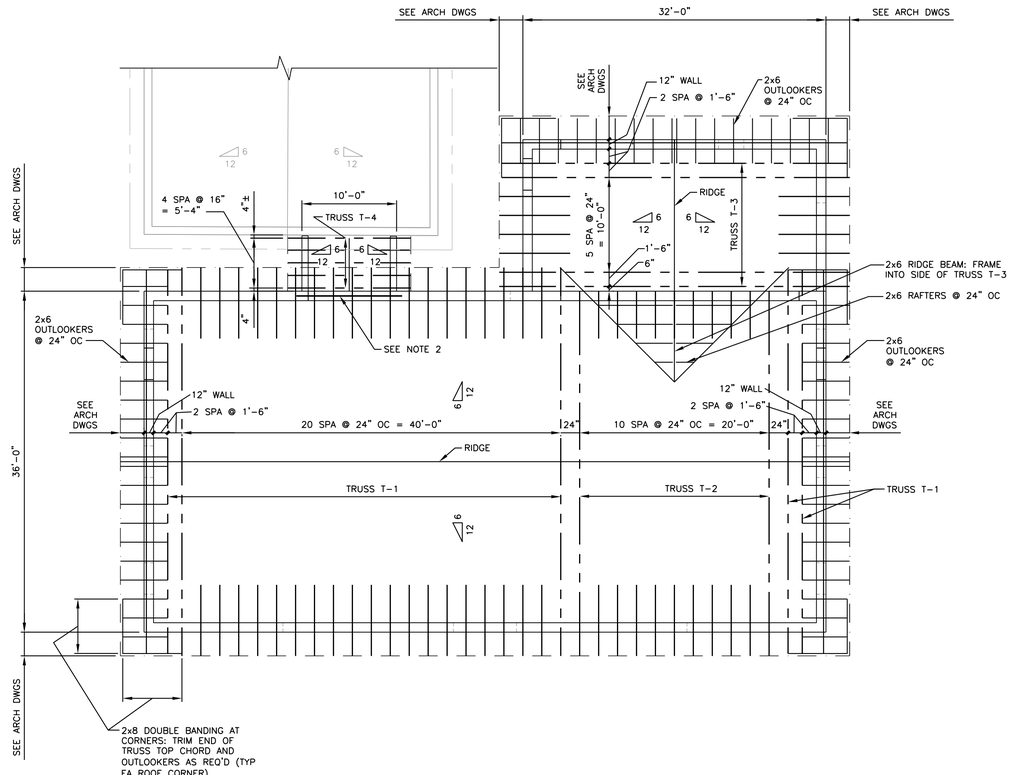


FOUNDATION/SLAB PLAN

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

NOTE:

1. PRIOR TO FOUNDATION CONSTRUCTION, EXISTING GRADE SHALL BE STRIPPED AND REBUILT PER RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER. (REFER TO GEOTECHNICAL REPORT.)
2. T/FTG ELEV = 941.17', UNLESS OTHERWISE NOTED. FOOTING SHALL BE STEPPED AS REQUIRED TO MAINTAIN A MINIMUM 24" OF COVER ABOVE BOTTOM OF FOOTING PER "STEPPED FOOTING DETAIL" ON DWG S-3. APPROXIMATE LOCATIONS OF FOOTING STEPS AND T/FTG ELEVATIONS ARE INDICATED THUS: XX.XX | XX.XX
3. T/SLAB ELEV = 942.5' U.N.O. THUS: (+/- X'-X"). WHERE INDICATED, SLAB SHALL BE UNIFORMLY SLOPED.
4. FLOOR SLAB SHALL BE 6" THICK AND SHALL BE REINF W/ #4 @ 12" OC, EW, CENTERED IN SLAB. PLACE SLAB ON 4" #57 STONE OVER VAPOR BARRIER.
5. SHRINKAGE CONTROL JOINTS ARE DENOTED "CTJ", AND SHALL BE SAW-CUT 12-24 HOURS AFTER SLAB IS PLACED. SLAB SEE DWG S-3 FOR TYPICAL SLAB DETAILS. AT CONTRACTOR'S OPTION, JOINT MAY BE CONSTRUCTION JOINT W/ 1/2" PRE-MOLDED JOINT FILLER.
6. NEW WALL FTG SHALL BE DOWELED INTO EXISTING WALL FTG w/ 3- #5 x 24" GROUTED ANCHORS. EMBED ANCHORS 6" INTO EXIST WALL FTG AT MID-HEIGHT OF FTG.
7. SAW-CUT EXISTING WALL TO FORM OPNG FOR NEW DOUBLE-DOOR. SEE HEAD, SILL AND JAMB DETAILS ON ARCH DWGS.
8. CONSTRUCT THICKENED SLAB UNDER PARTITION WALL. SEE DETAIL DWG S-3. SEE DETAIL 4, DWG S-3 FOR TOP OF WALL BRACE.
9. CONTROL JOINT IN TRENCH WALLS SHALL BE A FORMED JOINT PER DETAIL ON DWG S-3. CONTROL JOINT IN TRENCH SLAB MAY BE SAW-CUT.
10. ALL NEW INTERIOR CONCRETE FLOOR SURFACES AND PIPE TRENCH WALL AND SLAB SURFACES TO RECEIVE CHEMICAL RESISTANT EPOXY COATING (TRE-GLAZE 4508 BY DEVOE COATINGS OR EQUAL). COAT TO 4.0 MILS DRY THICKNESS. FLOOR SURFACES TO HAVE NON-SLIP FINISH. PREPARE SUBSTRATE AND INSTALL PRODUCT PER MANUF'S WRITTEN INSTRUCTIONS. COLOR TO MATCH EXISTING FLOOR COLOR. SUBMIT PRODUCT CUTSHEET FOR APPROVAL.



ROOF FRAMING PLAN

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

NOTE:

1. ROOF AND CEILING SHEATHING SHALL BE INSTALLED WITH LONG PANEL DIMENSION PERPENDICULAR TO THE TRUSS CHORDS. SHEATHING SHALL BE INSTALLED IN A "STAGGERED" PATTERN AND SHALL BE NAILED AT EACH BEARING EDGE WITH 8d GALV NAILS AT 6" OC.
2. INSTALL 16" DEEP MASONRY LINTEL ABOVE BREEZEWAY OPNG. REINFORCE w/ 2- #6 LOCATED 2" FROM BOTTOM OF LINTEL. PROVIDE 8" BEARING EACH END. APPLY FRP-FACED PLYWOOD PER ARCH DWGS.

X-REF: 20280a1, 20280-A-TB-P1, 20280-S-TB-FP, 20280-S-TB-RP
8/03, ROANOKE, BSR
P:\20280\30\Drawings\Struc\

NOTES:

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PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA — RHODES R. COPITHORN No. 022719 — PROFESSIONAL ENGINEER — 6-21-04

Stearns & Wheler, LLC
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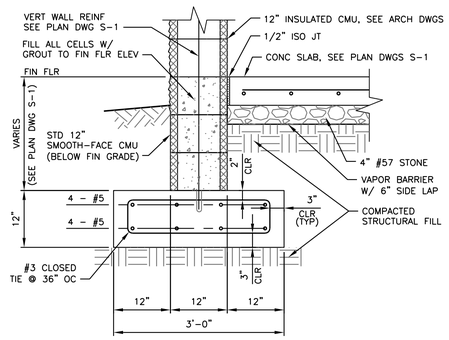
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

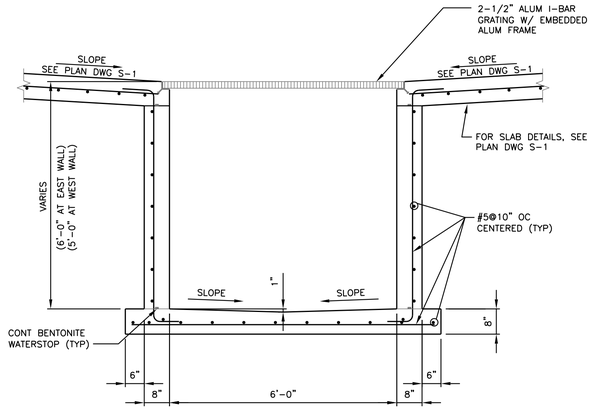
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

FOUNDATION & ROOF FRAMING PLANS

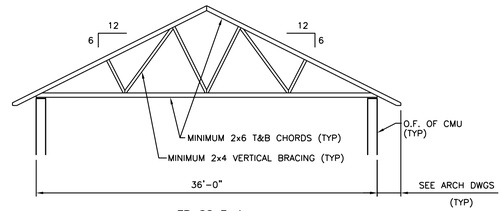
JOB NO. 20280 | DRAWING S-1 | SHEET 16 OF 37



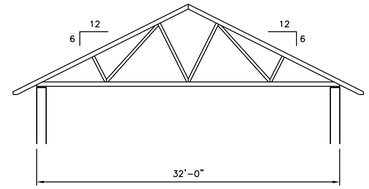
TYP FOUNDATION WALL SECTION (1 / S-1)
3/4"=1'-0"



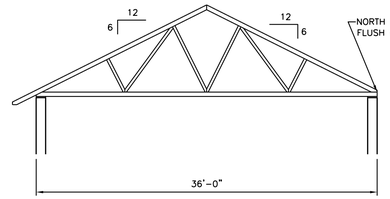
TYP TRENCH SECTION (2 / S-1)
1/2"=1'-0"



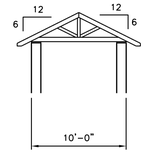
TRUSS T-1



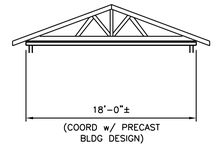
TRUSS T-3



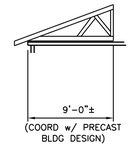
TRUSS T-2



TRUSS T-4



DIAGONAL TRUSS T-5
(REFER DWG A-5)



JACK TRUSS T-6
(REFER DWG A-5)

ROOF TRUSS ELEVATIONS

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

SHOP-FABRICATED WOOD ROOF TRUSS NOTES:

1. PRE-FABRICATED WOOD ROOF TRUSSES SHALL BE DESIGNED FOR, IN ADDITION TO SELF-WEIGHT LOADS, THE FOLLOWING MINIMUM LOADS:

   TOP CHORD LIVE LOAD = 20 PSF
   TOP CHORD DEAD LOAD = 10 PSF
   BOTTOM CHORD LIVE LOAD = 10 PSF
   BOTTOM CHORD DEAD LOAD = 5 PSF

   WIND LOADS IN ACCORDANCE WITH IBC-2001
   EXPOSURE CATEGORY C, IMPORTANCE FACTOR 1.1
   BASIC WIND SPEED (3 SECOND GUST) = 90 MPH

   LIVE LOAD DEFLECTION OF ROOF TRUSS AT MID-SPAN SHALL BE LIMITED TO L/240 (WHERE L IS SPAN LENGTH).

2. SEE SPECIFICATION SECTION 06193 FOR ADDITIONAL NOTES.

CMU PARTITION WALL BRACE (4 / S-1)
1"=1'-0"

TRENCH END WALL DETAILS (3 / S-1)
1/2"=1'-0"

X-REF: 20280sx1, 20280-A-TB-SC, TB-TRENCH, TRENCH END-WALL, TYPFT4
B/DS: HOWADE BSP
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NOTES:
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COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
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PROFESSIONAL ENGINEER

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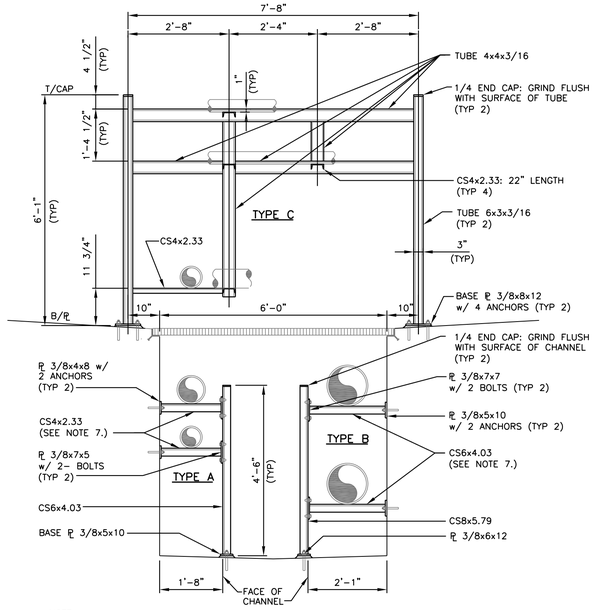
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

SECTIONS & DETAILS

JOB NO.	20280	DRAWING	S-2	SHEET	17 OF 37

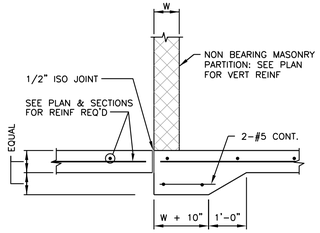


NOTE:

1. ALL SECTIONS & PLATES SHALL BE ALUM 6061-T6.
2. ALL ANCHORS SHALL BE 5/8"ø SS GROUTED, 4" EMBEDMENT.
3. ALL BOLTS SHALL BE 5/8"ø SS.
4. SHOP-WELD ALL CONNECTIONS (3/16" ALL-AROUND FILLET), EXCEPT WHERE NOTED TO BE FIELD-BOLTED.
5. MAX 1" NON-SHRINK GROUT UNDER BASE PLATES AS REQ'D.
6. ANCHOR PIPES TO SUPPORTS w/ 1/2"ø SS FIELD-DRILLED U-BOLTS, SIZE AS REQ'D.
7. FIELD LOCATE REQ'D ELEV OF SUPPORT AND FIELD-DRILL POST FOR BOLTED ATTACHMENT.
8. SEE MECH PLANS FOR REQUIRED LOCATIONS OF PIPE SUPPORT FRAMES.
9. PIPE SUPPORT LOCATIONS ARE SHOWN BASED ON PROPOSED PIPE LAYOUT. CONTRACTOR SHALL COORDINATE FINAL SUPPORT LOCATIONS WITH ACTUAL PIPING LAYOUT.

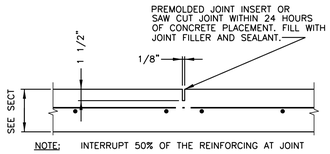
PIPE SUPPORT DETAILS

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



THICKENED SLAB DETAIL

NOT TO SCALE



NOTE: INTERRUPT 50% OF THE REINFORCING AT JOINT

SLAB ON GRADE CONTROL JOINT DETAIL

NOT TO SCALE

GENERAL STRUCTURAL NOTES

A. FOUNDATIONS.
1. MAXIMUM ALLOWABLE SOIL PRESSURE = 2,000 PSF.
2. EXCAVATIONS AND FORMS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO PLACING CONCRETE.
3. ALL FILL INSIDE BUILDING SHALL BE SELECT MATERIAL FREE FROM ROOTS, TRASH, WOOD SCRAPS, AND OTHER EXTRANEOUS MATERIALS. PLACE FILL IN LIFTS NOT EXCEEDING 8 INCHES AND COMPACT EACH LIFT TO 95% DENSITY AT OPTIMUM MOISTURE CONTENT AS MEASURED BY ASTM D698, EXCEPT THE TOP 12 INCHES OF SUBGRADE SHALL BE COMPACTED TO AT LEAST 98% DENSITY AT OPTIMUM MOISTURE CONTENT.

B. CONCRETE.
1. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS AS FOLLOWS:
   SIDEWALKS AND LANDINGS 5,000 PSI
   ALL OTHER CONCRETE 4,500 PSI
2. ANCHOR BOLT LENGTHS SHOWN ON THE DRAWINGS SHALL INCLUDE HOOKS OF NOT LESS THAN 3 INCHES IN LENGTH. PROVIDE ONE NUT AND ONE WASHER WITH EACH ANCHOR BOLT UNLESS OTHERWISE NOTED.

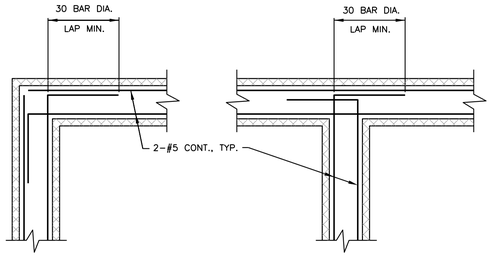
C. REINFORCING STEEL.
1. BARS SHALL BE ROLLED FROM NEW BILLET-STEEL CONFORMING TO ASTM A615, GRADE 60.
2. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 OR ASTM A497.
3. DETAIL AND FABRICATE REINFORCING STEEL IN ACCORDANCE WITH "ACI DETAILING MANUAL - 1994," PUBLICATION SP-66(94).
4. REINFORCING STEEL IN PLACE SHALL BE REVIEWED BY THE ENGINEER PRIOR TO PLACING CONCRETE.
5. PROVIDE BARS AT CORNERS AND INTERSECTIONS OF THE SAME NUMBER AND SIZE AS LONGITUDINAL BARS IN SLABS, FOOTINGS AND WALLS.

D. GROUT.
1. PROVIDE NON-SHRINK GROUT UNDER ALL COLUMN BASE PLATES AND BEAM BEARING PLATES. NON-SHRINK GROUT SHALL CONFORM TO CORPS OF ENGINEERS SPECIFICATION CRD-C 621-83.

E. DESIGN LIVE LOADS.
STRUCTURAL MEMBERS SHALL BE DESIGNED FOR FULL DEAD LOADS AND THE FOLLOWING LIVE LOADS:

1.	ROOF	20 PSF
2.	WIND	90 MPH (MAX 3-SEC GUST) IBC-2001, I = 1.1, EXPOSURE C
3.	FLOOR	100 PSF (LIGHT INDUSTRIAL)
4.	LATERAL EARTH PRESSURE	60 PCF (AT REST) 45 PCF (ACTIVE)
5.	SEISMIC	Ss = 0.25g, S1 = 0.09g SEISMIC USE GROUP = II , SPC = B

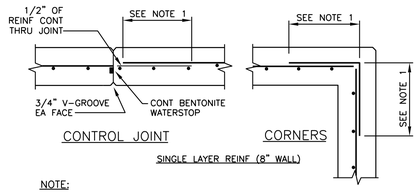
F. CONSTRUCTION SAFETY.
1. THESE STRUCTURAL DRAWINGS DO NOT CONTAIN NECESSARY COMPONENTS FOR SAFETY DURING CONSTRUCTION.
2. THE CONTRACTOR SHALL PROVIDE ADEQUATE TEMPORARY BRACING, SHORING AND GUYING OF FRAMING AGAINST WIND, CONSTRUCTION LOADS AND OTHER TEMPORARY FORCES UNTIL SUCH PROTECTION IS NO LONGER REQUIRED FOR THE SAFE SUPPORT OF THE FRAMING.



EXTERIOR CORNER INTERIOR CORNER

BOND BEAM REINFORCING PLACEMENT DETAIL

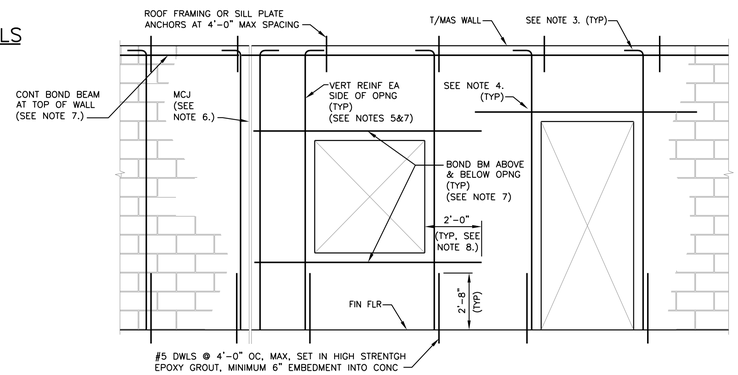
NOT TO SCALE



NOTE:
1. REINFORCING STEEL SHALL BE LAPPED PER SPECIFICATION SECTION 03001.

HORIZONTAL WALL REINFORCING DETAILS PLAN VIEW

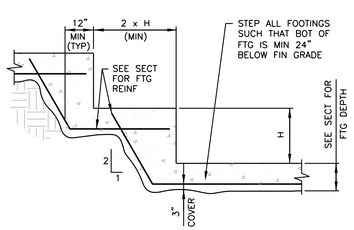
NOT TO SCALE



NOTE:
1. REINFORCING TYPICAL AT INTERIOR AND EXTERIOR WALLS AS NOTED.
2. MAXIMUM SPACING BETWEEN VERT REINF FOR EXTERIOR WALLS SHALL BE 8'-0". MAXIMUM VERT REINF SPACING FOR INTERIOR MASONRY PARTITION WALL SHALL BE 4'-0". SEE STRUCTURAL DWGS FOR ADDL REINF LOCATIONS.
3. VERT REINF FOR EXTERIOR WALLS SHALL TERMINATE w/ STANDARD HOOK 2" CLR FROM TOP OF BOND BEAM.
4. VERT REINF SHALL BE CONTINUOUS THROUGH BOND BEAM BY PROVIDING 3" DIAMETER OPENING IN BOTTOM OF BOND BEAM.
5. WHERE OPNG OCCURS ABOVE A HORIZ BOND BM, BOTTOM OF VERT REINF SHALL BE TERMINATED IN BOTTOM OF BOND BM w/ STD HK.
6. PROVIDE VERT REINF CELL EA SIDE OF MASONRY CONTROL JOINT. JOINT SHALL BE CONTINUOUS FROM TOP OF FOOTING TO TOP OF WALL. SEE ARCH DWGS FOR MCJ LOCATIONS.
7. BOND BM REINF & VERT REINF SHALL BE 1- #5 CONT, U.N.O. VERT REINF SHALL BE CENTERED IN CELL. BOND BM REINF SHALL BE CENTERED IN WALL AND LOCATED 2" ABOVE BOT OF BOND BM.
8. WHERE ADJACENT OPNG OCCURS WITHIN 2'-0", TERMINATE BOND BM AT EDGE OF ADJACENT OPENING.

MASONRY WALL SEISMIC REINFORCING DETAIL

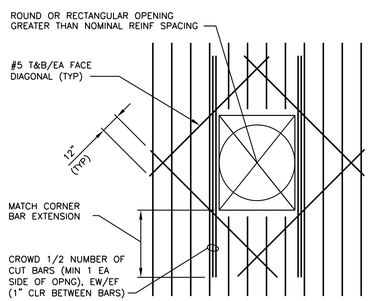
(SINGLE WYTHE WALL)
NTS



NOTE: SEE FOUNDATION PLAN FOR OTHER LOCATIONS WHERE FOOTING STEP REQ'D.

STEPPED FOOTING DETAIL

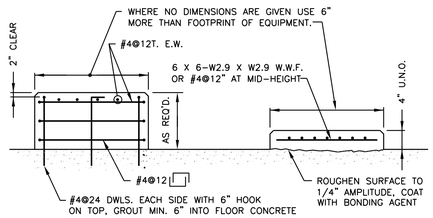
NOT TO SCALE



NOTE:
1. BARS SHOWN IN VERT DIRECTION ONLY FOR CLARITY. TREAT BARS IN HORIZ DIRECTION IN SAME MANNER.
2. DETAIL IS APPLICABLE AT ALL FORMED OPNGS LARGER IN ANY DIRECTION THAN THE NOMINAL BAR SPACING.

WALL/SLAB OPENING DETAIL

NOT TO SCALE



TYPICAL EQUIP./PUMP PAD HOUSE KEEPING PAD (USE WHERE NOTED ON DWGS.)

REINFORCEMENT DETAILS FOR EQUIPMENT PADS

NOT TO SCALE

X-REF: 20280ss1, 20280-PIPE-SUPT, HOR-WAL-RFNG-SNGL
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NOTES:

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PROJECT SUPERVISOR DEPARTMENT SUPERVISOR

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RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

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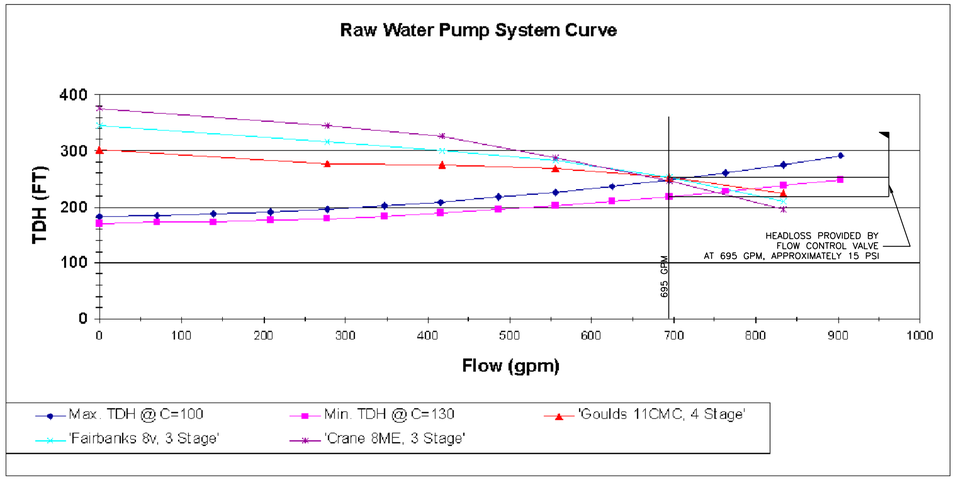
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028
STANDARD STRUCTURAL DETAILS

JOB NO.	20280	DRAWING	S-3	SHEET	18 OF 37



RAW WATER PUMP NOTES:

1. CONTRACTOR SHALL FURNISH AND INSTALL IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS TWO (2) SUBMERSIBLE TURBINE PUMPS WITH EACH PUMP CAPABLE OF MEETING THE FOLLOWING OPERATING CONDITIONS:

   FLOWRATE: 695 GPM

   TDH: 250 FT

2. SUBMERSIBLE TURBINE PUMP MANUFACTURERS SHALL BE GOULDS, FAIRBANKS–MORSE, CRANE–DEMING, OR APPROVED EQUAL.

3. THE PUMP(S) SHALL BE DESIGNED AND FURNISHED IN ACCORDANCE WITH THE LATEST HYDRAULIC INSTITUTE AND AWWA SPECIFICATIONS.

4. THE PUMP(S) SHALL OPERATE SATISFACTORILY WITH A REASONABLE SERVICE LIFE AND NOT OVERLOAD THE SERVICE FACTOR OF A WATER LUBRICATED, WATER COOLED MOTOR WITH STAINLESS STEEL JACKET.

5. CONTRACTOR SHALL INSTALL THE EQUIPMENT ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

6. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS AND SHALL NOTIFY ENGINEER OF ANY SPECIFIC DIFFERENCE.

GUARANTEE

1. CONTRACTOR SHALL PROVIDE EQUIPMENT GUARANTEES IN ACCORDANCE WITH ARTICLE 13 OF THE GENERAL CONDITIONS IN THE CONTRACT SPECIFICATIONS.

2. BY SUPPLYING A PRODUCT UNDER THE CONTRACT, THE MANUFACTURER AND CONTRACTOR JOINTLY AGREE THAT ALL MANUFACTURER'S WARRANTIES, EXPRESSED OR IMPLIED, PASS THROUGH THE CONTRACTOR TO OWNER. THIS WARRANTY OBLIGATION STARTS ON THE DATE OF THE SUBSTANTIAL COMPLETION AND SURVIVES ANY INSPECTION BY, DELIVERY TO, ACCEPTANCE BY OR PAYMENT BY THE OWNER OR CONTRACTOR FOR THE GOODS FURNISHED BY THE MANUFACTURER. FURTHER, THIS WARRANTS THAT THE EQUIPMENT DESIGNED, MANUFACTURED AND/OR USED MEETS ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS, INCLUDING APPLICABLE OSHA STANDARDS. THIS REQUIREMENT DOES NOT CHANGE OR LIMIT THE REQUIREMENTS FOR PERFORMANCE AFFIDAVITS DESCRIBED IN ARTICLE 1.03 OF THE CONTRACT SPECIFICATIONS.

SERVICES OF MANUFACTURER'S REPRESENTATIVE

1. PROVIDE SERVICES OF THE EQUIPMENT MANUFACTURER OR THEIR APPROVED REPRESENTATIVE IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

2. PROVIDE JOINTLY TO THE OWNER AND THE ENGINEER AN INSTALLATION CERTIFICATE FROM THE EQUIPMENT MANUFACTURER OR THEIR APPROVED REPRESENTATIVE, STATING THAT THE EQUIPMENT HAS BEEN PROPERLY INSTALLED AND TESTED TO THEIR SATISFACTION AND THAT ALL FINAL ADJUSTMENTS REQUIRED HAVE BEEN MADE.

3. FURNISH ALL NECESSARY MATERIALS (INCLUDING LUBRICANTS, CHEMICALS, ETC.) AND EQUIPMENT (INCLUDING MEASURING DEVICES, ETC.) FOR INITIAL OPERATION AND TESTING.

INITIAL OPERATION AND FIELD TESTING

1. TESTS, TRIALS AND INITIAL OPERATION SHALL BE PERFORMED IN ACCORDANCE WITH THESE SPECIAL PROVISIONS:

   A. CONTRACTOR SHALL PERFORM 6–HOUR STEP TEST AFTER THE NEW UNIT IS INSTALLED USING THE FLOW RATES SPECIFIED FOR THE NEW PUMP. WATER DEPTH, PUMPING RATE, AND DISCHARGE PRESSURE SHALL BE RECORDED AT 10 MINUTE INTERVALS DURING THE TEST. CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AND MONITORING DEVICES FOR THE TEST. TESTING RESULTS SHALL BE GIVEN TO THE ENGINEER.

   B. ALL TESTING SHALL BE DONE IN THE PRESENCE OF THE ENGINEER AND THE EQUIPMENT MANUFACTURER OR THEIR APPROVED REPRESENTATIVE.

   C. FINAL ACCEPTANCE OF THE EQUIPMENT WILL BE MADE AFTER THE EQUIPMENT HAS BEEN DEMONSTRATED IN THE FIELD TO MEET THE PERFORMACE REQUIREMENTS UNDER ALL NORMAL OPERATING CONDITIONS AND VERIFICATION THAT THE MOTORS ARE NOT OVERLOADED IN NORMAL OPERATING CONDITIONS.

   D. ADJUST, REPAIR, MODIFY, OR REPLACE ANY COMPONENTS OF THE SYSTEM THAT FAIL TO MEET ALL SPECIFIED REQUIREMENTS.

RAW WATER PUMP/PIPING SUPPORT NOTES:

1. CONTRACTOR SHALL FIELD ERECT AND INSTALL SUPPORT FRAMES FOR THE TWO (2) RAW WATER PUMPS & PIPING ASSEMBLIES.

2. SUPPORT FRAMES SHALL BE CAPABLE OF HANDLING LATERAL & VERTICAL LOADS/THRUSTS FROM PUMP OPERATION.

3. ALL SUPPORT FRAMES SHALL BE CONSTRUCTED OF ALUMINUM.

4. CONTRACTOR SHALL FIELD MEASURE LENGTH FOR SUPPORT AND GEOMETRY PRIOR TO FABRICATION.

5. CONTRACTOR SHALL REMOVE ALL EXISTING BRACING/SUPPORTS AFTER INSTALLATION OF NEW PIPE SUPPORT(S).

SEQUENCE OF CONTRUCTION NOTES:

1. COORDINATE WITH OWNER FOR RAW WATER PUMP REPLACEMENT/MODIFICATIONS.

2. REFER TO NOTES FOR THE ELECTRICAL CONNECTIONS/MODIFICATIONS AT THE RAW WATER PUMP STATION.

3. ONE RAW WATER PUMP SHALL REMAIN IN SERVICE AT ALL TIMES DURING PUMP REMOVAL/INSTALLATION AT THE RAW WATER PUMP STATION, UNLESS OTHERWISE APPROVED BY OWNER.

4. INTERRUPT ELECTRICAL SERVICE TO ONE RAW WATER PUMP. INTERRUPT CONTROLS.

5. REMOVE EXISTING RAW WATER PUMP ASSEMBLY FROM EXISTING 8" PIPE IN THE WET WELL STRUCTURE.

6. USING APPROPRIATE LIFTING EQUIPMENT, LIFT THE RAW WATER PUMP ASSEMBLY OUT OF THE WET WELL.

7. RE–CORE HOLE IN THE INTERIOR CONCRETE SLAB TO ALLOW FOR NEW RAW WATER PUMP INSTALLATION. RE–CORE SHALL NOT EXCEED 14" IN DIAMETER WITHOUT APPROVAL OF OWNER AND ENGINEER. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT ANY CONCRETE OR DEBRIS FROM FALLING INTO THE WET WELL.

8. ADD ADDITIONAL STRUCTURAL FRAMING TO EXISTING 8" PIPE TO SUPPORT ADDITIONAL WEIGHT REQUIREMENTS OF NEW RAW WATER PUMP/COLUMN ASSEMBLY.

9. LOWER NEW RAW WATER PUMP, MOTOR, INDUCER SLEEVE, COLUMN, AND ASSOCIATED APPURTENANCES DOWN INTO THE WET WELL WITH APPROPRIATE LIFTING EQUIPMENT.

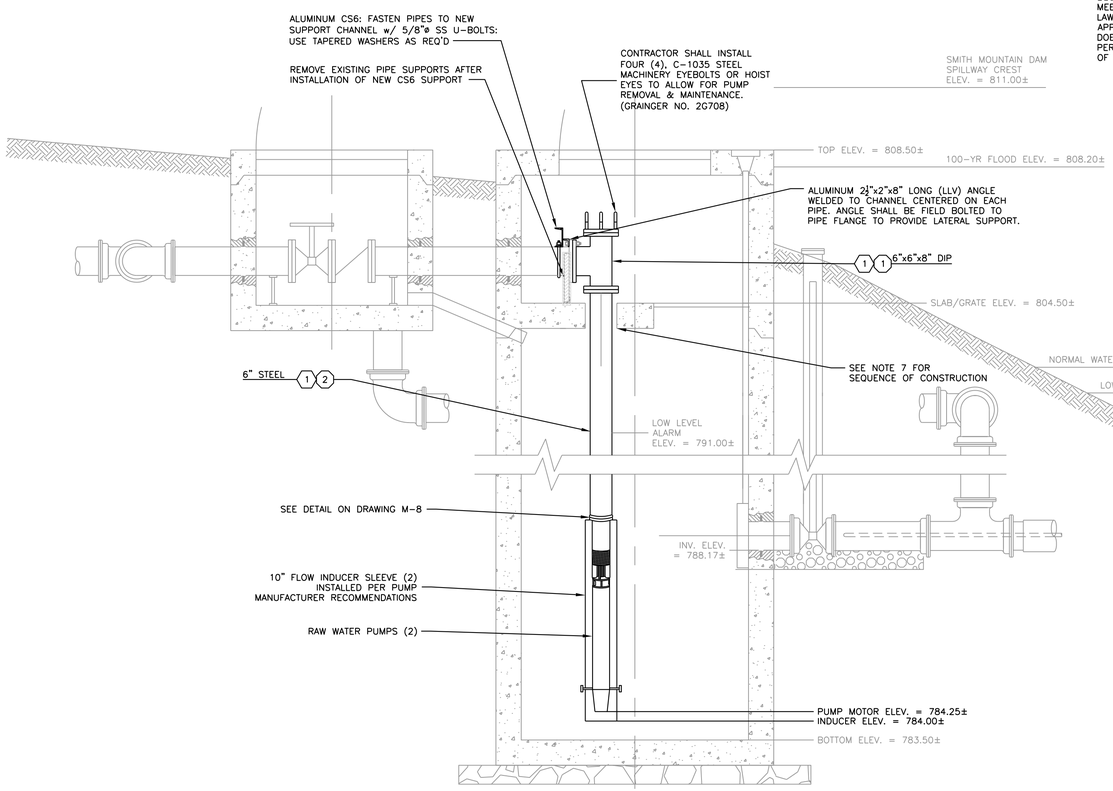
10. BOLT PROPOSED TEE W/ BLIND FLANGE TO EXISTING 8" PIPE.

11. CONNECT NEW ELECTRICAL SERVICE FOR NEW PUMP.

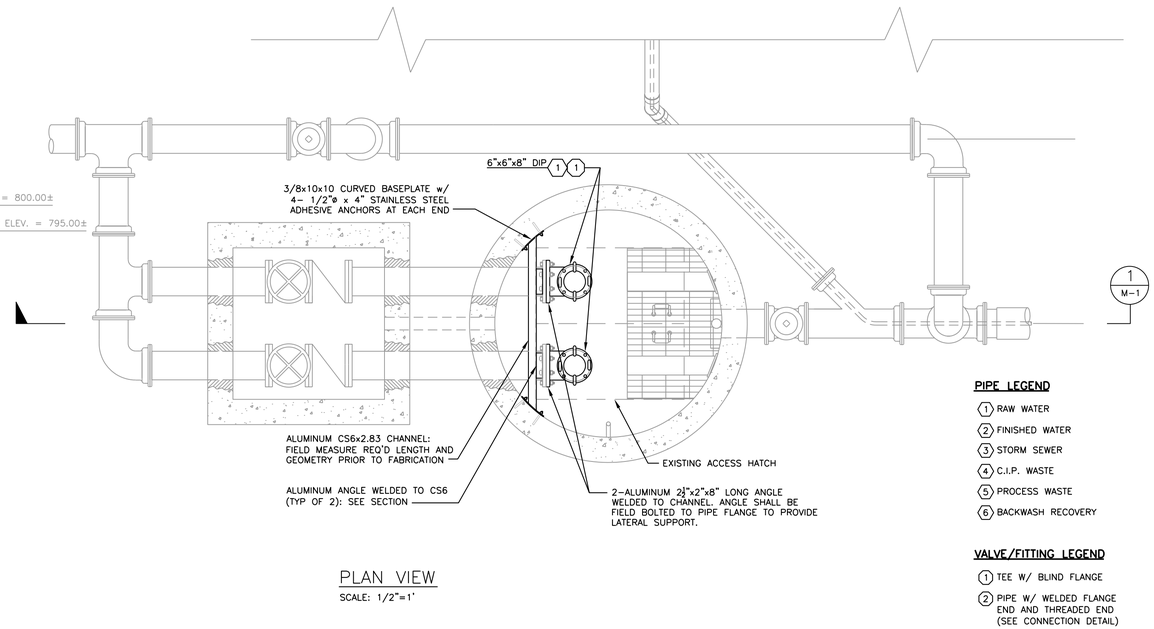
12. CONNECT CONTROL WIRING.

13. MAKE ALL ELECTRICAL CONNECTIONS NECESSARY TO ENERGIZE NEW RAW WATER PUMP AND TEST EQUIPMENT.

14. FOLLOWING EQUIPMENT TESTING, INITIALIZE NEW RAW WATER PUMP AND INTERRUPT ELECTRICAL SERVICE TO REMAINING RAW WATER PUMP FOR REMOVAL. FOLLOW SEQUENCE AS DESCRIBED ABOVE FOR SECOND RAW WATER PUMP REMOVAL/INSTALLATION.



PUMP STATION CROSS–SECTION (1 / M–1)
SCALE: 1/2"=1'



PLAN VIEW
SCALE: 1/2"=1'

PIPE LEGEND

1. RAW WATER
2. FINISHED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

VALVE/FITTING LEGEND

1. TEE W/ BLIND FLANGE
2. PIPE W/ WELDED FLANGE END AND THREADED END (SEE CONNECTION DETAIL)

NOTE: DRAWINGS OF EXISTING FACILITIES WERE PROVIDED BY THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY (BCPSA).

X–REF: 20280ga1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Mech\

NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	RE–SEALED				RRC	6/21/04
1	FOR APPROVAL	BSR	11/03	WPJ	CMT	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

Stearns & Wheler, LLC
Environmental Engineers and Scientists
310 FIRST STREET, S.W., SUITE 150
ROANOKE, VIRGINIA 24011
PHONE: (540) 982–1910 FAX: (540) 982–1913

BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

RAW WATER PUMP STATION MECHANICAL

JOB NO. 20280 | DRAWING M–1 | SHEET 19 OF 37

AUTOMATIC STRAINER NOTES (2)

1. AUTOMATIC STRAINER SHALL BE HAYWARD 6" MODEL 596 AUTOMATIC SELF CLEANING STRAINER. STRAINER SHALL BE CAST IRON CLASS 125 FLANGE 150 PSI WITH THREADED BACKWASH CONNECTION, ¾ HP BACKWASH ARM MOTOR, AND A DURAWEDGE STAINLESS STEEL SCREEN ELEMENT HAVING AN OPENING OF 0.015" (40 MESH).

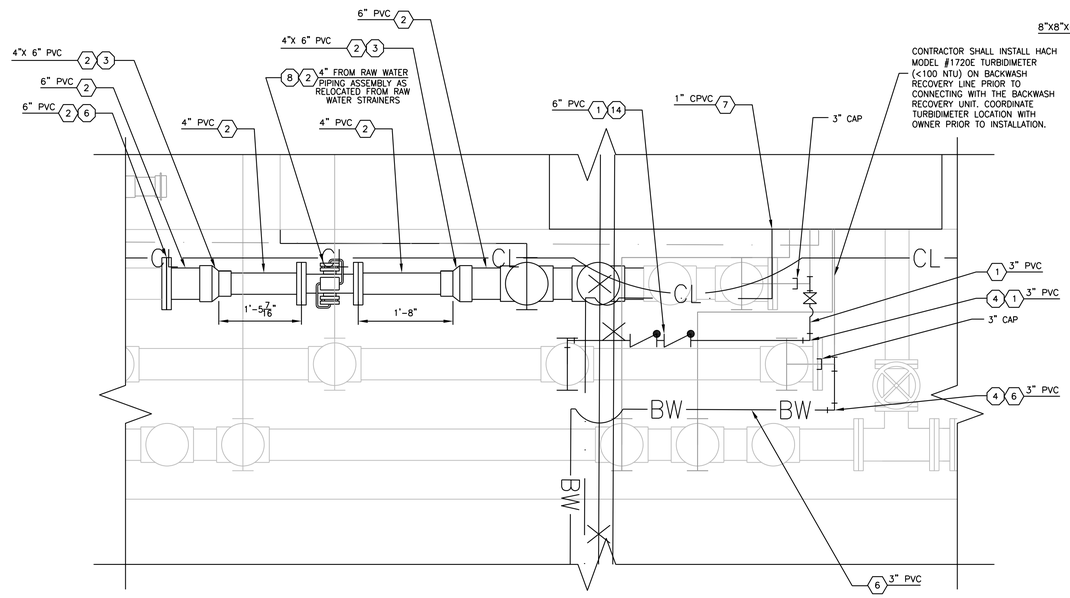
2. AUTOMATIC STRAINER CONTROL SYSTEM SHALL BE HAYWARD AUTOMATIC CONTROL SYSTEM (ACS-4) WITH THE CAPABILITY OF CONNECTING & TRANSMITTING INFORMATION TO THE PLANT PLC.

3. ACS-4 CONTROL SYSTEM COMPONENTS:

   SYSTEM FEATURES A NEMA 4 RATED (WATER & DUST TIGHT) PANEL BOX COMPLETE WITH ADJUSTABLE TIMER, DIFFERENTIAL PRESSURE OVERRIDE, 10 AMP CONTROL RELAY FOR BACKWASH VALVE ACTIVATION, DISPLAY LIGHTS TO INDICATE POWER ON BACKWASH VALVE OPEN – AND HIGH DIFFERENTIAL PRESSURE. A SELECTOR SWITCH IS ALSO INCLUDED TO MANUALLY CONTROL THE BACKWASH VALVE FUNCTIONS OF OFF OR ON-AUTO. THE PANEL ALSO HAS CONTACT TERMINALS FOR A MOTOR STARTER, AN EXTERNAL ALARM CONNECTION, A MOTOR STARTER, A 460V/120V DUAL VOLTAGE TRANSFORMER, & INCLUDES THE MOTOR STARTER & NECESSARY CONTROLS FOR THE AURORA MODEL 321 PUMP. THE PANEL REQUIRES 110 VAC INPUT & IS CSA APPROVED. THE PANEL HAS A DIFFERENTIAL PRESSURE SWITCH & AN ELECTRICALLY ACTUATED BALL VALVE THAT CONTROLS THE BACKWASH FUNCTION.

4. CONTROL SYSTEM OPERATION:

   SYSTEM SHALL OPERATE IN WHAT HAYWARD DEFINES AS "AUTOMATIC INTERMITTENT" MODE. THIS MODE IS ADJUSTABLE BY SETTING THE TIMER IN THE PANEL THAT CONTROLS THE FREQUENCY OF BACKWASHING & THE "OPEN" TIME OF THE BACKWASH VALVE. THE CONTROL SYSTEM SHALL ALSO MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE STRAINER. BACKWASH SHALL BE INITIATED IF THE DIFFERENTIAL PRESSURE RISES ABOVE 2 PSI ACROSS THE STRAINER. THE DIFFERENTIAL PRESSURE SWITCH SHALL COMPENSATE FOR SUDDEN HIGH LOADINGS BY OVERRIDING THE TIME CYCLE & INITIATING BACKWASH SHOULD THE DIFFERENTIAL PRESSURE RISE ABOVE THE SET POINT.



FLOWMETER & BACKWASH RECOVERY CONNECTION DETAIL (2)

NOT TO SCALE

FLOWMETER SPECIFICATIONS:

1. CONTRACTOR SHALL FURNISH AND INSTALL AN ELECTROMAGNETIC FLOW METER (ISCO OR APPROVED EQUAL) SUITABLE FOR FIXED-SITE MEASUREMENT OF BI-DIRECTIONAL FLOW IN A FULL PIPE. THE FLOW METER SHALL CONSIST OF A FLOW TUBE AND A FLOW TRANSMITTER, WHICH SHALL INDICATE, TOTALIZE AND TRANSMIT FLOW. THE FLOW TUBE SHALL USE A SPOOL PIECE CONFIGURATION WITH FIELD-INTERCHANGEABLE SENSORS CONTAINING COILS AND ELECTRODES.

2. THE FLOW METER SHALL MEASURE, INDICATE, AND TOTALIZE FLOW RATES TO WITHIN ±0.5 PERCENT OF ACTUAL FLOW FOR VELOCITIES OF 1-50 FEET PER SECOND.

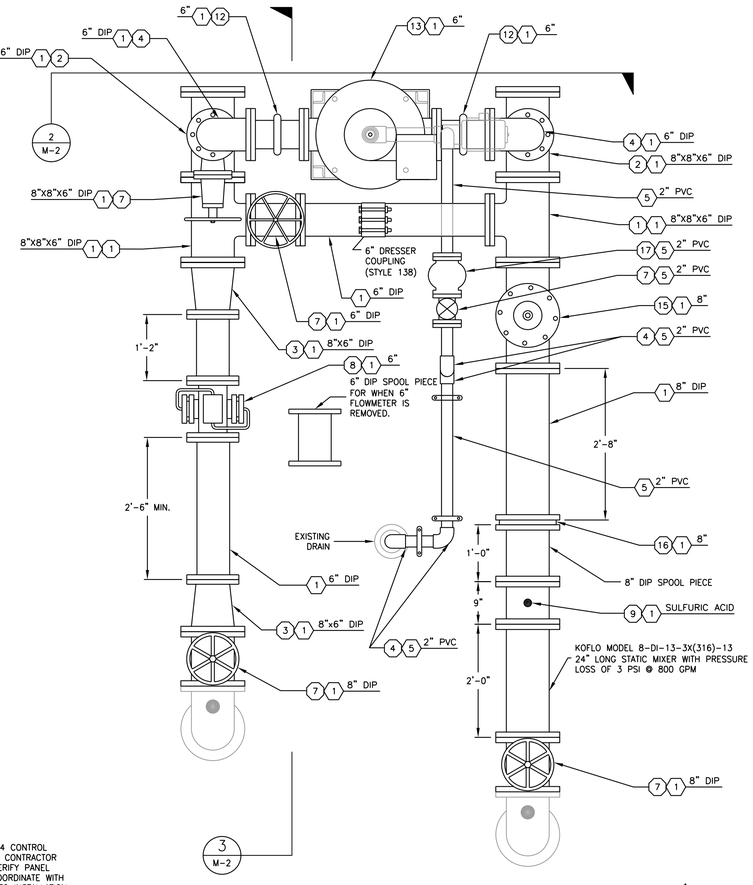
3. ACCURACY SHALL NOT BE AFFECTED BY CHANGES IN PERCENT SOLIDS OR CHANGES IN FLUID DENSITY, TEMPERATURE OR VISCOSITY. ACCURACY SHALL NOT BE AFFECTED BY THE PRESENCE OF AIR BUBBLES TO A GREATER EXTENT THAN THE FLUID VOLUME REPRESENTED BY SUCH AIR BUBBLES.

4. MAXIMUM PRESSURE SHALL BE 150 PSI.

5. THE FLOW TRANSMITTER SHALL BE MICROPROCESSOR-BASED, SHALL CONTAIN A KEYPAD AND A 2 LINE, 32 CHARACTER, BACKLIT ALPHANUMERIC LIQUID CRYSTAL DISPLAY WITH CHARACTERS, AND SHALL BE HOUSED IN A NEMA 4X AND IP65 CAST ALUMINUM, EPOXY PAINTED ENCLOSURE SUITABLE FOR CONDUIT CONNECTIONS.

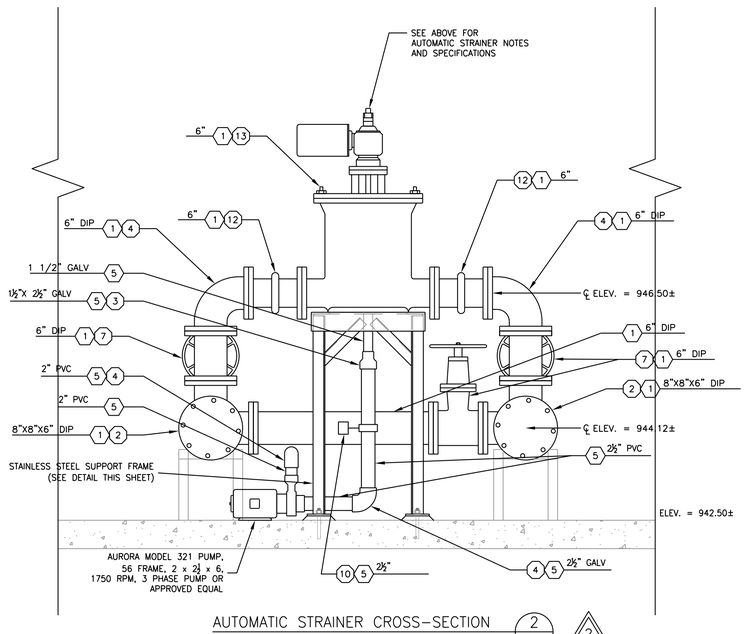
6. THE FLOW TRANSMITTER SHALL INCLUDE 2 ISOLATED CONTACT INPUTS, ACTIVATED BY CONTACT CLOSURE OR TRANSISTOR, PROGRAMMABLE TO ACKNOWLEDGE ALARMS, RESET TOTALIZERS, SELECT THE CURRENT FLOW RANGE IN FORWARD FLOW/MULTI RANGE MODE, OR INDICATE NON-FULL PIPE CONDITION, RATED 25 VOLTS DC, 15 mA.

7. THE FLOW TRANSMITTER SHALL INCLUDE AN ISOLATED, INTERNALLY POWERED 4 TO 20 mA OUTPUT INTO A MAXIMUM OF 500 OHMS. THE 4 TO 20 mA OUTPUT SHALL BE PROGRAMMABLE TO OPERATE IN EITHER FORWARD FLOW RATE, FORWARD FLOW RATE/MULTI RANGE, BIDIRECTIONAL FLOW RATE, OR BIDIRECTIONAL FLOW RATE/SPLIT RANGE MODE.



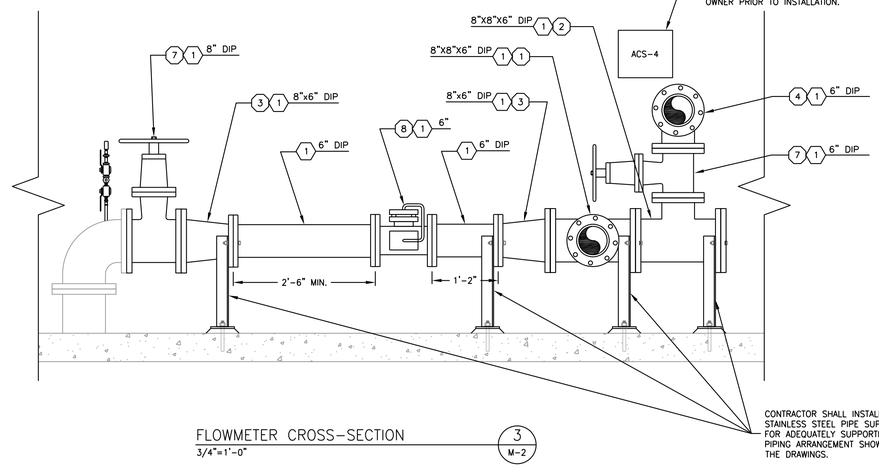
RAW WATER FLOWMETER/STRAINER MODIFICATIONS (2)

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



AUTOMATIC STRAINER CROSS-SECTION (2 M-2) (2)

3/4"=1'-0"



FLOWMETER CROSS-SECTION (3 M-2) (3)

3/4"=1'-0"

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY
7. EFM PROCESS WATER

VALVE/FITTING LEGEND

1. TEE
2. TEE W/ BLIND FLANGE
3. REDUCER
4. 90° ELBOW
5. 90° ELBOW W/ BLIND FLANGE
6. FLANGE CONNECTION
7. GATE VALVE
8. FLOWMETER
9. INJECTION POINT
10. BUTTERFLY VALVE W/ PNEUMATIC ACTUATOR
11. PLUG VALVE
12. EXPANSION JOINT
13. AUTOMATIC STRAINER
14. RPZ VALVE
15. FLOW CONTROL VALVE
16. ORIFICE PLATE ASSEMBLY
17. SWING CHECK VALVE
18. BALL VALVE W/ELECTRIC ACTUATOR

FLOW CONTROL VALVE SPECIFICATIONS:

1. FLOW CONTROL VALVE SHALL BE CLA-VAL MODEL 640-01 8" BSYKC, GLOBE VALVE W/ DUCTILE IRON BODY, BRONZE TRIM OR APPROVED EQUAL.

2. ORIFICE PLATE ASSEMBLY SHALL BE CLA-VAL 8" 150G 4.0 ORIFICE PLATE WITH A 4.00" BORE OR APPROVED EQUAL

X-REF: 20280sx1, 20280-M-SC, 20280-M-TB-P1, 20280-P-TB-P1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Mech\

NOTES:

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PROJECT SUPERVISOR — DEPARTMENT SUPERVISOR

COMMONWEALTH OF VIRGINIA — RHODES R. COPITHORN — No. 022719 — 6-21-04 — PROFESSIONAL ENGINEER

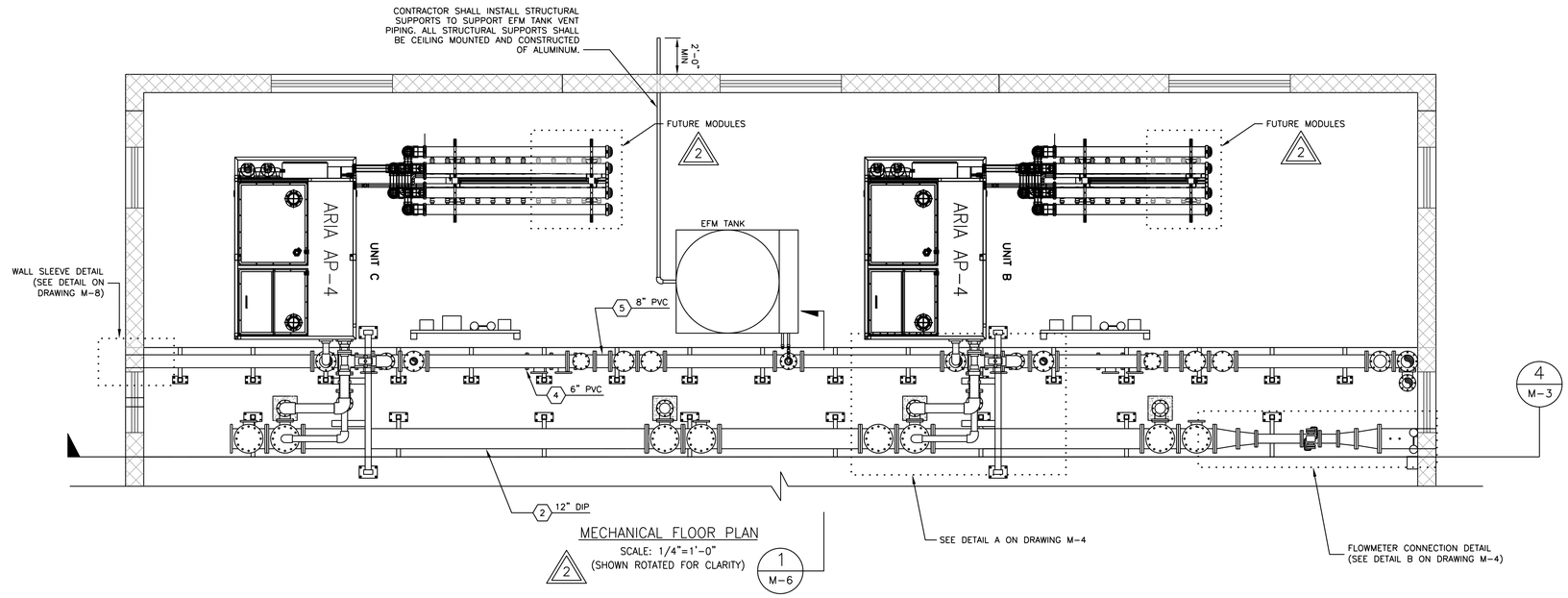
Stearns & Wheler, LLC
Environmental Engineers and Scientists
310 FIRST STREET, S.W., SUITE 150
ROANOKE, VIRGINIA 24011
PHONE: (540) 982-1910 FAX: (540) 982-1913

BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

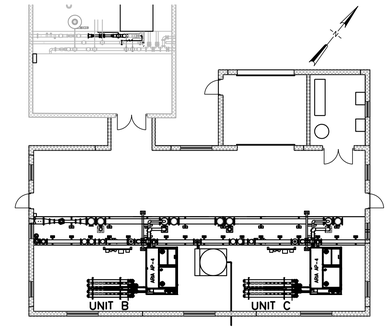
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

RAW WATER FLOWMETER & STRAINER MECHANICAL LAYOUT, SECTIONS, DETAILS & FILTERED WATER FLOWMETER LAYOUT

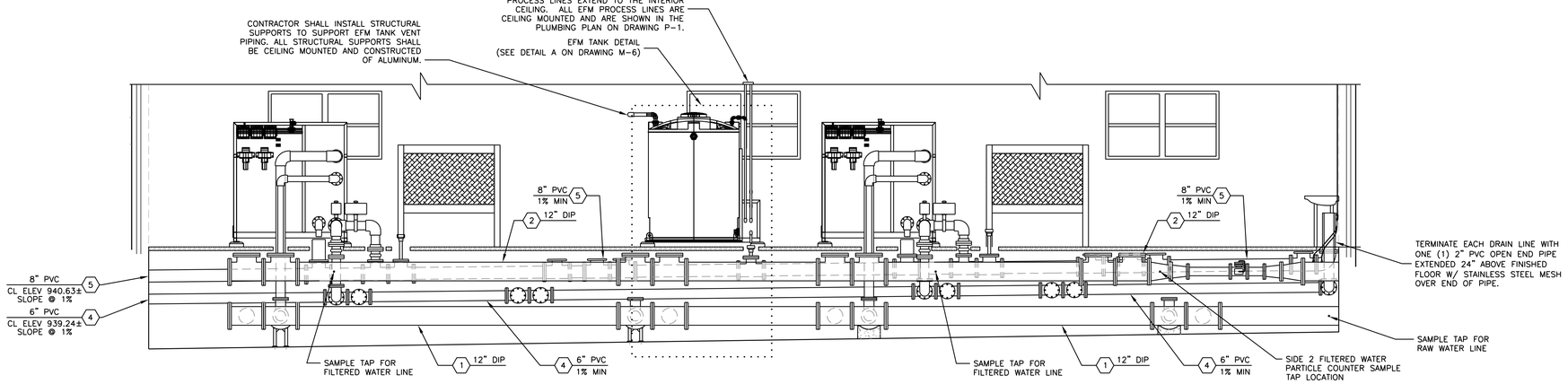
JOB NO. 20280 | DRAWING M-2 | SHEET 20 OF 37



MECHANICAL FLOOR PLAN
SCALE: 1/4"=1'-0"
(SHOWN ROTATED FOR CLARITY)
2 — 1 M-6



PROCESS AREA EQUIPMENT LAYOUT SCHEMATIC
SCALE: 1/16"=1'-0"
2



MECHANICAL LAYOUT CROSS-SECTION
1/4"=1'-0"
4 M-3 — 2

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

VALVE/FITTING LEGEND

1. TEE
2. TEE W/ BLIND FLANGE
3. REDUCER
4. 90° ELBOW
5. 90° ELBOW W/ BLIND FLANGE
6. FLANGE CONNECTION
7. GATE VALVE
8. FLOWMETER
9. INJECTION POINT
10. BUTTERFLY VALVE W/ PNEUMATIC ACTUATOR

X-REF: 20280gx1, 20280-A-TB-P1, 20280-M-SC, 20280-M-TB-P1
BJ/03; ROANOKE, BSR
P:\20280\30\Drawings\Mech\

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PROJECT SUPERVISOR — DEPARTMENT SUPERVISOR

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
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6-21-04
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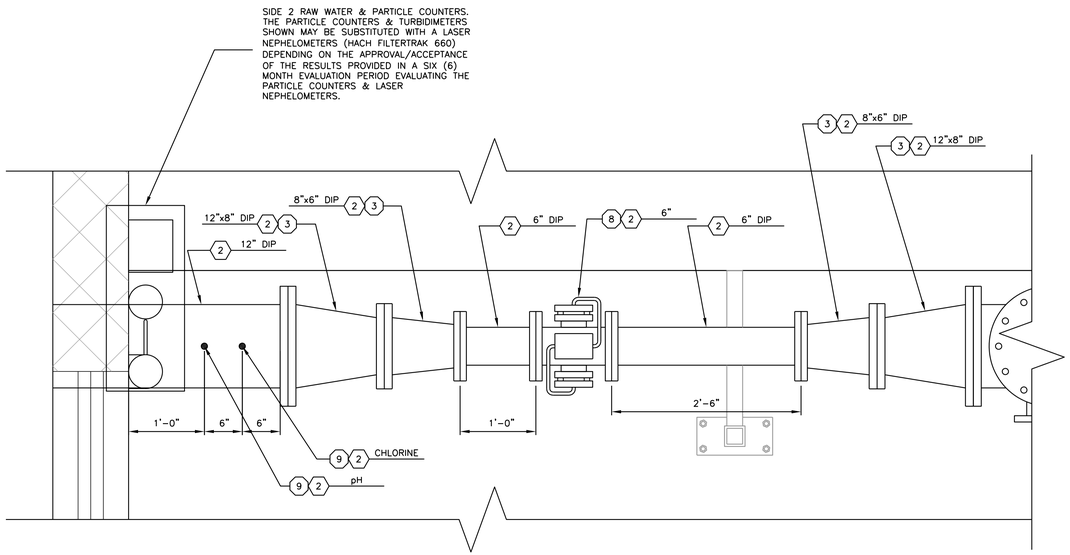
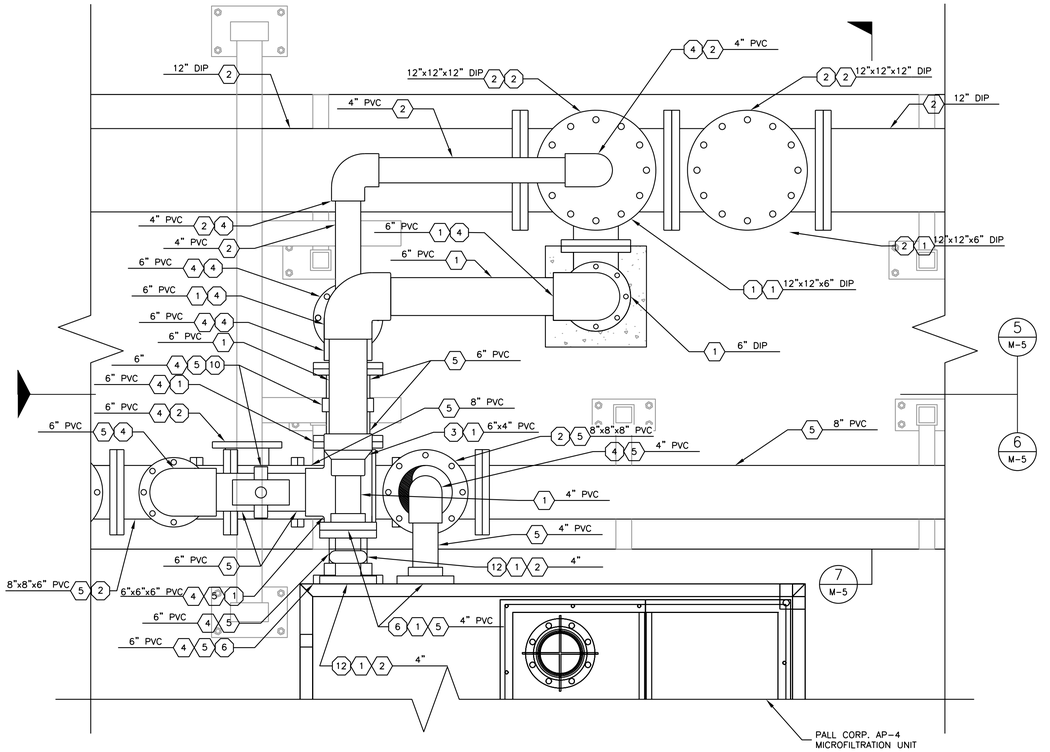
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

MECHANICAL FLOOR PLAN & CROSS SECTION

JOB NO. 20280 | DRAWING M-3 | SHEET 21 OF 37



DETAIL B FILTERED WATER FLOWMETER DETAIL
SCALE: 1"=1'-0"



DETAIL A TYPICAL MECHANICAL FLOOR PLAN DETAIL
SCALE: 1"=1'-0"

FLOWMETER SPECIFICATIONS:

1. CONTRACTOR SHALL FURNISH AND INSTALL AN ELECTROMAGNETIC FLOW METER (ISCO OR APPROVED EQUAL) SUITABLE FOR FIXED-SITE MEASUREMENT OF BI-DIRECTIONAL FLOW IN A FULL PIPE. THE FLOW METER SHALL CONSIST OF A FLOW TUBE AND A FLOW TRANSMITTER, WHICH SHALL INDICATE, TOTALIZE AND TRANSMIT FLOW. THE FLOW TUBE SHALL USE A SPOOL PIECE CONFIGURATION WITH FIELD-INTERCHANGEABLE SENSORS CONTAINING COILS AND ELECTRODES.

2. THE FLOW METER SHALL MEASURE, INDICATE, AND TOTALIZE FLOW RATES TO WITHIN ±0.5 PERCENT OF ACTUAL FLOW FOR VELOCITIES OF 1-50 FEET PER SECOND.

3. ACCURACY SHALL NOT BE AFFECTED BY CHANGES IN PERCENT SOLIDS OR CHANGES IN FLUID DENSITY, TEMPERATURE OR VISCOSITY. ACCURACY SHALL NOT BE AFFECTED BY THE PRESENCE OF AIR BUBBLES TO A GREATER EXTENT THAN THE FLUID VOLUME REPRESENTED BY SUCH AIR BUBBLES.

4. MAXIMUM PRESSURE SHALL BE 150 PSI.

5. THE FLOW TRANSMITTER SHALL BE MICROPROCESSOR-BASED, SHALL CONTAIN A KEYPAD AND A 2 LINE, 32 CHARACTER, BACKLIT ALPHANUMERIC LIQUID CRYSTAL DISPLAY WITH CHARACTERS, AND SHALL BE HOUSED IN A NEMA 4X AND IP65 CAST ALUMINUM, EPOXY PAINTED ENCLOSURE SUITABLE FOR CONDUIT CONNECTIONS.

6. THE FLOW TRANSMITTER SHALL INCLUDE 2 ISOLATED CONTACT INPUTS, ACTIVATED BY CONTACT CLOSURE OR TRANSISTOR, PROGRAMMABLE TO ACKNOWLEDGE ALARMS, RESET TOTALIZERS, SELECT THE CURRENT FLOW RANGE IN FORWARD FLOW/MULTI RANGE MODE, OR INDICATE NON-FULL PIPE CONDITION, RATED 25 VOLTS DC, 15 mA.

7. THE FLOW TRANSMITTER SHALL INCLUDE AN ISOLATED, INTERNALLY POWERED 4 TO 20 mA OUTPUT INTO A MAXIMUM OF 500 OHMS. THE 4 TO 20 mA OUTPUT SHALL BE PROGRAMMABLE TO OPERATE IN EITHER FORWARD FLOW RATE, FORWARD FLOW RATE/MULTI RANGE, BIDIRECTIONAL FLOW RATE, OR BIDIRECTIONAL FLOW RATE/SPLIT RANGE MODE.

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

VALVE/FITTING LEGEND

1. TEE
2. TEE W/ BLIND FLANGE
3. REDUCER
4. 90° ELBOW
5. 90° ELBOW W/ BLIND FLANGE
6. FLANGE CONNECTION
7. GATE VALVE
8. FLOWMETER
9. INJECTION POINT
10. BUTTERFLY VALVE W/ PNEUMATIC ACTUATOR
11. PLUG VALVE
12. EXPANSION JOINT
13. AUTOMATIC STRAINER
14. RPZ VALVE
15. 90° ELBOW W/ BASE BEND

X-REF: 20280sp1, 20280-A-TB-P1, 20280-M-SC, 20280-M-TB-P1
8/03, ROANOKE, BSR
P:\20280\30\Drawings\Mech\

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PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
RHODES R. COPTHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

Stearns & Wheler, LLC
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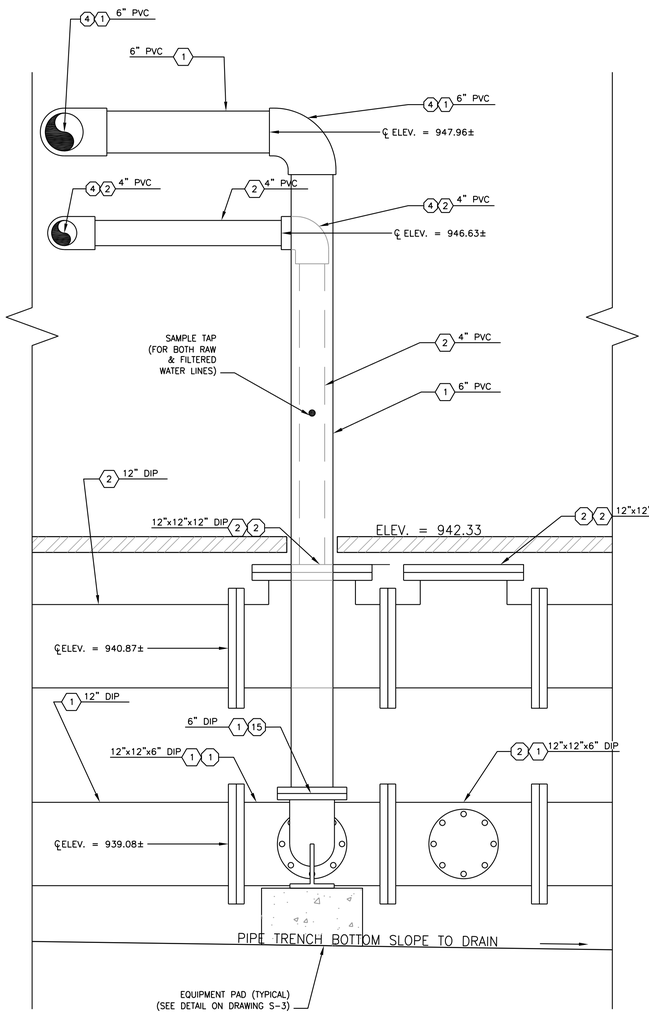
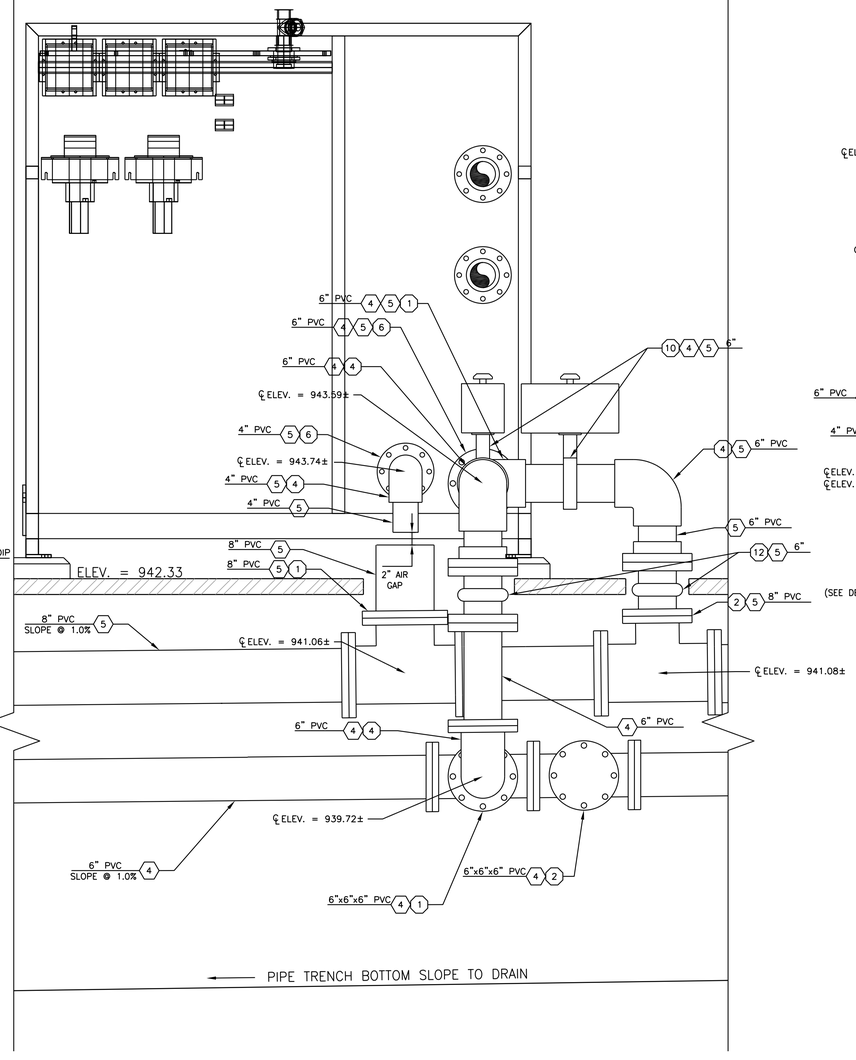
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028
MECHANICAL SECTIONS & DETAILS

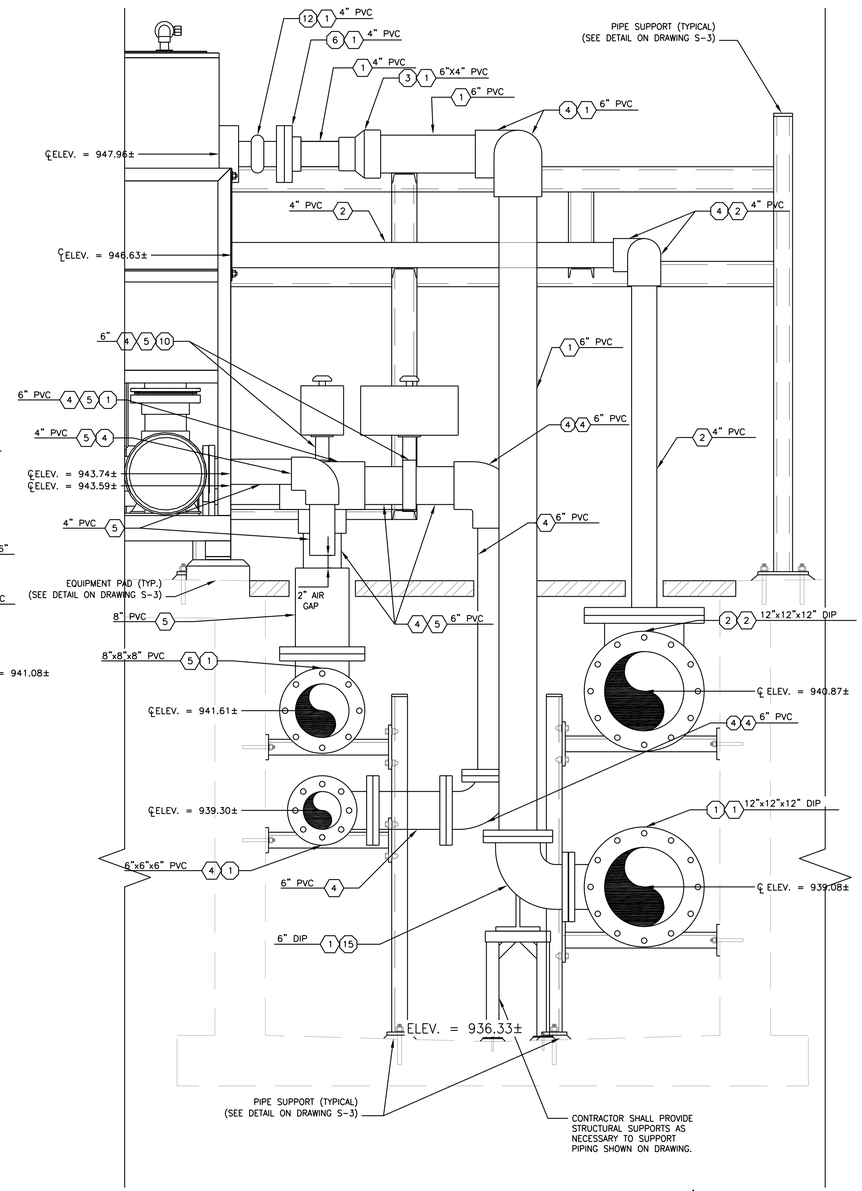
JOB NO. 20280 | DRAWING M-4 | SHEET 22 OF 37



TYPICAL RAW & FINISHED WATER CONNECTION DETAIL 5 M-4 2
SCALE: 1"=1'-0"



TYPICAL PROCESS WASTE & C.I.P. WASTE CONNECTION DETAIL 6 M-4 2
SCALE: 1"=1'-0"



MICROFILTRATION PIPING CONNECTION DETAIL 7 M-4 2
SCALE: 1"=1'-0"

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

VALVE/FITTING LEGEND

1. TEE
2. TEE W/ BLIND FLANGE
3. REDUCER
4. 90° ELBOW
5. 90° ELBOW W/ BLIND FLANGE
6. FLANGE CONNECTION
7. GATE VALVE
8. FLOWMETER
9. INJECTION POINT
10. BUTTERFLY VALVE W/ PNEUMATIC ACTUATOR
11. PLUG VALVE
12. EXPANSION JOINT
13. AUTOMATIC STRAINER
14. RPZ VALVE
15. 90° ELBOW W/ BASE BEND

NOTE:

ELEVATIONS FOR DRAIN LINES WERE CALCULATED FOR UNIT "B". ELEVATIONS ARE CONSIDERED APPROXIMATE. CONTRACTOR SHALL COORDINATE WITH DRAIN INSTALLATION.

X-REF: 20280gx1, 20280-M-SC
R/03, ROANOKE, BSR
P:\20280\30\Drawings\Mech\

NOTES:

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PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
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6-21-04
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BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

MECHANICAL SECTIONS & DETAILS

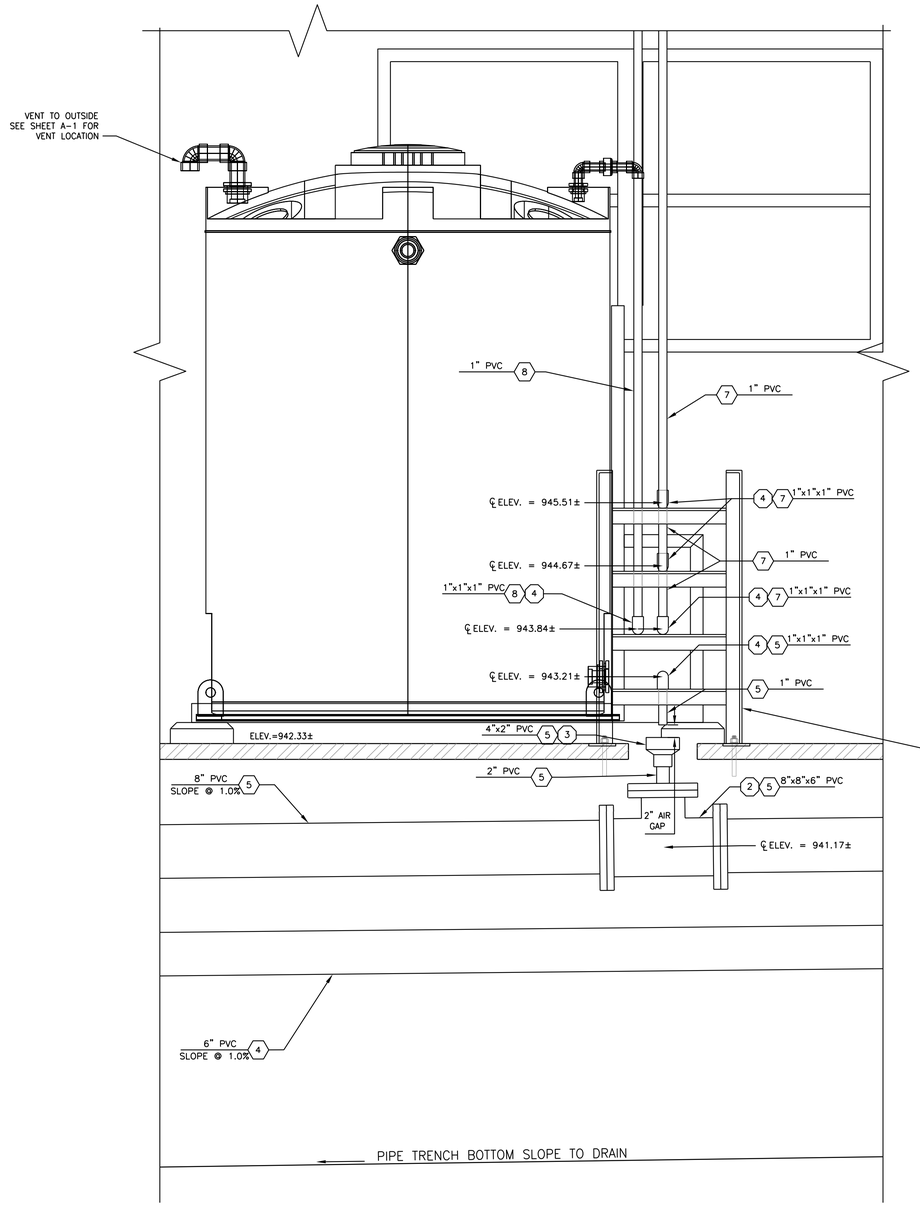
JOB NO. 20280 | DRAWING M-5 | SHEET 23 OF 37

PIPE LEGEND (2)

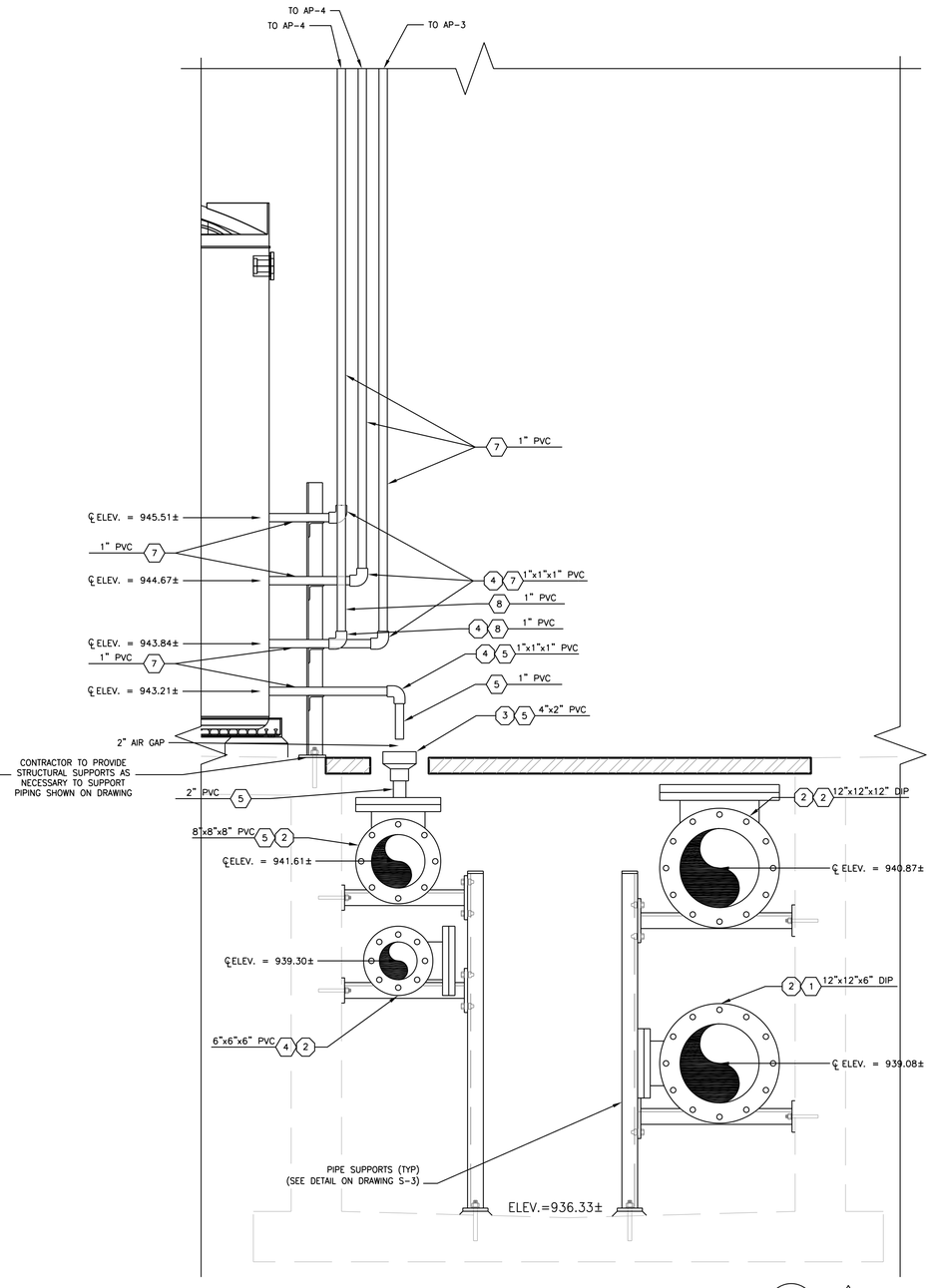
1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY
7. EFM PROCESS WATER
8. POTABLE WATER

VALVE/FITTING LEGEND

1. TEE
2. TEE W/ BLIND FLANGE
3. REDUCER
4. 90° ELBOW
5. 90° ELBOW W/ BLIND FLANGE
6. FLANGE CONNECTION
7. GATE VALVE
8. FLOWMETER
9. INJECTION POINT
10. BUTTERFLY VALVE W/ PNEUMATIC ACTUATOR
11. RESILIENT WEDGE VALVE
12. PLUG VALVE
13. EXPANSION JOINT
14. AUTOMATIC STRAINER



DETAIL (A) EFM TANK CONNECTION (2)
SCALE: 1"=1'-0"



EFM TANK PIPING CONNECTION CROSS-SECTION (1 / M-4) (2)
SCALE: 1"=1'-0"

X-REF: 20280qx1, 20280-M-SC
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Mech\

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1	BSR	11/03	WPJ	CMT	RRC	1/23/04

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ISSUE NO. | DRAWN | DATE | CHECKED | DESIGNER | APPROVED | DATE

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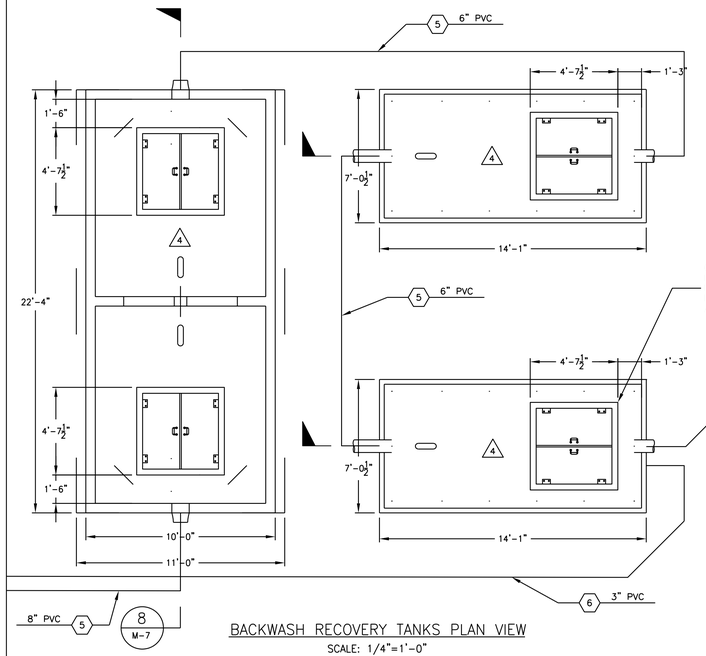
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

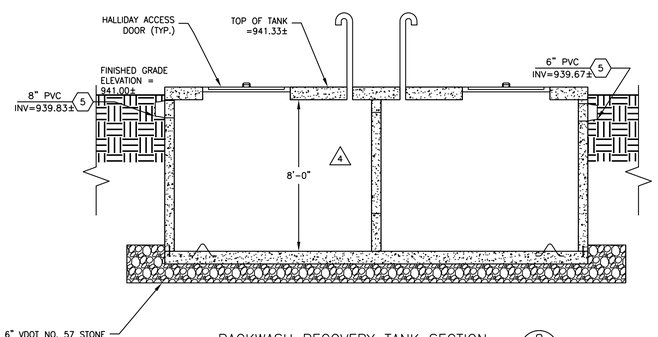
EFM TANK SECTIONS & DETAILS

JOB NO. 20280 | DRAWING M-6 | SHEET 24 OF 37



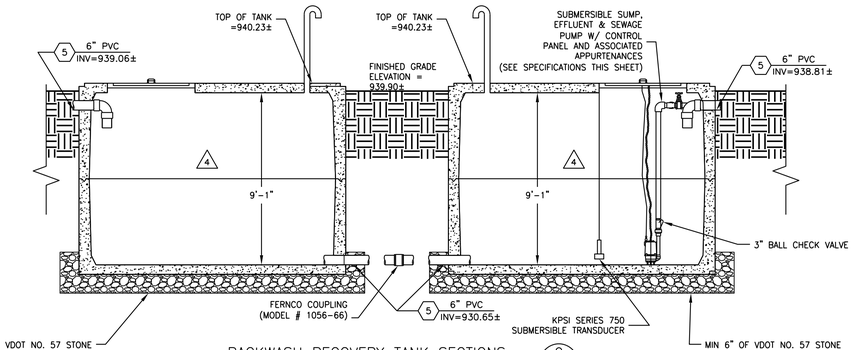
BACKWASH RECOVERY TANKS PLAN VIEW

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



BACKWASH RECOVERY TANK SECTION

1/4"=1'-0"



BACKWASH RECOVERY TANK SECTIONS

1/4"=1'-0"

PRECAST CONCRETE STRUCTURE SPECIFICATIONS:

1. UNLESS OTHERWISE STATED, ALL PRECAST STRUCTURES SHOWN SHALL BE CLEAR FLOW PRECAST STRUCTURES OR AN APPROVED EQUAL.

2. ALL PRECAST TANK STRUCTURES SHOWN ON THESE DRAWINGS SHALL BE FABRICATED OF MONOLITHIC PRECAST CONCRETE SECTIONS OF DENSE, WATERTIGHT CONCRETE HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH IN EXCESS OF 5,000 PSI AS DETERMINED BY TESTING IN ACCORDANCE WITH THE LATEST STANDARD ASTM TEST PROCEDURES, AND SHALL BE DESIGNED AND FURNISHED TO HOLD FREE STANDING WATER AS WELL AS TO WITHSTAND EARTH BACKFILL WHEN INSTALLED BELOW GRADE. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM SPECIFICATION A-305, SHALL BE PROVIDED THROUGHOUT, AND ALSO AT ALL OPENINGS, EDGES, AND ELSEWHERE AS REQUIRED FOR THE INTENDED SERVICE.

3. IN ADDITION TO STEEL REINFORCING, FIBERMESH "THREE-DIMENSIONAL" REINFORCEMENT SHALL BE USED. CONCRETE INGREDIENTS SHALL CONFORM AS FOLLOWS:

A. PORTLAND CEMENT, TYPE II PER ASTM SPECIFICATION C-150 (8 BAGS PER CUBIC YARD).
B. AGGREGATE, 1" TO #4 PER ASTM SPECIFICATION C-33.
C. SAND, 2.35 FINENESS MODULUS (FREE FROM ORGANIC MATTER).
D. WATER, CLEAN AND SUITABLE FOR DOMESTIC USE (4.62 GALLONS PER BAG OF CEMENT).
E. AIR, MAXIMUM 5% (ENTRAINED).
F. HONEYCOMBED OR RETEMPERED CONCRETE WILL NOT BE ACCEPTABLE.

4. PRECAST CONCRETE STRUCTURES SHALL BE HANDLED BY THE LIFTING DEVICES FURNISHED BY THE MANUFACTURER, UNDER THE SUPERVISION OF FACTORY TRAINED PERSONNEL. THE CONTRACTOR SHALL PROVIDE A SUITABLE SIZED CRANE AND QUALIFIED OPERATOR TO SET THE PRECAST STRUCTURAL SECTIONS.

SUBMERSIBLE PUMP STATION SPECIFICATIONS:

1. SUBMERSIBLE PUMP STATION SHALL BE CAPABLE OF PUMPING BACKWASH WATER AND MAINTAINING WET WELL ELEVATIONS AS SHOWN IN THE DRAWINGS, CONTROLS AND ELECTRIC. THE PUMPS SHALL BE CAPABLE OF MEETING THE THE FOLLOWING CONDITIONS:

FLOW: 120 GPM
HEAD: 45 FT

PUMPS SHALL BE MYERS MODEL MW200, GOULDS MODEL 3887BHF OR APPROVED
EQUAL (2HP, THREE PHASE PUMP, 2" DISCHARGE).

2. THE EQUIPMENT SHALL BE INSTALLED AT THE PUMP STATION BY THE CONTRACTOR IN ACCORDANCE WITH THE INSTRUCTIONS OF THE MANUFACTURER AND THE CONTRACT DOCUMENTS.

3. THE PUMP MOTORS SHALL BE INTEGRAL TO THE PUMP FOR SUBMERSIBLE OPERATION. THE SQUIRREL CAGE INDUCTION TYPE MOTOR SHALL BE OF CLASS F INSULATION, NEMA B DESIGN, CLASS H SLOT LINERS WITH A SERVICE FACTOR OF 1.15. ALL STARTING SWITCHES, CAPACITORS OR OTHER DEVICES SHALL BE PROVIDED INTEGRAL WITH MOTOR OR AT STARTERS.

4. THE MOTOR POWER CABLE SIZE SHALL BE SUCH AS TO LIMIT VOLTAGE DROP TO 1 PERCENT FOR LENGTH SHOWN PLUS 50 PERCENT AND SHALL BE OF THE SO OR STO TYPE INSULATED CABLE WITH A DOUBLE JACKETED PROTECTION SYSTEM, NEOPRENE OUTSIDE, SYNTHETIC RUBBER INSIDE, EXCEEDING INDUSTRY STANDARDS FOR OIL, GAS, AND SEWAGE RESISTANCE.

SUBMERSIBLE PUMP STATION SPECIFICATIONS: (2)

5. CONTROL EQUIPMENT – ALL ELECTRICAL CONTROLS, DEVICES, AND ENCLOSURE SHALL BE IN ACCORDANCE WITH PUMP MANUFACTURER'S RECOMMENDATIONS.

A. ALL COMPONENTS SHALL BE NEMA DEVICES, IEC EQUIPMENT IS NOT ACCEPTABLE.

B. FURNISH AND INSTALL ONE DUPLEX CONTROL PANEL (NEMA 12 U.L. LISTED) INTERIOR PAINTED ENCLOSURE IN THE HIGH POINT WATER TREATMENT PLANT PROCESS BUILDING. THE ENCLOSURE HALL BE EQUIPPED WITH MOUNTING EARS FOR WALL OR MOUNTING STAND INSTALLATION.

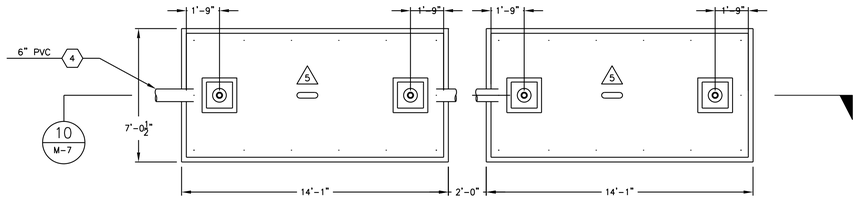
6. OPERATION OF CONTROLS – THE LIQUID LEVEL IN THE INFLUENT WET WELL SHALL BE CONTROLLED BY KPSI SERIES 750 SUBMERSIBLE TRANSDUCER. THE TRANSDUCER SHALL FEATURE FULL TEMPERATURE COMPENSATION AND SURFACE MOUNT INTERNAL SIGNAL CONDITIONING (4-20 mA SIGNAL).

WHEN THE BACKWASH RECOVERY SYSTEM IS IN OPERATION, THE CONTROL SYSTEM SHALL OPERATE ONE PUMP WITH THE SECOND PUMP IN STANDBY.

CONTROLS SHALL BE MOUNTED ON A LIFT-OUT PIPE SO THAT THEY CAN BE CLEANED OR REPLACED WITHOUT DISTURBING PUMP OR PIPING.

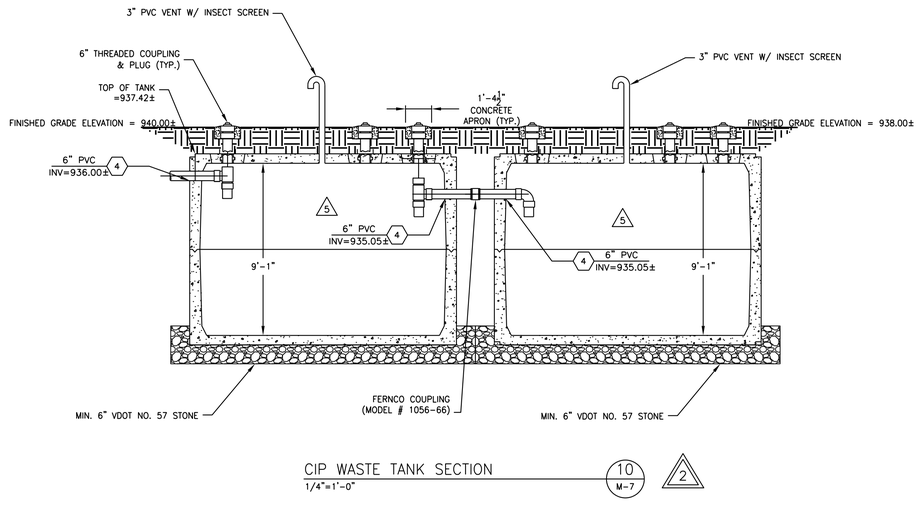
SUBMERSIBLE PUMP STATION SPECIFICATIONS:

7. GUIDE RAIL SYSTEM – PUMP STATION SHALL CONTAIN A GUIDE RAIL SYSTEM FOR A DUPLEX PUMP STATION. THE GUIDE RAIL SYSTEM SHALL CONSIST OF THE FOLLOWING: STAINLESS STEEL LIFTING CABLE, STAINLESS STEEL VALVE EXTENSION HANDLE, ADJUSTABLE STAINLESS STEEL WALL BRACKETS, STAINLESS STEEL GUIDE RAIL TUBING, STAINLESS STEEL UPPER PUMP/GUIDE BRACKET, 2" BRASS QUICK DISCONNECT ASSEMBLY, DISCHARGE IS 36" UP FROM BASE TO DISCHARGE CENTERLINE, CAST IRON BALL CHECK VALVE & LOWER PUMP BRACKET ASSEMBLY WITH BUNA BALL AND CLEAN-OUT PORT, SCHEDULE 40 GALVANIZED DISCHARGE PIPE, BASE OR STUD MOUNTING PLATE, STAINLESS STEEL ATTACHMENT BRACE, PLASTIC GUIDE RAILS CONNECTORS, STAINLESS STEEL INTERMEDIATE BRACES, UPPER AND LOWER CROSS BRACES, AND RELATED APPURTENANCES.



CIP WASTE HOLDING TANKS PLAN VIEW

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



CIP WASTE TANK SECTION

1/4"=1'-0"

BUILDING/STRUCTURE LEGEND

1. PROCESS AREA
2. UTILITY/STORAGE AREA
3. COMPRESSOR AREA
4. BACKWASH RECOVERY TANKS
5. C.I.P. WASTE TANKS (CHEMICAL CLEANING SOLUTION HOLDING TANKS)

PIPE LEGEND

1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

X-REF: 20280sy1, 20280-M-SC
B/03, ROANOKE, BSR
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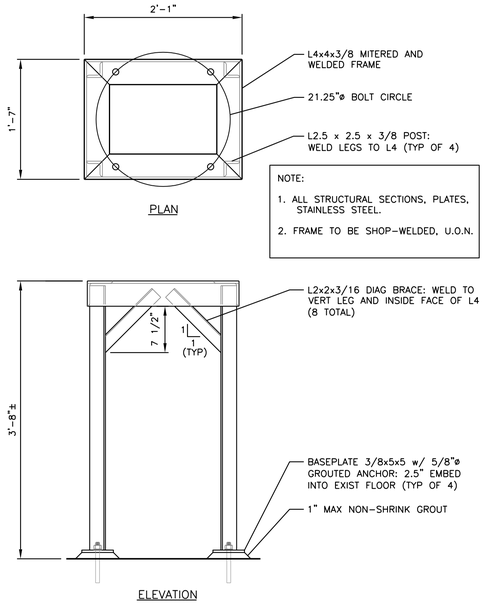
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

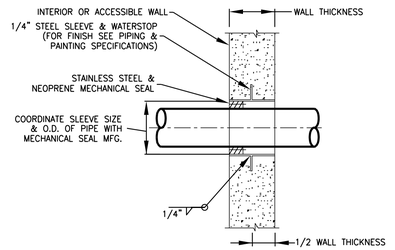
CHEMICAL FEED SYSTEM & BACKWASH RECOVERY TANKS SECTIONS & DETAILS

JOB NO.	20280	DRAWING	M-7	SHEET	25 OF 37



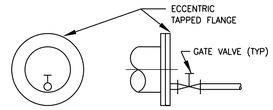
AUTOMATIC STRAINER SUPPORT DETAIL

NTS



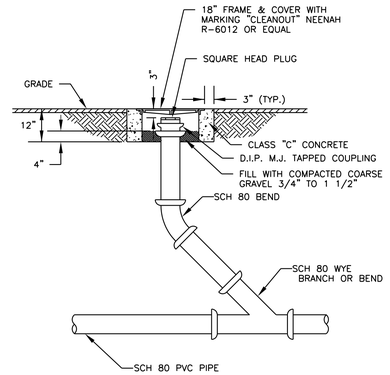
TYPICAL WALL SLEEVE DETAIL (2)

NOT TO SCALE

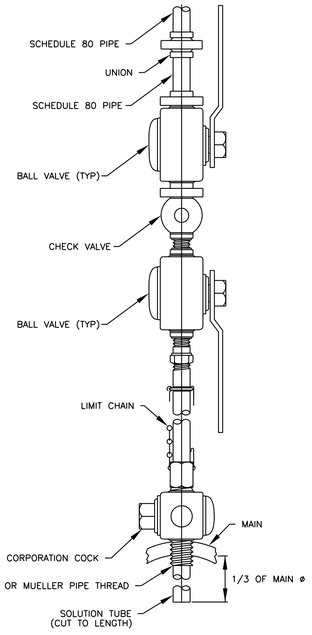


TYPICAL FLUSHING CONNECTION OR PIPE DRAIN DETAIL

NOT TO SCALE

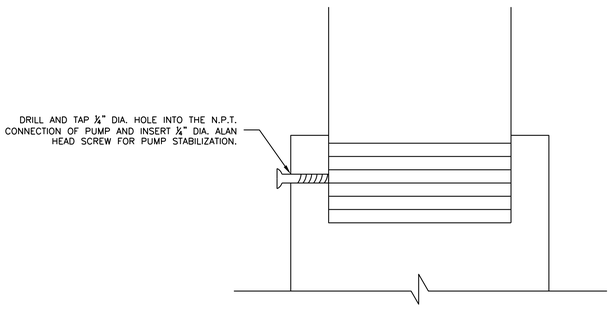


CLEANOUT DETAIL (C.O.) (2)



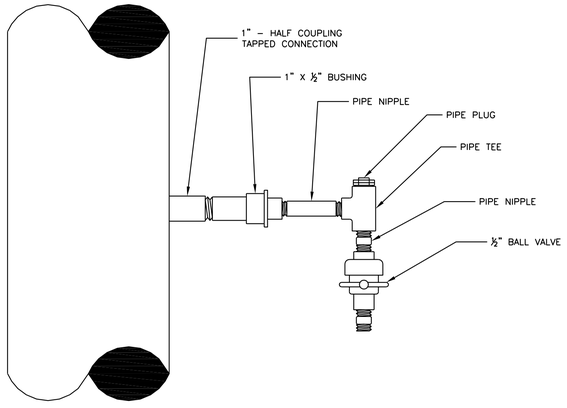
TYPICAL CHEMICAL FEED CONNECTION DETAIL

NOT TO SCALE



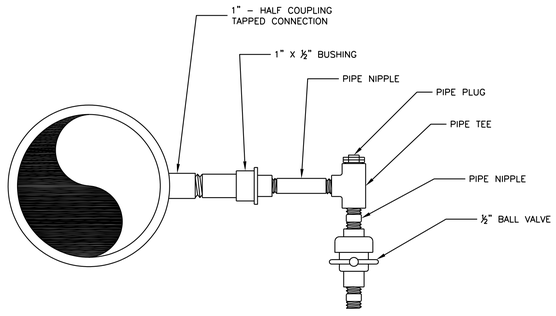
N.P.T. CONNECTION FOR SUBMERSIBLE PUMP AT RAW WATER PUMP STATION

NOT TO SCALE



SAMPLE TAP VERTICAL PIPE DETAIL

NOT TO SCALE



SAMPLE TAP HORIZONTAL PIPE DETAIL

NOT TO SCALE

X-REF: 20280gx1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Mech\

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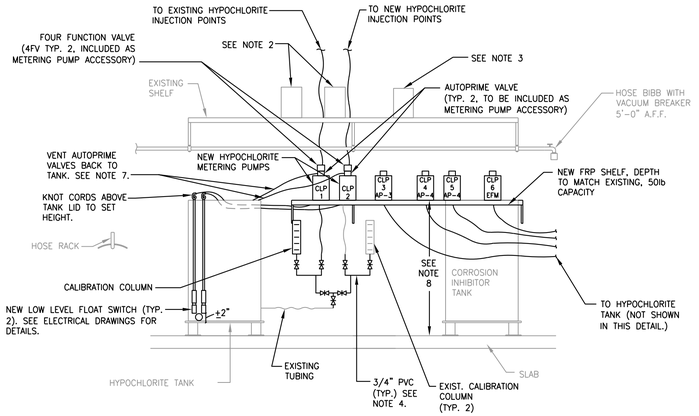
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

MISCELLANEOUS MECHANICAL DETAILS

JOB NO. 20280 | DRAWING M-8 | SHEET 26 OF 37



BUILDING/STRUCTURE LEGEND

1. PROCESS AREA
2. UTILITY/STORAGE AREA
3. COMPRESSOR AREA
4. BACKWASH RECOVERY TANKS
5. C.I.P. WASTE TANKS (CHEMICAL CLEANING SOLUTION HOLDING TANKS)

PIPE LEGEND

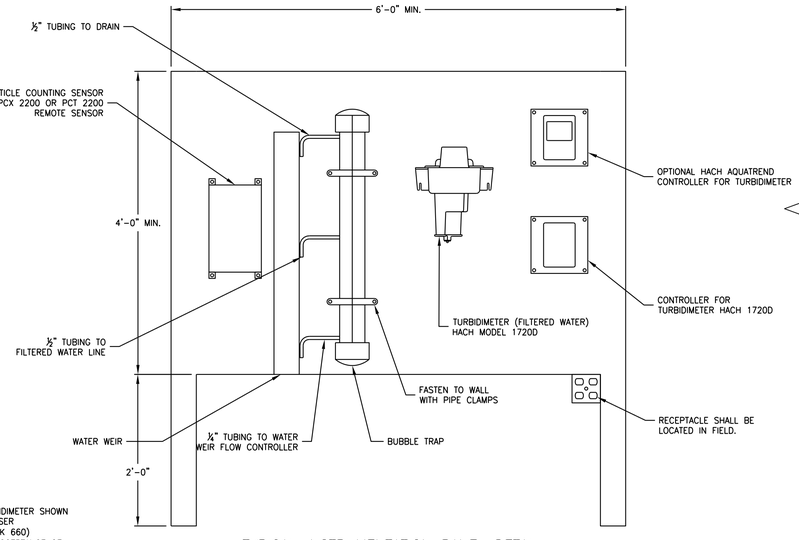
1. RAW WATER
2. FILTERED WATER
3. STORM SEWER
4. C.I.P. WASTE
5. PROCESS WASTE
6. BACKWASH RECOVERY

2 CHLORINE FEED PUMP SYSTEM MODIFICATIONS

NTS

CHLORINE FEED SYSTEM NOTES: 2

1. SEQUENCE OF CONSTRUCTION: COORDINATE WITH OWNER FOR ISOLATION/DRAINING OF CORROSION INHIBITOR TANK. DISCONNECT CORROSION INHIBITOR TANK FROM BASE OF PIPE MANIFOLD. DRAIN CORROSION INHIBITOR TUBING AND PIPE MANIFOLD. FLUSH SYSTEM WITH CLEAN POTABLE WATER FOR 30 MINUTES USING EXISTING CORROSION INHIBITOR PUMP. DISCONNECT HYPOCHLORITE TANK FROM HYPOCHLORITE PIPE MANIFOLD AND RECONNECT TO CORROSION INHIBITOR PIPE MANIFOLD. RELOCATE ONE EXISTING HYPOCHLORITE PUMP AND TUBING TO EXISTING CORROSION INHIBITOR PIPE MANIFOLD. RESUME NORMAL CHLORINATION OPERATION. ALL WORK RELATED TO ABOVE TRANSFER SEQUENCE MUST BE ATTENDED BY A LICENSED WATERWORKS OPERATOR FROM THE OWNER.
2. FOLLOWING INSTALLATION OF NEW HYPOCHLORITE PUMPS (CLP-1, CLP-2), DISCONNECT EXISTING HYPOCHLORITE PUMPS AND RETAIN FOR OWNER'S FUTURE USE. SEE ALSO NOTE 1 ABOVE.
3. RELOCATE EXISTING CORROSION INHIBITOR PUMP FOR OWNERS FUTURE USE.
4. PROVIDE ADDITIONAL PIPE SUPPORT BAR ABOVE EXISTING SUPPORT. MATCH EXISTING TYPE, MATERIAL TO BE PVC OR FRP WITH PLASTIC OR PVC COATING.
5. ALL NEW PIPE TO BE SCHEDULE 80 PVC.
6. ALL VALVES TO BE 3/4" TRUE UNION SCHEDULE 80 PVC BALL VALVES WITH TEFLON SEATS AND VENTED BALLS.
7. SECURE VENT TUBING FROM AUTOPRIME VALVES IN TANK LID SUCH THAT TUBING TERMINATIONS ARE ABOVE MAXIMUM WATER LEVEL.
8. TOP OF SHELF HEIGHT TO MATCH TOP OF TANK ELEVATION.
9. WHERE AVAILABLE, ALL CHEMICAL PIPING, TUBING, & TANKS SHALL BE NSF 61 OR USDA FOOD GRADE APPROVED MATERIALS.

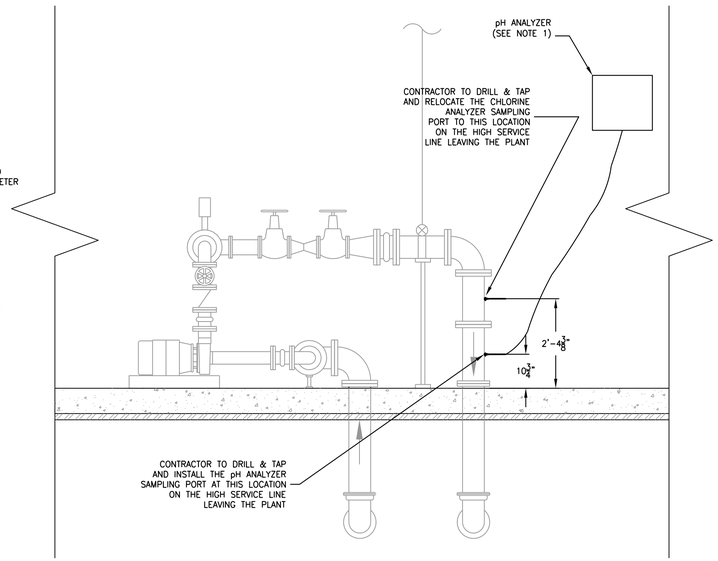


TYPICAL INSTRUMENTATION PANEL DETAIL

SCALE: 1"=1'-0"

INSTRUMENTATION NOTES: 2

1. THE PARTICLE COUNTER & TURBIDIMETER SHOWN MAY BE SUBSTITUTED WITH A LASER NEPHELOMETER (HACH FILTERTRAK 660) DEPENDING ON THE APPROVAL/ACCEPTANCE OF THE RESULTS PROVIDED IN A SIX (6) MONTH EVALUATION PERIOD EVALUATING THE PARTICLE COUNTER & LASER NEPHELOMETER.
2. FRAME FOR INSTRUMENTATION EQUIPMENT SHALL BE CONSTRUCTED USING STANDARD ALUMINUM STRUCTURAL MEMBERS.
3. BUBBLE TRAP SHALL CONSIST OF 4" SCHEDULE 80 PVC PIPE.
   - A. CHAMFER TOP OF PIPE & SAND INSIDE OF CAP FOR LOOSE FIT.
   - B. GLUE BOTTOM OF CAP IN PLACE..
   - C. DRILL & TAP ½" NPT IN 2 PLACES.
   - D. DRILL & TAP ¼" NPT.

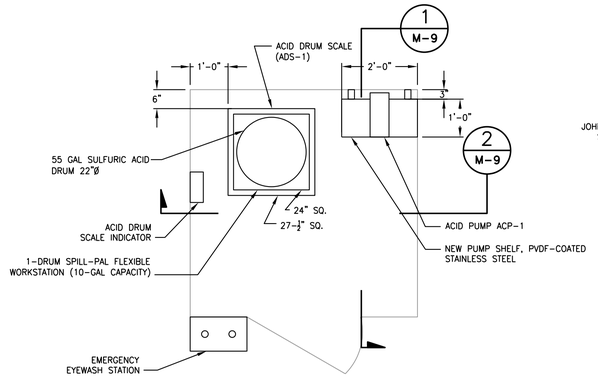


2 CHLORINE/pH ANALYZER LOCATION DETAIL

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

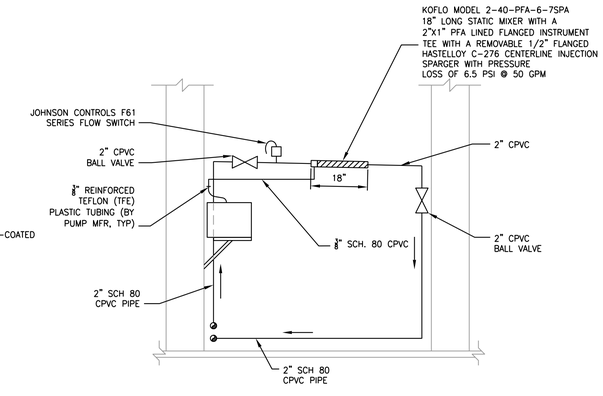
pH ANALYZER NOTES:

1. CONTRACTOR TO FIELD LOCATE THE pH ANALYZER (HACH MODEL EC310 TRANSMITTER, MODEL E2 ROUND ELECTRODE) CONTROLLER LOCATION DURING INSTALLATION.
2. CONTRACTOR SHALL COORDINATE LOCATION WITH OWNER PRIOR TO INSTALLATION.



pH CONTROL CHEMICAL FEED SYSTEM LAYOUT 2

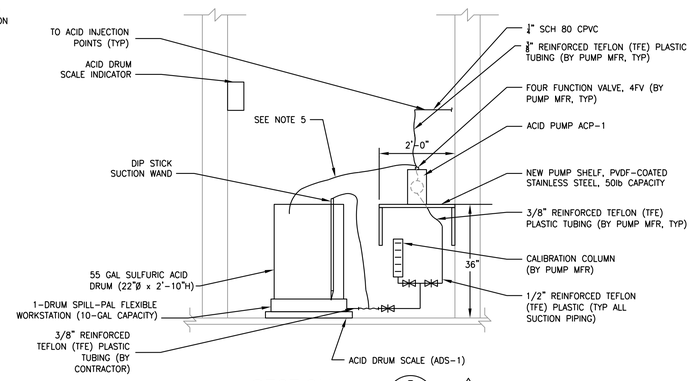
SCALE: 1/2"=1'-0"



SECTION 1 M-9

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

NOTE: DRAWINGS OF EXISTING FACILITIES WERE PROVIDED BY THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY (BCPSA).



SECTION 2 M-9 2

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

pH CONTROL SYSTEM NOTES: 2

1. ALL TUBING USED IN pH CONTROL SYSTEM TO BE 3/8" REINFORCED POLYTETRAFLUOROETHYLENE (TFE) PLASTIC.
2. ALL PH CONTROL SYSTEM PIPING TO BE SCHEDULE 80 CPVC.
3. MOUNT PIPING TO WALL USING 316 STAINLESS STEEL OR FRP MOUNTING CHANNELS WITH 316 STAINLESS STEEL HARDWARE.
4. VENT 4 FUNCTION VALVES BACK TO STORAGE DRUM WITH REINFORCED POLYTETRAFLUOROETHYLENE (TFE) PLASTIC.
5. SECURE VENT TUBING FROM AUTOPRIME VALVES IN TANK LID SUCH THAT TUBING TERMINATIONS ARE ABOVE MAXIMUM WATER LEVEL.
6. WHERE AVAILABLE, ALL CHEMICAL PIPING, TUBING, & TANKS SHALL BE NSF 61 OR USDA FOOD GRADE APPROVED MATERIALS.
7. THE pH ADJUSTMENT FEED PUMP RUN SIGNAL SHALL BE HARDWIRED TO THE FLOW SWITCH TO PREVENT THE PUMP FROM RUNNING WHEN THERE IS NO FLOW IN THE CARRIER PIPE.

X-REF: 20280sy1, 20280-M-SC, 20280-I-IP
8/03, ROANOKE, BSR
P:\20280\30\Drawings\Mech\

NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

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PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

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COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

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BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

CHEMICAL FEED SYSTEM, INSTRUMENTATION & SAMPLING DETAILS

JOB NO.	20280	DRAWING	M-9	SHEET	27 OF 37

LOUVER AND DAMPER SCHEDULE

UNIT I.D.	ROOM NAME	EQUIPMENT TYPE	DIMENSIONS (W" X H" X D")	BLADE ANGLE	OPERATOR TYPE	VOLTS/ PHASE	INTERLOCK WITH	NOTES	DESIGN BASIS MANUFACTURER	DESIGN BASIS MODEL
LV-1	PROCESS ROOM 100	COMBINATION FIXED/OPERABLE	40" x 40" x 4"	45°	POWER OPEN/SPRING RETURN	120/1	F-1	2, 4	GREENHECK	ECD-401
LV-2	PROCESS ROOM 100	COMBINATION FIXED/OPERABLE	40" x 40" x 4"	45°	POWER OPEN/SPRING RETURN	120/1	F-2	2, 4	GREENHECK	ECD-401
LV-3	UTILITY/STORAGE ROOM 101	COMBINATION FIXED/OPERABLE	40" x 40" x 4"	45°	POWER OPEN/SPRING RETURN	120/1	F-3	2, 4	GREENHECK	ECD-401
LV-4	UTILITY/STORAGE ROOM 101	COMBINATION FIXED/OPERABLE	16" x 16" x 4"	45°	POWER OPEN/SPRING RETURN	120/1	F-4	2, 4	GREENHECK	ECD-401
LV-5	COMPRESSOR ROOM 102	COMBINATION FIXED/OPERABLE	32" x 32" x 4"	45°	POWER OPEN/SPRING RETURN	120/1	F-5	2, 4	GREENHECK	ECD-401
LV-6	ELECTRIC ROOM	COMBINATION FIXED/OPERABLE	24" x 16" x 4"	45°	POWER OPEN/SPRING RETURN	120/1	F-6	2, 4	GREENHECK	ECD-401

FAN AND EXHAUSTER SCHEDULE

UNIT I.D.	ROOM NAME	TYPE OF EQUIPMENT	FAN DRIVE	FAN CFM	FAN EXT. S.P. IN. W.G.	FAN RPM	FAN SONES	HP	VOLTS/ PHASE	CONTROLS CONTROLLED BY	NOTES	DESIGN BASIS MANUFACTURER	DESIGN BASIS MODEL
F-1: F-3	PROCESS ROOM 100	WALL MOUNTED CENTR. EXHAUST	DIRECT	2500	.375	1140	14.3	0.5	120/1	ON/OFF SWITCH	2, 6	GREENHECK	CWB
F-4	UTILITY/STORAGE ROOM 101	WALL MOUNTED CENTR. EXHAUST	DIRECT	220	.375	1300	5.5	.04	120/1	ON/OFF SWITCH	2, 6	GREENHECK	CW-083
F-5	COMPRESSOR ROOM 102	WALL MOUNTED CENTR. EXHAUST	DIRECT	1000	.375	1140	8.2	0.17	120/1	HOA SWITCH/T-STAT	2, 6	GREENHECK	CW-121
F-6	ELECTRIC ROOM	WALL MOUNTED CENTR. EXHAUST	DIRECT	500	.375	1140	7.4	0.07	120/1	HOA SWITCH/T-STAT	2, 6	GREENHECK	CW-090

UNIT HEATER SCHEDULE

UNIT I.D.	ROOM	EQUIPMENT TYPE	INPUT (MBH)	OUTPUT (MBH)	AIR FLOW AT 70°F.	MOTOR/ ELEC. DATA HP	MOTOR/ ELEC. DATA VOLTS/ PHASE	MOTOR/ ELEC. DATA RPM	NOTES	DESIGN BASIS MANUFACTURER	DESIGN BASIS MODEL
GUH-1:GUH-2	PROCESS ROOM 100	PROPANE GAS, CEILING MOUNTED	75	60	1100	.083	120/1	1625	1, 3, 5, 7	MODINE	PD 75
GUH-3 :GUH-4	PROCESS ROOM 100	PROPANE GAS, CEILING MOUNTED	50	40	740	.025	120/1	1550	1, 3, 5, 7	MODINE	PD 50
GUH-5	COMPRESSOR ROOM 102	PROPANE GAS, CEILING MOUNTED	30	24	440	.025	120/1	1550	1, 3, 7	MODINE	PD 30
GUH-6	UTILITY/STORAGE ROOM 101	PROPANE GAS, CEILING MOUNTED	30	24	440	.025	120/1	1550	1, 3, 7	MODINE	PD 30
EUH-1	ELECTRIC, WALL MOUNTED	ELECTRIC, WALL MOUNTED	–	5KW	530	.025	120/1	1550	1, 3, 7	MODINE	HER 50

MISCELLANEOUS HVAC EQUIPMENT LIST

EQUIPMENT DESCRIPTION	MANUFACTURER	MODEL
SINGLE-STAGE, PILOT DUTY THERMOSTAT	WHITE ROGERS	WR80
CORROSION RESISTANT THERMOSTAT	CHROMALOX	WCRT
DAMPER/LOUVER MOTOR ACTUATOR	INVENSYS	MA SERIES
GAS UNIT HEATER VENTS	HEAT FAB	SAF-T VENT SC

SCHEDULE NOTES

1. UNIT TO BE PROVIDED WITH COMPLETE CONTROLS.
2. UNITS TO BE PROVIDED WITH RAW ALUMINUM FINISH.
3. CONDUIT AND WIRING BETWEEN UNIT HEATERS AND CONTROLLING THERMOSTATS TO BE PROVIDED AND INSTALLED BY THE HVAC TRADE IN ACCORDANCE WITH THE DIVISION 16000 ELECTRICAL SPECIFICATIONS.
4. PROVIDE EXTERNAL 1/2", 0.08 ALUMINUM WIRE MESH BIRDSCREEN WITH REMOVABLE ALUMINUM FRAME. FRAME AND SCREEN TO MATCH LOUVER FINISH.
5. TO BE CONTROLLED BY CORROSION RESISTANT THERMOSTATS.
6. UNIT TO BE PROVIDED WITH SELF-ACTING BACKDRAFT DAMPER.
7. MOUNT UNITS AS HIGH AS POSSIBLE AND IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

GENERAL NOTES

A. SCHEDULE LINE ITEMS MAY REFER TO MULTIPLE UNITS. EXAMPLE, F-1 F-3 REFERS TO FANS F-1 THROUGH F-3 (I.E. THREE UNITS).

B. CONTRACTOR TO BALANCE ALL AIR HANDLING SYSTEMS AND SUBMIT AIR BALANCE REPORT IN ACCORDANCE WITH ASHRAE.

C. REFER TO ARCHITECTURAL ELEVATION FOR LOUVER ELEVATIONS.

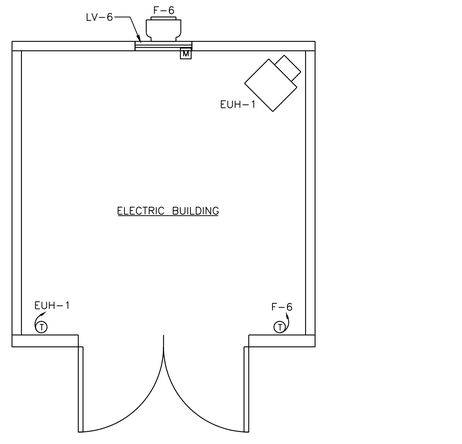
D. INSTALL AND TERMINATE UNIT HEATER VENTS ABOVE ROOF IN ACCORDANCE WITH LOCAL AND STATE CODE REQUIREMENTS.

ABBREVIATIONS

BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
EXT.	EXTERNAL
EUH	ELECTRIC UNIT HEATER
F	FAN
F.F.	FINISHED FLOOR
FPM	FEET PER MINUTE
HP	HORSEPOWER
HOA	HAND-OFF-AUTO
LV	LOUVER
MBH	THOUSAND BTUS PER HOUR
MOD	MOTOR OPERATED DAMPER
MTR	MOTOR
S.P.	STATIC PRESSURE
T-STAT	THERMOSTAT
TYP.	TYPICAL
GUH	GAS UNIT HEATER (PROPANE)
W.P.D.	WATER PRESSURE DROP
W.G.	WATER GAUGE

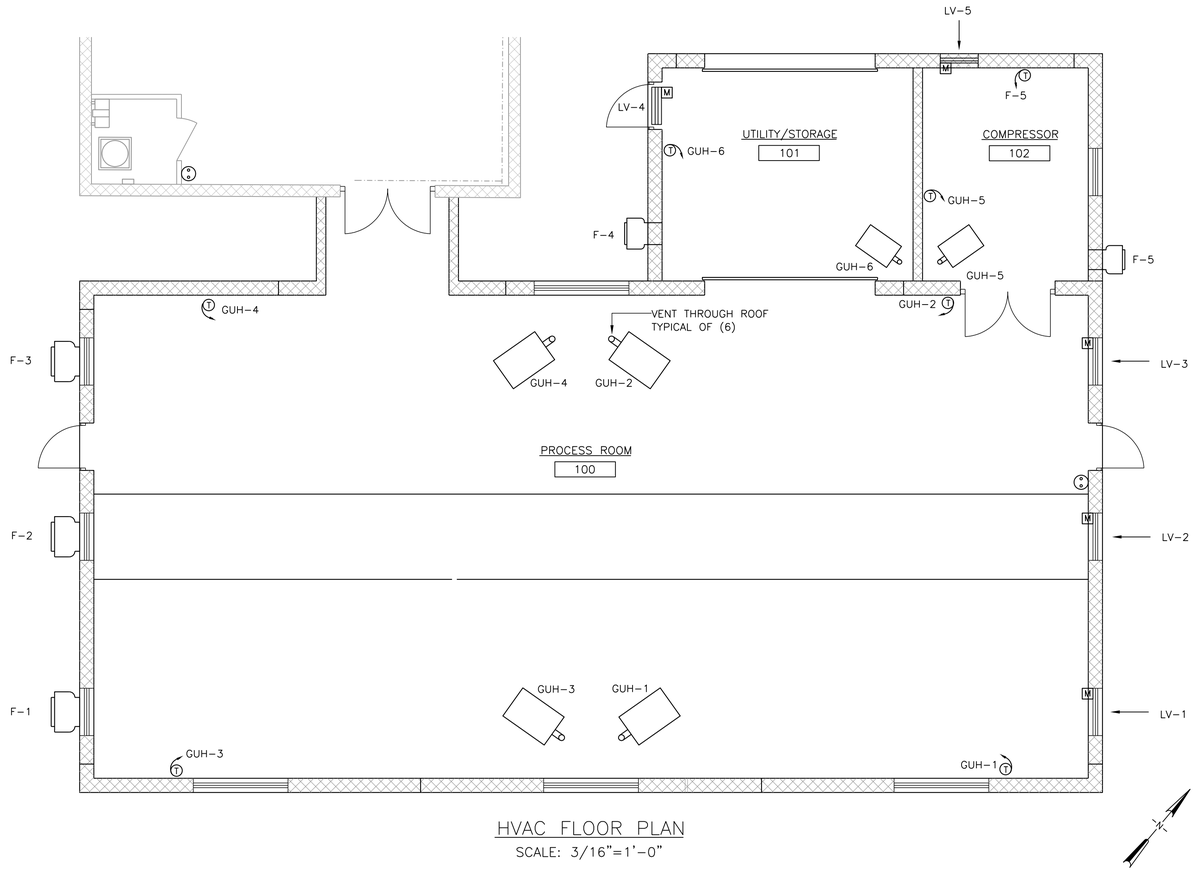
SYMBOLS

- LV- / M — LOUVER WITH MOTOR OPERATER (PLAN)
- 12x20 — DUCT SIZE IN INCHES (FIRST NO., SIDE SHOWN; SECOND NO., SIDE NOT SHOWN)
- T — THERMOSTAT
- M — DAMPER MOTOR
- UH — UNIT HEATER
- 100 CFM ← — SUPPLY AIR FLOW W/ RATE



RAW WATER PUMP STATION ELECTRICAL BUILDING HVAC FLOOR PLAN

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



HVAC FLOOR PLAN

SCALE: 3/16"=1'-0"

X-REF: 20280qx1, A-RWPS-PL, A-TB-P1, E-RWPS-P1, H-TB-P1, M-TB-P1, P-TB-P1
8/03, ROANOKE, BSR
P:\20280\30\Drawings\HVAC\

NOTES:

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2	RE-SEALED				RRC	6/21/04
1	FOR APPROVAL	EGC	11/03	WPJ	DBP	RRC	1/23/04

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COMMONWEALTH OF VIRGINIA
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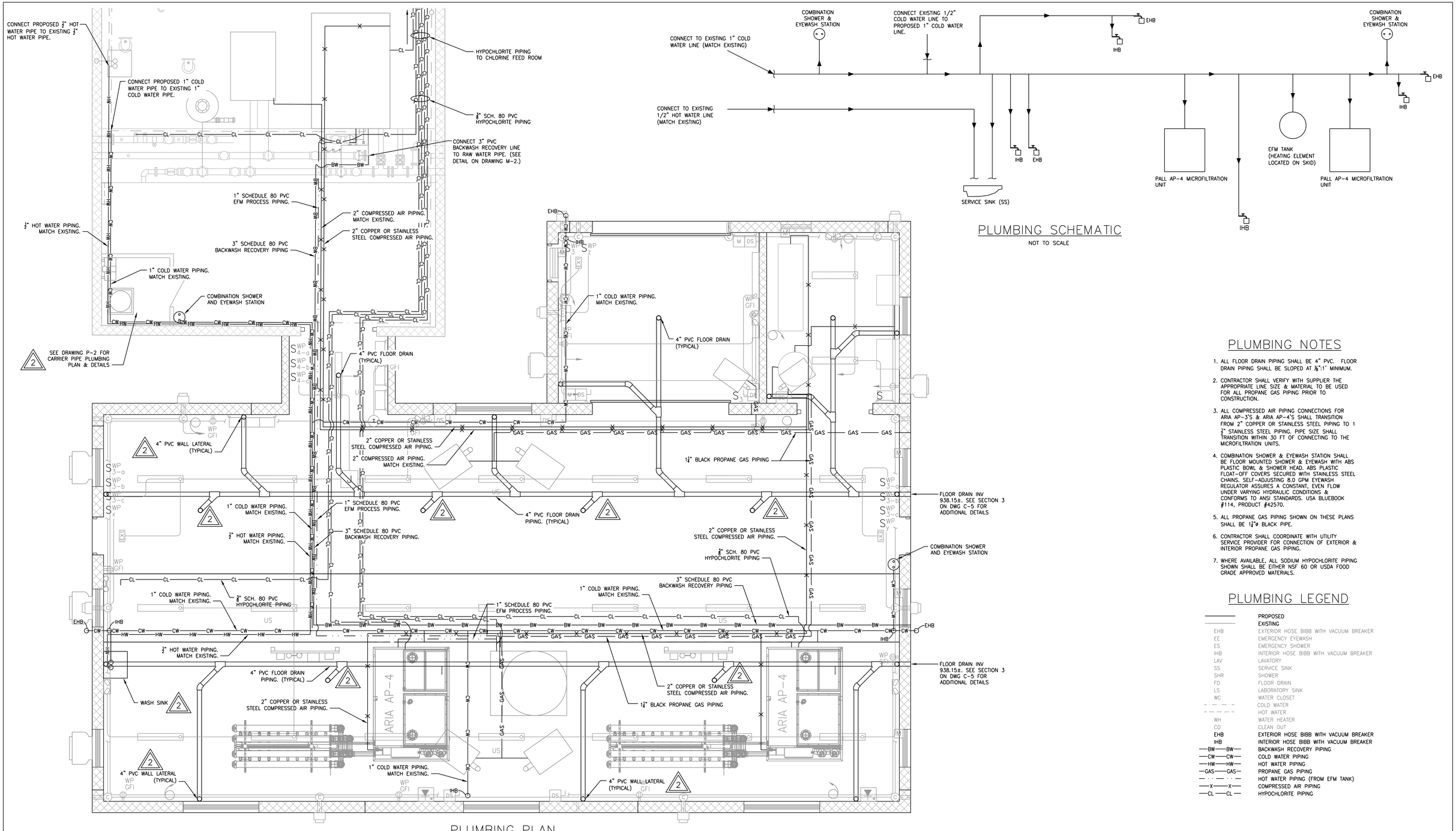
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

HVAC PLANS & DETAILS

JOB NO. 20280 | DRAWING H-1 | SHEET 28 OF 37



PLUMBING PLAN

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

PLUMBING SCHEMATIC

NOT TO SCALE

PLUMBING NOTES

1. ALL FLOOR DRAIN PIPING SHALL BE 4" PVC. FLOOR DRAIN PIPING SHALL BE SLOPED AT ⅛":1' MINIMUM.
2. CONTRACTOR SHALL VERIFY WITH SUPPLIER THE APPROPRIATE LINE SIZE & MATERIAL TO BE USED FOR ALL PROPANE GAS PIPING PRIOR TO CONSTRUCTION.
3. ALL COMPRESSED AIR PIPING CONNECTIONS FOR ARIA AP-3'S & ARIA AP-4'S SHALL TRANSITION FROM 2" COPPER OR STAINLESS STEEL PIPING TO 1 ½" STAINLESS STEEL PIPING. PIPE SIZE SHALL TRANSITION WITHIN 30 FT OF CONNECTING TO THE MICROFILTRATION UNITS.
4. COMBINATION SHOWER & EYEWASH STATION SHALL BE FLOOR MOUNTED SHOWER & EYEWASH WITH ABS PLASTIC BOWL & SHOWER HEAD. ABS PLASTIC FLOAT-OFF COVERS SECURED WITH STAINLESS STEEL CHAINS. SELF-ADJUSTING 8.0 GPM EYEWASH REGULATOR ASSURES A CONSTANT, EVEN FLOW UNDER VARYING HYDRAULIC CONDITIONS & CONFORMS TO ANSI STANDARDS. USA BLUEBOOK #114, PRODUCT #42570.
5. ALL PROPANE GAS PIPING SHOWN ON THESE PLANS SHALL BE 1¼"ø BLACK PIPE.
6. CONTRACTOR SHALL COORDINATE WITH UTILITY SERVICE PROVIDER FOR CONNECTION OF EXTERIOR & INTERIOR PROPANE GAS PIPING.
7. WHERE AVAILABLE, ALL SODIUM HYPOCHLORITE PIPING SHOWN SHALL BE EITHER NSF 60 OR USDA FOOD GRADE APPROVED MATERIALS.

PLUMBING LEGEND

———	PROPOSED
———	EXISTING
EHB	EXTERIOR HOSE BIBB WITH VACUUM BREAKER
EE	EMERGENCY EYEWASH
ES	EMERGENCY SHOWER
IHB	INTERIOR HOSE BIBB WITH VACUUM BREAKER
LAV	LAVATORY
SS	SERVICE SINK
SHR	SHOWER
FD	FLOOR DRAIN
LS	LABORATORY SINK
WC	WATER CLOSET
– – – –	COLD WATER
– – – –	HOT WATER
WH	WATER HEATER
CO	CLEAN OUT
EHB	EXTERIOR HOSE BIBB WITH VACUUM BREAKER
IHB	INTERIOR HOSE BIBB WITH VACUUM BREAKER
—BW—BW—	BACKWASH RECOVERY PIPING
—CW—CW—	COLD WATER PIPING
—HW—HW—	HOT WATER PIPING
—GAS—GAS—	PROPANE GAS PIPING
— · · — · · —	HOT WATER PIPING (FROM EFM TANK)
—X—X—	COMPRESSED AIR PIPING
—CL—CL—	HYPOCHLORITE PIPING

X-REF: 20280qx1, A-TB-P1, E-TB-P1, H-TB-P1, M-TB-P1, P-TB-P1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Plumb\

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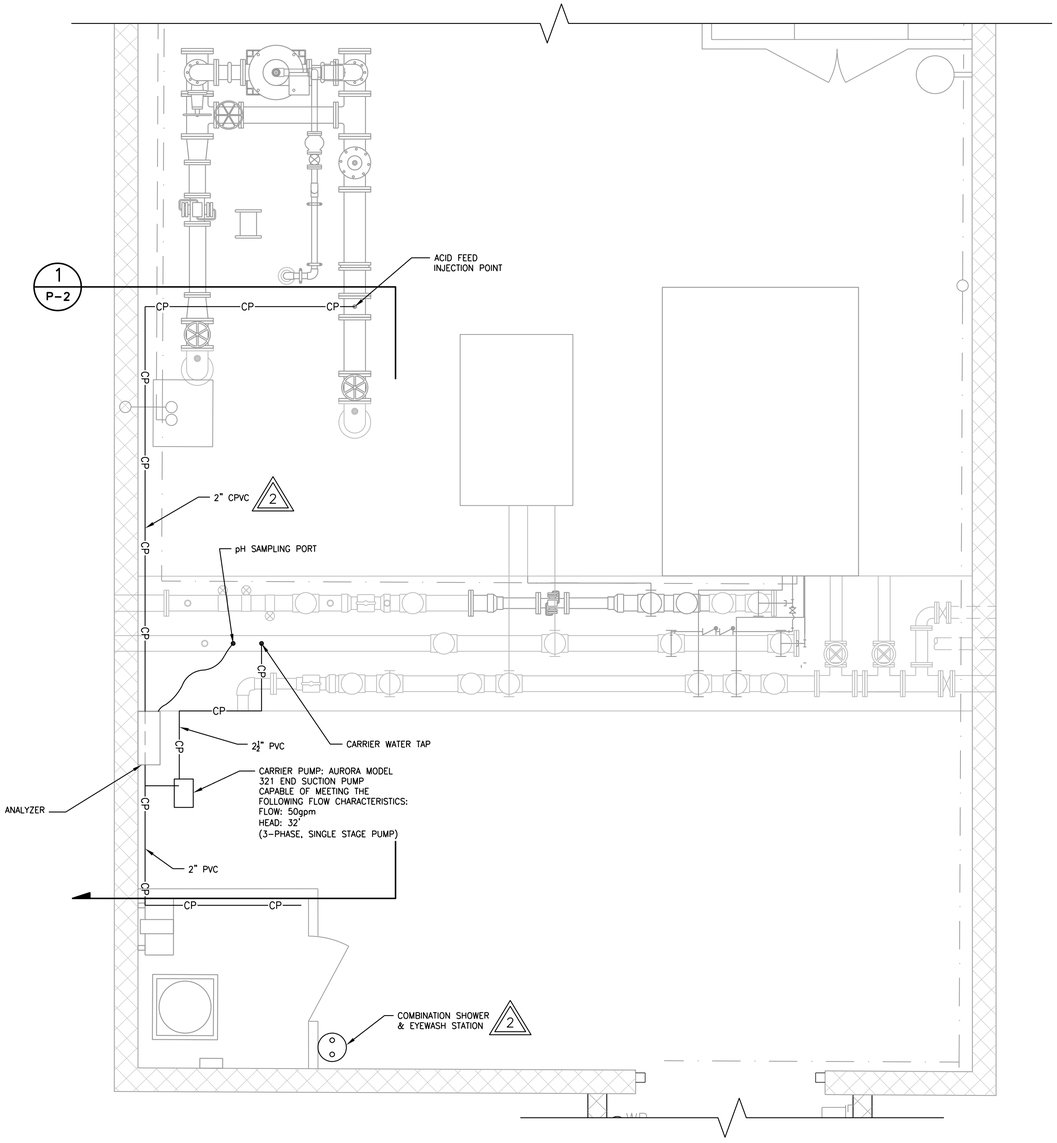
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

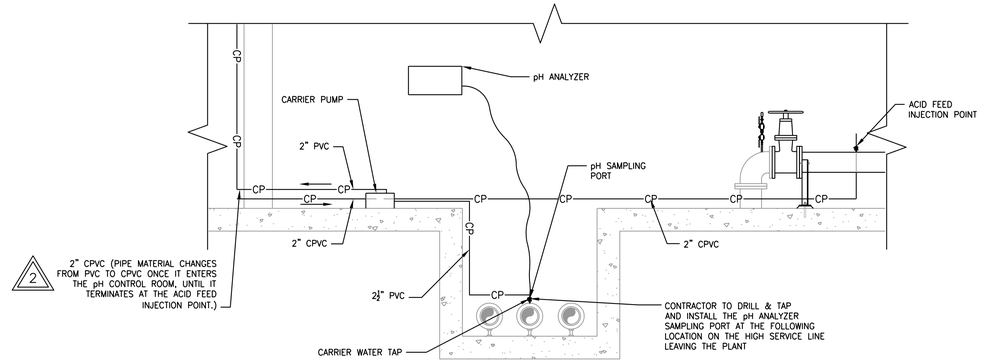
PLUMBING PLAN

JOB NO.	20280	DRAWING	P-1	SHEET	29 OF 37



pH CONTROL ROOM PLUMBING PLAN

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



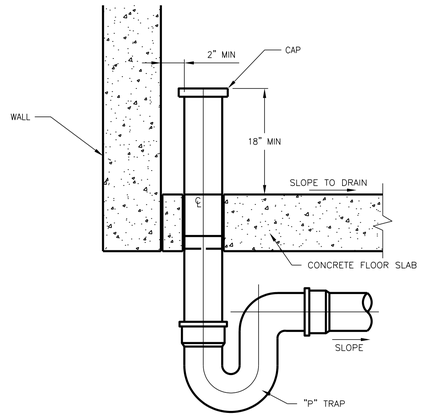
SECTION

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

1
P-2

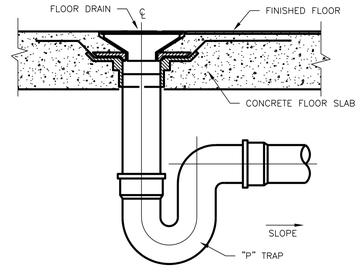
pH ANALYZER NOTES:

1. CONTRACTOR TO FIELD LOCATE THE pH ANALYZER (HACH MODEL EC310 TRANSMITTER, MODEL E2-ROUND ELECTRODE) CONTROLLER LOCATION DURING INSTALLATION.
2. CONTRACTOR SHALL COORDINATE LOCATION WITH OWNER PRIOR TO INSTALLATION.



WALL LATERAL DETAIL

NOT TO SCALE



FLOOR DRAIN DETAIL

NOT TO SCALE

PLUMBING NOTES

1. WHERE AVAILABLE, ALL PIPING ASSOCIATED WITH THE pH CONTROL SYSTEM SHALL BE NSF 60 OR USDA FOOD GRADE APPROVED MATERIALS.

PLUMBING LEGEND

———	PROPOSED
———	EXISTING
EHB	EXTERIOR HOSE BIBB WITH VACUUM BREAKER
EE	EMERGENCY EYEWASH
ES	EMERGENCY SHOWER
IHB	INTERIOR HOSE BIBB WITH VACUUM BREAKER
LAV	LAVATORY
SS	SERVICE SINK
SHR	SHOWER
FD	FLOOR DRAIN
LS	LABORATORY SINK
WC	WATER CLOSET
- - CW - -	COLD WATER
- - HW - -	HOT WATER
WH	WATER HEATER
CO	CLEAN OUT
EHB	EXTERIOR HOSE BIBB WITH VACUUM BREAKER
IHB	INTERIOR HOSE BIBB WITH VACUUM BREAKER
—BW—BW—	BACKWASH RECOVERY PIPING
—CW—CW—	COLD WATER PIPING
—HW—HW—	HOT WATER PIPING
—GAS—GAS—	PROPANE GAS PIPING
— · · HWR · · —	HOT WATER PIPING (FROM EFM TANK)
—X—X—	COMPRESSED AIR PIPING
—CL—CL—	HYPOCHLORITE PIPING
—CP—CP—	CARRIER FEED PIPING

X-REF: 20280sp1, A-TB-P1, E-TB-P1, H-TB-P1, M-TB-P1, P-TB-P1
B/03, ROANOKE, BSR
P:\20280\30\Drawings\Plumb\

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HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

CARRIER PIPE PLUMBING PLAN & DETAILS

JOB NO. 20280 | DRAWING P-2 | SHEET 30 OF 37

ELECTRICAL LEGEND

ABBREVIATIONS

A or AMP	AMPERE, AMPS
AC	ALTERNATING CURRENT
AF	AMPERE FRAME SIZE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AI	ANALOG INPUT
AIC	AMPS INTERRUPTING CURRENT
AIT	ANALYSIS INDICATING TRANSMITTER
ALT	ALTERNATOR
AM	AMMETER
ANN	ANNUNCIATOR
AO	ANALOG OUTPUT
AP	ANNUNCIATOR PANEL
AS	AMMETER SWITCH
ASV	AIR SOLENOID VALVE
AT	AMPERE TRIP RATING
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE
BB	BUCK BOOST
BC	BYPASS CONTACTOR
BKR	BREAKER
BLDG	BUILDING
C or COND	CONDUIT OR CONDUCTOR
CA	CABLE
CB	CIRCUIT BREAKER
CBDH	CIRCUIT BREAKER DISCONNECT HANDLE
CC	CONTROL CIRCUIT
CEP	CONCRETE EQUIPMENT PAD
CIRC	CIRCUIT
CLF	CURRENT LIMITING FUSE
COMP	COMPARTMENT
CONT	CONTINUATION
COR	CORROSION RESISTANT
CP	CONTROL PANEL
CS	CONTROL STATION
CPT	CONTROL POWER TRANSFORMER
CR ()–()	CONTROL RELAY (W/# DESIGNATION)
CT	CURRENT TRANSFORMER
DB	DUCTBANK
DC	DIRECT CURRENT
DIA	DIAMETER
DIV	DIVISION
DM	DAMPER MOTOR
DN	DOWN
DO	DISCRETE OUTPUT
DP	DIFFERENTIAL PRESSURE
DP()–()	DISTRIBUTION PANELBOARD (W/# DESIGNATION)
DPM	DIGITAL POWER MONITOR
DS	DISCONNECT SWITCH
DWG	DRAWING
EA	EACH
EL	ELEVATION
ELEC	ELECTRICAL
EMH–()	ELECTRICAL MANHOLE (W/# DESIGNATION)
EMR	EQUIPMENT MOUNTING RACK
ES	EMERGENCY SWITCH
ESTOP	EMERGENCY STOP
ETM	ELAPSED TIME METER
EX	EXISTING
F & I	FURNISHED AND INSTALLED
FA	FIRE ALARM
FE	FLOW ELEMENT
FF	FINISHED FLOOR
FIT	FLOW INDICATING TRANSMITTER
FLEX	FLEXIBLE
FS	FLOW SWITCH
FSW	FUSED SWITCH
FVNR	FULL VOLTAGE NON REVERSING
FVR	FULL VOLTAGE REVERSING
FVTS	FULL VOLTAGE TWO SPEED
G	GROUND
GEC	GROUNDING ELECTRODE CONDUCTOR
GEN	GENERATOR
GENSET	EMERGENCY POWER GENERATOR
GF	GROUND FAULT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GGCC	GROUND GRID CONNECTING CONDUCTOR
GRD	GROUND
HH	HANDHOLE
HOA	HAND–OFF–AUTO SELECTOR–SWITCH
HP	HORSEPOWER
HTC ()	HEAT TRACE CONTROLLER (W/# DESIGNATION)
HZ	HERTZ
IC	ISOLATION CONTACTOR
IL	INDICATING LIGHT
I/O	INPUT/OUTPUT
ISR	INTRINSICALLY SAFE RELAY
IT–()	ISOLATION TRANSFORMER (W/# DESIGNATION)
J or JB	JUNCTION BOX
JIC	JOINT INDUSTRIAL COUNCIL
KCMIL	THOUSANDS CIRCULAR MILS
KV	KILOVOLT
KVA	KILOVOLT AMPERES
KW	KILOWATT
LA	LIGHTING ARRESTOR
LC	LIGHTING CIRCUIT
LCP	LIGHTING CONTROL PANEL
LE	LEVEL ELEMENT
LIT	LEVEL INDICATING TRANSMITTER
LO	LOCKOUT
LP ()–()	LIGHTING PANELBOARD (W/# DESIGNATION)
LS	LIMIT SWITCH
LT	LIGHTING TRANSFORMER (W/# DESIGNATION)

mA	MILLIAMPS
MAG	MAGNETIC
MAX	MAXIMUM
MCC–()	MOTOR CONTROL CENTER (W/# DESIGNATION)
MCP	MOTOR CIRCUIT PROTECTOR
MCS/	MOLDED CASE SWITCH T – THERMAL ONLY M – MAGNETIC ONLY AUTO – AUTOMATIC ONLY
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MMS	MANUAL MOTOR STARTER
MOSG–()	MOTOR OPERATED SLIDE GATE (W/# DESIGNATION)
MOV–()	MOTOR OPERATED VALVE (W/# DESIGNATION)
MS	MOTOR STARTER
MSS	MOTOR STARTING SWITCH
MTG	MOUNTING
MTR	MOTOR TIMING RELAY
MTS	MANUAL TRANSFER SWITCH
MWTP	MOTOR WINDING THERMAL PROTECTION
MWTS	MOTOR WINDING TEMPERATURE SENSOR
Mx	MOTOR CONTACTOR AUXILIARY CONTACT
N	NEUTRAL
NC	NORMALLY CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOC.
NO	NORMALLY OPEN
NP	NAMEPLATE
OIT	OPERATOR INTERFACE TERMINAL
OL	OVERLOAD RELAY
ø	PHASE
P	POLE
PB	PUSHBUTTON
PBX	PULL BOX
PCS	PROCESS CONTROL SYSTEM
PF	PULLING FITTING or POWER FEED
PLC	PROGRAMMABLE LOGIC CONTROLLER
PNL	PANEL
POT	POTENTIOMETER
PP ()–()	POWER PANELBOARD (W/# DESIGNATION)
PR	PAIR
PRIM	PRIMARY
PS	PRESSURE SWITCH or POWER SUPPLY
PT	POTENTIAL TRANSFORMER
PVC	POLY–VINYL CHLORIDE
QTY	QUANTITY
RCP–()	RADIANT CEILING PANEL (W/# DESIGNATION)
RCT	REPEAT CYCLE TIMER
RECP	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
ROS	REMOTE OPERATING STATION
RP	RELAY PANEL
RV–AT	REDUCE VOLTAGE AUTO TRANSFORMER
SA	SURGE ARRESTOR
SCR	SILICON CONTROLLER RECTIFIER
SEC	SECOND or SECONDARY
SED	SERVICE ENTRANCE DISCONNECT
SHLD	SHIELDED
S/L	STOP/LOCKOUT SWITCH
SN	SOLID NEUTRAL
SEL or SEL SW	SELECTOR SWITCH
SS	STAINLESS STEEL
SSRV	SOLID STATE REDUCED VOLTAGE
SSW	SAFETY SWITCH
S/S	STOP/START PUSH BUTTON
STP	SHIELDED TWISTED PAIR
STR	STRANDED
SV ()	SOLENOID VALVE (W/# DESIGNATION)
SW	SWITCH
SWD	SWITCHING DUTY
SWSV	SEALWATER SOLENOID VALVE
TC	TERMINAL CABINET OR TIMED CLOSED
TDR	TIME DELAY RELAY
TEL	TELEPHONE
TERM	TERMINAL
TP	TIMER
TR	TERMINATION PANEL
TRANS	TRANSFORMER
TS	TORQUE SWITCH
TSP	TWISTED SHIELED PAIR
TST	TWISTED SHIELED TRIAD
T–STAT	THERMOSTAT
TTC	TELEPHONE TERMINATION CABINET
TTP	TELEPHONE TERMINATION PANEL
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UH–()	UNIT HEATER (W/# DESIGNATION)
ULS	ULTRASONIC LEVEL SENSOR
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UTP	UNSHIELED TWISTED PAIR
V	VOLTS
VA	VOLT–AMPERES
VFD	VARIABLE FREQUENCY DRIVE
VM	VOLTMETER
VS	VOLTMETER SWITCH OR VACUUM SWITCH
W/	WITH
WP	WEATHER PROOF, WATER PROOF
WS	WORKSTATION
XP	EXPLOSION PROOF
XFMR	TRANSFORMER
2S1W	2 SPEED, 1 WINDING
2S2W	2 SPEED, 2 WINDING

SYMBOLS

PLANS AND SCHEMATICS

- ELECTRICAL DUCT BANK (OR — E — E —)
- GROUND GRID
- GROUND ROD
- S — SINGLE POLE LIGHT SWITCH
- S_3 — THREE–WAY LIGHT SWITCH
- S_4 — FOUR–WAY LIGHT SWITCH

MODIFIERS: D – DIMMER SWITCH; EP – EXPLOSION PROOF; K – KEY OPERATED SWITCH; M – MOTOR RATED SWITCH; WP – WEATHERPROOF

- DUPLEX RECEPTACLE
- QUAD RECEPTACLE
- SINGLE RECEPTACLE

MODIFIERS: C – COMPUTER; CL – CLOCK; CR – CORROSION RESISTANT; WP – WEATHERPROOF; GFI – GROUND FAULT INTERUPTER; EP – EXPLOSION PROOF; R – RANGE

- GROUND
- VFD — VARIABLE FREQUENCY DRIVE
- J — JUNCTION BOX
- DELTA
- WYE
- FLEXIBLE CONDUIT W/ADAPTER
- TRANSFORMER
- CIRCUIT BREAKER
- W — MODULAR TELEPHONE JACK AND HANDSET UNIT (W – WALL MOUNTED)
- © — CONDUIT FITTING
- EQUIPMENT MOUNTING RACK (EMR) ⟨G10⟩
- XX HP — MOTOR W/HP DESIGNATION
- XX HP — VFD CONTROLLED MOTOR W/HP DESIGNATION
- HEATING ELEMENT
- T — CONDUIT TEE FITTING (3–WAY) OR X FITTING (4–WAY)
- DS — DISCONNECT SWITCH
- PORTABLE GENERATOR RECEPTACLE

ELEMENTARY

- START — MOMENTARY OPEN PUSHBUTTON (NORMALLY OPEN)
- STOP — MOMENTARY CLOSED PUSHBUTTON (NORMALLY CLOSED)
- MAINTAINED CONTACT PUSHBUTTON WITH MECHANICAL INTERLOCK
- H O A / XOO / OOX — THREE POSITION MAINTAINED CONTACT SELECTOR SWITCH
- F O S A / XOOO / OXOO / OOOX — FOUR POSITION MAINTAINED CONTACT SELECTOR SWITCH
- NORMALLY OPEN / NORMALLY CLOSED — TIME DELAY AFTER COIL ENERGIZED
- NORMALLY OPEN / NORMALLY CLOSED — TIME DELAY AFTER COIL DE–ENERGIZED
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- TEMPERATURE SWITCH
- LIMIT SWITCH
- FLOAT SWITCH
- PRESSURE SWITCH
- S — SOLENOID VALVE COIL
- INDICATING LIGHT *=COLOR: R – RED, W – WHITE, G – GREEN, A – AMBER
- PUSH–TO–TEST INDICATING LIGHT
- NP — NAME PLATE
- RED MUSHROOM HEAD PUSHBUTTON(MAINTAINED)
- CIRCUIT BREAKER
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR; CIRCUIT CONNECTIONS; GROUND

GENERAL NOTES:

G1. CONTRACTOR SHALL COORDINATE FINAL CONCRETE EQUIPMENT PAD (CEP) DIMENSIONS WITH FINAL DIMENSIONS OF EQUIPMENT AND OTHER STRUCTURES TO BE MOUNTED ON PADS. REFER TO INTERIOR AND EXTERIOR EQUIPMENT PAD DETAILS FOR ADDITIONAL INFORMATION. CEPS SHALL BE SIZE TO ACCOMMODATE FUTURE EQUIPMENT/SECTIONS WHERE SPACE IS RESERVED AS SHOWN ON THE DRAWINGS.

G2. ENCLOSURE DIMENSIONS SHOWN ON THE DRAWINGS ARE MINIMUM REQUIRED DIMENSIONS. ENCLOSURES SHALL BE SIZED TO ACCOMMODATE EQUIPMENT, CONTROLS AND COMPONENTS AS SHOWN, SPECIFIED AND REQUIRED FOR AN OPERABLE SYSTEM.

G3. EQUIPMENT, FEEDERS, AND BRANCH CIRCUITS ON THE DOWNSTREAM SIDE OF THE PANELBOARDS ARE NOT SHOWN ON THE ONE–LINE AND SCHEMATIC DIAGRAMS. REFER TO THE PANELBOARD SCHEDULES AND THE PLANS FOR RELATED INFORMATION.

G4. EVERY EFFORT HAS BEEN MADE TO IDENTIFY REMOTE ITEMS TO BE CONNECTED BY THE ELECTRICAL CONTRACTOR, EITHER IN THE ELEMENTARIES OR IN THE SCHEDULES. HOWEVER, NOT ALL OF THE REMOTE DEVICES MAY HAVE BEEN SHOWN ON THE ELECTRICAL PLAN DRAWINGS. REFER TO THE DRAWINGS OF RESPECTIVE TRADES TO LOCATE OR CONFIRM EQUIPMENT LOCATIONS.

G5. GROUNDING: ELECTRICAL SYSTEMS SHALL BE GROUNDED AS SPECIFIED AND SHOWN ON THE CONTRACT DRAWINGS. WORK SHALL ALSO BE PERFORMED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRIC CODE. GROUND GRID CONNECTIONS SHOWN ON THE INDIVIDUAL PLANS ARE MINIMUM REQUIREMENTS. ALL REQUIRED CONNECTIONS ARE NOT SHOWN ON PLANS FOR BREVITY.

G6. CONTRACTOR SHALL PROVIDE POWER SUPPLY AND CONTROL WIRING TO HEATING AND VENTILATION COMPONENTS AS SHOWN ON THE CONTRACT DRAWINGS. HEATING/VENTILATION CONTROL EQUIPMENT SHALL BE PROVIDED BY MANUFACTURER AS INDICATED.

G7. LIGHTING CIRCUITS ARE SHOWN DIAGRAMMATICALLY: EXACT LOCATION OF CONDUIT RUNS SHALL BE DETERMINED BY THE ELECTRICAL INSTALLER IN THE FIELD, UNLESS SPECIFICALLY DIMENSIONED ON THE PLANS. CONDUIT AND WIRE INFORMATION CAN BE FOUND ON THE PLANS, EQUIPMENT SCHEDULES AND SCHEMATICS.

G8. EXACT EQUIPMENT CONDUIT CONNECTIONS ARE TO BE DETERMINED BY THE ELECTRICAL INSTALLER BASED UPON THE ACTUAL FIELD LOCATION OF EQUIPMENT. INSTALL CONDUIT IN ACCORDANCE WITH SPECIFICATIONS.

G9. ALL PENETRATIONS THROUGH EXISTING SOLID CONCRETE STRUCTURES WHERE SLEEVES HAVE NOT BEEN PROVIDED SHALL BE CORE DRILLED AND SIZED TO ACCEPT MECHANICAL LINK SEALS. THROUGH NON–FIRE RATED WALLS, CORE HOLE AND SEAL AROUND CONDUIT WITH NON–SHRINK GROUT. THROUGH EXTERIOR WALL SEAL WATER TIGHT WITH SILICONE MASONRY SEALANT.

G10. EQUIPMENT MOUNTING RACK (EMR): THE FINAL LOCATION OF THE EMR'S SHALL BE COORDINATED IN THE FIELD TO AVOID INTERFERENCE WITH ACCESS TO THE PROCESS EQUIPMENT. SEE DETAIL E–7.

G11. EQUIPMENT REMOVALS: DISCONNECT AND REMOVE POWER/CONTROL CIRCUITS AND CONDUITS FROM THE RESPECTIVE EQUIPMENT.

G12. EQUIPMENT RELOCATIONS: DISCONNECT AND REMOVE POWER/CONTROL CIRCUITS AND CONDUCTORS FROM THE EQUIPMENT. EQUIPMENT SHALL BE REMOVED AND RELOCATED TO THE NEW LOCATION SHOWN ON THE CONTRACT DRAWINGS.

G13. CONDUIT REMOVALS: DISCONNECT AND REMOVE EXPOSED PORTIONS OF CONDUIT FOR EQUIPMENT TO BE REMOVED AND/OR RELOCATED. CUT, THREAD, COUPLE AND CAP EXISTING CONDUITS ADJACENT TO THE PENETRATION POINT WHERE THE CONDUITS ARE CONCEALED (IN WALLS, CONCRETE SLABS, BELOW GRADE). REPAIR WALL PENETRATIONS TO A WEATHER–TIGHT CONDITION MATCHING EXISTING WALL MATERIALS.

G14. EQUIPMENT TO REMAIN: PROVIDE NEW FEEDER OR BRANCH CIRCUIT CONDUIT AND WIRING TO EXISTING/RELOCATED EQUIPMENT REQUIRED TO REMAIN IN SERVICE. CUT AND REUSE EXISTING CONDUIT RUNS WHERE PRACTICAL. CIRCUIT CONDUCTORS SHALL BE REPLACED THE ENTIRE LENGTH OF THE CIRCUIT RUN.

GROUNDING NOTES:

1. THE GROUNDING SYSTEM IS SHOWN DIAGRAMMATICALLY. EXACT LOCATION OF CABLE, GROUND RODS AND CONNECTIONS SHALL BE DETERMINED IN THE FIELD.
2. ALL BURIED GROUNDING CABLE CONNECTIONS SHALL BE CADWELD OR THERMOWELD. THE WELDED CONNECTIONS SHALL BE LEFT EXPOSED FOR INSPECTION BY ENGINEER PRIOR TO BACKFILLING.
3. WHERE EXPOSED TO MECHANICAL INJURY, THE GROUNDING CONDUCTOR SHALL BE SUITABLY PROTECTED BY PIPE OR OTHER MECHANICAL PROTECTION. EACH END OF PROTECTING CONDUIT (IF METALLIC) SHOULD BE GROUNDED TO THE BARE CABLE.
4. ALL EXPOSED CABLE LUGS AND CONNECTORS SHALL BE OF THE COMPRESSION TYPE UNLESS OTHERWISE NOTED.
5. STEEL MUST BE CLEANED THOROUGHLY AND CABLE MUST BE COMPLETELY DRY BEFORE MAKING WELD CONNECTIONS.
6. THE GROUNDING SYSTEM SHALL BE CONNECTED TO THE GROUNDING ELECTRODES.

INSTRUMENT & FUNCTION TAGGING

XXX / ### — XXX = FUNCTIONAL INSTRUMENT IDENTIFICATION LETTERS FROM INSTRUMENT IDENTIFICATION TABLE; ### = LOOP NUMBER

GENERAL CIRCUIT/CONDUIT TAG IDENTIFICATION

TAG	CONDUIT SIZE	CONDUCTORS
P2	3/4"	2–#12, 1–#12G
P3	3/4"	3–#12, 1–#12G
P6	3/4"	6–#12, 1–#12G
Cx	3/4" (x=2 THRU 18) 1" (x=19 THRU 30) 2" (x=31 THRU 100)	x–#14, 1–#12G
TSP–x	3/4" (x=1,2) 1" (x=3,4) 2" (x=5 THRU 16)	x–#20 TWISTED SHIELDED PAIR
TST–x	3/4"	x–#20 TWISTED SHIELDED TRIAD
CAT5–x	3/4" (x=1 THRU 4) 1" (x=5 THRU 8)	x–CATEGORY 5 NETWORK CABLE (BELDEN 1583A OR EQUAL)

x–REF: 20280X1.DWG
03/11 BOWE, JHC
P:\20280\30\DRAWINGS\ELEC\

NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	RE–SEALED				RRC	6/21/04
1	FOR APPROVAL	JHC	11/03	WPJ	TJR	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

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BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

ELECTRICAL LEGEND
ABBREVIATIONS & SYMBOLS

JOB NO.	20280	DRAWING	E–1	SHEET	31 OF 37

POWER PANELBOARD PPRW

LOCATION: RAW WATER PUMP STATION
MAIN BUS RATING: 225A, 480/277V, 3PH, 4W
MINIMUM SHORT-CIRCUIT INTERRUPTION RATING: 35,000 A IC
MAIN BREAKER TRIP: 200AT/225AF

FED FROM: MTS
ESTIMATED CONNECTED LOAD: 100kVA
INCOMING FEED: 2 1/2"C w/4-#4/0, 1-#6G
ENCLOSURE: NEMA 12
TVSS/SURGE PROTECTION: INTEGRAL

NOTES*: SEE PANELBOARD SCHEDULE NOTES

DESCRIPTION	NOTES*	LOAD	CONDUIT/ CONDUCTOR SIZE	CB TRIP/POLE	CIRCUIT	A B C	CIRCUIT	CB TRIP/POLE	CONDUIT/ CONDUCTOR SIZE	LOAD	NOTES*	DESCRIPTION
LIGHTING TRANSFORMER LTRW		15kVA	3/4"C w/2-#8, 1-#10G	50A/3P	1	●	2					
					3	●	4	110A/3P	1-1/4"C w/3-#3, 1-#6G	60Hp		RAW WATER PUMP NO.1
AIR COMPRESSOR		5Hp	1" C w/3-#10, 1-#10G	20A/3P	5	●	6					
					7	●	8					
					9	●	10	110A/3P	1-1/4"C w/3-#3, 1-#6G	60Hp		RAW WATER PUMP NO.2
SPARE				20A/3P	11	●	12					
					13	●	14	20A/3P				SPARE
SPACE					15	●	16					
SPACE					17	●	18					
SPACE					19	●	20	20A/1P				SPARE
SPACE					21	●	22	20A/1P				SPARE
SPACE					23	●	24	20A/1P				SPARE
SPACE					25	●	26	20A/3P	HARD BUS CONNECTION	N/A		TVSS
SPACE					27	●	28					
SPACE					29	●	30					

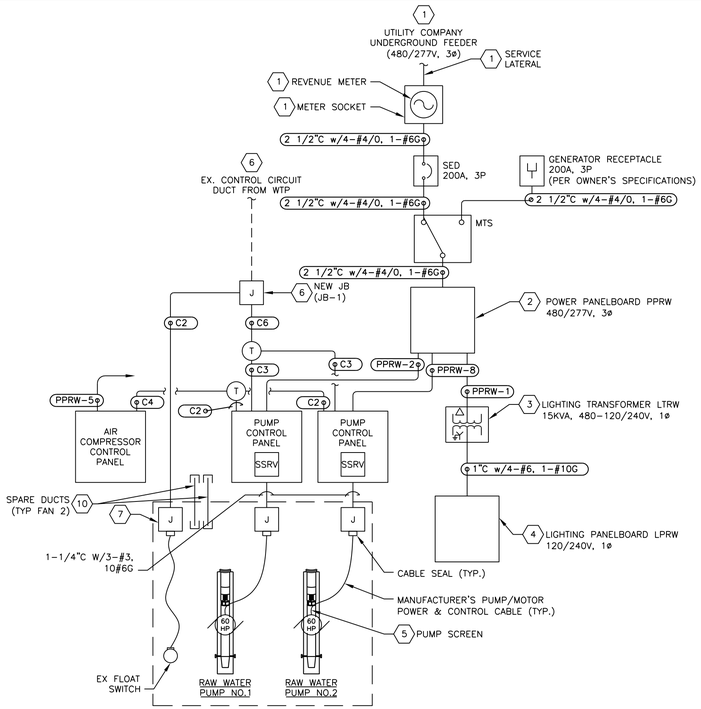
LIGHTING PANELBOARD LPRW

LOCATION: RAW WATER PUMP STATION
MAIN BUS RATING: 100A, 120/240V, 1PH, 3W
MINIMUM SHORT-CIRCUIT INTERRUPTION RATING: 10,000 AIC
MAIN BREAKER TRIP: 60AT/225AF

FED FROM: LIGHTING XFORMER LTRW
ESTIMATED CONNECTED LOAD: 15kVA
INCOMING FEED: 1"C w/4-#6, 1-#10G
ENCLOSURE: NEMA 12
TVSS/SURGE PROTECTION: N/A

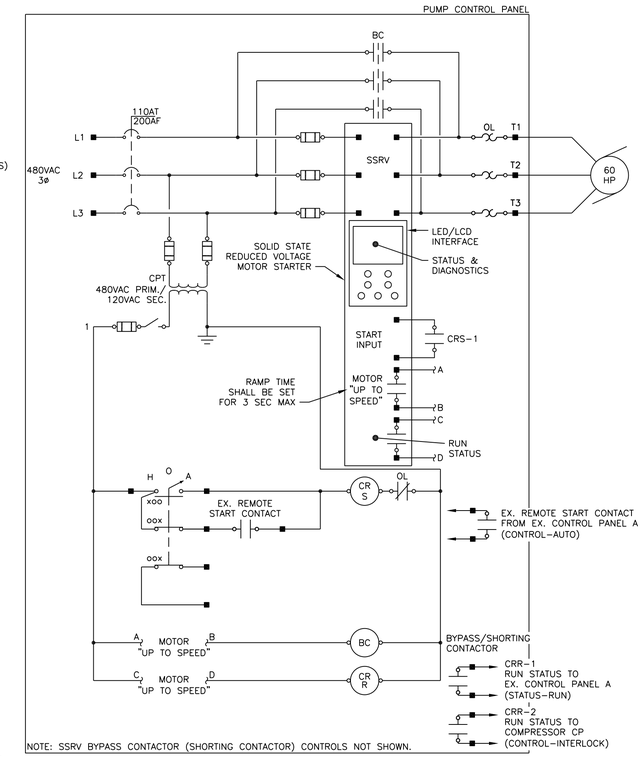
NOTES*: SEE PANELBOARD SCHEDULE NOTES

DESCRIPTION	NOTES*	LOAD	CONDUIT/ CONDUCTOR SIZE	CB TRIP/POLE	CIRCUIT	A B	CIRCUIT	CB TRIP/POLE	CONDUIT/ CONDUCTOR SIZE	LOAD	NOTES*	DESCRIPTION
LIGHTING - INTERIOR		17kW	3/4"C w/2-#12, 1-#12G	20A/1P	1	●	2	20A/1P	3/4"C w/2-#12, 1-#12G			RECEPTACLES - INTERIOR
LIGHTING - EXTERIOR		175kW	3/4"C w/2-#12, 1-#12G	20A/1P	3	●	4	20A/1P	3/4"C w/2-#12, 1-#12G	.2Hp		FAN F-6 MSCP
SPARE				20A/1P	5	●	6	20A/1P				SPARE
SPARE				20A/1P	7	●	8	20A/1P				SPARE
SPARE				20A/1P	9	●	10	20A/1P				SPARE
SPACE					11	●	12					SPACE
SPACE					13	●	14					SPACE
SPACE					15	●	16					SPACE
SPACE					17	●	18					SPACE
SPACE					19	●	20					SPACE



2 RAW WATER PUMP STATION
POWER & CONTROL SCHEMATIC DIAGRAM

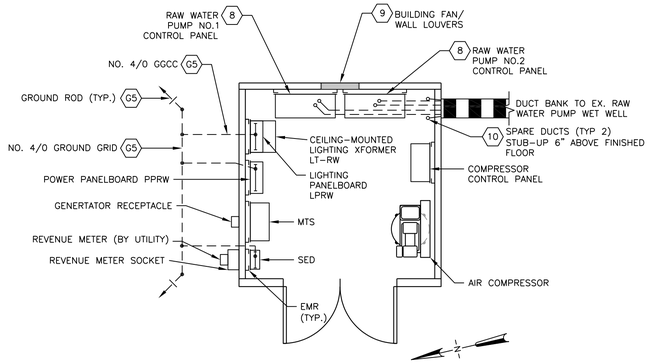
NOT TO SCALE



2 RAW WATER PUMP NO.1 CONTROL PANEL ELEMENTARY

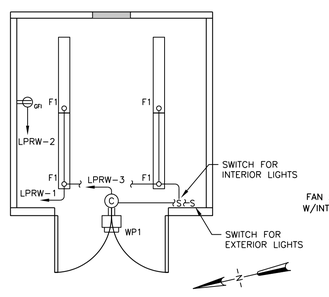
NOT TO SCALE

(TYP. FOR: RAW WATER PUMP NO.2)



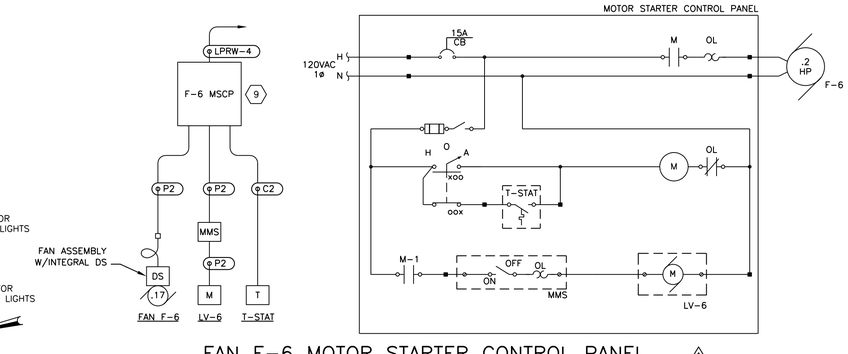
RAW WATER PUMP STATION
POWER & CONTROL PLAN

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



RAW WATER PUMP STATION
LIGHTING PLAN

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



FAN F-6 MOTOR STARTER CONTROL PANEL
ELEMENTARY AND CONDUIT RISER DIAGRAM

NOT TO SCALE

DRAWING NOTES

1. UNDERGROUND ELECTRICAL SERVICE: PROVIDE ELECTRIC SERVICE EQUIPMENT AND INSTALLATION OF EQUIPMENT PER UTILITY COMPANY'S REQUIREMENTS. PROVIDE SERVICE ENTRANCE RISER POLE, CONDUIT, CABLES AND METER SOCKET PER UTILITY SPECIFICATIONS. COORDINATE FINAL LOCATION OF EQUIPMENT AND FINAL TERMINATIONS WITH UTILITY. REVENUE METER SHALL BE PROVIDED BY UTILITY.
2. POWER PANELBOARD: NOT ALL PANELBOARD CIRCUITS ARE SHOWN ON THE POWER AND CONTROL PLAN OR THE POWER & CONTROL SCHEMATIC DIAGRAM. REFER TO POWER PANELBOARD SCHEDULE FOR ADDITIONAL CIRCUIT REQUIREMENTS.
3. LIGHTING TRANSFORMER: PROVIDE MOUNTING BRACKETS AS REQUIRED TO CEILING MOUNT LIGHTING TRANSFORMER.
4. LIGHTING PANELBOARD: NOT ALL PANELBOARD CIRCUITS ARE SHOWN ON THE POWER AND CONTROL PLAN OR THE POWER & CONTROL SCHEMATIC DIAGRAM. REFER TO LIGHTING PANELBOARD SCHEDULE FOR ADDITIONAL CIRCUIT REQUIREMENTS.
5. PUMP SCREEN: MODIFY PUMP SCREEN TO ACCOMODATE PUMP POWER & CONTROL CABLE.
6. EX. CONTROL CIRCUITS: PROVIDE NEW JUNCTION BOX W/TERMINAL BLOCKS TO EXTEND EXISTING PUMP CONTROL AND STATUS CIRCUITS TO NEW PUMP CONTROL PANELS.
7. EX. LOW LEVEL FLOAT SWITCH: PROVIDE NEW JUNCTION BOX W/TERMINAL BLOCKS IN PUMP VAULT TO EXTEND EXISTING CONTROL SIGNALS TO NEW JUNCTION BOX JB-1.
8. RAW WATER PUMP SSRV PANELS: LOCATE PANELS SUCH THAT THEY ARE CENTERED VERTICALLY BETWEEN THE LOUVERS.
9. BUILDING FAN/WALL LOUVERS: CONTRACTOR SHALL COORDINATE FINAL LOCATION OF CONTROL PANELS AND CONDUIT TO AVOID INTERFERENCE WITH FAN AND LOUVER OPENINGS.
10. SPARE DUCTS: PROVIDE 2 SPARE 1" DUCTS WITH PULLWIRE BETWEEN PUMP STATION & EXISTING PUMP VAULT. COUPLE & CAP EACH DUCT END.

1/4"=1'-0" (2 0 2 4 6 8 10)

X-REF: 20280GX1.DWG
03/11 RDWEB_JHC
P:\20280_50\DRAWINGS\ELEC\

NOTES:
Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	REVISED PER OWNER & VDH COMMENTS	JHC	6/04	WPJ	TJR	RRC	6/21/04
1	FOR APPROVAL	JHC	11/03	WPJ	TJR	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA — RHODES R. COPITHORN No. 022719 — 6-21-04 — PROFESSIONAL ENGINEER

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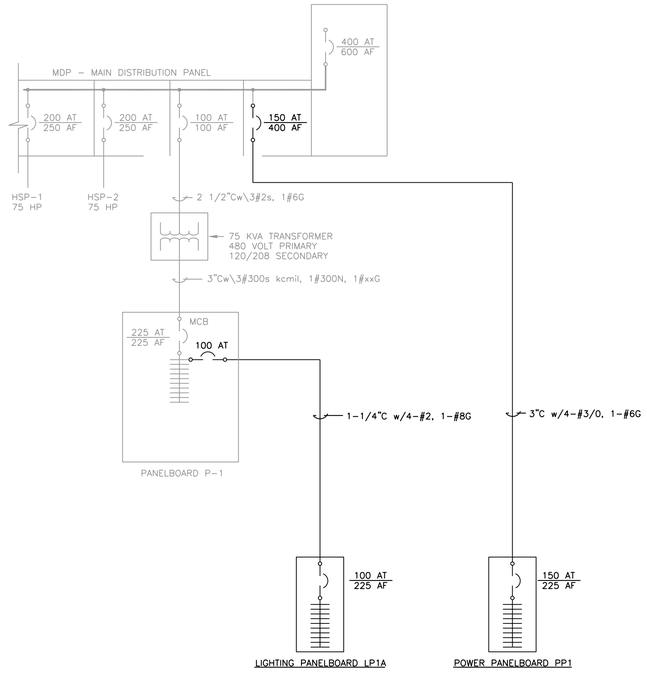
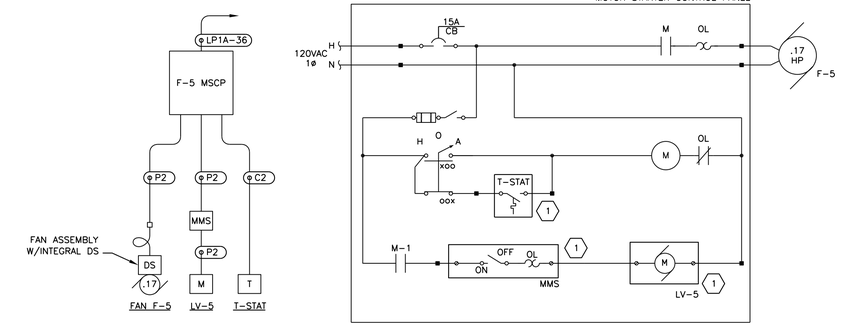
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028
RAW WATER PUMP STATION
PLANS, SCHEDULES & DIAGRAMS

JOB NO. 20280 | DRAWING E-2 | SHEET 32 OF 37



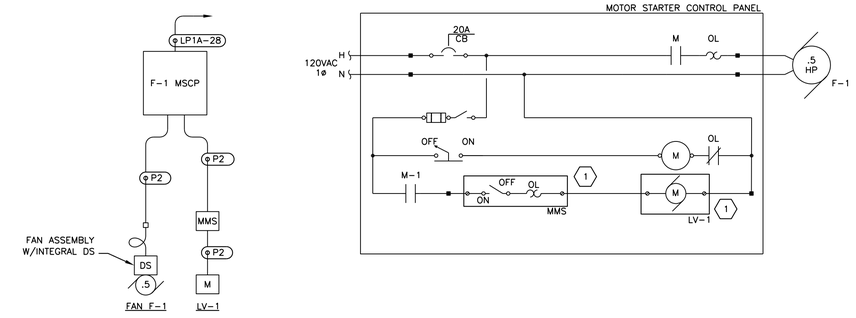
BEDFORD PLANT 1-LINE DIAGRAM

NOT TO SCALE



FAN F-5 MOTOR STARTER CONTROL PANEL ELEMENTARY AND CONDUIT RISER DIAGRAM

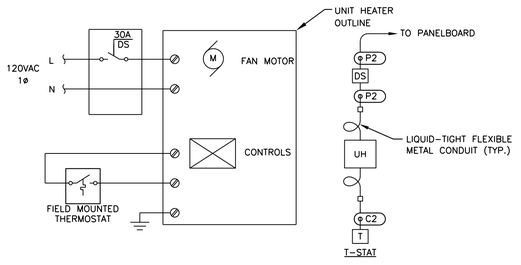
NOT TO SCALE



FAN F-1 MOTOR STARTER CONTROL PANEL ELEMENTARY & CONDUIT RISER DIAGRAM

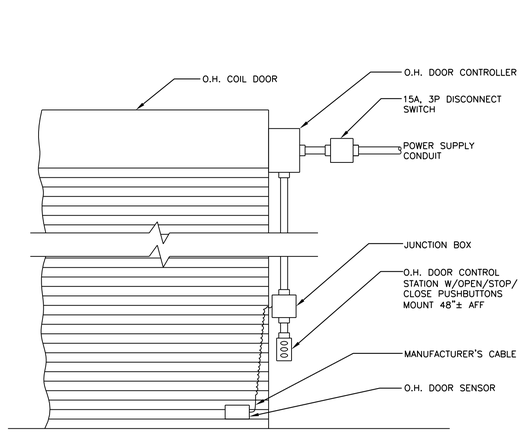
NOT TO SCALE

TYP. FOR: FAN F-2 W/LOUVER LV-2
FAN F-3 W/LOUVER LV-3
FAN F-4 W/LOUVER LV-4



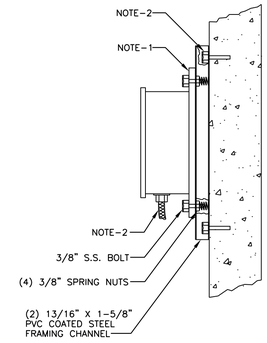
UNIT HEATER (GUH) SCHEMATIC & CONDUIT RISER DIAGRAM (EXTERNAL THERMOSTAT)

NOT TO SCALE



TYPICAL OVERHEAD DOOR ELEVATION

NOT TO SCALE

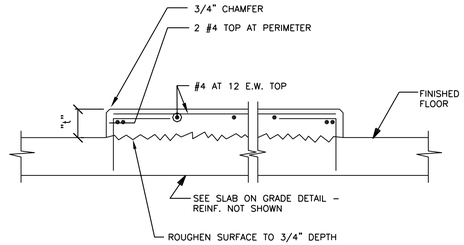


EQUIPMENT MOUNTING RACK (EMR) DETAIL

NOT TO SCALE

DETAIL NOTES:

1. USE 1/4" ALUMINUM PLATE. DIMENSION TO SUIT EQUIPMENT BEING USED AND QUANTITY OF EQUIPMENT ON PLATE. USE (4) 3/8" S.S. ANCHOR BOLTS TO MOUNT FRAMING CHANNEL TO WALL.
2. ALL CONDUIT FROM EQUIPMENT TO BE LIQUID TIGHT 3/4" FLEXIBLE TO J-BOX.

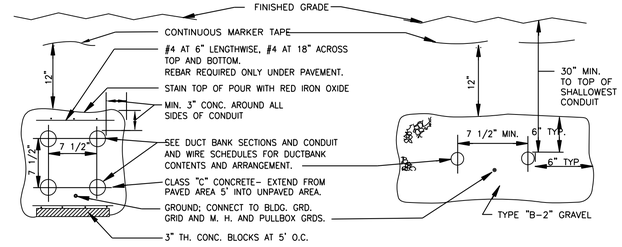


NOTES:

1. COORD. EQUIP. PAD SIZE, THICKNESS (t) & ANCHOR BOLT LOCATIONS W/ ELEC. DWGS. AND EQUIPMENT

TYPICAL INDOOR EQUIPMENT PAD DETAIL

NOT TO SCALE



CONCRETE ENCASED
UNDER PAVED AREAS

GRAVEL ENCASED
UNDER UNPAVED AREAS

DUCT BANK DETAILS

NO TO SCALE

DRAWING NOTES:

(1) EQUIPMENT AND CONTROLS LOCATED IN THE FIELD.

X-REF: 20280GX1.DWG
8/03, ROANOKE, BSR
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NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	RE-SEALED				RRC	6/21/04
1	FOR APPROVAL					
	BSR	11/03	WPJ	CMT	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
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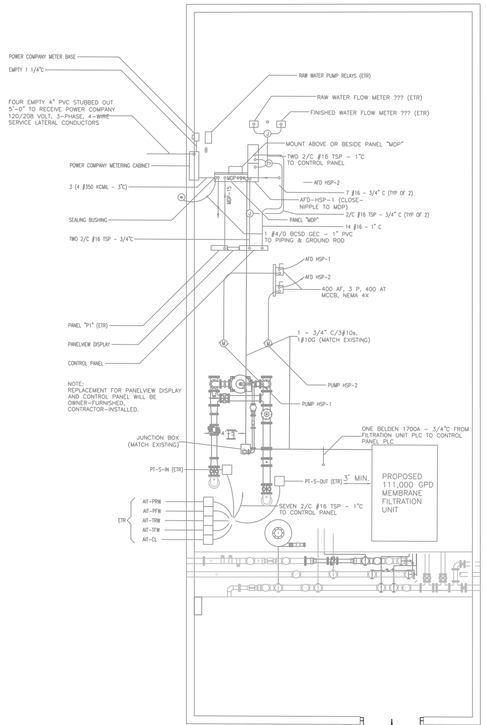
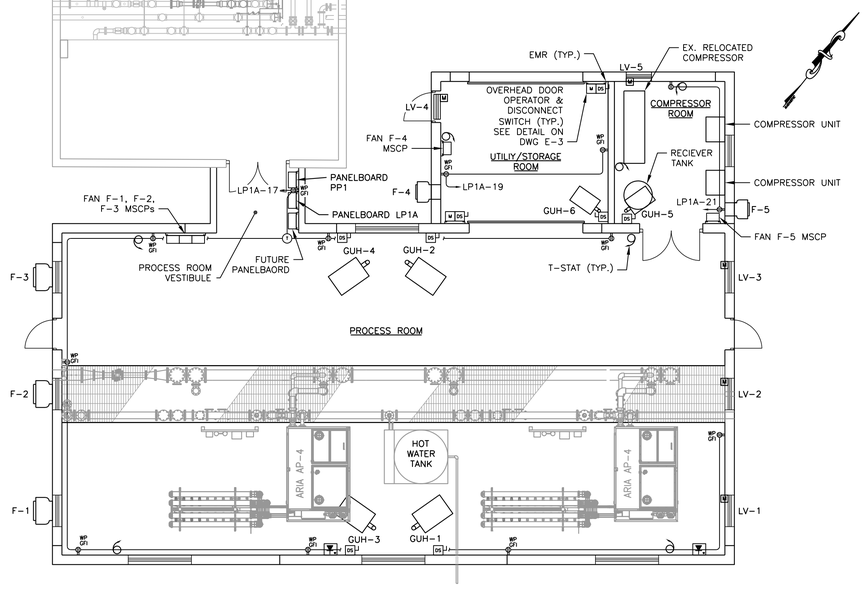
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

ONE-LINE DIAGRAMS & ELECTRICAL DETAILS

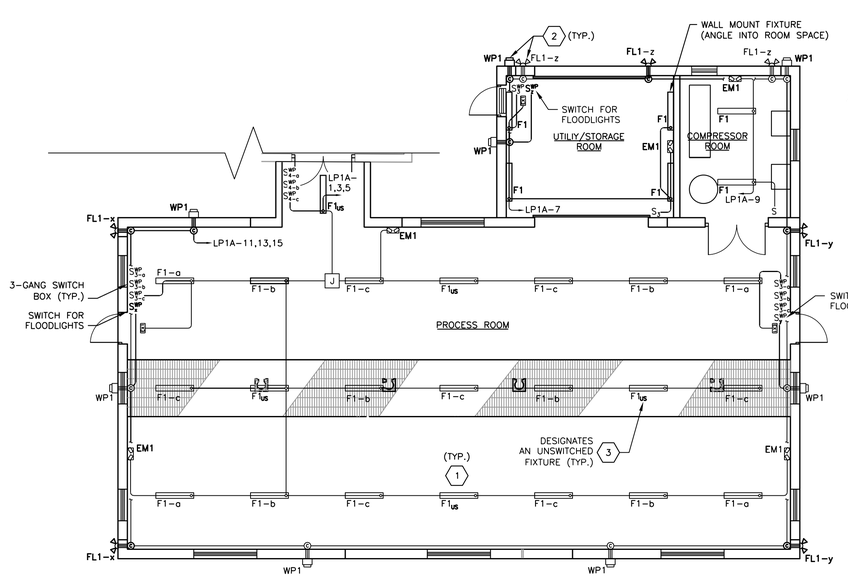
JOB NO.	20280	DRAWING	E-3	SHEET	33 OF 37





POWER & CONTROL PLAN

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



LIGHTING PLAN

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

DRAWING NOTES:

1. INTERIOR LIGHTING FIXTURES: COORDINATE FINAL LOCATIONS OF LIGHTING FIXTURES WITH HVAC EQUIPMENT SUCH THAT THE FIXTURES DO NOT INTERFERE WITH THE EQUIPMENT.
2. EXTERIOR LIGHTING FIXTURES: LOCATIONS SHOWN HERE ARE FOR WIRING PURPOSES ONLY. COORDINATE FINAL LOCATIONS OF LIGHTING FIXTURES WITH ARCHITECTURAL ELEVATIONS. LOCATIONS ON ARCHITECTURAL DRAWINGS TAKE PRECEDENCE OVER LOCATIONS SHOWN THE ELECTRICAL PLANS.
3. UNSWITCHED FIXTURES: WIRE UNSWITCHED SWITCHED TO SAME POWER CIRCUIT AS THE F1-a FIXTURES. THESE FIXTURES SHALL REMAIN ON CONTINUOUSLY.

1/8"=1'-0" 8 4 0 8 16

NOTE: DRAWINGS OF EXISTING FACILITIES WERE PROVIDED BY THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY (BCPSA).

X-REF: 20280a1, 20280-A-TB-P1, 20280-E-TB-P1, 20280-S-TB-FP
03/11 BOWE, JHC
P:\20280\3D\DRAWINGS\ELEC\

NOTES:

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2	RE-SEALED				RRC	6/21/04
1	FOR APPROVAL	JHC	11/03	WPJ	TJR	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

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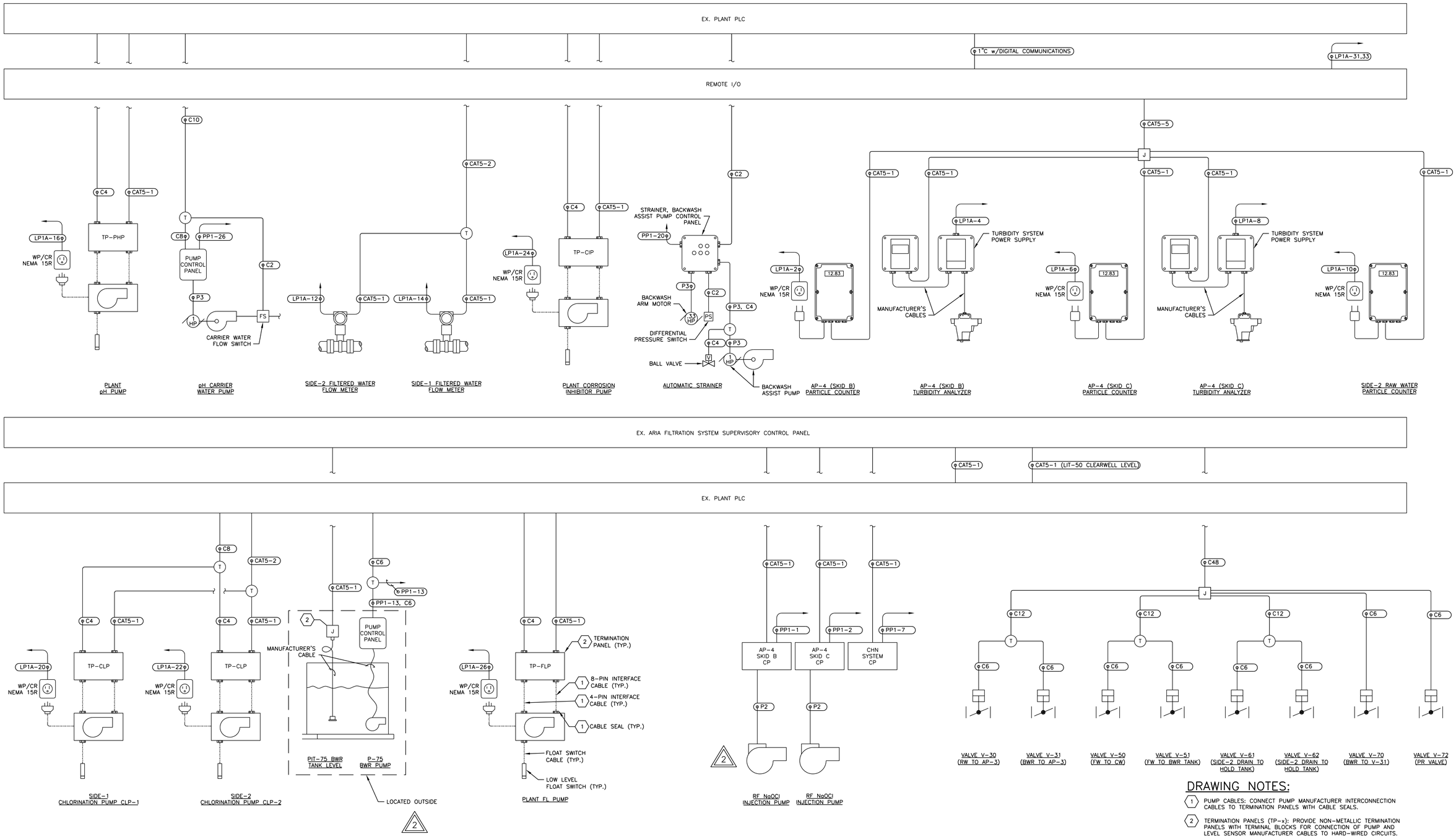
BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

POWER, CONTROL & LIGHTING PLANS

JOB NO. 20280 | DRAWING E-4 | SHEET 34 OF 37



DRAWING NOTES:

1. PUMP CABLES: CONNECT PUMP MANUFACTURER INTERCONNECTION CABLES TO TERMINATION PANELS WITH CABLE SEALS.
2. TERMINATION PANELS (TP-x): PROVIDE NON-METALLIC TERMINATION PANELS WITH TERMINAL BLOCKS FOR CONNECTION OF PUMP AND LEVEL SENSOR MANUFACTURER CABLES TO HARD-WIRED CIRCUITS.

X-REF: 20280GX1.DWG
03/12, BOWC, JHC
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ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	REVISED PER OWNER & VDH COMMENTS	JHC	6/04	WPJ	TJR	RRC	6/21/04
1	FOR APPROVAL	JHC	11/03	WPJ	TJR	RRC	1/23/04

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HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

CONDUIT RISER DIAGRAM

JOB NO. 20280 | DRAWING E-5 | SHEET 35 OF 37

POWER PANELBOARD PP1

LOCATION: PROCESS ROOM (100)
MAIN BUS RATING: 225A, 480/277V, 3PH, 4W
MINIMUM SHORT-CIRCUIT INTERRUPTION RATING: 35,000 AIC
MAIN BREAKER TRIP: 150AT/225AF
FED FROM: MAIN DISTRIBUTION PANEL
ESTIMATED CONNECTED LOAD: 40kVA
INCOMING FEED: 3"C w/4-#250, 1-#6G
ENCLOSURE: NEMA 4X STAINLESS STEEL
TVSS/SURGE PROTECTION: INTEGRAL

NOTES*: SEE PANELBOARD SCHEDULE NOTES

DESCRIPTION	NOTES*	LOAD	CONDUIT/ CONDUCTOR SIZE	CB TRIP/POLE	CIRCUIT	A	B	C	CIRCUIT	CB TRIP/POLE	CONDUIT/ CONDUCTOR SIZE	LOAD	NOTES*	DESCRIPTION
AP-4 SKID B CP			3/4"C w/3-#8, 1-#10G	40A/3P	1	●			2					
					3		●		4	40A/3P	3/4"C w/3-#8, 1-#10G			AP-4 SKID C CP
					5			●	6					
CHH SYSTEM CP			3/4"C w/3-#10, 1-#10G	25A/3P	7	●			8					
					9		●		10	25A/3P	3/4"C w/3-#12, 1-#12G	10Hp		AIR COMPRESSOR NO.1
					11			●	12					
P-75 PUMP CONTROL PANEL			3/4"C w/3-#10, 1-#10G	25A/3P	13	●			14					
					15		●		16	25A/3P	3/4"C w/3-#12, 1-#12G	10Hp		AIR COMPRESSOR NO.2
					17			●	18					
ROLL UP DOOR NO.1		3Hp	3/4"C w/3-#12, 1-#12G	15A/3P	19	●			20					
					21		●		22	15A/3P	3/4"C w/3-#12, 1-#12G	1.5Hp		STRAINER BACKWASH ASSIST PUMP CONTROL PANEL
					23			●	24					
ROLL UP DOOR NO.2		3Hp	3/4"C w/3-#12, 1-#12G	15A/3P	25	●			26					
					27		●		28	15A/3P	3/4"C w/3-#12, 1-#12G	1Hp		pH CARRIER WATER PUMP
					29			●	30					
SPACE					31	●			32					SPACE
SPACE					33		●		34					SPACE
SPACE					35			●	36					SPACE
SPACE					37	●			38					
SPACE					39		●		40	20A/3P				TVSS
SPACE					41			●	42					

LIGHTING PANELBOARD LP1A

LOCATION: PROCESS ROOM (100)
MAIN BUS RATING: 100A, 208/120V, 3PH, 4W
MINIMUM SHORT-CIRCUIT INTERRUPTION RATING: 10,000 AIC
MAIN BREAKER TRIP: 100AT/225AF
FED FROM: EX. PANELBOARD P1
ESTIMATED CONNECTED LOAD: 12kW
INCOMING FEED: 1-1/4"C w/4-#2, 1-#6G
ENCLOSURE: NEMA 4X STAINLESS STEEL
TVSS/SURGE PROTECTION: N/A

NOTES*: SEE PANELBOARD SCHEDULE NOTES

DESCRIPTION	NOTES*	LOAD	CONDUIT/ CONDUCTOR SIZE	CB TRIP/POLE	CIRCUIT	A	B	C	CIRCUIT	CB TRIP/POLE	CONDUIT/ CONDUCTOR SIZE	LOAD	NOTES*	DESCRIPTION
LIGHTING - PROCESS RM CIR #1	4	6kW	3/4"C w/2-#12, 1#12G	15A/1P	1	●			2	20A/1P	3/4"C w/2-#12, 1#12G	.18kVA		RECEPT. - PART. COUNTER
LIGHTING - PROCESS RM CIR #2	4	6kW	3/4"C w/2-#12, 1#12G	15A/1P	3		●		4	20A/1P	3/4"C w/2-#12, 1#12G	50W		TURBIDITY ANALYZER
LIGHTING - PROCESS RM CIR #3	4	6kW	3/4"C w/2-#12, 1#12G	15A/1P	5			●	6	20A/1P	3/4"C w/2-#12, 1#12G	.18kVA		RECEPT. - PART. COUNTER
LIGHTING - UTILITY ROOM	4	3kW	3/4"C w/2-#12, 1#12G	15A/1P	7	●			8	20A/1P	3/4"C w/2-#12, 1#12G	50W		TURBIDITY ANALYZER
LIGHTING - COMPRESSOR ROOM	4	1.7kW	3/4"C w/2-#12, 1#12G	15A/1P	9		●		10	20A/1P	3/4"C w/2-#12, 1#12G	.18kVA		RECEPT. - PART. COUNTER
LIGHTING - EXTERIOR WALL PAKS	4	1.4kW	3/4"C w/2-#12, 1#12G	15A/1P	11			●	12	20A/1P	3/4"C w/2-#12, 1#12G	50W		SIDE-2 FLOWMETER
LIGHTING - FLOODLIGHTS CIR. #1	4	6kW	3/4"C w/2-#12, 1#12G	15A/1P	13	●			14	20A/1P	3/4"C w/2-#12, 1#12G	50W		SIDE-1 FLOWMETER
LIGHTING - FLOODLIGHTS CIR. #2	4	6kW	3/4"C w/2-#12, 1#12G	20A/1P	15		●		16	20A/1P	3/4"C w/2-#12, 1#12G	50W		PLANT pH PUMP
LIGHTING - FLOODLIGHTS CIR. #3	4	9kW	3/4"C w/2-#12, 1#12G	20A/1P	17			●	18	20A/1P				SPARE
RECEPT. - PROCESS ROOM		.36kVA	3/4"C w/2-#12, 1#12G	20A/1P	19	●			20	20A/1P	3/4"C w/2-#12, 1#12G	.18kVA		RECEPT. - CLP-1
RECEPT. - UTILITY ROOM		.36kVA	3/4"C w/2-#12, 1#12G	20A/1P	21		●		22	20A/1P	3/4"C w/2-#12, 1#12G	.18kVA		RECEPT. - CLP-2
RECEPT. - COMPRESSOR ROOM		1.8kVA	3/4"C w/2-#12, 1#12G	20A/1P	23			●	24	20A/1P	3/4"C w/2-#12, 1#12G	.18kVA		RECEPT. - CORROSION PUMP
GUH - 1 & 2		.05Hp	3/4"C w/2-#12, 1#12G	20A/1P	25	●			26	20A/1P	3/4"C w/2-#12, 1#12G	.18kVA		RECEPT. - FL PUMP
GUH - 3 & 4		.05Hp	3/4"C w/2-#12, 1#12G	20A/1P	27		●		28	20A/1P	3/4"C w/2-#12, 1#12G	.5Hp		FAN F-1 MSCP
GUH - 5 & 6		.09Hp	3/4"C w/2-#12, 1#12G	20A/1P	29			●	30	20A/1P	3/4"C w/2-#12, 1#12G	.5Hp		FAN F-2 MSCP
REMOTE I/O CABINET - CIR #1			3/4"C w/2-#12, 1#12G	20A/1P	31	●			32	20A/1P	3/4"C w/2-#12, 1#12G	.5Hp		FAN F-3 MSCP
REMOTE I/O CABINET - CIR #2			3/4"C w/2-#12, 1#12G	20A/1P	33		●		34	20A/1P	3/4"C w/2-#12, 1#12G	.04Hp		FAN F-4 MSCP
SPARE				20A/1P	35			●	36	20A/1P	3/4"C w/2-#12, 1#12G	1.7Hp		FAN F-5 MSCP
SPARE				20A/1P	37	●			38	20A/1P				SPARE
SPARE				20A/1P	39		●		40	20A/1P				SPARE
SPARE				20A/1P	41			●	42	20A/1P				SPARE

PANELBOARD SCHEDULE NOTES

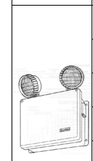
1. PROVIDE GFCI RATED CIRCUIT BREAKER.
2. PROVIDE HACR RATED CIRCUIT BREAKER.
3. PROVIDE CIRCUIT BREAKER CAPABLE OF BEING LOCKED IN THE "OFF" POSITION (HANDLE LOCK-OFF/PADLOCK ATTACHMENT FEATURE).
4. LIGHTING CIRCUITS MAY REQUIRE ADDITIONAL CONDUCTORS FOR SWITCHED LEGS.

LIGHTING FIXTURE SCHEDULE

TYPE:	SYMBOL	GENERAL FIXTURE PARAMETERS	
F1		DESCRIPTION:	VAPOR-TIGHT 4' INDUSTRIAL FLUORESCENT
		LIGHT SOURCE:	(3) 32W, T-8 FLUORESCENT
		RATINGS:	UL LISTED FOR WET LOCATIONS
		VOLTAGE:	120VAC, 1ø, 60Hz
		BALLAST:	3-LAMP, ELECTRONIC, RAPID START
		HOUSING:	FIBERGLASS REINFORCED POLYESTER ENCLOSED & GASKETED W/ COLD-ROLLED STEEL & WIREWAY
		LENS:	ACRYLIC PRISMATIC W/STAINLESS STEEL LATCHES
		REFLECTOR:	HIGH-GLOSS, WHITE, BAKED ENAMEL
		DIFFUSER:	ACRYLIC
		MOUNTING:	CEILING/PENDANT OR WALL MOUNTED AS SHOWN ON CONTRACT DRAWINGS
		ADDITIONAL FEATURES:	INTEGRAL FUSING
		MANUFACTURERS:	LITHONIA: DM/DMW SERIES OR EQUAL

TYPE:	SYMBOL	GENERAL FIXTURE PARAMETERS	
EX1	EX1	DESCRIPTION:	LED ALL-CONDITION EXIT SIGN W/EMERGENCY BATTERY
		LIGHT SOURCE:	(2) 2.3W RED LED
		RATINGS:	UL LISTED FOR NEMA 4X
		VOLTAGE:	120VAC, 1ø, 60Hz BATTERY: RATED FOR 90 MINUTES W/CONSTANT-CURRENT BATTERY CHARGER
		BALLAST:	N/A
		HOUSING:	CAST ALUMINUM
		LENS:	WHITE-ON-WHITE STENCIL FACE
		REFLECTOR:	N/A
		DIFFUSER:	N/A
		MOUNTING:	MOUNT FIXTURE AS NECESSARY FOR PROPER INSTALLATION AT THE SHOWN LOCATIONS
		ADDITIONAL FEATURES:	NICKEL-CADMIUM BATTERY
		MANUFACTURERS:	LITHONIA: LV EL N SERIES OR EQUAL

TYPE:	SYMBOL	GENERAL FIXTURE PARAMETERS	
WP1		DESCRIPTION:	METAL-HALIDE WALL-PAK
		LIGHT SOURCE:	(1) 175W METAL-HALIDE
		RATINGS:	UL LISTED FOR WET LOCATIONS
		VOLTAGE:	120VAC, 1ø, 60Hz
		BALLAST:	COPPER-WOUND CONSTANT-WATTAGE AUTOTRANSFORMER
		HOUSING:	CORROSION-RESISTANT, DIE-CAST ALUMINUM W/DARK BRONZE THERMOSET POLYESTER POWDER
		LENS:	N/A
		REFLECTOR:	WHITE THERMOSET POLYESTER POWDER
		DIFFUSER:	N/A
		MOUNTING:	WALL-MOUNTED
		ADDITIONAL FEATURES:	(CR) ENHANCED CORROSION-RESISTANT FINISH (PE) INTEGRAL PHOTOCELL (EXTERIOR FIXTURES ONLY)
		MANUFACTURERS:	LITHONIA: TWP SERIES OR EQUAL

TYPE:	SYMBOL	GENERAL FIXTURE PARAMETERS	
EM1		DESCRIPTION:	50W INDUSTRIAL LEAD-CALCIUM BATTERY EMERGENCY UNIT
		LIGHT SOURCE:	(2) 12W HALOGEN, GLASS SEALED-BEAM LAMPS
		RATINGS:	UL LISTED FOR WET LOCATIONS
		VOLTAGE:	120VAC, 1ø, 60Hz BATTERY: 12VDC BATTERY RATED FOR 50W FOR 90 MINUTES W/SOLID STATE BATTERY CHARGER
		BALLAST:	N/A
		HOUSING:	FIBERGLASS-REINFORCED POLYESTER W/GASKET SEALS
		LENS:	N/A
		REFLECTOR:	N/A
		DIFFUSER:	N/A
		MOUNTING:	WALL-MOUNTED, COORDINATE POSITION SO LAMP HEADS CAN BE FULLY ROTATED
		ADDITIONAL FEATURES:	(LD) LOAD DISCONNECT SWITCH (TD) INTEGRATED TIME DELAY
		MANUFACTURERS:	LITHONIA: ELU(3)X SERIES OR EQUAL

TYPE:	SYMBOL	GENERAL FIXTURE PARAMETERS	
FL1		DESCRIPTION:	TWIN-BEAM COMPACT HALOGEN FLOODLIGHT
		LIGHT SOURCE:	(2) 150W, T-3 DOUBLE-END, HALOGEN LAMPS
		RATINGS:	WET & CORROSIVE LOCATIONS
		VOLTAGE:	120VAC, 1ø, 60Hz
		BALLAST:	N/A
		HOUSING:	CORROSION-RESISTANT DIE-CAST ALUMINUM PROVIDE BRONZE COLORED MODEL
		LENS:	N/A
		REFLECTOR:	N/A
		DIFFUSER:	N/A
		MOUNTING:	WALL-MOUNTED
		ADDITIONAL FEATURES:	N/A
		MANUFACTURERS:	COOPER LIGHTING (REGENT): MODEL TMO150 OR EQUAL

x-REF: 20280OX1.DWG
03/11 BDWG_JHC
P:\20280\30\DRAWINGS\ELEC\

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3	ISSUED FOR CONSTRUCTION					
2	RE-SEALED				RRC	6/21/04
1	FOR APPROVAL	JHC	11/03	WPJ	TJR	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

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BEDFORD COUNTY PUBLIC SERVICE AUTHORITY
HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028
ELECTRICAL SCHEDULES

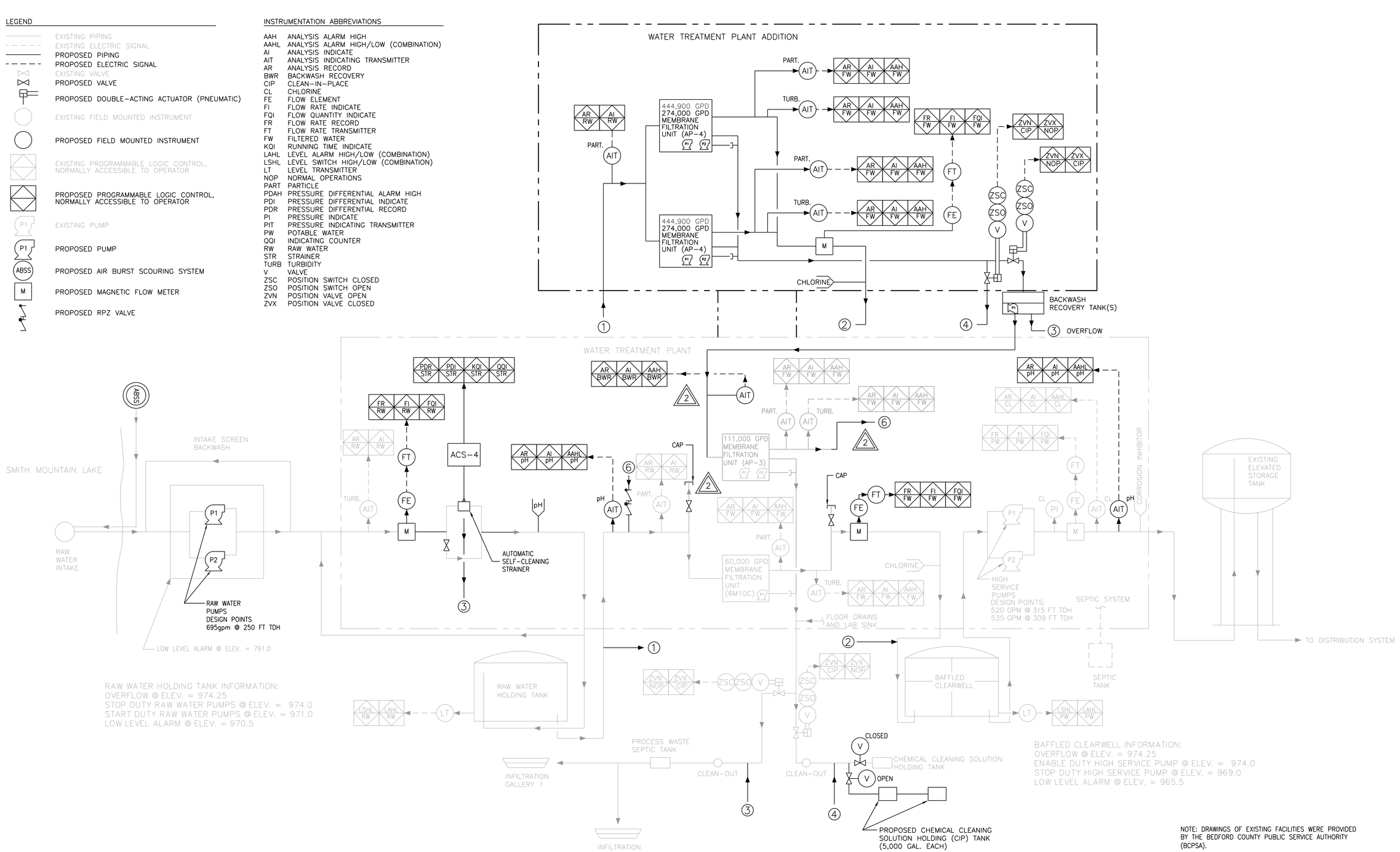
JOB NO. 20280 | DRAWING E-6 | SHEET 36 OF 37

LEGEND

- EXISTING PIPING
- EXISTING ELECTRIC SIGNAL
- PROPOSED PIPING
- PROPOSED ELECTRIC SIGNAL
- EXISTING VALVE
- PROPOSED VALVE
- PROPOSED DOUBLE-ACTING ACTUATOR (PNEUMATIC)
- EXISTING FIELD MOUNTED INSTRUMENT
- PROPOSED FIELD MOUNTED INSTRUMENT
- EXISTING PROGRAMMABLE LOGIC CONTROL, NORMALLY ACCESSIBLE TO OPERATOR
- PROPOSED PROGRAMMABLE LOGIC CONTROL, NORMALLY ACCESSIBLE TO OPERATOR
- EXISTING PUMP
- PROPOSED PUMP
- PROPOSED AIR BURST SCOURING SYSTEM
- PROPOSED MAGNETIC FLOW METER
- PROPOSED RPZ VALVE

INSTRUMENTATION ABBREVIATIONS

AAH	ANALYSIS ALARM HIGH
AAHL	ANALYSIS ALARM HIGH/LOW (COMBINATION)
AI	ANALYSIS INDICATE
AIT	ANALYSIS INDICATING TRANSMITTER
AR	ANALYSIS RECORD
BWR	BACKWASH RECOVERY
CIP	CLEAN-IN-PLACE
CL	CHLORINE
FE	FLOW ELEMENT
FI	FLOW RATE INDICATE
FQI	FLOW QUANTITY INDICATE
FR	FLOW RATE RECORD
FT	FLOW RATE TRANSMITTER
FW	FILTERED WATER
KQI	RUNNING TIME INDICATE
LAHL	LEVEL ALARM HIGH/LOW (COMBINATION)
LSHL	LEVEL SWITCH HIGH/LOW (COMBINATION)
LT	LEVEL TRANSMITTER
NOP	NORMAL OPERATIONS
PART	PARTICLE
PDAH	PRESSURE DIFFERENTIAL ALARM HIGH
PDI	PRESSURE DIFFERENTIAL INDICATE
PDR	PRESSURE DIFFERENTIAL RECORD
PI	PRESSURE INDICATE
PIT	PRESSURE INDICATING TRANSMITTER
PW	POTABLE WATER
QQI	INDICATING COUNTER
RW	RAW WATER
STR	STRAINER
TURB	TURBIDITY
V	VALVE
ZSC	POSITION SWITCH CLOSED
ZSO	POSITION SWITCH OPEN
ZVN	POSITION VALVE OPEN
ZVX	POSITION VALVE CLOSED



NOTE: DRAWINGS OF EXISTING FACILITIES WERE PROVIDED BY THE BEDFORD COUNTY PUBLIC SERVICE AUTHORITY (BCPSA).

X-REF: 20280sx1
B/GIS HOWADE RSR
P:\20280\30\Drawings\inst\

NOTES:

Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known.

ISSUE NO.	DRAWN	DATE	CHECKED	DESIGNER	APPROVED	DATE
3	ISSUED FOR CONSTRUCTION					
2	REVISED PER OWNER & VDH COMMENTS	BSR	6/04	WPJ	CMT	RRC	6/21/04
1	FOR APPROVAL	BSR	11/03	WPJ	CMT	RRC	1/23/04

PROJECT SUPERVISOR _____ DEPARTMENT SUPERVISOR _____

COMMONWEALTH OF VIRGINIA
RHODES R. COPITHORN
No. 022719
6-21-04
PROFESSIONAL ENGINEER

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310 FIRST STREET, S.W., SUITE 150
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BEDFORD COUNTY PUBLIC SERVICE AUTHORITY

HIGH POINT WTP EXPANSION – PROJECT NO. 2003 – 028

PROCESS & INSTRUMENTATION DIAGRAM

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