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Keystone ENGINEERING GROUP

Understanding Construction Plans

PREPARED FOR: New Jersey Water Association 2023 Fall Conference
PRESENTER: Andres Otero, P.E. & Haley Scott, E.I.T.

Presentation Outline:
Construction Plan Interpretation

01

Blueprints vs. Blackline Drawings
Mylars vs. Vellums vs. Sepias

02

Design/Build Documents vs.
Design-Bid-Build Documents

03

Nomenclature/Legend/Scales

04

Site/Civil Plans

05

P&ID (Process and
Instrumentation Diagram)

06

Mechanical Plans

07

Electrical Plans

08

Plumbing/HVAC Plans

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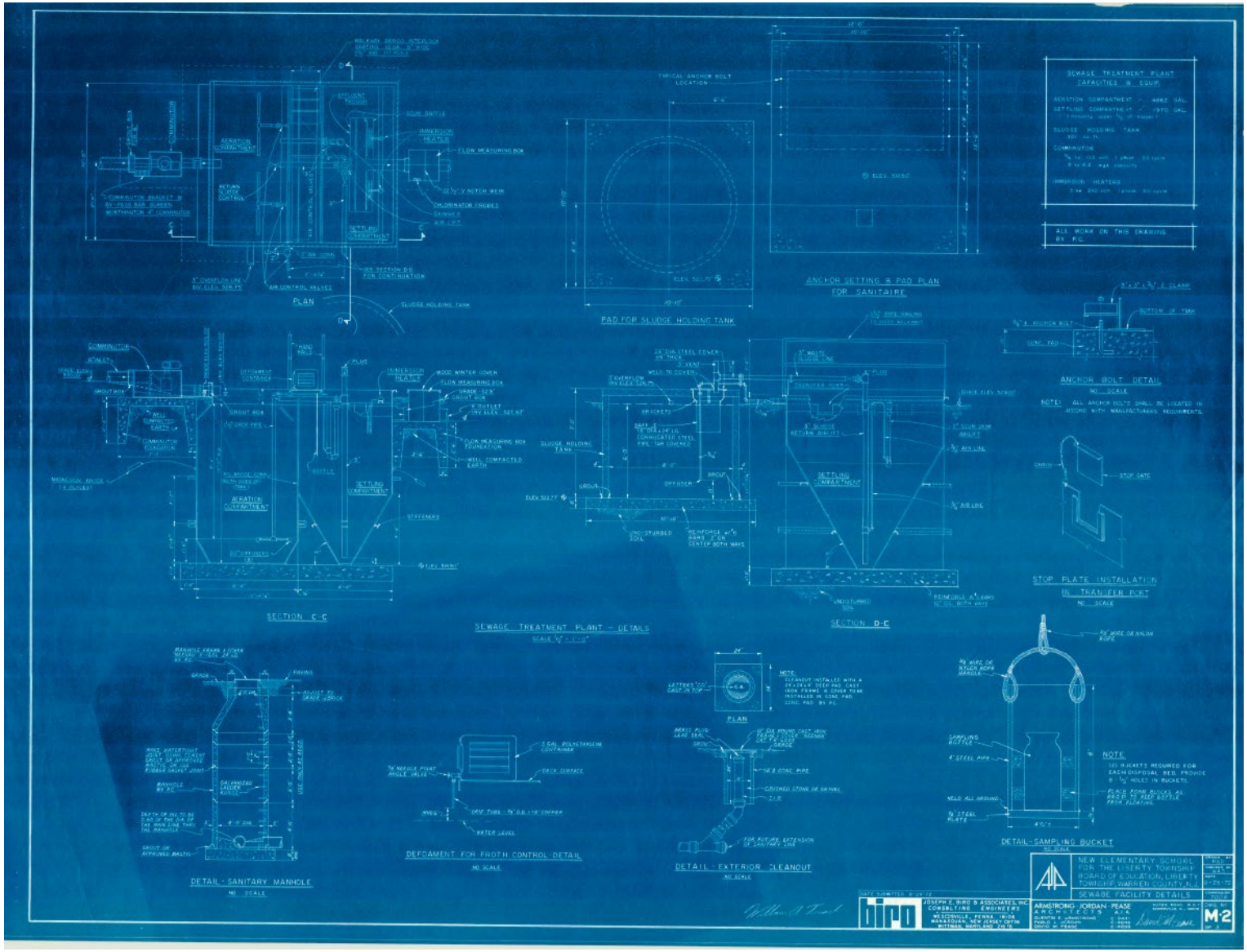
Blueprints – Then and Now

- Originating in 1842, old style blueprint utilized a blue background and white drafting.
- Process for developing was chemically intense and smelly
- Unable to reproduce color or shades of grey
- New style blueprints utilize a white background and blue drafting.
  - Developed in the 1940's
  - Diazo (pronounced Dye-A-Zoe) paper starts out yellow
  - Mylar with drafting is placed over Diazo paper
  - UV light burns through all but drafting; ammonia develops remainder

Old Style Blueprint



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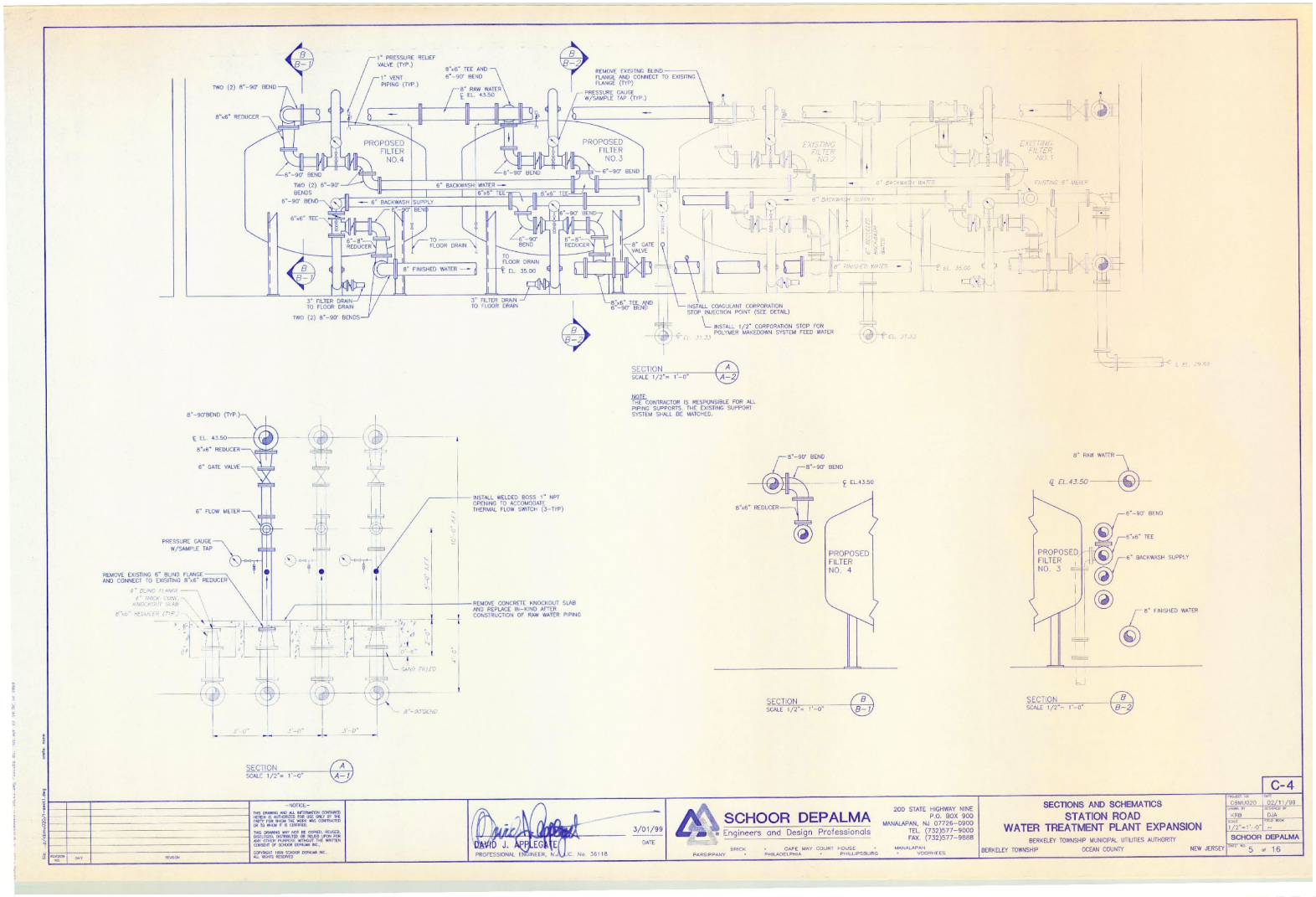
New Style Blueprint



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Blackline Drawings

- What is a blackline drawing?
  - Black drafting on white background.
  - Laser plotter printing on stock white paper.
  - Most common form of engineering drafted plans.
  - Copies made from original blackline drawings.

- Standard sheet sizes
  - 24” (H.) x 36” (L.)
  - 30” (H.) x 42” (L.)

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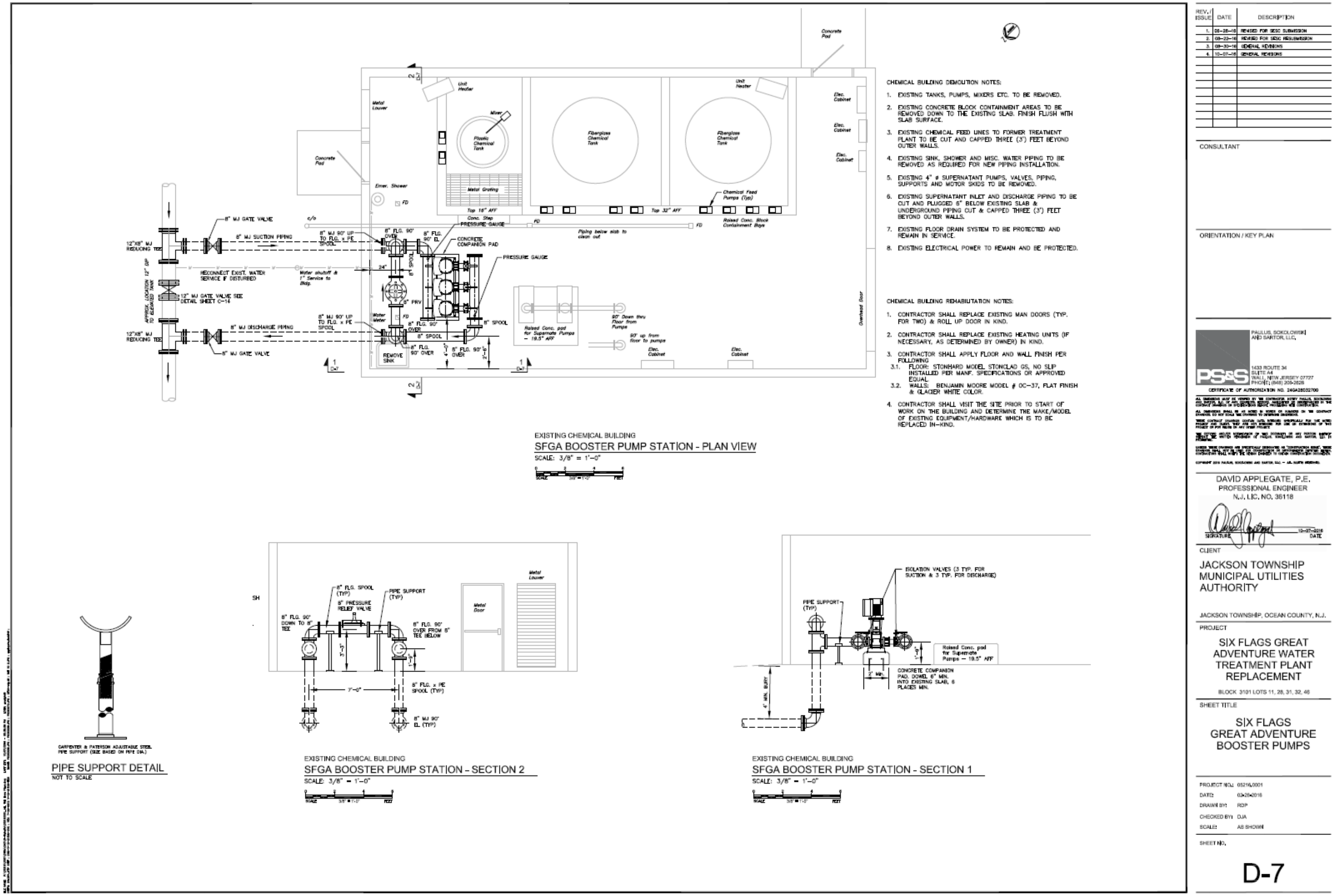
Blackline Sheet



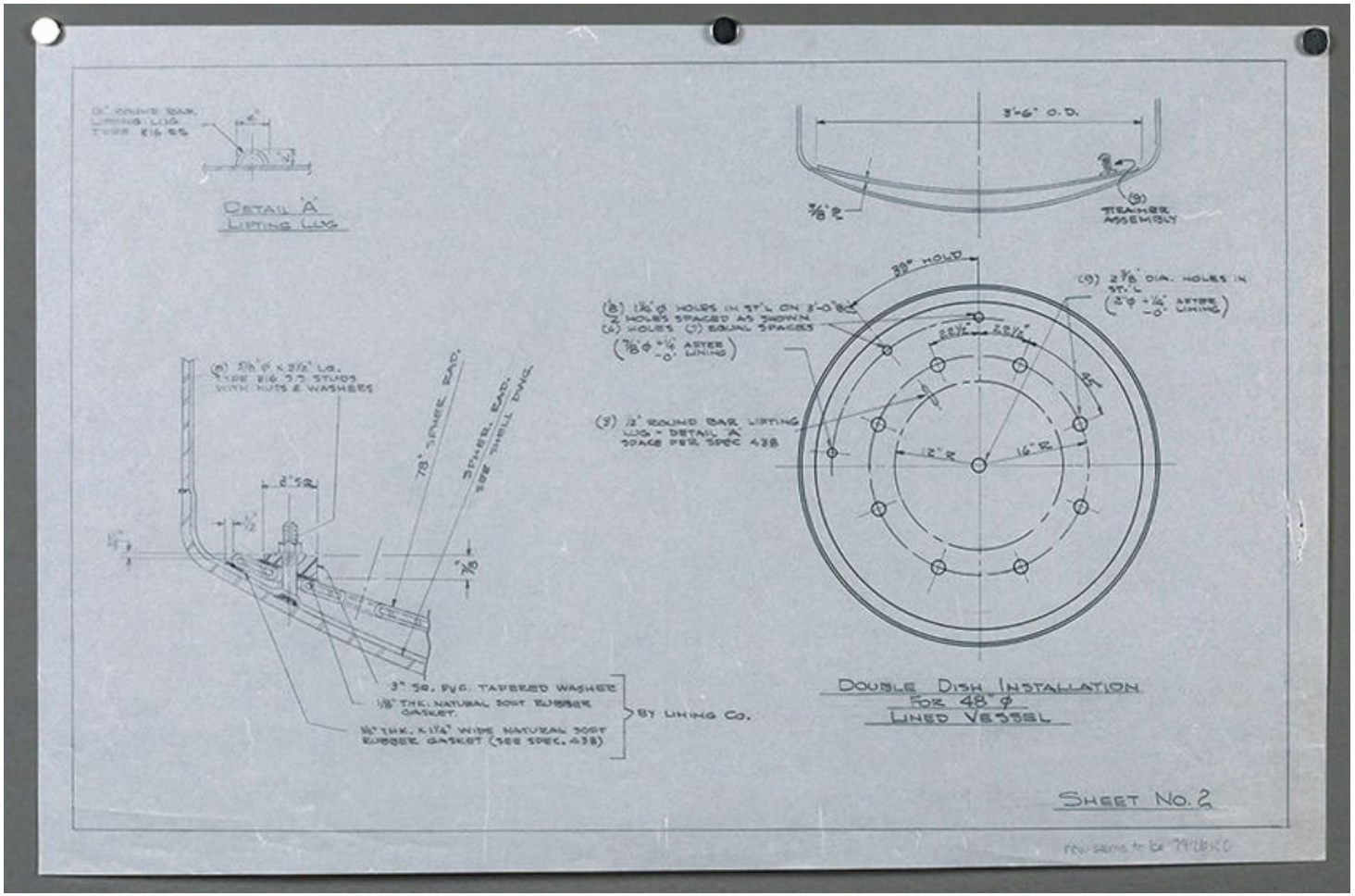
Mylars vs. Vellums vs. Sepias

- What is a Mylar®?
  - A stretched polyester (plastic) film; specifically, a resin, Polyethylene Terephthalate (PET) as manufactured by Dupont.
  - Old days: India ink drafting; Modern days: Laser plotter printing
- What is a vellum?
  - Olden days: a calf skin; Modern days: plasticized rag cotton or tree fibers
  - Translucent and very thin
- What is a sepia?
  - Photographic paper that develops with a light brown background with dark brown drafting/lines
  - Cheaply reproduces a Mylar or a vellum

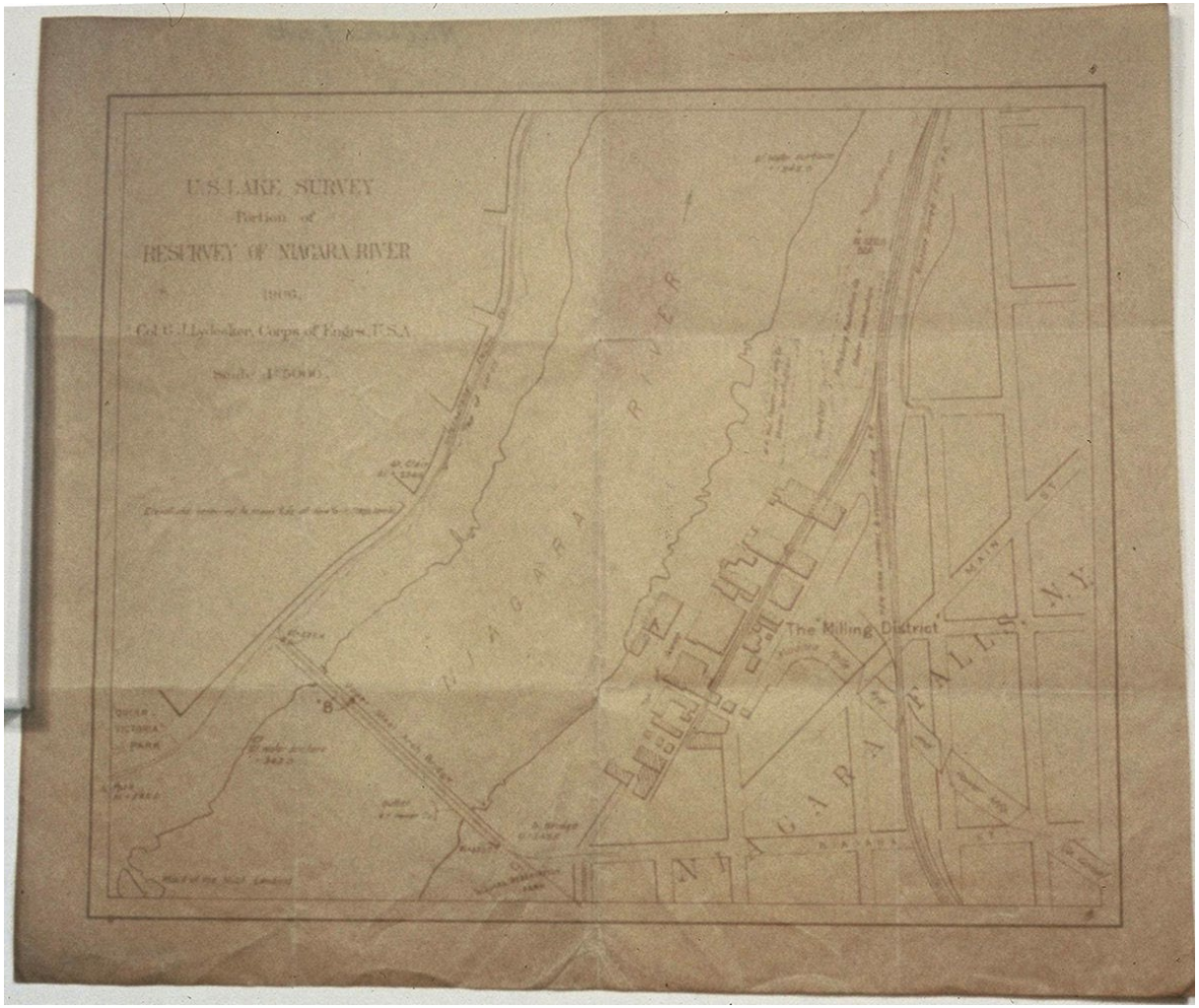
Mylar


WINDSOR RD.
SCALE IN FEET
SNOW REMOVAL
LARGE TRACTORS
SNOW REM
HAND SHOV
RIVER

Vellum


DETAIL 'A'
LIFTING LUG
3'-6" O.D.
TRUNNION ASSEMBLY
39" HOLD
(9) 2 1/8" DIA. HOLES IN ST'L
(2" ϕ +1/4" -0" AFTER LINING)
(8) 1 1/4" ϕ HOLES IN ST'L ON 3'-0" B.C.
2 HOLES SPACED AS SHOWN
(6) HOLES (?) EQUAL SPACES
(7/8" ϕ +1/4" -0" AFTER LINING)
(9) 2" ROUND BAR LIFTING LUG - DETAIL 'A' SPACE PER SPEC 438
(8) 5/8" ϕ x 3 1/2" Lg. TYPE 316 S.S. STUDS WITH NUTS & WASHERS
78° SPHER. RAD.
34° SPHER. RAD. SEE SHELL DWG.
2" SQ.
1/2"
7/8"
3" SQ. PVC. TAPERED WASHER
1/8" THK. NATURAL SOFT RUBBER GASKET.
1/8" THK. x 1 1/4" WIDE NATURAL SOFT RUBBER GASKET (SEE SPEC. 438)
BY LINING CO.
DOUBLE DISH INSTALLATION
FOR 48" ϕ
LINED VESSEL
SHEET NO. 2

Sepia


U.S. LAKE SURVEY
Portion of
RESURVEY OF NIAGARA RIVER
1905.
Col. G. J. Lydecker, Corps of Engrs. U.S.A.
Scale 1:5000.
NIAGARA RIVER
The Milling District
MAIN
N. Y.
NIAGARA FALLS

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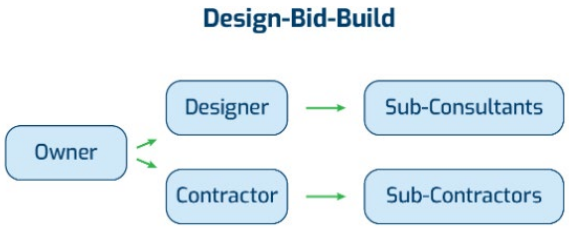
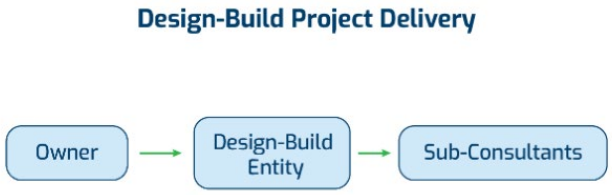
Design/Build Documents vs. Design-Bid-Build Documents



- Design-Bid-Build (D-B-B) Plans
  - Design detail at 100% level; more traditional delivery method
  - Privately or publicly bid
  - Contractor is managed by engineer
  - Change orders negotiated



- Design-Build (D-B) Plans
  - Tend to be more conceptual in nature
  - Design detail level usually about 30%
  - Engineer-Contractor partnership to effectuate implementation
  - In theory, D-B team is responsible for any change orders

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As-Built Plans

- Show as constructed conditions
- Depict triangulated and/or GPS'd buried facilities (i.e.: valves, services, shut offs) in a GIS format
- May have the titles "As-Built Plans" or "Record Plans"
- Plans may also have a stamp in the titleblock to indicate they are "Record Plans"
- Used to "find things" in the future
  - Buried valves
  - Service connections
  - Fittings

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Common Pipe Materials

- DIP = ductile iron pipe.
  - Replaced cast iron pipe as the industry standard for potable water
- CIP = cast iron pipe
  - Older potable water mains,
  - Risk of corrosion, tuberculation (looks like clogged artery)
- PVC = polyvinyl chloride
  - White color, best suited for non-pressurized applications
- CPVC = chlorinated polyvinyl chloride
  - Off-white color, used for chemical handling & plumbing
  - Added chlorine increases durability & resistance to heat
- HDPE = high density polyethylene
  - Flexible, common in trenchless pipe installations (HDD)

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Common Pipe Materials (cont'd)

- ACP = asbestos cement pipe
  - Older potable water mains and sewers
  - Discontinued use due to Asbestos dust
- TCP = terracotta pipe
  - aka VCP = vitrified clay pipe
  - Subject to cracking, common in older gravity sewer systems
- PCCP = prestressed concrete cylinder pipe
  - Larger diameter potable water mains
  - Commonly found in Northern New Jersey
- RCP = reinforced concrete pipe
  - Reinforced with steel
  - Best suited for stormwater/drainage applications
- CMP = corrugated metal pipe
  - Best suited for stormwater/drainage applications
  - Thinner than RCP and have shorter lifespan

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Nomenclature - Fittings

- FL = flanged
- MJ = mechanical joint
- PE = plain end
- FLxFL = flange by flange
- PExPE = plain end by plain end
- SCH = schedule (i.e.: SCH 40 PVC)
- CTS = copper tube size
- IPS = iron pipe size
- NPS = nominal pipe size
- DN = diameter nominal (metric)
- NPT = national pipe thread

Nomenclature - Valves

- GV = gate valve
- BFV = butterfly valve
- BV = ball valve
- CV = check valve
- PRV = pressure reducing valve
- PCV = pump control valve
- PRV = pressure reducing valve
- RPZ = reduced pressure zone
- PSV = pressure sustaining valve
- ACV = altitude control valve
- NRS = non-rising stem
- OS&Y = outside screw (or stem) and yoke

Legend

LEGEND

W	DENOTES EXIST. WATER MAIN
WV	DENOTES EXIST. WATER VALVE
FM	DENOTES EXIST. SEWER FORCE MAIN
T	DENOTES EXIST. UG TELEPHONE
T	DENOTES PROPOSED UG TELEPHONE
E	DENOTES EXIST. UG ELECTRIC
E	DENOTES PROPOSED UG ELECTRIC
X X	DENOTES EXIST. FENCING
X X	DENOTES PROPOSED FENCING
	DENOTES EXIST. MANHOLE
S	DENOTES PROPOSED SEWER MANHOLE
W	DENOTES PROPOSED WATER MAIN
WV	DENOTES PROPOSED WATER VALVE
SS	DENOTES PROPOSED GRAVITY SEWER MAIN
CO	DENOTES PROPOSED SEWER CLEANOUT
GV	DENOTES GATE VALVE
BFV	DENOTES BUTTERFLY VALVE
	DENOTES PROPOSED SIGN
	DENOTES HANDICAPPED SPACE
N.C.	DENOTES NORMALLY CLOSED
N.O.	DENOTES NORMALLY OPEN
M.O.	DENOTES MOTOR OPERATED
DIP	DENOTES DUCTILE IRON PIPE
MJ	DENOTES MECHANICAL JOINT PIPE
PVC	DENOTES POLYVINYL CHLORIDE PIPE

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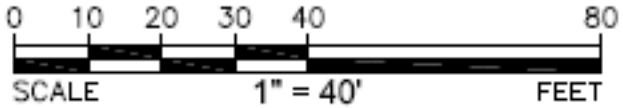
Drawing Scales

- Scales allow us to represent a project area at a more practical size
- The scale is a ratio for converting a given length on the physical plan to the real-world measurement
- Some common scales are 1) engineering and 2) architectural

Scales - Engineering



PROJECT NO.: 05216.0001

DATE: 02-26-2016

DRAWN BY: JDF

CHECKED BY: DJA

SCALE: 1" = 40'

SHEET NO.

C-1

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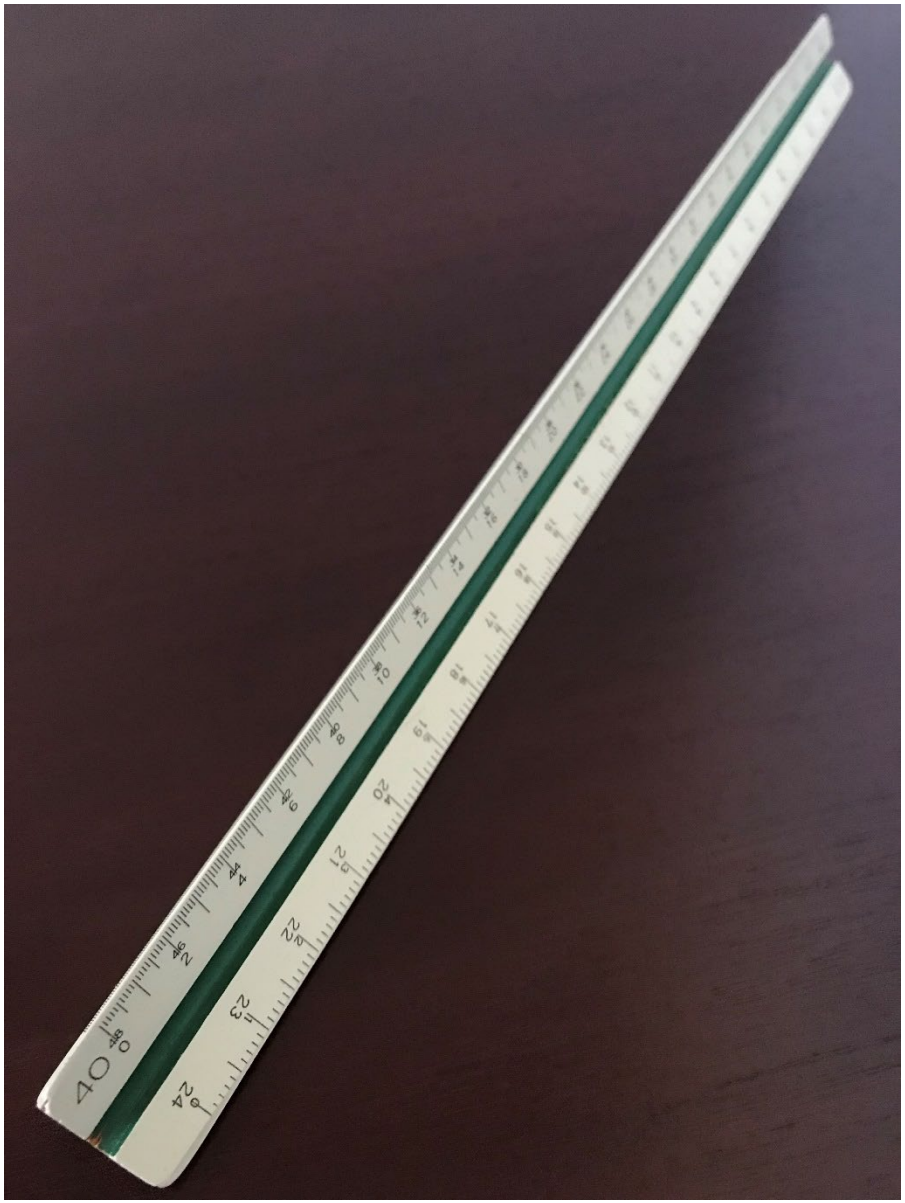
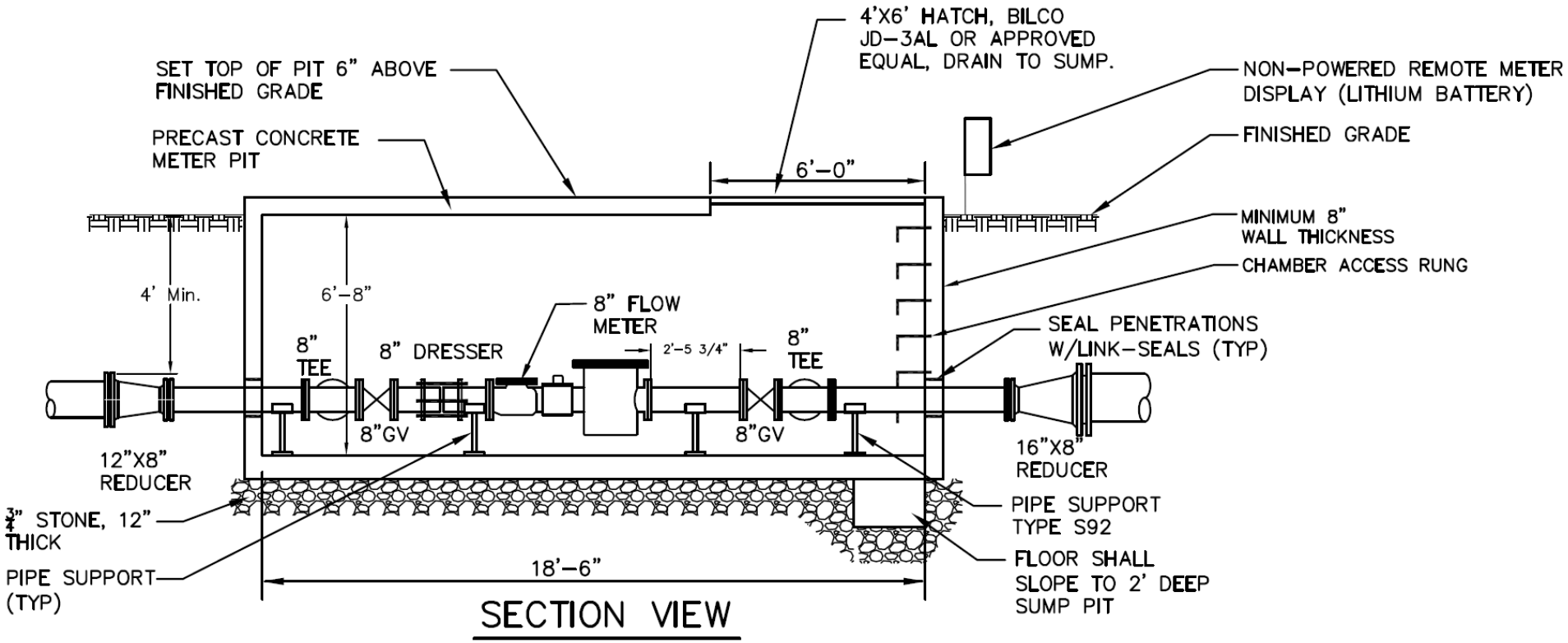
Scales - Engineering



Scales - Architectural



INTERCONNECT METER CHAMBER

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

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Scales - Architectural

Common Drawing Views

- Plan View
- Section View
- Elevation View
- Detail View

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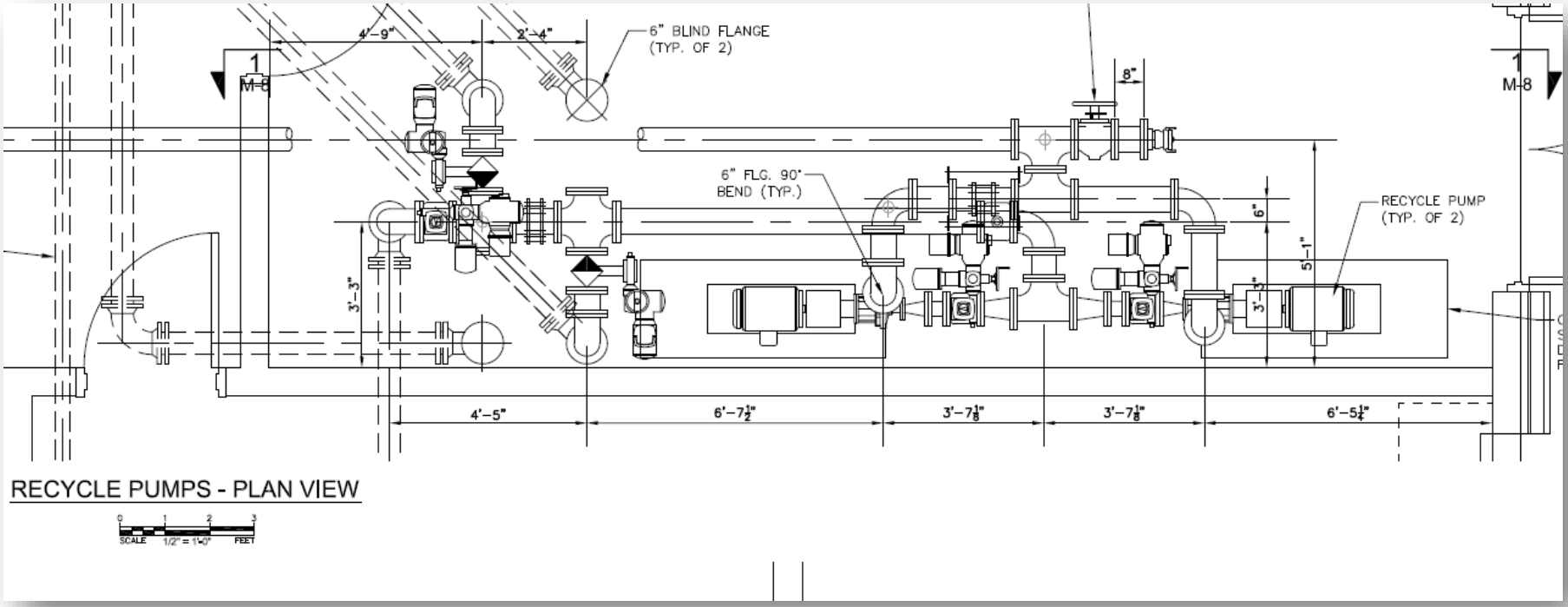
Plan Views

- A plan view is a drawing depicting a bird's eye view of the project site or building
- Most common view for depicting overall sites and floor layouts
- If a building has multiple floors, a plan view will be created for every floor

Plan View Example



Section View

- Allow us to view a space as if you were standing on the ground and looking straight at it
- Allow us to view components that may otherwise be hidden in plan views
- Refer to the section view callout on the floor plan to locate yourself

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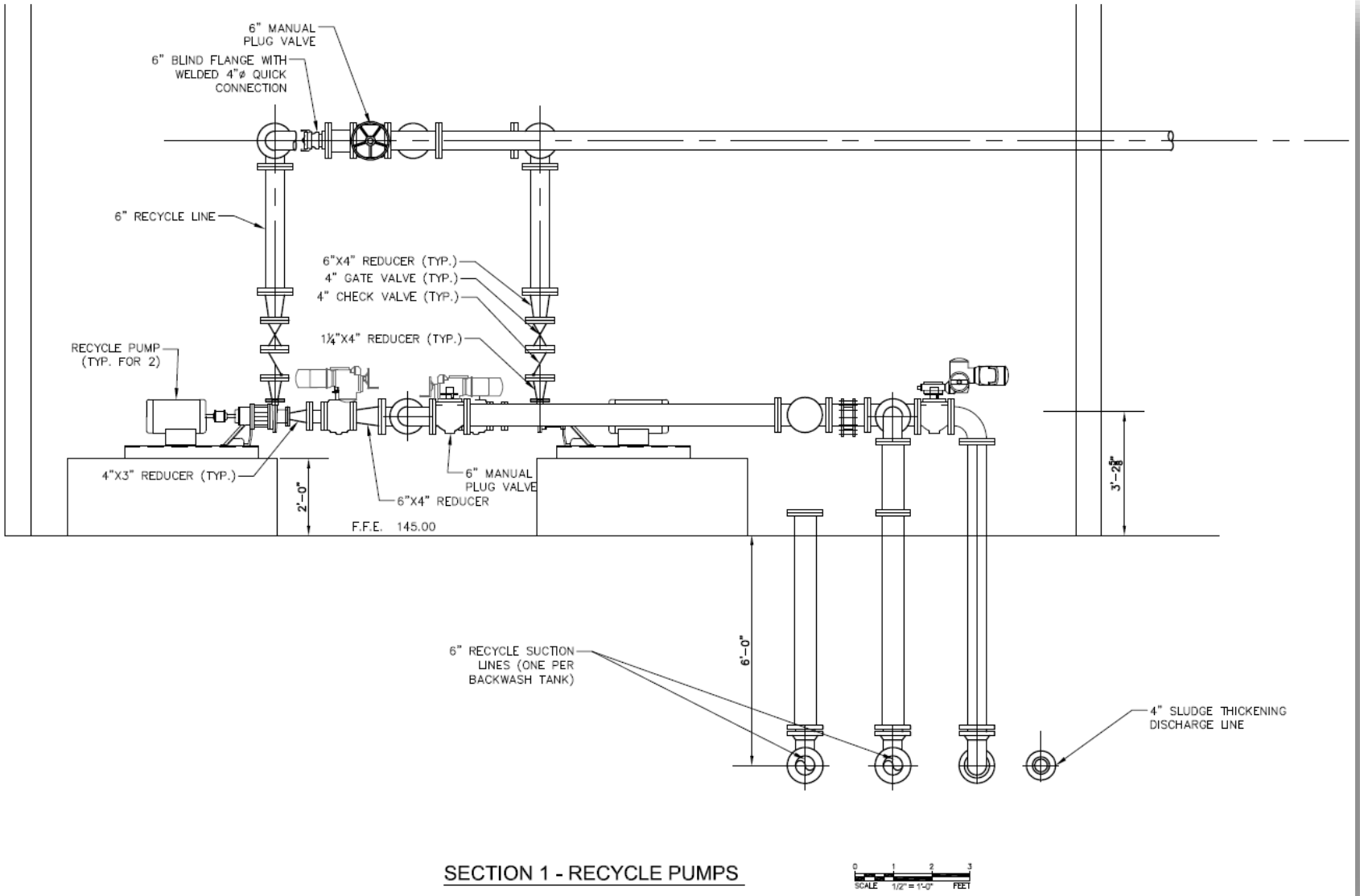
Section View Example



Elevation View

- A view from the side of an object, building or structure
- Similar to section views except the focus is on the exterior rather than the interior
- Most commonly used in architectural drawings

Elevation View Example

1 NORTH ELEVATION
1/8" = 1'-0"

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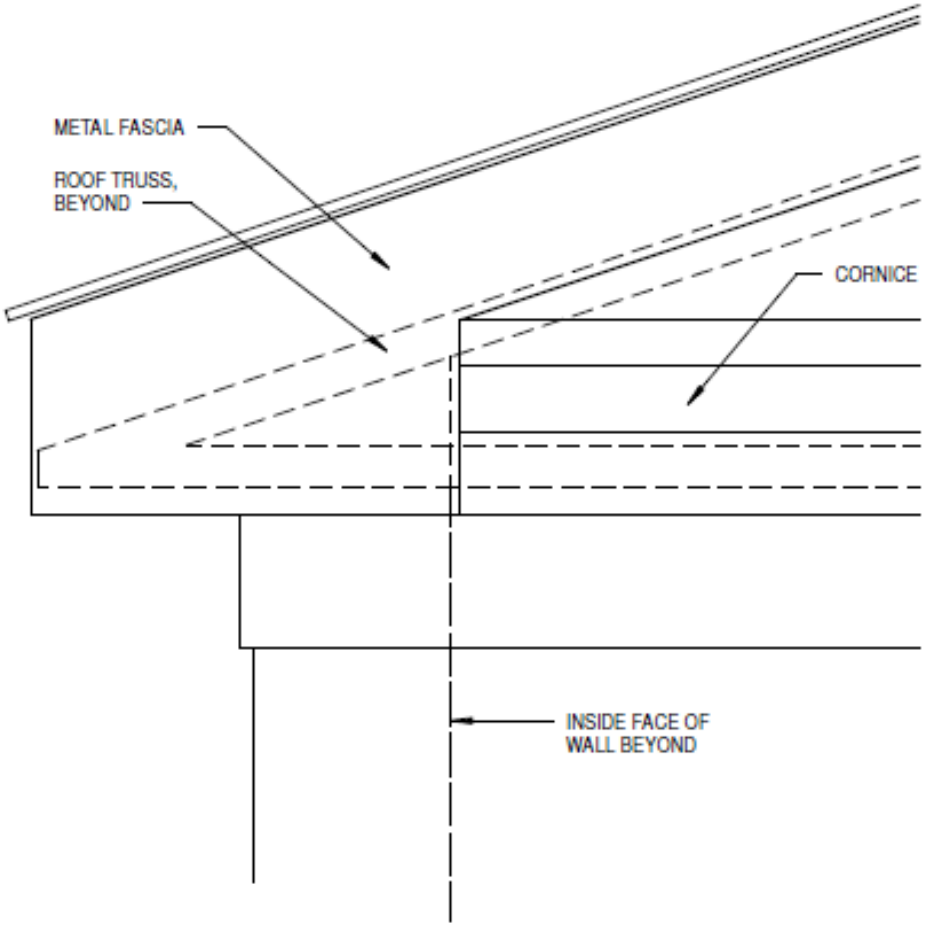
Detail View

- Best suited for focusing on intricate details of a smaller area
- Uses an enlarged scale



5 DETAIL OF PORKCHOP
1" = 1'-0"

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Site/Civil Plans

- Reflect everything outside of a building
- Existing topography
- Proposed grading/topography
- Stormwater management
- Landscaping design (planting and lighting)
- Utility and/or yard piping layout
- Soil erosion and sediment control
- Architectural
- Structural
- Construction details

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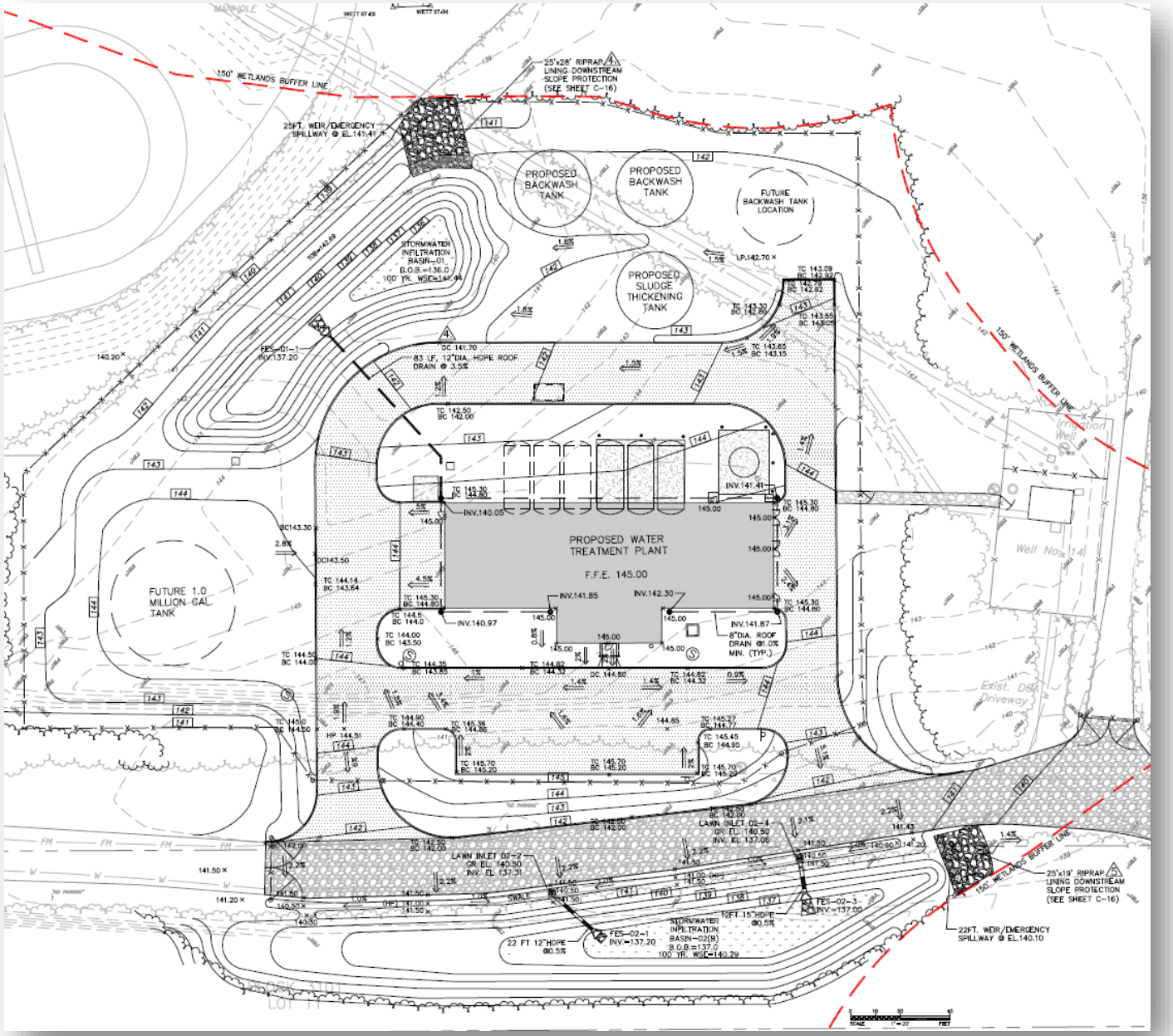
Topography



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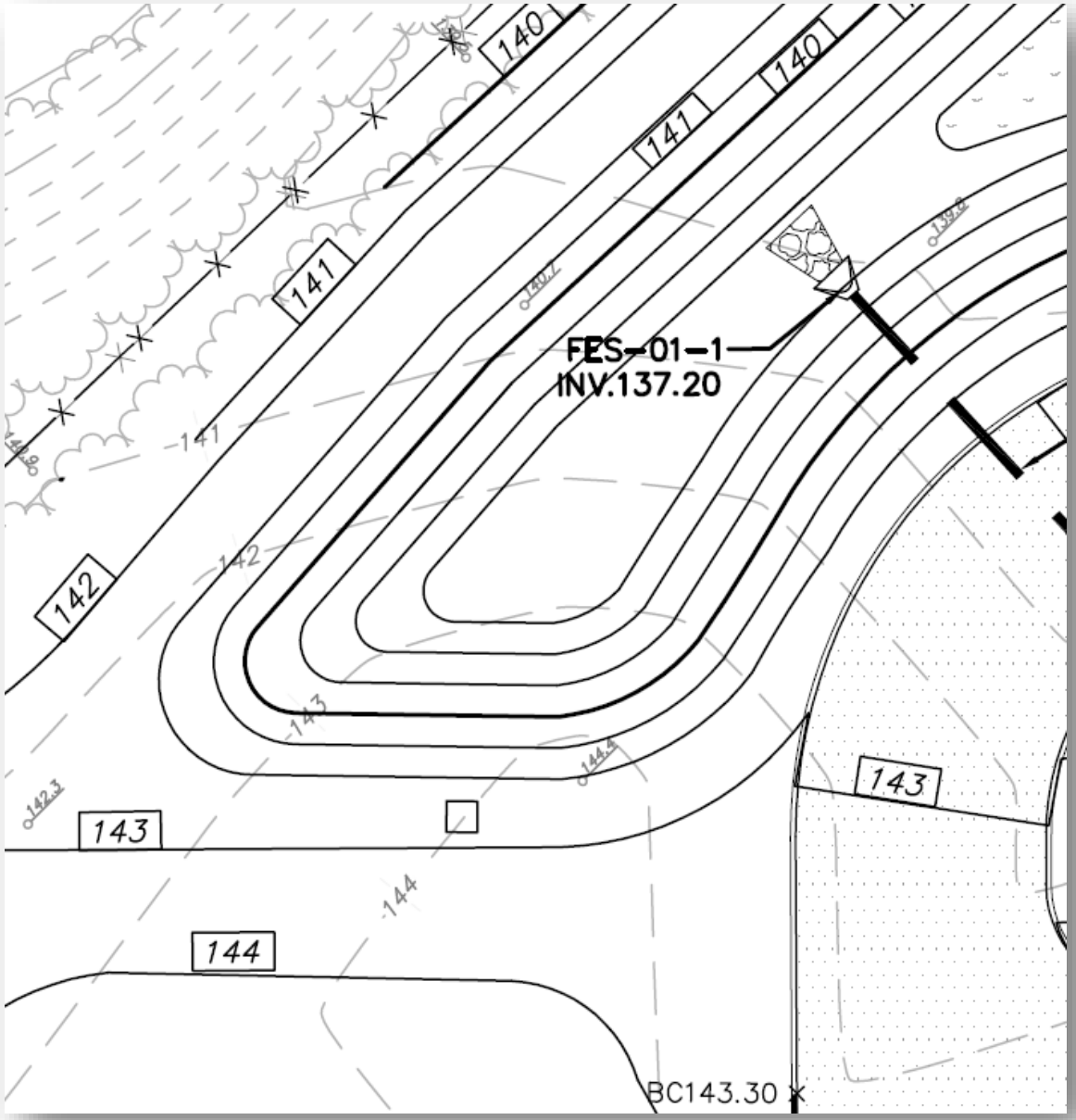
Topography


140
141
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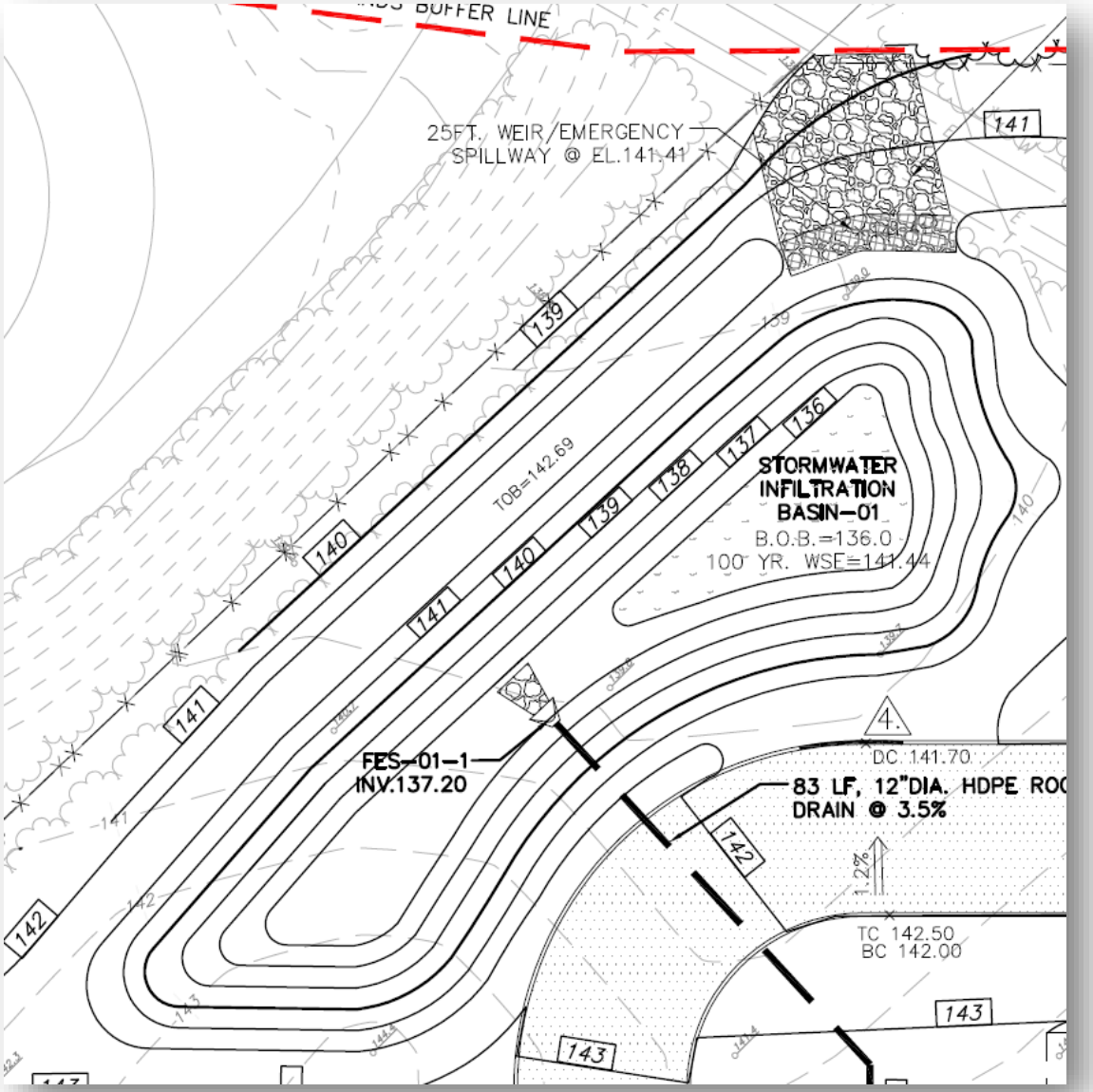
144
FES-01-1
INV.137.20
BC143.30

Stormwater Management



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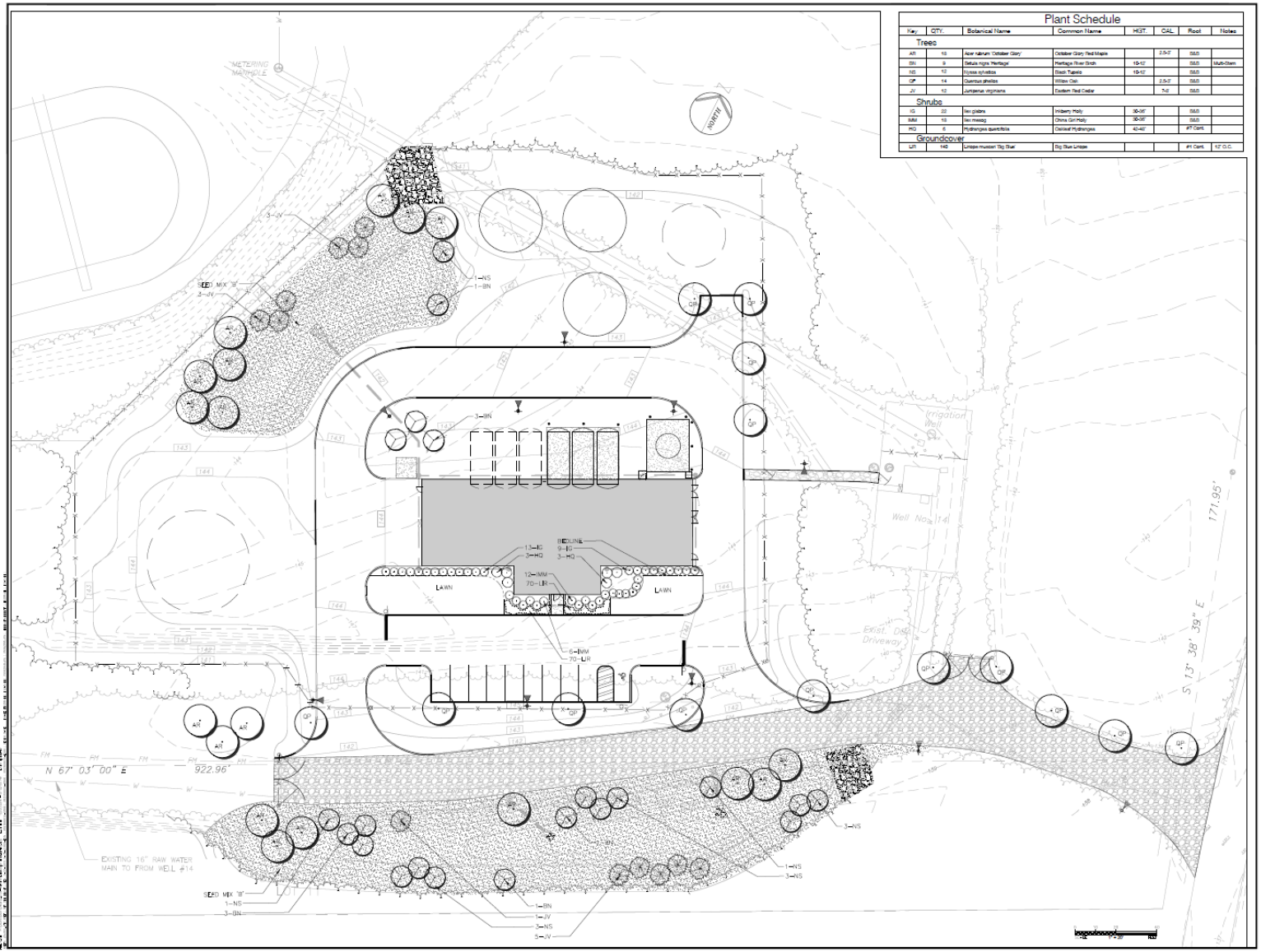
Landscaping - Planting



REV / ISSUE	DATE	DESCRIPTION
1	03-02-16	ISSUED FOR SEC SUBMISSION
2	03-22-16	ISSUED FOR SEC RESUBMISSION
3	05-31-16	ISSUED FOR BID
4	10-21-16	ISSUED FOR BID

CONSULTANT

ORIENTATION / KEY PLAN

PAULUS, SOKOLOWSKI AND SARTOR, LLC.
1433 ROUTE 34
SUITE A4
WALL, NEW JERSEY 07727
PHONE: (848) 206-2626

DAVID APPLEGATE, P.E.
PROFESSIONAL ENGINEER
N.J. LIC. NO. 36118

SIGNATURE 12-22-2016 DATE

CLIENT

JACKSON TOWNSHIP MUNICIPAL UTILITIES AUTHORITY

JACKSON TOWNSHIP, OCEAN COUNTY, N.J.

PROJECT

SIX FLAGS GREAT ADVENTURE WATER TREATMENT PLANT REPLACEMENT

BLOCK 3101 LOTS 11, 28, 31, 32, 46

SHEET TITLE

WTP SITE LANDSCAPE PLAN

PROJECT NO.: 05216.0001
DATE: 02-25-2016
DRAWN BY: AS
CHECKED BY: DJA
SCALE: 1" = 20'

SHEET NO.

C-9

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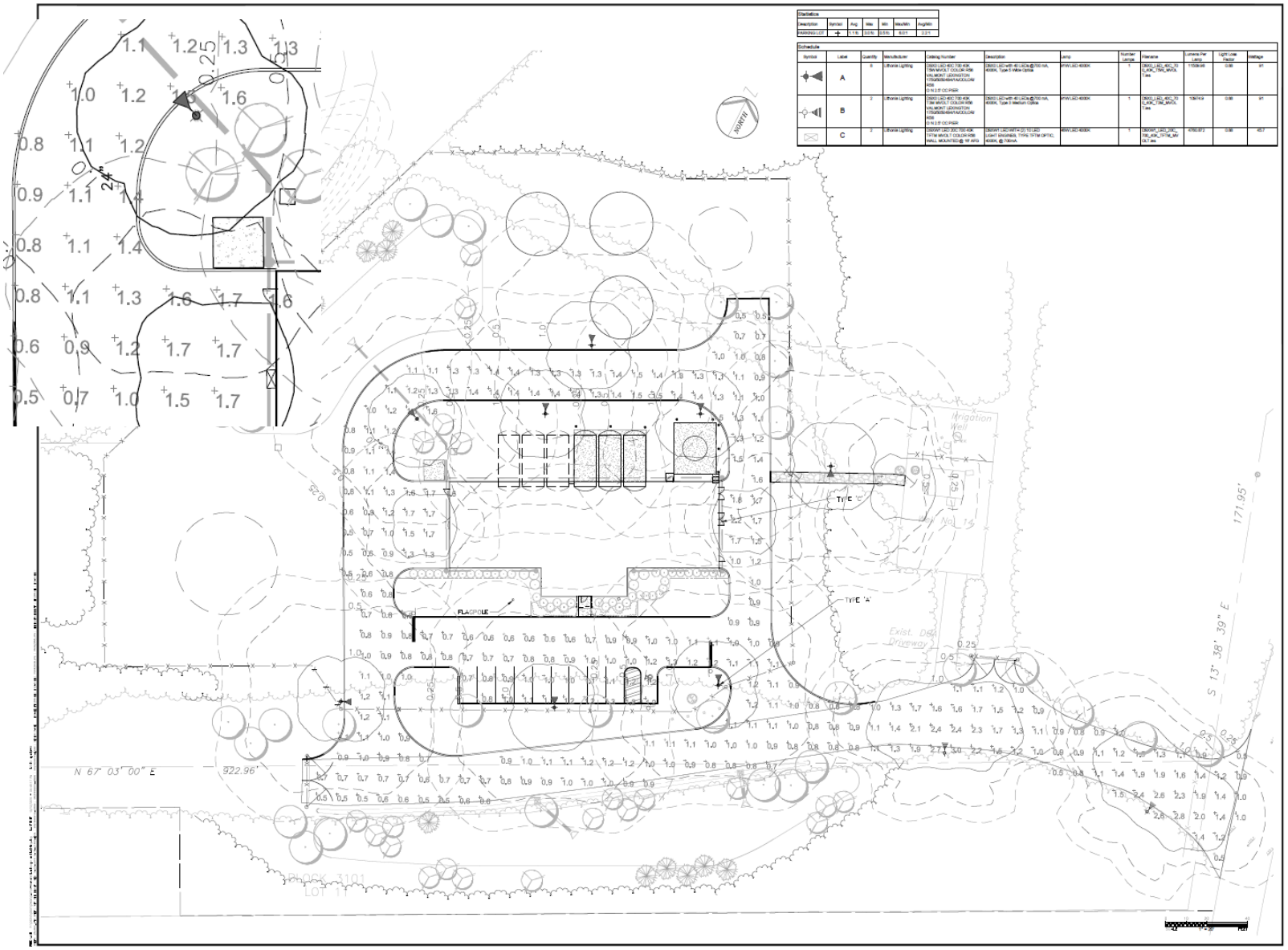
Landscaping - Lighting



REV./ ISSUE	DATE	DESCRIPTION
1	05-23-16	REVISED PER NJDEP COMMENTS
2	05-24-16	REVISED PER NJDEP COMMENTS
3	05-30-16	ADDITIONAL REVISIONS

CONSULTANT

ORIENTATION / KEY PLAN

PAULUS, SOKOLOWSKI AND SARTOR, LLC.
1433 ROUTE 34
SUITE #4
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PHONE: (848) 206-2626
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DAVID APPLEGATE, P.E.
PROFESSIONAL ENGINEER
N.J. LIC. NO. 36118
SIGNATURE DATE

CLIENT

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JACKSON TOWNSHIP, OCEAN COUNTY, N.

PROJECT

SIX FLAGS GREAT ADVENTURE WATER TREATMENT PLANT REPLACEMENT

BLOCK 3101 LOTS 11, 28, 31, 32, 46

SHEET TITLE

WTP SITE LIGHTING PLAN

PROJECT NO.: 05216.0001
DATE: 02-26-2016
DRAWN BY: AB
CHECKED BY: DJA
SCALE: 1" = 20'

SHEET NO.

C-10

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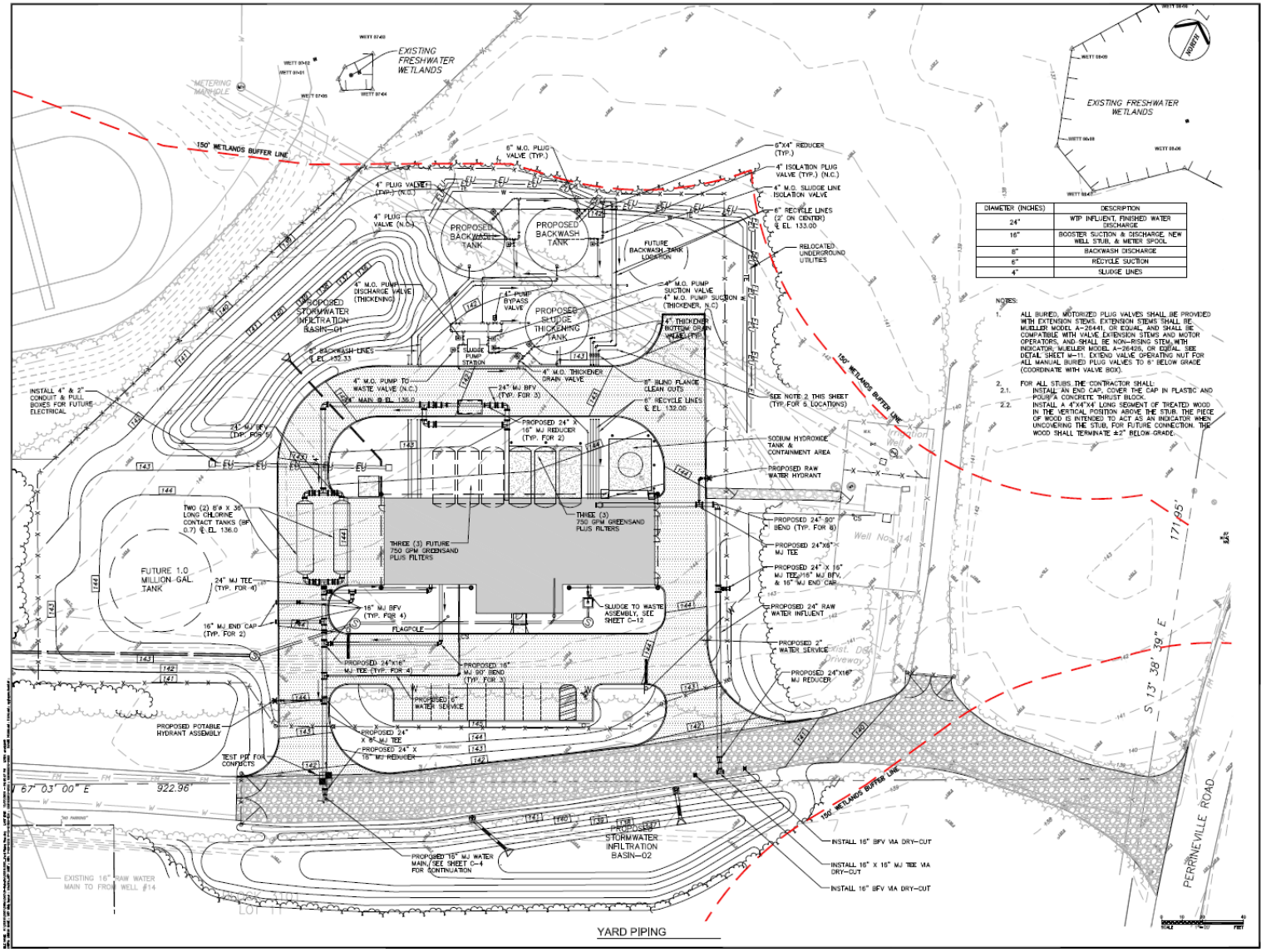
Utility Plans



DIAMETER (INCHES)	DESCRIPTION
24"	WTP INFLUENT, FINISHED WATER DISCHARGE
16"	BOOSTER SUCTION & DISCHARGE, NEW WELL STUB, & METER SPOOL
8"	BACKWASH DISCHARGE
6"	RECYCLE SUCTION
4"	SLUDGE LINES

NOTES:
1. ALL BURIED, MOTORIZED PLUG VALVES SHALL BE PROVIDED WITH EXTENSION STEMS. EXTENSION STEMS SHALL BE MUELLER MODEL A-26441, OR EQUAL, AND SHALL BE COMPATIBLE WITH VALVE EXTENSION STEMS AND MOTOR OPERATORS, AND SHALL BE NON-RISING STEM, WITH INDICATOR, MUELLER MODEL A-26455, OR EQUAL. SEE DETAIL SHEET M-11. EXTEND VALVE OPERATING NUT FOR ALL MANUAL BURIED PLUG VALVES TO 6" BELOW GRADE (COORDINATE WITH VALVE BOX).
2. FOR ALL STUBS THE CONTRACTOR SHALL:
   2.1. INSTALL AN END CAP, COVER THE CAP IN PLASTIC AND POUR A CONCRETE THRUST BLOCK.
   2.2. INSTALL A 4"X4"X4' LONG SEGMENT OF TREATED WOOD IN THE VERTICAL POSITION ABOVE THE STUB. THE PIECE OF WOOD IS INTENDED TO ACT AS AN INDICATOR WHEN UNCOVERING THE STUB, FOR FUTURE CONNECTION. THE WOOD SHALL TERMINATE ±2" BELOW GRADE.

REV./ ISSUE	DATE	DESCRIPTION
1.	09-28-16	REVISED FOR SCDC SUBMISSION
2.	06-22-18	REVISED FOR SCDC RESUBMISSION
3.	08-30-18	GENERAL REVISIONS
4.	10-07-18	GENERAL REVISIONS

CONSULTANT

ORIENTATION / KEY PLAN

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PHONE: (848) 205-2026
CERTIFICATE OF AUTHORIZATION NO. 24GA28033700

DAVID APPLEGATE, P.E.
PROFESSIONAL ENGINEER
N.J. LIC. NO. 35118

SIGNATURE 10-07-2018 DATE

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JACKSON TOWNSHIP MUNICIPAL UTILITIES AUTHORITY

JACKSON TOWNSHIP, OCEAN COUNTY, N.J.

PROJECT
SIX FLAGS GREAT ADVENTURE WATER TREATMENT PLANT REPLACEMENT

BLOCK 3101 LOTS 11, 28, 31, 32, 46

SHEET TITLE
WTP YARD PIPING PLAN

PROJECT NO.: 05216.0001
DATE: 03-24-2016
DRAWN BY: RDP
CHECKED BY: DJA
SCALE: 1" = 20'

SHEET NO.
C-7

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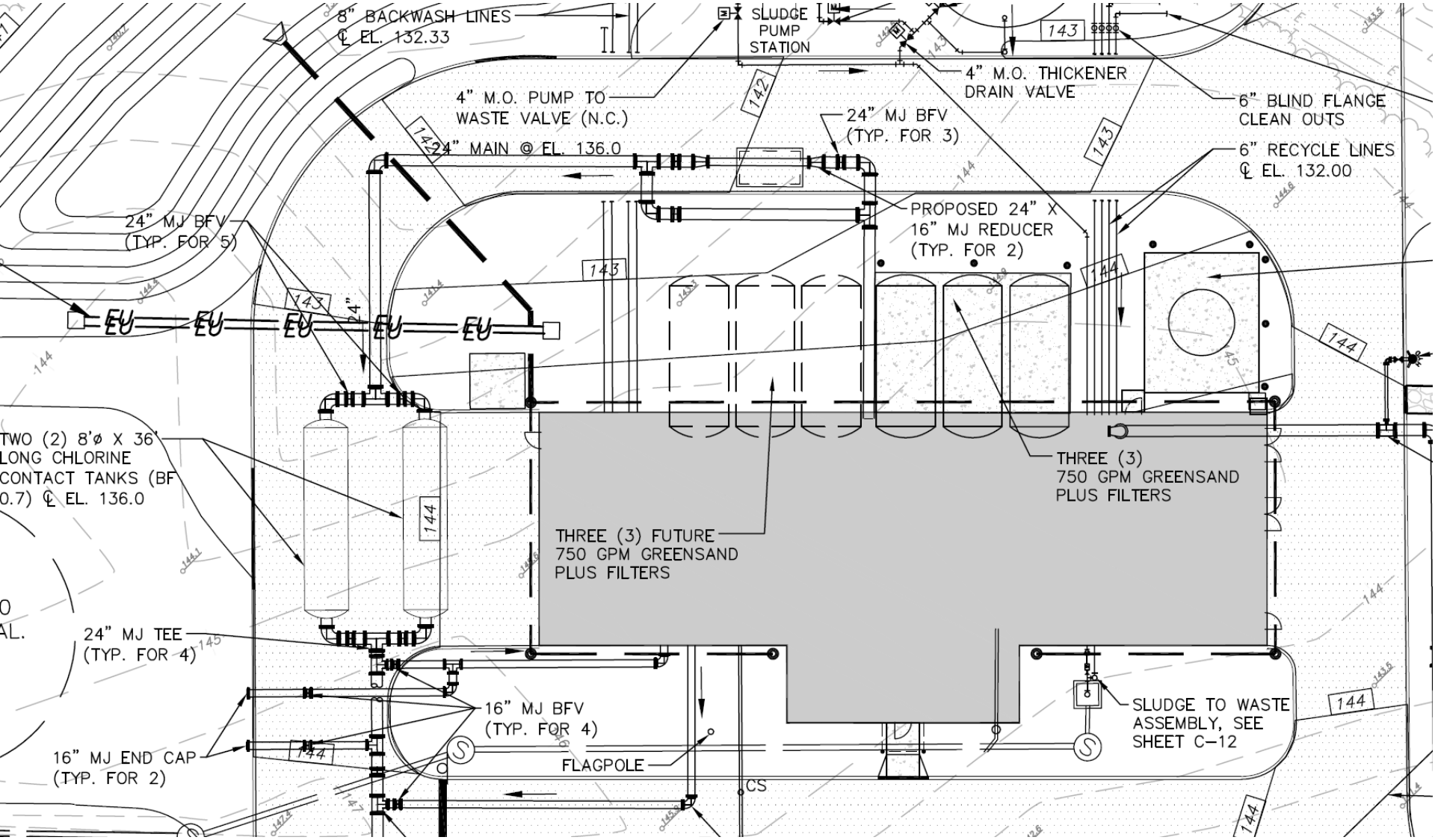
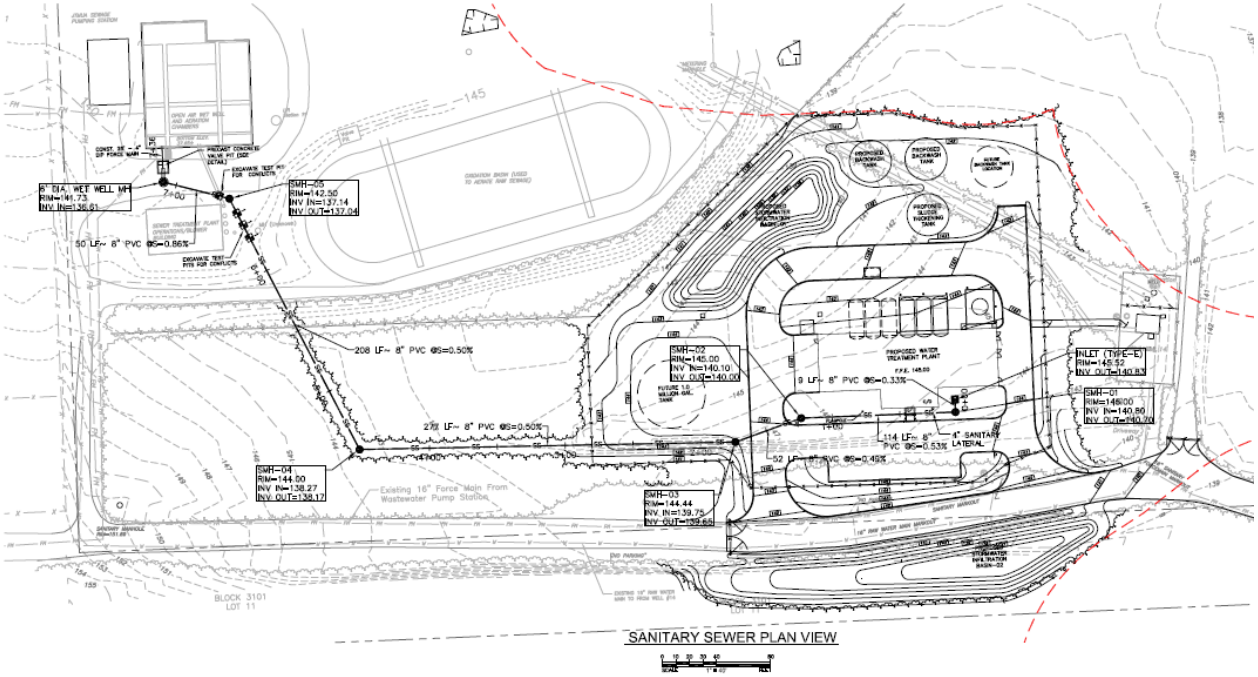
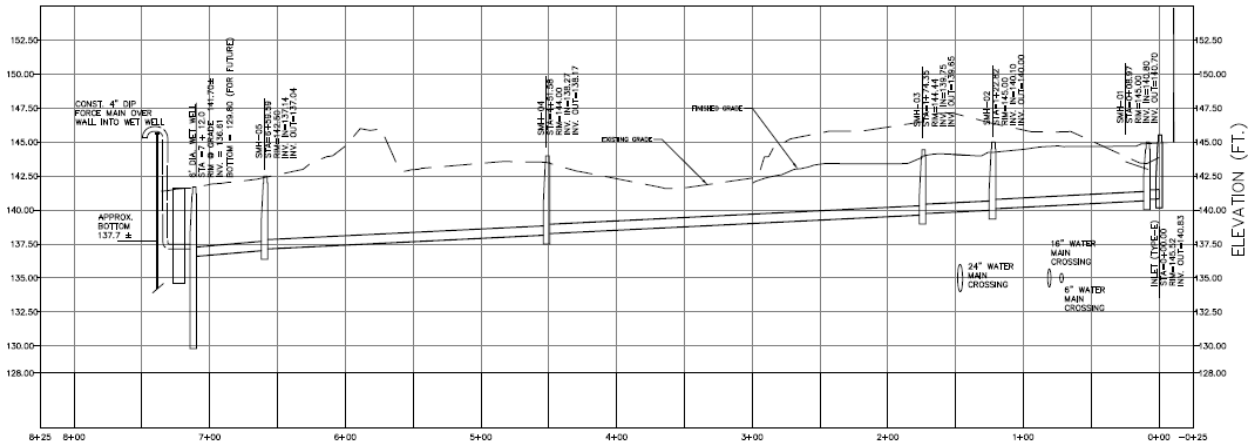
Utility Plans



Utility Profiles



SANITARY SEWER PLAN VIEW



SANITARY SEWER MAIN - PROFILE
SCALE: HORIZONTAL 1" = 40'
VERTICAL 1" = 4'

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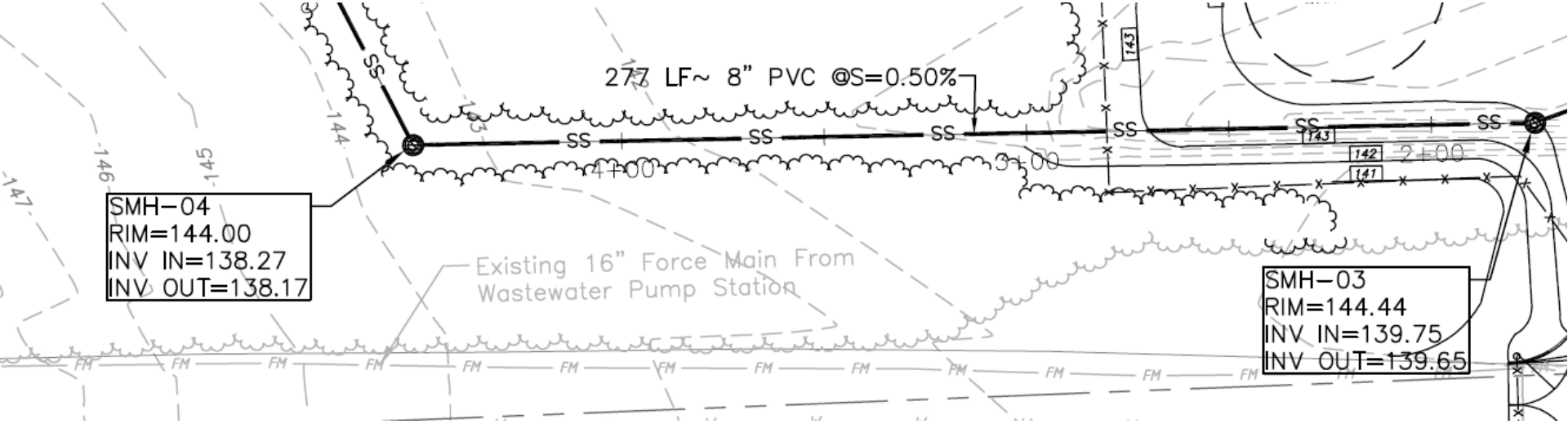
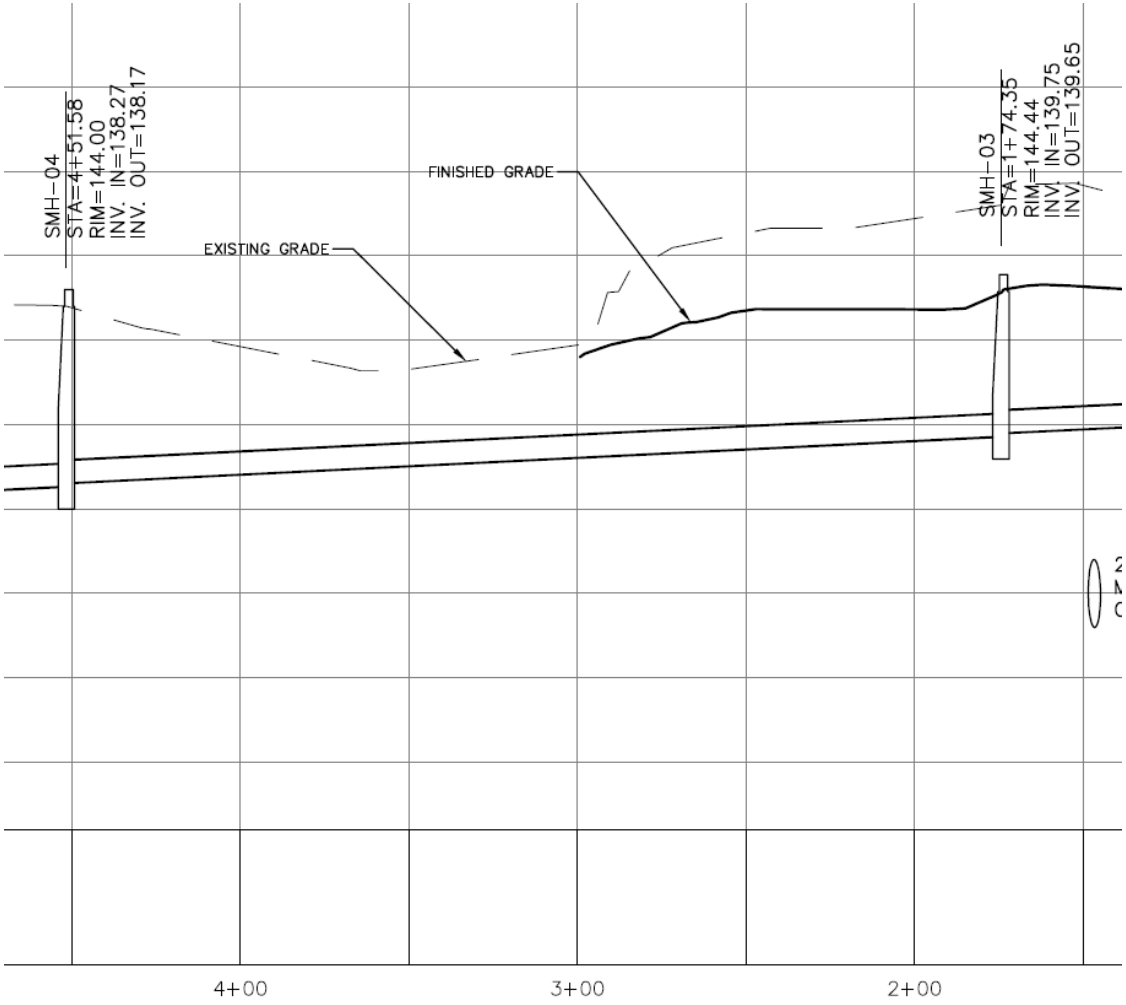
Utility Profiles



Utility Profiles



SANITARY SEWER MAIN - PROFILE

SCALE: HORIZONTAL 1" = 40'
VERTICAL 1" = 4'

0 10 20 30 40 80
SCALE 1" = 40' FEET

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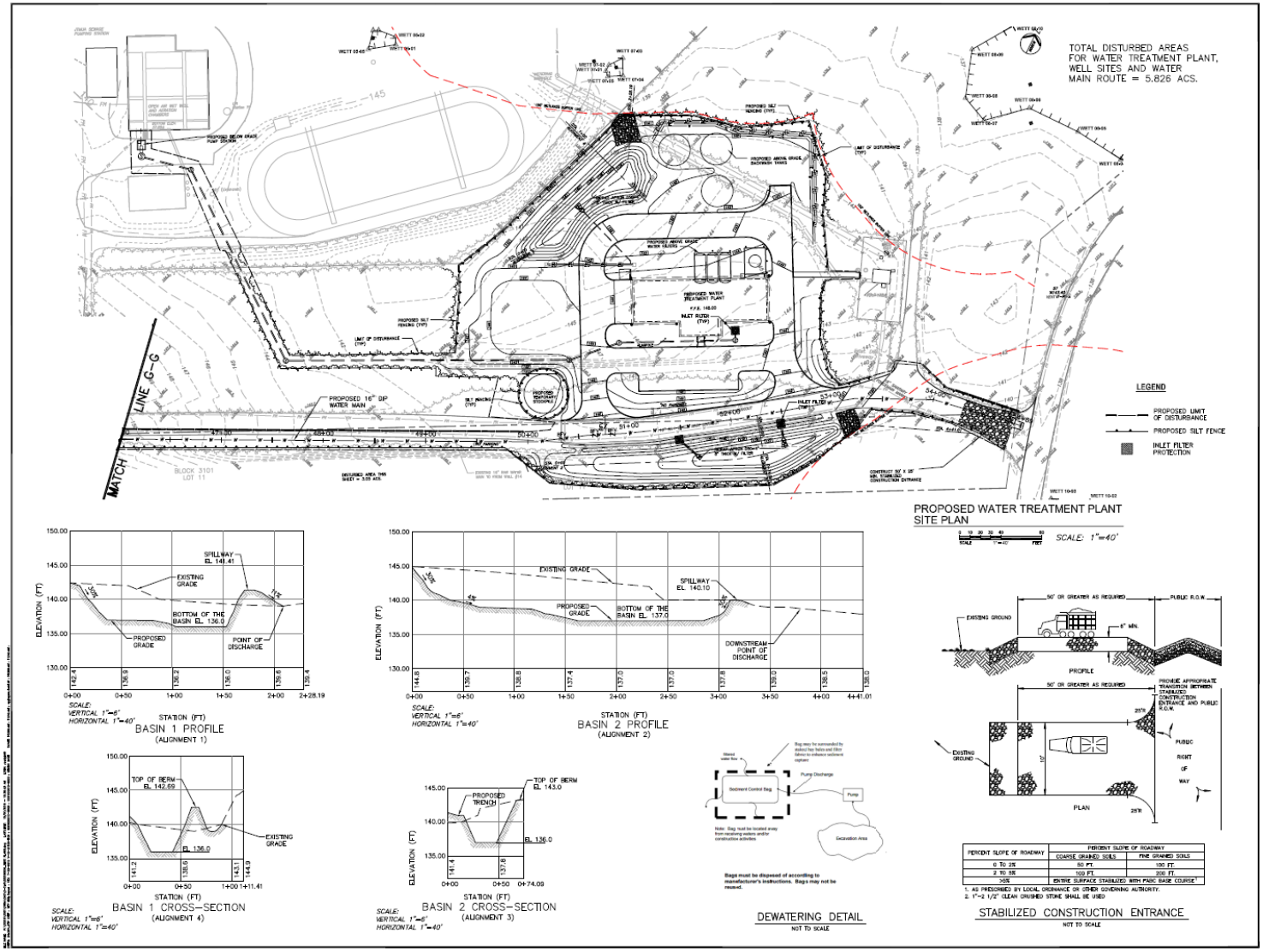
Soil Erosion and Sediment Control



REV./ ISSUE	DATE	DESCRIPTION
1	06-28-16	REVISED FOR SESC SUBMISSION
2	08-23-16	REVISED FOR SESC RESUBMISSION
3	09-30-16	GENERAL REVISIONS
4	09-30-16	REVISED FOR SESC RESUBMISSION
5	10-27-16	REVISED FOR SESC RESUBMISSION

CONSULTANT

ORIENTATION / KEY PLAN

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10-27-2016
DATE

CLIENT
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JACKSON TOWNSHIP, OCEAN COUNTY, N.J.

PROJECT
SIX FLAGS GREAT ADVENTURE WATER TREATMENT PLANT REPLACEMENT
BLOCK 3101 LOTS 11, 28, 31, 32, 46

SHEET TITLE
SOIL EROSION & SEDIMENT CONTROL PLAN & DETAILS SHEET 4 OF 4

PROJECT NO.: 05216.0001
DATE: 06-28-2016
DRAWN BY: RDP
CHECKED BY: WS
SCALE: AS SHOWN
SHEET NO.:

SE-4

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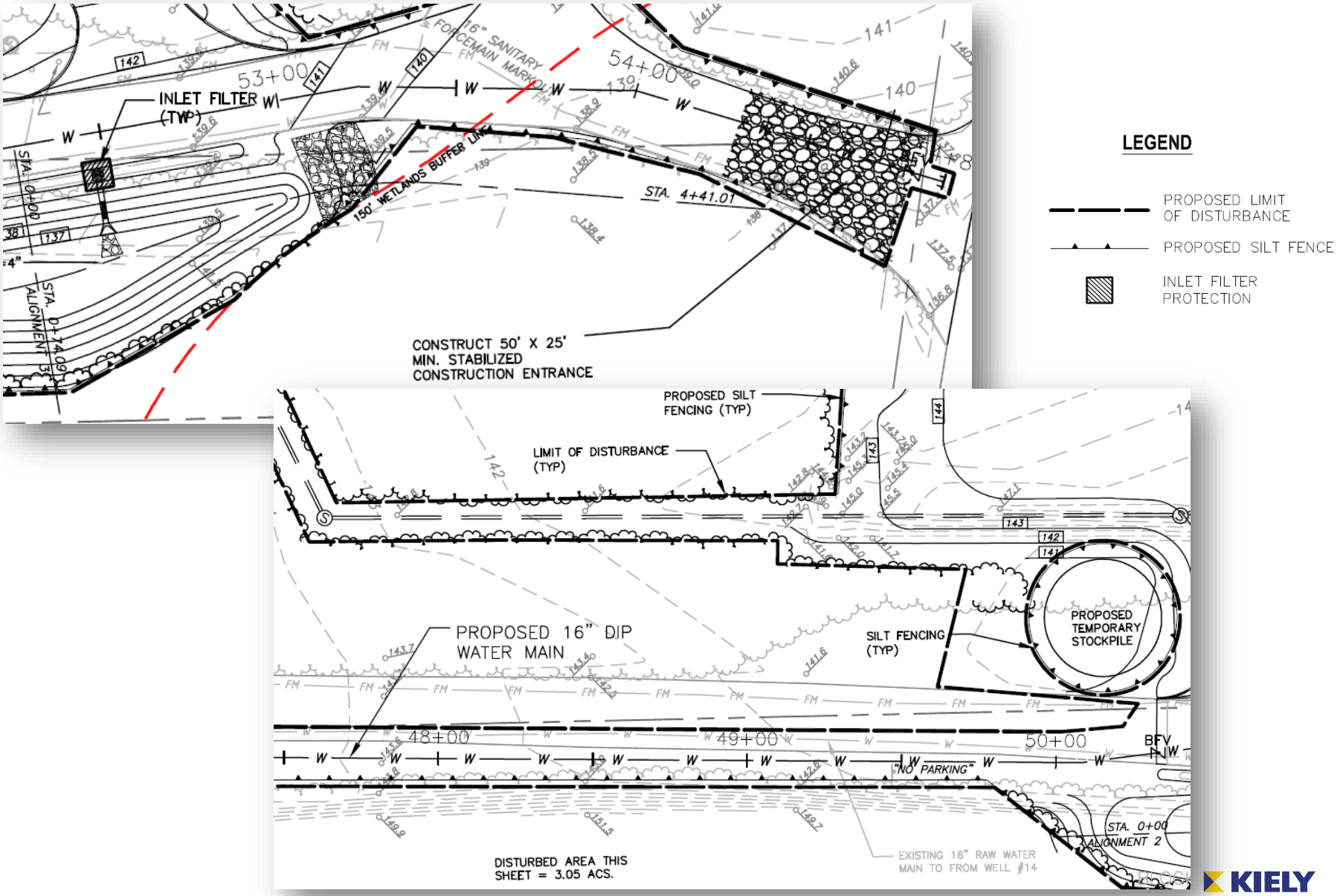
Soil Erosion and Sediment Control



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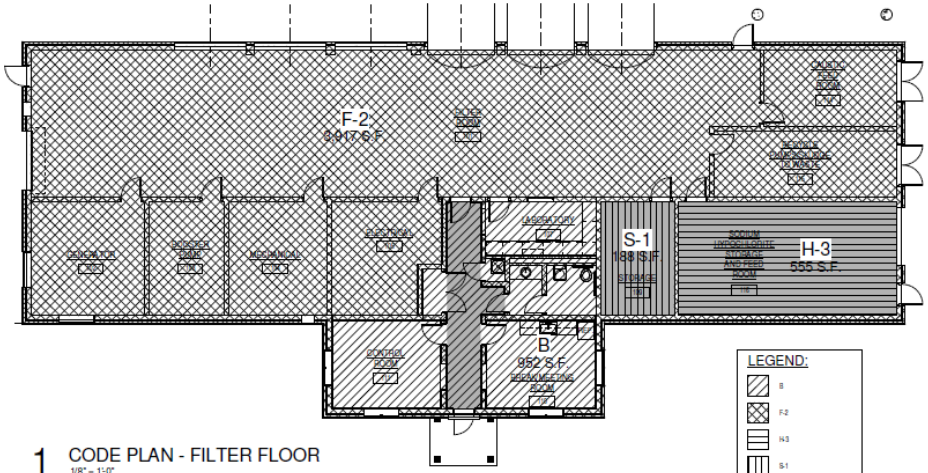
Architectural



1 CODE PLAN - FILTER FLOOR
1/8" = 1'-0"

Applicable Codes and Standards — **ICC Reference**

New Jersey Uniform Construction Code	N.J.A.C. 5:23
2015 New Jersey International Building Code	N.J.A.C. 5:23-5.14
2009 National Standard Plumbing Code	N.J.A.C. 5:23-3.16
Energy Subcode - ASHRAE 90.1-2010	N.J.A.C. 5:23-3.18
2015 International Mechanical Code	N.J.A.C. 5:23-3.20
Barrier Free Subcode (ICC/ANSI A117.1-2005	N.J.A.C. 5:23-7

Boardgrown Authority
Township of Jackson, NJ

2015 New Jersey International Building Code Requirements

Chapter 3 – Use Group and Occupancy

Mixed Use	Area Provided
- Use Group B – Business	952 s.f.
- Use Group S-1 – Storage	188 s.f.
- Use Group F-2 – Low Hazard Factory	3,917 s.f.
- Use Group H-3 – High Hazard Water Reactive	555 s.f.
Total Area	5,612 s.f.

Chapter 4 – Special Requirements

413.2 – Ceiling of S-1 Storage Area.
Requirement: 1 hour fire rated.
Provided: 1 hour fire rated.

Table 414.2.5 – Maximum Quantity of Storage of Corrosive or Hazardous Material in H-3 Use Group.
Requirement: 0*5 gallons.
Provided:

414.5.3 – Spill control, drainage and containment in H-3 Use Group.
Requirement: Total volume of hazard material.
Provided:

414.6 – Outdoor Storage, Dispensing and Use of Hazardous Materials.
Requirements:
414.6.1 – Weather protection to be provided.
414.6.1.1 – Not more than one side of structure or 25% of the perimeter shall have walls or create an obstruction.
414.6.1.3 – Structure shall be constructed from non-combustible materials.
Provided:

415.10.3 – Floors of Storage Area for Corrosive or Hazardous Materials.
Requirement: Floor shall be watertight and constructed with non-combustible materials.
Provided: Lined poured-in-place concrete structure.

Chapter 5 – General Building Heights and Areas

504.2 – Mixed Use.
Requirement: No individual mixed-use occupancy shall exceed the height and number of stories for the most restricted applicable occupancy.
Provided: See tables below.

Table 504.3 – Allowable Building Height.

	Allowable Height	Height Provided
- Use Group B	85 feet	24 feet
- Use Group S-1	85 feet	24 feet
- Use Group F-2	85 feet	24 feet
- Use Group H-3	85 feet	24 feet

Table 504.4 – Allowable Number of Stories Based on Type 2B Construction.

	Allowable	Provided
- Use Group B	5 stories	1 story
- Use Group S-1	3 stories	1 story
- Use Group F-2	3 stories	1 story
- Use Group H-3	3 stories	1 story

506.2.2 – Allowable Area of a 1 Story Mixed Occupancy Building Based on Type 2B Construction.
Requirement: Area of applicable Use Group on to exceed the maximum allowable for the Use Group.
Provided: See table below.

Table 506.2

	Allowable Area	Provided Area
- Use Group B	23,000 s.f.	952 s.f.
- Use Group S-1	23,000 s.f.	188 s.f.
- Use Group F-2	23,000 s.f.	3,917 s.f.
- Use Group H-3	14,000 s.f.	555 s.f.

508.3.1 – Non Separate of Occupancies.
Requirement: The most restrictive requirement of each of the non-separated uses shall apply to the entire non-separated use.
Provided: The area of the non-separated use B, S-1, and F-2 is 4,870 s.f.; the maximum permitted is 23,000 s.f.

508.3.3 – Fire Separation.
Requirement: Non-separation is required between non-separated occupancies. EXCEPTION: H-3 shall be separated from the other occupancy uses.
Provided: Fire separation has been provided between H-3 and combined Use Groups B, S-1, and F-2.

508.4.2 – Allowable Area for Mixed-Use Area.
Requirement: The maximum area is determined by the sum of the ratios of the actual building areas divided by the allowable area building areas for each group. The sum of the ratios shall not exceed 1.0.
Provided: (Area of B + S-1 + F-2) / 23,000 = 0.210.

Table 508.4 – Required Fire Separation.
Requirement: Fire separation between Use Group F-2 and H-3 shall be 3 hour.
Provided: 3 hour masonry wall; 3 hour pre-cast concrete ceiling.

Chapter 6 – Type of Construction

602.2 – Type I and II Construction
Provided: IIB non-combustible construction with no fire sprinkler system.

Table 601 – Fire-Resistant Rate of Building Elements

Structural Frame	0 hour
Exterior Bearing Wall	0 hour
Interior Bearing Wall	0 hour
Floor Construction	0 hour
Roof Construction	0 hour

Chapter 7 – Fire and Smoke Protection

705.2.1 – Projections from Walls of Type I and II Construction shall be of Non-Combustible Materials.

Chapter 8 – Interior Finishes

Class II flooring is minimum required in Use Groups B, S, and H-3.
Provided: Class II floor finishes in entire building.

Chapter 9 – Fire Protection System
901.6.2 – Fire alarm systems are required and shall be monitored by an approved supervisory station.

901.6.2 – Fire alarm systems are required and shall be monitored by an approved supervisory station.
901.6.3 – Group H.
Supervision and monitoring and emergency alarm, detection and automatic fire.
Extinguishing systems are required for Use Group H occupancies.

906.2 – Portable Fire Extinguishers.
Maximum floor area per fire extinguisher is 11,250 s.f.
Maximum travel distance is 75 feet.
Provide: 1 @ front door
1 @ corridor door
1 @ each exit door
1 in H-3 area

Chapter 10 – Means of Egress

1003.4 Walking surface of means of egress shall have a securely attached, slip-resistant surface.

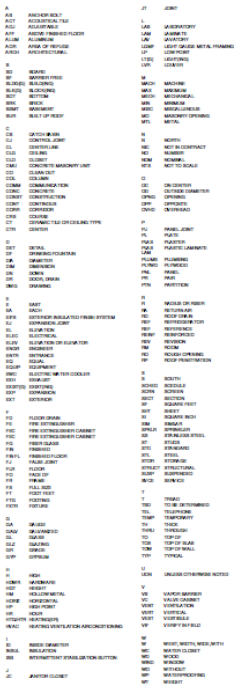
Table 1004.1.2 – Occupancy Loading.
Required:
B 1 per 100 s.f. |_ 54 persons
H 1 per 200 s.f.
Provided: 20 people

1006.2.1 – Egress based on occupant load and common path of egress travel distance.
Two exits shall be provided.

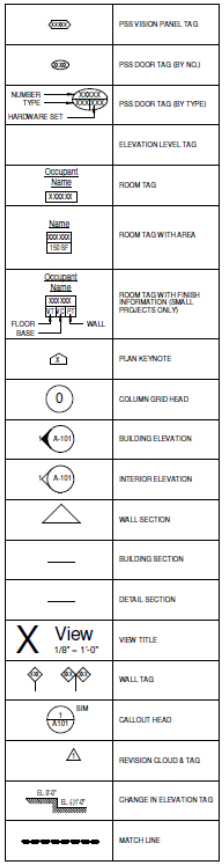
Table 1017.2 – Exit Access Travel Distance.
Required: for Use Groups B, F-2, S-1: 200 feet
Provided: 75 s maximum
Required: for Use Group H-3: 150 feet maximum
Provided: 36 feet maximum

Table 1020.1 – Corridor Fire-Resistant Rating.
Required: Without sprinklers for Use Group B, F, and S – 1 hour
With sprinklers for Use Group B, F, and S – 0 hour
Provided: Sprinkler system for corridor.

ABBREVIATIONS



SYMBOLS



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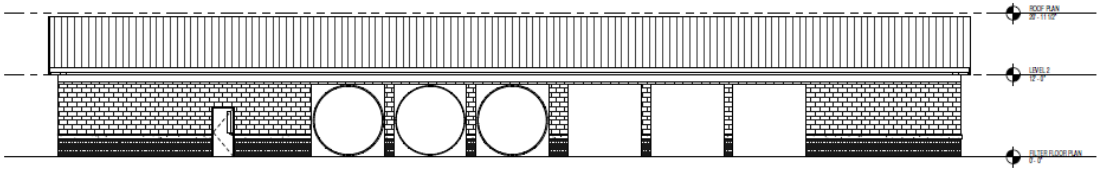
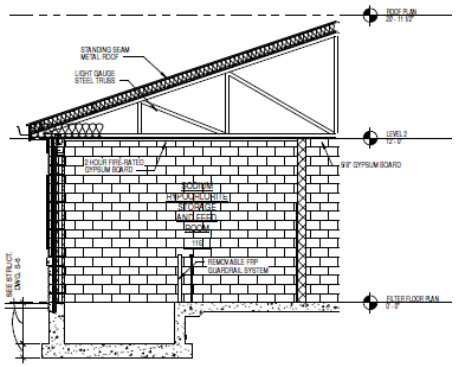
1 NORTH ELEVATION
1/8" = 1'-0"

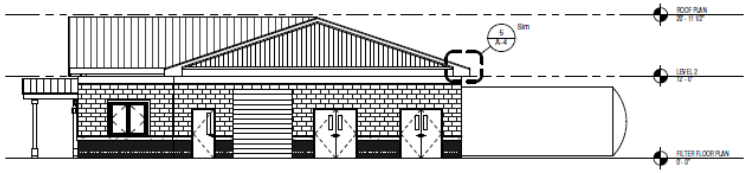


2 SOUTH ELEVATION
1/8" = 1'-0"

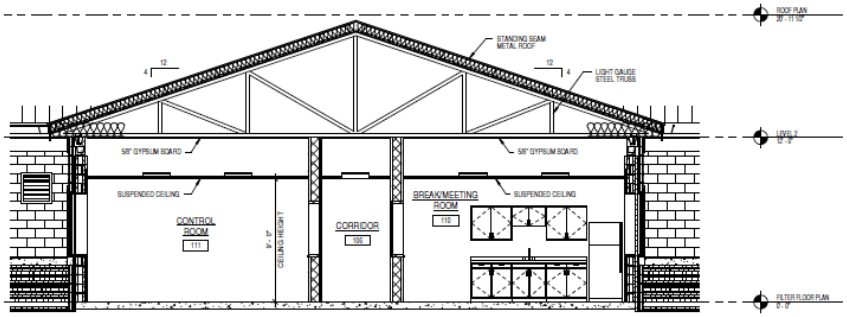


7 BUILDING SECTION 3
1/4" = 1'-0"

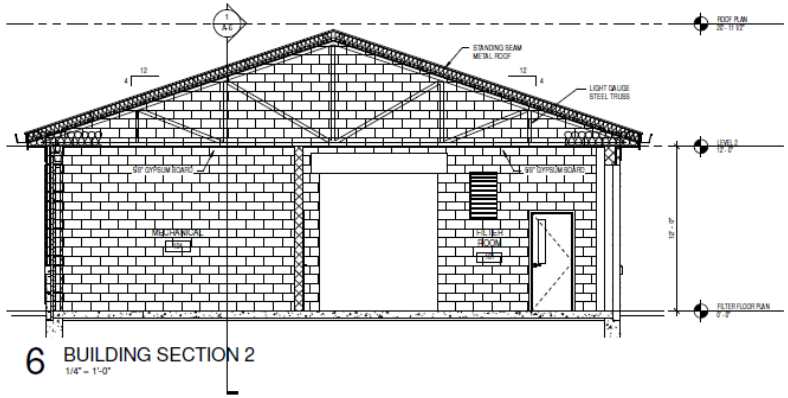
4 EAST ELEVATION
1/8" = 1'-0"



3 WEST ELEVATION
1/8" = 1'-0"



5 BUILDING SECTION 1
1/4" = 1'-0"



6 BUILDING SECTION 2
1/4" = 1'-0"

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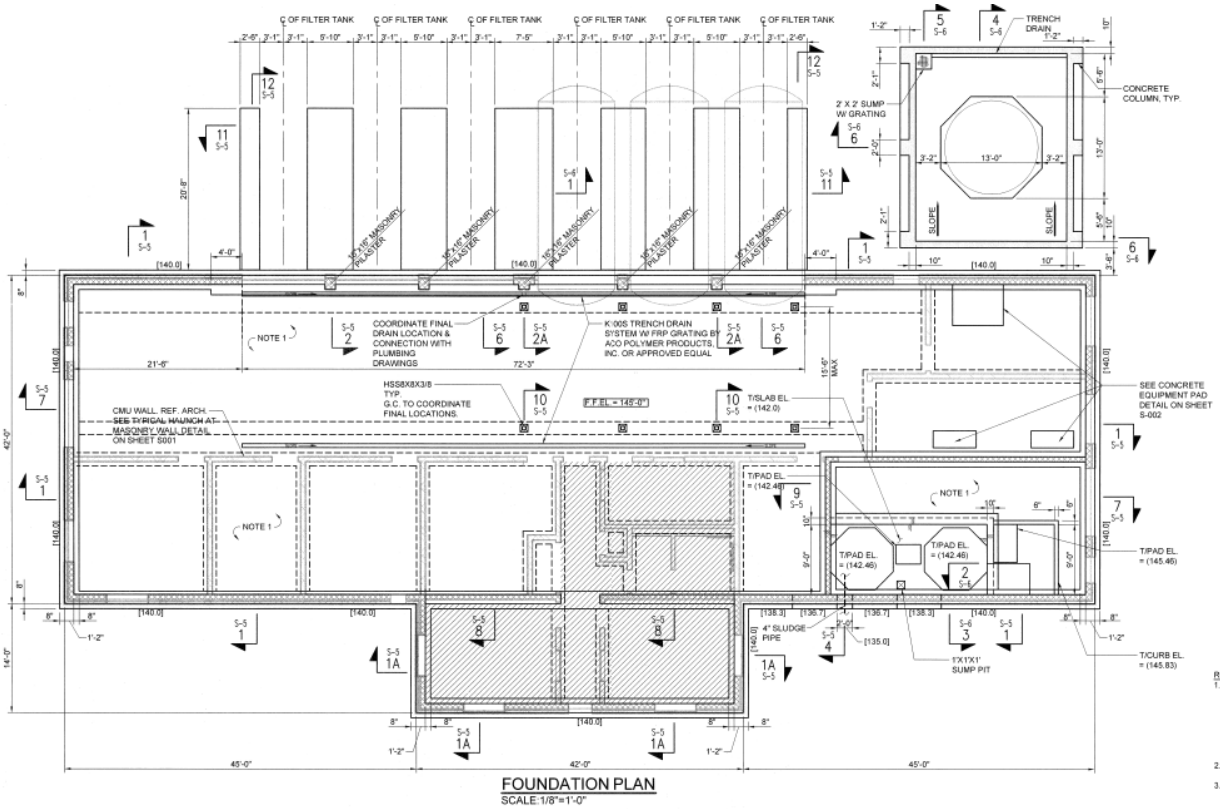
Structural



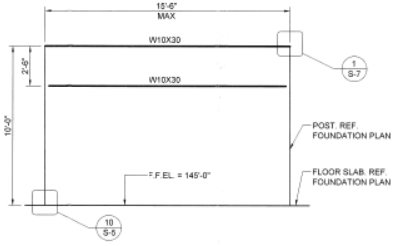
FOUNDATION PLAN
SCALE: 1/8"=1'-0"

FOUNDATION NOTES:
1. SLAB ON GRADE SHALL BE NORMAL WEIGHT CONCRETE PLACED OVER 6 INCHES OF 3/4" CLEAN CRUSHED STONE & REINFORCED WITH SYNTHETIC (POLYOLEFIN) MACRO FIBERS. SEE GENERAL NOTES FOR INFORMATION. FINISH FLOOR ELEVATION SHOWN INDICATES ACTUAL ELEVATION.
2. [...] INDICATES BOTTOM OF FOOTING ELEVATION.
3. LOCATION, SHAPE, & SIZE OF ALL CONCRETE EQUIPMENT PADS SHOWN SHALL BE COORDINATED WITH WATER RESOURCE DRAWINGS.

LEGEND:

6" SLAB W/ FIBER

8" SLAB W/ FIBER



PIPE SUPPORT ELEVATION
SCALE: 1/4"=1'-0"

ROOF FRAMING NOTES:
1. ROOF FRAMING SHALL BE 1 1/2" - 20 GAGE TYPE B WIDE RIB METAL ROOF DECK, SPANNING OVER PREFABRICATED ENGINEERED LIGHT GAGE METAL FRAME ROOF TRUSSES. GENERAL CONTRACTOR SHALL SUBMIT DETAILED STRUCTURAL TRUSS DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW JERSEY FOR REVIEW AND APPROVAL.
2. PERMANENT ROOF TRUSS BRACING IS REQUIRED FOR THE STABILITY OF THE STRUCTURAL ROOF SYSTEM.
3. WEB CONFIGURATIONS SHOWN ARE SCHEMATIC. FINAL ROOF TRUSS DESIGN SHALL BE PROVIDED BY TRUSS FABRICATOR

PREFABRICATED LIGHT GAUGE ROOF TRUSS LOADING REQUIREMENTS:

(LOADING SHALL BE APPLIED IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES)

TOP CHORD ROOF LOADING REQUIREMENTS:

DEAD LOAD = 15PSF
LIVE LOAD = 20 PSF
ROOF SNOW LOAD = 30 PSF
UNBALANCED ROOF SNOW LOADS = PER ASCE 7-10 LOADING REQUIREMENTS
WIND LOAD = PER ASCE 7-10 LOADING REQUIREMENTS

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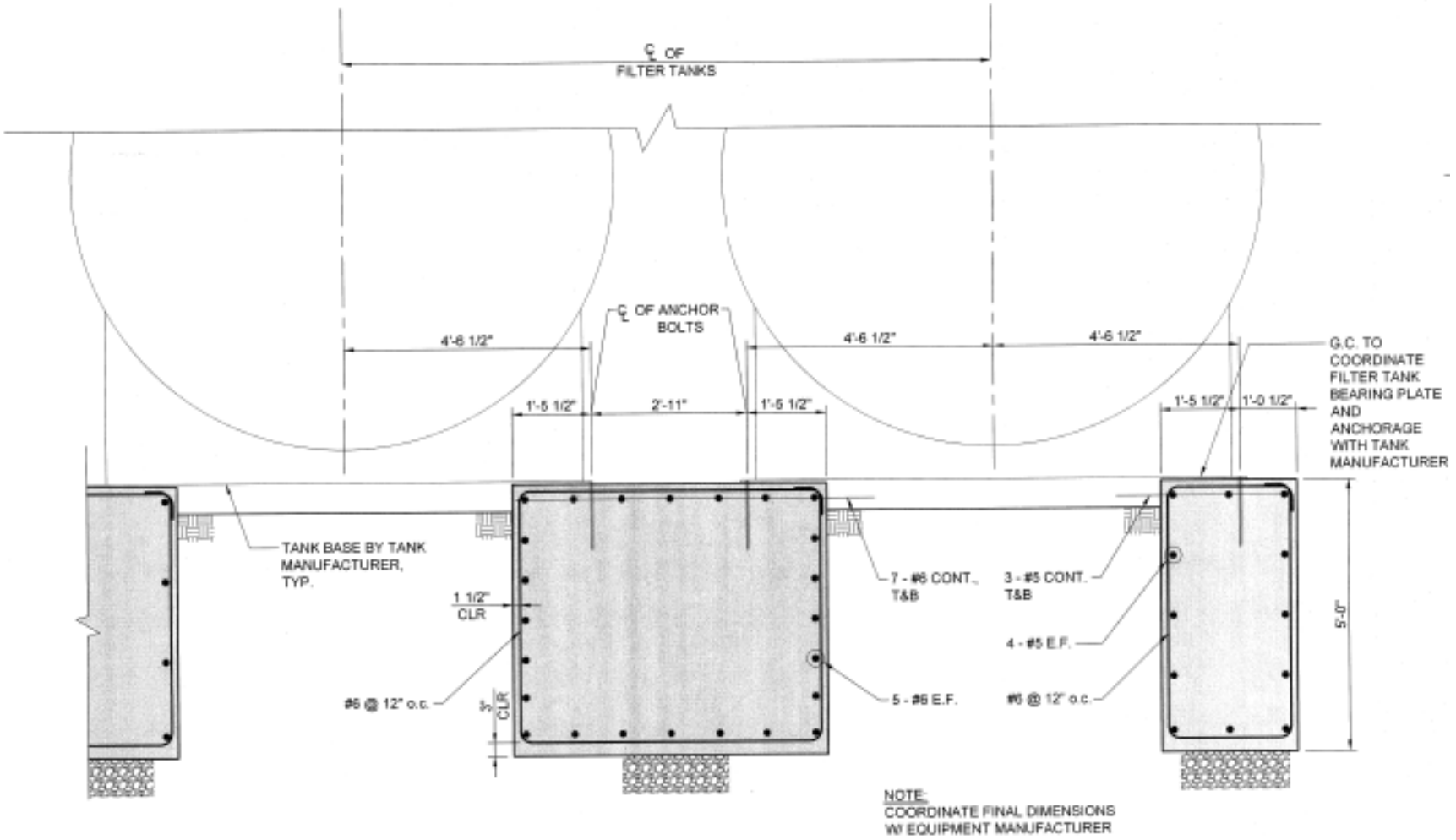
Structural



SECTION 11

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

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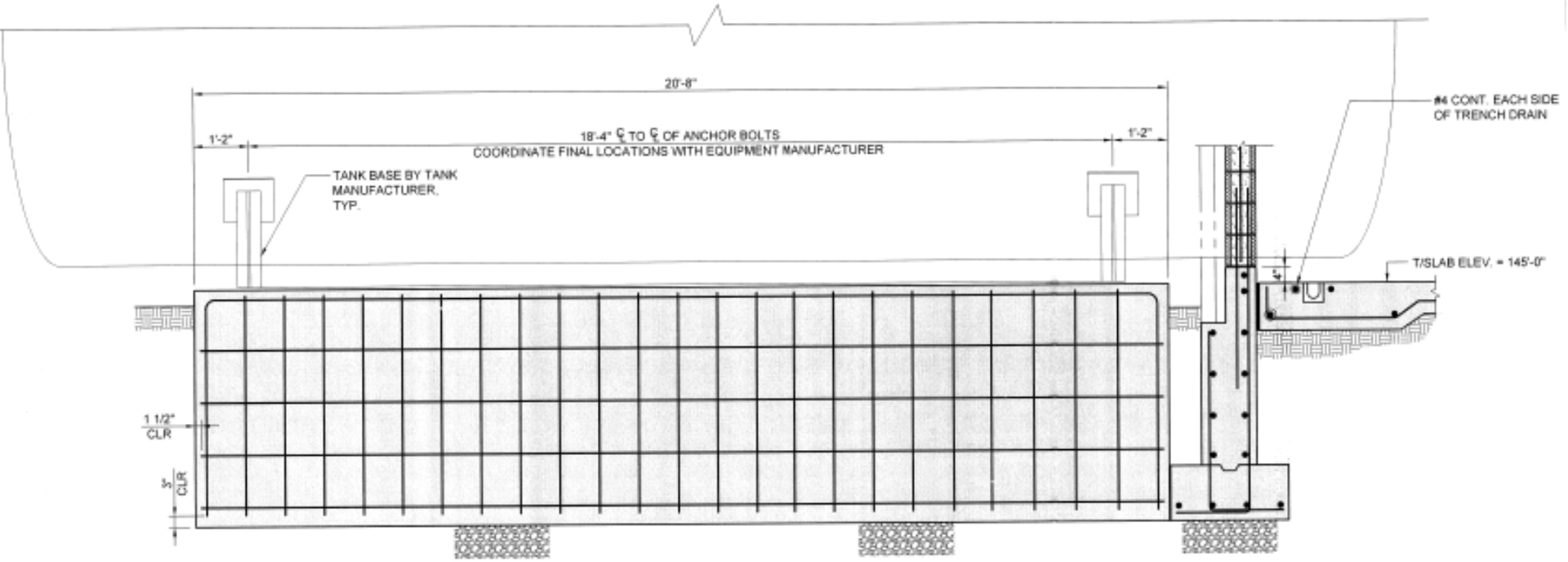
Structural



NOTE:
COORDINATE FINAL DIMENSIONS W/ EQUIPMENT MANUFACTURER

SECTION 12
SCALE: 1/2"=1'-0"

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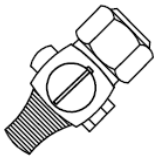
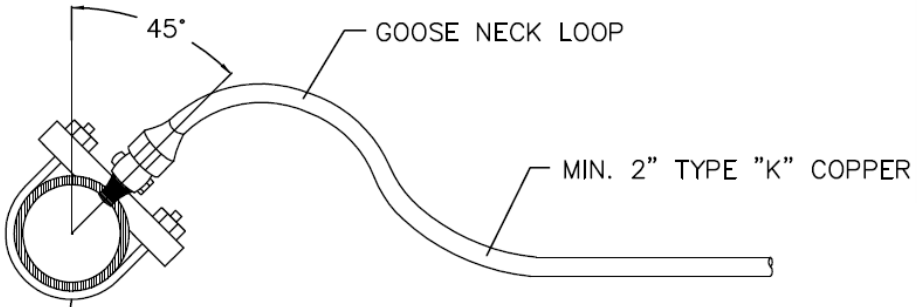
Construction Details



CORPORATION STOP – MUELLER B–25008, OR EQUAL.



CORPORATION STOP

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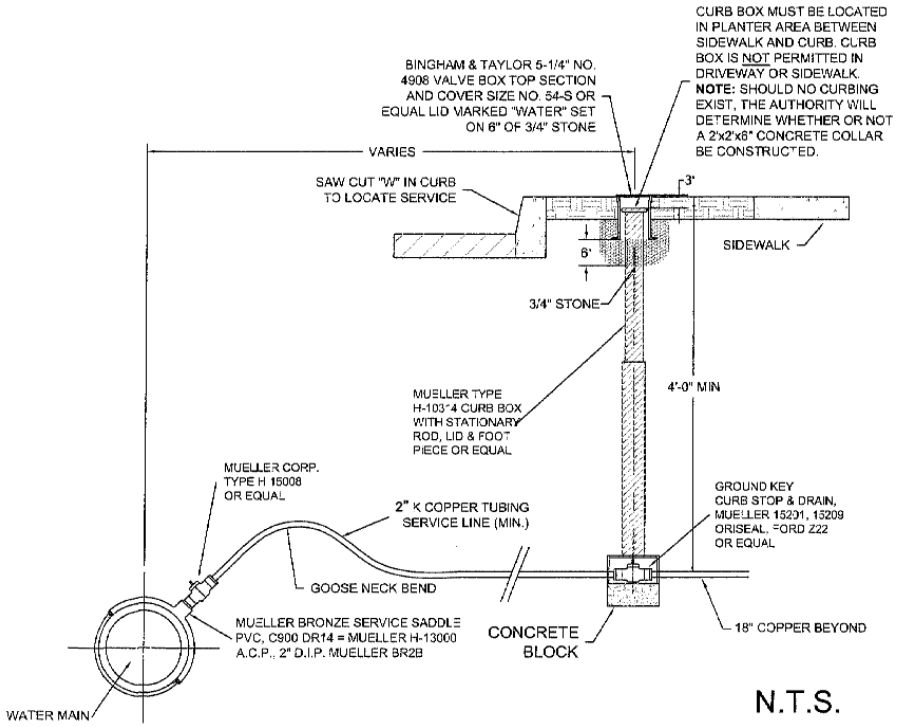
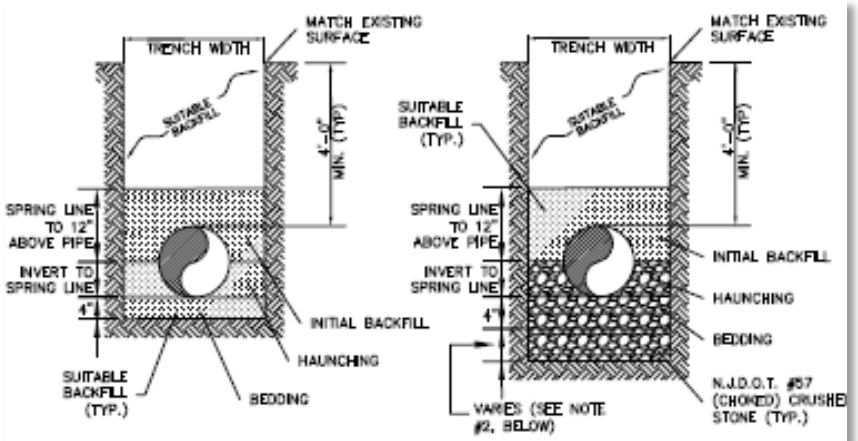


TYPICAL WATER SERVICE DETAIL

NOT TO SCALE

Construction Details



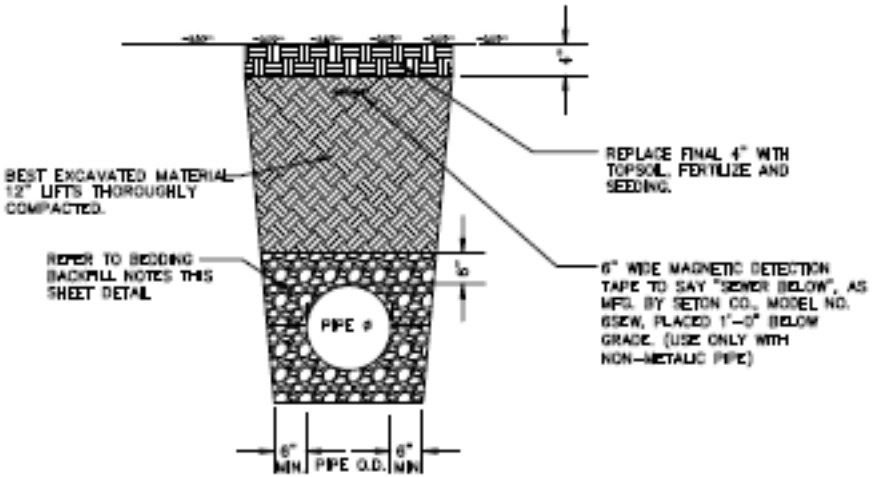
STABLE BEDDING FOUNDATION
(DRY, SUITABLE BEDDING CONDITIONS)

UNSTABLE TRENCH
(CLAY, WET OR UNSUITABLE BEDDING CONDITIONS)

NOTES:

1. SUITABLE BACKFILL SHALL CONSIST OF SELECT FILL OR SUITABLE FILL MATERIAL FREE FROM ORGANIC OR DELETERIOUS MATERIAL.
2. UNSUITABLE MATERIAL ENCOUNTERED BENEATH THE TRENCH TO BE REMOVED TO A DEPTH DETERMINED BY THE ENGINEER.
3. SUITABLE BACKFILL TO BE THOROUGHLY COMPACTED IN 6" LIFTS BY MECHANICAL TAMPING (OR BY HAND TAMPING WHEN AND WHERE DIRECTED).
4. SUITABLE BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY TEST.
5. AREAS SURROUNDING PIPE SHALL BE HAND TAMPED TO FILL ALL CAVITIES.
6. EXCAVATION SHALL COMPLY WITH OSHA REQUIREMENTS.
7. THE CONTRACTOR MUST DEWATER PRIOR TO PLACING THE PIPE IF WET TRENCH CONDITIONS ARE FOUND. THE PIPE MUST REMAIN IN DRY CONDITIONS UNTIL BACKFILLED
8. MAX. PAYMENT FOR TRENCH RESTORATION SHALL BE LIMITED TO 4'-6". ANY ADDITIONAL TRENCH RESTORATION REQUIRED SHALL BE AT THE CONTRACTOR'S EXPENSE.

TYPICAL DUCTILE IRON PIPE BEDDING/BACKFILL TRENCH RESTORATION
NOT TO SCALE



PVC PIPE BEDDING & TRENCH BACKFILL
NOT TO SCALE

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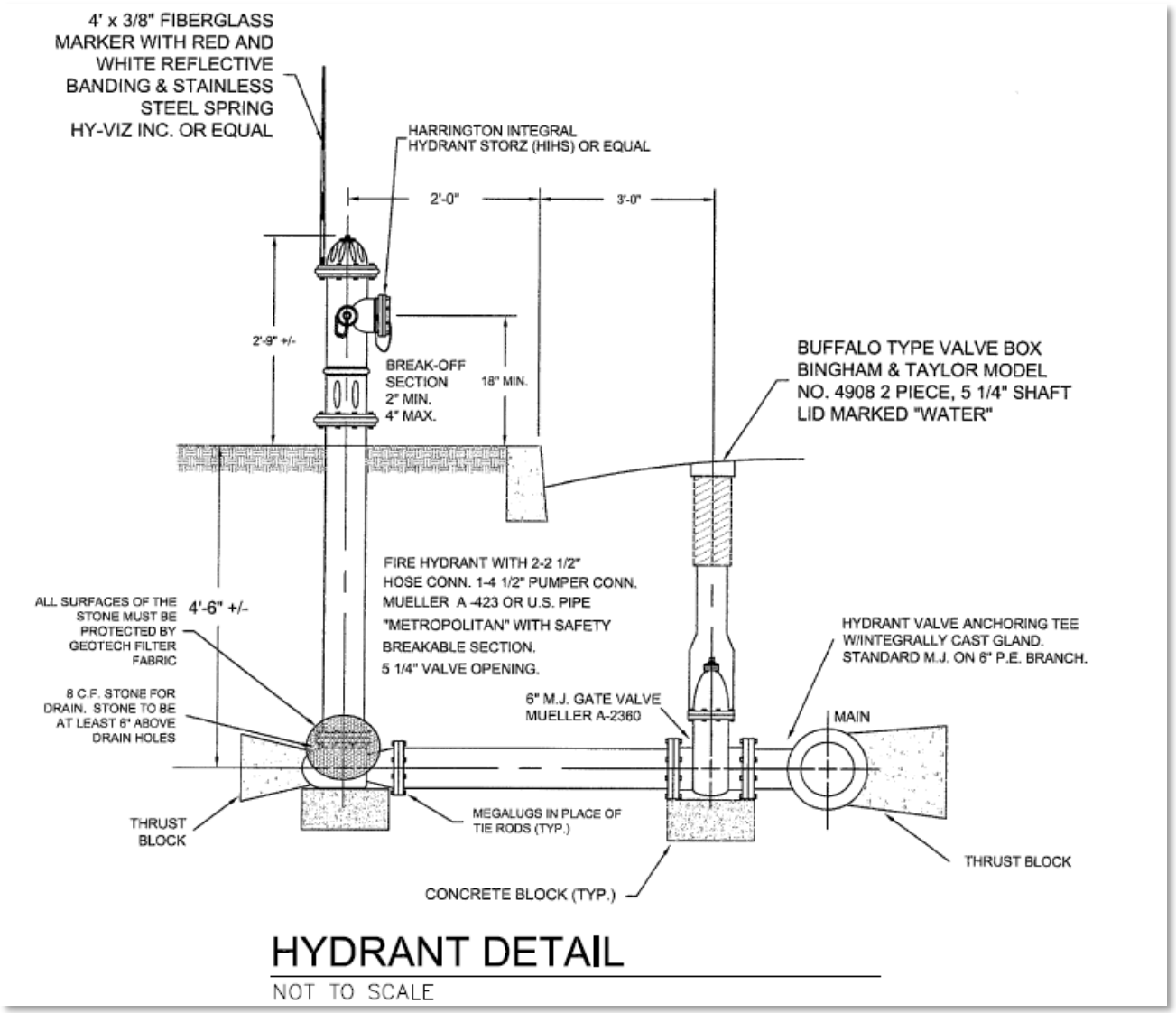
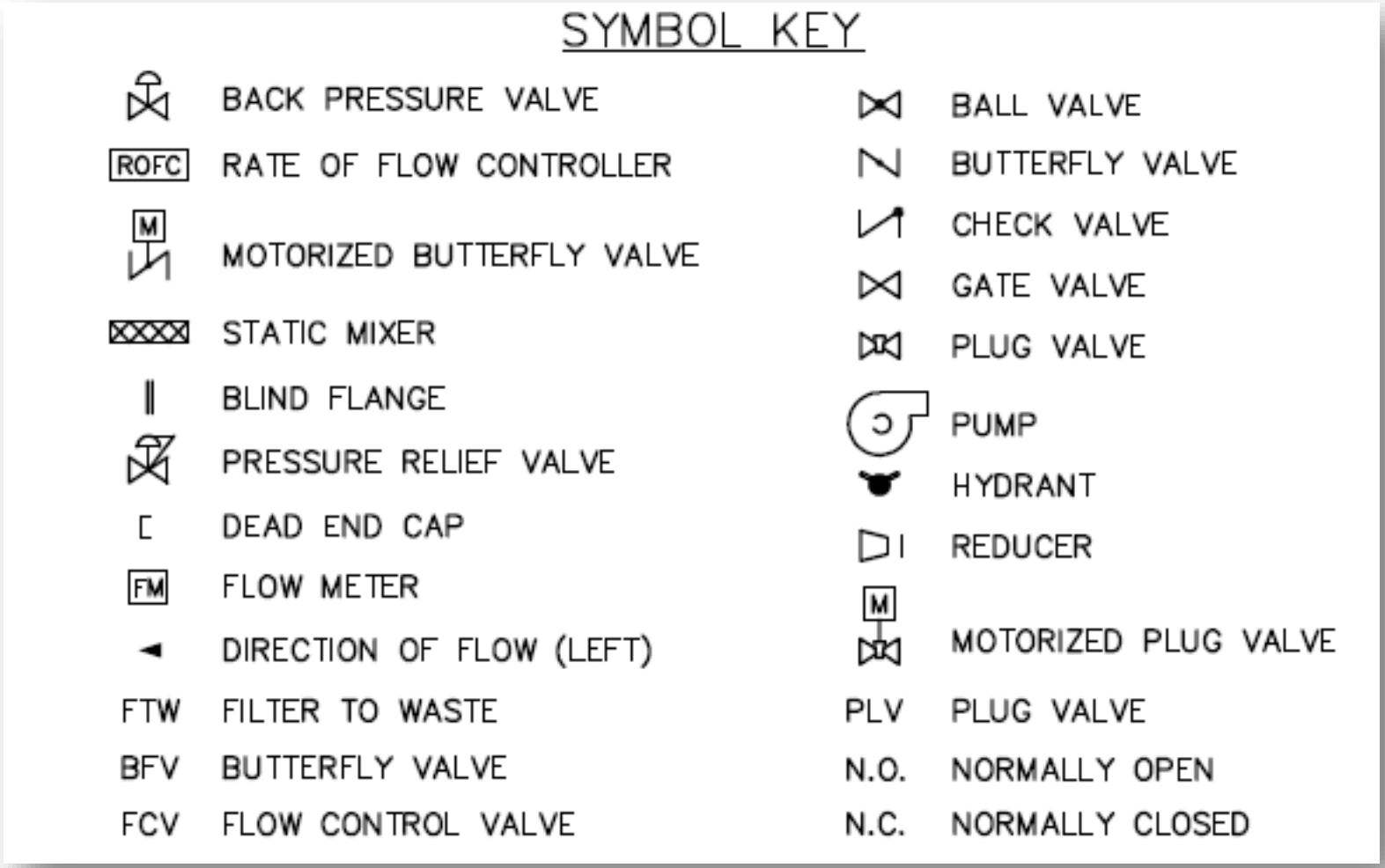
Construction Details



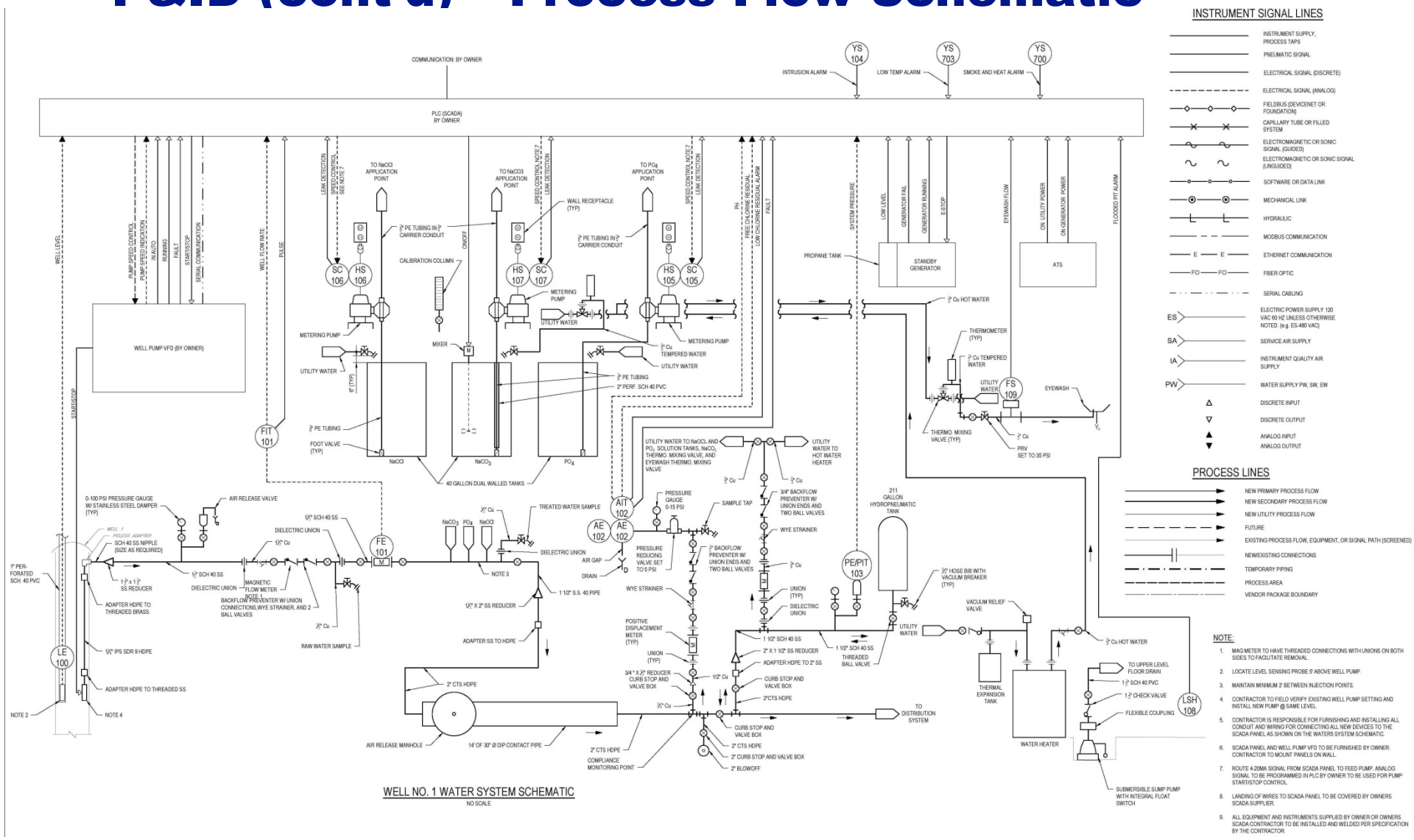
Process and Instrumentation Diagrams (P&ID's)

- Depicts the flow pattern of the medium (water, wastewater, air, etc.)
- Reflects interaction of instruments and signals
- Lays out control logic
- Good, all-around reference guide to how things work
- Drawing not to scale (NTS)

P&ID (cont'd)


SYMBOL KEY
BACK PRESSURE VALVE
ROFC
RATE OF FLOW CONTROLLER
M
MOTORIZED BUTTERFLY VALVE
STATIC MIXER
BLIND FLANGE
PRESSURE RELIEF VALVE
DEAD END CAP
FM
FLOW METER
DIRECTION OF FLOW (LEFT)
FTW
FILTER TO WASTE
BFV
BUTTERFLY VALVE
FCV
FLOW CONTROL VALVE
BALL VALVE
BUTTERFLY VALVE
CHECK VALVE
GATE VALVE
PLUG VALVE
PUMP
HYDRANT
REDUCER
M
MOTORIZED PLUG VALVE
PLV
PLUG VALVE
N.O.
NORMALLY OPEN
N.C.
NORMALLY CLOSED

P&ID (cont'd) – Process Flow Schematic



WELL NO. 1 WATER SYSTEM SCHEMATIC

NO SCALE

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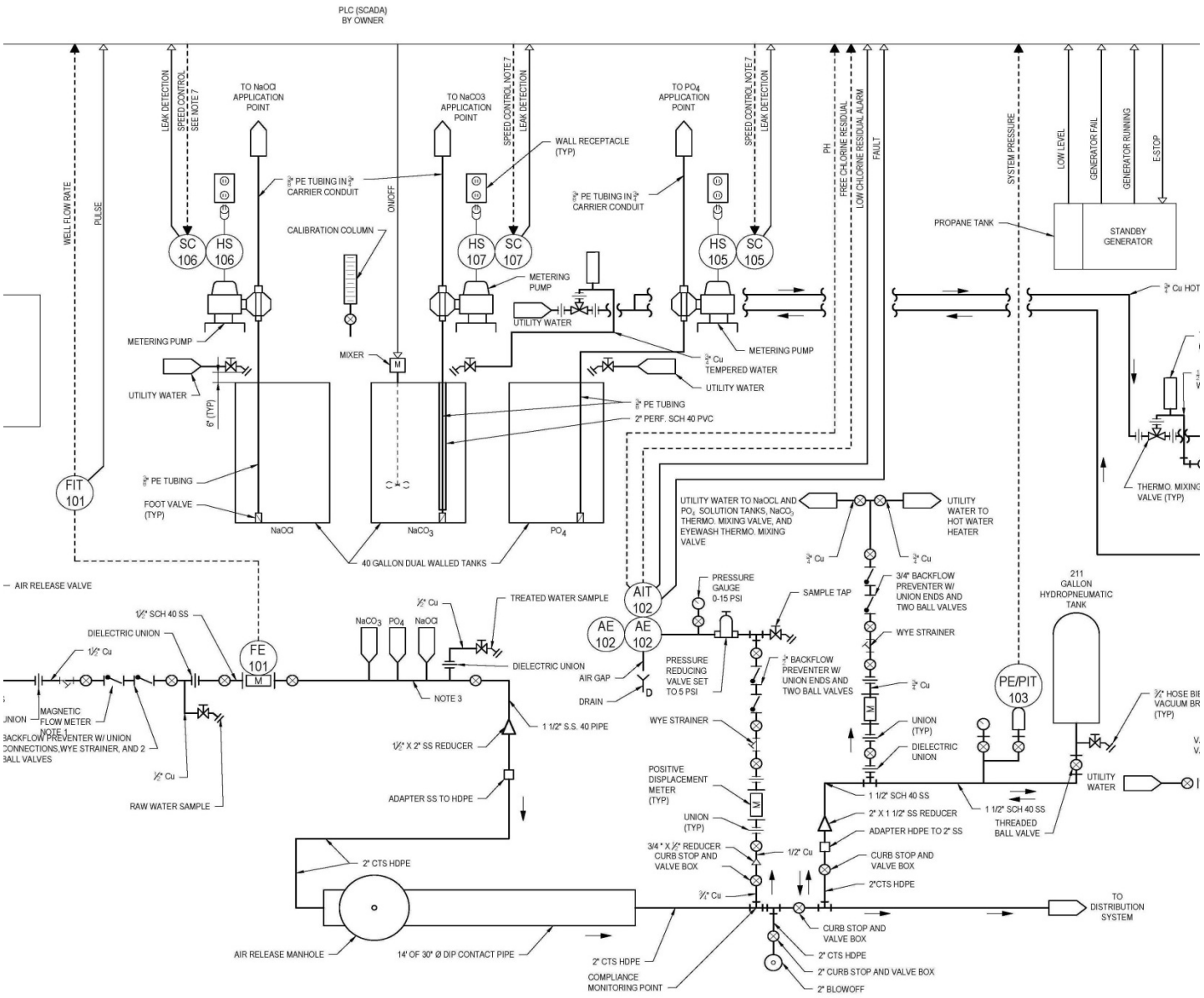
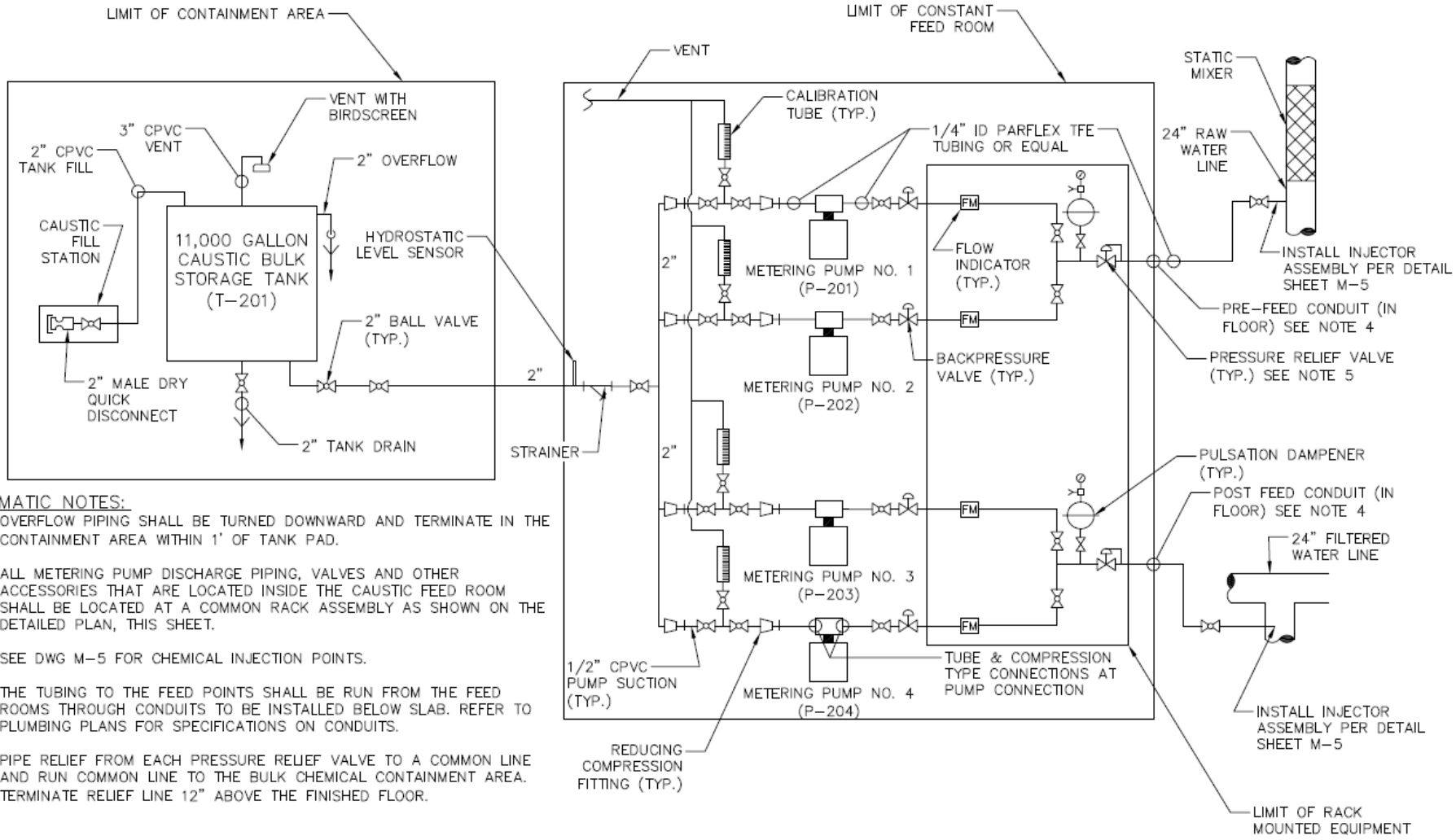
P&ID (cont'd)


PLC (SCADA) BY OWNER
WELL FLOW RATE
PULSE
LEAK DETECTION
SPEED CONTROL SEE NOTE 7
TO NaOCl APPLICATION POINT
TO NaCO3 APPLICATION POINT
TO PO4 APPLICATION POINT
SPEED CONTROL NOTE 7
LEAK DETECTION
WALL RECEPTACLE (TYP)
PH
FREE CHLORINE RESIDUAL
LOW CHLORINE RESIDUAL ALARM
FAULT
SYSTEM PRESSURE
LOW LEVEL
GENERATOR FAIL
GENERATOR RUNNING
E-STOP
PROPANE TANK
STANDBY GENERATOR
¾" PE TUBING IN 3" CARRIER CONDUIT
ON/OFF
CALIBRATION COLUMN
SC 106
HS 106
HS 107
SC 107
HS 105
SC 105
METERING PUMP
UTILITY WATER
MIXER
¾" Cu TEMPERED WATER
¾" Cu HOT
¾" PE TUBING
2" PERF. SCH 40 PVC
FIT 101
FOOT VALVE (TYP)
NaOCl
NaCO3
PO4
40 GALLON DUAL WALLED TANKS
UTILITY WATER TO NaOCL AND PO4 SOLUTION TANKS, NaCO3 THERMO. MIXING VALVE, AND EYEWASH THERMO. MIXING VALVE
UTILITY WATER TO HOT WATER HEATER
THERMO. MIXING VALVE (TYP)
AIR RELEASE VALVE
1½" SCH 40 SS
DIELECTRIC UNION
1½" Cu
FE 101
MAGNETIC FLOW METER NOTE 1
BACKFLOW PREVENTER W/ UNION CONNECTIONS, WYE STRAINER, AND 2 BALL VALVES
½" Cu
RAW WATER SAMPLE
½" Cu
TREATED WATER SAMPLE
DIELECTRIC UNION
NOTE 3
1 1/2" S.S. 40 PIPE
1½" X 2" SS REDUCER
ADAPTER SS TO HDPE
2" CTS HDPE
AIR RELEASE MANHOLE
14' OF 30" Ø DIP CONTACT PIPE
AIT 102
AE 102
AE 102
PRESSURE GAUGE 0-15 PSI
SAMPLE TAP
AIR GAP
DRAIN
PRESSURE REDUCING VALVE SET TO 5 PSI
¾" BACKFLOW PREVENTER W/ UNION ENDS AND TWO BALL VALVES
WYE STRAINER
POSITIVE DISPLACEMENT METER (TYP)
UNION (TYP)
3/4 " X ½" REDUCER
CURB STOP AND VALVE BOX
¾" Cu
1/2" Cu
2" CTS HDPE
COMPLIANCE MONITORING POINT
CURB STOP AND VALVE BOX
2" CTS HDPE
2" CURB STOP AND VALVE BOX
2" BLOWOFF
¾" Cu
¾" Cu
3/4" BACKFLOW PREVENTER W/ UNION ENDS AND TWO BALL VALVES
WYE STRAINER
¾" Cu
UNION (TYP)
DIELECTRIC UNION
211 GALLON HYDROPNEUMATIC TANK
PE/PIT 103
1 1/2" SCH 40 SS
2" X 1 1/2" SS REDUCER
ADAPTER HDPE TO 2" SS
CURB STOP AND VALVE BOX
2"CTS HDPE
1 1/2" SCH 40 SS THREADED BALL VALVE
UTILITY WATER
½" HOSE BIB VACUUM BR (TYP)
TO DISTRIBUTION SYSTEM

P&ID (cont'd)



SCHEMATIC NOTES:

1. OVERFLOW PIPING SHALL BE TURNED DOWNWARD AND TERMINATE IN THE CONTAINMENT AREA WITHIN 1' OF TANK PAD.
2. ALL METERING PUMP DISCHARGE PIPING, VALVES AND OTHER ACCESSORIES THAT ARE LOCATED INSIDE THE CAUSTIC FEED ROOM SHALL BE LOCATED AT A COMMON RACK ASSEMBLY AS SHOWN ON THE DETAILED PLAN, THIS SHEET.
3. SEE DWG M-5 FOR CHEMICAL INJECTION POINTS.
4. THE TUBING TO THE FEED POINTS SHALL BE RUN FROM THE FEED ROOMS THROUGH CONDUITS TO BE INSTALLED BELOW SLAB. REFER TO PLUMBING PLANS FOR SPECIFICATIONS ON CONDUITS.
5. PIPE RELIEF FROM EACH PRESSURE RELIEF VALVE TO A COMMON LINE AND RUN COMMON LINE TO THE BULK CHEMICAL CONTAINMENT AREA. TERMINATE RELIEF LINE 12" ABOVE THE FINISHED FLOOR.

PROPOSED CAUSTIC FEED SYSTEM SCHEMATIC

NOT TO SCALE

KIELY

Mechanical Plans

- Depict building interior water, wastewater, air, etc. moving systems
- Reflect piping lay out and connection types
- Both plan and section views
- Typically utilizes architectural scale

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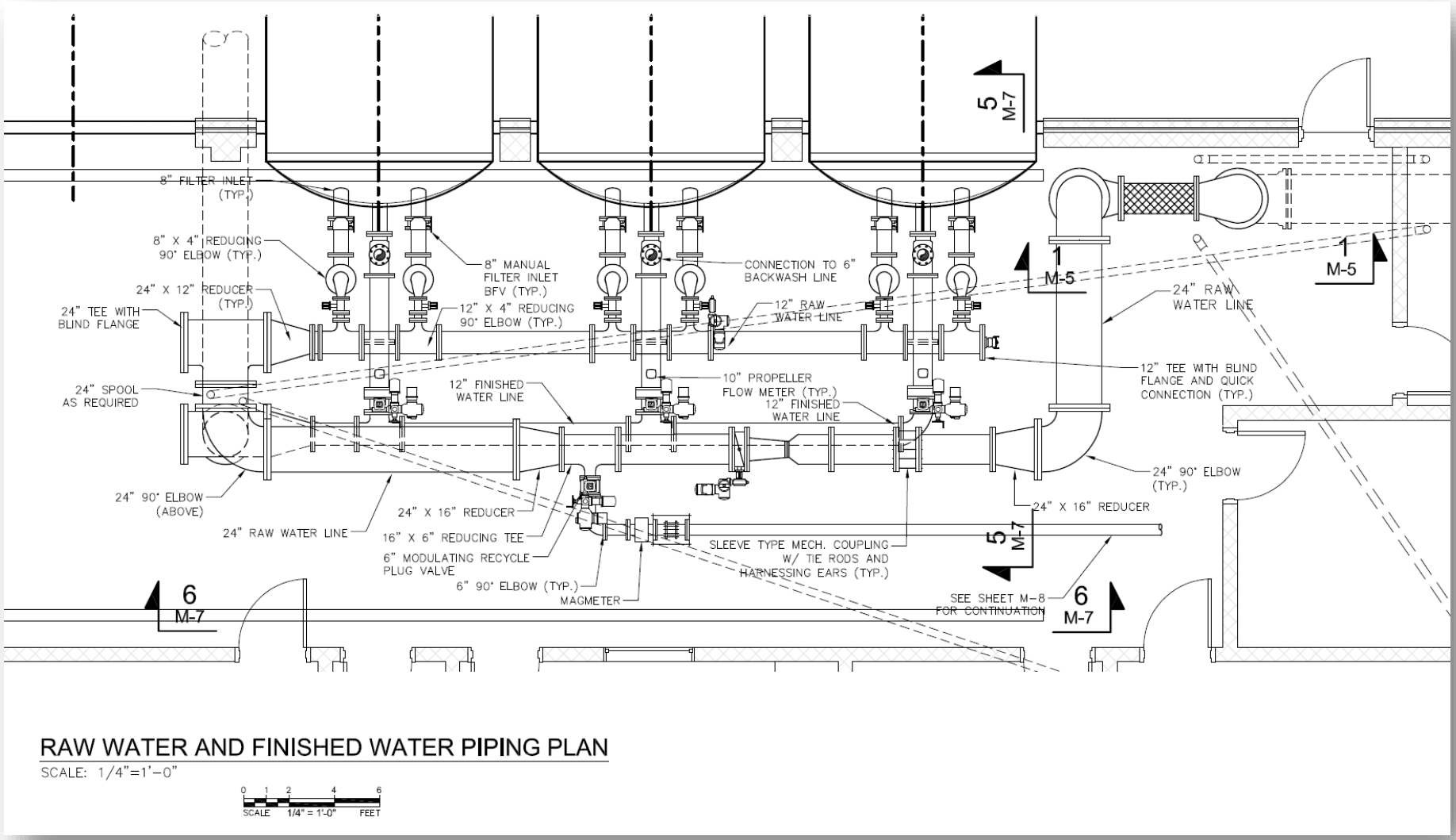
Mechanical Plans

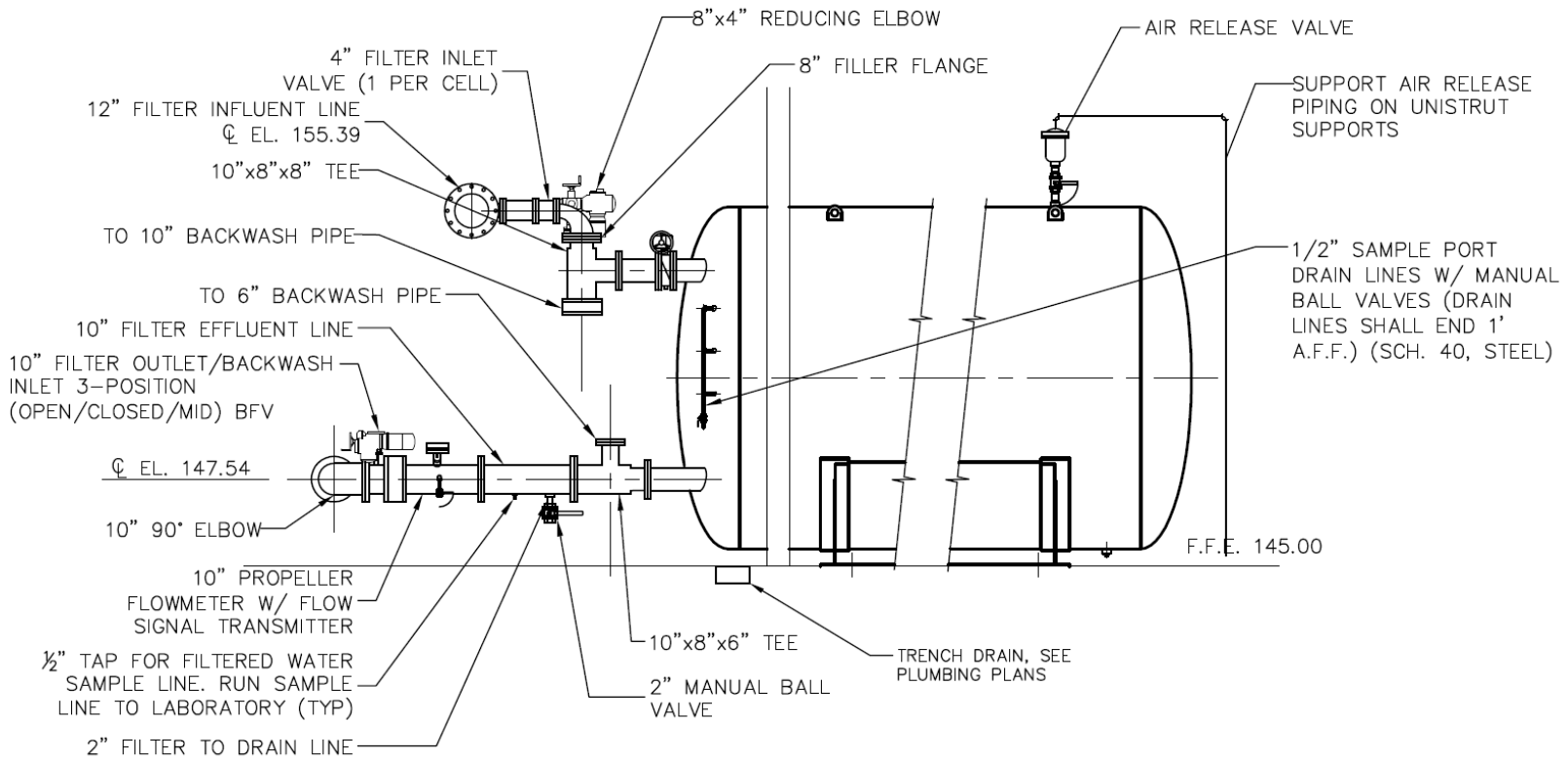


RAW WATER AND FINISHED WATER PIPING PLAN

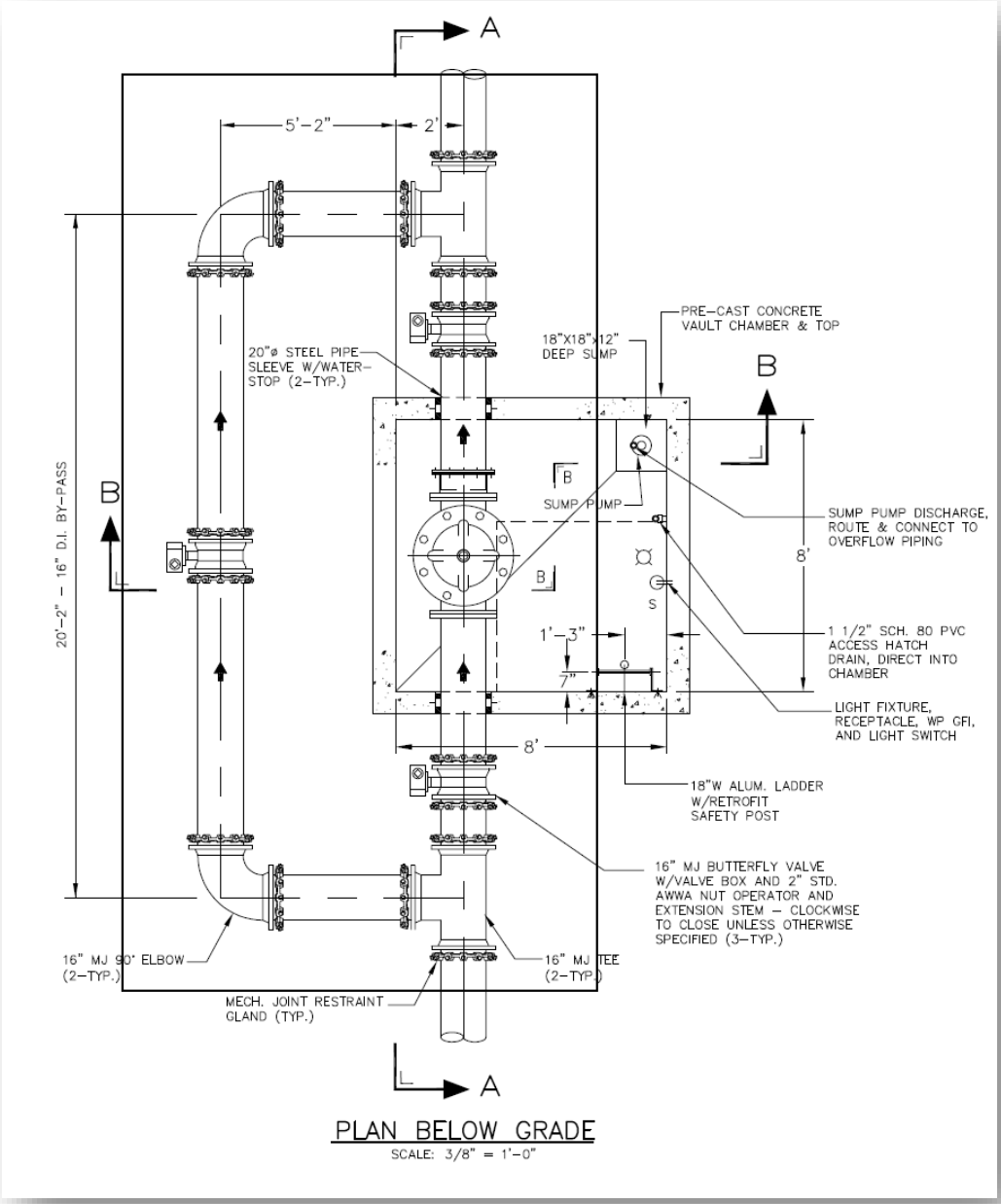
SCALE: 1/4"=1'-0"

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

Mechanical Plans

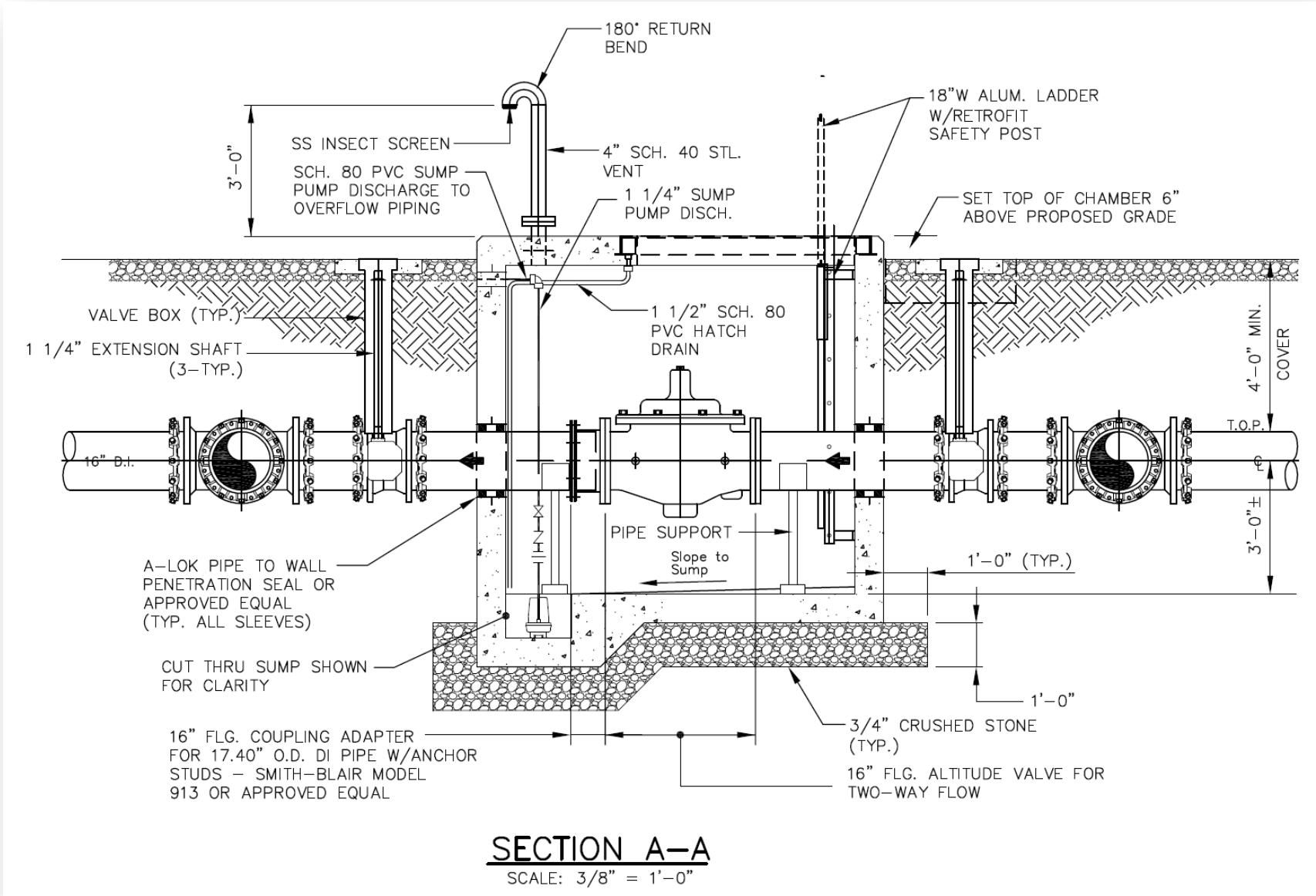


Mechanical Plans - Below Grade Structures



KIELY

Mechanical Plans - Below Grade Structures



SECTION A-A

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

KIELY

Electrical Plans

- Electrical Site Plan
- Single Line Diagram
- Building Power Plans
- Interior and Exterior Lighting Plans
- Interconnection Diagrams
- Equipment Control Diagrams
- Electrical Schedules and Details

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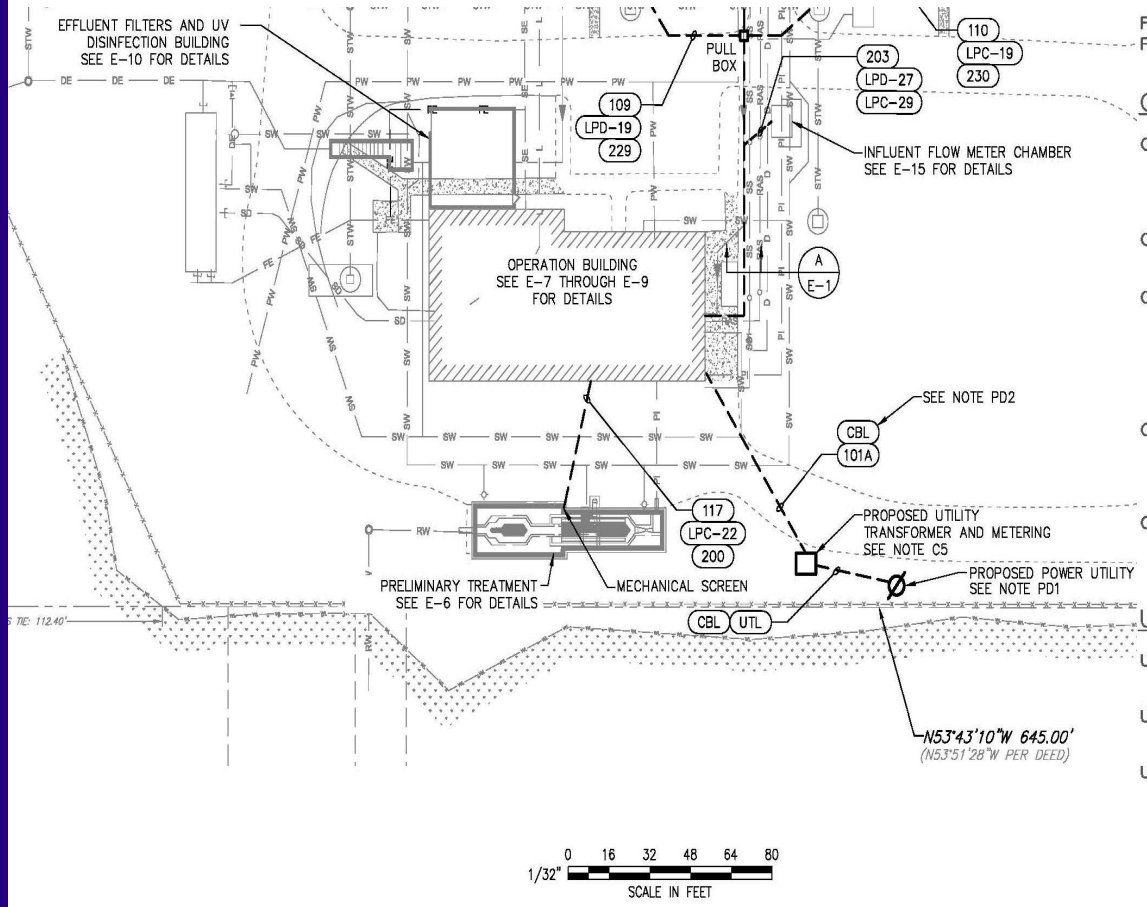
Electrical Plans – Site Plan



POWER SERVICE NOTES:

FOR ELECTRICAL SERVICE INSTALLATION CONTACT SORIN LUCACHIS FROM PSE&G AT (609) 799-6802. REFERENCE WORK ORDER #500667395.

CONTRACTOR POWER RESPONSIBILITIES:

C1. COORDINATE WITH PSE&G FOR NEW UTILITY POLE LOCATION, PREPARATION OF TRANSFORMER FOUNDATION, AND METERING SUPPORT REQUIREMENTS PRIOR TO ANY EXCAVATION. NEW FOUNDATION AND SUPPORTS SHALL BE NO FURTHER THAN 10' FROM THE ROAD.

C2. PROVIDE TRENCHING AND CONDUITS INSTALLATIONS PER PSE&G STANDARDS.

C3. PROVIDE AND INSTALL THREE 4" POWER CONDUIT FROM UTILITY POLE TO TRANSFORMER FOUNDATION, FROM TRANSFORMER TO METERING AND FROM METERING TO OPERATIONS BUILDING. PROVIDE ONE SPARE 2" COMMUNICATION CONDUIT FROM UTILITY POLE TO OPERATIONS BUILDING. SPARE CONDUITS SHALL BE INSTALLED WITH PULL STRING AND BE CAPPED AT BOTH ENDS.

C4. PROVIDE, INSTALL AND TERMINATE CONDUCTORS AS DEFINED ON THE SINGLE LINE DIAGRAM FROM THE TRANSFORMER SECONDARY TO METER, AND FROM METER TO OPERATIONS BUILDING SERVICE ENTRANCE DISCONNECT.

C5 COORDINATE WITH PSE&G CT CABINET AND METER BASE REQUIREMENTS. PROVIDE AND INSTALL METER BASE, METER DISCONNECT SWITCH AND METER MOUNTING SUPPORT.

UTILITY COMPANY. POWER RESPONSIBILITIES:

U1. THE UTILITY COMPANY SHALL PROVIDE AND INSTALL NEW POLE, NEW TRANSFORMER AND NEW TRANSFORMER PAD.

U2. THE UTILITY COMPANY IS TO PROVIDE AND INSTALL PRIMARY CABLING AND TERMINATIONS TO NEW TRANSFORMER.

U3. THE UTILITY COMPANY SHALL PROVIDE AND INSTALL THEIR METER AND CURRENT TRANSFORMERS.

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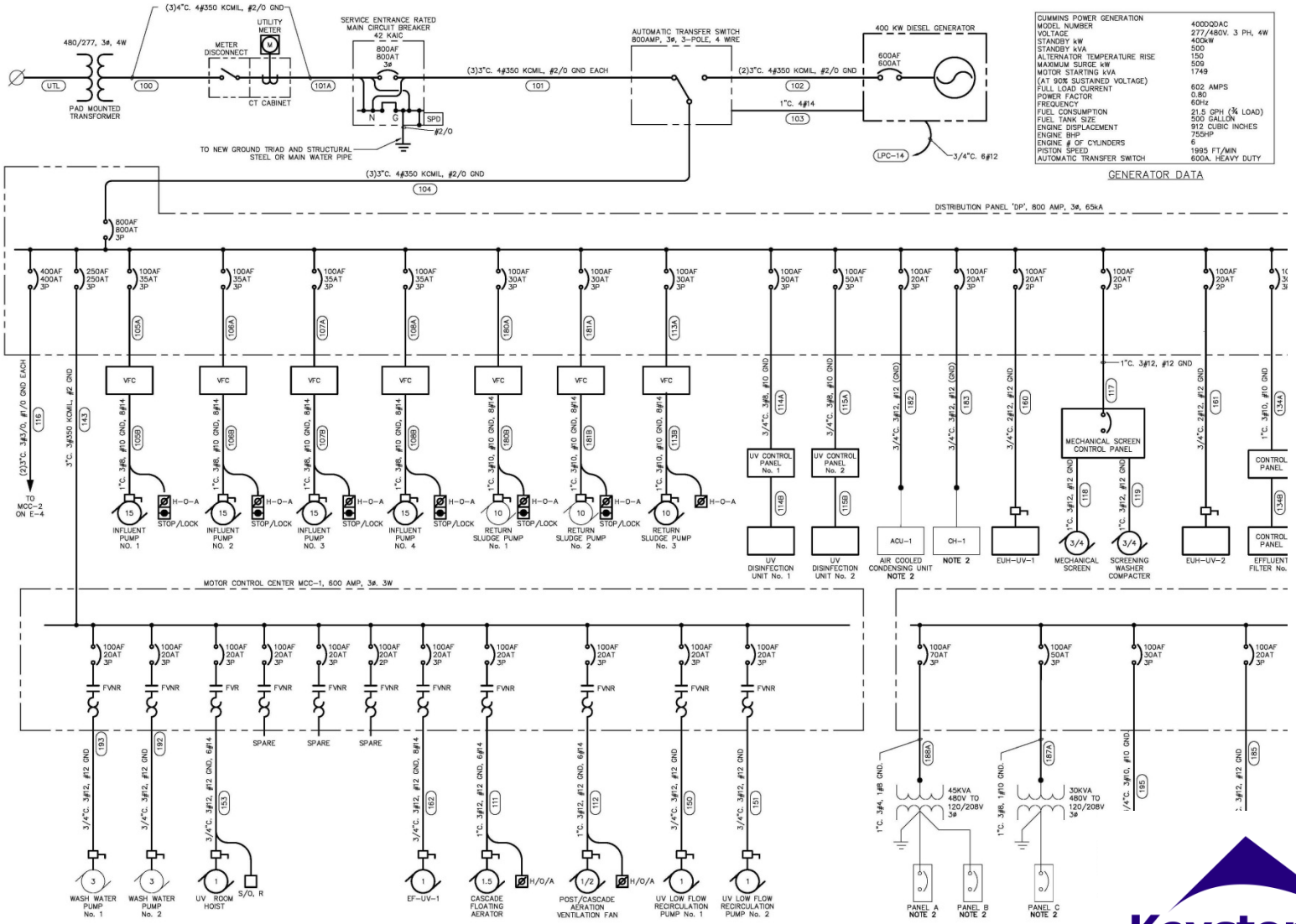
Electrical Plans – Single Line Diagram



GENERATOR DATA	
CUMMINS POWER GENERATION	
MODEL NUMBER	400DQDAC
VOLTAGE	277/480V. 3 PH, 4W
STANDBY kW	400kW
STANDBY kVA	500
ALTERNATOR TEMPERATURE RISE	150
MAXIMUM SURGE kW	509
MOTOR STARTING kVA	1749
(AT 90% SUSTAINED VOLTAGE)	
FULL LOAD CURRENT	602 AMPS
POWER FACTOR	0.80
FREQUENCY	60Hz
FUEL CONSUMPTION	21.5 GPH (¾ LOAD)
FUEL TANK SIZE	500 GALLON
ENGINE DISPLACEMENT	912 CUBIC INCHES
ENGINE BHP	755HP
ENGINE # OF CYLINDERS	6
PISTON SPEED	1995 FT/MIN
AUTOMATIC TRANSFER SWITCH	600A. HEAVY DUTY

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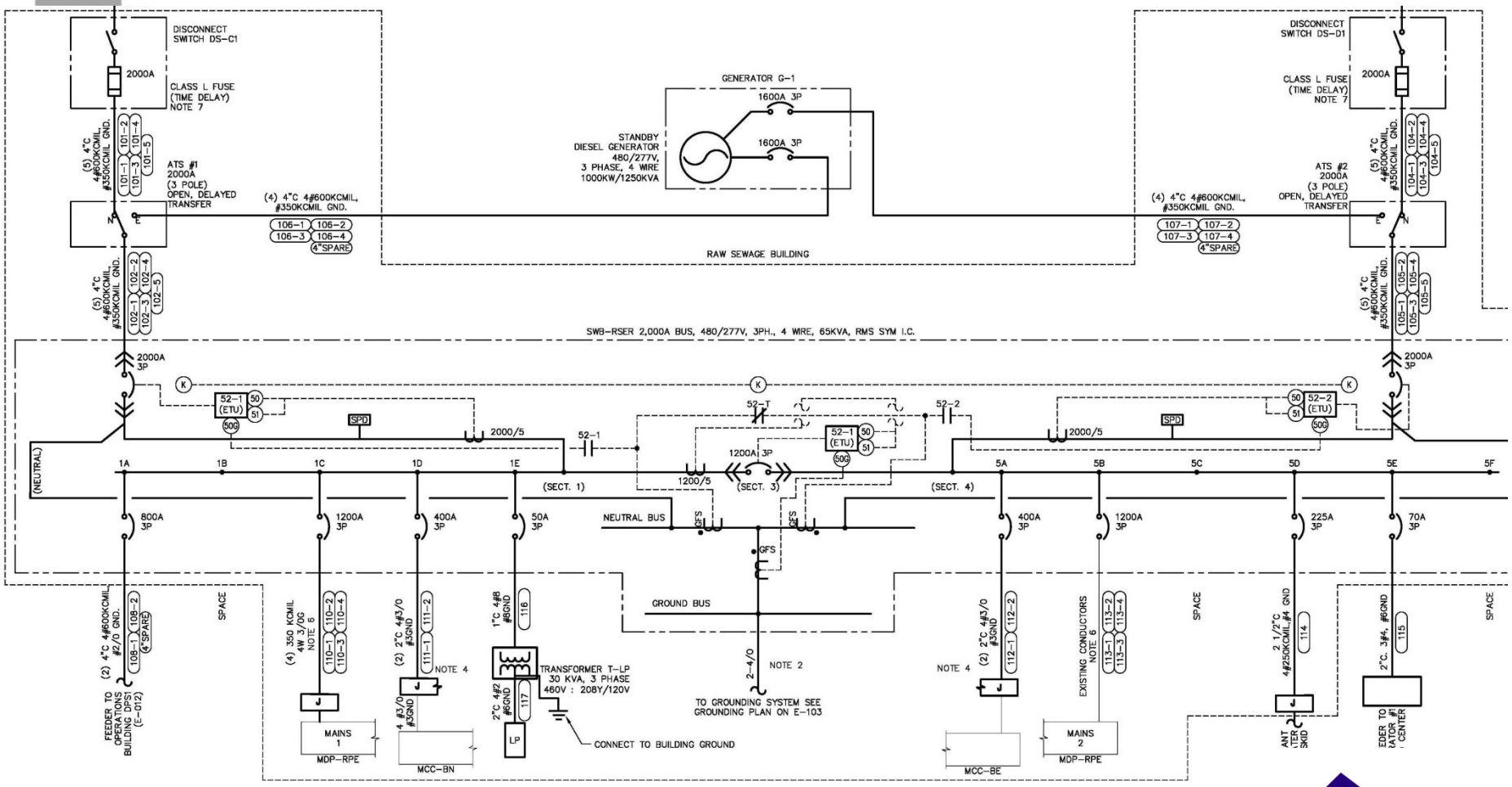
Electrical Plans – Single Line Diagram



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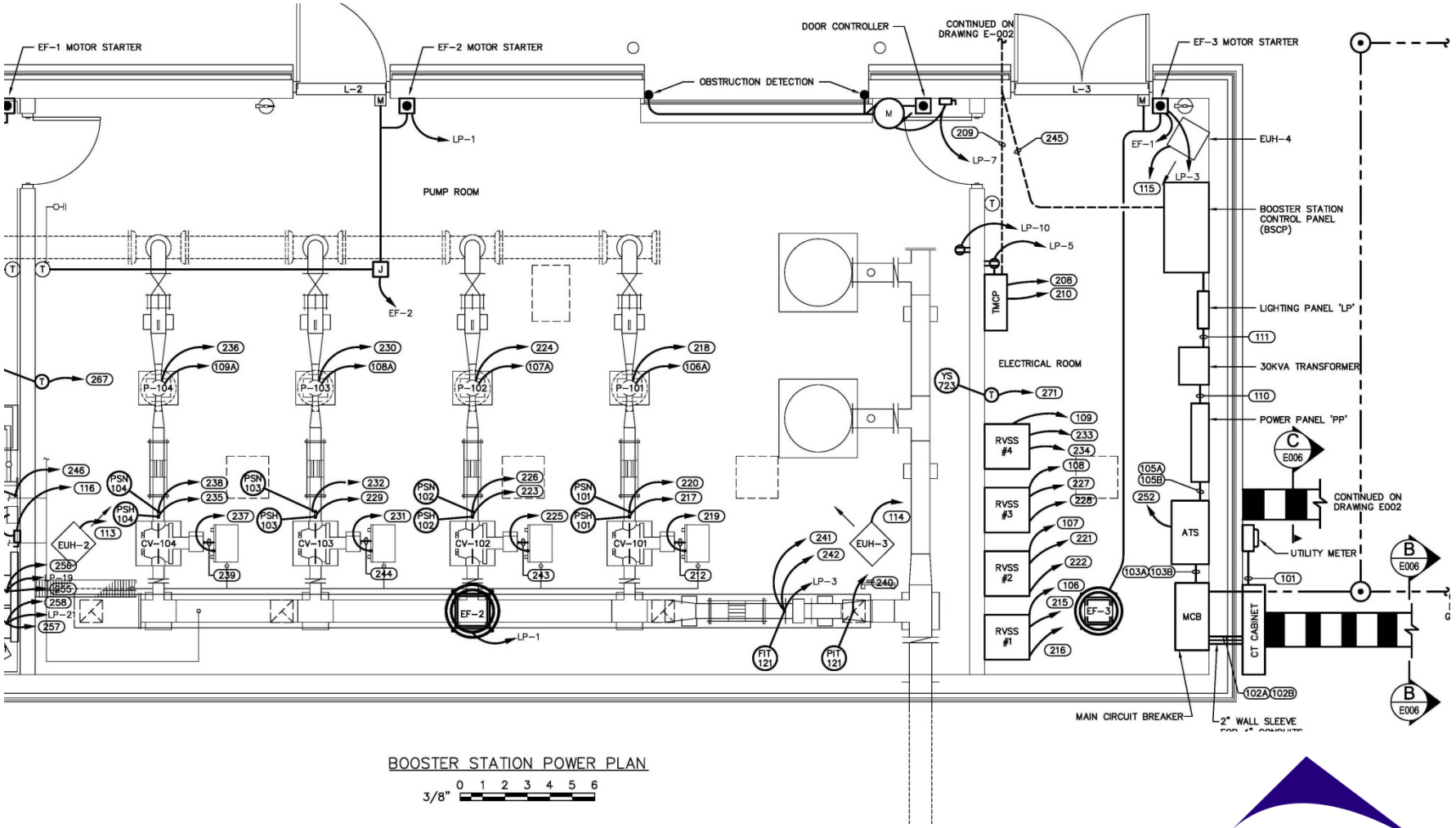
Electrical Plans – Power Plan



BOOSTER STATION POWER PLAN

3/8" 0 1 2 3 4 5 6

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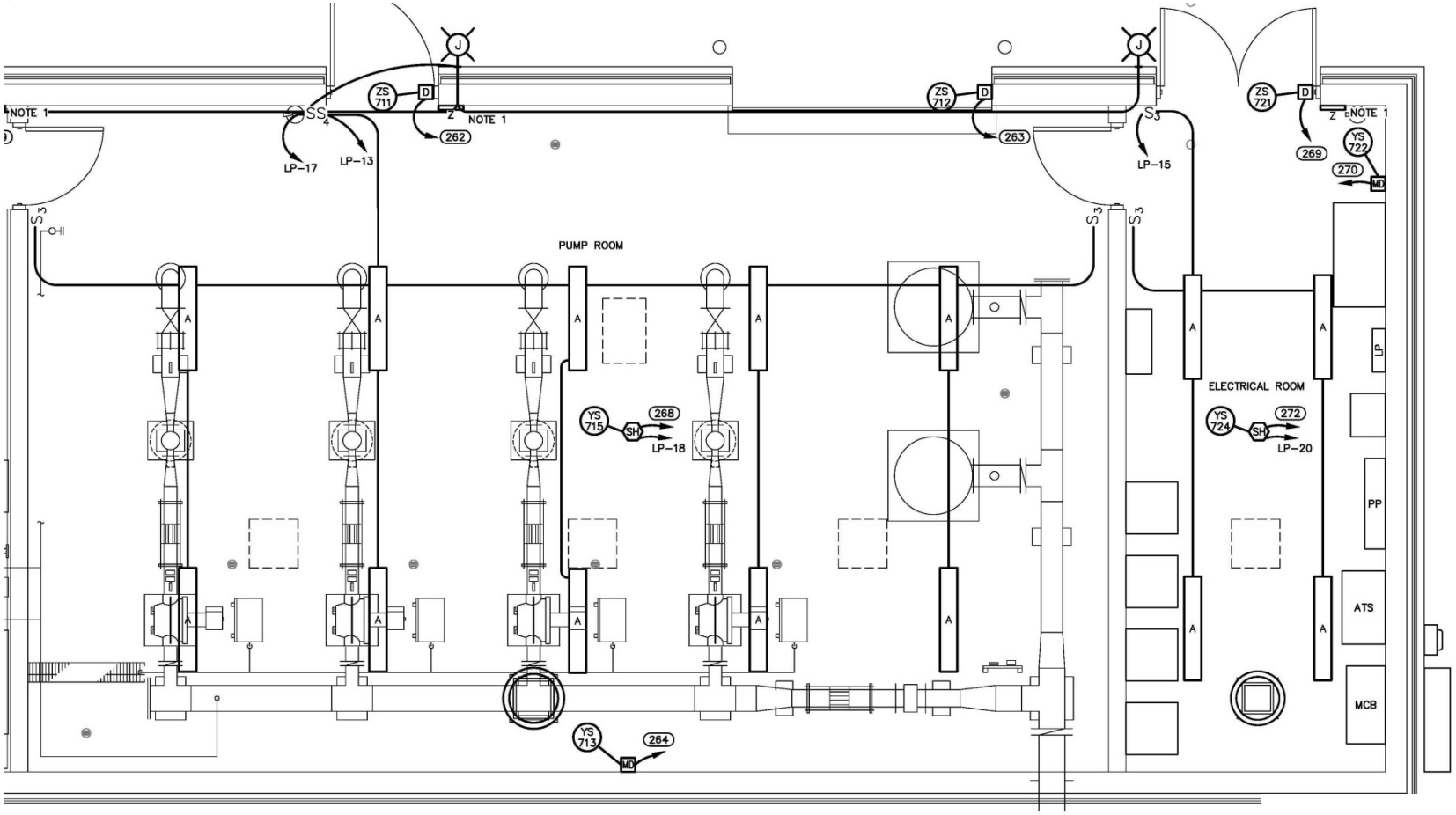
Electrical Plans – Lighting Plan



BOOSTER STATION LIGHTING PLAN

3/8" 0 1 2 3 4 5 6

END:

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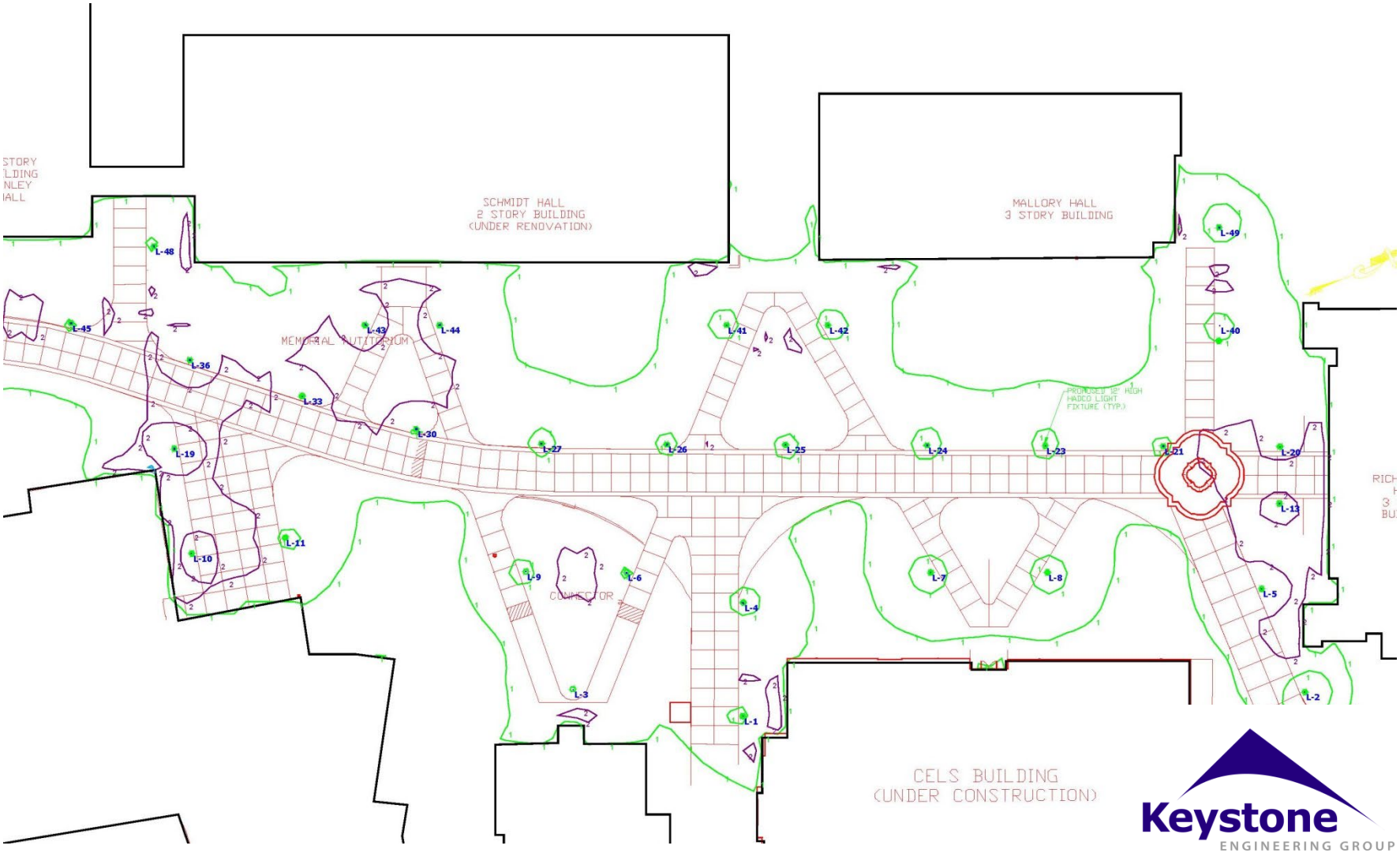
Electrical Plans – Photometric Plan



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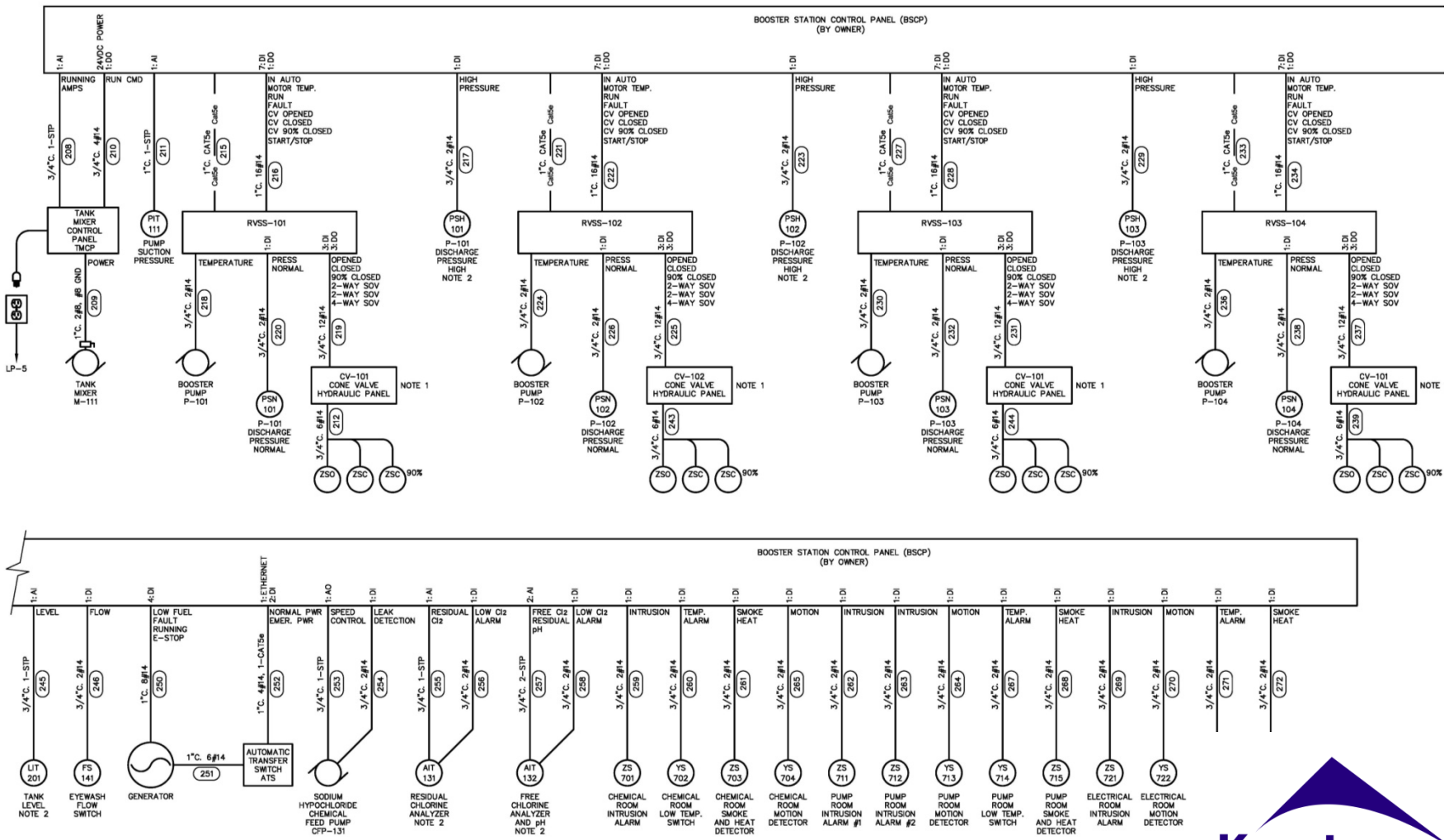
Electrical Plans – Interconnection Diagram



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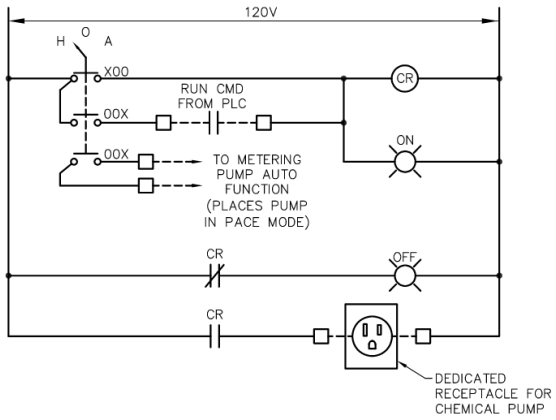
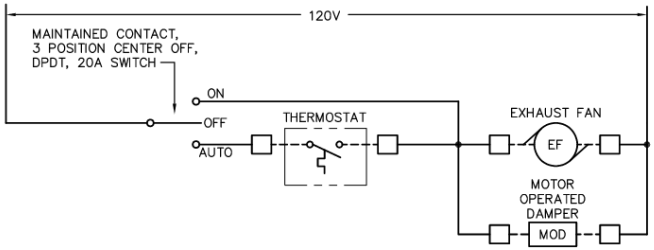
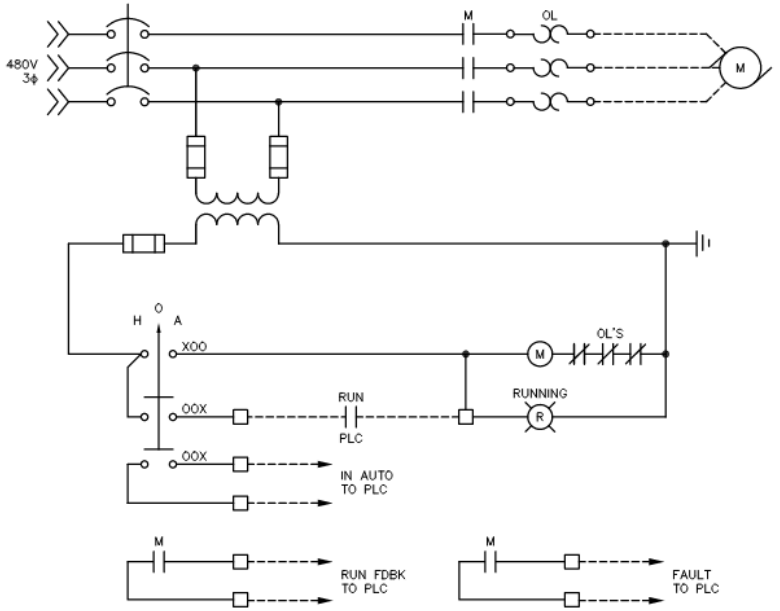
Electrical Plans – Control Diagrams



METERING PUMP CONSTANT SPEED CONTROL DIAGRAM



EXHAUST FAN BASIC CONTROL DIAGRAM



BASIC FVNR CONTROL DIAGRAM

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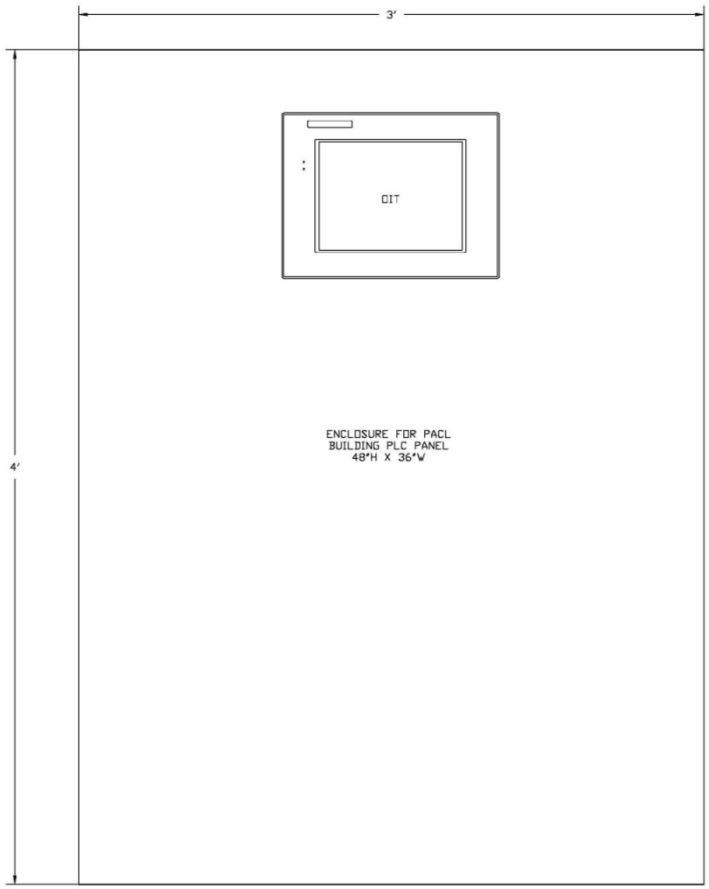
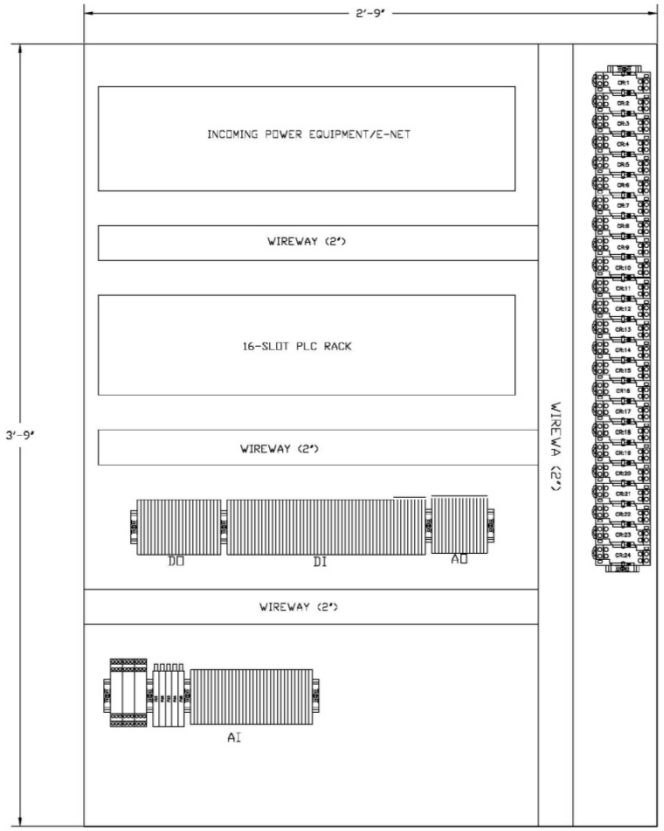
Electrical Plans – Control Panel Layout





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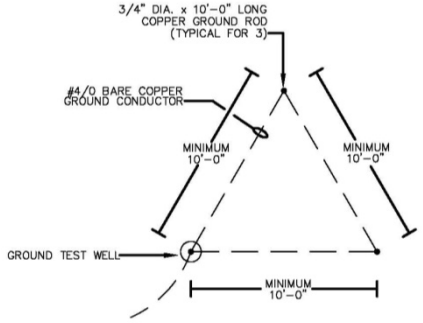
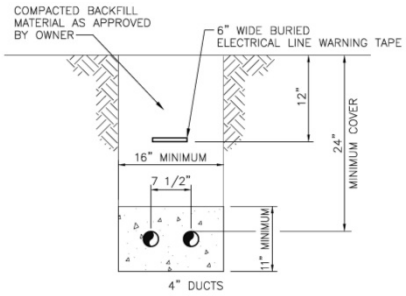
Electrical Plans – Schedules and Details



DETAIL – GROUND TRIANGLE

N.T.S.



ELECTRICAL DUCTBANK DETAIL

N.T.S.

LIGHTING PANEL LPB1 SCHEDULE

120/208 V. 3 PHASE 60HZ 4 WIRE

SERVICE	C/B	KWATTS	CKT	L1 L2 L3 N	CKT	KWATTS	C/B	SERVICE
FILTER AIR RELEASE HEAT TRACE	20A	–	1		2	–	20A	EYEWASH HEAT TRACE
OUTDOOR SHOWER HEAT TRACE	20A	–	3		4	–	20A	SPARE
CV-111-1A (RAW WATER INLET)	20A	0.5	5		6	0.5	20A	CV-111-2A (RAW WATER INLET)
CV-111-1B (RAW WATER INLET)	20A	0.5	7		8	0.5	20A	CV-111-2B (RAW WATER INLET)
CV-112-1 (EFFLUENT/BACKWASH)	20A	0.5	9		10	0.5	20A	CV-112-2 (EFFLUENT/BACKWASH)
CV-113-1 (DRAIN DOWN)	20A	0.5	11		12	0.5	20A	CV-113-2 (DRAIN DOWN)
CV-114-1A (BACKWASH OUTLET)	20A	0.5	13		14	0.5	20A	CV-114-2A (BACKWASH OUTLET)
CV-114-1B (BACKWASH OUTLET)	20A	0.5	15		16	0.5	20A	CV-114-2B (BACKWASH OUTLET)
CV-115-1 (RINSE TO WASTE)	20A	0.5	17		18	0.5	20A	CV-115-2 (RINSE TO WASTE)
CV-116-1 (AIR PRESSURIZATION)	20A	0.5	19		20	0.5	20A	CV-116-2 (AIR PRESSURIZATION)
CV-118-1A (AIRWASH INLET)	20A	0.5	21		22	0.5	20A	CV-118-2A (AIRWASH INLET)
CV-118-1B (AIRWASH INLET)	20A	0.5	23		24	0.5	20A	CV-118-2B (AIRWASH INLET)
SPARE	20A	–	25		26	–	20A	SPARE
SPARE	20A	–	27		28	–	20A	SPARE
CV-111-3A (RAW WATER INLET)	20A	0.5	29		30	0.5	20A	CV-115-3 (RINSE TO WASTE)
CV-111-3B (RAW WATER INLET)	20A	0.5	31		32	0.5	20A	CV-116-3 (AIR PRESSURIZATION)
CV-112-3 (EFFLUENT/BACKWASH)	20A	0.5	33		34	0.5	20A	CV-118-3A (AIRWASH INLET)
CV-113-3 (DRAIN DOWN)	20A	0.5	35		36	0.5	20A	CV-118-3B (AIRWASH INLET)
CV-114-3A (BACKWASH OUTLET)	20A	0.5	37		38	–	20A	SPARE
CV-114-3B (BACKWASH OUTLET)	20A	0.5	39		40	–	20A	SPARE
SPARE	20A	–	41		42	–	20A	SPARE

SN

PANEL MTD: SURFACE TYPE: SEE SPECIFICATIONS

MANUFACTURER: SEE SPECIFICATIONS
MAIN BREAKER: 100A
FEEDER SIZE: 4#2, #8 GND.
MAIN LUGS: 225A
FEEDER ENTRY: BOTTOM
ENCLOSURE: NEMA 4X SS

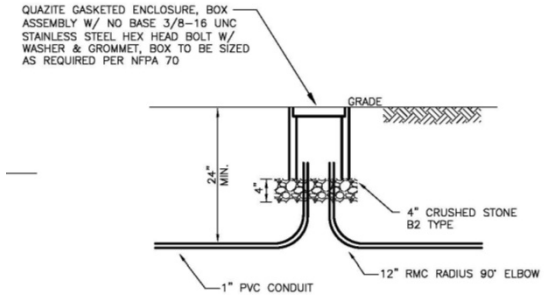
BRANCH BREAKERS		
NO.	POLES	AMPS.
42	1	20
–	–	–
–	–	–
–	–	–
–	–	–
–	–	–

GUTTERS: TOP ____ BOTTOM ____ SIDES ____

PANEL NOTES:
GROUND BUS. FULL SIZE NEUTRAL BUS.
SUB-FEED LUGS

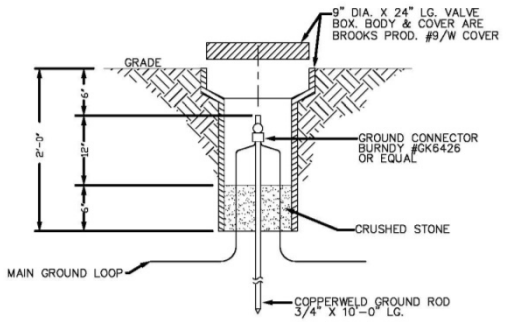
PANEL LOADING SCHEDULE	
PHASE	KWATTS
L1	4.5
L2	4.5
L3	6
CONNECTED LOAD	15
SPARE	–
TOTAL LOAD	15

LIGHTING PANEL 'LPB1' SCHEDULE



PULL BOX DETAIL

N.T.S.



DETAIL – GROUND TEST WELL

N.T.S.

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HVAC Plans

- Ventilation Systems
- Heating Systems
- Air Conditioning Systems
- HVAC Building Plans
- HVAC Schedules
- HVAC Details

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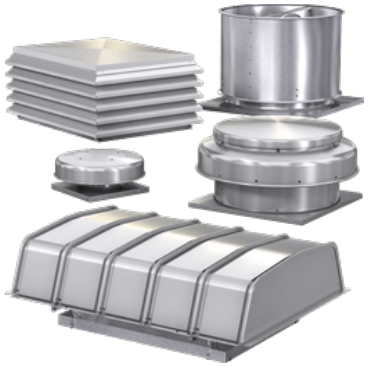
HVAC Plans – Ventilation Systems

- Supply Fans
- Exhaust Fans
- Make-up Air Units
- Energy Recovery Units
- Louvers/Hoods



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HVAC Plans – Heating Systems

- Electric Unit Heaters
- Gas Unit Heaters
- Infrared Heaters
- Furnaces
- Boilers

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HVAC Plans – Air Conditioning Systems

- Mini-Split System
- Split System
- Heat Pump
- Rooftop Unit
- Chiller
- Cooling Tower

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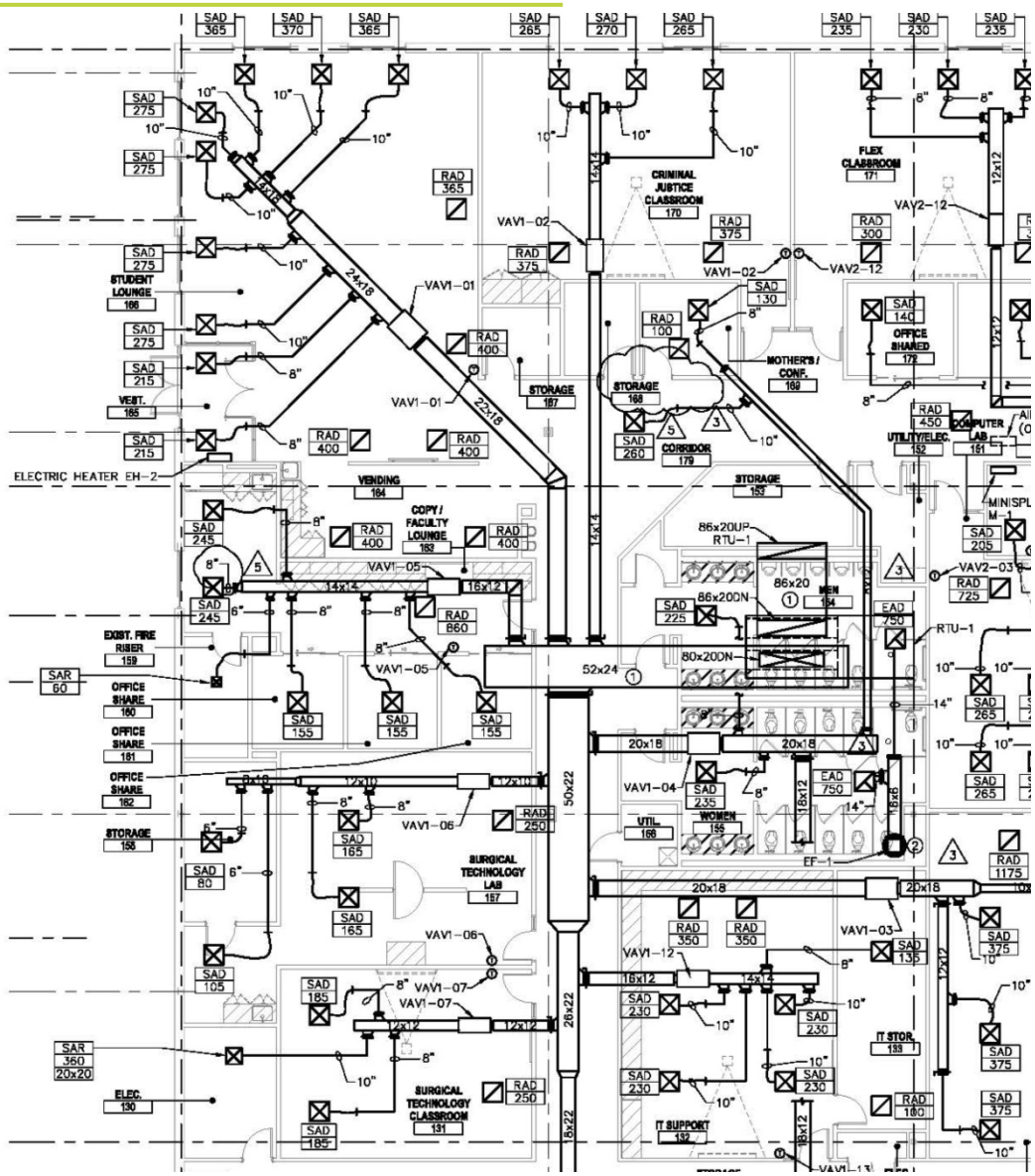
HVAC Plans – Building Plans



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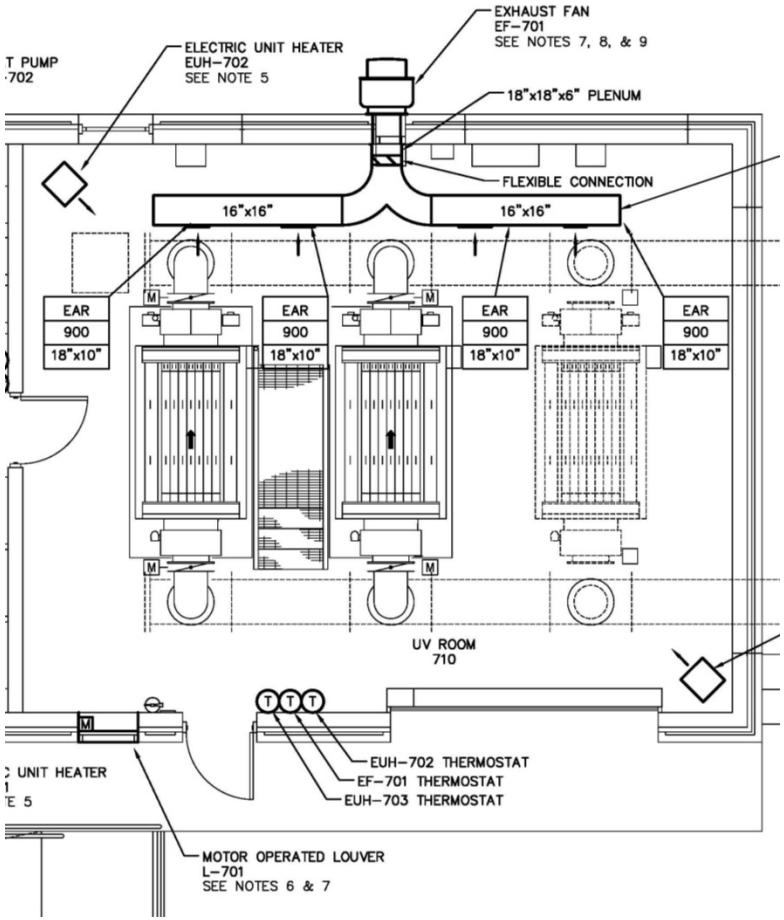
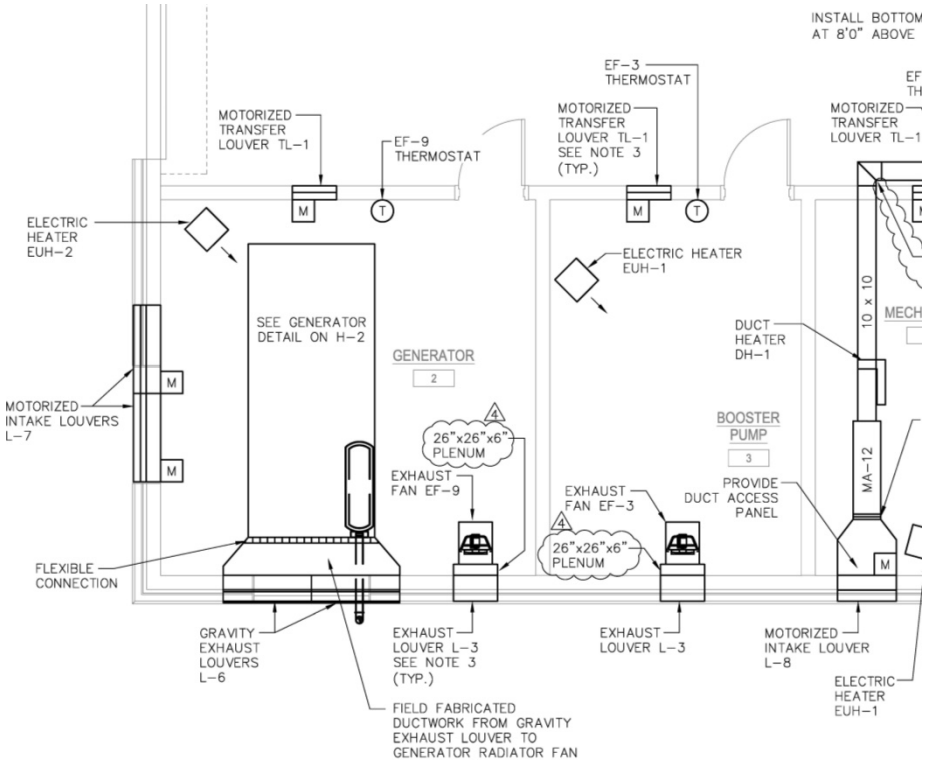
HVAC Plans – Building Plans





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HVAC Plans – Schedules

- Schedules for HVAC equipment are key for identifying equipment performance, basis of design manufacturer / model number, electrical requirements, and accessories

INDOOR MINI-SPLIT SYSTEM SCHEDULE

TAG NUMBER	BUILDING/ROOM	INDOOR MINI-SPLIT MODEL No. (M)	OUTDOOR HEAT PUMP (HP)	REFRIG. TYPE	NOMINAL TONS	MIN SEER	COOLING CAPACITY				HEAT PUMP HEATING CAPACITY	FAN		ELECTRICAL CHARACTERISTICS (INDOOR/OUTDOOR)			BASIN OF DESIGN MANUF.	INDOOR UNIT WEIGHT LBS.	REMARKS
							EVAPORATOR ENT. AIR °F		MBH TOTAL COOL	MBH SENS. COOL	MBH @ 47°F	TOTAL CFM	E.S.P. IN W.C.	VOLTS	PHASE	MCA			
							DB	WB											
M-601	SECONDARY SLUDGE./ELECTRICAL	PKA-A18HA7	HP-601	R-410A	1.5	18.5	80	67	18.0	12.24	22.0/13.9	320	–	208	1	1.0	MITSUBISHI	29	1-10
HDU-701	OPERATIONS/CONTROL 704	SEZ-KD18NA4	HP-701	R-410A	1.5	16.0	80	67	18.0	12.6	21.6	410	0.32	208	1	1.0	MITSUBISHI	62	1-9
HDU-702	OPERATIONS/OFFICE 703	SEZ-KD12NA4	HP-701	R-410A	1.5	16.0	80	67	120	8.4	13.6	410	0.32	208	1	1.0	MITSUBISHI	50	1-9
M-701	OPERATIONS/ELECTRICAL 709	PKA-A12HA7	HP-702	R-410A	1.0	20.8	90	67	12.0	9.7	11.8/7.2	170	–	208	1	1.0	MITSUBISHI	49	1-10

1. ANTI-MOLD WASHABLE FILTER IN INTEGRAL FILTER RACK.
2. INSULATED DRAIN HOSE.
3. REFRIGERANT PIPING KIT.
4. HONEYWELL THERMOSTAT, 7-DAY PROGRAMMABLE WITH LCD DISPLAY
5. LOW AMBIENT OPERATION.
6. FILTER SET (1 YEAR SUPPLY)
7. BUILT IN DRAIN LIFT MECHANISM.
8. INDOOR UNIT POWERED FROM OUTDOOR UNIT.
9. PROVIDE COMMUNICATION WIRING FROM ROOM THERMOSTAT TO INDOOR UNIT AND FROM THE OUTDOOR HEAT PUMP TO THE INDOOR UNIT PER MANUFACTURER'S REQUIREMENTS.
10. INSTALL ASPEN MINI AQUA CONDENSATE PUMPS INSIDE THE WALL-MOUNTED UNIT. ROUTE THE CONDENSATE TO OUTDOORS IN INSULATED PVC PIPING. CONDENSATE PIPING SHALL NOT BE ROUTED OVER ANY ELECTRICAL EQUIPMENT.

NOTE:
SUBSTITUTIONS OF FURNACE BRAND AND/OR MODEL MUST MEET OR EXCEED SPECIFIED FAN HORSEPOWER AND STATIC PRESSURE. BLOWER PERFORMANCE INCLUDES FILTER AIR P.D.

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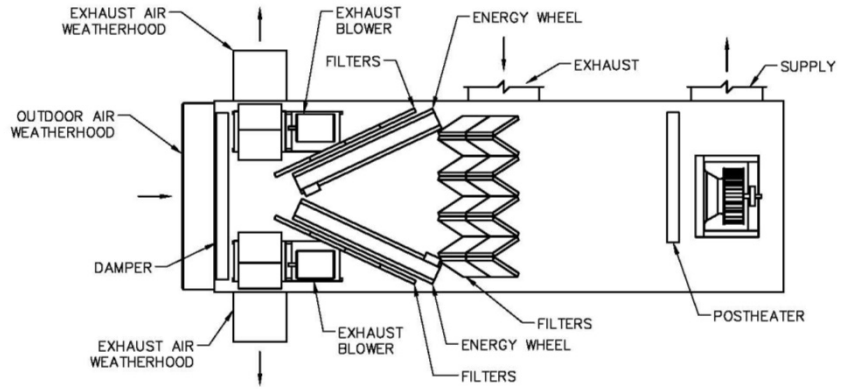
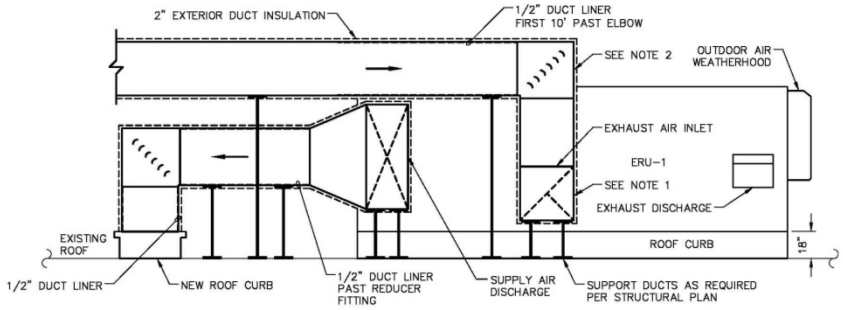
HVAC Plans – Details





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Plumbing Plans

- Potable Water Systems
- Sanitary and Vent Systems
- Natural Gas Systems
- Plumbing Building Plans
- Plumbing Schedules
- Plumbing Riser Diagrams
- Plumbing Details

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Plumbing Plans – Potable Water Systems

- Details water service requirements within a 5 foot boundary of the building and locates the water meter
- Hot / Cold water distribution system
- Tepid water distribution system for emergency fixtures

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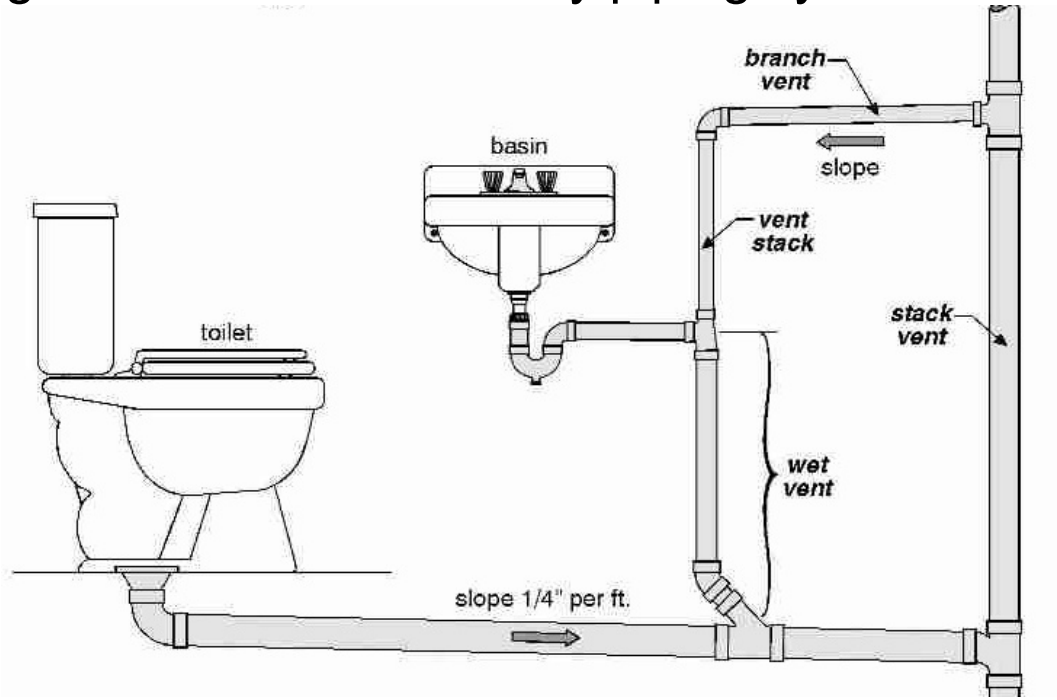
Plumbing Plans – Sanitary and Vent Systems

- Details sanitary waste building discharge location(s) within a 5 foot boundary of the building
- Sanitary piping distribution from connected fixtures
- Venting connections to sanitary piping systems



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Plumbing Plans – Natural Gas Systems

- Details natural gas service entrance and pressure requirements within a 5 foot boundary of the building
- Natural gas distribution system
- Natural gas service and equipment regulators

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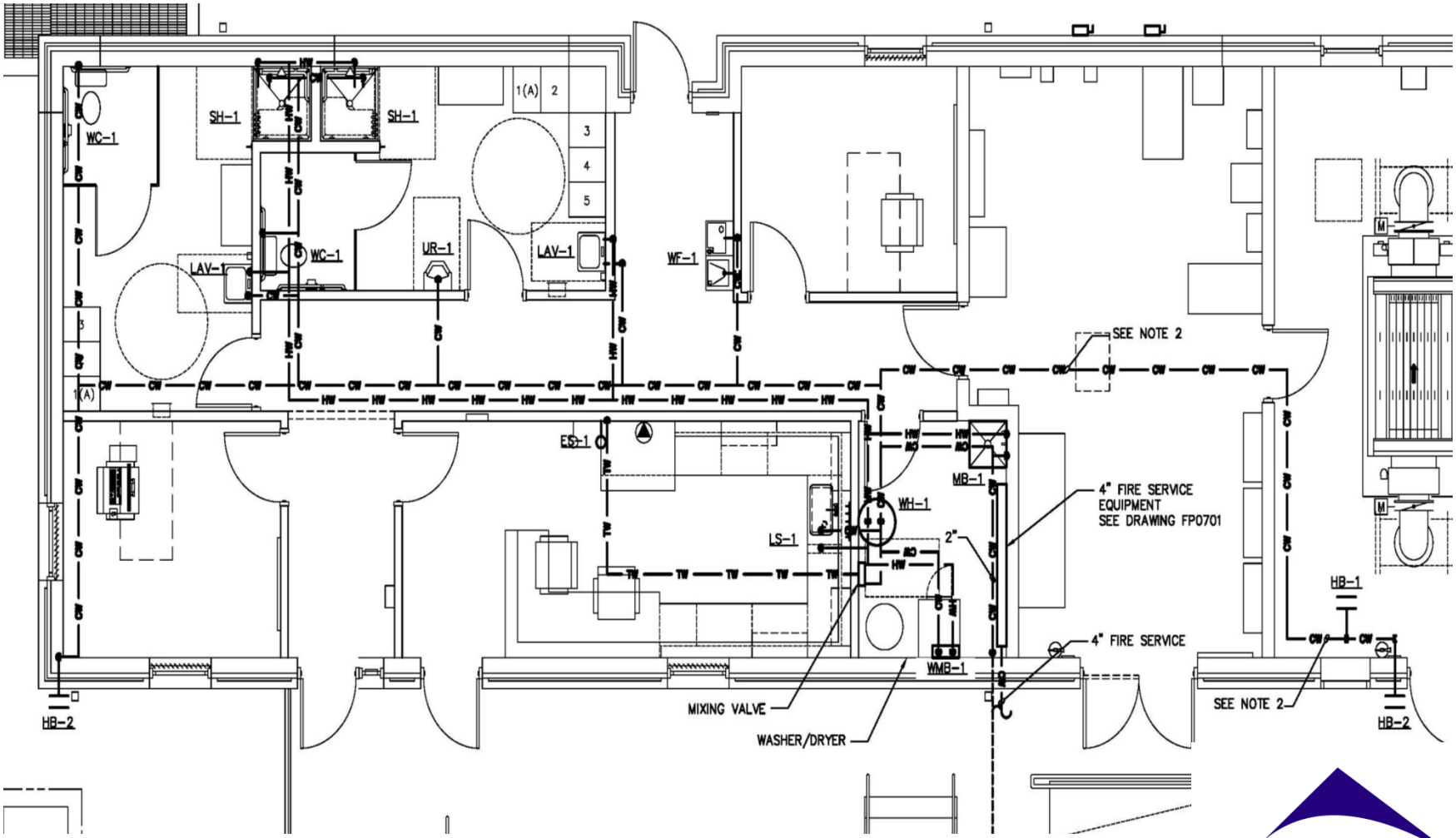
Plumbing Plans – Building Plans



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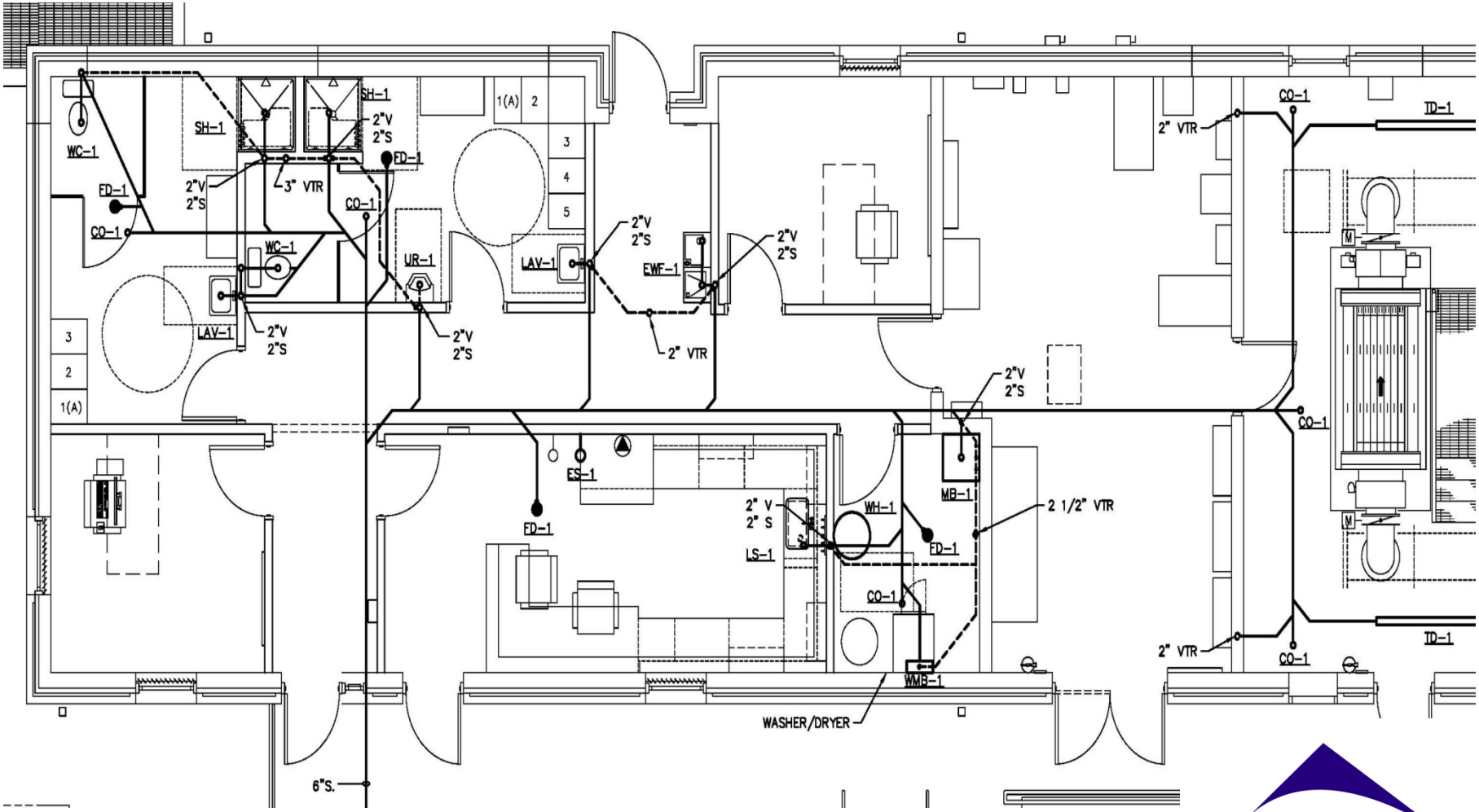
Plumbing Plans – Building Plans



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Plumbing Plans – Plumbing Schedules

PLUMBING FIXTURE SCHEDULE

TAG NUMBER	FIXTURE	MANUFACTURER	MODEL NUMBER	MATERIAL	FAUCET	MATERIAL	C.W.	H.W.	WASTE	REMARKS / ACCESSORIES
CO-1	FLOOR CLEANOUT	J.R. SMITH	4020S	IRON	-	-	-	-	3"	FINISHED FLOOR CLEANOUT WITH "TWIST-TO-FLOOR" ADJUSTABLE TOP. TOP SHALL BE ROUND NICKEL BRONZE TOP.
CO-2	WALL CLEANOUT	J.R. SMITH	4505Y	IRON	-	-	-	-	4"	CLEANOUT TEE WITH COUNTER SUNK PLUG AND INTERNAL THREADING FOR TEST PLUG USE.
EES-1	EMERGENCY EYEWASH/SHOWER	GUARDIAN	G1902P	ABS PLASTIC	-	-	1 1/4"	1 1/4"	-	PROVIDE COMBINATION EYEWASH/SHOWER SAFETY STATION WITH PLASTIC BOWL WITH ORANGE POWDER COAT. FC20 FLOW REGULATOR, FLOW SWITCH AND G3800LF THERMOSTATIC MIXING VALVE.
EES-2	OUTDOOR EMERGENCY EYEWASH/SHOWER	GUARDIAN	GFR1902	SEE DETAIL ON THIS SHEET	-	-	1 1/4"	1/4"	1 1/4"	PROVIDE COMBINATION ORANGE ABS PLASTIC SHOWER HEAD WITH EYEWASH, FC20 FLOW REGULATOR, FLOW SWITCH, AND G3800LF THERMOSTATIC MIXING VALVE. PROVIDE STAINLESS STEEL EYEWASH BOWL WITH TWO (2) GS-PLUS SPRAY HEADS, AND SPRAY HEAD DUST COVERS.
ES-1	EMERGENCY SHOWER	GUARDIAN	G1643	ABS PLASTIC	-	-	1 1/4"	1 1/4"	-	PROVIDE HORIZONTALLY MOUNTED PLASTIC SHOWER HEAD WITH ABS ORANGE PLASTIC, FC20 FLOW REGULATOR, FLOW SWITCH, AND G3800LF THERMOSTATIC MIXING VALVE.
FD-1	FLOOR DRAIN	J.R. SMITH	2010-A	CAST IRON	-	-	-	-	3"	CAST IRON FLOOR DRAIN WITH 7" ADJUSTABLE NICKEL BRONZE TOP AND DEEP SEAL P-TRAP. PROVIDE PRO-SET "TRAP-GUARD" INSERT.
EWF-1	WATER FOUNTIAN	ELKAY	LZSTL8WSLP	STAINLESS STEEL	-	-	3/8"	-	1 1/2"	SELF CONTAINED, ELECTRIC REFRIGERATED, BI-LEVEL WALL-MOUNTED WATER COOLER WITH BOTTLE FILLING STATION, BI-LEVEL IN WALL CARRIER, AND WATER SENTRY, PLUS REPLACEMENT FILTERS (1 YEAR SUPPLY). PROVIDE SHUTOFF VALVE AND 1-1/2" P-TRAP. ADA COMPLIANT.
HB-1	HOSE BIB	LEGEND VALVE	T-537	BRASS	-	-	3/4"	-	-	1/4 TURN BALL VALVE, BRASS, HOSE BIB
HB-2	HOSE BIB	LEGEND VALVE	T-550A	BRASS	-	-	3/4"	-	-	HOSE BIB CONSTRUCTED OF HEAVY DUTY FORGED BRASS. FROST RESISTANT.
KS-1	KITCHEN SINK	JUST	SL-2225-A-GR	STAINLESS STEEL	DELTA 16927-SD-DST	POLISHED CHROME	1/2"	1/2"	1 1/2"	STAINLESS STEEL 25"Lx22"Wx6"D TOP MOUNTED SINK WITH A SINGLE BOWL AND SINGLE FAUCET HOLE. PROVIDE CHROME SUPPLIES, INLINE STOPS, AND P-TRAP. ADA COMPLIANT
LAV-1	LAVATORY	SLOAN	SF-2350	VITREOUS CHINA	MOEN 84503	CHROME	1/2"	1/2"	1 1/2"	WHITE WALL MOUNTED LAVATORY WITH 4" FAUCET HOLES, AND BATTERY OPERATED FAUCET WITH MIXING VALVE AND TEMPERATURE ADJUSTMENT, CHROME SUPPLIES, IN-LINE STOPS AND P-TRAP. ADA COMPLIANT.
LS-1	LAB SINK	-	-	-	-	-	1/2"	1/2"	2"	SEE ARCHITECTURAL PLANS FOR DETAILS.

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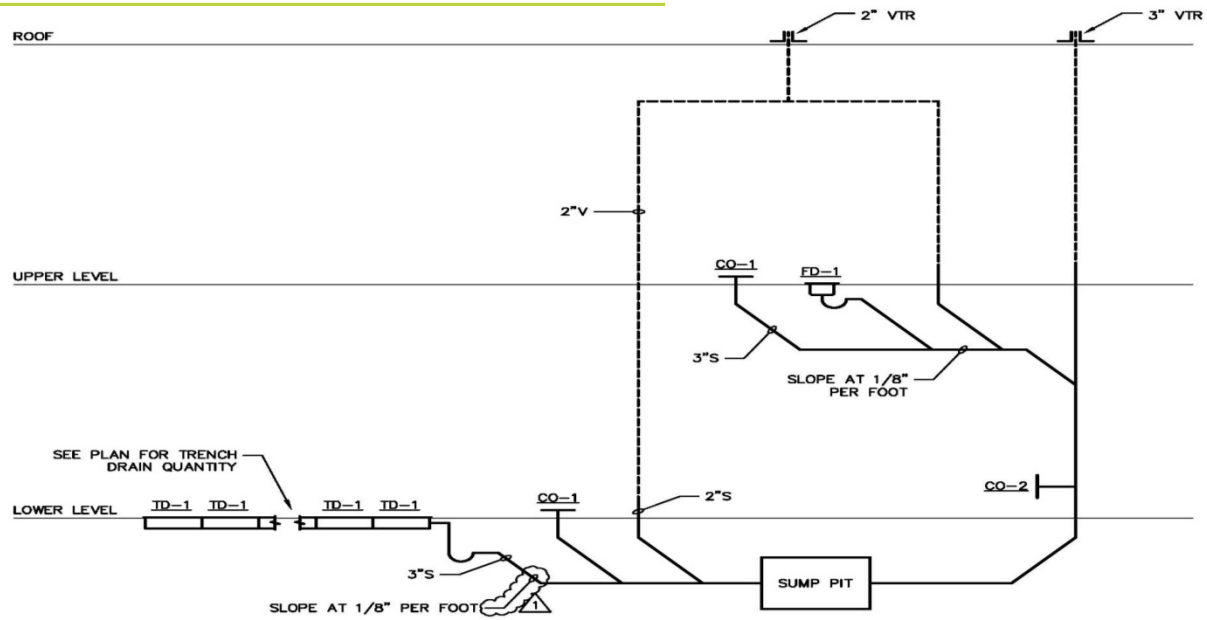
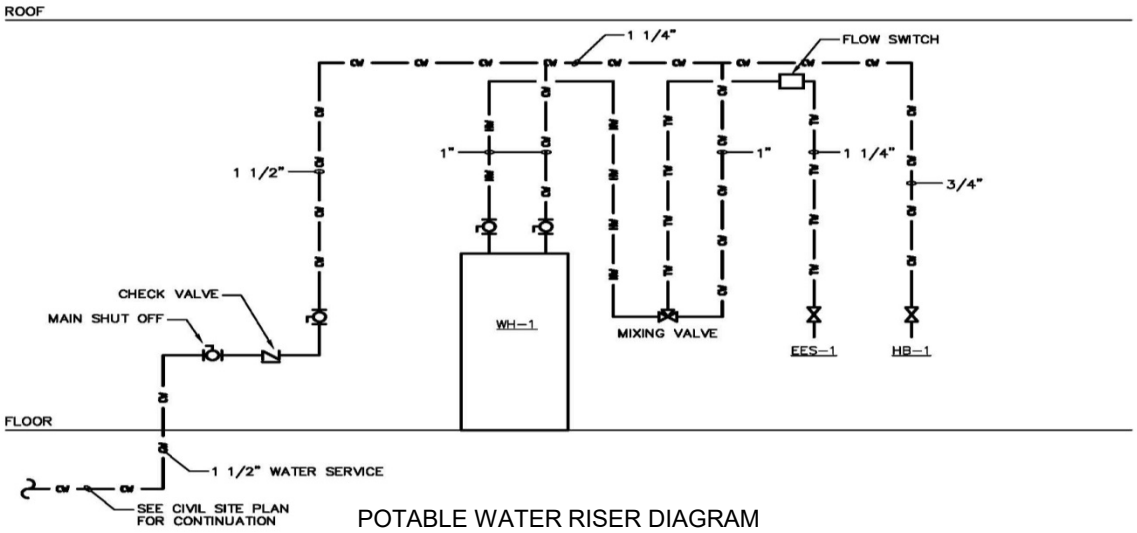
Plumbing Plans – Riser Diagrams



SANITARY AND VENT RISER DIAGRAM



POTABLE WATER RISER DIAGRAM

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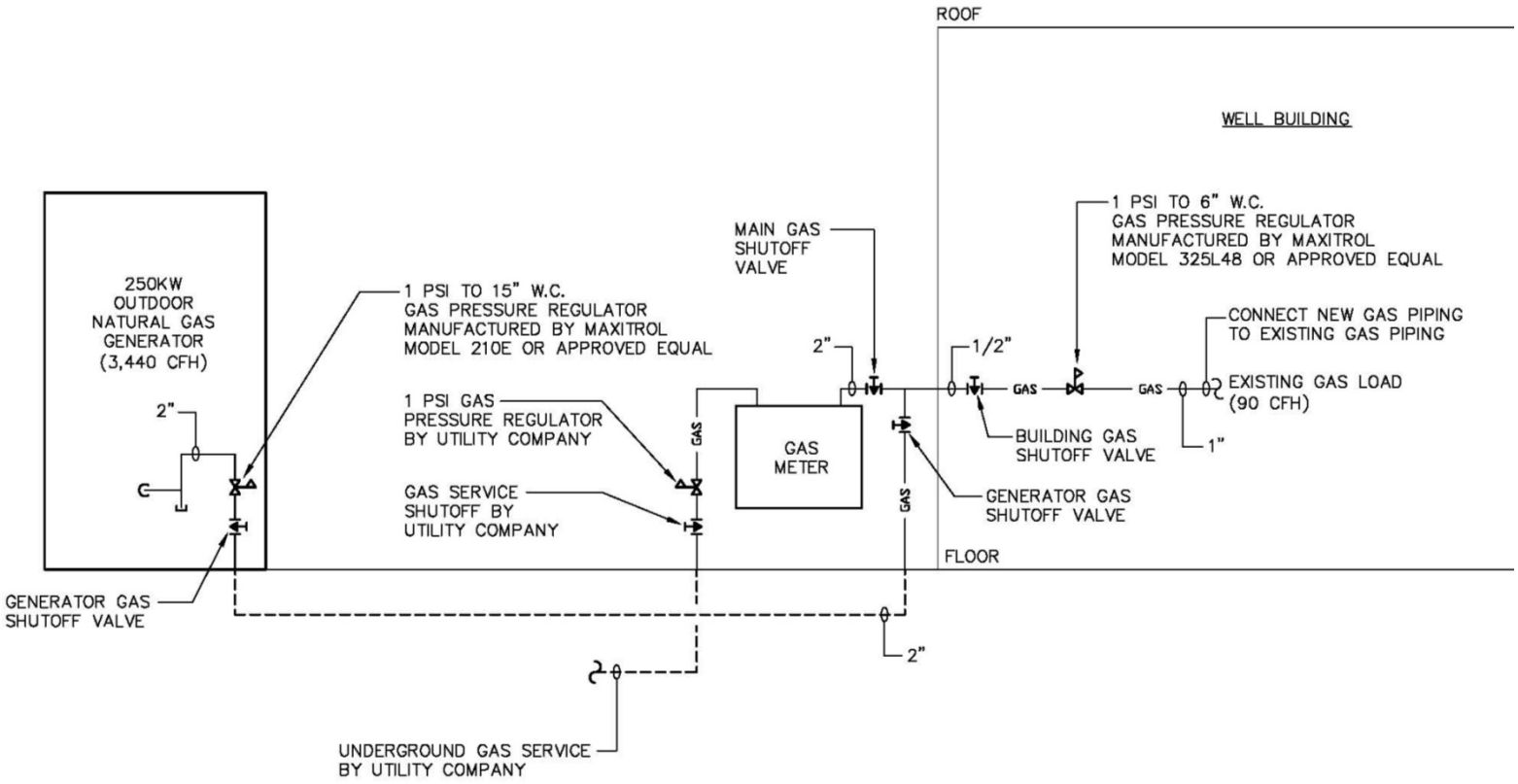
Plumbing Plans – Riser Diagrams



NATURAL GAS RISER DIAGRAM

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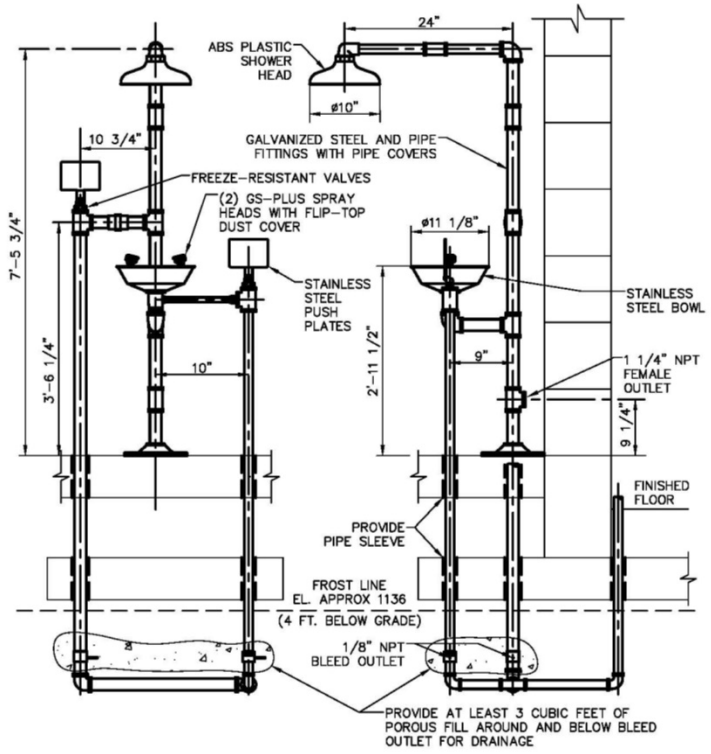
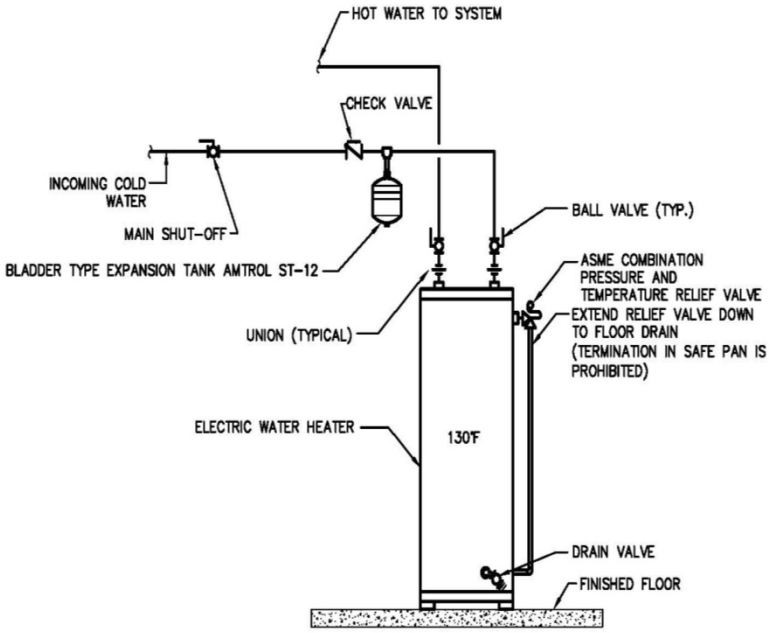
Plumbing Plans – Plumbing Details



FREEZE-RESISTANT SAFETY SHOWER AND EYEWASH STATION

NOT TO SCALE



ELECTRIC WATER HEATER PIPING DETAIL

NOT TO SCALE

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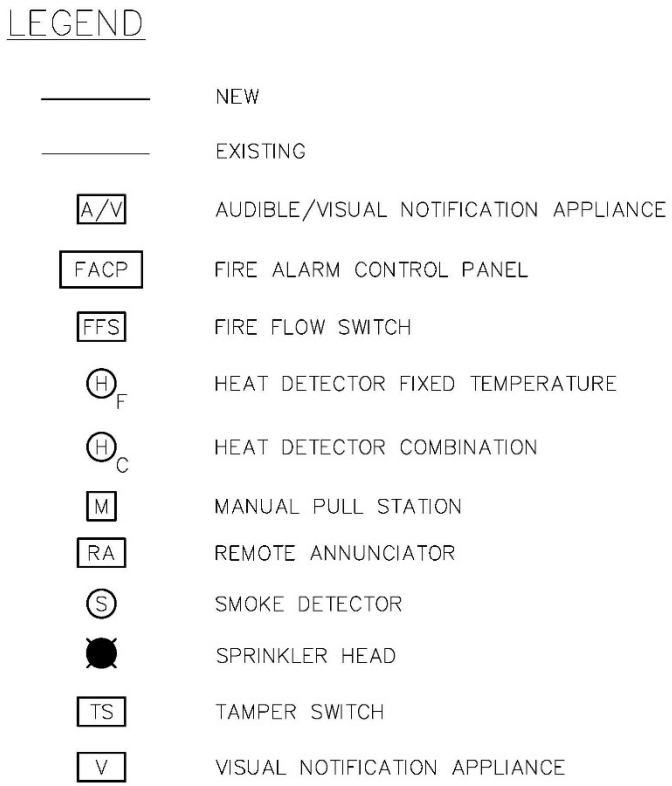
Fire Plans

- Fire Protection Systems
- Fire Flow Hydrant Testing
- Fire Alarm Systems
- Fire Building Plans
- Fire Details



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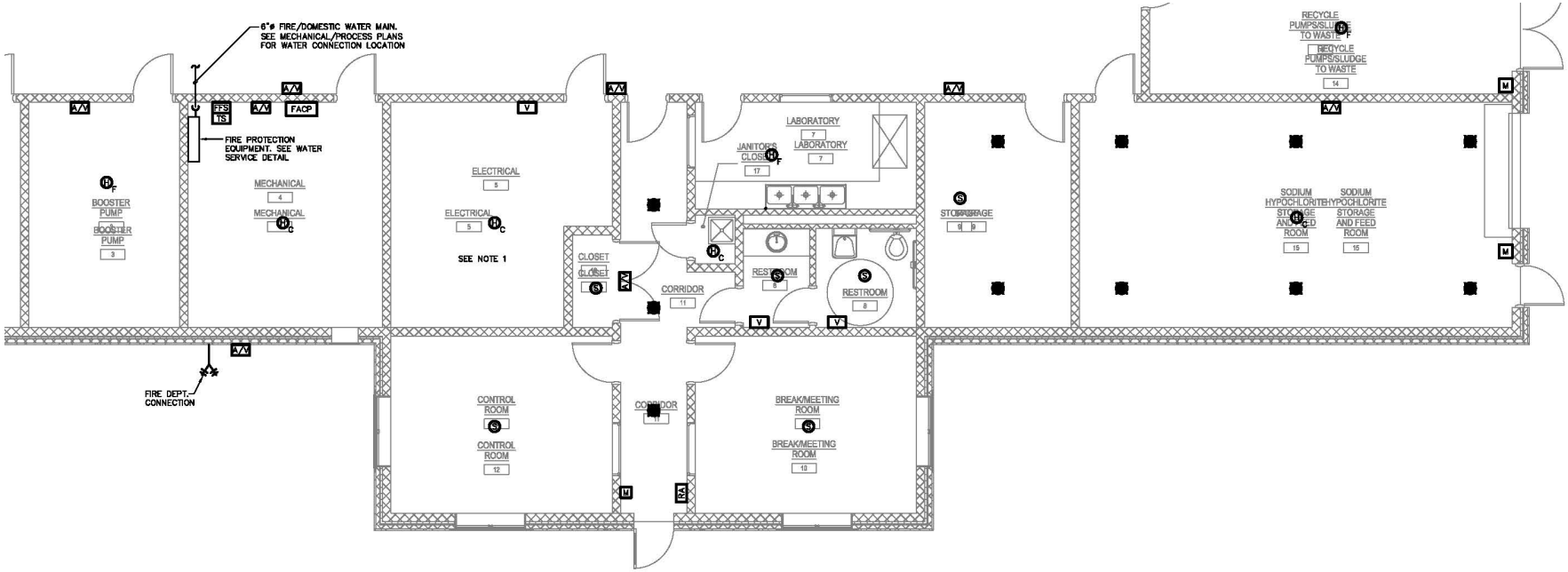
Fire Plans – Building Plans



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THANK YOU