

October 14, 2016  
Transmittal No: CREC - 001

Joseph Raymond  
144 Harrisville Main Street  
Harrisville, RI 02830

**Subject: Clear River Energy Center (CREC) – Building Drawing Package**

Dear Mr. Raymond,

As discussed, we are forwarding the building drawings for your review. This package includes a site plan, general arrangement, plan and section views of the Administration and Control Building, the specification the specifications that the buildings will be designed to, and the site grading, drainage and storm water management plans. A list of the drawings is enclosed.

CREC has not reached a stage where we have authorized the detailed design and construction contractor who would prepare the detailed drawings for the project, however we are forwarding representative drawings from one of our sister projects (Lackawanna Energy Center) which has the same power generation equipment and is a similar configuration (Lackawanna has three single shaft power trains as opposed to two and each train is cooled by an air cooled condenser) and has already commenced construction. The drawing set includes a complete plan set for the LEC Administration and Control Building and plan and elevation views of the turbine building. The turbine building and details are set by the major equipment manufacturer, General Electric, and is the identical equipment being proposed for Clear River Energy and as such the design for the Clear River facility will be very similar, the only significant differences being those features that are needed to meet local codes and permit requirements.

We trust the enclosed package of drawings represents the type of drawings and information you were expecting to receive. The finish product on CREC will be similar and you should expect a drawing package similar to the enclosed drawing set for review once the project has obtained the necessary approvals and has advance into detailed design and engineering needed to support construction. Please advise if there is additional drawings or data that you need and we will make every effort to provide that information.

# Invenergy

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Please feel free to reach out me via email should you have any questions or concerns at [jniland@Invenergyllc.com](mailto:jniland@Invenergyllc.com).

Regards,



John Niland

CC: Amit Nadkarni

Alan Shoer (APS)

## Information Provided for Building Inspector Review

### **CREC information**

The following are the drawings specific to the Clear River Energy Center that have been prepared to support procurement of the engineering, procure, and construction (EPC) contract for the project. The drawings include the site plan, general arrangement, layout and preliminary architectural features of the control administration building, and drawings from the stormwater management plan. The specifications that would govern the design of the buildings have also been provided.

<b>Drawing Number</b>	<b>Drawing Title</b>
238926-0GA-C1000	Single Shaft Site Arrangement
238926-0GA-C1001B	Single Shaft GA Modifications to Support Permitting
238926-0GA-A1000	Administration Building Floor Plan
A-2.0	Exterior Elevations - (Reference Drawing)
A-3.0	Typical Wall Sections - (Reference Drawing)
A3.1	Typical Wall Sections - (Reference Drawing)
Specifications	Consolidated Specification for Building Design from EPC Specification
01C000	Stormwater Management Cover
01C001	Legend
01C100	Existing Drainage Conditions
01C200	Proposed Site Layout Plan
01C300	Proposed Grading, Drainage and Water Quality Plan
01C400	Proposed Drainage Plan
01C600	Roadway Plan & Profile
01C601	Roadway Plan & Profile
01C800	Proposed Site Drainage Details
01C801	Proposed Site Drainage Details
01C802	Proposed Site Drainage Details
01C803	Proposed Site Drainage Details
01C804	Proposed Site Drainage Details
01C805	Proposed Site Drainage Details

## LEC information

The following information is from a sister project to the CREC that is representative of the design of the similar buildings and structures. These are provided as examples to support the review.

Drawing Number	Drawing Title
2014-087-199-BA1.10	Units 1,2 & 3 Turbine Bldg – Architectural Floor Plan
2014-87-199-BA3.01	Units 1,2 & 3 Turbine Bldg – Exterior Elevations
2014-87-199-BA3.02	Units 1,2 & 3 Turbine Bldg – Exterior Elevations
2014-087-001-BA0.00	001-Administration Building - Cover Sheet
2014-087-001-BA0.01	001-Administration Building – Standards
2014-087-001-BA0.02	001-Administration Building – Code Analysis
2014-087-001-BA1.10	001-Administration Building – Architectural Floor Plan
2014-087-001-BA1.11	001-Administration Building – Reflected Ceiling Plan
2014-087-001-BA1.12	001-Administration Building – Enlarged Restroom Plans & Elevations
2014-087-001-BA2.01	001-Administration Building – Roof Plan & Details
2014-087-001-BA3.01	001-Administration Building – Exterior Elevations
2014-087-001-BA4.01	001-Administration Building – Building Sections
2014-087-001-BA4.02	001-Administration Building – Wall Sections
2014-087-001-BA4.03	001-Administration Building – Wall Sections
2014-087-001-BA4.04	001-Administration Building – Wall Sections
2014-087-001-BA5.04	001-Administration Building – Wall Sections
2014-087-001-BA6.00	001-Administration Building – Door & Room Finish Schedules
2014-087-001-BA6.01	001-Administration Building – Door & Window Details
2014-087-001-BA6.02	001-Administration Building – Door & Window Details
2014-087-001-BA6.03	001-Administration Building – Door & Window Details
2014-087-001-BS0.00	001-Administration Building – General Notes
2014-087-001-BS0.01	001-Administration Building – Special Inspections
2014-087-001-BS1.10	001-Administration Building – Foundation Plan
2014-087-001-BS2.10	001-Administration Building – Roof Framing Plan
2014-087-001-BS3.10	001-Administration Building – Typical Foundation Details
2014-087-001-BS3.11	001-Administration Building – Foundation Sections & Details
2014-087-001-BS3.12	001-Administration Building – Glass Wall Header Elevation
2014-087-001-BS3.20	001-Administration Building – Canopy Framing
2014-087-001-BS4.10	001-Administration Building – Typical Roof Framing

	Details
2014-087-001-BS4.11	001-Administration Building – Roof Framing Sections & Details
2014-087-001-BS4.12	001-Administration Building – Monorail Details
2014-087-001-BP0.00	001-Administration Building – Plumbing Abbreviations & Symbols
2014-087-001-BP1.11	001-Administration Building – Plumbing Floor Plan- Sanitary Vent System
2014-087-001-BP1.12	001-Administration Building – Plumbing Floor Plan- Domestic Water System
2014-087-001-BP1.13	001-Administration Building – Plumbing Plan-Gas and Condensate System
2014-087-001-BP2.00	001-Administration Building – Sanitary Drain/Vent Isometric Riser
2014-087-001-BP2.01	001-Administration Building – Domestic Hot & Cold Water Isometric Riser
2014-087-001-BP2.02	001-Administration Building – Gas & Condensate Drain Isometric Riser
2014-087-001-BP4.00	001-Administration Building – Plumbing Schedules and Details
2014-087-001-BM0.00	001-Administration Building – Mechanical HVAC Abbreviations & Symbols
2014-087-001-BM1.10	001-Administration Building – Mechanical HVAC First Floor Plan
2014-087-001-BM1.11	001-Administration Building – Mechanical Piping First Floor Plan
2014-087-001-BM1.20	001-Administration Building – Mechanical HVAC Roof Plan
2014-087-001-BM3.00	001-Administration Building – Mechanical Details
2014-087-001-BM3.01	001-Administration Building – Mechanical Details
2014-087-001-BM4.00	001-Administration Building – Mechanical HVAC Schedules
2014-087-01-BM4.01	001-Administration Building – Mechanical HVAC Schedules
2014-087-001-BM5.00	001-Administration Building – Mechanical HVAC Facility Instruments & Controls Symbols & Abbreviations
2014-087-001-BM5.01	001-Administration Building – Mechanical HVAC Facility Instruments & Controls
2014-087-001-BM5.02	001-Administration Building – Mechanical HVAC Facility Instruments & Controls
2014-087-001-BM6.00	001-Administration Building – Mechanical HVAC Flow Diagram
2014-087-001-BM6.01	001-Administration Building – Mechanical VRF System

	Diagram
2014-087-001-BE0.00	001-Administration Building – Electrical Symbols & Abbreviations
2014-087-001-BE0.01	001-Administration Building – Light Fixture and Device Schedules
2014-087-001-BE0.02	001-Administration Building – Equipment Schedule and One-Line Diagram
2014-087-001-BE0.03	001-Administration Building – Equipment Schedule
2014-087-001-BE0.04	001-Administration Building – Electrical Panel Schedules
2014-087-001-BE0.05	001-Administration Building – Electrical Panel Schedules
2014-087-001-BE1.11	001-Administration Building – Lighting Floor Plan
2014-087-001-BE2.11	001-Administration Building – Power Floor Plan – Level 1
2014-087-001-BE2.12	001-Administration Building – Power Floor Plan Above Ceiling
2014-087-001-BE2.13	001-Administration Building – Electrical Roof Plan
2014-087-001-BE4.11	001-Administration Building – Security Floor Plan – Level 1
2014-087-001-BE9.00	001-Administration Building – Electrical Details
2014-087-001-BE9.01	001-Administration Building – Enlarged Power Plan

## **1 INTRODUCTION**

The Clear River Energy Center ("Facility") shall be configured as a nominal 850 – 1,000 MW, dual one-on-one single shaft (2, 1x1 single shaft), duct fired, combined cycle generation station. The two units will be installed in phases. The first unit (Unit 1) shall be installed in Phase 1 and the second unit (Unit 2) shall be installed in Phase 2. The common balance of plant (BOP) systems shall be designed for both units and installed in Phase 1.

The proposed location of buildings at the Facility is as shown on the project conceptual site arrangement drawing 238926-0GA-C1001B.

The following sections specify the general design requirements for the Facility buildings.

## **2 SUMMARY OF WORK**

Contractor shall furnish and install enclosed structural steel buildings as identified below in accordance with the latest state building code and with all applicable interior equipment foundations, drainage, electrical, mechanical, HVAC, and life safety systems intended for proper function.

- Combined Administration/Control and Maintenance/Warehouse Building with storm shelter
- Turbine Building (one per Power Island)
- Feedwater Pump Building (one per Power Island)
- BOP Electrical Building (one per Power Island)
- Water Treatment Building
- Auxiliary Boiler Building
- Gas Compressor Building
- Fuel Oil Equipment Building
- Fire Pump Building
- Switchyard Control Building

Structural and architectural provisions shall be provided complete including all shallow and deep foundations, lifting equipment, steel structures, and protective coatings.

## **3 DESIGN BASIS**

The power station Facility, including the buildings shall be designed and constructed over the entire ambient condition range.

The Facility shall be designed in compliance with all applicable laws and regulations. In particular, the Facility shall comply with all relevant federal and state environmental and occupational health and safety regulations.

### **3.1 CODES AND STANDARDS**

The following codes, standards, and publications of the latest issue in effect at date of the Agreement shall be used in the design and installation of the Work.

**Invenergy Clear River Energy Center  
Specification for Building Design**

ACI	American Concrete Institute
AHRI	Air-conditioning, Heating, and Refrigeration Institute
AISC	American Institute for Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	ASTM International
AWS	American Welding Society
CRSI	Concrete Reinforcing Steel Institute
IBC	International Building Code
IES	Illuminating Engineers Society
ISA	International Society of Automation
ISO	International Standards Organization
MBMA	Metal Building Manufacturers Association
NACE	National Association of Corrosion Engineers
NAIMA	North American Insulation Manufacturers Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
SDIS	Steel Deck Institute Standards
SJIS	Steel Joint Institute Standard
SMACNA	Sheet Metal and Air-conditioning Contractors National Association
SSPC	Society of Protective Coatings
UL	Underwriters Laboratories

Adoption of alternative standards shall be subject to Owner's prior approval. When requested, Contractor shall provide one English language copy of the requested alternative for Owner's sole use.

Contractor shall be consistent in their application of codes and standards in execution of the Work.

### **3.2 FORBIDDEN MATERIALS**

Equipment and materials or any other temporary or permanent items which contain PCBs, asbestos or asbestos bearing materials, nuclear sources, lead based paint ( $>1.0 \text{ mg/cm}^2$ ), or

**Invenergy Clear River Energy Center  
Specification for Building Design**

0.5% by weight), methyl ethyl ketones (MEK), or mercury are prohibited from use at the Facility.

**3.3 SITE CONDITIONS**

**Elevation**

Site elevation shall be established at 575 feet above mean sea level (MSL) for the main power block. Grading around foundations and exposed concrete slabs shall be sloped to assure proper drainage away from foundation structures.

**Precipitation**

Point precipitation frequency estimates Burrillville, RI:

- Annual average, inches 47.18 \*\*
- 10 year, 24-hour, inches 5.05\*
- 25 year, 24-hour, inches 6.24\*
- 100 year, 24-hour, inches 8.40\*
- Average Snowfall Total 33.80\*\*

*\*Data based on NOAA Atlas 14 point precipitation frequency estimates (Mansfield, NJ)*

*\*\*Based on NOAA Normals of the US 1981-2010 (Providence, RI)*

**Dry Bulb Ambient Temperature**

Temperatures are from 2013 ASHRAE fundamentals handbook for Providence, RI.

- 50 Year Extreme High Temperature 104.3 °F
- 1% Incident Temperature 86.7 °F (52% RH)
- Annual Average Mean Temperature 51.8 °F
- 50 Year Extreme Low Temperature -8.9 °F

**3.4 BASIC STRUCTURAL DESIGN CRITERIA**

Structural design criteria for the facilities buildings shall be in accordance with Section 4.

**3.5 BASIC HVAC DESIGN CRITERIA**

HVAC design criteria for the facilities buildings shall be in accordance with Section 5.

**3.6 BASIC FIRE PROTECTION DESIGN CRITERIA**

HVAC design criteria for the facilities buildings shall be in accordance with Section 6.

**3.7 PAINTING AND COATING**

This section outlines the general requirements and scope of painting and lining for the buildings.

Finish colors shall be selected by Owner from among the paint manufacturer’s standard colors. The “Paint/Lining System Application Table” contained herein includes specific definition of primer and finish paints and lining materials, touch-up, and application of galvanizing and other similar materials.

**Standards**

The following specific codes and standards apply:

American Concrete Institute (ACI)

**Invenergy Clear River Energy Center  
Specification for Building Design**

- 222R Protection of Metals in Concrete Against Corrosion
- 515.1R Guide to the Use of Waterproofing, Damproofing, and Decorative Barrier Systems for Concrete

ASTM International (ASTM)

- A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- D520 Standard Specification for Zinc Dust Pigment
- D3359 Standard Test Method for Cross Hatch Adhesion Test of Coatings
- D4417 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

International Concrete Repair Institute (ICRI)

- 310.1R Guideline for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion

Society of Protective Coatings (SSPC)

- AB1 Mineral and Slag Abrasives
- AB2 Cleanliness of Recycled Ferrous Metallic Abrasives
- AB3 Ferrous Metallic Abrasive
- PA2 Measurement of Dry Coating Thickness with Magnetic Gages
- SP1 Solvent Cleaning
- SP3 Power Tool Cleaning
- SP6 Commercial Blast Cleaning
- SP10 Near-White Blast Cleaning
- SP11 Power Tool Cleaning to Bare Metal
- SP13 Surface Preparation of Concrete
- Paint 20 Zinc-Rich Primers (Type I, Inorganic, and Type II, Organic)
- Paint 30 Weld-Through Inorganic Zinc Primer

National Association for Corrosion Engineers (NACE)

- SP0178 Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service

**Paint/Lining System Tables**

**Table 1- Paint/Lining Systems Application Table**

Item to be Coated	Exposure	Coating System (Note 1)	Color (Note 2)
<b>Structural Steel</b>			
Structural steel, Pre-engineered building structural steel	Interior, <220°F, SSPC Environmental Zone 1A	A	
Structural steel, Pre-engineered building structural steel	Interior, <220°F, corrosive environment	D	

**Invenergy Clear River Energy Center  
Specification for Building Design**

Item to be Coated	Exposure	Coating System (Note 1)	Color (Note 2)
Structural steel, Pre-engineered building structural steel	Interior, < 220 °F, non-corrosive, fire proofed		
Structural steel, Pre-engineered building structural steel	Exterior	Z	
<b>Miscellaneous Steel</b>			
Handrails, guardrails, ladders, safety cages	Interior and Exterior	Z	
Grating, stair stringers, toe and kick-plates, stair treads, checkered floor plate	Interior and Exterior, ≤220°F, noncorrosive	Z	First and last stair tread nose shall be safety yellow.
Metal siding, roofing and gutters	Exterior	20 year warranty	
<b>Ductwork</b>			
Ductwork; HVAC and other, interior and exterior, <220°F		E, I,	Silver / aluminum
Ductwork, Stacks, and Similar; Other than HVAC, interior and exterior, 220°F to 750°F +		K, L	Match system
Ductwork; Exposed doors, frames, supports, and ports, interior and exterior, (insulated)		H	Match balance

Notes:

1. See Paint/Lining Systems Table below. Where modifier number (second digit) is not used, either parent coating type may be used (e.g., B1 or B2, where B is specified).
2. Physical color samples shall be submitted to Owner for approval for all exterior paint colors.

**Table 2 - Paint/Lining Systems**

Step	Surface Prep/Paint or Coating	DFT (mils)
<b>A - Inorganic Zinc</b>		
Initial Surface Prep:	SSPC-SP6	
1st Coat:	Inorganic zinc silicate primer, gray-green pigment	3.0-4.0
Repair Surface Prep:	SSPC-SP3/11	
Touch-up:	Organic zinc epoxy primer	3.0-4.0
<b>D - Inorganic Zinc Primer, Polyamide Epoxy Finish</b>		
Initial Surface Prep:	SSPC-SP6	
1 <sup>st</sup> Coat:	Inorganic zinc primer, gray-green pigment	3.0-4.0
2 <sup>nd</sup> Coat:	Polyamide epoxy	4.0-6.0
Repair Surface Prep:	SSPC-SP3/11	

**Invenergy Clear River Energy Center  
Specification for Building Design**

<b>Step</b>	<b>Surface Prep/Paint or Coating</b>	<b>DFT (mils)</b>
Touch-up:	Organic zinc primer, same finish coat	
<b>E – Inorganic Zinc Primer, Epoxy Mastic, Urethane Finish</b>		
Initial Surface Prep:	SSPC-SP6	
1 <sup>st</sup> Coat:	Inorganic zinc primer, gray green pigment	2.0-3.0
2 <sup>nd</sup> Coat:	High build epoxy mastic	4.0-6.0
3 <sup>rd</sup> Coat:	Aliphatic urethane	2.0-3.0
Repair Surface Prep:	SSPC-SP3/11	
Touch-up:	Organic zinc primer, same intermediate and finish coats	
<b>H – Epoxy Primer, Epoxy Finish</b>		
Initial Surface Prep:	SSPC-SP6	
1 <sup>st</sup> Coat:	High build epoxy primer	4.0-6.0
2 <sup>nd</sup> Coat:	High build epoxy	4.0-6.0
<b>I – Epoxy Primer, Epoxy, Urethane Finish</b>		
Initial Surface Prep:	SSPC-SP6	
1 <sup>st</sup> Coat:	Epoxy primer	2.0-3.0
2 <sup>nd</sup> Coat:	High build epoxy	4.0-6.0
3 <sup>rd</sup> Coat:	Aliphatic urethane	2.0-3.0
<b>Z – Hot Dipped Galvanizing</b>		
Initial Surface Prep:	SSPC-SP6	
Coating:	ASTM A123, A153, or A767	per ASTM
Repair:	ASTM A780	per ASTM
Painted Surface Prep:	ASTM D7396	

Table Notes:

1. When top coating over inorganic, zinc silicate primers, a mist coat is necessary to avoid bubbling. A mist coat may be a thinned coat or applied by a quick pass of the spray gun prior to applying the full coat, but allowing sufficient time for solvent evaporation. Please consult coating manufacturer's technical product data sheets for further details.
2. Two coats of Epoxy at 4.0 – 8.0 mils DFT per coat can be substituted for two of Acrylic if desired.
3. Acid containments shall be rated for full immersion; system shall be Carboline Semstone, Blome TL 400 HWM vinyl ester resin lining with fiberglass reinforcing, or Owner approved equal.
4. Chemistry of cargo must be specified along with product concentration, temperature, etc.
5. See Paint/Linings Application Table above.

### **3.8 SIGNAGE**

Contractor shall provide complete signage for the Facility. Within the Site, Contractor shall provide signs for the following:

- Signs identifying each building and enclosure shall be placed over each entrance
- Room numbers on doors, room names for conference rooms, building-internal signs for restrooms, and emergency egress
- General directions to assembly points for inclement weather throughout the Facility
- Areas requiring hearing protection, other personal protection equipment (PPE), confined space access, heat stress, chemicals, or similar safety instructions
- Required NFPA 704 placards
- Locations where extra care is needed to enter (e.g., flammable material storage, forklift traffic areas, other)
- Locations where manual drain valves are included on secondary containment areas (e.g., describing when valves are to be opened/closed)
- General directions to safety shower/eyewash stations
- Required signage for arc flash areas on all equipment rated at above 300 V
- Floor plaques that provide an overview of building floor plan and state the floor number or letter, at the entrance/exit of stairwells and elevators
- Painted floor area marking space required for equipment maintenance (e.g. shaft, rotor, tube, motor control center drawers, fire extinguishers, pull spaces)
- Painted indoor floor areas for preferred walkways
- OSHA safety and emergency response signs
- Design floor loading for all above ground level/elevated platforms and grated areas serviced by hoists.
- Design capacity for all lifting points, monorails, gantries, and cranes
- Underground utility corridor signs
- Electrical equipment enclosures, and electrical safety signs therein
- Fire protection system access/direction signs
- Building column identification at ground level and elevated platforms
- Any signage required by federal, state, or local regulations
- Cautionary paint or tape where applicable (e.g. low hanging pipes or beams, trip hazards, high voltage, etc.)

## **4 STRUCTURAL/ARCHITECTURAL**

### **4.1 SUMMARY**

Contractor shall furnish the buildings listed in Section 2.0 – Summary of Work. This section outlines the minimum structural and architectural requirements for buildings.

## **4.2 BUILDINGS**

Unless noted otherwise, all buildings shall be metal sided-metal frame pre-engineered type structures. The Administration/Control Building and the Warehouse/Maintenance building shall have structural precast wall system.

### **4.2.1 General Building Requirements**

Structures shall be designed to support and provide personnel access to the mechanical equipment and piping/electrical/control systems directly or indirectly associated with power generation. All enclosed and non-enclosed structures shall have permanent grating, platforms, ladders, and stairways for personnel access that meet the requirements of the state OSHA. All penetrations and openings through grating shall have banding. Structures and equipment components shall be supported by suitable concrete foundations either bearing on existing soil or if required, for heavier equipment and structures, supported on deep foundations (piles).

For all buildings and enclosures, an applicable (future) collateral loading should be provided in wall and roof framing to allow future conduit, cable tray, and mechanical piping to be top-supported (especially for any pre-engineered buildings). If collateral loading is not needed in a specific structure, the unity stress for all members should be limited to 0.9. For buildings with significant piping and tray, a lower unity stress allowance shall be used coupled with increased load factors on primary framing that shall be affected. All wind girts shall be designed to support their own vertical dead weight rather than be supported by liner panel or temporary means so that they do not warp.

Contractor shall provide Owner with complete design calculations for each building, enclosure, or other structure signed and sealed by a professional engineer, registered in the State that account for all applicable loading and code requirements.

Liner panels on the insides of all buildings shall be used to absorb sound and protect insulation, while also providing a hard surface for maintenance. For general areas, the liner panel shall match the outer wall panel. Liner panels in areas of high traffic or where materials shall be stored on the inside shall consider thick sections or even 3-foot high row of concrete masonry. The minimum liner and wall and roof metal panel gauge thickness that shall be allowed for any building or enclosures is 24 gauge, without Owner approval. All roof and wall panels shall be protected with galvanizing base coat and finish painting coat with a minimum guaranteed service life of 30 years (warranty required). The finish coating film integrity shall be for 30 years service against cracking, flaking, chipping and peeling, with chalking and fading resistance covered for at least 25 years. Gutter systems shall be similarly coated, with debris guards provided.

See following articles for additional building requirements.

### **4.2.2 Turbine Building**

The turbine building footprint shall be designed to accommodate the selected Power Island Supplier's recommended component laydown and maintenance requirements within the concrete section of the operating floor. The synchronous generator rotor removal pull space shall be completely within the building volume and shall not require removal of a wall panel or disassembly of the generator exciter enclosure to remove the rotor with the bridge crane. Generator isophase bus shall be routed outside of the rotor removal space.

### **4.2.3 Administration Building**

The Administration/Control Building main conference room shall be designed as a storm shelter area. The storm shelter shall be designed in accordance with the ICC/NSSA 500 Standard for the Design and Construction of Storm Shelters.

#### **4.2.4 Water Treatment Building**

The water treatment building shall be provided with an office/laboratory room. The laboratory shall include a fume hood, lab sink, and counters with cabinets above and below, lab bench, a computer station with desk and chair, and testing equipment consisting of a pH meter, conductivity meter, turbidity meter, spectrophotometer, hardness titrator, lab demineralizer and other standard laboratory equipment.

### **4.3 STRUCTURAL REQUIREMENTS**

#### **4.3.1 General**

Design shall be in accordance with the applicable codes and regulations and industry standards referred to in this section. The design criteria discussed in this section shall govern the technical requirements for designing civil/structural elements.

Work shall be produced in accordance with the rules applicable to Professional Engineers practicing in the State, using due standards of care, skill and diligence. Design drawings and specifications produced shall be sealed by a Professional Engineer licensed to practice in Rhode Island.

#### **4.3.2 Codes and Standards**

In addition to the codes and standards identified in Section 03 – Facility Design Basis, relevant aspects of the Rhode Island State Building Code, the 2012 International Building Code (IBC), and the editions of the American Concrete Institute (ACI) code and American Institute of Steel Construction (AISC) code incorporated by reference.

Structural design shall be in conformance with the latest standard accepted edition listed in in the table below, to the extent they apply, unless the building code requires a more conservative design.

#### American Concrete Institute (ACI)

117/117R	Standard Specifications for Tolerances for Concrete Construction and Materials and Commentary
301	Specifications for Structural Concrete
315	Details and Detailing of Concrete Reinforcement
318/318R	Building Code Requirements for Structural Concrete and Commentary
350R	Environmental Engineering Concrete Structures
351.R1	Grouting between Foundations and Bases for Support of Equipment and Machinery
351.R2	Static Foundations for Equipment and Machinery
351.R3	Dynamic Foundations for Equipment and Machinery
360R	Guide to Design of Slabs-on-Ground
530/530.1R	Building Code Requirements for Masonry Structures and Specifications for Masonry Structures and Commentaries

#### American Institute of Steel Construction (AISC)

303	Code of Standard Practice for Structural Steel Buildings and Bridges
341	Seismic Provisions for Structural Steel buildings
360	Specification for Structural Steel buildings

**Invenergy Clear River Energy Center  
Specification for Building Design**

American Society of Civil Engineers (ASCE)

- 7 Minimum Design Loads for Buildings and Other Structures  
Structural Design of Air and Gas Ducts for Power Stations and Industrial Boiler Applications

American Welding Society (AWS)

- D1.1 Structural Welding Code-Steel

Association of Iron and Steel Institute (AISI)

Specifications of the Design of Cold Formed Structural Steel Members

Metal Buildings Manufacturer Association (MBMA)

Metal Building Systems Manual

Precast Prestressed Concrete Institute (PCI)

Manual for Structural Design of Architectural Precast Concrete

Research Council On Structural Connections (RCSC)

Specification for Structural Joints Using ASTM A325 or A490 Bolts

Steel Deck Institute (SDI)

Design Manual for Composite Deck, Form Decks and Roof Decks –  
Publication No. 30

Diaphragm Design Manual

Steel Joist Institute (SJI)

Standard Specifications, Loads Tables and Weight Tables for Steel Joists  
and Joist Girders

**4.3.3 Design Loads**

Design loads and load combinations for all buildings, structures, structural elements and components, handrails, guardrails, and connections shall be determined according to the criteria specified below, unless the applicable building code requires more severe design conditions. Loads imposed on structural systems from the weight of all temporary and permanent construction, occupants and their possessions, environmental effects, differential settlement, and restrained dimensional changes shall be considered.

Wind, seismic, and snow loading shall be in accordance with IBC or local jurisdictional building code, whichever is more stringent.

**4.3.3.1 Wind Loads**

Wind design shall be in accordance with:

- 3 second gust = 139 mph
- Exposure category = C

**4.3.3.2 Seismic Loads**

Seismic design shall be in accordance with SBC-1 2013 Table 1608.1 and Chapters 11 thru 15 of ASCE 7-10 as applicable, utilizing the inputs below:

- Job site (soil) class = D (Code Default)
- Mapped  $MCE_R$  spectral response accelerations,  $S_s = 0.175g$

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- Mapped  $MCE_R$  spectral response accelerations,  $S_1 = 0.063g$
- Spectral acceleration for short periods,  $S_{DS} = 0.187g$
- Spectral acceleration for a 1-second period,  $S_{D1} = 0.101g$
- Seismic Design Category,  $SDC = B$
- Importance factor,  $I_E = 1.25$
- Seismic design criteria may be adjusted by Owner based on future geotechnical investigation and report

### **4.3.3.3 Snow Loads**

Snow loads applied to exposed equipment and buildings shall be in accordance with SBC-1 2013 Table 1608.1 and Chapter 7 of ASCE 7-10, utilizing the inputs below:

- Ground snow load,  $p_g = 35$  psf
- Importance factor,  $I_S = 1.1$

### **4.3.3.4 Live Loads**

The live loads used in the design of buildings and structures shall be the maximum loads likely to be imposed by the intended use or occupancy, but shall not be less than the minimum uniform design live loads. Components of the structural system may be designed for a reduced live load in accordance with the local building code. Roofs shall be designed to preclude instability resulting from ponding effects by ensuring adequate primary and secondary drainage systems, slope, and member stiffness.

Live loads used in the design of buildings and structures shall be the maximum loads likely to be imposed by the intended use or occupancy, but not less than the following minimum uniform live loads:

- Turbine operating deck floor = 150 psf
- Ground floor slabs = 250 psf
- Storage areas = Weight of stored material, but no less than 150 psf
- Other concrete floors = 100 psf
- Grating floors = 100 psf
- Checker Plate floors = 100 psf
- Stairs = 100 psf

### **4.3.3.5 Construction Loads**

Construction or crane access considerations may dictate the use of temporary structural systems. Special considerations shall be made to ensure the stability and integrity of the structures during any periods involving use of temporary bracing systems.

### **4.3.3.6 Buildings and Other Structures**

Except for the administration/control building and warehouse/maintenance building superstructure support systems shall consist of pre-engineered steel moment frame construction with bracing in the orthogonal axis direction as required or custom designed steel braced frame structures and/or steel moment frame structures. Position of bracing shall meet spatial requirements for access and maintenance. The superstructure shall provide an integrated gravity and lateral load resisting system to transfer loads to the reinforced concrete foundation.

**4.3.3.7 Concrete**

Except as otherwise specified, or where precast structural elements can reduce cost and meet or exceed cast-in-place reinforced concrete performance, all concrete shall be reinforced cast-in-place concrete designed in accordance with ACI 318, *Building Code Requirements for Structural Concrete*, and other applicable structure specific codes and standard.

Exposed concrete floors within the water treatment, chemical lab building and chemical feed area are to have a steel-trowel finish and be sealed to impart chemical resistance where such exposure is possible.

Duct banks which run under roads and maintenance areas shall be adequately reinforced to withstand anticipated loads, supported by deep foundations if necessary by design, and shall be marked with a permanent dye to identify it as electrical ductbank.

**4.3.3.8 Concrete Masonry Block Work**

Structural masonry design shall be in accordance with the latest edition of ACI 530, *Building Code Requirements for Masonry Structures*.

**4.3.3.9 Steel Structures**

Design and construction of steel structures shall utilize standard design practices as defined by local building codes and standards, but not less than those defined below.

<b>System</b>	<b>Criteria</b>
Deflection, floors and roofs, live load only	Span/360, vertical, unless attached to more rigid, brittle members
Deflection, floors and roofs, dead and live load combined	Span/240, vertical
Deflection, roof beams and boiler girders	Span/360, vertical
Deflection, girts	Span/360, horizontal
Deflection, grating (100 psf uniform load)	1/4 inch maximum
Deflection, crane and hoist support beams	Span/800, vertical (with impact), Span/1000 vertical (without impact)
Deflection, duct plates (between stiffeners)	Span/100, normal operations only
Deflection, duct plate stiffeners	Span/240, normal operations only
Unbraced length, pipe bracing in ducts	$KL/r \leq 120$ , checked for vortex shedding in flow and thermal restraint forces

**4.3.3.10 Pre-Engineered Buildings**

Design of the structural framing, by pre-engineered metal building (PEMB) manufacturer, shall be in accordance with the MBMA Metal Building Systems Manual.

Framing configurations shall conform to the architectural floor plans.

Prior to any pre-engineered building package being shipped to Site for erection, a letter of certification signed and stamped by a professional engineer registered in the State shall be provided to Owner and shall include the following information and state that the building meets all applicable Contract and code requirements:

- Column base loads (for each load combination)
- Column base loads (for envelope solution)

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- Allowable loads for framing members
- Critical reactions and locations
- Critical shears and locations
- Critical moments and locations

**4.4 STRUCTURAL MATERIALS**

Materials, workmanship, and testing shall be in accordance with the appropriate specifications, standards and codes. Methods of quality control shall be clearly established and documented for all structural Work (e.g., concrete, steel, connections, anchors, other) by Contractor, including the Submittal of test records to Owner. Third party shall be used to complete any special inspections and for Site quality control functions (soils, asphalt, concrete, steel, connections, other).

Working methods shall ensure the construction of stable structures able to withstand all applied loadings during construction and for the design life of the Facility without collapse, failure or excessive deformation such as to cause any damage, loss of function or any durability problems.

**4.4.1 Structural Steel**

Structural steel shall be detailed and fabricated in accordance with the AISC *Code of Standard Practice* and the AISC *Specification for Structural Steel Buildings*. Construction of steel structures shall use materials as defined in the table below:

<b>Material</b>	<b>Criteria</b>
General use steel shapes, plates, appurtenances	Multicertification ASTM A36/A572, Grade 50, or ASTM A992.
Steel tube, rectangular or square	ASTM A500, Grade B
Bolts	ASTM A325, A490, F1852, F2280
Weld filler metal	70 ksi tensile strength
Extreme corrosion-resistant stainless steel	ASTM A167, type as required
Guardrail and handrail pipe	1-1/2 inch nominal diameter, ASTM A53, Type E or S, Grade B for new construction.
Steel grating	3/16 inch by 1-1/4 inch bearing bars, galvanized. Furnish with serrated surface for exterior applications
Toeboard, banding, kickplate and grating panel ends	ASTM A36 or ASTM A1101, galvanized
Anchor bolts, sized for design loads	ASTM F1554, ASTM A193, Type 316 stainless steel
Miscellaneous channels, angles, plates, and embedded shapes	ASTM A36
Stair stringers	ASTM A36, C10 minimum
Stair treads	Steel grating, galvanized, cast abrasive or bent checker plate nosings

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<b>Material</b>	<b>Criteria</b>
Metal deck, roof	1-1/2 inch profile depth (or as required by design), 22 gauge minimum, galvanized
Metal deck, form	1-1/2 inch profile depth (or as required by design), 18 gauge minimum, galvanized.
Checkered steel floor plate	ASTM A786 (0.25 inch thick)

Where structural components are subject to severe corrosion due to chemical exposure but not elevated temperatures, Contractor may use FRP (fiber-reinforced polymer) material produced for structural application. All structural shapes shall be capable of carrying their intended load, contain ultraviolet (UV) light inhibitors and be flame retardant per ASTM E-84 Class 1 with flame spread of less than 25.

Provisions of Section H1.3 of the AISC Manual of Steel Construction shall not be used when any biaxial bending may occur under any loading case. Provisions of H1.1 shall be satisfied for all biaxial bending and compression load cases. All bolted connections in primary building, enclosure, and structure members shall be bolted using A325 or A490 bolts. Direct-tensioning indication devices ("squirters"), or tension controlled bolts, for both secondary and primary members shall be used. Secondary members may be bolted using A307 bolts.

**4.4.2 Structural precast wall panels**

Precast concrete wall panels shall be detailed and fabricated in accordance with the *Precast Prestressed Concrete Institute standards* at a PCI certified production facility and /or NPCA/ANCI certified production facility. Panels shall have a minimum thickness required by design to support panel self weight, gravity, roof snow loads, wind loads, and erection loads.

Reinforcing fabric shall be stainless steel deformed wire in accordance with ASTM A1022, or carbon fiber mesh C-Grid® by Carboncast

Wall panels shall be built and erected in accordance with production, erection, and interface tolerances established by PCI.

**4.5 ARCHITECTURAL REQUIREMENTS**

**4.5.1 General**

The buildings and building systems shall be designed based on the applicable codes and requirements as determined by the Rhode Island State Building Code.

Contractor shall perform a building code analysis and establish occupancy and type of construction for each building.

The design and material selections in the interior building/office areas shall be driven by functionality and established Owner architectural standards and sustainability goals. The overall Project seeks an Envision™ rating for sustainable infrastructure. Sustainable criteria based on the LEED New Construction v3, 2009 rating system is noted where applicable. Contractor shall provide related material data sheets showing applicable sustainable attributes of materials with Submittals. The Facility does not seek a LEED rating. The buildings shall be designed for accessibility complying with applicable law.

**4.5.2 Architectural Codes and Standards**

Normally occupied areas such as control rooms shall be designed in general accordance with the requirements of the latest applicable building codes and standards. Allowable variances and applicable local code interpretations should be established before project

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commencement.

Fire rated assemblies shall be provided when required by building or fire codes. Penetrations through partitions shall be provided with fire stops per NFPA. Insulation shall be used for sound and thermal control in walls between and around finished rooms and air-conditioned areas.

**4.5.3 Exterior Architecture Criteria**

The exterior architectural systems provide a durable, weathertight enclosure to protect systems and personnel and allow for a controlled interior environment.

Exterior architectural systems shall conform to the following general design criteria:

Item	Criteria
Walls	Walls shall consist of insulated metal wall panel or Insulated precast concrete panels were required. Building enclosures may also be pre-engineered; exposed surfaces to be non-reflective.
Roofs	Metal standing seam roofing. Built-up roofing or single-ply membrane over metal deck may also be used. Flat roofing shall be used unless Owner approval is provided. Solar reflectance of materials shall be considered. Solar Reflectance Index (SRI) of materials: Low slope roofing with SRI > or = 78, steep slope roofing or curved roof area with SRI > or = 29 preferred. Roofs on the turbine building and other membrane roofs shall have parapet walls installed around the perimeter.
Thermal insulation	Incorporated into the walls and roofs for thermal design.
Louvers	Include stormproof louvers as required by the ventilation design.
Windows	Include windows, frames, and glazing. Selection shall be based on Facility and environmental requirements.
Personnel doors	Hollow, metal type personnel doors. Insulation and fire rating criteria shall be dictated by the interior and environmental requirements.
Equipment access doors	Double mandooors (for smaller equipment access) and/or large exterior metal curtain doors, motor operated with weather seals, windlocks, and backup manual chain operators.
Masonry block	Consist of concrete block, which may be utilized for enclosure and separation purposes.
Finish painting	Exterior steel materials not galvanized or factory finished shall be finish painted. Colors shall be selected by Owner. Exposed surfaces to be non-reflective. See previous section for painting systems of structural components. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials.

**4.5.3.1 Acoustical Insulation**

Acoustical insulation shall be incorporated into the walls and roofs of the Turbine Building. The minimum acoustical performance requirements are summarized in the table below. The transmission loss (TL) values are octave band-specific and expressed in terms of dB. The

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values equate to an overall STC 35 which can be achieved using 24 gauge steel cladding coupled with high-density internal acoustic insulation and perforated liner.

Absorptive Surface	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Barrier or Enclosure (dB)	10	16	17	24	32	41	49	52	57

If a more stringent design than the minimum requirements specified above is required to satisfy the far field noise guarantees of the Agreement, Contractor shall be responsible for design and installation of a complete system of noise abatement that satisfies the guaranteed requirements.

**4.5.3.2 Interior Architecture Criteria**

The interior architectural items shall provide a functional, low maintenance, aesthetically pleasing environment. Interior architectural items shall conform to the following general design criteria:

Item	Criteria
Partitions	Partitions for general unfinished plant areas shall be constructed of masonry, metal wall panel. The complete administration/control building interior, including the storm shelter masonry and all structural steel, shall be furnished with a drywall finish.
Windows	Interior fixed windows as required by the occupancy. Rated and nonrated glazing shall be installed in accordance with fire retardant criteria where applicable.
Personnel doors	Hollow, metal type personnel doors. Insulation and fire rating criteria shall be dictated by the interior and environmental requirements. Wood doors are not allowed.
Concrete slabs	Warehouse, maintenance shop and mechanical/electrical areas – concrete slab sealed with concrete hardener. Sealants shall be low-VOC materials.
Ceilings	Ceilings in the administration/control building and finished areas of the Facility shall consist of suspended, exposed grid, lay-in acoustical type systems. Wet areas shall consist of moisture resistant materials. The use of sustainable, low-emitting materials containing recycled content and that are regionally located is desired where possible.
Floor coverings	Floor coverings in the administration/control building and finished areas of the Facility shall a tile suitable for high traffic areas, commercial modular carpet tiles for office and general areas. Floor coverings in control and electrical equipment rooms shall be static dissipative and shall incorporate epoxy coatings. High moisture areas shall incorporate unglazed ceramic tiles. The use of sustainable, low-emitting materials containing recycled content and that are regionally located is desired where possible.
Wall coverings	Glazed wall tiles shall be used in shower and toilet rooms for maintenance and sanitary requirements. All other finished area wall

Item	Criteria
	coverings shall be identified in the painting section. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials.
Interior drywall	Smooth, clean, and dry surface preparation; a primer coat (0.5-3.0 mils) of sealer or thinned finish coat as recommended by the paint manufacturer; and a finish coat (1-2 mils) of low gloss acrylic latex paint. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials, per VOC limits of LEED New Construction v3, 2009.
Finish painting	Interior areas shall be coated where required for chemical resistance, light reflection, or aesthetics. Interior masonry walls shall be coated a gloss finish. Paints and coatings used in the building interior and applied on-Site shall be low-VOC materials, per VOC limits of LEED New Construction v3, 2009.
Sanitary facilities	Toilet and shower facilities, associated accessories, and janitor closet with mop station shall be provided where required to meet code and Facility requirements. Low-flow flush and flow plumbing fixtures shall be utilized where applicable.
Raised floor areas	The administration/control building control room, DCS equipment room, electrical room and communications area shall have raised floors furnished with anti-static carpet tiles.

## **4.6 ARCHITECTURAL MATERIALS**

### **4.6.1 Concrete Masonry Units**

Concrete masonry Units shall be hollow, normal weight, nonload-bearing, Type 1 conforming to ASTM C 129, or load bearing Grade N, Type 1 conforming to ASTM C 90.4, as appropriate. Concrete masonry Units shall be reinforced as required. Masonry Units shall not be used for structures designed to resist fluid loads such as basins.

### **4.6.2 Preformed Metal Siding**

Preformed metal siding panels shall be fabricated from galvanized sheet steel. Exterior and interior face panels shall be 22 gauge minimum. Exterior siding shall be either an insulated or an uninsulated field-assembled system as required by this specification. Uninsulated siding panels shall meet the same finish and strength characteristics as the insulated siding system.

The wall system shall be designed to withstand the specified wind loading with practical and economical support girt spacing.

Exterior panel surfaces exposed to weather shall be coil coated with a finish designed to withstand all Site-specific conditions. The siding finish color shall be selected by Owner, from among the siding manufacturer's standard colors if possible. The final finish shall be non-reflective. The interior surface of the exterior panels shall be finished with manufacturer's standard baked-on enamel finish. When required, the interior liner panels shall be galvanized sheet steel. Exposed panel surfaces shall have manufacturer's standard gloss white baked-on enamel finish.

### **4.6.3 Precast Concrete Wall Panels**

Precast concrete wall panels exterior surface shall have a texture and color/coating as selected by Owner. A 12 inch x 12 inch sample coupons shall be submitted for approval by the Owner. Where applied coatings are selected, the coating shall be compatible and adhere to concrete and shall be acrylic, epoxy, or polyurethane based. Coating shall be selected to provide the least maintenance cost for the 30 life of the plant.

Where specified, the architectural wall finish schedule interior surfaces shall have a texture and color, finish as selected by Owner. 12 inch x 12 inch sample coupons shall be submitted for approval.

After a color, texture, and finish are selected a minimum 4ft x 4ft full scale panel mock-up shall be erected in the vertical position at the site for final approval. Owner has the right to reject the field erected mock-up.

Panel shall have an insulated core to meet or exceed the energy code requirements and not less than the thermal requirements of the building design.

Panels shall be sealed to resist water penetration and streaking

Panel joints shall be detailed showing industry standard joint thickness, backer rods, and sealant depth.

### **4.6.4 Roofing**

Roofing for all major structures shall consist of the following roofing systems. The completed roofing system shall meet the requirements for a Factory Mutual Class I rating and fire code requirements for the type of building. Five-inch gutters shall be provided to direct rainwater to the storm sewer system.

- Acoustical standing seam metal roofing; or
- White synthetic single layer membrane over insulation and a metal deck; or
- Stone covered built-up roofing over insulation and metal deck.

Standing seam roof panels shall have a slope within the range of 1/2 to 1 inch of rise per 12 inches of run, but not less than required by local code. Standing seam roof decks shall have acoustical insulation built into the roofing panel or as a separate component of the roof system, placed directly below the roof panel. Minimum of R-19 fiberglass blanket insulation with UL 25 or less flame spread rating shall be used and attached to the ceiling with metal components such that there shall be no sagging. Standing seam roof panels shall have hidden (nonexposed) fasteners. Roof panel gage and shape of panels shall be sufficient to withstand all design loadings without excessive deflection or vibration.

Built-up and single membrane roof systems shall have a minimum slope of 1/4 inch per foot toward the roof drains. Roof drains with expansion joints shall be provided at the low edge of the roof and shall be located as determined by the detailed design. The roof drains shall be set in galvanized steel pans and flashed appropriately.

A membrane and roof expansion joint shall be used to separate areas where a major change in structural framing occurs.

Cant strips and vertical wood nailers shall be attached to the roof decks with expansion clearance from walls and parapets with insulation placed in the clearance space.

Snow guards shall be provided at all roof edges.

All gutters and downspouts shall be heat traced to minimize icing.

#### **4.6.5 Metal Roll-Up Doors**

Roll-up doors shall be constructed of interlocking roll-formed galvanized steel slats to withstand a minimum of 25 psf wind pressure. Roll-up doors shall be motor-operated with a manual chain operated backup feature. Provide uninsulated door curtains for the maintenance shop roll-up doors.

#### **4.6.6 Hollow Metal Doors, Frames, and Hardware**

Interior personnel doors shall be flush hollow metal on pressed steel door frames and shall include hinges, locksets, closers, weather-stripping, and accessory hardware. Fire doors and frames shall conform to NFPA 80 for the class of door furnished.

Doors shall meet the requirements of Steel Door Institute (SDI) - recommended specifications 100-91, Grade II, Model 2. Doors shall be heavy-duty seamless-composite construction using 18 gauge galvanized face sheets. Door frames shall be formed of 16 gauge steel to the sizes and shapes required.

Doors and frames in the outer limits of environmentally controlled areas shall be fully insulated. Where fire doors are required, the door, frame, and hardware shall bear a certification label from Underwriter's Laboratories for the class of opening and rating.

Exterior doors shall have roofs, awnings, or overhangs to protect personnel from snow.

All doors shall be finished with glass and glazing to help prevent the doors from being opened into oncoming traffic. Glass and glazing shall conform to the requirements for glazing materials for Category II products in accordance with the Safety Standards for Architectural Glazing Materials 16 CFR 1201, and installed in accordance with the publications of the Flat Glass Marketing Association.

#### **4.6.7 Windows**

Windows shall consist of aluminum frames with insulated and tinted glazing as used in commercial or industrial applications. The windows shall be weather tight including low-E insulated glass in thermally broken aluminum frames.

#### **4.6.8 Louvers**

Louvers shall be both the operable and inoperable types, fabricated of extruded-aluminum section alloy and provided with stainless steel fastenings and removable aluminum bird screen. Louvers shall have a paint finish meeting the specified finish requirements for the adjacent siding. Blades shall be storm proof. The louver-free area shall be a minimum of 50 percent of the louver face area. Louvers shall be designed for manual or gravity operation. Louvers shall be designed to meet wind loads.

#### **4.6.9 Floor Finish**

Floor finishes shall generally be concrete, steel troweled to a smooth surface and finished with a seal hardener.

Floors in personnel areas shall be unglazed ceramic tile in high traffic areas and commercial modular carpet tiles in offices and low traffic finished areas.

Exposed concrete finishes shall be repaired according to ACI 301-10, 5.3.7 - *Repair of Surface Defects*. Allowable hole size to be no greater than 1/4 inch.

The toilet facilities shall receive unglazed ceramic mosaic tiles.

#### **4.6.10 Protective Coatings for Architectural Elements**

Contractor shall prequalify all coatings and colors with Owner prior to purchase. See Section 03 - Facility Design Basis, Article 3.13.8 - Painting/Lining System Tables for coating requirements of structural elements (steel, concrete, and masonry block).

#### **4.6.11 Doors, Roll-up Doors and Frames**

All exterior doors (personnel) and frames shall receive Supplier's standard zinc-rich primer in the shop and finish coat in the field with a minimum ISO 12944 C5 coating classification, or equivalent door manufacturers recommended finish.

Roll-up doors shall be primed and finish coated in the Supplier's shop. Touch-up shall be performed as required with a compatible primer using SSPC-SP 3, Power Tool Cleaning standard.

Interior man doors (personnel) and frames that have both sides exposed to an interior environment shall receive Supplier's standard primer in the shop and finish coat in the field with an ISO 12944 C3 environment finish, or equivalent door manufactures recommended finish.

#### **4.6.12 Masonry Walls and Concrete Floors**

Surfaces exposed to chemical contaminants shall be coated with polyester- or vinylester-based coatings.

Concrete floors in electrical, DCS, and switchgear rooms shall have epoxy coatings and be static dissipative.

Exposed (visible) interior masonry wall surfaces in office areas shall have a surface preparation that is clean, dry and free of contaminants; a primer coat thickness rate per paint manufacturer of masonry filler; an intermediate coat (2-3 mils) of low gloss acrylic latex; and a finish coat (2-3 mils) of low gloss acrylic latex.

See Section 03 - Facility Design Basis, Article 3.13.8 - Painting/Lining System Tables for coating requirements of masonry block elements.

#### **4.6.13 Gypsum Wallboard**

Exposed surfaces shall receive one coat of sealer and two coats of compatible acrylic finish.

### **5 HVAC DESIGN CRITERIA**

The following articles define the HVAC requirements for the Facility buildings.

#### **5.1 DESIGN CONDITIONS**

Climatic conditions for the design of HVAC systems shall be based on the criteria listed in Section 2 – Design Basis. The climatic data set from the 2013 ASHRAE Fundamentals Handbook shall be used for design calculations. For heating design the 99.6 percent parameters shall be used. For ventilation design, the 0.4 percent design parameters shall be used. For air conditioning design, the 1.0 percent parameters shall be used.

#### **5.2 DESIGN REQUIREMENTS**

In addition to the codes and standards listed in Section 2 – Design Basis, the HVAC systems shall be designed to the following specific codes and standards:

Acoustics Society of America (ASA)

S12.2 Criteria for Evaluating Room Noise

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American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

- 52.2 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
- 55 Thermal Environmental Conditions for Human Occupancy
- 62.1 Ventilation for Acceptable Indoor Air Quality
- 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings

Sheet Metal & Air-Conditioning Contractors' National Association (SMACNA)

- 006 HVAC Duct Construction Standards - Metal and Flexible

Buildings, enclosures, and interior spaces shall be heated, ventilated, and air-conditioned, to provide proper environmental control to meet equipment protection and safety requirements as well as to provide personnel comfort in areas normally occupied. For areas that are not continuously occupied, the HVAC systems shall be designed to provide a minimum level of personal comfort when maintenance activities are being performed.

The following areas shall be designed to maintain the minimum conditions as listed below:

<b>INDOOR DESIGN CONDITIONS</b>					
<b>Building/Room Name</b>	<b>Cooling Design Temp, F</b>	<b>Heating Design Temp, F</b>	<b>System Type</b>	<b>Redundancy</b>	<b>Filtration</b>
Offices & Administration Areas	72	72	HVAC	Multiplicity	Yes
Control Room	72	72	HVAC	Redundant	Yes
DCS Rooms, UPS Rooms, Electronics Rooms	72	72	HVAC	Redundant	Yes
Laboratory Rooms / Sample Panel Rooms	72	72	HVAC Exhaust	Multiplicity	Yes
Electrical Equipment Rooms	85	55	HVAC	Multiplicity	Yes
Battery Rooms	77 ±2	77 ± 2	HVAC Exhaust	Multiplicity	Yes
Turbine Building	Ambient + 20	45	H&V	Multiplicity	None
Water Treatment Bldg, Feedwater Pump Bldg, Gas Compressor Bldg, Aux Boiler Bldg	Ambient + 15	55	H&V	Multiplicity	None
Warehouse	Ambient + 15	55	H&V	Multiplicity	None
Workshop	Ambient + 15	72	H&V	Multiplicity	None

**Notes:**

1. Systems with multiplicity shall be configured as (n+1) redundancy. Redundant systems shall be configured with full backup (100 percent) capability redundancy.
2. Filtration requirements shall be in accordance with the recommendations of ASHRAE 62.1. Filters shall be at least a MERV 6 rating.
3. Electrical equipment rooms shall not exceed 104 °F (40 °C) under any operating condition during the loss of one item of HVAC equipment.

### **5.2.1 Air Changes**

Air changes per hour for the administration building, control room, remote offices, laboratory rooms, and other occupied areas shall comply with ASHRAE 62.1.

Battery rooms shall have sufficient fresh airflow to maintain less than 0.8 percent hydrogen concentration in the room based on manufacturer's data for hydrogen gas release.

### **5.2.2 Design Pressure**

The pressure in individual portions of the Administration Building shall be maintained positive in relation to the exterior, storage areas, vehicle maintenance/garage areas, and the vestibules. Toilet rooms, janitor's closets, and any other similar areas shall be maintained negative and exhausted directly to the outdoors with respect to adjacent building spaces. Administration areas (excluding areas that are exhausted to the outdoors) may use plenum returns, however all items in the ceiling to be plenum rated.

### **5.2.3 Hours of Operation**

The Facility is a 24-hour per day operation. Contractor is responsible for coordinating with Owner to determine the areas/buildings that may utilize some type of night set-back or ventilation reduction.

## **5.3 COMBUSTION TURBINE AND STEAM TURBINE BUILDING**

The ventilation philosophy shall be designed to use displacement ventilation (thermal buoyancy) concepts.

The building roof shall use a continuous ridge vent (or equivalent for flat roofs) to release air to the outdoors. The ridge vent shall include motorized dampers, bird screen, and weather hood to prevent precipitation from entering the building. Low velocity makeup air to the building shall be provided from makeup air units. The makeup air units shall consist of intake damper, inlet filters, redundant fans, and indirect natural gas fired or electric heaters. The makeup air units shall be shop fabricated assemblies. Each makeup air unit shall be capable of increasing the makeup air to above freezing during cold ambient conditions to prevent localized freezing of equipment and piping systems inside the building. Ductwork and diffusers shall be used along the perimeter of the building to supply makeup air at grade, mezzanine, and operating deck levels as needed. Provide sufficient capacity in the makeup air unit sizing, such that the loss of one makeup air unit does not affect overall building temperatures (localized affects are acceptable near the unit that is out of service). The size of the makeup air units shall be sufficient to limit the number of wall penetrations. Makeup air units shall be fully accessible around the perimeter for inspection and maintenance activities.

Localized areas within the building that require spot cooling shall be ventilated using circulating fans.

## **5.4 WATER TREATMENT BUILDING**

The water treatment building shall be ventilated using power wall ventilators with a continuous ridge vent on the roof for exhaust. The ventilators shall be located at grade to allow access for maintenance.

Natural gas fired or electrical unit heaters shall be located within the building to provide heating. The heaters shall be positioned as close to grade/floor as allowed by equipment or structures, and not causing personnel hazards.

The office and laboratory room located in the building shall be provided with a ground-mounted packaged HVAC system to provide complete temperature and humidity control for personnel comfort and equipment protection.

## **5.5 BATTERY ROOMS**

Battery Rooms shall be under negative pressurization and vented directly to the outdoors by exhaust fans. Battery room temperature shall be based on manufacturers' recommendations for life and charging considerations. Battery rooms shall be provided with HVAC to maintain a temperature of  $77 \pm 2$  °F. Rooms shall be exhausted by 2 x 50 percent exhaust fans.

Provide a hydrogen sensor in the battery room with an externally mounted alarm and control panel outside the room (Sensidyne SensAlarm plus or equal). High hydrogen levels or loss of ventilation shall alarm on the local panel.

## **5.6 ADMINISTRATION BUILDING AND CENTRAL CONTROL ROOM**

The Administration Building HVAC systems shall be in accordance with the recommendations of ASHRAE standard 90.1. The Administration Building HVAC systems shall use a VAV type design that incorporates energy recovery of the exhausted air. HVAC units shall include outdoor air economizers for use in cold weather operation.

The HVAC system shall be provided with zone temperature control. Interior control zones must not exceed 600 sf per zone for open office areas or a maximum of four offices per zone for closed office areas. Exterior perimeter zones on north, south, east and west sides of the building shall be separate zones. Corner offices shall be a dedicated zone. Perimeter zones shall not exceed 300 sf. Independent zones should be provided for spaces such as conference rooms, entrance lobbies, kitchen areas, and physical fitness areas.

The Control Room and associated adjacent electronics rooms located inside the Administration Building shall be provided with a separate redundant HVAC system from the administration area's system to provide complete temperature and humidity control for personnel comfort and equipment protection. Failure of any major piece of HVAC equipment shall not cause a failure of the Control Room's or equipment room's HVAC operation.

All HVAC controls shall be designed as direct digital control (DDC). Provide a "front end" computer with all control software including a graphics package that provides visual, on-screen graphics to locate control points and features for the Administration Building and Central Control Room systems.

Prepare floor plans for seating numbers to determine individual space design occupancies. These occupancies shall be incorporated in the load calculations. Heat producing office equipment shall be coordinated with Owner as the design progresses. Calculations shall be in accordance with the ASHRAE Handbook of Fundamentals. Internal equipment gain shall not be used as part of the heating load calculations (loads are not modeled to allow lowering of the base heating load). For the cooling load calculations, the people load is assumed at peak occupancy levels for each space.

HVAC systems shall be designed to limit noise. The systems shall be designed for a NC40 level in accordance with ANSI/ASA S12.2.

## **5.7 MAINTENANCE/WAREHOUSE BUILDING**

The maintenance office shall be provided with a packaged HVAC system. The warehouse workshop area shall be provided with heating and ventilation. Provide a welding booth in the workshop with dedicated ventilation system to remove welding fumes from the building. The welding booth shall be 6 feet wide, 9 feet tall, and 4 feet deep.

## **5.8 HEATING, VENTILATION AND AIR-CONDITIONING EQUIPMENT**

HVAC rotating equipment (AHUs, ACUs, CDUs, and fans) shall be vibrationally isolated from their supporting structures and shall be purchased completely assembled, tested and balanced by the manufacturer. HVAC equipment and systems shall be designed such that components which require maintenance are easily accessible.

All HVAC systems that require ductwork shall be designed to utilize low-pressure ductwork. All ductwork shall be tightly sealed, and rigidly supported. Supply and return ductwork serving air-conditioned areas shall be internally lined in accordance with SMACNA installation details for the entire distribution system. Exhaust systems in air-conditioned areas does not require insulation. Ductwork in non air-conditioned areas does not require insulation. Ductwork in the Administration Building or any other room or area with finished spaces shall be installed in the walls and ceiling and not exposed to view.

Smoke and fire dampers as well as fire rated caulks and sealants for fire rated wall penetrations associated with the ductwork shall be included in the design as required by NFPA and Building Codes.

Ducted systems shall be flow tested and balanced.

## **6 FIRE PROTECTION**

The Facility shall be equipped with a fire protection system that will provide fire protection for the buildings.

The fire protection system is comprised of the fire water supply, water-based fire suppression systems, alarm and detection system, clean agent systems, and portable fire extinguishers.

### **6.1 CODES AND STANDARDS**

In addition to the codes and standards listed in Section 2 – Design Basis, the fire protection systems shall be designed to the Rhode Island Fire Safety Code and the following specific codes and standards:

#### National Fire Protection Association (NFPA)

NFPA 1	Fire Prevention Code
NFPA 10	Standard for Portable Fire Extinguishers
NFPA 11	Standard for Low-, Medium-, and High-Expansion Foam
NFPA 13	Standard for the Installation of Sprinkler Systems
NFPA 14	Standard for the Installation of Standpipes and Hose Systems
NFPA 15	Standard for Water Spray Fixed Systems for Fire Protection
NFPA 16	Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems
NFPA 20	Standard for the Installation of Stationary Pumps for Fire Protection
NFPA 22	Standard for Water Tanks for Private Fire Protection
NFPA 24	Standard for the Installation of Private Fire Service Mains and their Appurtenances
NFPA 25	Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

**Invenergy Clear River Energy Center  
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NFPA 30	Flammable and Combustible Liquids Code
NFPA 54	National Fuel Gas Code
NFPA 55	Compressed Gases and Cryogenic Fluids Code
NFPA 56	Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm and Signaling Code
NFPA 73E	Standard for Safety in the Work Place
NFPA 75	Standard for the Protection of Electronic Computer/Data Processing Equipment
NFPA 80	Standard for Fire Doors and Fire Windows
NFPA 85	Boiler and Combustion Systems Hazards
NFPA 90A	Standard for the Installation of Air-Conditioning and Ventilating Systems
NFPA 101	Life Safety Code
NFPA 110	Standard for Emergency and Standby Power Systems
NFPA 170	Fire Safety and Emergency Symbols
NFPA 220	Standard on Types of Building Construction
NFPA 241	Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA 400	Hazardous Materials Code
NFPA 750	Standard on Water Mist Fire Protection Systems
NFPA 780	Standard for the Installation of Lightning Protection Systems
NFPA 850	Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations
NFPA 2001	Standard on Clean Agent Fire Extinguishing Systems

## **6.2 GENERAL**

All fire protection materials or services that require approval in accordance with NFPA shall be FM or UL approved. The "Authority Having Jurisdiction" shall be the State Fire Marshal. Contractor is responsible for contacting the AHJ and determining if any local codes or rules apply to the Facility. All recommendations of NFPA 850 shall be considered as required in the design of the Facility unless specified differently herein.

## **6.3 FIRE PROTECTION DESIGN BASIS DOCUMENT**

Contractor shall prepare a fire protection design basis document (DBD) in accordance with NFPA 850, Chapter 4 and submit to Owner prior to sending to the AHJ. The approved DBD shall be periodically updated during the design phase of the Facility (including the buildings) and reissued.

## **6.4 FIRE ALARM AND DETECTION**

The custom-designed fire alarm and detection system shall be in accordance with NFPA 72. The fire alarm system shall be an intelligent addressable type using FlashScan™ signaling

**Invenergy Clear River Energy Center  
Specification for Building Design**

line or equivalent circuits. Contractor shall provide a master Fire Alarm Control Unit (FACU) located in the Central Control Room (CCR). All local FACUs shall be connected to the master FACU.

Local FACUs shall accept signals from initiating devices or other FACUs, alarm in the CCR, and process the signals to determine the required output functions, such as provide local alarms and annunciation and/or initiate release of the fire suppression systems.

The CT local FACU shall be connected to the master FACU.

Smoke detection systems shall be provided in the areas specified herein, and as recommended by NFPA 850. Aspirating type smoke detectors shall be provided for electronics and electrical rooms.

Contractor shall provide a shared public address/emergency notification capability into the master FACU. Loud speakers and other notification devices shall be placed throughout the Facility to allow both emergency communications, and regular employee paging. Contractor shall provide the following functionality:

- Speakers shall be located such that paging and emergency announcements can be heard throughout the Facility.
- Ability to make an announcement on the system using the Business Telephone System

## **6.5 FIRE WATER SUPPLY**

The Facility's fire water supply shall come from the Service/Fire Water Storage tank. Contractor shall review and verify the suitability of the water supply to meet the Facility's requirements.

A motor-driven fire pump, diesel-driven fire pump, and a motor-driven jockey pump shall be provided in accordance with NFPA 20. The diesel-driven fire pump shall use ultra low sulfur diesel fuel. The fire pumps shall take suction from a dedicated water volume in the service/fire water storage tank and discharge to the service main (yard loop).

The pumps shall supply the design maximum water demand for any automatic suppression system plus flow for fire hydrants or hose stations per NFPA 850 requirements. The pumps shall have a 10 percent or 10 psi margin on head, whichever is greater.

The electric-motor and diesel-engine-driven fire pumps shall incorporate both manual and automatic start features. A manual start switch shall be on the associated local pump controller and on a mimic panel located in the CCR master FACU. Automatic start shall be initiated by pressure switch in accordance with standard NFPA practice. Once started, the pump(s) shall continue to run until manually stopped at the associated local pump controller. A jockey pump shall be provided to maintain water pressure in the fire water main. During fire conditions, the motor-driven fire pump shall start automatically when pressure in the fire water distribution header drops below a set point. If the pressure in the header continues to drop, the diesel engine fire pump shall automatically start.

## **6.6 FIRE SERVICE MAINS**

The main fire header shall loop around the Facility with service main branch lines to buildings, auxiliary structures, enclosures, yard fire hydrants and water-based suppression systems. The fire service main shall be designed to NFPA 24.

Underground piping material shall be HDPE or ductile iron. Above ground piping material shall be carbon steel. The service main piping minimum size shall be 10 inches.

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Specification for Building Design**

Buildings with fire suppression systems shall have dual feeds from the loop system to ensure both systems are not taken out of service due to a single line break.

Header valves for suppression system isolation should be provided with electronic feedback to the fire control panel. Header PIV are to be provided without tamper switches.

**6.7 FIRE PROTECTION SYSTEMS**

The table below outlines the minimum fire detection and suppression systems to be provided for the Facilities buildings and structures.

<b>Area or Equipment</b>	<b>Suppression System</b>	<b>Detection</b>
CT enclosures	Clean Agent or Water Mist	Cross Zoned Heat Detectors
ST Building: ground floor, mezzanine, and platforms subject to oil flow, oil spray, or oil accumulation	Wet Pipe Sprinkler	Frangible Bulb
ST Building - above the operating floor	Portable Extinguishers	Local Smoke and/or Heat Detectors
Electrical Rooms (switchgear, MCC, etc.)	Portable Extinguishers	Aspirating Smoke Detector
Administration building	Wet pipe Sprinkler	Smoke Detection and Frangible Bulb
Central control room	Portable Extinguishers	Smoke Detection
Maintenance Workshop	Wet Pipe Sprinkler	Frangible Bulb
Warehouse	Wet Pipe Sprinkler	Smoke Detection and Frangible Bulb
Water Treatment building	Wet Pipe Sprinkler	Frangible Bulb
Feedwater Pump Building	Wet Pipe Sprinkler	Frangible Bulb
Auxiliary Boiler Building	Portable Extinguishers	Smoke Detection
Gas Compressor Building	Wet Pipe Sprinkler	Frangible Bulb
Diesel Fire Pump Room	Wet Pipe Sprinkler	Frangible Bulb

**6.8 WATER BASED FIRE SUPPRESSION SYSTEMS**

Sprinkler and fixed spray systems shall be designed and installed in accordance with NFPA 13 and NFPA 15, respectively. Water Mist Fire Protection may be proposed as an alternative.

**6.8.1 Steam Turbine**

Sprinkler systems for the steam turbine shall be designed to Factory Mutual Data Sheet 7-101.

The Power Island turbine building ground floor shall be provided with containment walls and drainage in accordance with NFPA 850 Article 5.5. Trench drains shall be used to contain and remove lube oil from the building and minimize the size of fire sprinkler areas within the turbine building. Containment walls shall be provided under and around the STG to prevent the spread of burning lube oil to other areas, in accordance with the insurance provider’s requirements.

In addition to the NFPA codes, the sprinkler systems for the steam turbine shall be designed to Factory Mutual Data Sheet 7-101. The following deviations and corresponding alternates to FM Global Data Sheet 7-101 are to be provided:

**Invenergy Clear River Energy Center  
Specification for Building Design**

<b>Section</b>	<b>FM Scope Description</b>	<b>Alternate Scope to be Provided</b>
2.2.4.2	Locate oil conditioning systems in a cut-off room of 1 hour construction or outside the turbine building.	Oil conditioning systems to be located on grade floor of the Steam Turbine Building. No cut-off room is required.
2.2.2.1	Provide enhanced fire resistance for structural steel.	Not required if lube oil conditioning skid is located at grade (Concrete turbine pedestal, lube oil reservoir at grade, building steel exposure mitigated by curbing and drainage).
2.2.3.1	Provide an engineered spill containment and emergency drainage system that shall "contain and drain" mineral oil released from lubrication oil systems. Ensure containment is adequate for the quantity of oil in the reservoir.	The design includes drains to a permanent plant drain system that includes containment (oil/water separator) with electric driven pump discharge per NFPA 850 requirements.
2.2.3	Design emergency drainage capacities and floor pitch (to drains) in accordance with FM Global Property Loss Prevention Data Sheet 7-83, <i>Drainage Systems for Ignitable Liquids</i> , or equivalent design criteria, to provide a discharge flow rate equal to the combined water spray and sprinkler demand plus 750 gpm hose stream.	NFPA based 500 gpm hose stream criteria shall be utilized for supply and drainage flow rates.
2.2.5	Control, Seal, and Lube oil Piping	Steam turbine manufacturer's standard piping design shall be used.
2.3.5.F	Provide automatic sprinkler protection for cable trays where quantity presents significant fire loading.	Automatic sprinkler protection of cable trays is not to be provided.
2.4.1.1	Provide a water supply capable of meeting the maximum design sprinkler discharge flow rate plus 750 gpm for hose streams.	NFPA 850 criteria of 500 gpm shall be used. This exception applies across Data Sheet 7-101.
2.4.1.3	Install automatic sprinklers in accordance with Data Sheet 2-0, <i>Installation Guidelines for Automatic Sprinklers</i> . Install automatic water-spray systems in accordance with Data Sheet 4-1N, <i>Water Spray Fixed Systems, for Fire Protection</i> .	NFPA design basis to be used.
2.4.1.10	If fire pump(s) are needed, use FM Approved fire pumps, controllers and drivers as applicable. Install them in accordance with recommendations in DS 3-7, <i>Fire Protection Pumps</i> . If electric motor driven pumps are used, supply power from a source that shall not be interrupted in the event of loss of power to the Station.	NFPA design basis to be used.
2.4.2	Provide one of the following protection methods over oil pumps and conditioning equipment where pressurized releases could result in spray fires that could expose the roof, operating floor, turbine, generator, or other critical targets	Subparagraph D shall be used - FM approved spray shields on flanges of piping shall be provided.
2.4.4.1.b	Provide a fixed, automatically actuated water spray system with directional-spray nozzles or automatic sprinkler protection for the control oil system containing mineral oil.	An FM approved fire resistant fluid shall be utilized, therefore a spray water system is not to be provided.

**Invenergy Clear River Energy Center  
Specification for Building Design**

<b>Section</b>	<b>FM Scope Description</b>	<b>Alternate Scope to be Provided</b>
2.4.4.3	Direct Connected Exciter Enclosure CO2 system.	A CO2 based protection system is not to be provided for the static excitation design.

**6.9 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS**

Clean agent suppression systems shall be designed in accordance with NFPA 2001.

Clean agent systems shall use INERGEN or NOVEC. Halon is prohibited. Carbon dioxide suppression systems shall not be applied without Owner approval for their use.

**6.10 FIRE EXTINGUISHERS**

Portable multipurpose dry chemical extinguishers shall be located throughout the Facility.

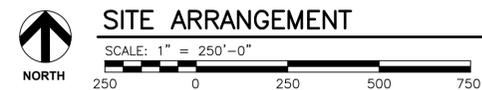
These extinguishers shall be sized, rated, and spaced in accordance with NFPA 10.

Supplemental CO<sub>2</sub> extinguishers having a minimum rating of 20B:C shall be located to serve electrical equipment rooms and control rooms.



- NOTES:**
1. WETLANDS DELINEATION PERFORMED BY ESS GROUP, INC., WALTHAM, MA. SURVEY CONDUCTED JULY 2015. ALL WETLANDS MUST BE CONFIRMED BY DEM.
  2. SURVEY PERFORMED BY WATERMAN ENGINEERING COMPANY, EAST PROVIDENCE, RI. SURVEY DRAWING: 15-015\_SU1\_EMAIL\_2-12-2016.DWG
  3. SET-BACK FROM FUTURE CONSTRUCTION ROW FOR SINGLE OR DOUBLE CIRCUIT.
  4. SEE DRAWING C1002 FOR CONSTRUCTION LAYDOWN EXTENTS AND REQUIREMENTS.
  5. THE TWO UNITS AT THIS FACILITY WILL BE INSTALLED IN PHASES. THE FIRST UNIT (UNIT 1) SHALL BE INSTALLED IN PHASE 1 AND THE SECOND UNIT SHALL BE INSTALLED IN PHASE 2. THE COMMON BOP SYSTEMS SHALL BE DESIGNED FOR BOTH UNITS AND INSTALLED IN PHASE 1.

- LEGEND**
- INDICATES EXISTING PROPERTY LINES FROM SURVEYOR
  - INDICATES PROPOSED PROPERTY LINES BY HDR
  - INDICATES EXISTING DELINEATED WETLANDS
  - INDICATES CONSTRUCTION LAYDOWN EXTENTS



**SITE ARRANGEMENT**

SCALE: 1" = 250'-0"



ISSUE	DATE	DESCRIPTION	DWN	ENGR	CHK	APPV
4	06 JUL 16	ADDED FENCE LINE	EDC	-	-	-
3	30 JUN 16	REVISED PROPERTY LINES & SITE ARRANGEMENT	EDC	-	-	-
2	30 MAR 16	ISSUED FOR PROPERTY SUBDIVISION APPROVAL	EDC	-	-	-
1	07 MAR 16	BID ISSUE (STAGGERED UNIT INSTALLATION)	EDC	-	-	-
0	02 NOV 15	M0102 BID ISSUE	EDC	-	-	-

**PRELIMINARY  
NOT FOR  
CONSTRUCTION  
OR  
RECORDING**

**INVENERGY, LLC  
CLEAR RIVER ENERGY CENTER**

**SINGLE SHAFT  
SITE ARRANGEMENT**

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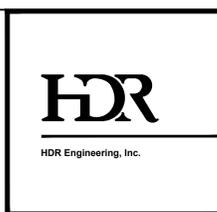
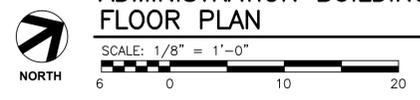




**NOTES:**  
 1. ROOM DESIGN TO MEET ICC-500 CRITERIA FOR STORM SHELTER.

**LEGEND:**  
 - - - - - INDICATES NERC CIP SIX WALL BOUNDARY  
 \_\_\_\_\_ INDICATES AREA OF REFUGE (STORM SHELTER)

**ADMINISTRATION BUILDING FLOOR PLAN**



ISSUE	DATE	DESCRIPTION	DWN	ENGR	CHK	APPV
1	07 MAR 16	BID ISSUE (STAGGERED UNIT INSTALLATION)	EDC	-	-	-
0	02 NOV 15	M0102 BID ISSUE	EDC	-	-	-

**PRELIMINARY  
 NOT FOR  
 CONSTRUCTION  
 OR  
 RECORDING**

**INVENERGY, LLC  
 CLEAR RIVER ENERGY CENTER**

**ADMINISTRATION BUILDING FLOOR PLAN**

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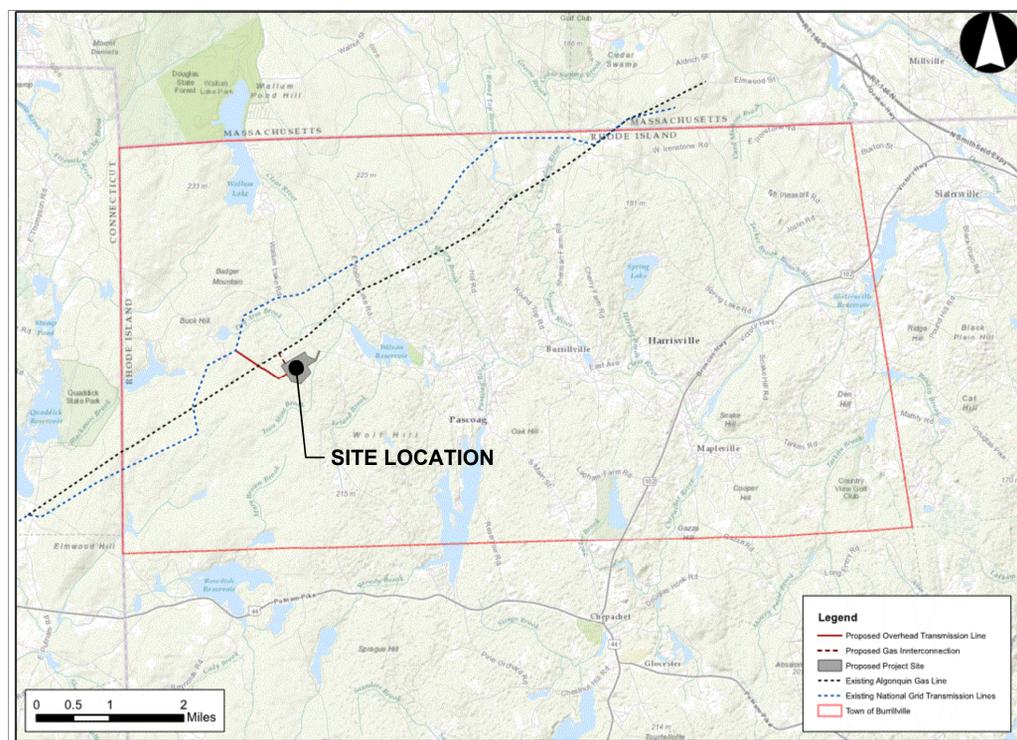


Drawing Package For

# Stormwater Management

## INDEX OF DRAWINGS

SITE PLANS	
01C000	COVER
01C001	LEGEND
01C100	EXISTING DRAINAGE CONDITIONS
01C200	SITE LAYOUT PLAN
01C300	GRADING PLAN
01C400	DRAINAGE PLAN
01C600	ROADWAY PLAN AND PROFILE
01C601	ROADWAY PLAN AND PROFILE
01C800	STORMWATER DETAILS
01C801	STORMWATER DETAILS
01C802	STORMWATER DETAILS
01C803	STORMWATER DETAILS
01C804	STORMWATER DETAILS
01C805	STORMWATER DETAILS



## Clear River Energy LLC

Project No.  
00000000238926

Burrillville, Rhode Island  
September, 2016

**CIVIL MAPPING SYMBOLOGY**

**UTILITY/CIVIL LINE SYMBOLOGY**

-  **IP6** SILT FENCE INLET PROTECTION
-  DIRECTION OF OVERLAND FLOW DURING & AFTER MASS GRADING
-  **X.XX** DIRECTION OF OVERLAND FLOW W/ GRADE
-  **SB** SEDIMENT BASIN
-  **CE** TEMPORARY STONE CONSTRUCTION EXIT
-  **DB** TEMPORARY DIVERSION DITCH/BERM
-  **OP1** OUTLET PROTECTION RIP-RAP PAD (FOR SIZE SEE DETAIL)
- (11R)** HYDROCAD REFERENCE NODE FOR CALCS
-  WETLAND
-  SPECIAL AQUATIC SITE
-  PROPOSED STORM STRUCTURE
-  **D** EXISTING POINT OF DISCHARGE
-  **D** PROPOSED POINT OF DISCHARGE
-  LIMITS OF DRAINAGE SUB-BASIN
-  EXISTING LIGHT POLE
-  **S** EXISTING SIGN

-  PROPERTY LINE SETBACK
-  PROPERTY LINE
-  500 EXISTING CONTOUR ELEVATIONS
-  500 PROPOSED CONTOUR ELEVATIONS
-  **LOD** LIMITS OF DISTURBANCE (SILT FENCE INSTALLATION, SEE NOTE ABOVE)
-  **SF** PROPOSED SILT FENCE
-  PROPOSED STORM DRAIN
-  WETLAND
-  WETLAND BUFFER
-  EXISTING STREAM
-  EXISTING STREAM BANK
-  100' STREAM BUFFER
-  200' STREAM BUFFER
-  RIGHT OF WAY
-  DRAINAGE AREAS
-  **>** DRAINAGE PATHS
-  TREELINE
-  **G** EXISTING GAS LINE

**GENERAL NOTES:**

1. THIS IS A STANDARD CIVIL SYMBOLOGY SHEET. ALL SYMBOLS ARE NOT NECESSARILY USED ON THIS PROJECT.
2. SCREENING OR SHADING OF WORK IS USED TO INDICATE EXISTING COMPONENTS OR TO DE-EMPHASIZE PROPOSED IMPROVEMENTS TO HIGHLIGHT SELECTED TRADE WORK. REFER TO CONTEXT OF EACH SHEET FOR USAGE.

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ISSUE	DATE	DESCRIPTION	PROJECT NUMBER	PROJECT MANAGER
			00000000238926	C. JACOBS

CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**LEGEND**

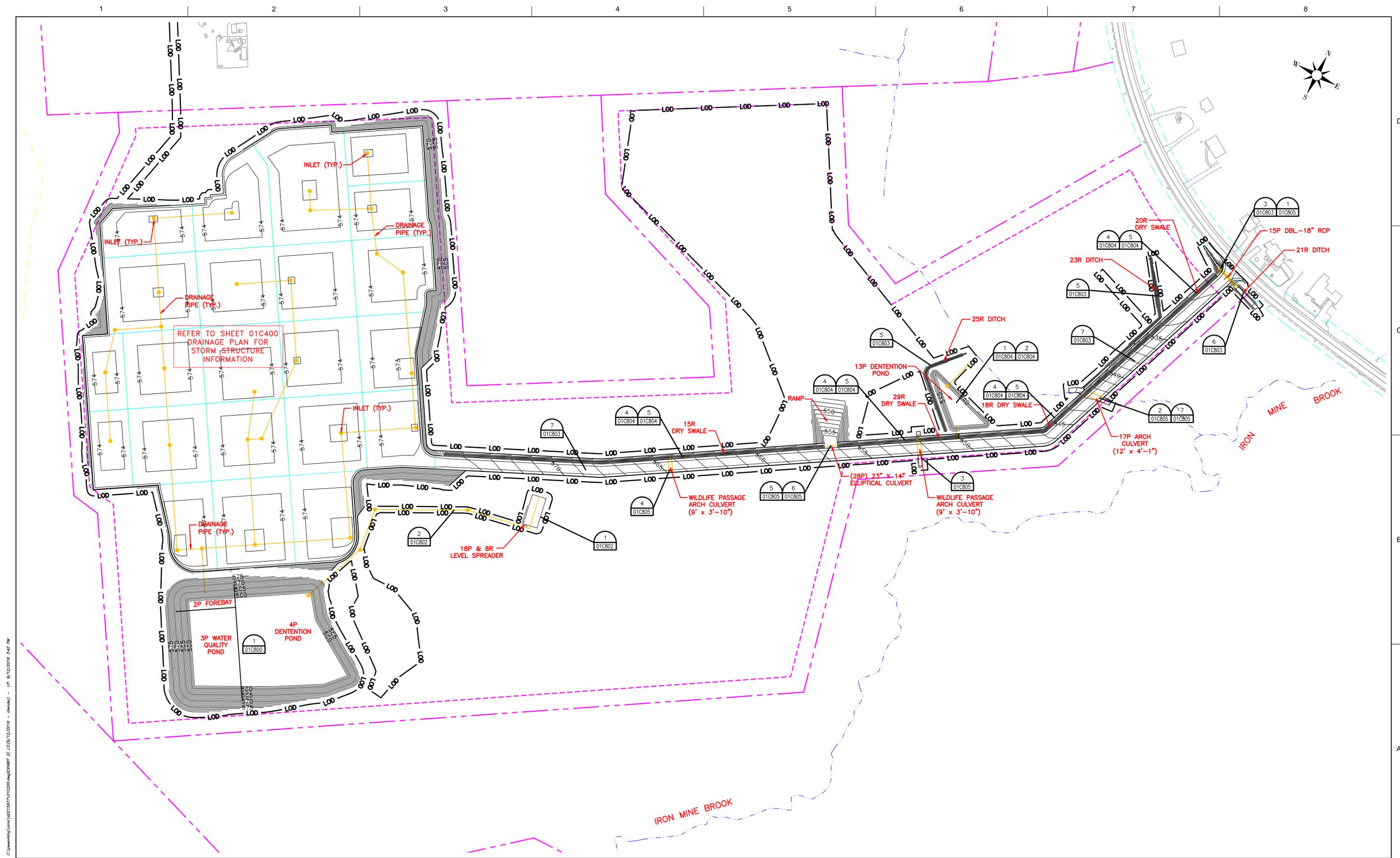


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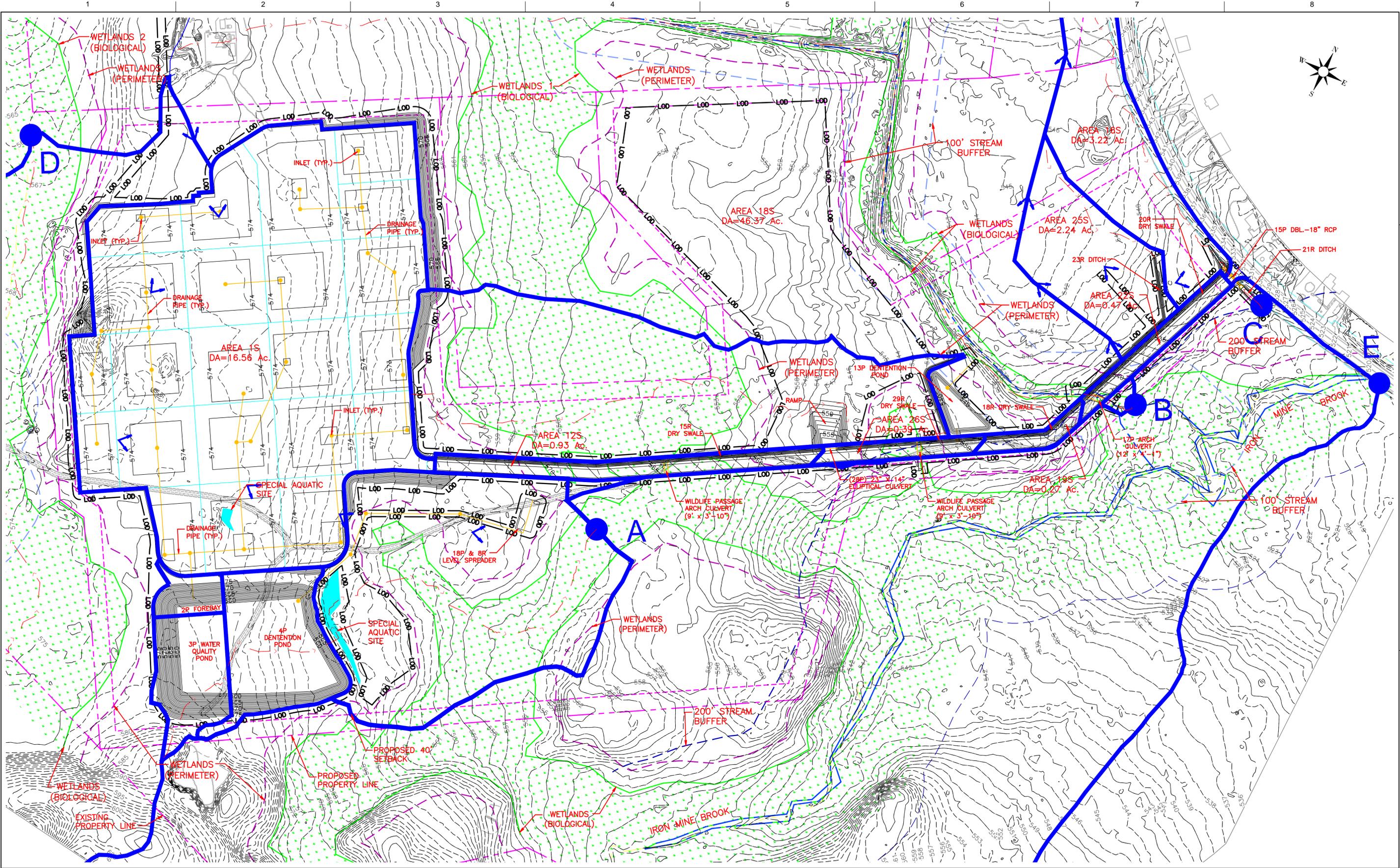
PROJECT MANAGER C. JACOBS		
ISSUE	DATE	DESCRIPTION
PROJECT NUMBER	00000000238926	

CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED SITE LAYOUT PLAN**



SHEET  
**01C200**



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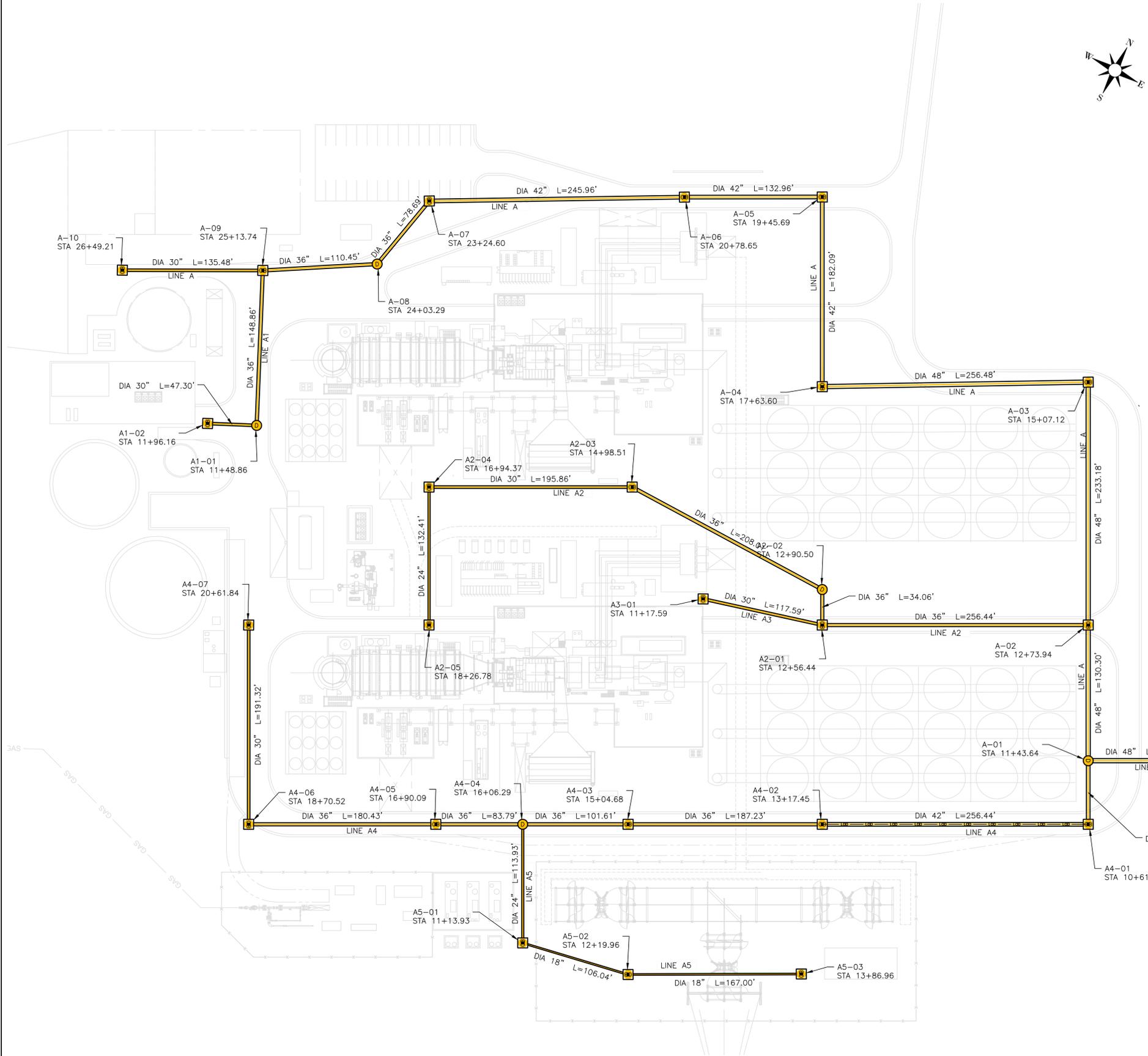


PROJECT MANAGER C. JACOBS		
ISSUE	DATE	DESCRIPTION
PROJECT NUMBER	00000000238926	

CLEAR RIVER ENERGY CENTER  
 TOWN OF BURRILLVILLE,  
 PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED GRADING, DRAINAGE  
 AND WATER QUALITY PLAN**

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 SCALE: AS SHOWN  
 SHEET: 01C300



STRUCTURE TABLE				
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A-01	MANHOLE	N:320837.98 E:259130.75	573.78	563.12
A-02	DROP BOX INLET	N:320907.01 E:259241.27	572.62	563.43
A-03	DROP BOX INLET	N:321030.54 E:259439.04	572.38	564.02
A-04	DROP BOX INLET	N:321245.76 E:259299.53	572.69	564.66
A-05	DROP BOX INLET	N:321342.22 E:259453.97	572.94	565.11
A-06	DROP BOX INLET	N:321454.91 E:259383.40	572.57	565.43
A-07	DROP BOX INLET	N:321661.52 E:259249.96	573.02	566.05
A-08	MANHOLE	N:321762.35 E:259171.98	573.84	566.25
A-09	DROP BOX INLET	N:321762.10 E:259108.33	572.90	566.52
A-10	DROP BOX INLET	N:321762.40 E:259036.78	572.90	566.86
A1-01	MANHOLE	N:321688.60 E:258979.02	573.36	566.89
A1-02	DROP BOX INLET	N:321729.69 E:258955.59	572.77	567.01
A2-01	DROP BOX INLET	N:321124.51 E:259105.41	573.16	564.09
A2-02	MANHOLE	N:321142.55 E:259134.30	573.59	564.18
A2-03	DROP BOX INLET	N:321350.11 E:259120.61	572.95	564.70
A2-04	DROP BOX INLET	N:321516.23 E:259016.85	572.95	565.19
A2-05	DROP BOX INLET	N:321446.08 E:258904.55	573.17	565.52
A3-01	DROP BOX INLET	N:321235.22 E:259065.79	573.16	564.38
A4-01	DROP BOX INLET	N:320805.65 E:259079.00	572.62	563.27
A4-02	DROP BOX INLET	N:321023.15 E:258943.15	573.16	563.91

STRUCTURE TABLE				
NAME	TYPE	LAYOUT COORDINATES	LID	SUMP ELEVATION
A4-03	DROP BOX INLET	N:321181.95 E:258843.96	573.16	564.38
A4-04	MANHOLE	N:321268.12 E:258790.13	574.34	564.63
A4-05	DROP BOX INLET	N:321339.19 E:258745.74	572.89	564.84
A4-06	DROP BOX INLET	N:321492.23 E:258650.15	572.92	565.29
A4-07	DROP BOX INLET	N:321593.58 E:258812.41	572.75	565.77
A5-01	DROP BOX INLET	N:321207.77 E:258770.50	574.34	564.91
A5-02	DROP BOX INLET	N:321105.53 E:258721.62	573.45	565.18
A5-03	DROP BOX INLET	N:320964.15 E:258810.50	573.26	565.60

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ISSUE	DATE	DESCRIPTION
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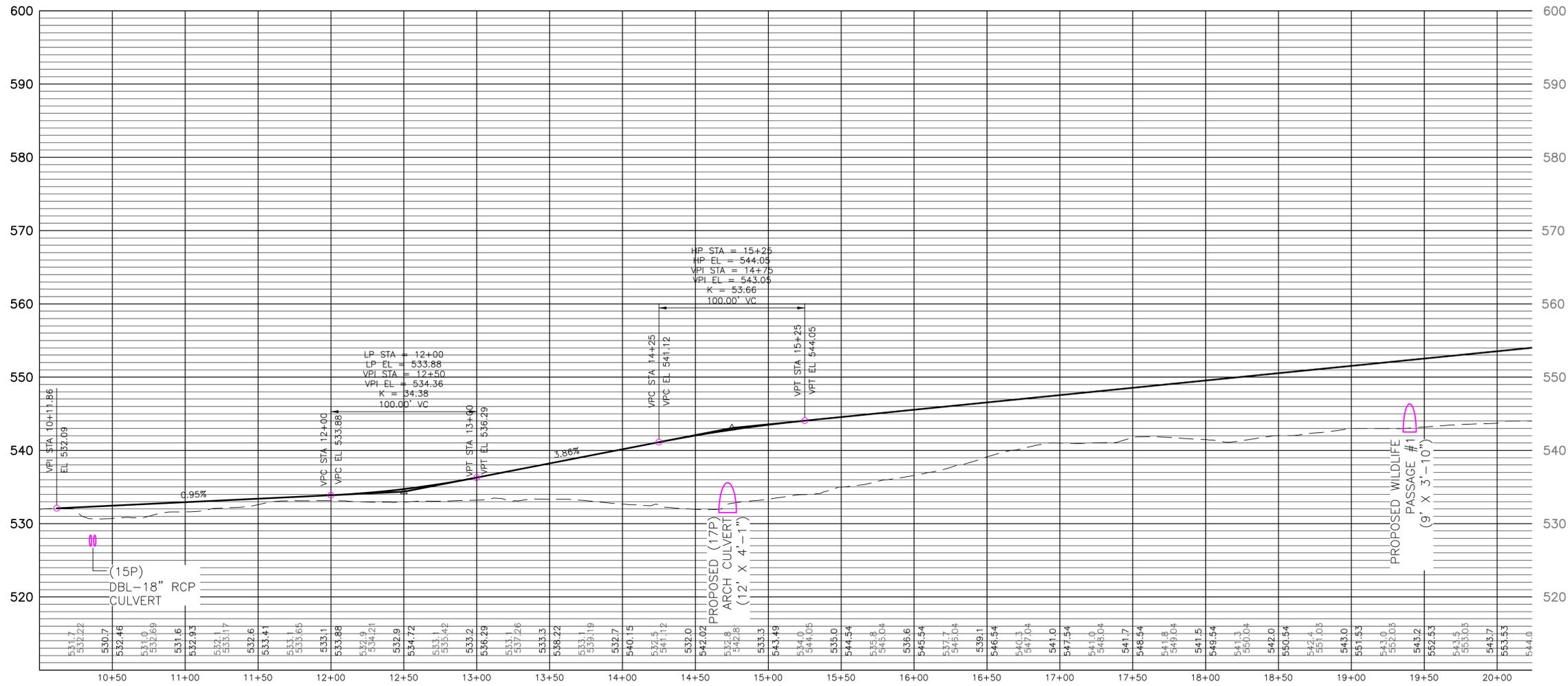
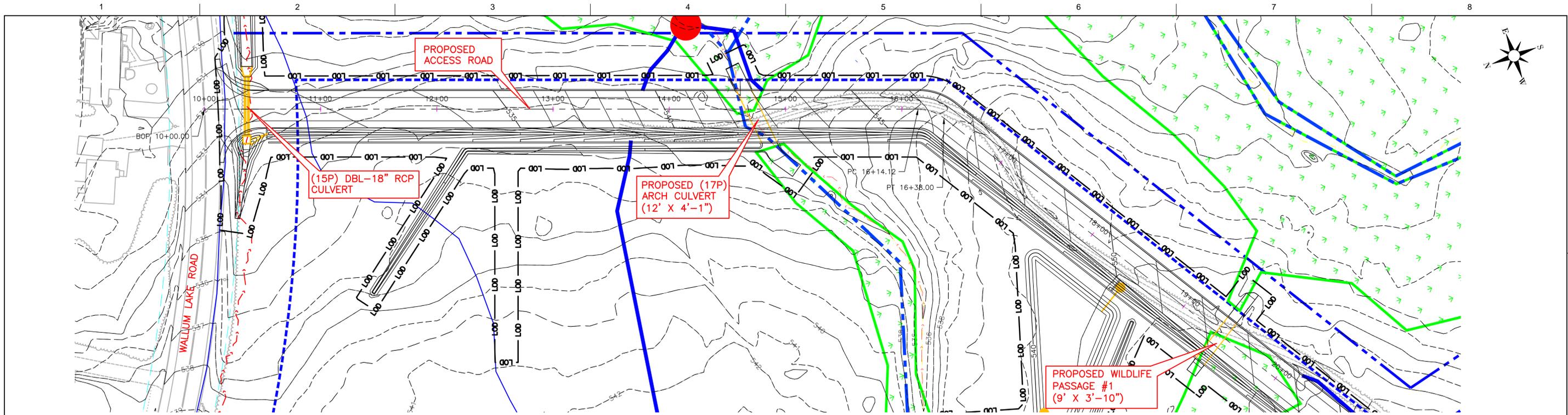
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED DRAINAGE PLAN**



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SCALE | AS SHOWN

SHEET  
**01C400**



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ISSUE	DATE	DESCRIPTION

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PROJECT NUMBER	000000000238926

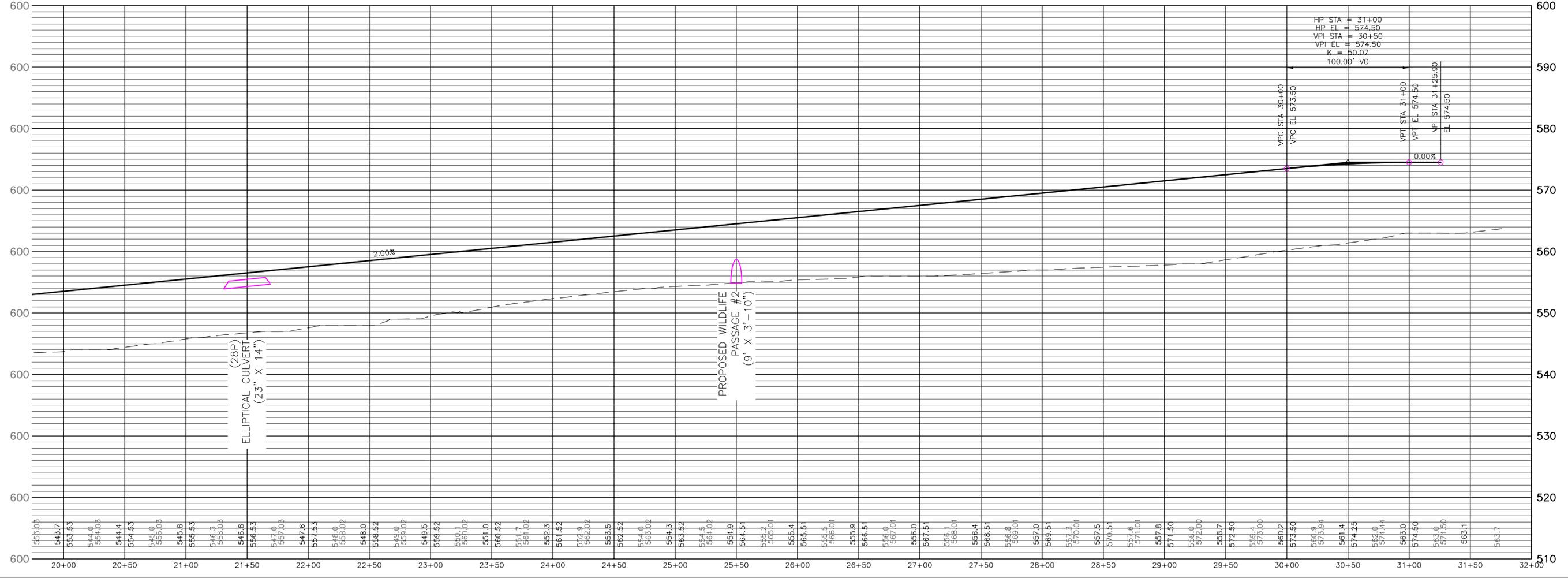
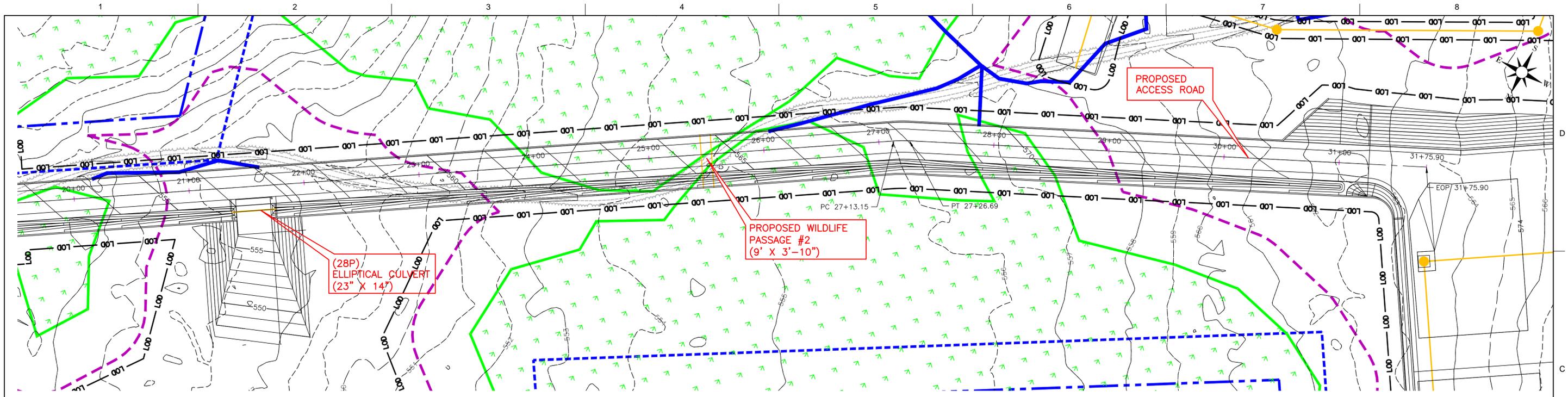
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**ROADWAY  
PLAN & PROFILE**



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SCALE | AS SHOWN

SHEET  
**01C600**



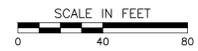
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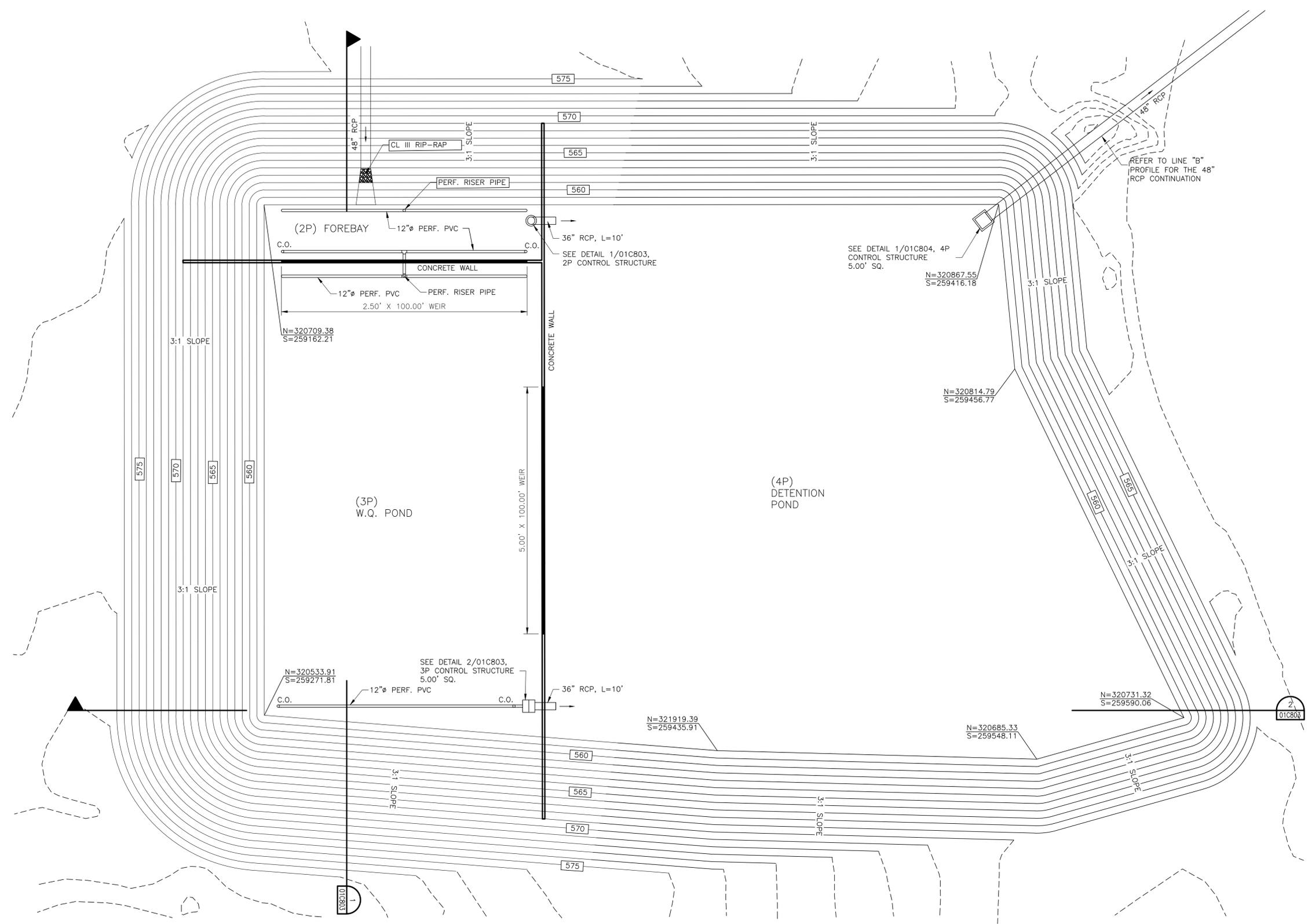
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND



FILENAME 01C601.dwg  
SCALE AS SHOWN

**ROADWAY  
PLAN & PROFILE**

SHEET  
**01C601**



**BASIN A DETAIL (2P)(3P)(4P)**

SCALE: 1"=20'



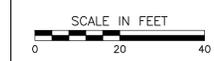
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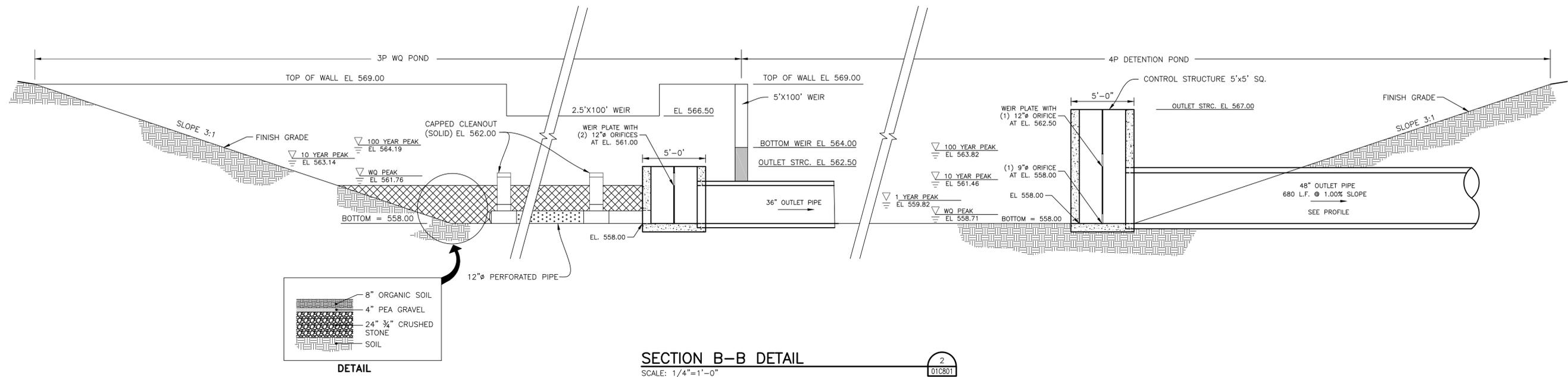
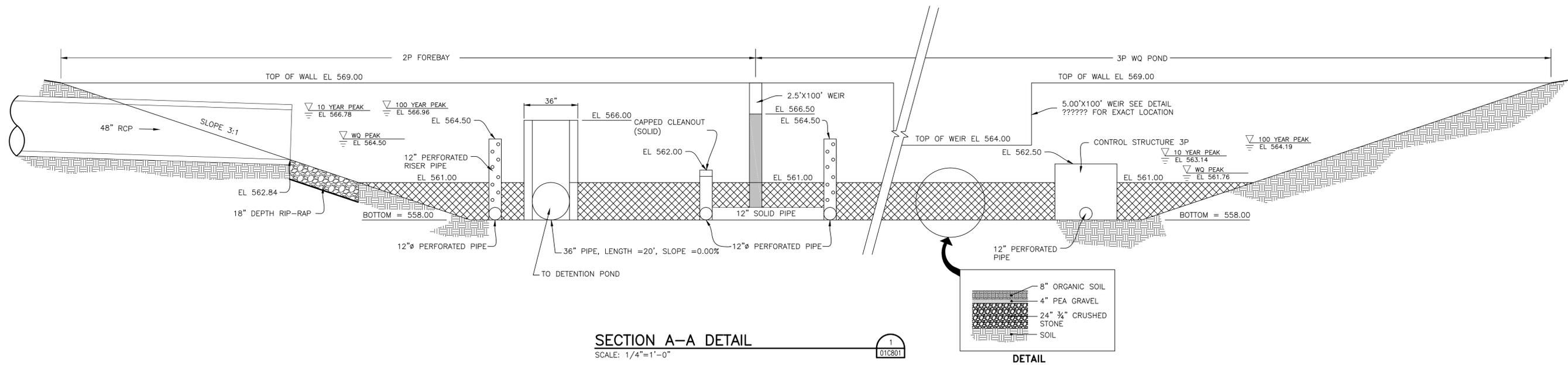
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED SITE  
DRAINAGE DETAILS**



FILENAME 01C800.dwg  
SCALE AS SHOWN

SHEET  
**01C800**



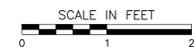
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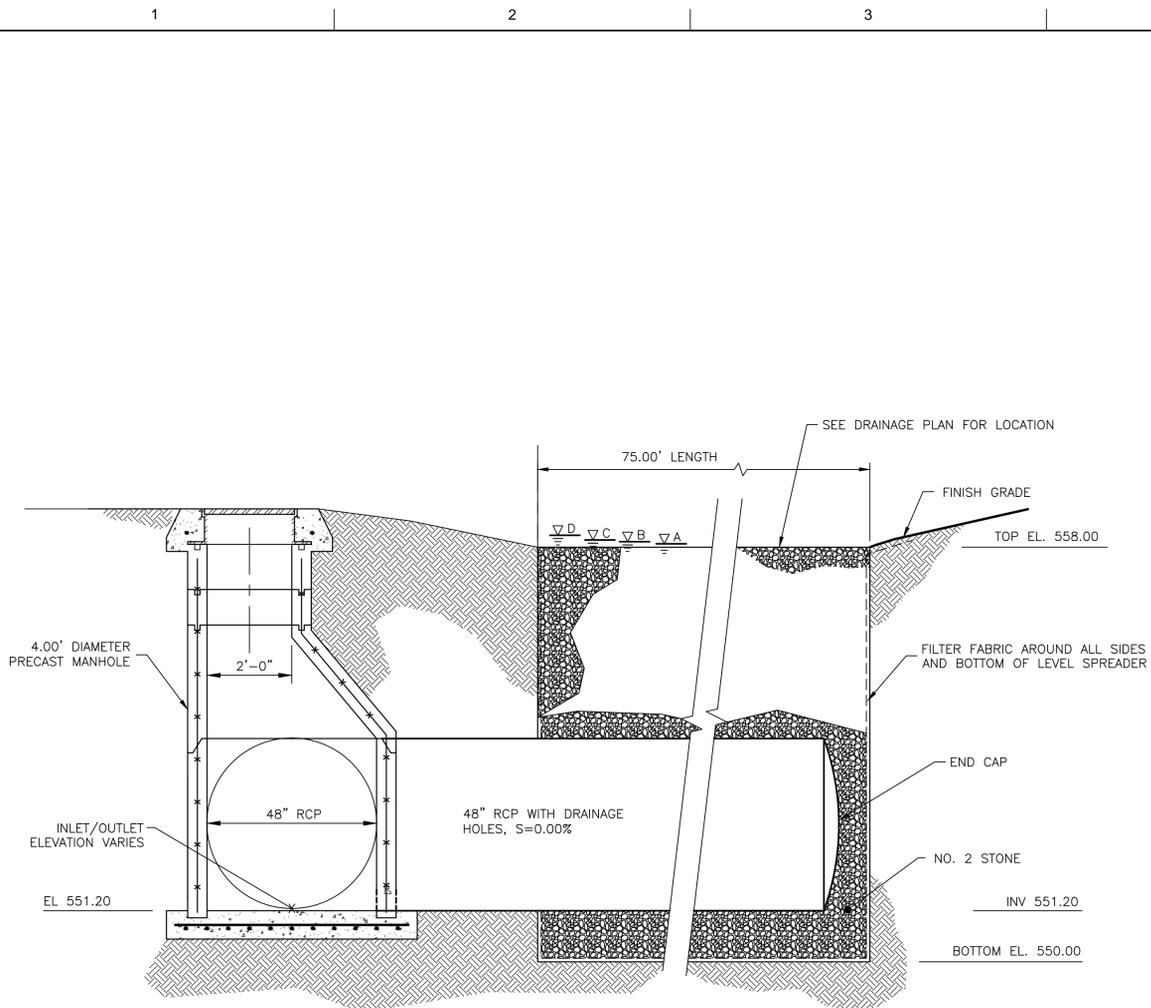
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED SITE  
DRAINAGE DETAILS**



FILENAME | 01C801.dwg  
SCALE | AS SHOWN

SHEET  
**01C801**



WATER DEPTH SCHEDULE		
	STORM EVENT	ELEVATION
A	WQ PEAK	558.08
B	1 YR PEAK	558.13
C	10 YR PEAK	558.17
D	100 YR PEAK	558.28

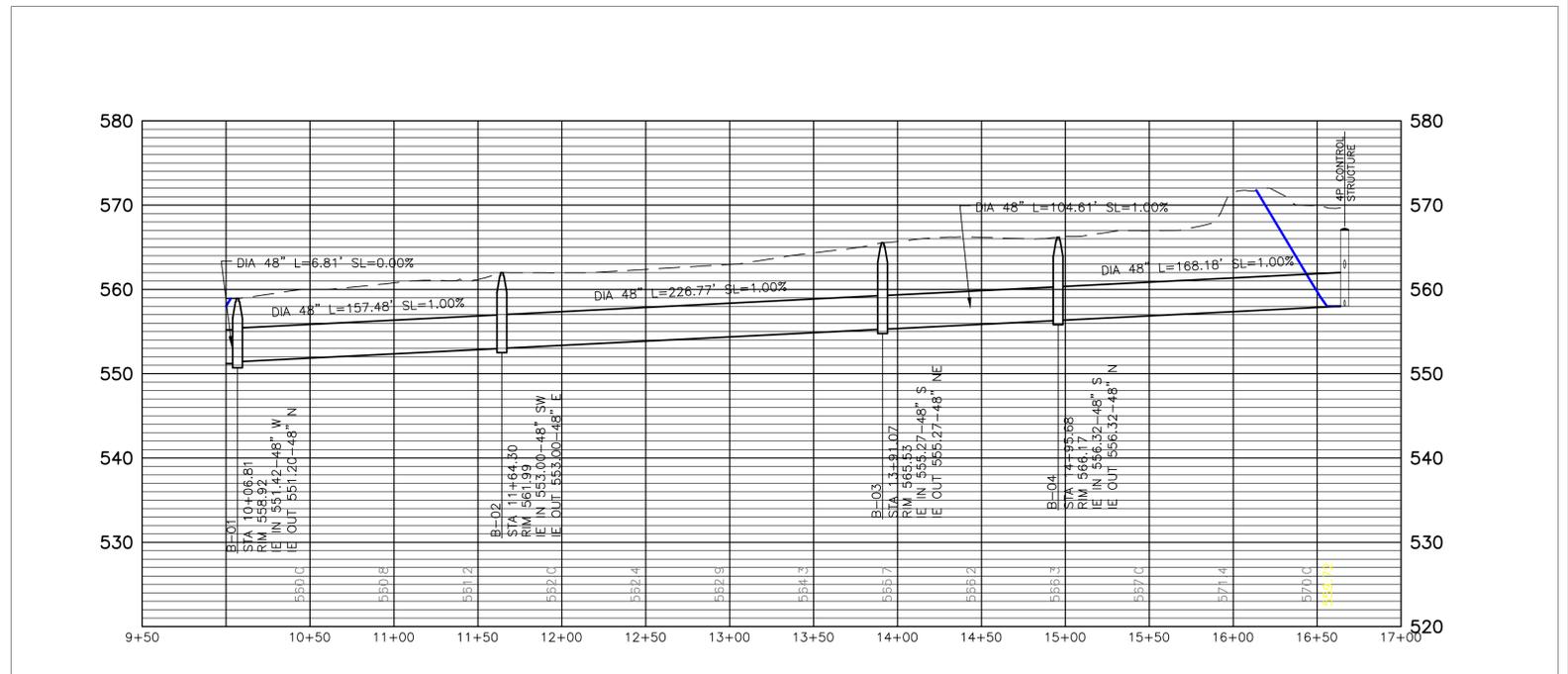
**NOTE:**

- 1) 48" I.D. PERFORATED UNDERDRAIN WITH FILTER SOCK. LAY PIPE WITH PERFORATIONS ON BOTTOM OF PIPE AND CAP END OF PIPE. LAY UNDERDRAIN AT 0.00% SLOPE FROM MANHOLE INVERT AND THRU BOTTOM OF LEVEL SPREADER.
- 2) WATER DEPTH MEASURED FROM TOP OF LEVEL SPREADER = EL 558.00.

**LEVEL SPREADER DETAIL (18P)**

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

1  
01C802



**PROFILE OF LINE B**

SCALE: HOR- 1"=50' VER- 1"= 5'

2  
01C802

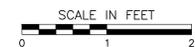
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ISSUE	DATE	DESCRIPTION	PROJECT NUMBER	PROJECT MANAGER
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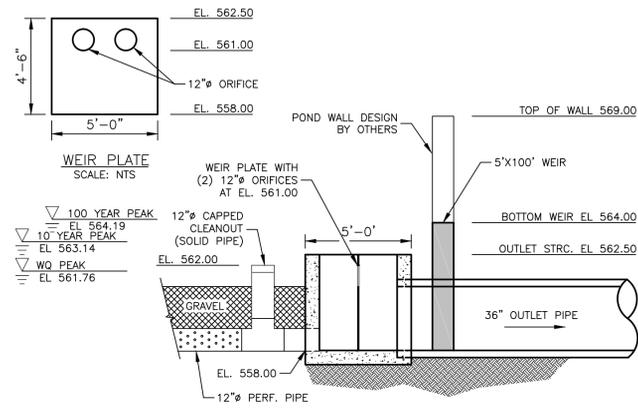
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED SITE  
DRAINAGE DETAILS**



FILENAME 01C802.dwg  
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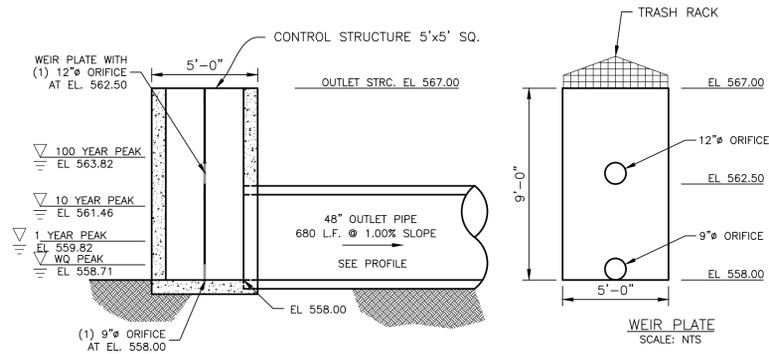
SHEET  
**01C801**



**CONTROL STRUCTURE DETAIL (3P)**

SCALE: NTS

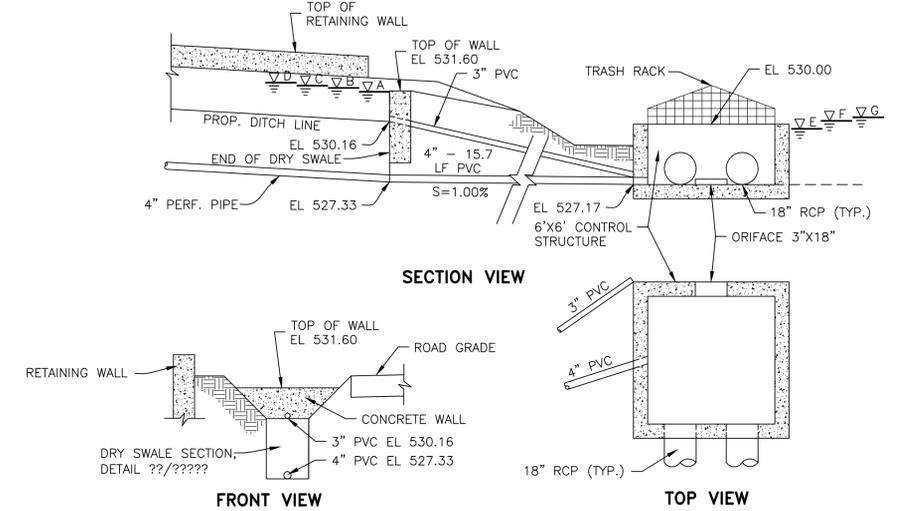
1  
01C803



**CONTROL STRUCTURE DETAIL (4P)**

SCALE: NTS

2  
01C803



**WATER DEPTH SCHEDULE (23P)**

	STORM EVENT	ELEVATION
A	WQ PEAK	531.56
B	1 YR PEAK	531.74
C	10 YR PEAK	531.85
D	100 YR PEAK	531.99

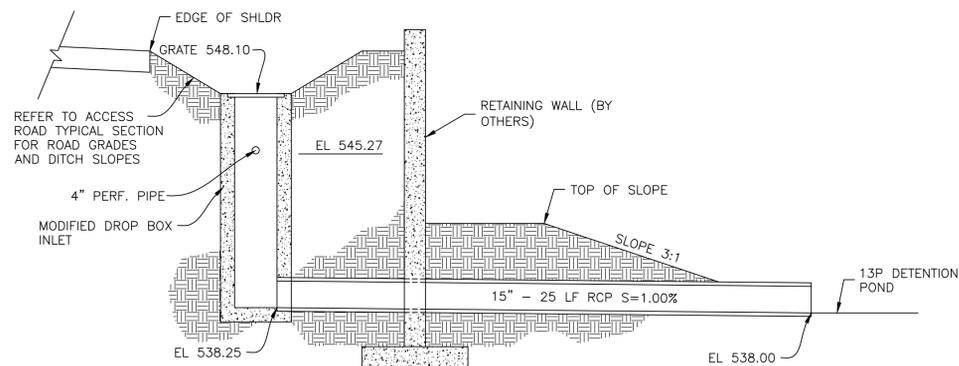
**WATER DEPTH SCHEDULE (15P)**

	STORM EVENT	ELEVATION
E	1 YR PEAK	529.79
F	10 YR PEAK	530.16
G	100 YR PEAK	530.33

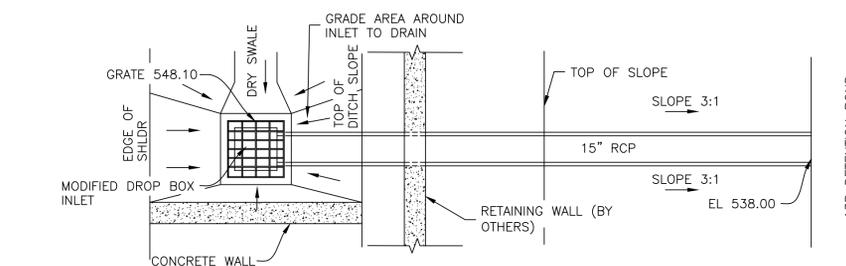
**END OF SWELL 20R DETAIL (23P)(15P)**

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

3  
01C803



**SECTION VIEW**

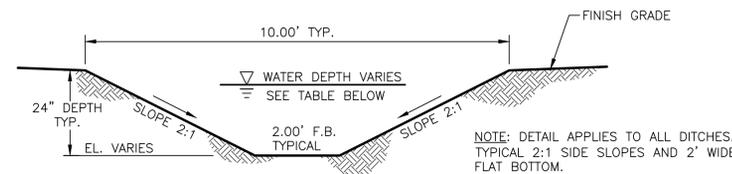


**PLAN VIEW**

**END OF SWELL DETAIL (29R)**

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

4  
01C803

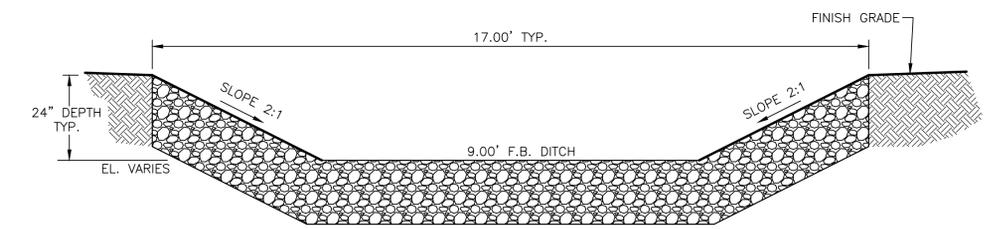


STORM EVENT	WATER DEPTH SCHEDULE	
	RE-ROUTING DITCH (23R)	RE-ROUTING DITCH (25R)
1 YR PEAK	0.32	0.56
10 YR PEAK	0.60	1.00
100 YR PEAK	0.92	1.49

**TYPICAL DITCH SECTION (23R)**

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

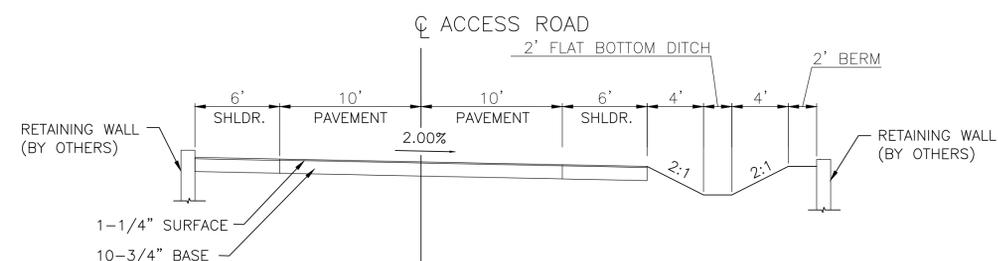
5  
01C803



**OUTLET CHANNEL FOR DBL 18" RCP (21R)**

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

6  
01C803



**ACCESS ROAD TYPICAL SECTION**

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

7  
01C803

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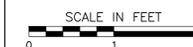
ISSUE	DATE	DESCRIPTION

PROJECT MANAGER C. JACOBS

PROJECT NUMBER 00000000238926

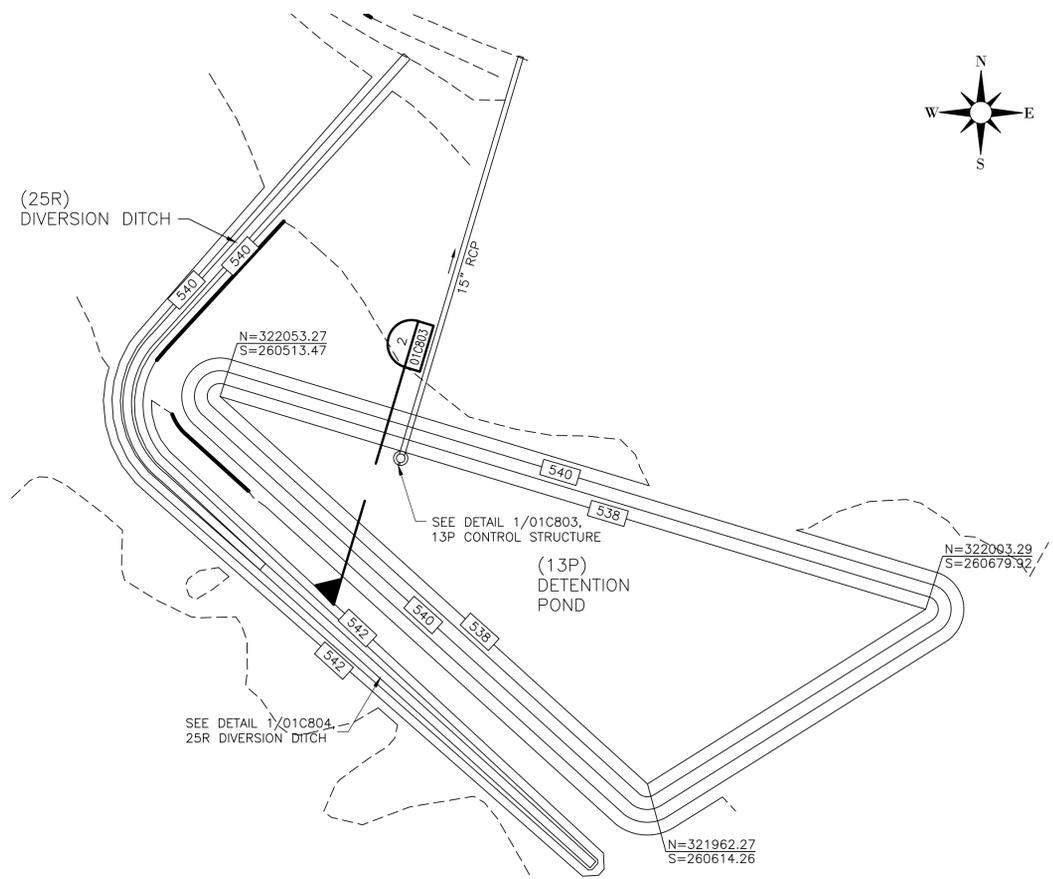
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED SITE  
DRAINAGE DETAILS**

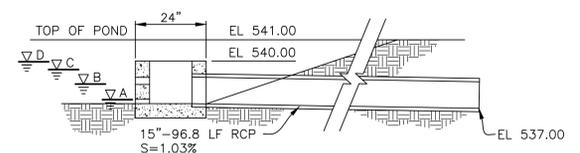


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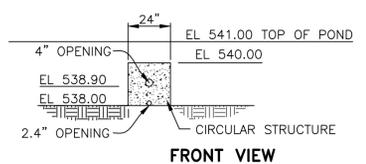
SHEET  
**01C803**



**BASIN B DETAIL (13P)**  
SCALE: 1"=20'



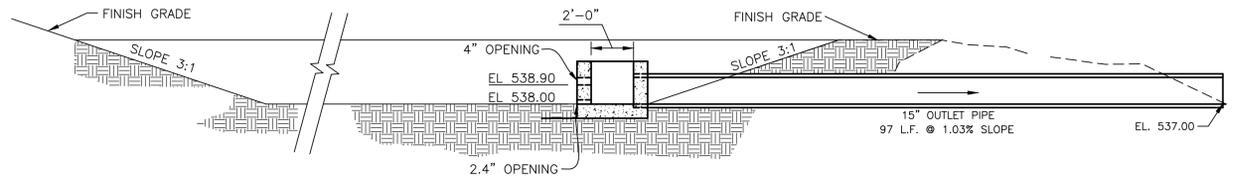
**SECTION VIEW**



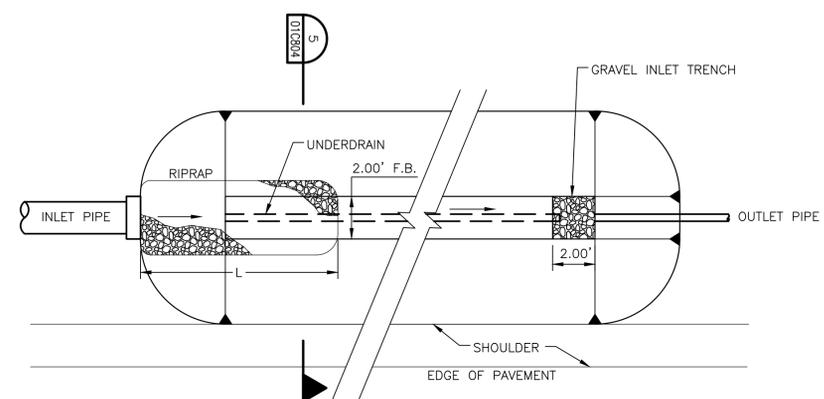
**FRONT VIEW**

WATER DEPTH SCHEDULE		
STORM EVENT		ELEVATION
A	WQ PEAK	538.19
B	1 YR PEAK	538.92
C	10 YR PEAK	539.60
D	100 YR PEAK	539.97

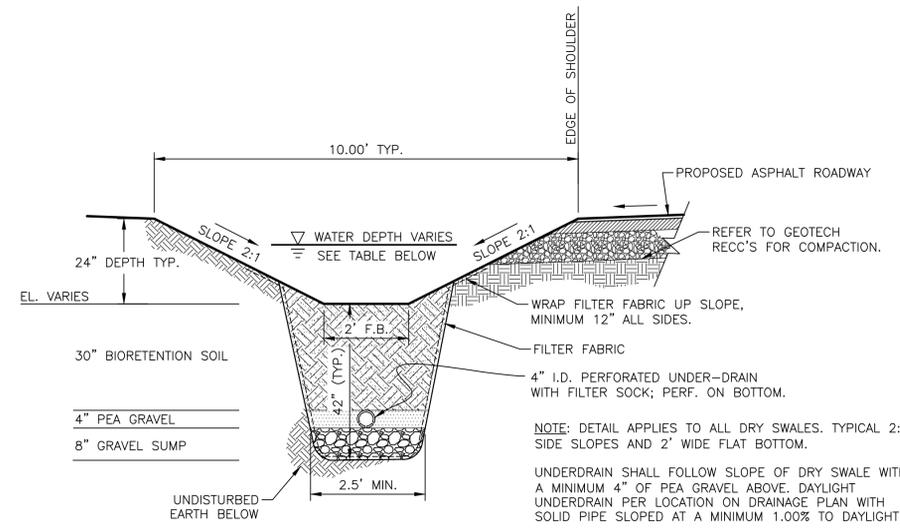
**CONTROL STRUCTURE DETAIL (13P)**  
SCALE: 1/4"=1'-0"



**SECTION C-C DETAIL (13P)**  
SCALE: 1/4"=1'-0"



**TYPICAL DRY SWALE DETAIL**  
SCALE: 1/4"=1'-0"



STORM EVENT	MAX. WATER DEPTH (IN FEET)			
	DRY SWALE - 1 (15R)	DRY SWALE - 2 (18R)	DRY SWALE - 3 (20R)	DRY SWALE - 4 (29R)
WATER QUALITY	0.12	0.03	0.11	0.13
1 YR PEAK	0.26	0.08	0.25	0.30
10 YR PEAK	0.41	0.12	0.38	0.46
100 YR PEAK	0.59	0.17	0.53	0.66

**TYPICAL DRY SWALE SECTION (15R)(29R)(18R)(20R)**  
SCALE: 1/2"=1'-0"

C:\pwworking\jacob\102218971\01C804.dwg(PLT) LS(9/12/2016 4:28 PM) - LPL 9/12/2016 4:28 PM



ISSUE	DATE	DESCRIPTION

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PROJECT NUMBER	00000000238926

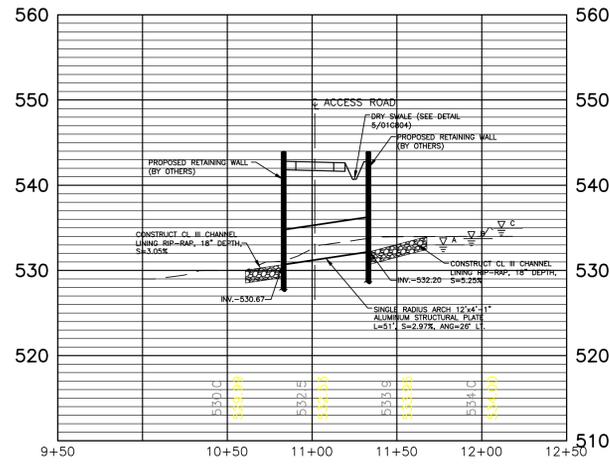
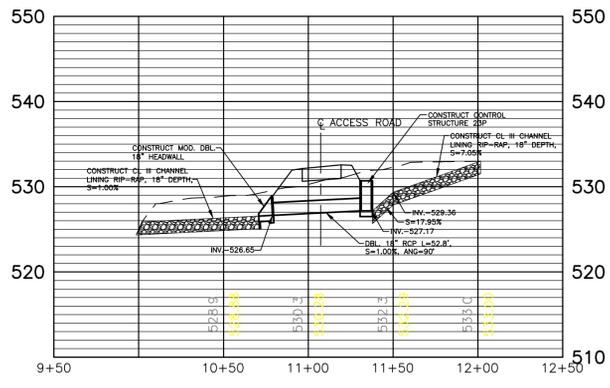
CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

**PROPOSED SITE  
DRAINAGE DETAILS**

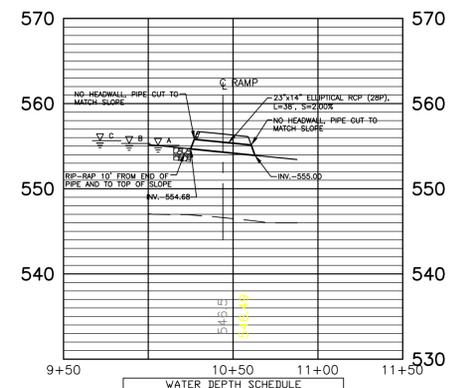
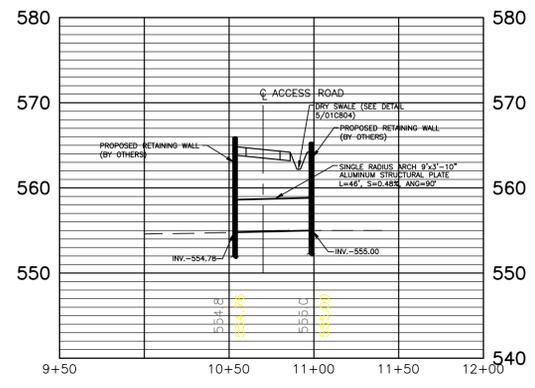
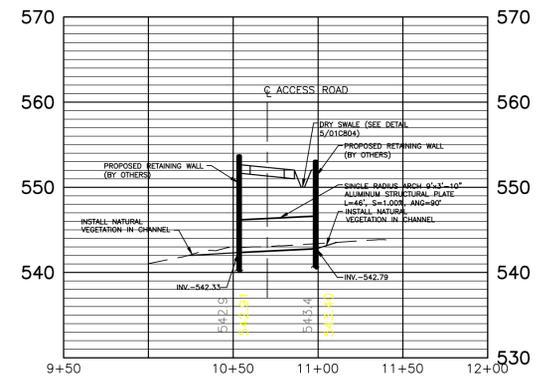


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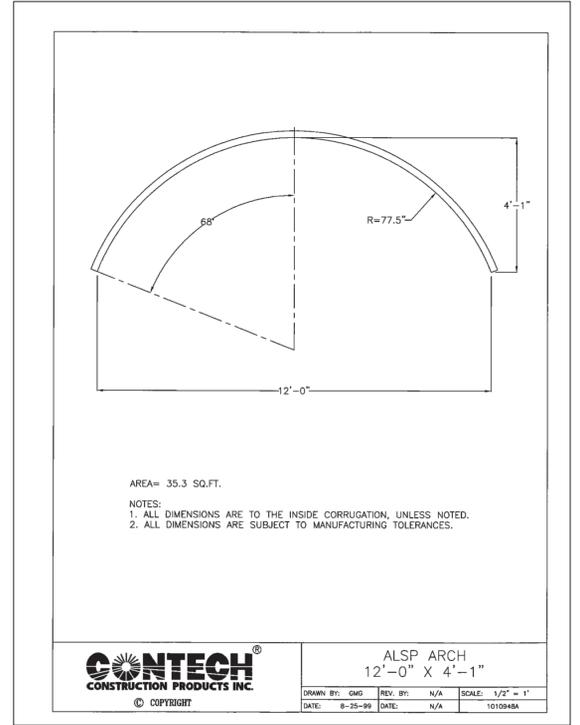
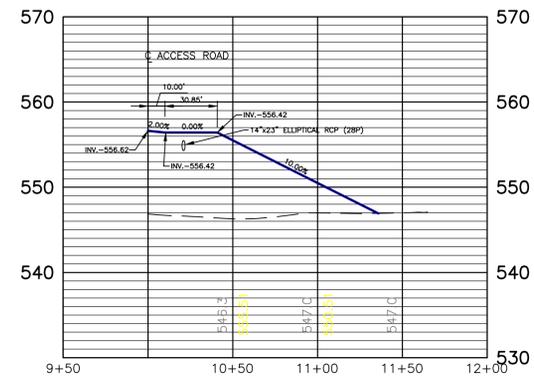
SHEET  
**01C804**



WATER DEPTH SCHEDULE		
STORM EVENT	ELEVATION	
A 1 YR PEAK	533.00	
B 10 YR PEAK	533.76	
C 100 YR PEAK	534.96	



WATER DEPTH SCHEDULE		
STORM EVENT	ELEVATION	
A 1 YR PEAK	555.02	
B 10 YR PEAK	555.25	
C 100 YR PEAK	555.57	



WILDLIFE PASSAGE #2 SECTION  
SCALE: HOR- 1"=50' VER- 1"=5'

RAMP PIPE SECTION (28P)  
SCALE: HOR- 1"=50' VER- 1"=5'

RAMP PIPE SECTION (28P)  
SCALE: HOR- 1"=50' VER- 1"=5'

ALSP ARCH 12'-0" X 4'-1"  
NTS

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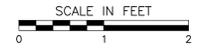
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PROJECT MANAGER C. JACOBS

PROJECT NUMBER 00000000238926

CLEAR RIVER ENERGY CENTER  
TOWN OF BURRILLVILLE,  
PROVIDENCE COUNTY, RHODE ISLAND

PROPOSED SITE  
DRAINAGE DETAILS

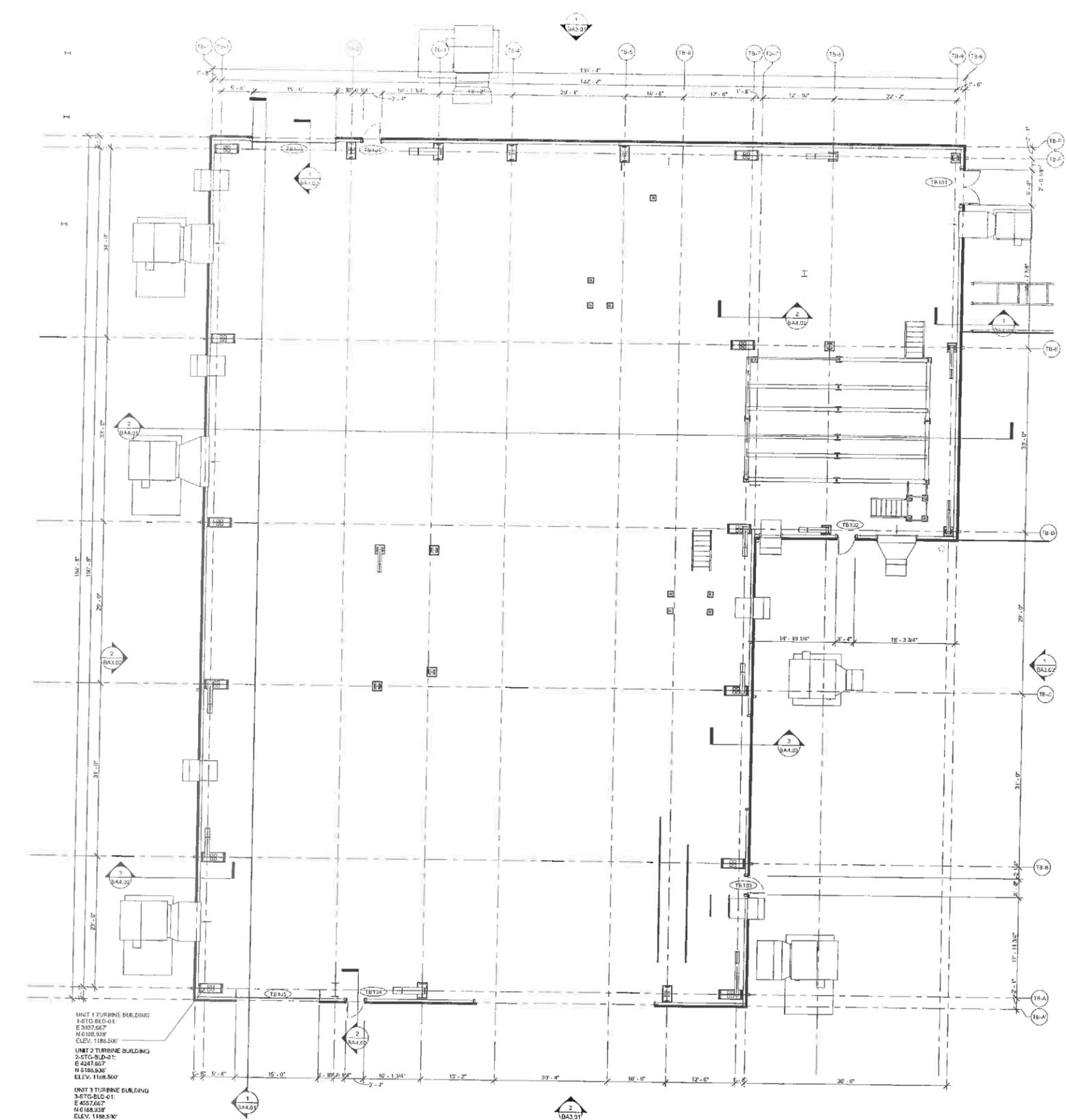


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SCALE AS SHOWN

SHEET  
01C805

# SYMBOLS

- DRAWING TITLE**
  - XXXXXX DRAWING NUMBER
  - XXXXXX DRAWING NAME
  - XXXXXX SCALE 1/4" = 1'-0"
  - XXXXXX CURRENT SHEET NUMBER
  - XXXXXX SHEET NUMBER DETAIL IS REFERENCED FROM
- COLUMN GRID AND NUMBER**
  - XXXXXX COLUMN NUMBER DESIGNATION
  - XXXXXX COLUMN LETTER DESIGNATION
  - XXXXXX COLUMN LINE
- SECTION CUT**
  - XXXXXX DIRECTION OF SECTION CUT
  - XXXXXX SECTION NUMBER
  - XXXXXX SHEET NUMBER SECTION IS REFERENCED FROM
- BUILDING ELEVATION**
  - XXXXXX DIRECTION OF ELEVATION
  - XXXXXX ELEVATION NUMBER
  - XXXXXX SHEET NUMBER ELEVATION IS REFERENCED FROM
- ELEVATION TARGET**
  - XXXXXX FLOOR OR LEVEL (REFERENCE POINT)
  - XXXXXX BUILDING DATUM ELEVATION
- CONSTRUCTION NOTE**
  - XXXXXX DESCRIPTIVE TEXT
  - XXXXXX CONSTRUCTION NOTE NUMBER
- DOOR NUMBER**
  - XXXXXX DOOR LETTER
  - XXXXXX ROOM NUMBER REFERENCE
- WALL TYPE**
  - XXXXXX WALL TYPE INDICATOR
  - XXXXXX WALL TYPE REFERENCE NUMBER
- ROOM NAME AND ROOM NUMBER**
  - XXXXXX ROOM NAME
  - XXXXXX ROOM NUMBER
- DETAIL OR ENLARGED PLAN REFERENCE**
  - XXXXXX DETAIL NUMBER
  - XXXXXX SHEET NUMBER DETAIL IS REFERENCED FROM
  - XXXXXX BOUNDARY DEFINITION
- INTERIOR ELEVATION**
  - XXXXXX DIRECTION OF ELEVATION
  - XXXXXX SHEET REFERENCE NUMBER
  - XXXXXX ELEVATION NUMBER
- REVISION BUBBLE**
  - XXXXXX REVISION AREA CLOUDED
- REVISION SYMBOL**
  - XXXXXX REVISION NOTE NUMBER



UNIT 1 TURBINE BUILDING  
1-5TC-BLD-01  
E 5357.667  
N 6188.939  
ELEV. 1188.500'

UNIT 2 TURBINE BUILDING  
2-5TC-BLD-01  
E 4347.667  
N 6188.936  
ELEV. 1188.500'

UNIT 3 TURBINE BUILDING  
3-5TC-BLD-01  
E 4557.667  
N 6188.939  
ELEV. 1188.500'

**ARCHITECTURAL FLOOR PLAN - LEVEL 1**  
SCALE: 1/8" = 1'-0"



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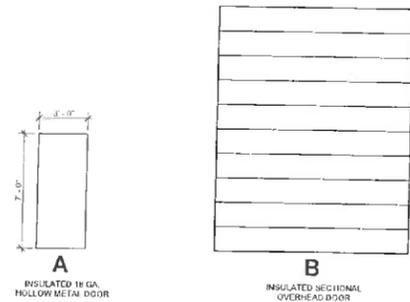
ISSUED FOR PROPOSAL	8/26/16
<b>B</b> ISSUED FOR PROPOSAL	Date
T. WILSON	C. ROJICE
DESIGN BY	CHECKED BY
DRAWN BY	DATE

Invernergy  
KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
Association  
6831 Rome Boulevard  
Lenexa, Kansas 66219  
913.492.0400 www.gba.com

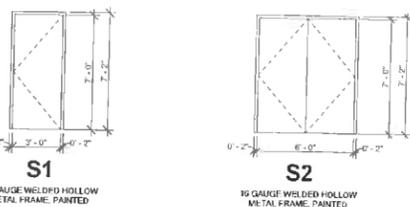
**ISSUED FOR PROPOSAL**

UNITS 1, 2 & 3 TURBINE BUILDING  
ARCHITECTURAL FLOOR PLAN  
DRAWING NUMBER  
2014-087-199-BA1.10



**DOOR TYPES**

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

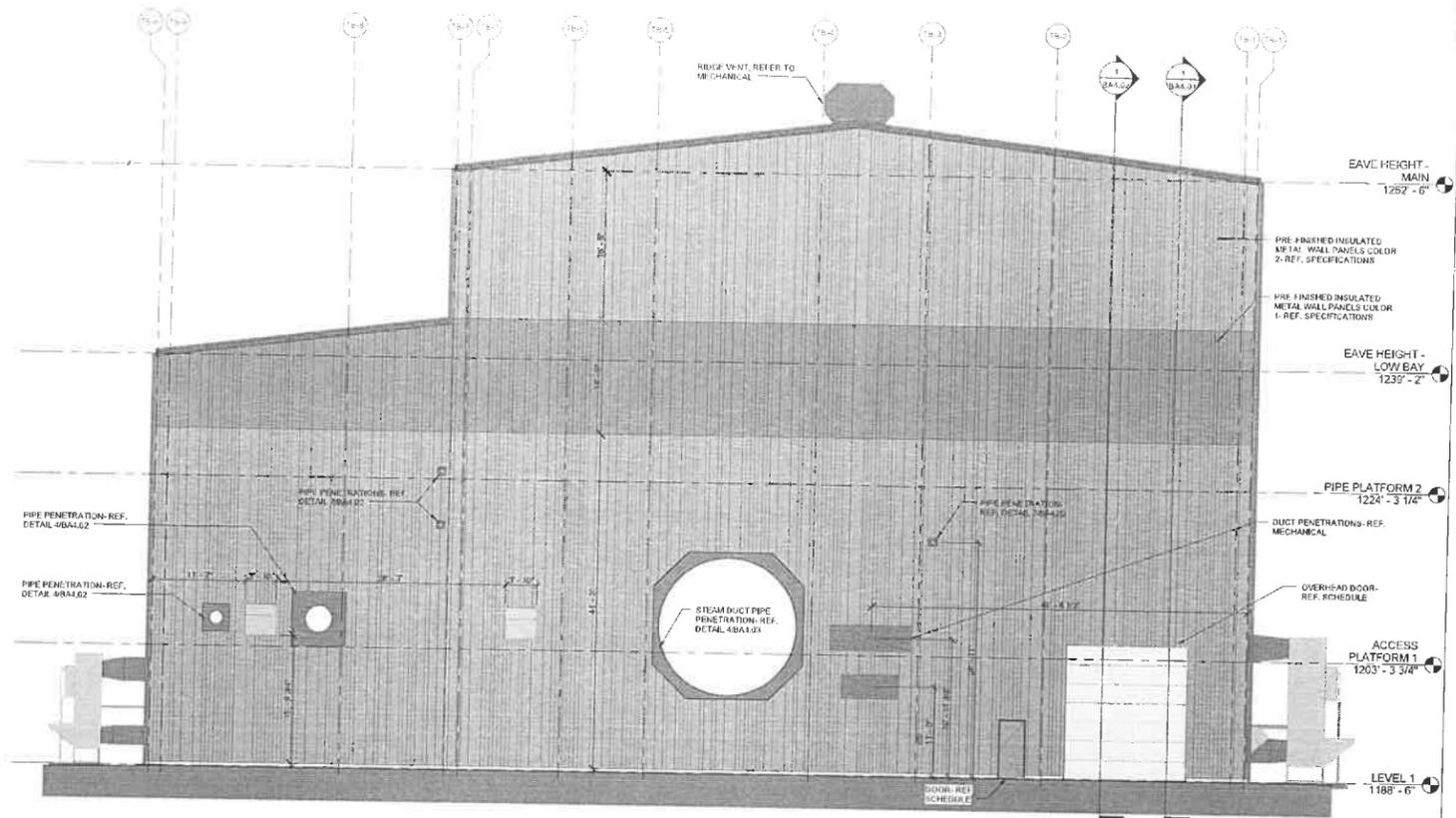


**HM FRAME TYPES**

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

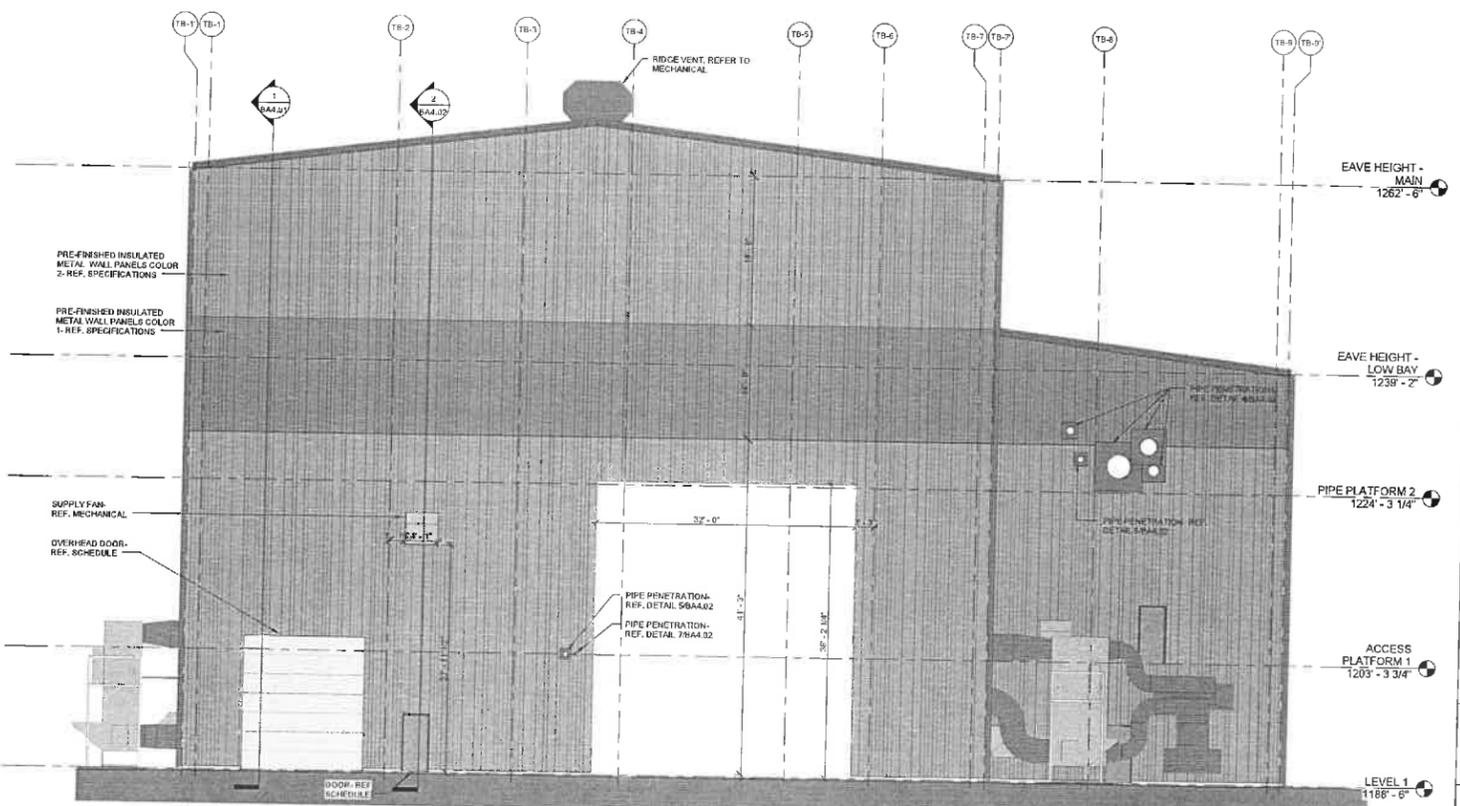
**DOOR SCHEDULE**

NO.	DOOR		FRAME		DETAILS			REMARKS	UL RATING	REF. SPEC SECTION
	SIZE (WxHxT)	TYPE	MATERIAL	TYPE	MATERIAL	SILL	JAMB			
TR101	3'-0" x 7'-0" x 1-3/4"	A	STL	S1	H.M.	3BA6.01	1BA6.01	2BA6.01		01
TR102	3'-0" x 7'-0" x 1-3/4"	A	STL	S1	H.M.	3BA6.01	1BA6.01	2BA6.01		01
TR103	3'-0" x 7'-0" x 1-3/4"	A	STL	S1	H.M.	3BA6.01	1BA6.01	2BA6.01		01
TR104	3'-0" x 7'-0" x 1-3/4"	A	STL	S1	H.M.	3BA6.01	1BA6.01	2BA6.01		01
TR105	15'-0" x 15'-0"	E	STL	-	-	6BA6.01	4BA6.01	5BA6.01		02
TR106	15'-0" x 15'-0"	C	STL	-	-	6BA6.01	4BA6.01	5BA6.01		02
TR107	3'-0" x 7'-0" x 1-3/4"	A	STL	S1	H.M.	3BA6.01	1BA6.01	2BA6.01		01
TR108	3'-0" x 7'-0" x 1-3/4"	A	STL	S1	H.M.	3BA6.01	1BA6.01	2BA6.01		01



**NORTH BUILDING ELEVATION**

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



**SOUTH BUILDING ELEVATION**

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

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 Architecture COAA AX011135

B	ISSUED FOR PROPOSAL	8/26/16
No.	Description	Date
B	ISSUED FOR PROPOSAL	
DESIGN BY	T. WILSON	C. ROJCE
DRAWN BY	T. WILSON	8/26/16
CHECKED BY	C. ROJCE	DATE

**Invenergy**

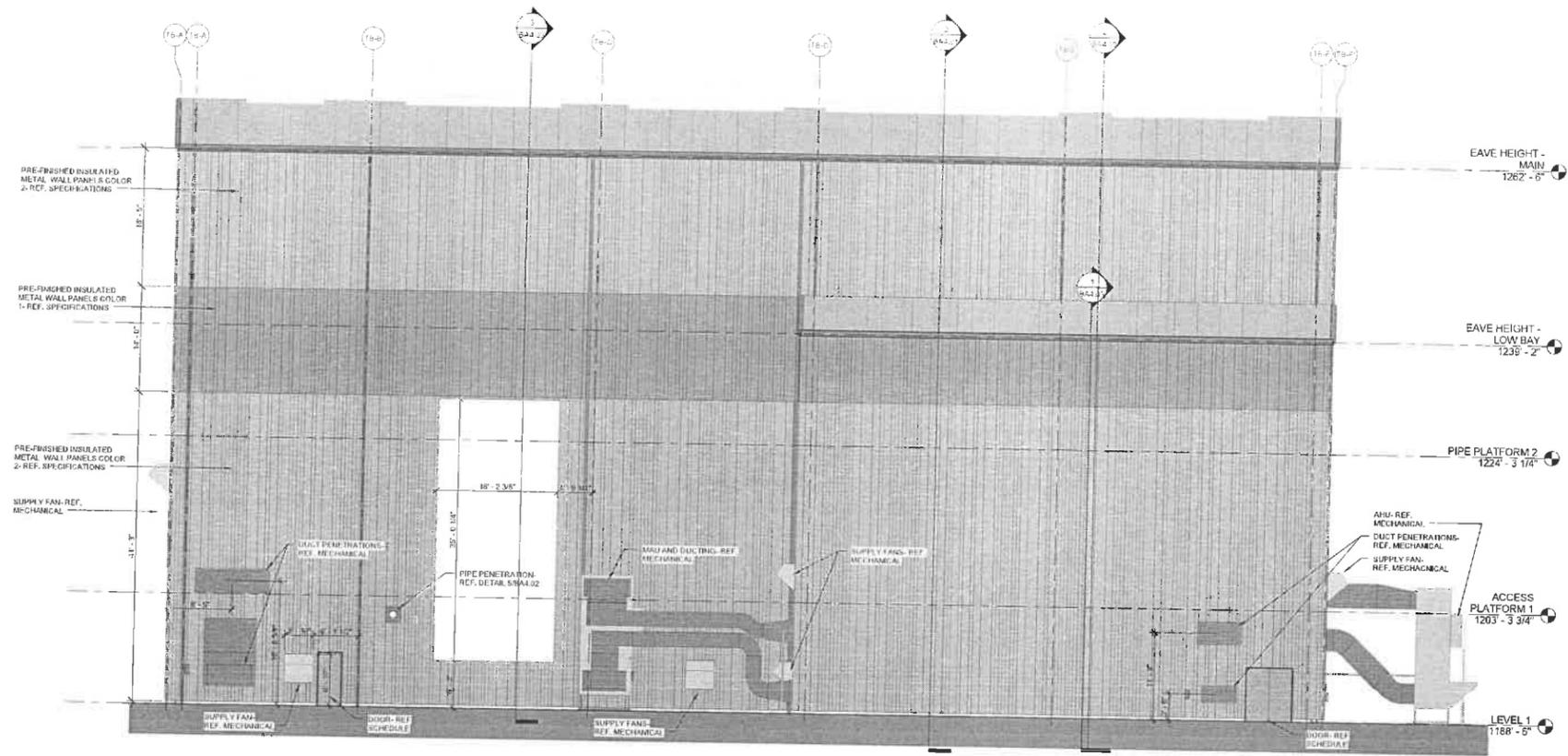
KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A. Association**  
 2891 Renner Boulevard  
 Lenexa, Kansas 66249  
 913.627.9291 www.gbaa.com

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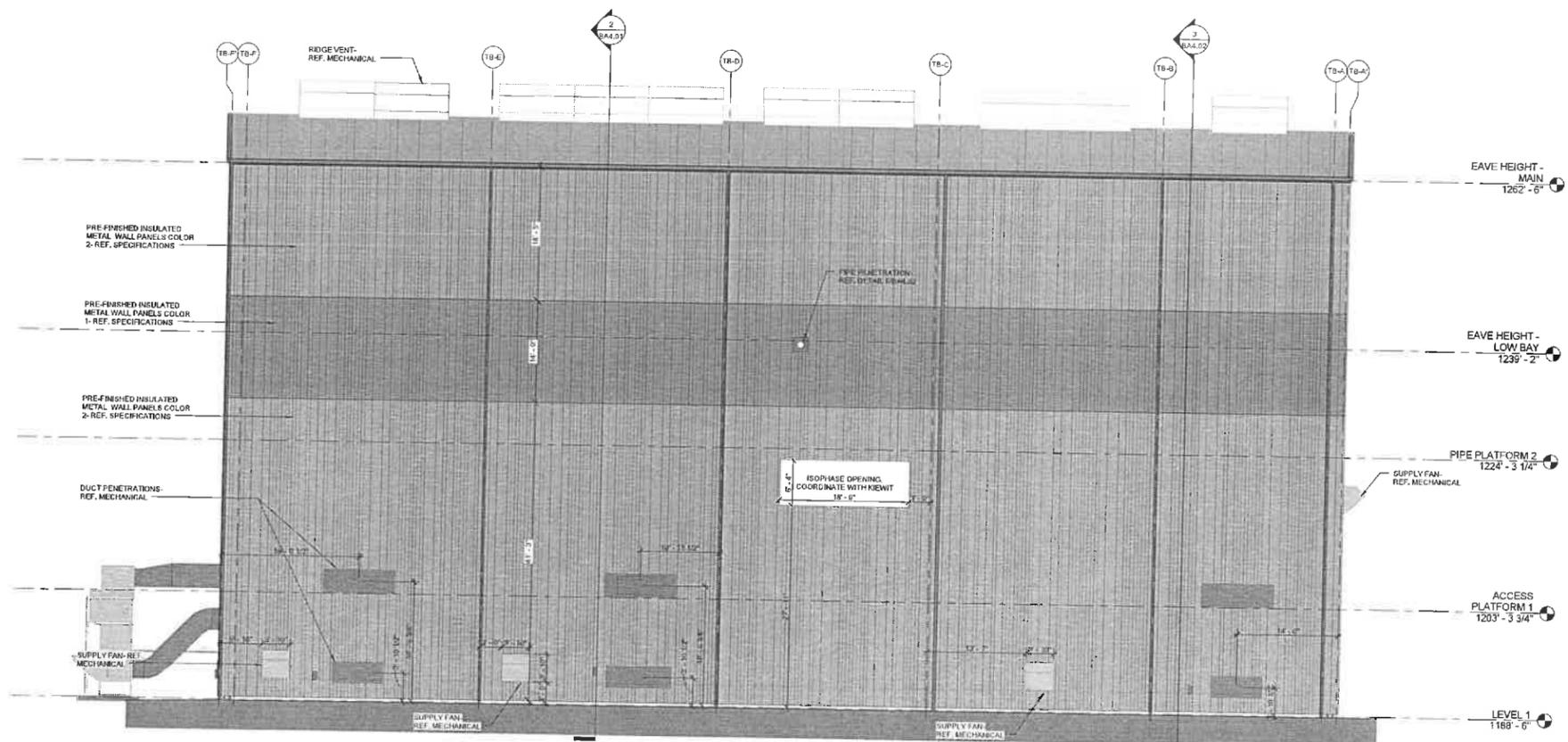
UNITS 1, 2 & 3 TURBINE BUILDING  
 EXTERIOR ELEVATIONS

DRAWING NUMBER  
 2014-087-199-BA3,01



**EAST BUILDING ELEVATION**

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



**WEST BUILDING ELEVATION**

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

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B	ISSUED FOR PROPOSAL	
REV	DESIGN BY: T. WILLSON	DRAWN BY: C. ROGGE
	CHECKED BY:	DATE:

Larkara Energy Center LLC

**Invenergy**

KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
 Association  
 5301 Raven Boulevard  
 Lenexa, Kansas 66219  
 913.492.6400 www.gbapoa.com

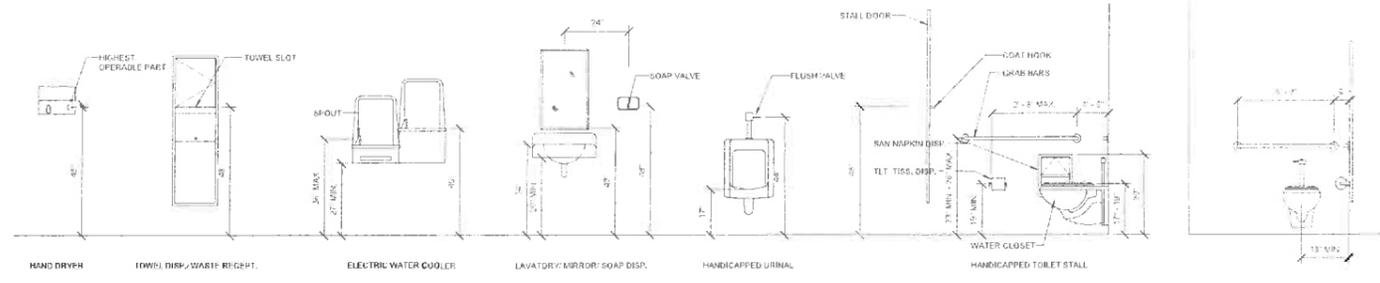
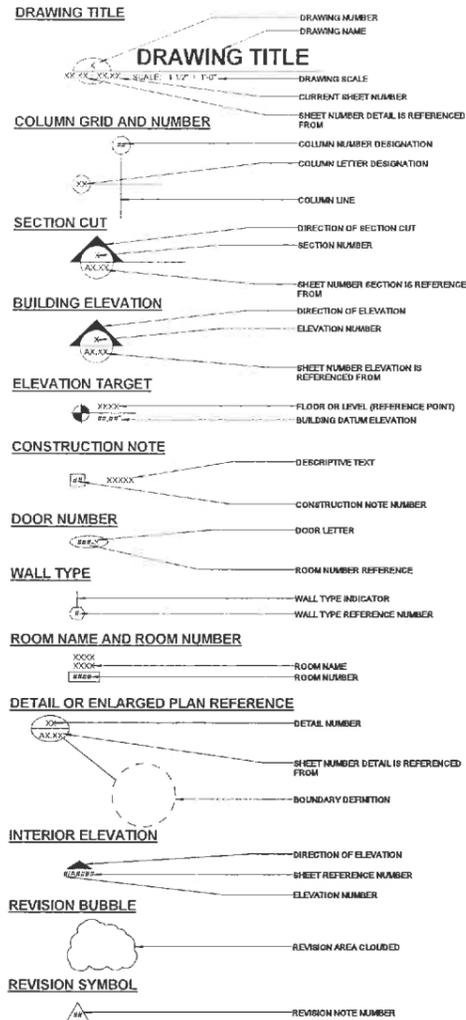
**ISSUED FOR PROPOSAL**

UNITS 1, 2 & 3 TURBINE BUILDING  
 EXTERIOR ELEVATIONS

DRAWING NUMBER  
 2014-087-199-BA3.02

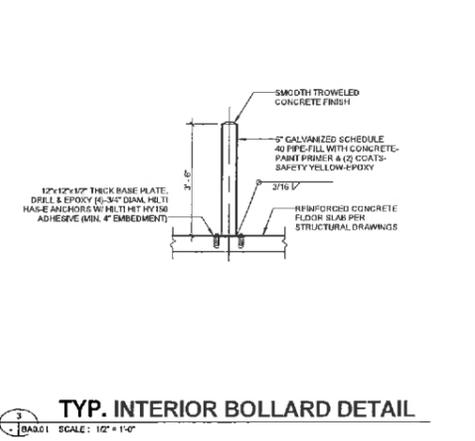
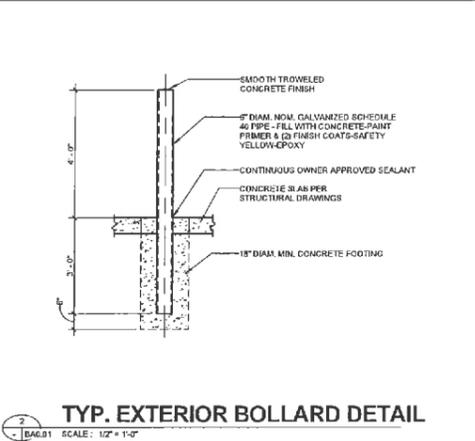
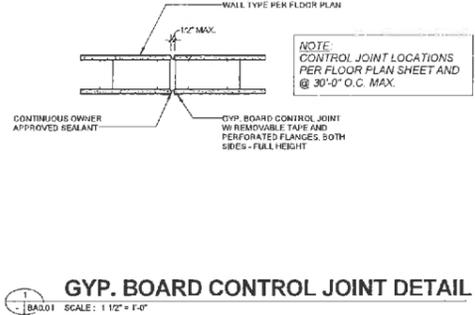
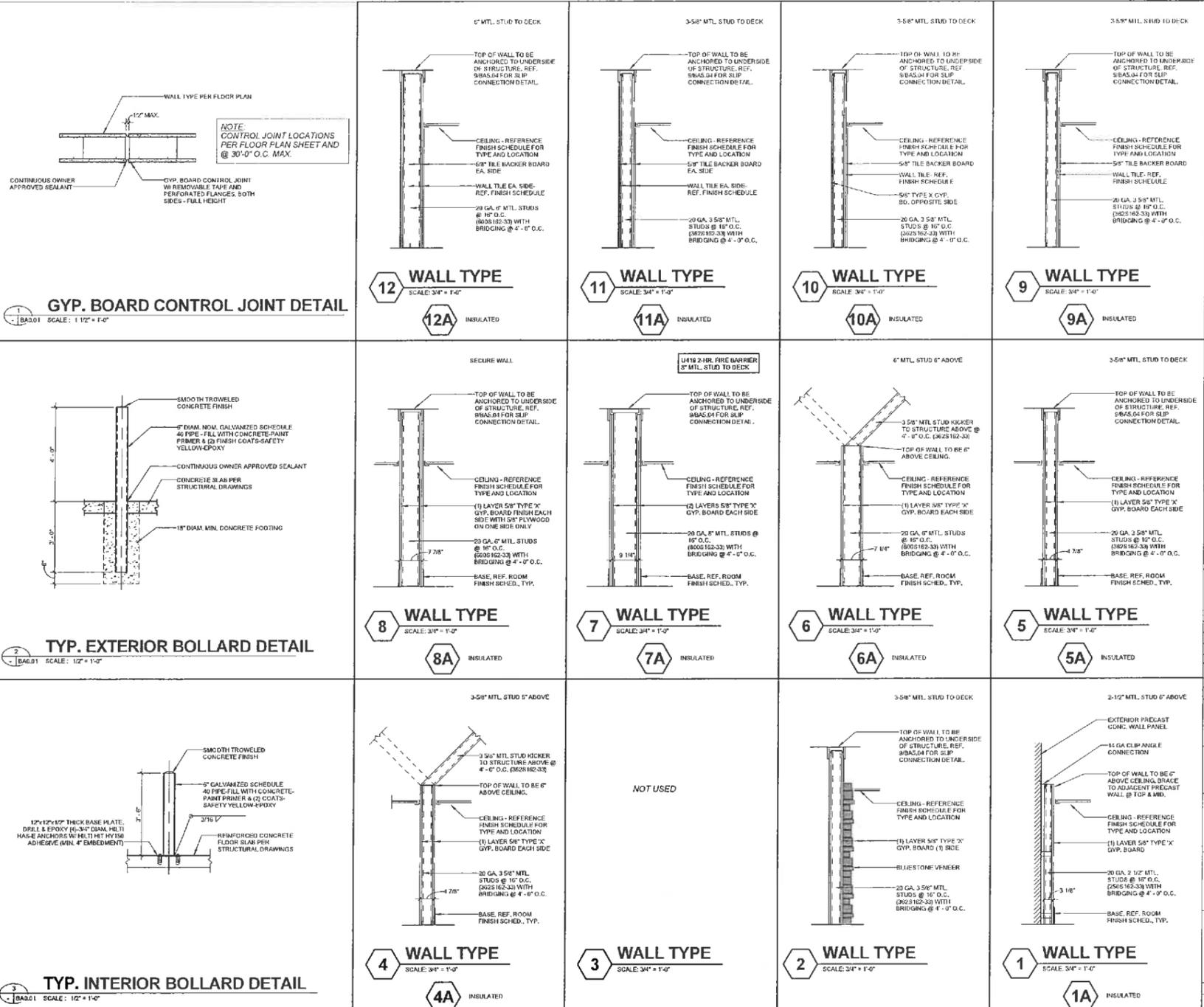


# SYMBOLS



## TYPICAL TOILET FIXTURE & ACCESSORY MOUNTING HEIGHTS

NOTE: ACCESSORIES WITH LEADING EDGE 1/2" AND 1/8" AF. SHALL NOT PROJECT MORE THAN 1" HORIZONTALLY INTO CIRCULATION PATH.



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DESIGN BY	T. WILLSON	06/07/16
DRAWN BY	T. WILLSON	
CHECKED BY	C. ROGGE	

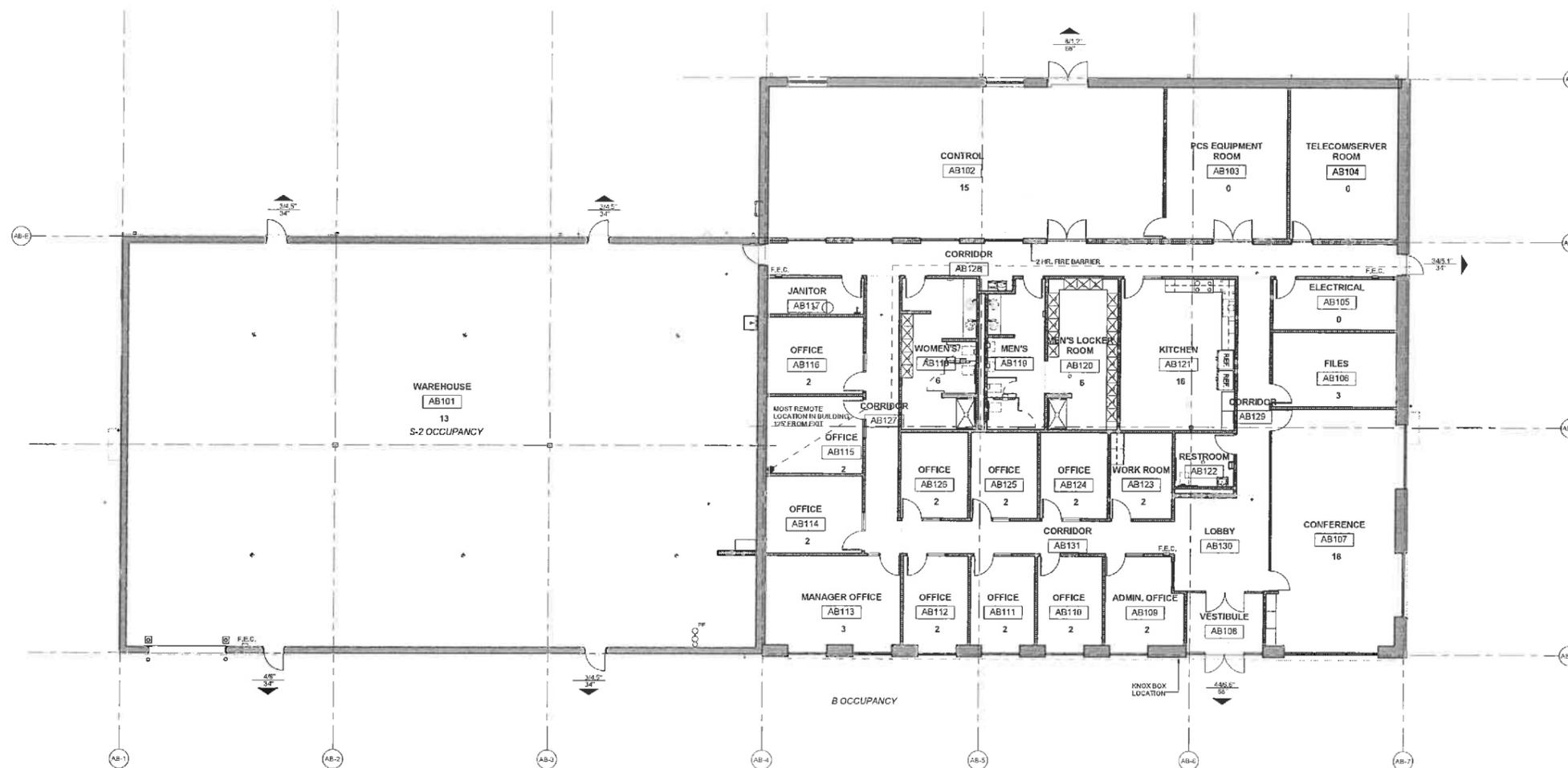
**Invernergy**  
 KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A. Association**  
 6501 Renner Boulevard  
 Lenexa, Kansas 66218  
 913.622.9400 www.gbainfo.com

**NOT FOR CONSTRUCTION**

001 - ADMINISTRATION BUILDING STANDARDS

DRAWING NUMBER  
 2014-087-001-BA0.01



**CODE SYMBOLS LEGEND**

	NUMBER OF OCCUPANTS
	WIDTH/DEPTH FOR 4 OR 6 OCCUPANTS
	EXIT
	EGRESS PATH
	ROOM NAME
	ROOM NUMBER
	NUMBER OF OCCUPANTS
	FIRE EXTINGUISHER CABINET

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No.	Description	Date
REV	T. WILSON DESIGNED BY	T. WILSON DRAWN BY
	C. ROGGE CHECKED BY	09/07/16 DATE

Larkansas Farms Const LLC  
**Invenergy**  
 KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
 Association  
 3801 Raven Boulevard  
 Lenexa, Kansas 66218  
 913-492-0900 www.gba.com

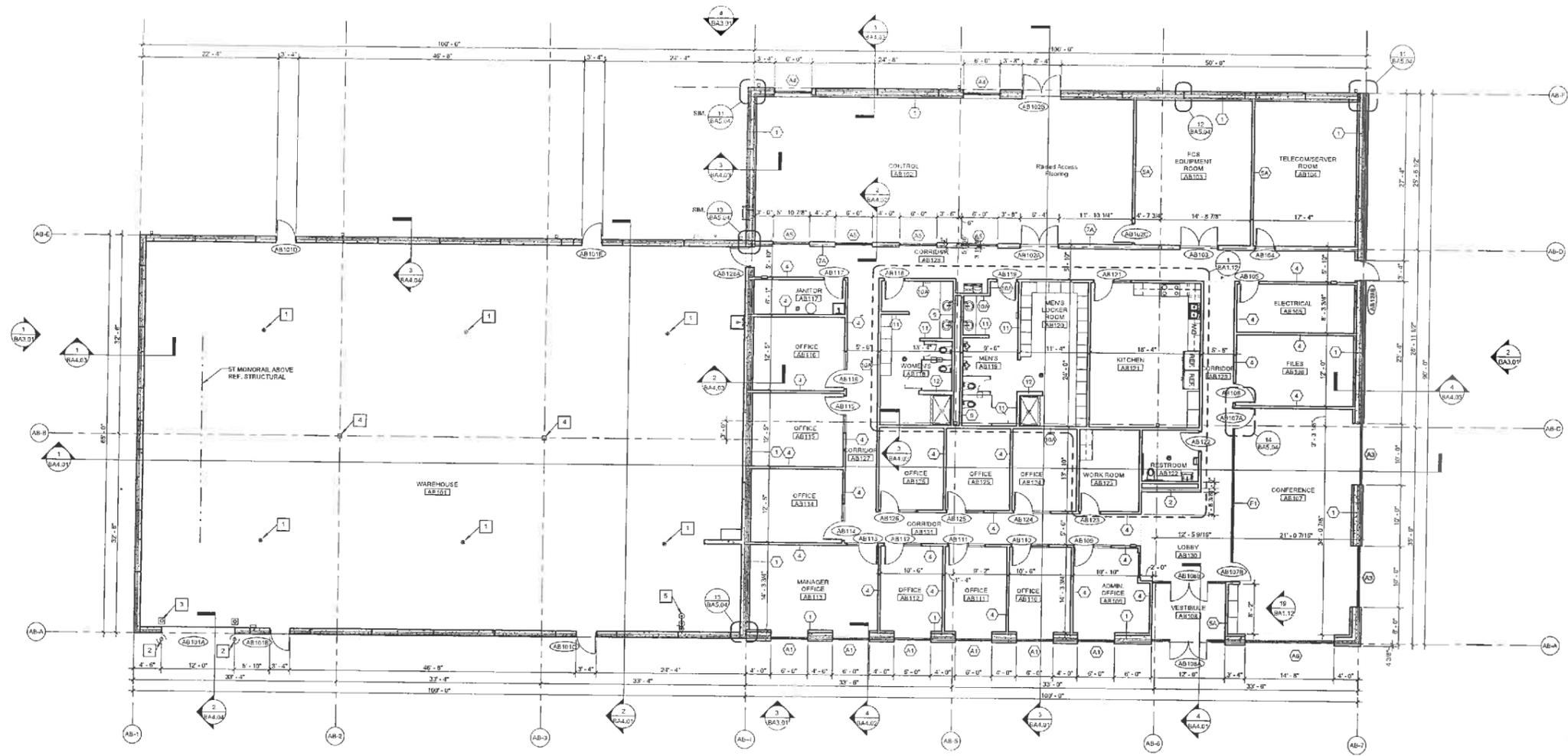
**NOT FOR CONSTRUCTION**

**CODE COMPLIANCE PLAN**  
 1/BA0.02 SCALE: 1/8" = 1'-0"



001 - ADMINISTRATION BUILDING  
 CODE ANALYSIS

DRAWING NUMBER  
 2014-087-001-BA0.02



**ARCHITECTURAL FLOOR PLAN**  
 1 BA1.10 SCALE: 1/8" = 1'-0"



- GENERAL NOTES**
- ALL DIMENSIONS ARE TO THE FINISH FACE OF NEW PARTITIONS OR FURRING (GIR WALL AND PART). (G)
  - PROVIDE CONTROL JOINT IN GYP. BOARD WALLS @ 3/4" O.C. MAX. SEE DETAIL 1BA031.
  - ALL GYPSUM BOARD TO BE 5/8" TYPE, UNLESS NOTED OTHERWISE.
  - USE MOISTURE RESISTANT GYPSUM BOARD AT ALL TUBET ROOMS AND WET ENVIRONMENT.
  - REFER TO 1BA044 FOR TOP OF WALL DEFLECTION TRACK DETAIL.
  - REFER TO 1E-TAIL 1BA061 FOR GYP. BOARD CONTROL JOINT DETAIL.

- CONSTRUCTION NOTES**
- FLOOR DRAIN, PROVIDE 1/2" RADIUS SWEEP, SLOPED TO DRAIN. MAX. SLOPE 1/4" PER FT. REFERENCE PLUMBING DRAWINGS.
  - EXTERIOR 4" CONCRETE FILLED PIPE BOLLARDS, REF. DETAIL 2BA001.
  - INTERIOR 2" CONCRETE FILLED PIPE BOLLARDS, REF. DETAIL 3BA001.
  - PAINT EXPOSED COLUMNS TYP.
  - EMERGENCY SHOWER STATION REFER TO PLUMBING.

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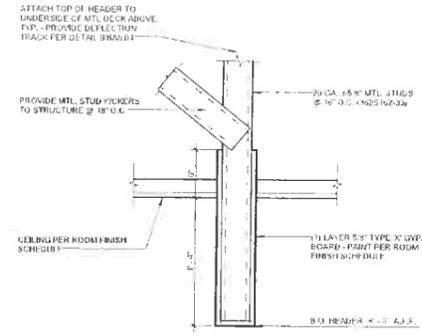
No.	Description	Date
REV	T. WILLSON DESIGN BY	T. WILLSON DRAWN BY
	C. ROGGE CHECKED BY	06/07/16 DATE

Lawrence E. Egan, Owner, LLC  
**Invenery**  
 KIEWIT POWER CONSTRUCTORS CO.

<b>GBA P.A.</b> Association 5851 Renner Boulevard Lenexa, Kansas 66215 913.492.6800 www.gbaa.com	<b>NOT FOR CONSTRUCTION</b>

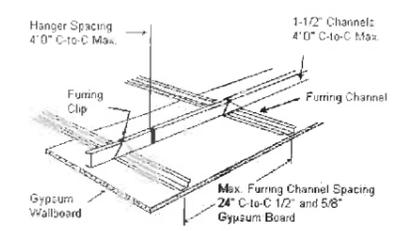
001 - ADMINISTRATION BUILDING  
 ARCHITECTURAL FLOOR PLAN

DRAWING NUMBER  
 2014-087-001-BA.1.10



3 HEADER DETAIL @ CEILING  
SCALE: 1/2" = 1'-0"

FURRING CHANNEL DETAILS



In suspended gypsum board ceilings, drywall channels are clipped to or wire tied to suspended cold-rolled channels rather than to framing members. Various clips may be used.

2 SUSPENDED CEILING GRID  
SCALE: 1/2" = 1'-0"

- GENERAL NOTES:**
1. GYPSUM BOARD CEILING AT LUNBY HALL FROM ROOF STRUCTURE. REF. 2014-02 BASIS OF DESIGN. TO AVOID THE THRU SHAPED CORNER CHANNELS AND FURRING CHANNELS. REF. SPECIFICATIONS.
  2. GYPSUM BOARD CEILING BETWEEN COLUMN 1 AND MAIN REAR. REFER SUPPORTED. REF. WALL TYPES.
  3. FIXTURES SHOWN ON REFLECTED CEILING PLANS ARE FOR REFERENCE ONLY. REFER TO ELECTRICAL AND MECHANICAL DRAWINGS.

- CONSTRUCTION NOTES:**
1. HEADER AT CEILING. REF. J-BA1.11.
  2. STAINLESS STEEL STRUCTURAL.
  3. STEEL AWNING. REF. STRUCTURAL.
  4. PRE-FINISHED SHEET METAL SOFFIT.

**CEILING LEGEND**

SCALE: NTS

CEILING TYPE "A": 2x2' SUSPENDED ACOUSTICAL GRID AND PANELS

CEILING TYPE "B": 2x4' SUSPENDED ACOUSTICAL GRID AND PANELS

CEILING TYPE "C": 5/8" TYPE X GYP. BO. ON FURRING CHANNELS. REF. J-BA1.11

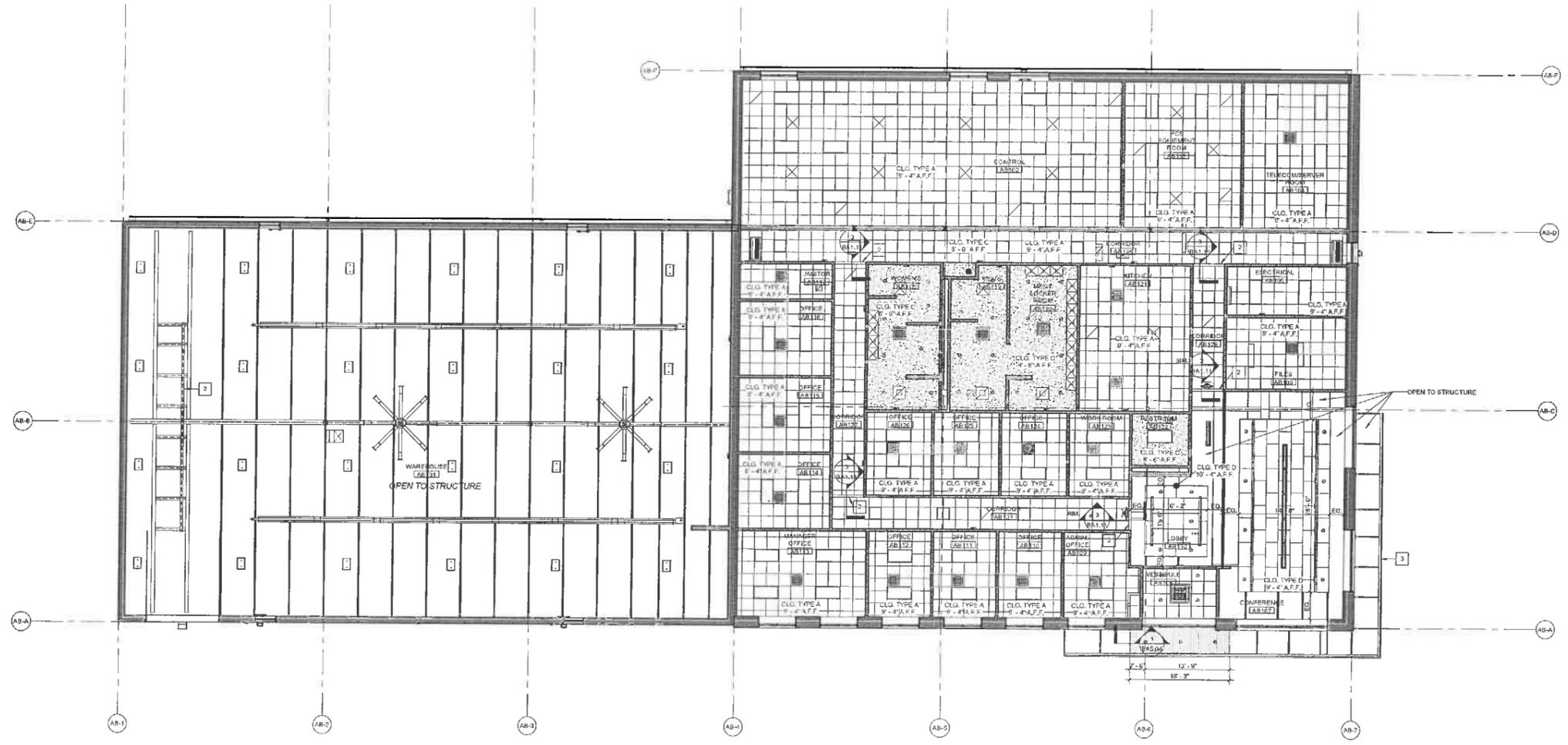
CEILING TYPE "D": TECHNIQUE METAL ACOUSTICAL GRID AND PANELS

- 2 x 4' LIGHT FIXTURE
- 2 x 2' LIGHT FIXTURE
- SURFACE MOUNTED MAG CHILL
- 1 x 4' LIGHT FIXTURE
- LIGHT FIXTURE
- LIGHT FIXTURE
- 2 x 2' SUPPLY
- 2 x 2' RETURN
- FAN REF. MECHANICAL
- EMERGENCY EXIT LIGHT FIXTURE
- AIR CONDITIONING UNIT
- AIR SUPPLY SLOT DIFFUSER

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1 ARCHITECTURAL CEILING PLAN  
SCALE: 1/8" = 1'-0"



No.	Description	Date
DESIGN BY	T. WILSON	06/07/16
DRAWN BY	T. WILSON	
CHECKED BY	C. ROJAS	

Larkins Engineering LLC

**Inverergy**

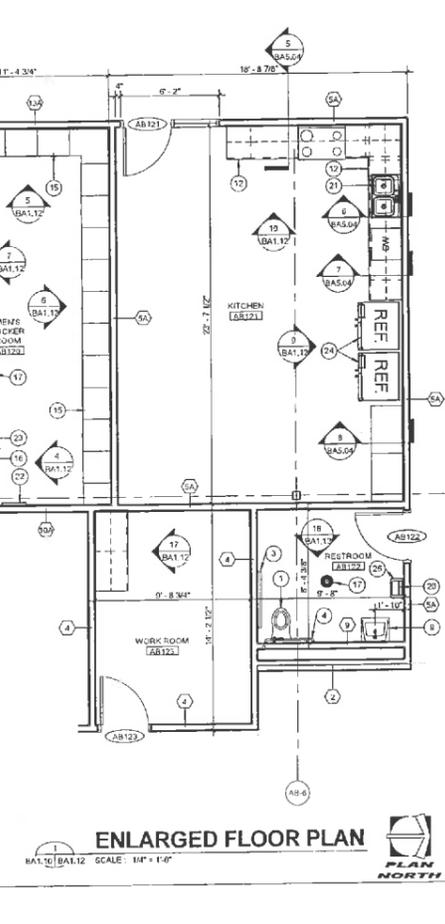
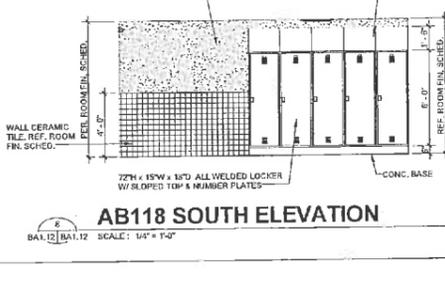
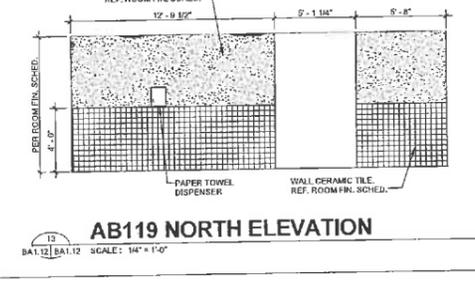
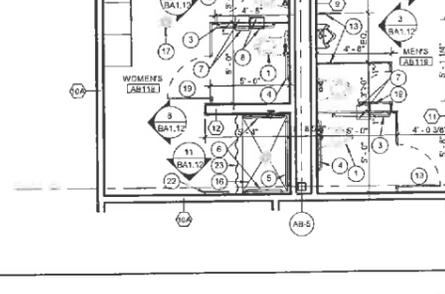
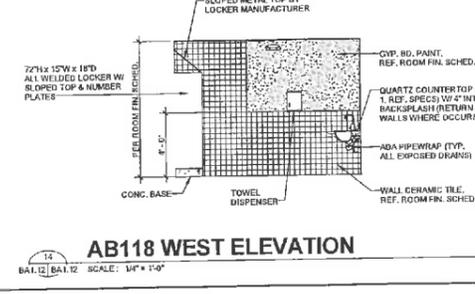
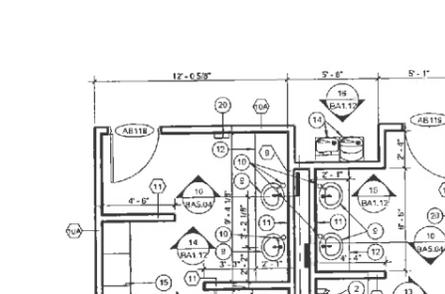
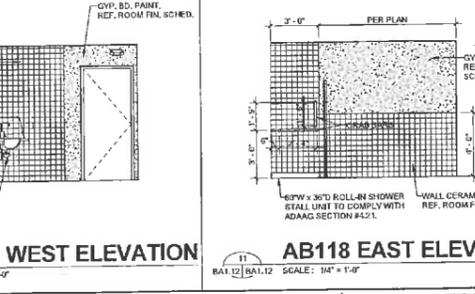
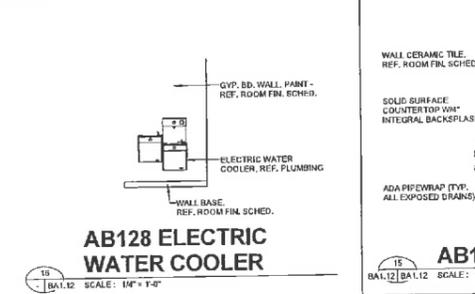
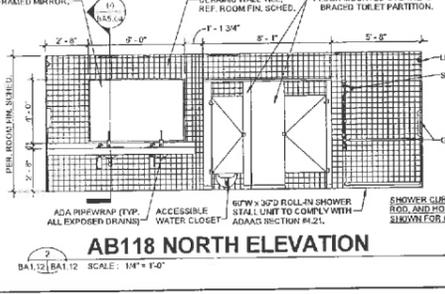
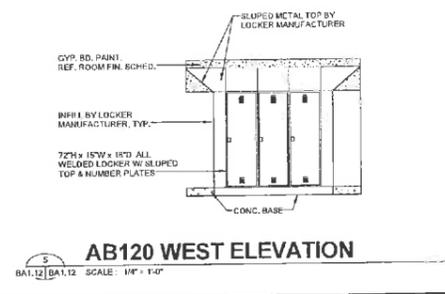
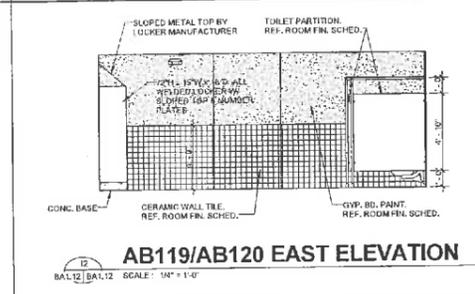
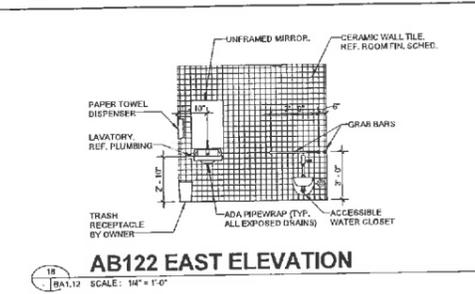
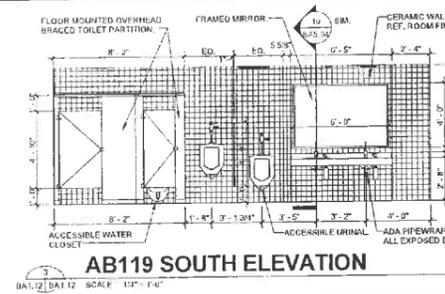
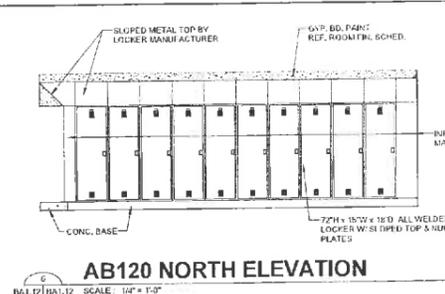
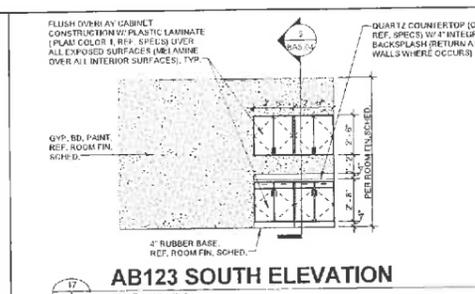
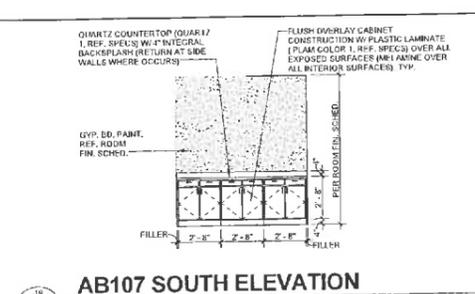
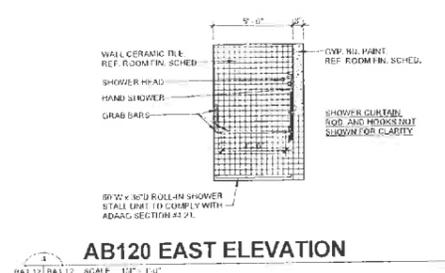
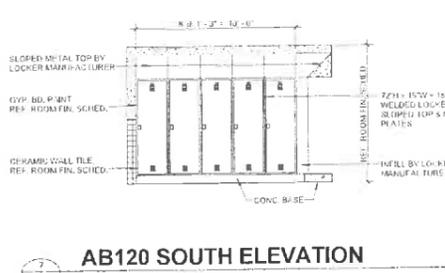
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3031 River Boulevard  
Lynch, VA 24062  
212.492.2400 www.gbapainc.com

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001 - ADMINISTRATION BUILDING  
REFLECTED CEILING PLAN

DRAWING NUMBER  
2014-087-001-BA1.11



- GENERAL NOTES**
- ALL DIMENSIONS ARE TO THE FINISH FACE OF PARTITIONS OR FURRING (DRYWALL AND PARTS).
  - PROVIDE CONTROL JOINTS IN GYP. BOARD WALLS AT 8'-0\"/>
- EXCLUDE NOTES**
- ALL OF THESE SHALL BE PROVIDED UNLESS AN APPROVED EQUAL IS AUTHORIZED BY ARCHITECT
- ACCESSIBLE WATER CLOSET TO COMPLY WITH ADAAG SECTION 4.16 REF. PLUMB. DWGS
  - ACCESSIBLE URINAL TO COMPLY WITH ADAAG SECTION 4.18
  - 3\"/>

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1	T. WILLSON	05/07/15
2	DESIGN BY	DRAWN BY
3	C. ROOGE	CHECKED BY
4		DATE

Invenergy

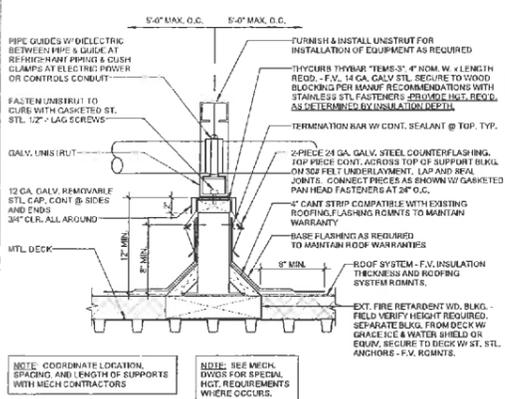
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5801 River Building  
Lenexa, Kansas 66219  
913.492.3430 www.gbapain.com

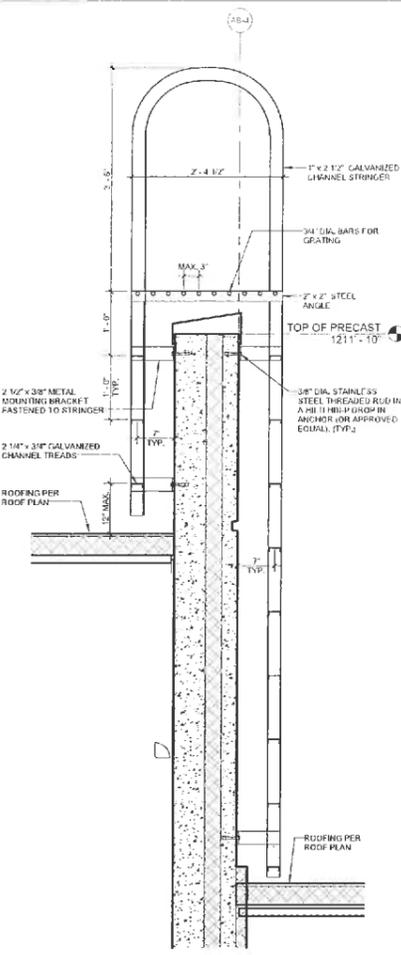
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001 - ADMINISTRATION BUILDING  
ENLARGED RESTROOM PLANS & ELEVATIONS

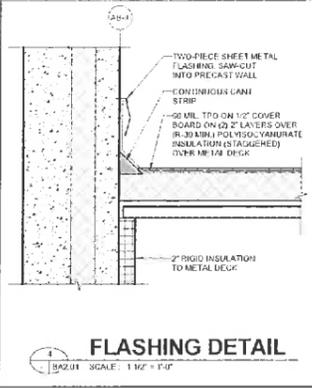
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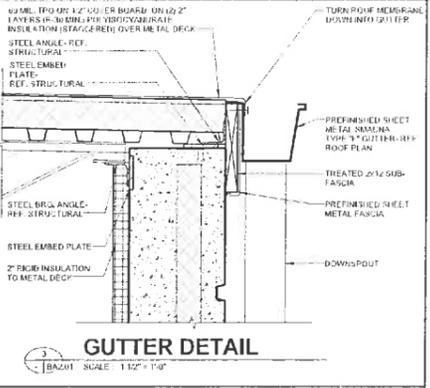
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SCALE: 1/2" = 1'-0"



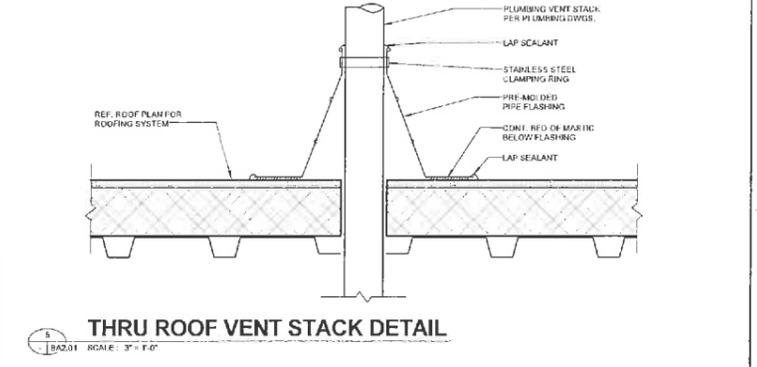
**ROOF ACCESS FIXED LADDER**  
SCALE: 1" = 1'-0"



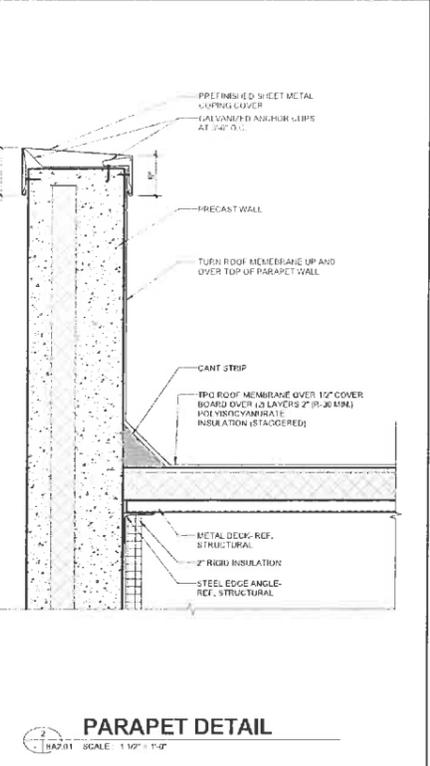
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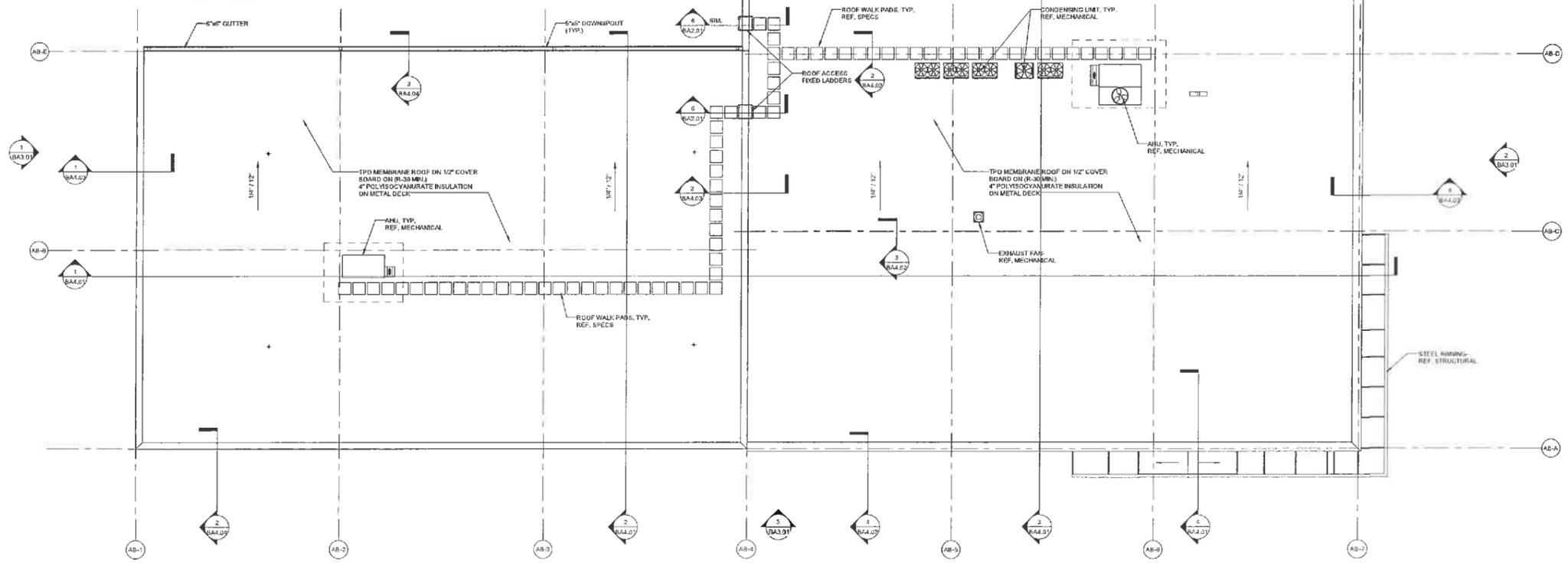
**GUTTER DETAIL**  
SCALE: 1/2" = 1'-0"



**THRU ROOF VENT STACK DETAIL**  
SCALE: 3" = 1'-0"



**PARAPET DETAIL**  
SCALE: 1/2" = 1'-0"



**ARCHITECTURAL ROOF PLAN**  
SCALE: 1/8" = 1'-0"



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No.	Description	Date
1	T. WILLSON	06/07/16
2	T. WILLSON	
3	C. ROGGE	

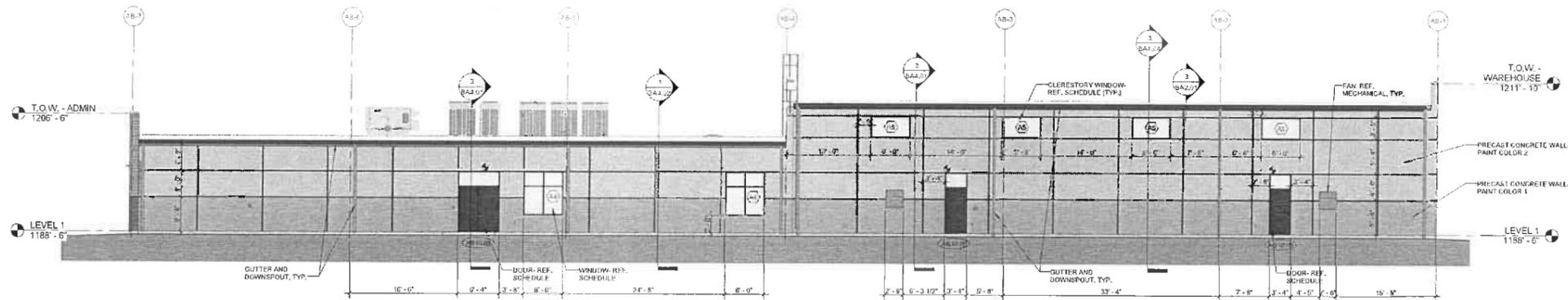
Luckmann Energy Control LLC  
**Invernergy**  
KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
Association  
8811 Renner Boulevard  
Lincoln, Kansas 66219  
913.492.0400 www.gbafirm.com

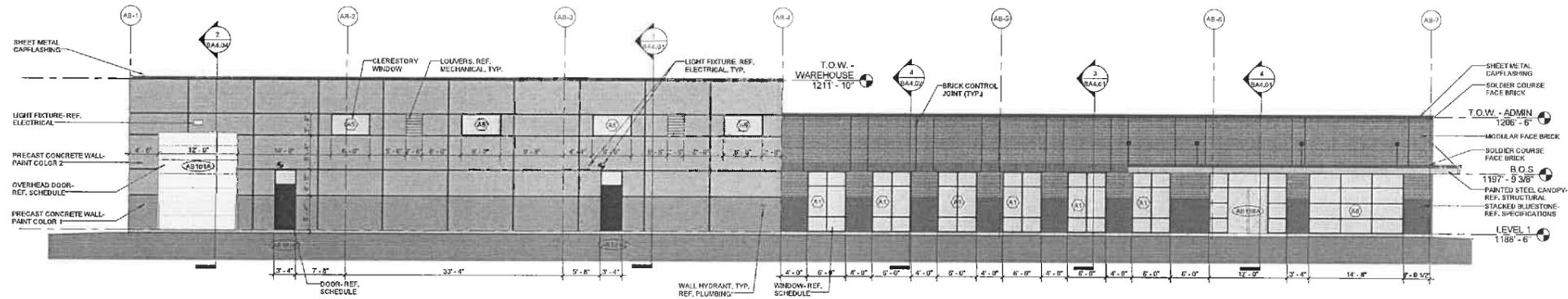
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001 - ADMINISTRATION BUILDING  
ROOF PLAN & DETAILS

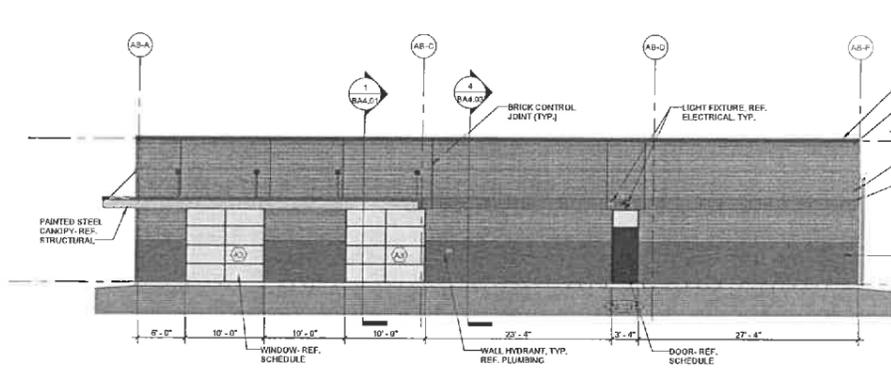
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2014-087-001-BA-01



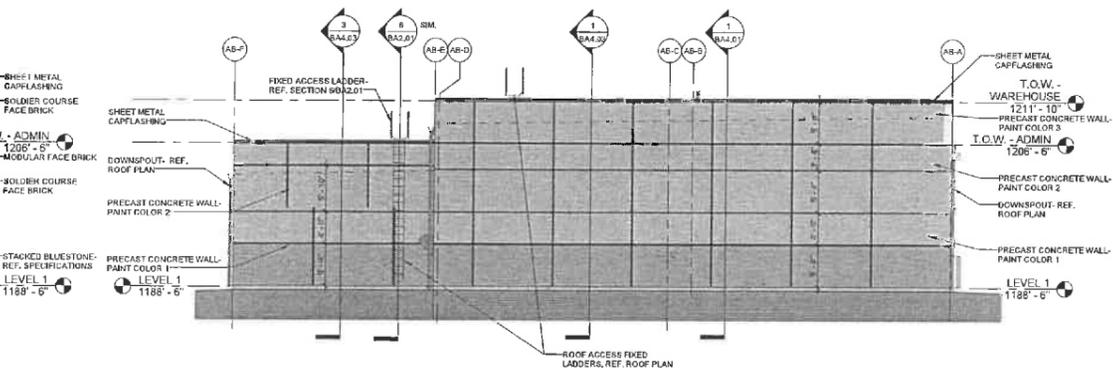
**WEST BUILDING ELEVATION**  
 B4.10|BA3.01 SCALE: 1/8" = 1'-0"



**EAST BUILDING ELEVATION**  
 B4.10|BA3.01 SCALE: 1/8" = 1'-0"



**NORTH BUILDING ELEVATION**  
 B4.10|BA3.01 SCALE: 1/8" = 1'-0"



**SOUTH BUILDING ELEVATION**  
 B4.10|BA3.01 SCALE: 1/8" = 1'-0"

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No.	Description	Date
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	C. ROJAS CHECKED BY	06/07/16 DATE

Invernergy

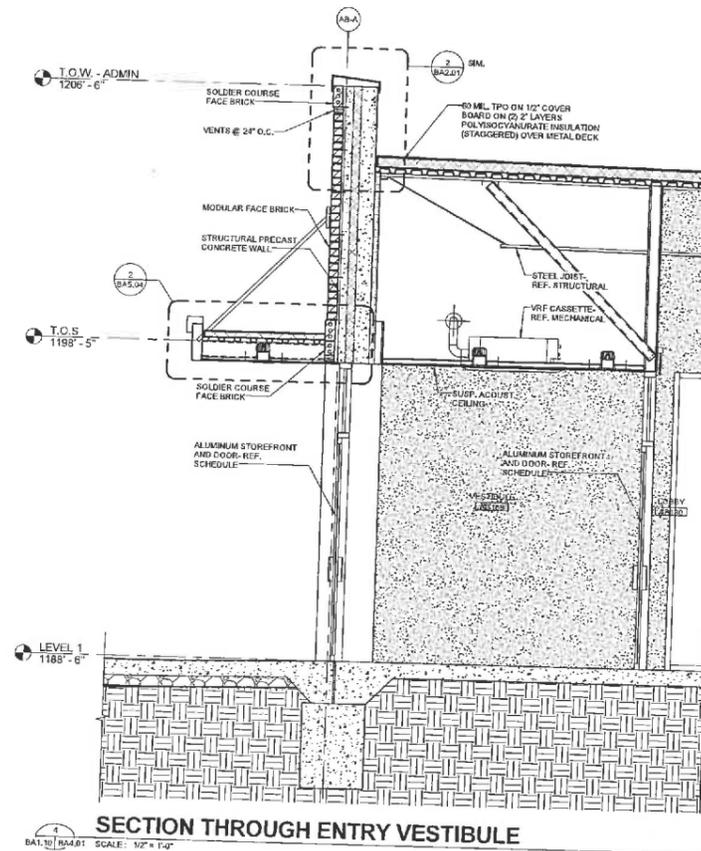
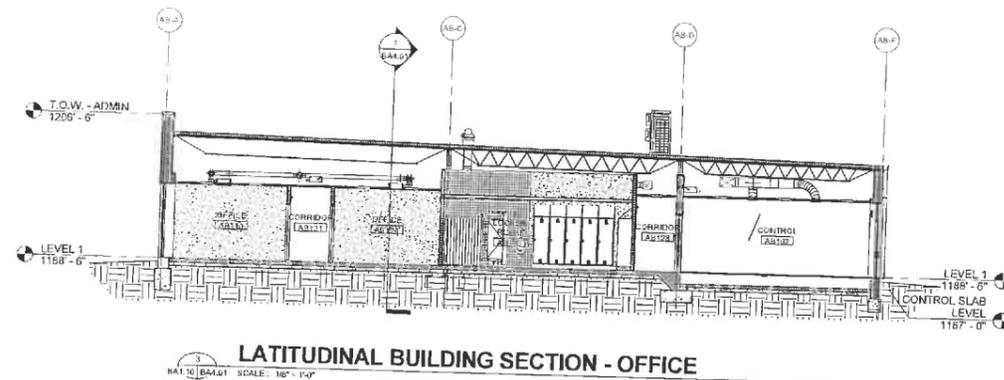
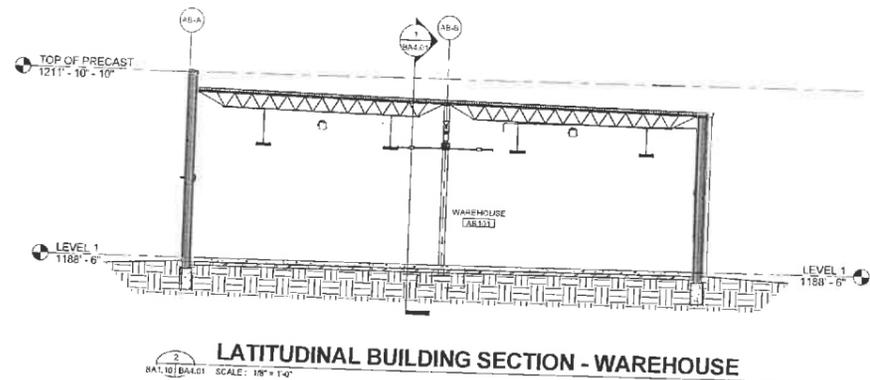
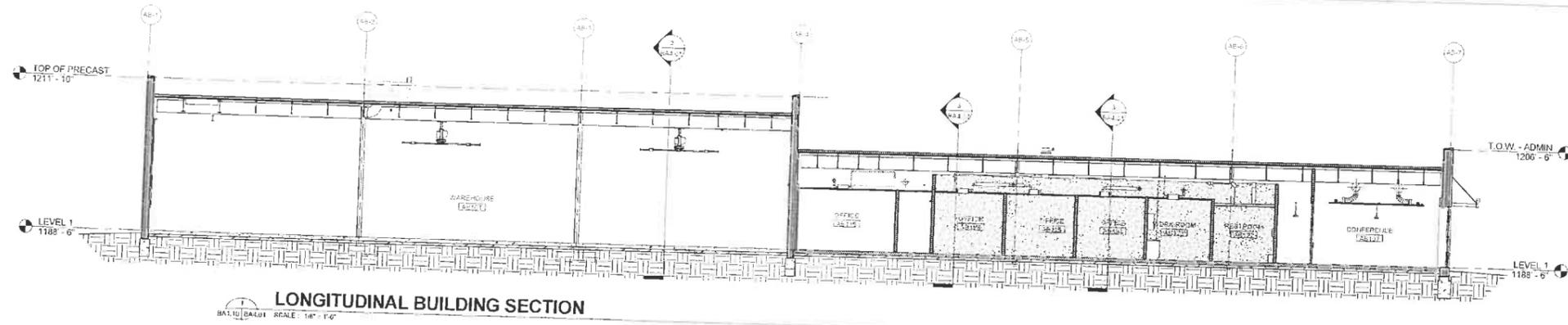
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 Lenexa, Kansas 66213  
 913-921-9492 www.gbapaa.com

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001 - ADMINISTRATION BUILDING  
 EXTERIOR ELEVATIONS

DRAWING NUMBER  
 2014-087-001-BA3.01



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1	T. WILSON	T. WILSON
2	C. ROOPE	06/27/16
3	DESIGNED BY	DRAWN BY
4	CHECKED BY	DATE

Tulawana Engrg. Const. LLC

**Invenergy**

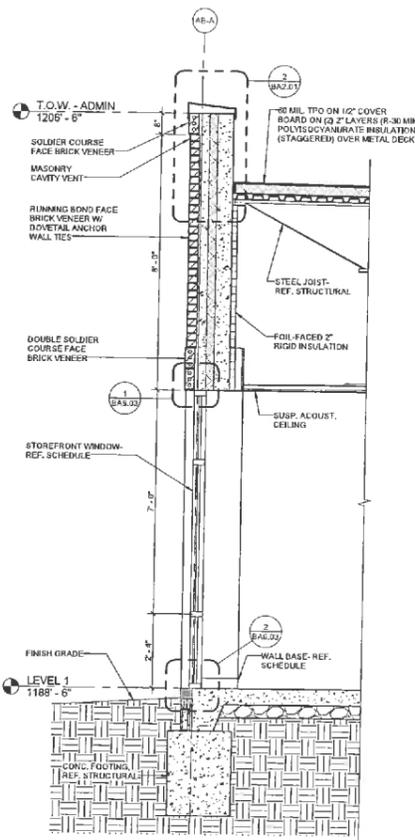
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 2601 River Boulevard  
 Lenexa, Kansas 66213  
 913.492.9400 www.gbainc.com

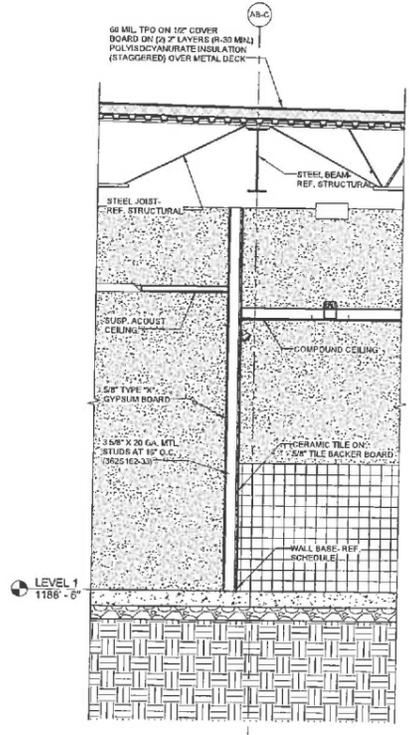
**NOT FOR CONSTRUCTION**

001 - ADMINISTRATION BUILDING  
 BUILDING SECTIONS

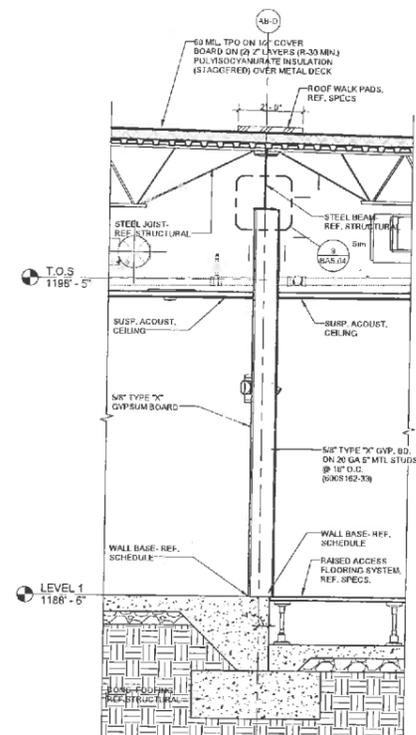
DRAWING NUMBER  
 2014-087-001-BA.01



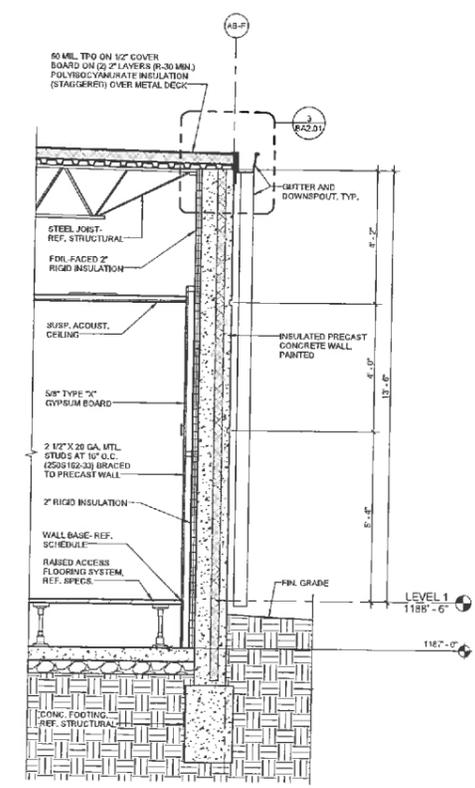
**WALL SECTION - EAST WALL**  
 BAI.10|BA4.02 SCALE: 1/2" = 1'-0"



**WALL SECTION - GIRDER BEAM**  
 BAI.10|BA4.02 SCALE: 1/2" = 1'-0"



**WALL SECTION - EAST CONTROL**  
 BAI.10|BA4.02 SCALE: 1/2" = 1'-0"



**WALL SECTION - WEST WALL**  
 BAI.10|BA4.02 SCALE: 1/2" = 1'-0"

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	T. WILLSON DRAWN BY	C. ROGGE CHECKED BY
	1-a- Kansas Energy Center, LLC	

**Invenergy**

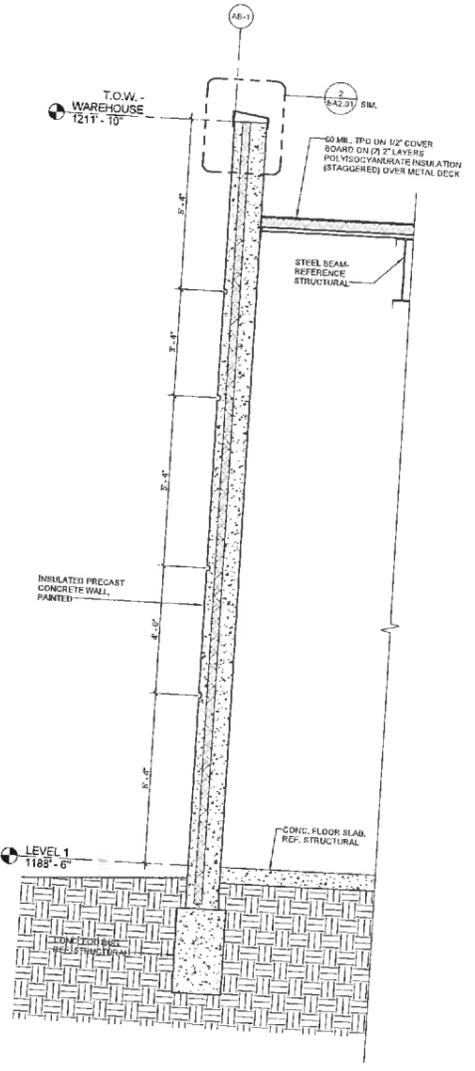
**KIEWIT POWER CONSTRUCTORS CO.**

**GBA P.A.**  
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 2813 Kiewit Boulevard  
 Lenexa, Kansas 66215  
 913.862.9499 www.gbapam.com

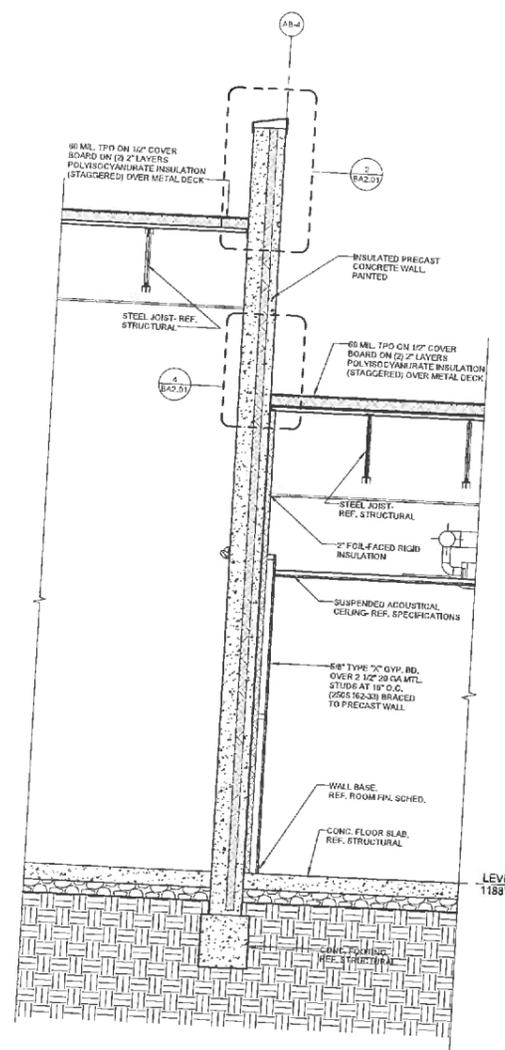
**NOT FOR CONSTRUCTION**

**001 - ADMINISTRATION BUILDING  
 WALL SECTIONS**

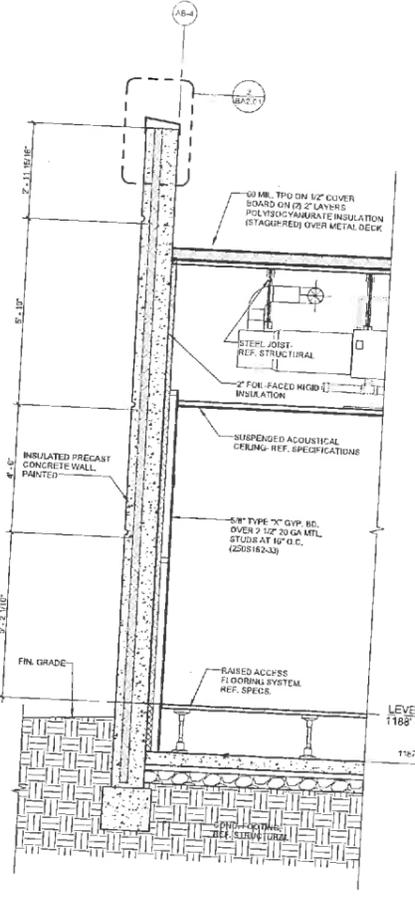
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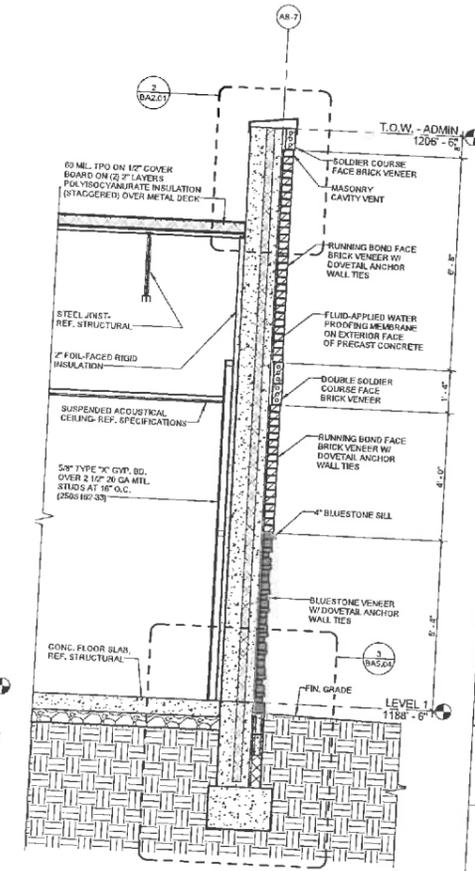
1 WALL SECTION - SOUTH WALL  
SCALE: 1/2" = 1'-0"



2 WALL SECTION - NORTH WALL OF WAREHOUSE  
SCALE: 1/2" = 1'-0"



3 WALL SECTION - SOUTH WALL OF CONTROL  
SCALE: 1/2" = 1'-0"



4 WALL SECTION - NORTH WALL  
SCALE: 1/2" = 1'-0"

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No.	Description	Date
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	C. BOJWIE CHECKED BY	08/07/16 DATE

Lackawanna Energy Center LLC

**Invenergy**

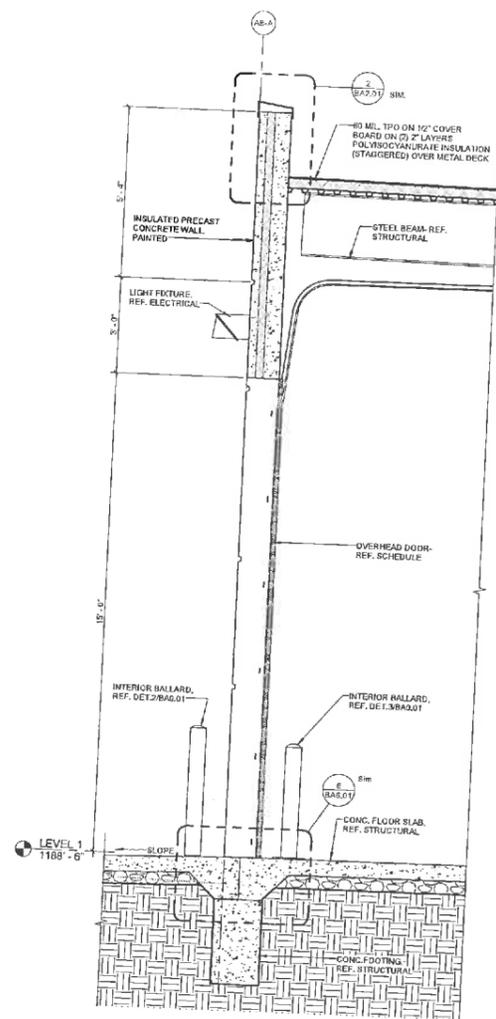
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 Association  
 8801 Riverchase Boulevard  
 Lenexa, Kansas 66150  
 (913) 452-2400 www.gbaforum.com

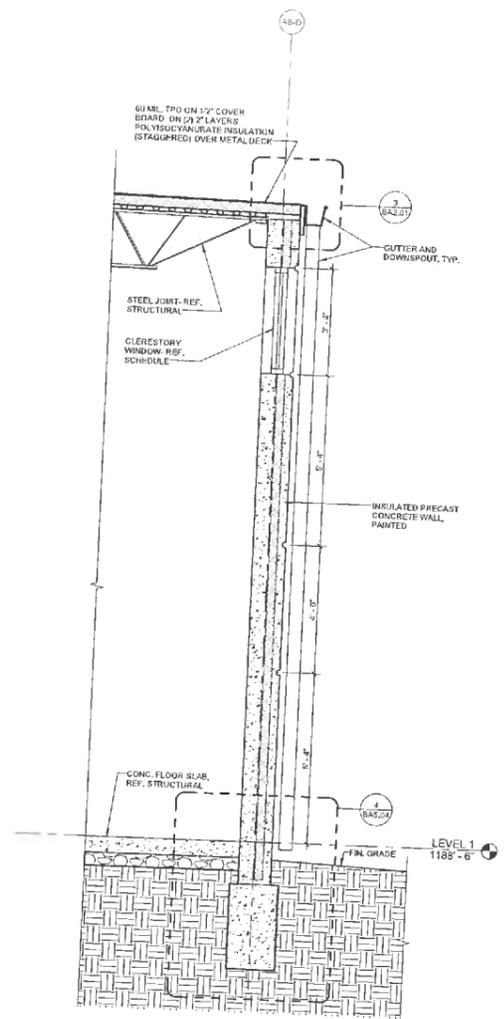
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001 - ADMINISTRATION BUILDING  
 WALL SECTIONS

DRAWING NUMBER  
 2014-087-001-BA4.03



2  
BA1.10/BA4.04 SCALE: 1/2" = 1'-0"  
**WALL SECTION - EAST WALL OF WAREHOUSE**



3  
BA1.10/BA4.04 SCALE: 1/2" = 1'-0"  
**WALL SECTION - WEST WALL OF WAREHOUSE**

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DRAWN BY	C. ROGGE	06/07/16
CHECKED BY		
DATE		

Lackawanna Energy Center LLC

**Invenergy**

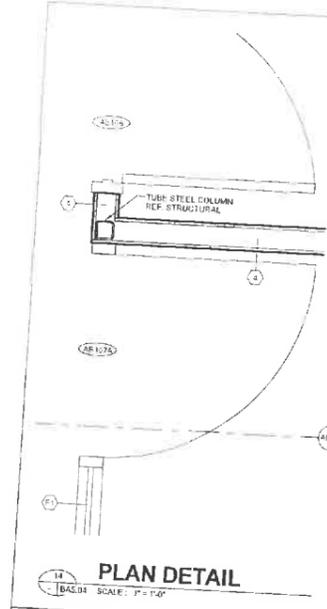
**KIEWIT POWER CONSTRUCTORS CO.**

**GBA P.A.**  
Association  
5801 Renner Boulevard  
Lenexa, Kansas 66219  
913.492.8400 www.gba.com

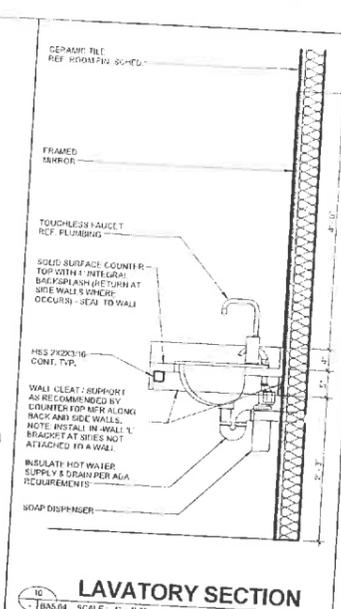
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001 - ADMINISTRATION BUILDING  
WALL SECTIONS

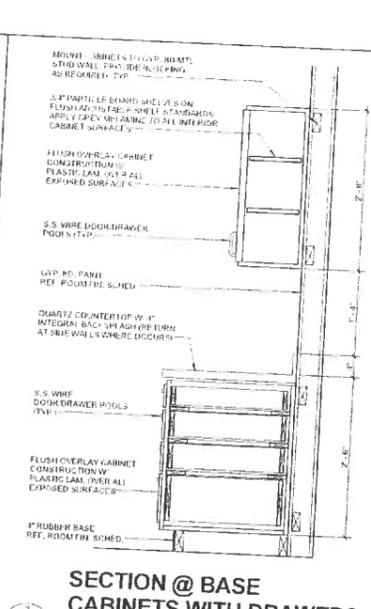
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2014-087-001-BA4.04



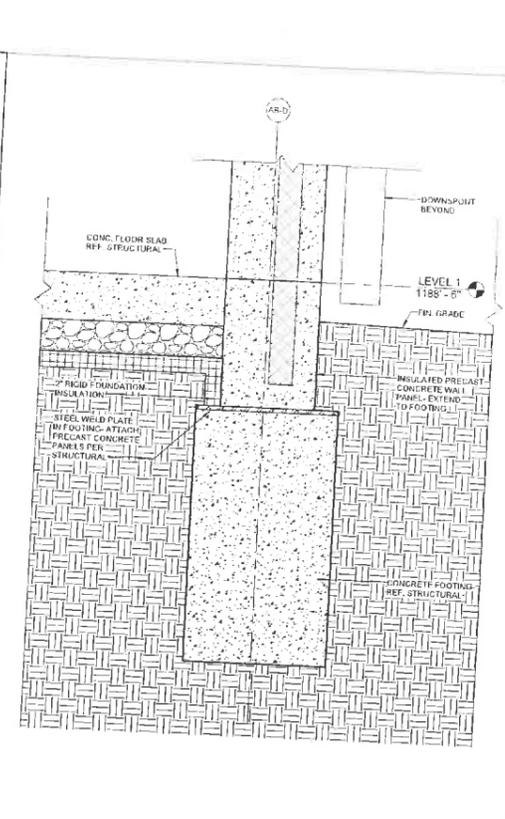
14 PLAN DETAIL  
SCALE: 1" = 1'-0"



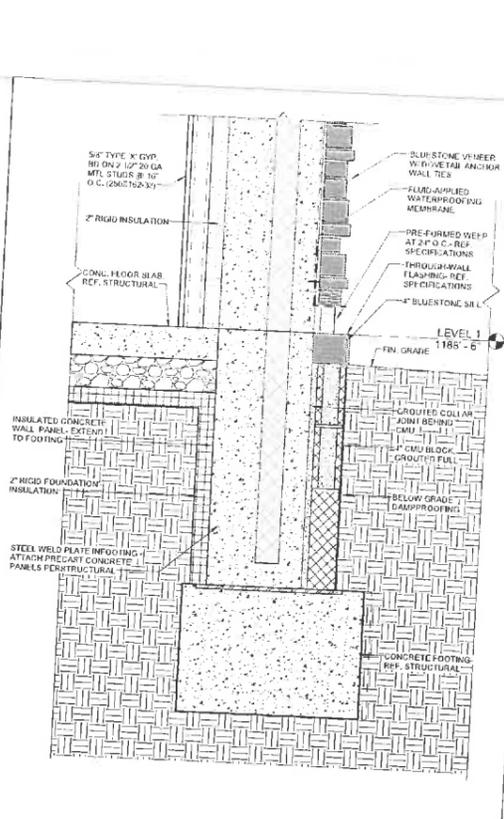
10 LAVATORY SECTION  
SCALE: 1" = 1'-0"



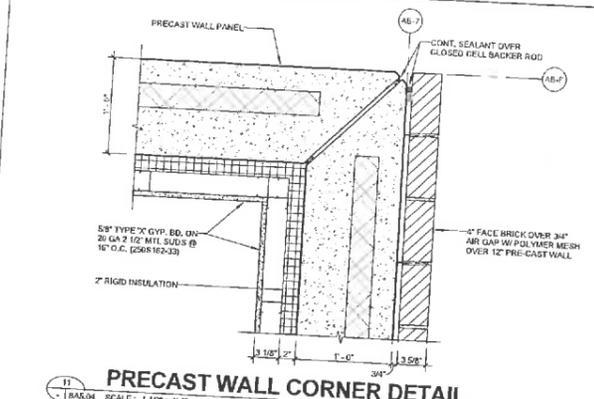
SECTION @ BASE CABINETS WITH DRAWERS  
SCALE: 1" = 1'-0"



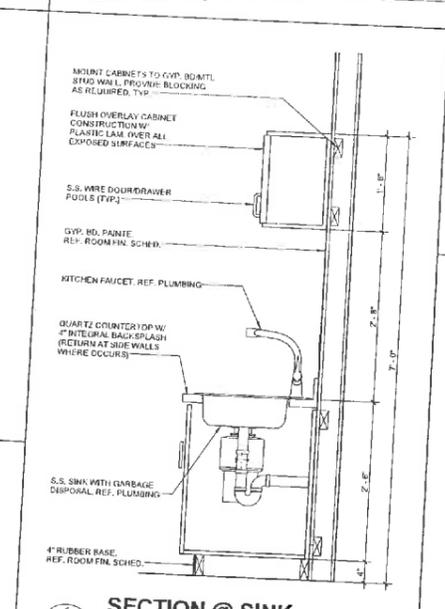
BASE OF WALL DETAIL - PRECAST  
SCALE: 1 1/2" = 1'-0"



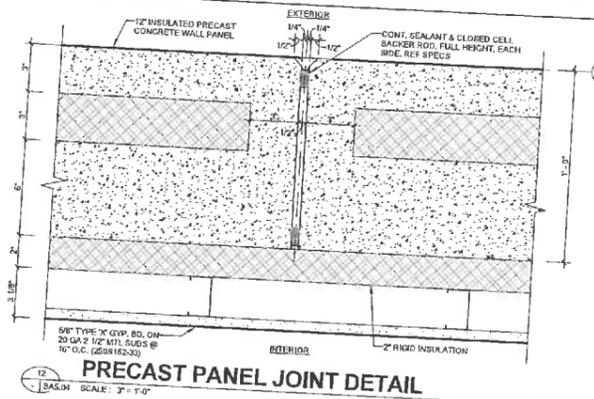
BASE OF WALL DETAIL - MASONRY  
SCALE: 1 1/2" = 1'-0"



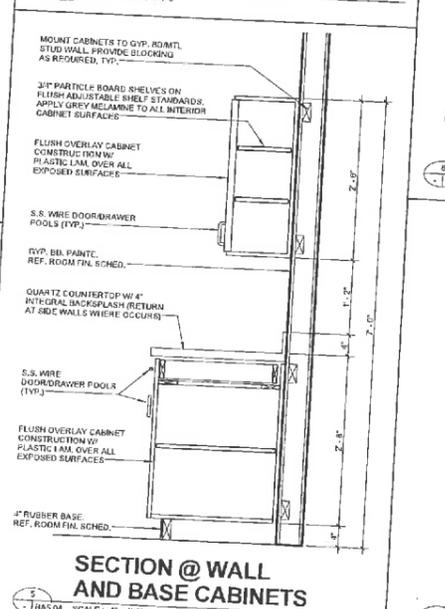
11 PRECAST WALL CORNER DETAIL  
SCALE: 1 1/2" = 1'-0"



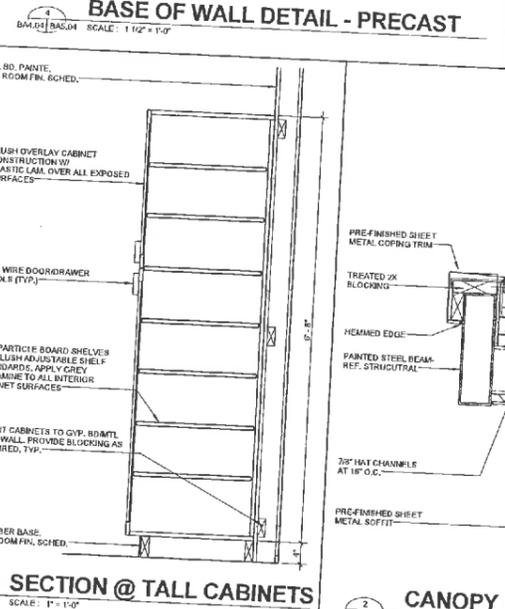
SECTION @ SINK  
SCALE: 1" = 1'-0"



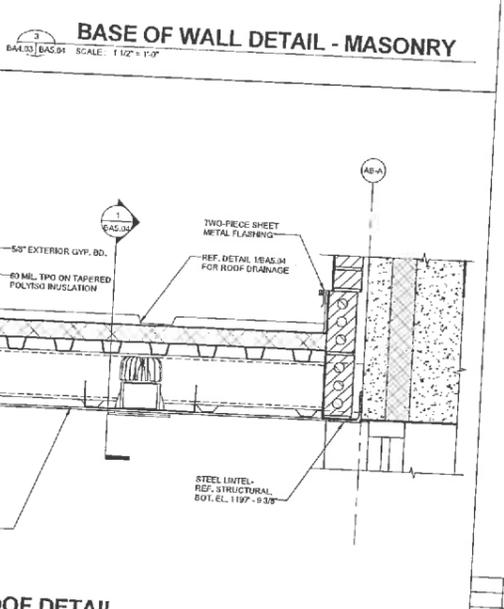
12 PRECAST PANEL JOINT DETAIL  
SCALE: 3" = 1'-0"



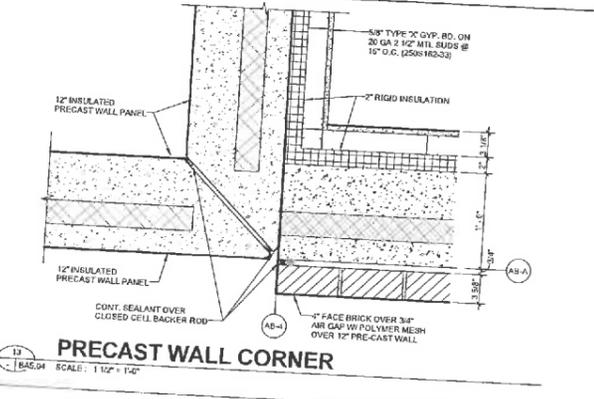
SECTION @ WALL AND BASE CABINETS  
SCALE: 1" = 1'-0"



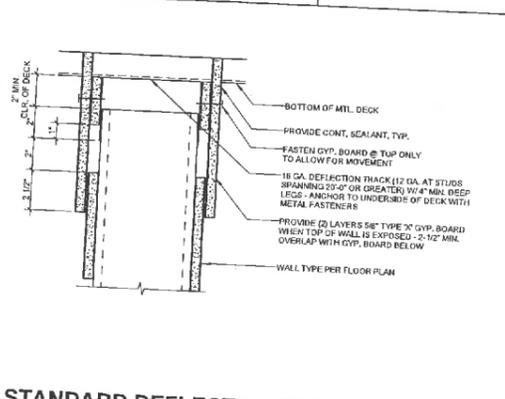
SECTION @ TALL CABINETS  
SCALE: 1" = 1'-0"



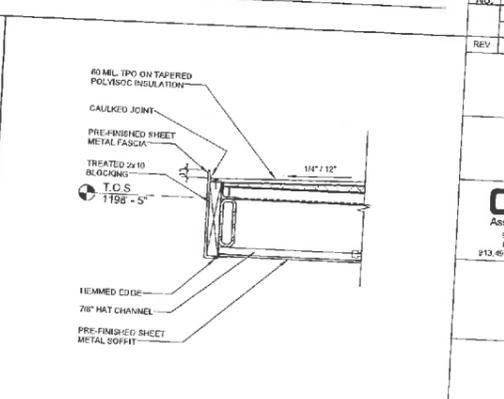
CANOPY ROOF DETAIL  
SCALE: 1 1/2" = 1'-0"



13 PRECAST WALL CORNER  
SCALE: 1 1/2" = 1'-0"



STANDARD DEFLECTION TRACK DETAIL  
SCALE: 3" = 1'-0"



CANOPY EDGE DETAIL  
SCALE: 1 1/2" = 1'-0"

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No.	Description	Date
REV	T. WILLSON DESIGN BY	T. WILLSON DRAWN BY
	C. ROGGE CHECKED BY	06/07/15 DATE

Lockwood Green Consulting LLC

**Inverney**

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**GBA P.A.**  
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Lenexa, Kansas 66150  
913.452.9400 www.gbam.com

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001 - ADMINISTRATION BUILDING  
MISCELLANEOUS DETAILS

DRAWING NUMBER  
2014-087-001-BA5.04

### ROOM FINISH SCHEDULE

MK	NAME	FLOOR FINISH			WALLS			REMARKS
		S.C.	BASE FINISH	MOUTH (TYP.)	EAST	SOUTH	WEST	
AB101	WAREHOUSE							
AB102	CONTROL							
AB103	POST EQUIPMENT ROOM							
AB104	TELECOM SERVER ROOM							
AB105	TELECOM							
AB106	FILES							
AB107	LOCKER/STORAGE							
AB108	VESTIBULE							
AB109	ADMIN OFFICE							
AB110	OFFICE							
AB111	OFFICE							
AB112	OFFICE							
AB113	MANAGER OFFICE							
AB114	OFFICE							
AB115	OFFICE							
AB116	OFFICE							
AB117	JANITOR							
AB118	WOMEN'S							
AB119	MEN'S							
AB120	MEALS LOCKER ROOM							
AB121	KITCHEN							
AB122	RESTROOM							
AB123	TOILET ROOM							
AB124	OFFICE							
AB125	OFFICE							
AB126	CORRIDOR							
AB127	CORRIDOR							
AB128	CORRIDOR							
AB129	CORRIDOR							
AB130	LOBBY							
AB131	CORRIDOR							

### ROOM FINISH LEGEND

**FLOOR FINISHES**  
 S.C. SPALED CONCRETE  
 GP11 CARPET TYPE 1  
 GP12 CARPET TYPE 2  
 GP13 CARPET TYPE 3  
 WOM WALK-OFF MAT  
 PFT1 PORCELAIN FLOOR TILE  
 LV11 LUBRIC/VINYL TILE

**BASE FINISHES**  
 F2B FRESHEN BASE  
 F2FB FRESHEN KASE

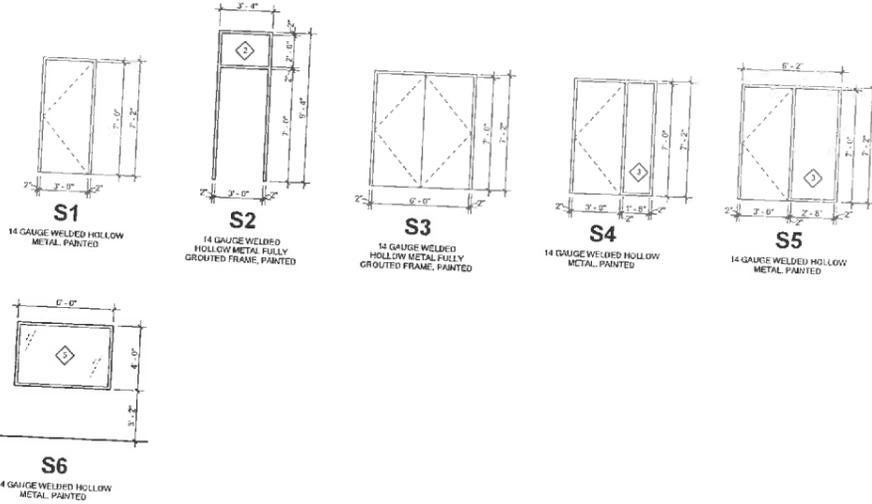
**WALL FINISHES**  
 P11 PAINT COLOR 1  
 P12 PAINT COLOR 2  
 P13 PAINT COLOR 3  
 P14 PAINT COLOR 4  
 CWT1 CERAMIC WALL TILE  
 NST BLUE STONE VENEER

### DOOR SCHEDULE

MK	SIZE (WxHxT)	DOOR		FRAME		DETAILS			REMARKS	UL RATING
		TYPE	MATERIAL	TYPE	MATERIAL	SILL	AMB	HEAD		
AB101A	12'-0" x 10'-0"	A	STL	82	HML	3BA6.01	3BA6.01	3BA6.01		
AB101B	12'-0" x 10'-0"	A	STL	82	HML	3BA6.01	3BA6.01	3BA6.01		
AB101C	3'-0" x 7'-0" x 1'-3"	A	STL	82	HML	3BA6.01	3BA6.01	3BA6.01		
AB101D	3'-0" x 7'-0" x 1'-3"	A	STL	82	HML	3BA6.01	3BA6.01	3BA6.01		
AB101E	3'-0" x 7'-0" x 1'-3"	A	STL	82	HML	3BA6.01	3BA6.01	3BA6.01		
AB102A	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB102B	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB103	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB104	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB105	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB106	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB107A	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB107B	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB108A	3'-0" x 7'-0" x 1'-3"	F	GL	81	ALUM	3BA6.01	3BA6.01	3BA6.01		
AB108B	3'-0" x 7'-0" x 1'-3"	F	GL	81	ALUM	3BA6.01	3BA6.01	3BA6.01		
AB109	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB110	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB111	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB112	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB113	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB114	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB115	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB116	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB117	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB118	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB119	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB120	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB121	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB122	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB123	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB124	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB125	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB126	3'-0" x 7'-0" x 1'-3"	C	WD	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB128A	3'-0" x 7'-0" x 1'-3"	A	STL	81	HML	3BA6.01	3BA6.01	3BA6.01		
AB128B	3'-0" x 7'-0" x 1'-3"	D	ALUM	81	ALUM	3BA6.01	3BA6.01	3BA6.01		

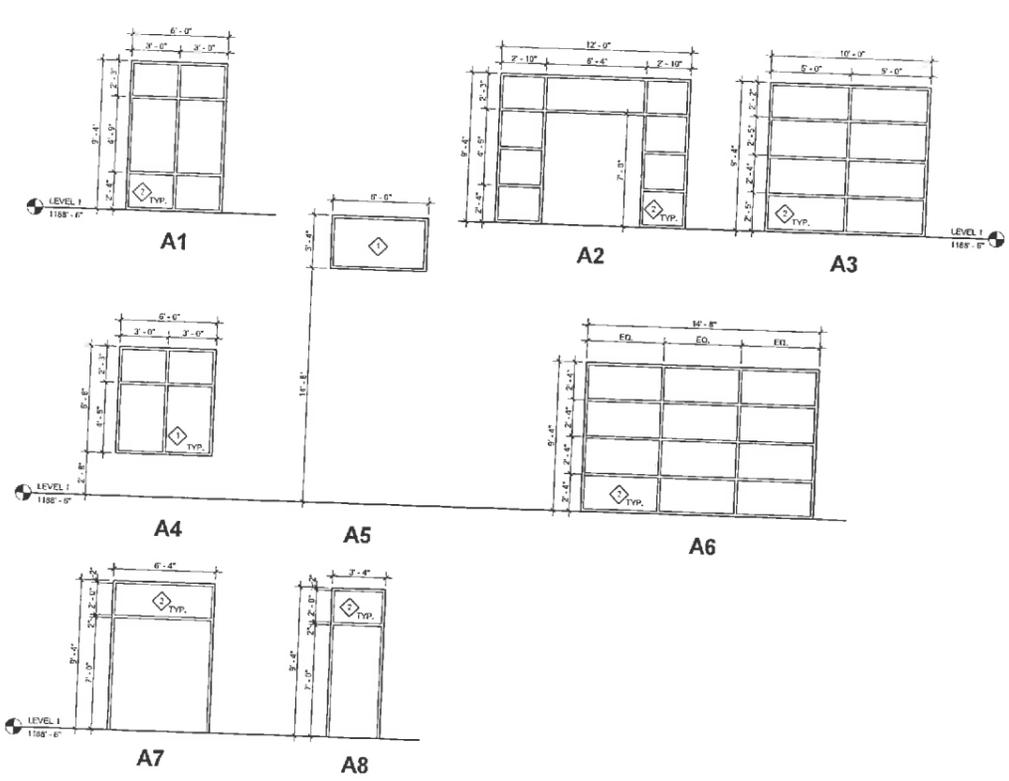
### HOL. MTL. FRAME TYPES

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



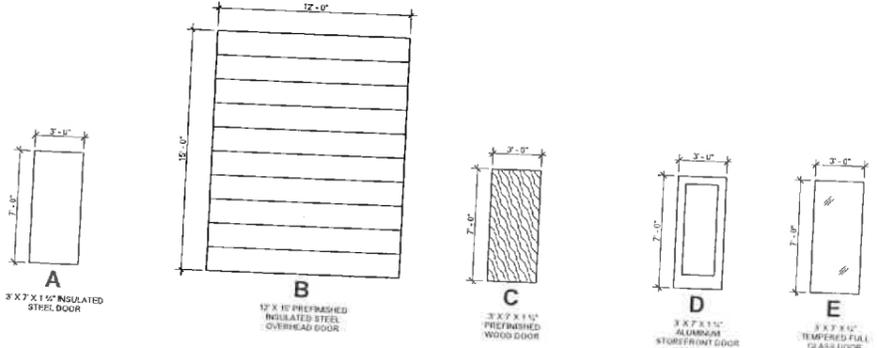
### ALUMINUM FRAME TYPES

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



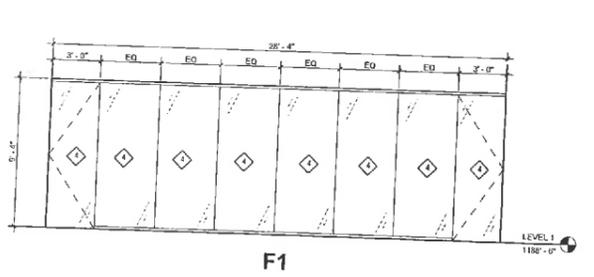
### DOOR TYPES

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



### FRAMELESS WALL SYSTEMS

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



### GLAZING LEGEND

- ◆ 1" INSULATED GLAZING
- ◆ 1" INSULATED GLAZING, TEMPERED
- ◆ 1/4" TEMPERED PLATE GLASS
- ◆ 1/2" TEMPERED PLATE GLASS
- ◆ 1/2" 2 HOUR RATED FIRE GLASS

REFER TO SPECIFICATIONS SECTION 08000 FOR ADDITIONAL GLAZING INFORMATION

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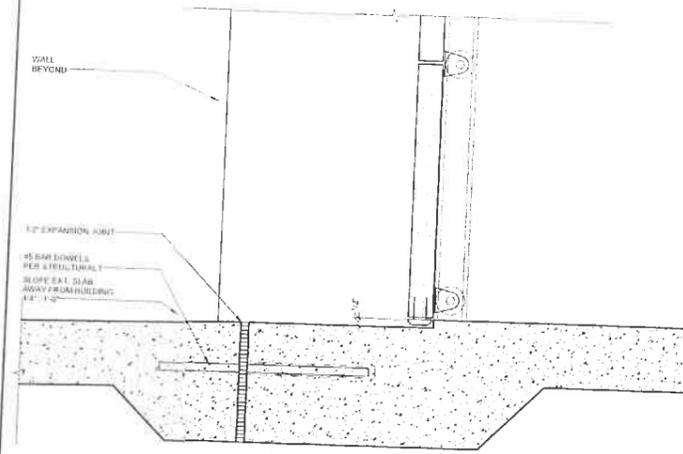
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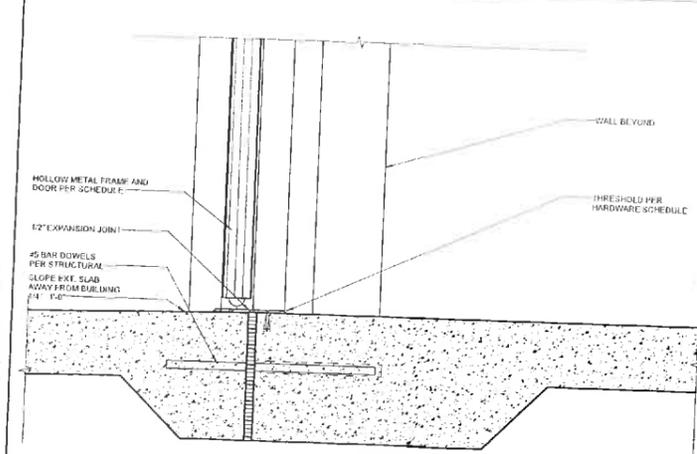
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001 - ADMINISTRATION BUILDING  
 DOOR & ROOM FINISH SCHEDULES

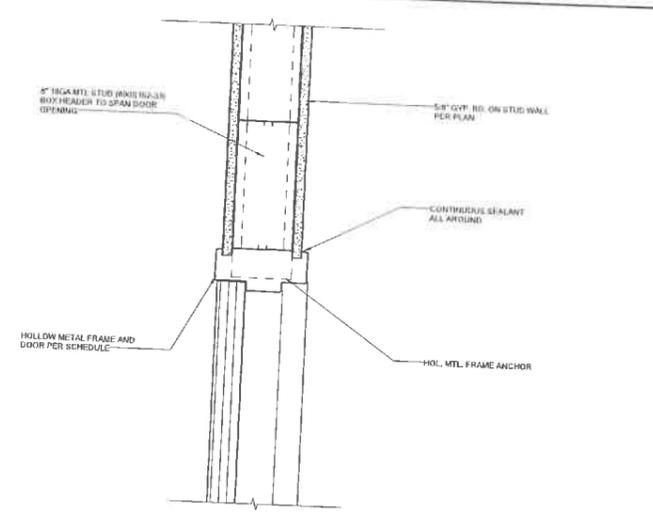
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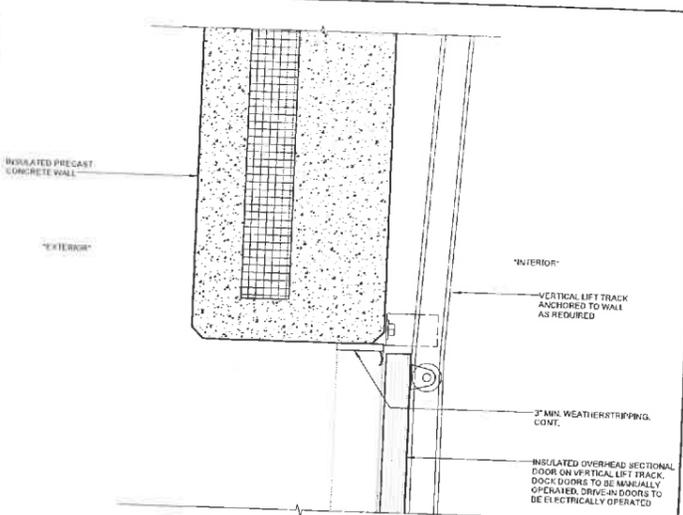
1 SILL DETAIL - OVERHEAD DOOR IN EXT. WALL  
SCALE: 3" = 1'-0"



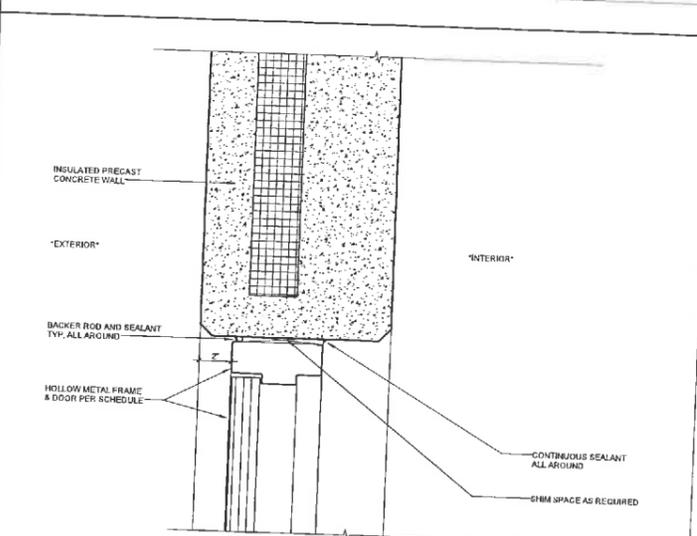
1 SILL DETAIL - HOL. MTL. FRAME IN EXT. WALL  
SCALE: 3" = 1'-0"



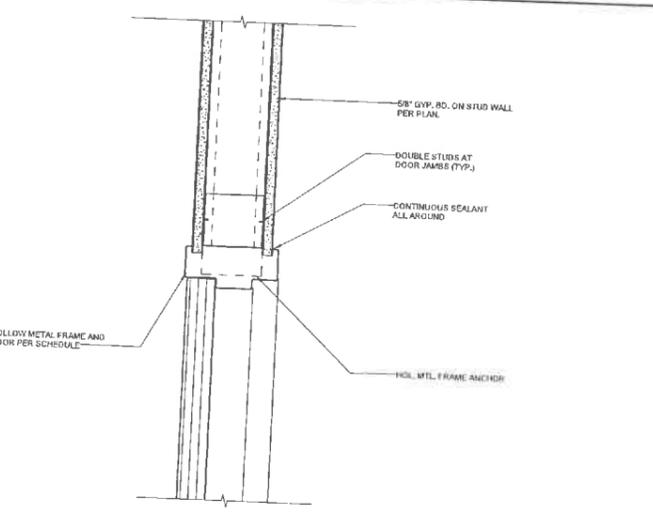
2 HEAD DETAIL - HOL. MTL. FRAME IN GYP. WALL  
SCALE: 3" = 1'-0"



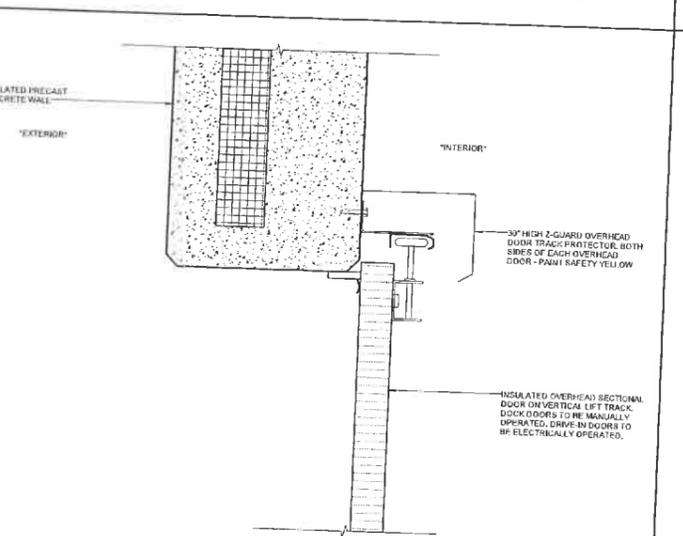
3 HEAD DETAIL - OVERHEAD DOOR IN EXT. WALL  
SCALE: 3" = 1'-0"



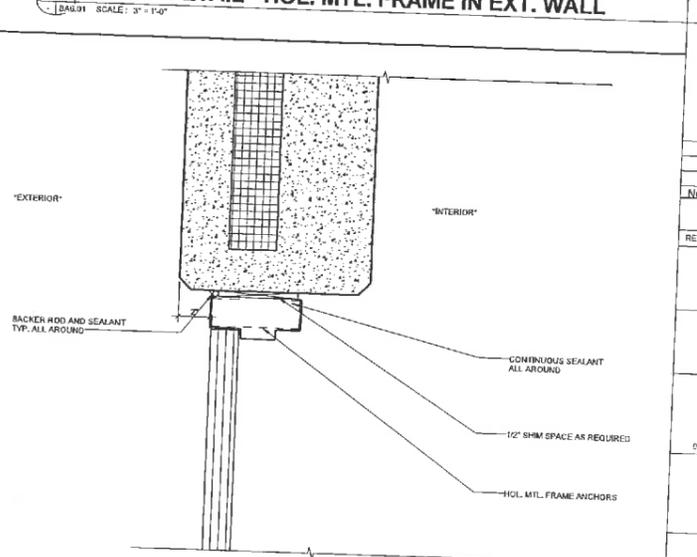
2 HEAD DETAIL - HOL. MTL. FRAME IN EXT. WALL  
SCALE: 3" = 1'-0"



7 JAMB DETAIL - HOL. MTL. FRAME IN INT. GYP. WALL  
SCALE: 3" = 1'-0"



4 JAMB DETAIL - OVERHEAD DOOR IN EXT. WALL  
SCALE: 3" = 1'-0"



1 JAMB DETAIL - HOL. MTL. FRAME IN EXT. WALL  
SCALE: 3" = 1'-0"

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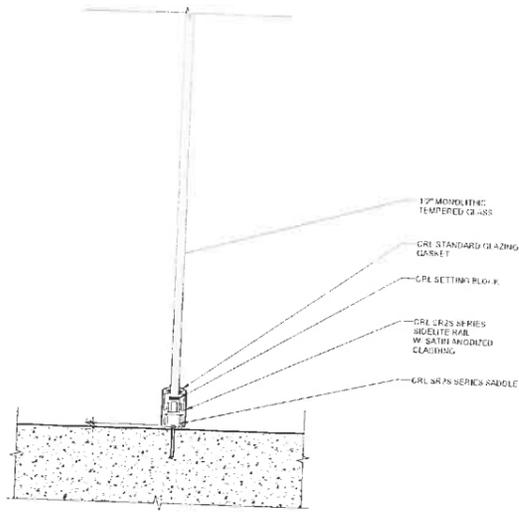
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Lenexa, Kansas 66219  
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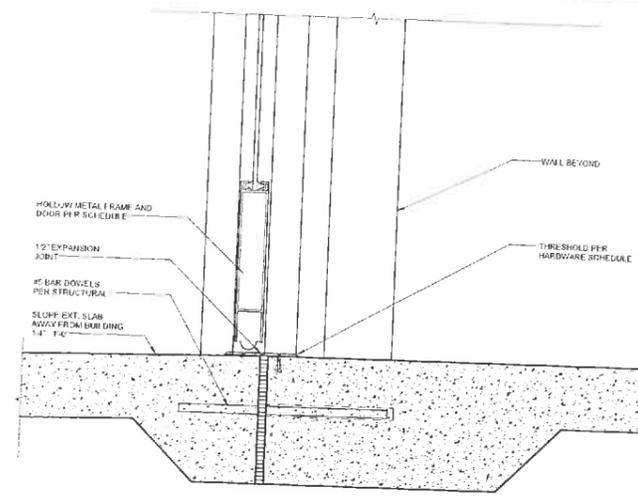
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001 - ADMINISTRATION BUILDING  
DOOR AND WINDOW DETAILS

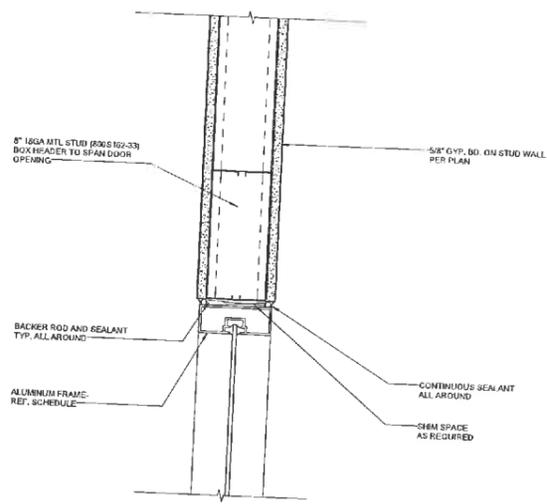
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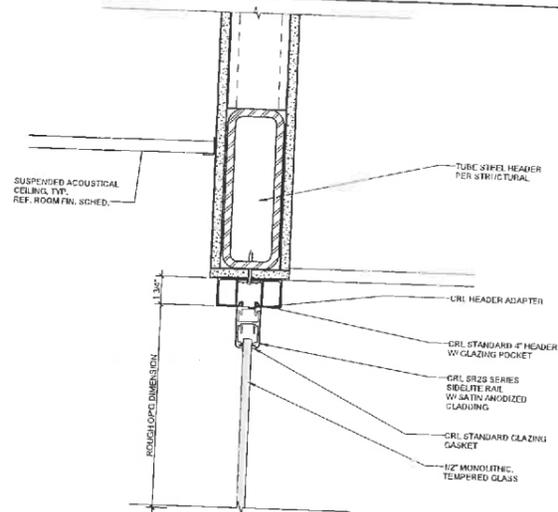
6 SILL DETAIL - FRAMELESS SYSTEM  
SCALE: 3" = 1'-0"



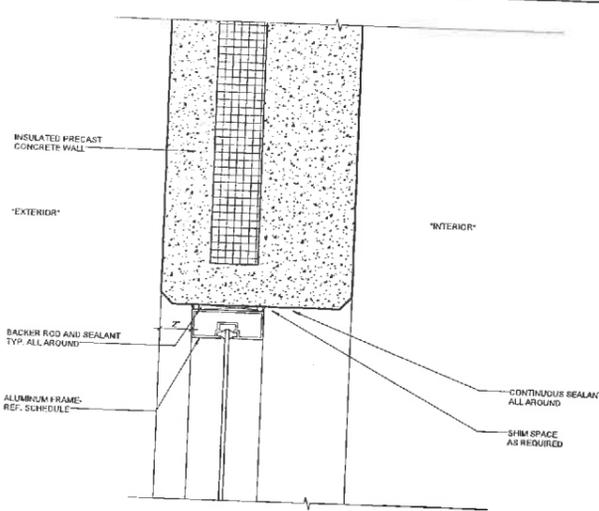
7 SILL DETAIL - ALUM. FRAME IN EXT. WALL  
SCALE: 3" = 1'-0"



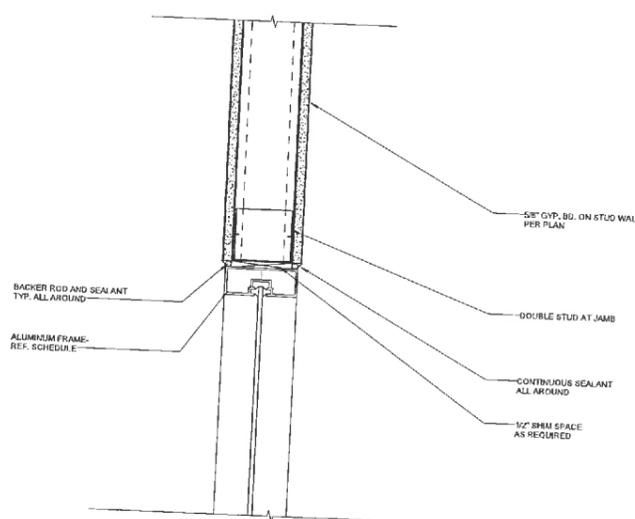
8 HEAD DETAIL - ALUM. FRAME IN GYP. WALL  
SCALE: 3" = 1'-0"



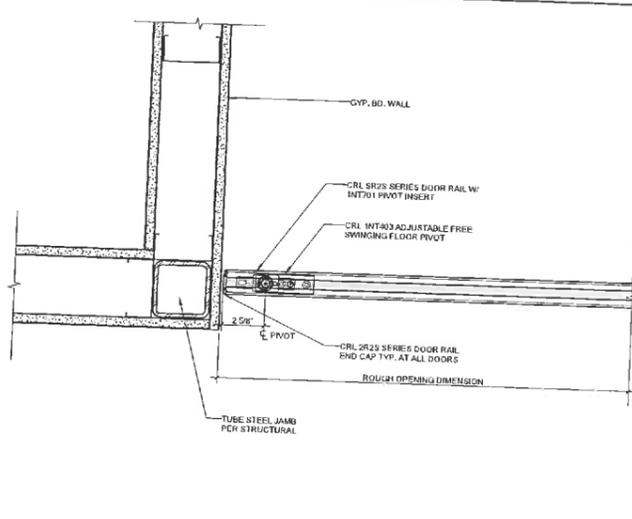
9 HEAD DETAIL - FRAMELESS SYSTEM  
SCALE: 3" = 1'-0"



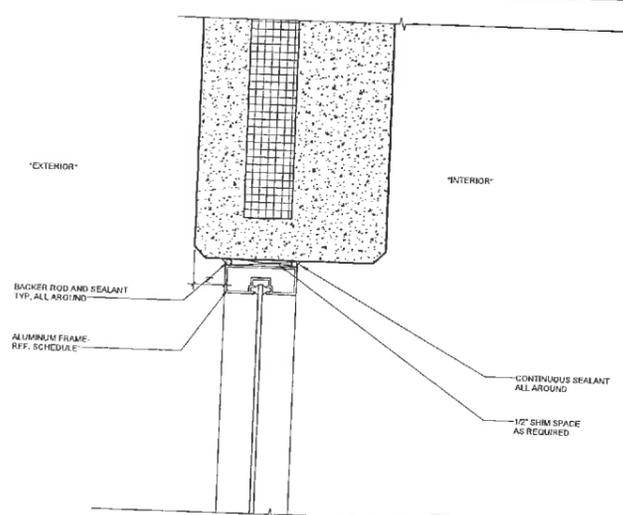
10 HEAD DETAIL - ALUM. FRAME IN EXT. WALL  
SCALE: 3" = 1'-0"



11 JAMB DETAIL - ALUM. FRAME IN GYP. WALL  
SCALE: 3" = 1'-0"



12 JAMB DETAIL - FRAMELESS SYSTEM  
SCALE: 3" = 1'-0"



13 JAMB DETAIL - ALUM. FRAME IN EXT. WALL  
SCALE: 3" = 1'-0"

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T. WILLSON	T. WILLSON	C. ROKAGE
DESIGN BY	DRAWN BY	CHECKED BY
		DATE

Lockman Energy Center LLC

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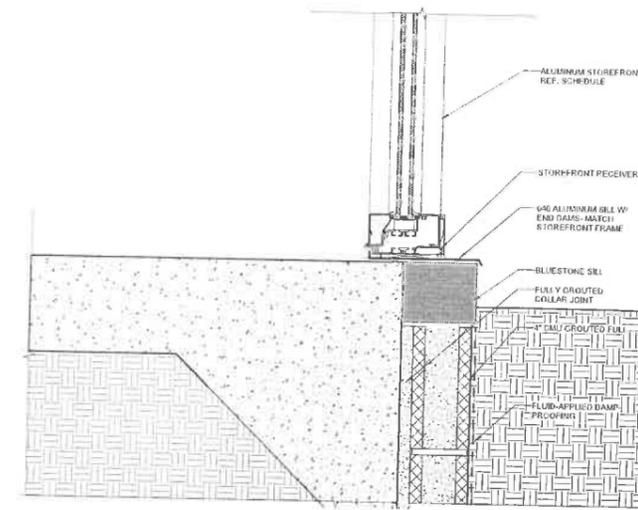
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Association  
9901 Ranney Boulevard  
Lenexa, Kansas 66215  
913.492.9400 www.gbapla.com

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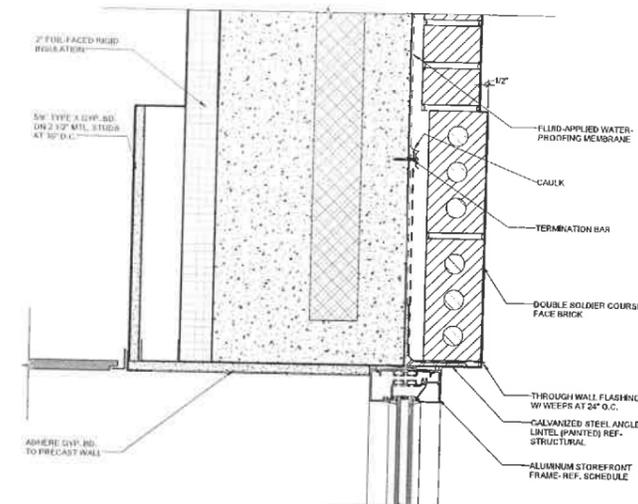
001 - ADMINISTRATION BUILDING  
DOOR AND WINDOW DETAILS

DRAWING NUMBER

2014-087-001-BA6.02



**SILL DETAIL - ALUMINUM AT EXT. MASONRY**  
 DRAWN SCALE 3/4" = 1'-0"



**HEAD DETAIL - ALUM. AT EXT. MASONRY**  
 DRAWN SCALE 3/4" = 1'-0"

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DRAWN BY	T. WILSON	
CHECKED BY	C. ROGGE	06/07/16

Larkasama Energy Center L.L.C.

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KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
 Association  
 2891 Riverchase Boulevard  
 Lenox, Kansas 66219  
 781.462.9400 www.gbapainc.com

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001 - ADMINISTRATION BUILDING  
 DOOR AND WINDOW DETAILS

DRAWING NUMBER  
 2014-087-001-BA6.03

# GENERAL NOTES

GENERAL NOTES - STRUCTURAL  
 DESIGN SPECIFICATIONS ACI 318M-11, ASCE 14TH EDITION  
 GOVERNING BUILDING CODE: IBC 2009  
 RISK (OCCUPANCY) CATEGORY: III

ROOF DESIGN LOADS	
ROOFING/INSULATION	7 psf
DECKING	3.5 psf
FRAMING SELF WT.	1.1
COLLATERAL	20 psf
<b>LIVE LOAD</b>	<b>23.7 psf (SNOW)</b>

$P_s$	= 28 psf
$P_f$	= 23.7 psf
$C_s$	= 1.1
$I_s$	= 1.1
$C_e$	= 1.0

SNOW DRIFT AND RAIN ON SNOW LOADING IN ACCORDANCE WITH GOVERNING BUILDING CODE

CANOPY DESIGN LOADS	
ROOFING/INSULATION/SOFFIT	10 psf
FRAMING SELF WT.	1.1
<b>LIVE LOAD</b>	<b>23.7 psf (SNOW)</b>

SEISMIC DESIGN CATEGORY	= A
$R$	= 1.25
$S_s$	= 0.2g
$S_1$	= 0.58g
SITE CLASS	= C
$S_{ms}$	= 1.60g
$S_{m1}$	= 0.857g

BASIC SEISMIC-FORCE-RESISTING SYSTEM - WAREHOUSE  
 DESIGN BASE SHEAR (N/S DIRECTION) = 6.1 K  
 DESIGN BASE SHEAR (E/W DIRECTION) = 4.7 K  
 BASIC SEISMIC-FORCE-RESISTING SYSTEM - OFFICE  
 DESIGN BASE SHEAR (N/S DIRECTION) = 4.6 K  
 DESIGN BASE SHEAR (E/W DIRECTION) = 4.5 K

WIND LOAD:	$V_{50}$ = 90 MPH
	$I_s$ = 1.15
	$C_e$ = C
EXPOSURE CATEGORY	= C
GCPI	= ±0.18

WIND COMPONENTS & CLADDING - WAREHOUSE WALL ELEMENTS			
LOCATION	GROSS WIND PRESSURE "q"		EDGE ZONE
	ZONE 4	ZONE 5	
AREA < 10 FT <sup>2</sup>	± 24.2	± 25.9	6'-6" FT.
AREA = 50 FT <sup>2</sup>	± 22.3	± 25.1	6'-6" FT.
AREA > 100 FT <sup>2</sup>	± 21.4	± 23.3	6'-6" FT.

WIND COMPONENTS & CLADDING - OFFICE WALL ELEMENTS			
LOCATION	GROSS WIND PRESSURE "q"		EDGE ZONE
	ZONE 4	ZONE 5	
AREA < 10 FT <sup>2</sup>	± 22.9	± 28.3	7'-3" FT.
AREA = 50 FT <sup>2</sup>	± 21.1	± 23.8	7'-3" FT.
AREA > 100 FT <sup>2</sup>	± 20.2	± 22.0	7'-3" FT.

LINEAR INTERPOLATION IS PERMITTED.

WALL COMPONENTS & FASTENERS SHALL BE DESIGNED FOR THE WIND PRESSURES, W, SHOWN IN THE TABLE. APPLICABLE LOAD COMBINATION FACTORS (1.0K, 0.6W, ETC.) SHALL BE APPLIED TO THE GROSS WIND PRESSURES PER THE GOVERNING BUILDING CODE.

ZONE 5 WIND PRESSURES APPLY TO WALL COMPONENTS & FASTENERS THAT ARE IN THE EDGE ZONE - THE DISTANCE FROM ALL CORNERS OF THE BUILDING. ZONE 4 WIND PRESSURES APPLY TO ALL AREAS NOT IN THE EDGE ZONE.

REFERENCE THE ROOF FRAMING PLAN FOR WIND COMPONENTS AND CLADDING UPLIFT PRESSURES ON ROOF ELEMENTS, IF APPLICABLE.

**GENERAL:**

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY OBSERVED DISCREPANCIES IN DIMENSIONS, DETAILING, OR OTHER ITEMS AS SHOWN ON THE PLANS OR SPECIFIED PRIOR TO PROCEEDING WITH WORK RELATING TO SAID DISCREPANCIES.

2. THE CONTRACTOR SHALL NOT ALTER OR MODIFY WORK SHOWN ON THE STRUCTURAL DRAWINGS WITHOUT RECEIVING WRITTEN APPROVAL FROM THE ENGINEER.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING SHOP DRAWINGS FOR CONCRETE WALL PANELS, JOIST GIRDERS, BAR JOISTS, STRUCTURAL STEEL, METAL DECK, REINFORCING STEEL, CONCRETE MIX DESIGNS, GEOPERS, AND POST-INSTALLED ANCHORS. SHOP DRAWINGS MUST BE REVIEWED FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION, AND SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO, ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR, AND PROGRAMS INCIDENTAL THERETO, BY THE CONTRACTOR PRIOR TO SUBMITTING SHOP DRAWINGS SUBMITTED WITHOUT THE CONTRACTOR'S STAMPED APPROVAL WILL BE RETURNED REJECTED. ALL SHOP DRAWINGS SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO CONSTRUCTION.

4. THE STRUCTURAL SYSTEMS SHOWN ON THESE DOCUMENTS HAVE BEEN DESIGNED FOR THE FINAL IN PLACE USAGE OF THE STRUCTURE BASED ON THE INTENDED OCCUPANCY AND CODE REQUIREMENTS. WHILE GENERAL CONSTRUCTIBILITY HAS BEEN CONSIDERED, THE STRUCTURAL SYSTEMS HAVE NOT BEEN DESIGNED TO ACCOMMODATE SPECIFIC CONSTRUCTION MEANS AND METHODS THAT MIGHT BE UTILIZED BY THE CONTRACTOR.

5. THE BUILDING IS NOT STRUCTURALLY STABLE UNTIL ALL CONNECTIONS, FRAMING, SHEARWALLS, PERMANENT BRACING, METAL DECKING AND EXTERIOR LOAD BEARING WALLS (WHERE APPLICABLE) ARE COMPLETE AND HAVE ACHIEVED THEIR DESIGN STRENGTH. CONTRACTOR IS SOLELY RESPONSIBLE FOR MAINTAINING STRUCTURAL STABILITY DURING ERECTION AND CONSTRUCTION. TEMPORARY BRACING SYSTEMS ARE NOT TO BE REMOVED UNTIL STRUCTURAL WORK IS COMPLETE.

6. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR OTHER PERTINENT INFORMATION RELATED TO THE STRUCTURAL WORK AND COORDINATE AS REQUIRED. THESE STRUCTURAL DRAWINGS ARE INTENDED TO BE UTILIZED AS A COMPLETE SET OF DOCUMENTS THAT REPRESENT THE BUILDING'S STRUCTURAL SYSTEMS. NO SINGLE SHEET OR SERIES OF SHEETS IS INTENDED TO "STAND ALONE". TYPICAL DETAILS ARE NOT SHOWN AT SPECIFIC LOCATIONS THROUGHOUT THE DRAWINGS, BUT ARE TO BE APPLIED WHERE REQUIRED. THESE INCLUDE BUT NOT LIMITED TO: ARCHITECTURAL DRAWINGS, CIVIL DRAWINGS, AND MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS. CONTRACTOR SHALL VERIFY COORDINATION OF THESE DRAWINGS WITH CONTENTS OF ABOVE SETS SPECIFIED AND ONLY PROCEED WITH BRIDING AND CONSTRUCTION AFTER SUCH HAS TAKEN PLACE.

7. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE, AND EXCEPT WHERE SPECIFICALLY SHOWN, DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, PROCEDURES, TECHNIQUES, SEQUENCE, AND SAFETY PRECAUTIONS AND

PROGRAMS. THE ENGINEER WILL NOT BE RESPONSIBLE FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

8. PERIODIC SITE OBSERVATION BY FIELD REPRESENTATIVES OF GBA, IF PROVIDED, IS SOLELY FOR THE PURPOSE OF DETERMINING IF THE WORK OF THE CONTRACTOR IS PROCEEDING IN GENERAL ACCORDANCE WITH THE CONTRACT DOCUMENTS. THIS LIMITED SITE OBSERVATION SHOULD NOT BE CONSIDERED AS EXHAUSTIVE OR CONTINUOUS TO CHECK THE QUALITY OR QUANTITY OF THE WORK, BUT RATHER PERIODIC IN AN EFFORT TO GUARD THE OWNER AGAINST DEFECTS OR DEFICIENCIES IN THE WORK OF THE CONTRACTOR.

**SLAB ON GRADE:**

1. THE CONCRETE SLAB-ON-GRADE HAS BEEN DESIGNED FOR ITS FINAL USE AND NOT FOR CONSTRUCTION CONSIDERATIONS. CONTRACTOR SHALL COORDINATE THE SLAB DESIGN WITH CONSTRUCTION NEEDS. THE SLAB DESIGN INDICATED IN THESE DRAWINGS IS TO BE CONSIDERED A MINIMUM. SUBMIT CHANGES TO THE SLAB DESIGN TO THE ENGINEER FOR REVIEW.

2. WELDED WIRE FABRIC SHALL BE SUPPLIED IN SHEETS ONLY. ROLLS WILL NOT BE PERMITTED.

3. WELDED WIRE FABRIC, WHEN USED, SHALL BE SUPPORTED ON CHAIRS OR BLOCKS PRIOR TO CONCRETE PLACEMENT. MESH SHALL NOT BE MOVED AND PULLED UP DURING CONCRETE PLACEMENT.

4. WELDED WIRE FABRIC SHALL HAVE END LAPS OF ONE FULL MESH PLUS 2" BETWEEN CROSS WIRES. WIRE ALL LAPS SECURELY TOGETHER.

5. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

6. SLABS TO RECEIVE MOISTURE SENSITIVE FLOOR COVERINGS SHALL BE COVERED WITH MOISTURE SENSITIVE FLOORING, SUCH AS SEAMLESS SHEET VINYL FLOORING, WHICH UTILIZE A MOISTURE SENSITIVE ADHESIVE. SHALL BE CONSTRUCTED AS FOLLOWS:

VAPOR BARRIER	1/2" ML THICKNESS MEETING ASTM E1745 CLASS A LIQUID BARRIER IN DIRECT CONTACT WITH THE CONCRETE SLAB. INSTALL VAPOR BARRIER PER ASTM E1643 TAPE ALL SEAMS. TAPE ALL PENETRATIONS THROUGH VAPOR BARRIER. SEAL ANY PUNCTURES OR HOLES MADE IN VAPOR BARRIER.
SURFACE FINISH	LIGHT TROWEL WITH LIGHT BROOM FINISH.
CURING	IMPERVIOUS SHEET CURING - 3 DAYS. NO CURING COMPOUNDS TO BE APPLIED TO SURFACE OF CONCRETE.
REWETTING	AVOID REWETTING SLAB AFTER INITIAL CURING. SOURCES OF WATER TO BE AVOIDED: RAIN, WET GRINDING, SAWCUTTING, POWER WASHING.

**FOUNDATIONS:**

1. FOUNDATIONS FOR THIS PROJECT HAVE BEEN DESIGNED IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN A SOIL REPORT PREPARED BY ALENFELDER DATED DECEMBER 23, 2004, AND AN ADDENDUM DATED FEBRUARY 1, 2005. CONTINUOUS AND INDIVIDUAL FOOTINGS HAVE BEEN DESIGNED FOR AN ALLOWABLE SOIL BEARING VALUE OF 1500 PSF UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL REFER TO SOIL COLUMN FOUNDATIONS HAVE BEEN DESIGNED IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN SHOP DRAWINGS PROVIDED BY GEOTECHNICAL ENGINEERING DATED 04-20-16. MEZZANINE COLUMN FOUNDATIONS HAVE BEEN DESIGNED FOR AN ALLOWABLE SOIL BEARING VALUE OF 5000 PSF. THE CONTRACTOR SHALL REFER TO THE GEOTECHNICAL REPORT FOR ALL REQUIREMENTS AND RECOMMENDATIONS PERTAINING TO THIS PROJECT. REFER TO FOUNDATION PLAN, S110 FOR MEZZANINE FOOTING LOAD VALUES.

2. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GR. 36 AND SHALL BE LOCATED BY MEANS OF A TEMPLATE. PROVIDE A NUT ABOVE AND BELOW TEMPLATE TO ASSURE PROPER VERTICAL ALIGNMENT.

3. ALL FOUNDATIONS SHALL BE SQUARE AND LEVEL.

4. GROUT BELOW COLUMN BASE PLATES. GROUT SHALL BE DRY AND STIFF TO PREVENT SHRINKAGE. WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI THROUGHOUT CONTACT GROUT BENEATH BASE PLATE.

5. GROUT BELOW CONCRETE WALL PANELS. GROUT MIX SHALL BE SHRINK-RESISTANT WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI.

**CONCRETE AND REINFORCING STEEL:**

LOCATION	MINIMUM COMPRESSIVE STRENGTH (psi)	MAXIMUM AGGREGATE SIZE (in.)	MIN. CEMENT (lbs.)	MAXIMUM WATER/CEMENT RATIO	MAXIMUM SLUMP (in.)	AIR ENTRAINMENT PERCENT (%)
INTERIOR SLABS	4000	¾"	611	.48	4	0
EXTERIOR SLABS	4000	¾"	611	.48	4	6±1
INTERIOR FOUNDATIONS	4000	¾"	611	.48	4	0
PERIMETER FOUNDATIONS	4000	¾"	611	.48	4	6±1

NOTE: DO NOT ADD WATER TO CONCRETE DURING DELIVERY, AT PROJECT SITE, OR DURING PLACEMENT. THE INTENT OF THESE SPECIFICATIONS IS THAT THE CONTRACTOR SUPPLY CONCRETE MIXES WITH A MINIMUM AMOUNT OF MIX WATER IN ORDER TO LIMIT PLASTIC SHRINKAGE CRACKING. IT IS EXPECTED THAT WORKABILITY FOR CONCRETE MIXES WILL REQUIRE THE ADDITION OF WATER-REDUCING AND/OR SUPER-PLASTICIZING ADJUTIVES.

2. FLY ASH SHALL BE CLASS C AND MAY BE USED IN ALL CONCRETE MIXES UNLESS HIGH EARLY STRENGTH MIXES ARE SPECIFIED. FLY ASH, IF USED, SHALL CONFORM TO ASTM D618. DO NOT EXCEED 25% OF THE TOTAL CEMENT VOLUME.

3. ALL CONCRETE IS REINFORCED UNLESS SPECIFICALLY CALLED OUT AS UNREINFORCED. REINFORCE ALL CONCRETE NOT OTHERWISE SHOWN WITH SAME STEEL AS IN SIMILAR SECTIONS OR AREAS.

4. NO ALUMINUM ITEMS SHALL BE EMBEDDED IN ANY CONCRETE OR PLACED IN CONTACT WITH CONCRETE.

5. CAST-IN-PLACE CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST AMERICAN CONCRETE INSTITUTE DOCUMENTS, AC301, 305, 305.1, 318, AND 347 UNLESS OTHERWISE NOTED IN THESE CONTRACT DOCUMENTS.

6. PRIOR TO PLACING CONCRETE IN ANY LOCATION, IF IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO HAVE THOROUGHLY CHECKED AND COORDINATED ALL DIMENSIONS, ELEVATIONS, OPENINGS, RECESSES, AND BLOCKOUTS SHOWN ON THE ARCHITECTURAL, STRUCTURAL AND MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS. IN THE EVENT ERRORS, CONFLICTS, OR OMISSIONS EXIST, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE ARCHITECT OR ENGINEER FOR NECESSARY CORRECTIVE ACTION.

7. REINFORCING BARS #4 AND LARGER (EXCEPT TIES AND STIRRUPS) SHALL MEET ASTM A615 WITH SUPPLEMENTARY REQUIREMENTS (S1), GRADE 60. SMALLER BARS SHALL BE GRADE 40.

8. CONCRETE COVERAGE OF REINFORCEMENT SHALL HAVE THE FOLLOWING CLEAR DISTANCES UNLESS NOTED OTHERWISE ON THE DRAWINGS:

CAST AGAINST EARTH	3"
FORMED CONCRETE EXPOSED TO EARTH OR WEATHER	2"
NOT EXPOSED TO EARTH OR WEATHER	1" SLABS, 1-½" BEAMS AND COLUMNS

9. CONSTRUCTION JOINTS IN GRADE BEAMS SHALL BE AT MIDSPAN UNLESS NOTED OTHERWISE. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS UNLESS NOTED OTHERWISE.

10. EMBEDDED AND ALL REINFORCING BARS MARKED CONTINUOUS SHALL BE EMBEDDED TO DEVELOP THE FULL TENSION CAPACITY OF THE BARS. LAPS SHALL BE CLASS B TENSION LAPS UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS. UNLESS SHOWN OTHERWISE, SPLICE TOP BARS NEAR MIDSPAN AND SPLICE BOTTOM BARS OVER SUPPORTS.

11. SUPPLY CORNER BARS 4"-Ø LONG (MIN. 2"-Ø IN EACH DIRECTION) IN OUTSIDE FACE OF CONCRETE AT CORNERS OF ALL WALLS AND GRADE BEAMS, MATCHING SIZE AND SPACING OF HORIZONTAL BARS, WHERE THERE ARE NO VERTICAL BARS IN OUTSIDE FACE OF WALL. SUPPLY THREE (3)-Ø VERTICAL SUPPORT BARS FOR CORNER BARS.

12. ALL BARS ARE TO BE SUPPORTED IN FORMS AND SPACED WITH WIRE BAR SUPPORTS PER ACI MANUAL OF STANDARD PRACTICE FOR DETAILING CONCRETE STRUCTURES (LATEST EDITION). BARS SHALL BE SECURELY WIRDED PER LATEST EDITION OF CRSI'S "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS," UNLESS OTHERWISE NOTED. CONCRETE SHALL BE PLASTIC OR HAVE PLASTIC-TIPPED FEET.

13. CONCRETE PLACED DURING HOT WEATHER SHALL CONFORM TO THE REQUIREMENTS OF ACI 306R-88 (HOT WEATHER) IS DEFINED AS A PERIOD WHEN, FOR MORE THAN 3 SUCCESSIVE DAYS, THE MEAN DAILY TEMPERATURE DROPS BELOW 40°F.

14. CONCRETE PLACED DURING HOT WEATHER SHALL CONFORM TO THE REQUIREMENTS OF ACI 306R-88 (HOT WEATHER) IS DEFINED AS THAT COMBINATION OF AIR TEMPERATURE, RELATIVE HUMIDITY AND WIND SPEED THAT WILL CAUSE A RATE OF EVAPORATION OF 0.2 LB/50.0 FT<sup>2</sup>/HR, OR MORE AS DEFINED BY FIGURE 2.1.5 OF ACI 306R-88.

15. CHAMFER ALL EXPOSED CORNERS OF CONCRETE SLABS, WALLS, BEAMS AND COLUMNS "X", UNLESS NOTED OTHERWISE ON DETAILS.

**STRUCTURAL STEEL:**

1. ALL STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING:

STRUCTURAL STEEL WIDE FLANGES	= ASTM A992, GRADE 50
MISCELLANEOUS STEEL	= ASTM A36
HOLLOW STRUCTURAL SECTION	= ASTM A500, GRADE B (F <sub>y</sub> = 46 ksi)
STEEL PIPE	= ASTM A513, TYPE E OR S, GRADE 48

2. CONNECTIONS NOT SHOWN SHALL BE DESIGNED BY THE FABRICATOR. NON-COMPOSITE BEAM CONNECTIONS SHALL DEVELOP 50% OF THE TOTAL UNIFORM LOAD CAPACITY AS GIVEN IN THE TABLES FOR "ALLOWABLE LOADS ON BEAMS," FOR GIVEN SIZE, SPAN AND GRADE OF THE CONNECTED MEMBER. UNLESS NOTED OTHERWISE, COMPOSITE BEAM CONNECTIONS SHALL DEVELOP 75% OF THE UNIFORM LOAD CAPACITY FOR THE GIVEN SIZE, SPAN AND GRADE OF THE CONNECTED MEMBER. UNLESS NOTED OTHERWISE, BOLTS SHALL BE AS FOLLOWS:

CONNECTION BOLTS	= ASTM A325
ANCHOR BOLTS	= ASTM F1554, GR. 36 OR ASTM A335
SHEAR STUD CONNECTORS	= ASTM A108, GRADE 1215 THROUGH 1020

3. BOLTING SHALL CONFORM TO THE CRSI'S "SPECIFICATION FOR STRUCTURAL JOISTS USING ASTM A325 OR A490 BOLTS."

4. WELDING SHALL BE PERFORMED BY A QUALIFIED WELDER AND CONFORM TO THE LATEST PUBLICATION OF APPLICABLE CODES SET FORTH BY THE AMERICAN WELDING SOCIETY. WELDING ELECTRODES SHALL BE E70XX.

5. WELD ALL JOISTS TO SUPPORTING MEMBERS WITH ¾" X 2" LONG FILLET WELD ON EACH SIDE OR GREATER PER SA. IN STEEL FRAMES, WHERE COLUMNS ARE NOT FRAMED IN AT LEAST TWO DIRECTIONS WITH STRUCTURAL STEEL MEMBERS, JOISTS AT COLUMN LINE SHALL BE FIELD WELDED AT THE COLUMNS TO PROVIDE LATERAL BRACING DURING CONSTRUCTION.

6. ALL ROOF BAR JOISTS SHALL BE DESIGNED FOR UPLIFT AS STIPULATED BY THE APPLICABLE BUILDING CODE. EXTRA BRACING SHALL BE ADDED AS REQUIRED, AND THE JOIST MANUFACTURER SHALL CERTIFY THAT THE JOISTS HAVE BEEN DESIGNED FOR REVERSE BENDING DUE TO UPLIFT.

7. ALL BAR JOISTS SHALL HAVE HORIZONTAL BRACING AS RECOMMENDED BY THE STEEL JOIST INSTITUTE. PROVIDE ¾" BRACING IN ADDITION TO HORIZONTAL BRACING WHERE HORIZONTAL BRACING IS DISCONTINUOUS, UNLESS HORIZONTAL BRACING IS CONNECTED TO A WALL TOP AND BOTTOM OF JOIST. THE FABRICATOR SHALL FOLLOW THE LATEST REQUIREMENTS OF THE STEEL JOIST INSTITUTE REGARDING ADDITIONAL BOLTED ¾" BRACING REQUIRED FOR ERECTION STABILITY.

8. ALL HANGERS SUPPORTING PIPE, EQUIPMENT, CONDUIT, ETC. OF MORE THAN 200 LBS. SUPPORTED FROM STEEL BAR JOISTS OR JOIST GIRDERS SHALL BE HUNG FROM TOP CHORDS AND WITHIN 2" OF WEB PANEL POINTS. IF INTERFERENCES EXIST THAT WILL NOT ALLOW PIPE TO BE HUNG IN THIS MANNER, THE CONTRACTOR SHALL NOTIFY THE ENGINEER FOR REQUIRED MODIFICATIONS.

9. ALL OPENINGS IN THE ROOF SHALL BE FRAMED WITH A 4 X 4 X ¾ ANGLE MINIMUM, UNLESS NOTED OTHERWISE. MECHANICAL UNITS SHALL BE SUPPORTED WITH STRUCTURAL STEEL FRAMES AS REQUIRED. IF FRAMING IS NOT SHOWN FOR MECHANICAL UNITS, NOTIFY THE ENGINEER.

10. PROVIDE 1/4" INCH THICK CLOSURE PLATES ON ENDS OF ALL HSS SECTIONS, UNLESS NOTED OTHERWISE.

**POST-INSTALLED ANCHORS AND REBAR:**

1. POST-INSTALLED ANCHORS AND REBAR SHALL BE INSTALLED USING AN ADHESIVE UNLESS SPECIFICALLY NOTED OTHERWISE. ANCHORS SHALL CONSIST OF THE FOLLOWING ANCHOR TYPES, AS PROVIDED BY Hilti, Inc.:

ANCHORAGE TO CONCRETE	(1) HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT (TC-CD OR TE-YD)
	(2) STEEL ANCHOR ELEMENT SHALL BE HILTI HAN-E THREADED ROD PER ICC ESR-3187.
REBAR DOWELING INTO CONCRETE	(1) HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT (TC-CD OR TE-YD) AND CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3187.

2. CONTACT HILTI AT (800) 879-8500 FOR PRODUCT RELATED QUESTIONS.

3. IF THE CONTRACTOR CHOOSES TO SUBMIT A SUBSTITUTION FOR APPROVAL, THEY MUST ATTACH CALCULATIONS SHOWING THAT THE SUBSTITUTION IS "EQUAL" TO THE SPECIFIED ANCHOR. THE CONTRACTOR SHALL SUBMIT THE SUBSTITUTION FOR REVIEW. THE CONTRACTOR SHALL NOTE THAT THE ICC-REPORT MAY INDICATE ADDITIONAL SPECIAL INSPECTION REQUIREMENTS. ANY ADDITIONAL SPECIAL INSPECTION REQUIREMENTS MUST BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER.

4. INSTALL ANCHORS PER THE MANUFACTURER'S INSTRUCTIONS, AS INCLUDED IN THE ANCHOR PACKAGING.

5. THE CONTRACTOR SHALL ARRANGE AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ON-SITE INSTALLATION TRAINING FOR ALL OF THE ANCHORS SPECIFIED. THE STRUCTURAL ENGINEER OF RECORD MUST RECEIVE DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR'S PERSONNEL WHO INSTALL ANCHORS ARE TRAINED PRIOR TO THE COMMENCEMENT OF INSTALLING ANCHORS.

6. OVERHEAD ADHESIVE ANCHORS MUST BE INSTALLED USING THE HILTI PROF SYSTEM.

7. ANCHOR CAPACITY IS DEPENDANT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGES OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWING.

8. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS UNLESS NOTED ON THE DRAWINGS THAT THE BARS CAN BE CUT. THE CONTRACTOR SHALL REVIEW THE EXISTING STRUCTURAL DRAWINGS AND SHALL UNDERTAKE MEASURES TO LOCATE THE POSITION OF THE EXISTING REINFORCING BARS AT THE LOCATIONS OF THE CONCRETE ANCHORS, BY HILTI FERROSCAN, GPR, X-RAY, OR OTHER MEANS.

**STRUCTURAL PRECAST OR SITE CAST TILT-UP CONCRETE WALL PANELS:**

1. GBA HAS NOT BEEN RETAINED TO DESIGN THE CONCRETE WALL PANELS ON THIS PROJECT. THE PRECAST/TILT-UP COMPONENTS OF THE STRUCTURE SHOWN ON THESE DRAWINGS SHALL BE DESIGNED BY THE PRECAST/TILT-UP CONTRACTOR AND SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE JURISDICTION WHERE THE PROJECT IS LOCATED. WALL PANELS SHALL BE DESIGNED TO COMPLY WITH ALL LOCAL CODES, WITH THE PRECAST/TILT-UP INDUSTRY STANDARDS AND TO SAFELY CARRY THE LOADS SHOWN ON THESE DRAWINGS AND AS REQUIRED BY CODE. THE PRECAST/TILT-UP DESIGN SHALL INCLUDE ALL BOLTS, PLATES, BRACES, AND WELD SIZES FOR ALL CONNECTIONS BETWEEN THE PRECAST/TILT-UP AND THE SUPPORTING STRUCTURE AND FOUNDATIONS. THE PRECAST/TILT-UP CONTRACTOR SHALL PROVIDE A COMPLETE VERTICAL AND LATERAL SYSTEM TO SAFELY CARRY THE PRESCRIBED AND REQUIRED LOADS SAFELY TO THE FOUNDATION.

2. DESIGN CALCULATIONS SHALL CONSIDER AND SHOW STRESS FROM DEAD LOAD OF PANEL, DEAD LOAD OF CEILING, THE LOAD OF STRUCTURE, SNOW LOAD, WIND LOAD, SEISMIC LOAD AND TEMPERATURE DIFFERENTIAL. THE LOAD AND CONNECTION DESIGN SHALL CONSIDER EXCESSIVE VIBRATIONS ASSOCIATED WITH CONNECTIONS USED FOR FRAMING MEMBER SUPPORTS. DESIGN OF THE WALL PANELS BY THE CONTRACTOR SHALL INCLUDE A DESIGN TO RESIST THE STRESSES CAUSED BY BOTH THE ERECTION OF THE WALL PANELS AND ANY TEMPORARY BRACING USED FOR ERECTION OF THE PANELS UNTIL THE PERMANENT STRUCTURAL SYSTEMS ARE IN PLACE.

3. ALL PRECAST/TILT-UP CONCRETE SHALL COMPLY WITH ACI 301, CONCRETE REINFORCING STEEL INSTITUTE, "MANUAL OF STANDARD PRACTICE", AND "AMERICAN WELDING SOCIETY".

4. TYPICAL SUGGESTED GRAVITY AND LATERAL PANEL CONNECTIONS ARE SHOWN ON THE DRAWINGS. DETAILS SHOWN ARE TYPICAL ONLY AND DO NOT COVER ALL SITUATIONS. THE PRECAST/TILT-UP FABRICATOR MAY CONSIDER OTHER CONNECTION TYPES PROVIDED THAT THE DESIGN INTENT IS NOT CHANGED FROM THAT SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS. SUGGESTED DETAILS ON THE DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS AND PREVALING BUILDING CODES.

5. PRECAST/TILT-UP CONCRETE CONNECTIONS SHALL NOT INDUCE ANY TORSION INTO SUPPORTING STEEL BEAMS OR COLUMNS.

6. CONNECTION DESIGN SHALL ACKNOWLEDGE THE CONSTRUCTION SEQUENCING OF THE ENTIRE PROJECT AS A WHOLE. CONNECTION DESIGN SHALL TAKE INTO CONSIDERATION PANEL VOLUME CHANGES, FROM THE CONCRETE CURING PROCESS, FROM LONG TERM CREEP AND SHRINKAGE, AND FROM TEMPERATURE DIFFERENTIALS, BOTH POSITIVE AND ON OPPOSITE FACES OF THE PANEL.

7. ALL STEEL PLATES SHALL BE A36 STEEL UNLESS NOTED OTHERWISE. ANCHORS SHALL BE HEADED STUDS OR DEFORMED BAR ANCHORS AS INDICATED ON THE DRAWINGS. REINFORCING STEEL WELDED TO STEEL PLATES SHALL NOT BE USED AS ANCHORS.

8. ALL STEEL PLATES, SHAPES, AND ANCHORS USED FOR PRECAST/TILT-UP GRAVITY AND LATERAL SUPPORTS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. GOLF, BUTTE, AND HELLS IN ORDER TO BEST SPECIFIED AND OTHER FORCES THAT MAY OCCUR DURING CONSTRUCTION AND UNTIL ALL CONNECTIONS TO THE COMPLETE PERMANENT STRUCTURAL SYSTEM ARE IN PLACE.

9. FIELD WELDING SHALL BE PERFORMED BY A QUALIFIED WELDER AND CONFORM TO THE LATEST PUBLICATION OF APPLICABLE CODES SET FORTH BY THE AMERICAN WELDING SOCIETY. WELDING ELECTRODES SHALL BE E70XX.

10. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR DIMENSIONAL, FINISH, AND OTHER REQUIREMENTS OF PRECAST/TILT-UP CONCRETE PANELS.

11. ALL BRACING (AND CONNECTIONS) REQUIRED TO LATERALLY BRACE THE PRECAST/TILT-UP SHALL BE THE TOTAL RESPONSIBILITY OF THE CONTRACTOR.

12. ALL EMBEDDED ITEMS IN THE PRECAST/TILT-UP PANELS, STRUCTURAL FRAME AND FOUNDATIONS AND ALL MATERIAL FOR SETTING BOLTS, WASHERS, PLATES, SHAPES, ETC. USED TO SUPPORT THE PRECAST/TILT-UP BOTH VERTICALLY AND LATERALLY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

13. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ERECT THE PANELS IN A MANNER THAT WILL BE SAFE FOR PERSONNEL AND PROPERTY, AND TO BRACE AND OTHERWISE PROTECT THE PANELS AGAINST WIND, SEISMIC AND OTHER FORCES THAT MAY OCCUR DURING CONSTRUCTION AND UNTIL ALL CONNECTIONS TO THE COMPLETE PERMANENT STRUCTURAL SYSTEM ARE IN PLACE.

14. ERECTION TOLERANCE SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE SPECIFICATIONS, LATEST EDITION.

15. DEFLECTIONS OF THE SUPPORTING FRAME MAY OCCUR AS PANELS ARE ERECTED, NECESSITATING REALIGNMENT, REGRADING, AND POSSIBLY RESETTING OF GEOR. AND HELLS IN ORDER TO MEET SPECIFIED TOLERANCES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONSIDER SUCH DEFLECTIONS, WHETHER SPECIFICALLY INDICATED ON THE DRAWINGS OR NOT AND PROVIDE FOR THE SAME DURING THE ERECTION PROCESS AT NO ADDITIONAL COST TO THE OWNER.

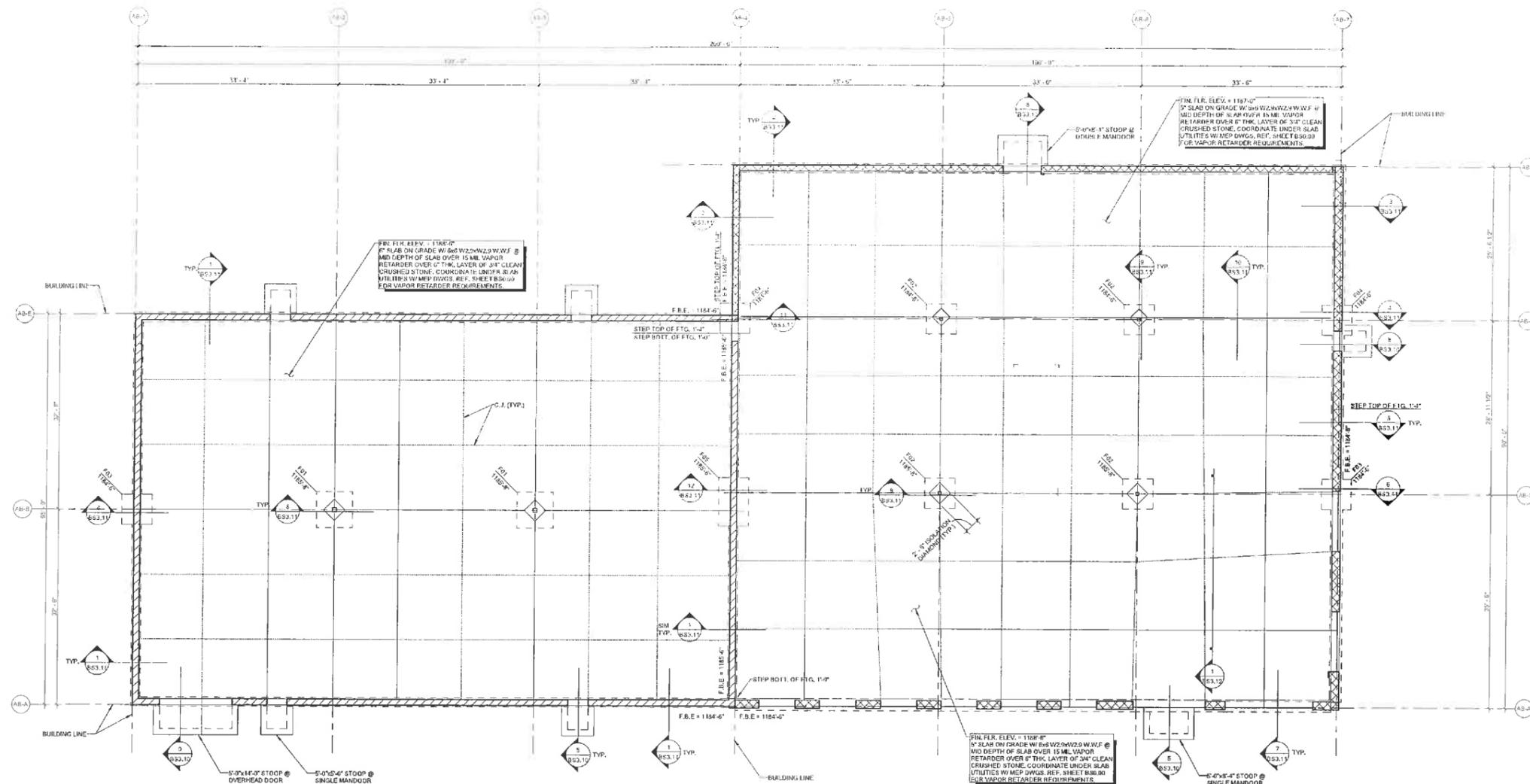
16. DESIGN CALCULATIONS, SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE JURISDICTION WHERE THE PROJECT IS LOCATED, SHALL BE SUBMITTED FOR ARCHITECTS/ENGINEERS RECORD. CALCULATIONS WILL NOT BE RETURNED. THE CALCULATIONS MUST BE BOUND WITH THE ENGINEER'S SIGNATURE, SEAL AND DATE SEALED ON THE COVER SHEET. CALCULATIONS MUST BE INDEXED BY PRECAST/TILT-UP ELEMENT AND ARRANGED IN A LOGICAL, ORDERLY FASHION. INCOMPLETE OR PARTIAL SUBMITTALS WILL BE REJECTED.

17. THE CONTRACTOR SHALL SUBMIT COMPLETE ERECTION DRAWINGS SHOWING DIMENSIONED PLANS, ELEVATIONS, SECTIONS, AND DETAILS WITH PRECAST/TILT-UP UNIT MARKS FOR EACH ELEMENT.

18. THE CONTRACTOR SHALL SUBMIT PRODUCTION DRAWINGS OF PRECAST/TILT-UP MEMBERS SHOWING ALL DIMENSIONS AND INFORMATION NECESSARY TO CONSTRUCT THE PANELS. THIS INFORMATION SHALL INCLUDE, BUT NOT BE LIMITED TO, DIMENSIONS, REINFORCING STEEL, EMBED LOCATIONS, CAST-IN INSERTS, JOINTS, BLOCKOUTS, REGLET'S, REVEALS AND ANY OTHER ITEMS. INCLUDE LAYOUT OF WYTHE CONNECTORS FOR BRANCHING PANELS. PANEL DRAWINGS SHALL TAKE INTO CONSIDERATION REQUIREMENTS SHOWN ON ALL ELECTRICAL AND PLUMBING PRODUCTION DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE JURISDICTION WHERE THE PROJECT IS LOCATED.

19. SHOP DRAWINGS SHALL INDICATE ADDITIONAL STEEL REINFORCEMENT REQUIRED TO RESIST HOISTING AND ERECTION STRESSES. SHOW LOCATIONS OF HOISTING POINTS AND LIFTING DEVICES FOR HANDLING AND ERECTIONS.





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



DESIG.	SIZE	REINF.
F01	6'-0" x 5'-0" x 1'-6"	(#35 EA. WAY, BOTT.)
F02	5'-0" x 5'-0" x 1'-6"	(#35 EA. WAY, BOTT.)
F03	5'-0" x 5'-0" x 2'-0"	(#36 EA. WAY, BOTT.)
F04	5'-0" x 5'-0" x 1'-6"	(#35 EA. WAY, BOTT.)
F05	8'-0" x 5'-0" x 1'-6"	(12 #45 DIR. BOTT., #35 EW DIR. BOTT.)

**LEGEND:**

- 1'-0" INSULATED PRECAST WALL PANEL. REFERENCE ARCHITECTURAL DRAWINGS FOR ADDITIONAL DETAILS.
- 1'-0" INSULATED PRECAST WALL PANEL WITH BRICK FACADE. REFERENCE ARCHITECTURAL DRAWINGS FOR ADDITIONAL DETAILS.
- 1'-0" TYPING DESIGNATION (REFERENCE FOUNDATION SCHEDULE THIS SHEET).
- COLUMN SCHEDULE MARK (REFERENCE COLUMN SCHEDULE ON SHEET BS12.8).

**ABBREVIATIONS:**

- F.B.E. - FOOTING BEARING ELEVATION
- F.F.C. - FINISHED FLOOR ELEVATION
- C.J. - CONTROL JOINT
- W.W.F. - WELDED WIRE FABRIC

**GENERAL NOTES**

1. REFERENCE TYPICAL SLAB AND FOUNDATION DETAIL 6.04 SHEET BS3.10.
2. REFERENCE ARCHITECTURAL PLUMBING, ELECTRICAL, MECHANICAL, FIRE PROTECTION, AND CIVIL DRAWINGS FOR ANY BELOW GRADE PIPING, DRAINAGE, UTILITIES, STRUCTURES, ETC., WHICH UTILITY TRENCHES PASS BENEATH BUILDING FOUNDATIONS, FLOOR SLAB & PAVEMENT LAYOUTS. BACKFILL TRENCH PER GEOTECHNICAL REPORT RECOMMENDATIONS.
3. THE FINISHED SURFACE OF CONCRETE FLOOR SLAB-ON-GRADE SHALL BE MADE FLAT AND LEVEL CONFORMING TO ASTM 1155 FLATNESS (PS). SPECIFIED OVERALL VALUE (SOPV) GREATER THAN OR EQUAL TO 25 AND LEVELNESS (PL) GREATER THAN OR EQUAL TO 25 WITHIN MINIMUM LOCAL VALUES (MLV) OR FLATNESS (FL) GREATER THAN OR EQUAL TO 17 AND LEVELNESS (PL) GREATER THAN OR EQUAL TO 15.
4. REFERENCE BASE PLATE DETAILS ON SHEET BS4.10.

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No.	Description	Date

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DESIGNED BY: DESIGNED BY, DRAWN BY: DRAWN BY, CHECKED BY: CHECKED BY, DATE: DATE

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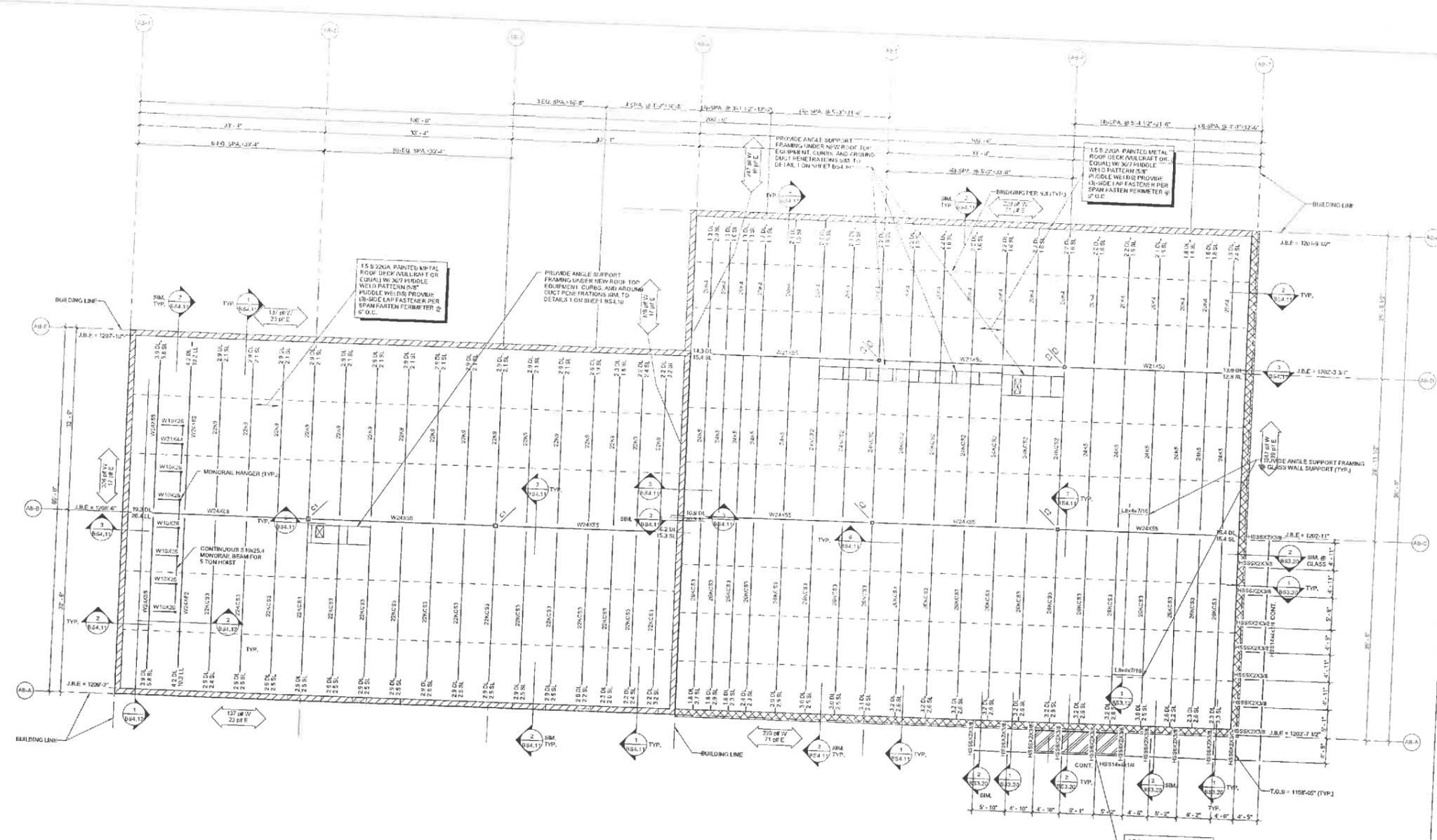
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Association  
9531 Renner Boulevard  
Lynchburg, VA 24503  
434-492-0907 www.gba.com

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001 - ADMINISTRATION BUILDING  
FOUNDATION PLAN

DRAWING NUMBER  
2014-087-001-BS1.10



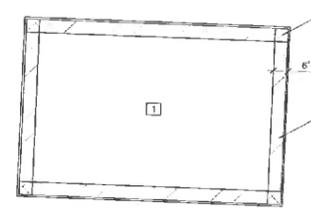
- LEGEND:**
- COLUMN SCHEDULE MARK: REF. SCHEDULE ON THIS SHEET
  - METAL DECK SPAN DIRECTION
  - WIND LOAD TO BE RESISTED BY PRE-CAST WALL: SEISMIC LOAD TO BE RESISTED BY PRE-CAST WALL. THESE LOADS ARE GRAPHICALLY REFERENCE TO GADS (1002 & 6.7C) AND DO NOT INCLUDE THE LONGITUDINAL SEISMIC FORCES DUE TO SELF-WEIGHT OF THE WALL PANELS.
  - PRECAST REACTION MARKS
  - EXTENTS OF LANSKY METAL ROOF DECK
  - 1/4" UNRELATED PRE-CAST WALL PANEL: REFERENCE ARCHITECTURAL DRAWINGS FOR ADDITIONAL DETAILS
  - 1/4" INSULATED PRE-CAST WALL PANEL WITH BRICK FACADE: REFERENCE ARCHITECTURAL DRAWINGS FOR ADDITIONAL DETAILS

- ABBREVIATIONS:**
- J.B.E. JUST BEARING ELEVATION
  - B.O.S. BOTTOM OF STEEL ELEVATION
  - S.J.I. STEEL JOIST INSTITUTE

- GENERAL NOTES:**
- REFERENCE TYPICAL ROOF FRAMING DETAIL ON SHEET BS4.10.
  - REFERENCE ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL AND FIRE PROTECTION DRAWINGS FOR ANY ROOF PENETRATIONS, ETC.
  - PROVIDE ANGLE FRAMING TO SUPPORT ROOF DECK AT ROOF PENETRATIONS PER DETAIL 1 ON SHEET BS4.10.
  - SUPPLY METAL ROOF DECKING IN 3-SPAN LENGTHS OR GREATER.

**COLUMN SCHEDULE**

DESIG	SIZE	COMMENTS
C1	H88X43X14	
C2	H88X43X16	
C3	H56X36X14	

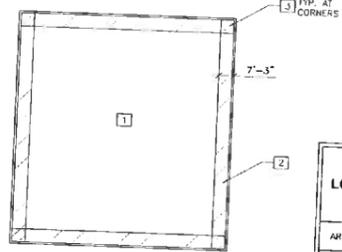


1. SEE PRESSURES FOR ZONES 1, 2, & 3 BELOW.

**NET UPLIFT DIAGRAM WAREHOUSE**

LOCATION	GROSS WIND UPLIFT PRESSURE "W" (PSF)			EDGE ZONE
	ZONE 1	ZONE 2	ZONE 3	
AREA < 10 FT²	-22.28	-37.39	-56.27	6'-6" FT.
AREA = 50 FT²	-20.87	-27.95	-53.61	6'-6" FT.
AREA = 100 FT²	-20.37	-24.17	-24.17	6'-6" FT.

LINEAR INTERPOLATION IS PERMITTED.  
 ROOF COMPONENTS & FASTENERS SHALL BE DESIGNED FOR THE WIND PRESSURES SHOWN IN THE TABLE & DIAGRAM.  
 JOIST UPLIFT LOAD COMBINATION IS 0.9D + 1.6W. "W" IS AS SHOWN ABOVE AND "D" = 10 PSF.



1. SEE PRESSURES FOR ZONES 1, 2, & 3 BELOW.

**NET UPLIFT DIAGRAM OFFICE**

LOCATION	GROSS WIND UPLIFT PRESSURE "W" (PSF)			EDGE ZONE
	ZONE 1	ZONE 2	ZONE 3	
AREA < 10 FT²	-21.1	-35.4	-53.28	7'-3" FT.
AREA = 50 FT²	-19.76	-26.46	-51.63	7'-3" FT.
AREA = 100 FT²	-19.31	-22.89	-22.89	7'-3" FT.

LINEAR INTERPOLATION IS PERMITTED.  
 ROOF COMPONENTS & FASTENERS SHALL BE DESIGNED FOR THE WIND PRESSURES SHOWN IN THE TABLE & DIAGRAM.  
 JOIST UPLIFT LOAD COMBINATION IS 0.9D + 1.6W. "W" IS AS SHOWN ABOVE AND "D" = 10 PSF.

**ROOF FRAMING PLAN**  
 SCALE: 1/8" = 1'-0"



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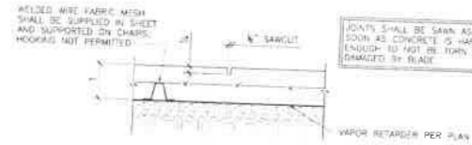
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 Association  
 9801 Turner Boulevard  
 Lincoln Park, IL 60466  
 708.492.7400 www.gbainc.com

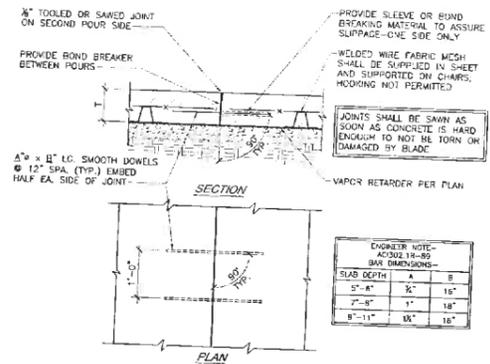
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001 - ADMINISTRATION BUILDING  
 ROOF FRAMING PLAN

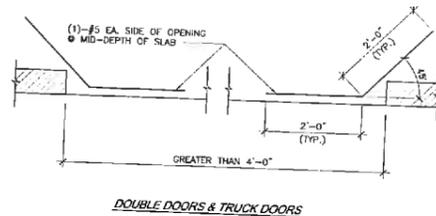
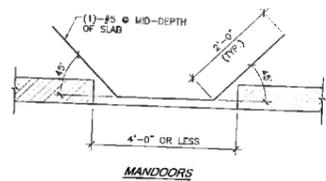
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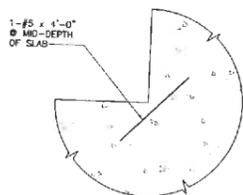
**TYP. CONTROL JOINT DETAIL**  
SCALE: N.T.S.



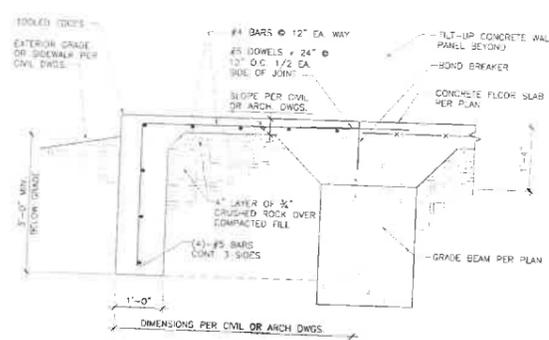
**TYP. CONSTRUCTION JOINT DETAIL**  
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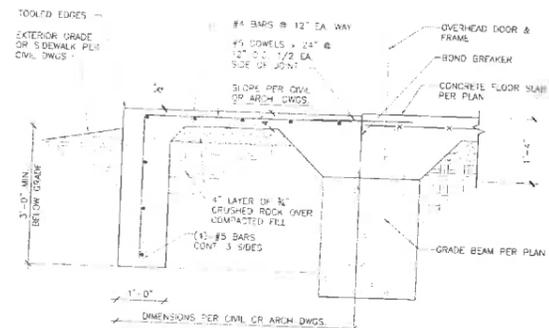
**TYP. SLAB REINF. @ INSIDE CORNERS**  
SCALE: N.T.S.



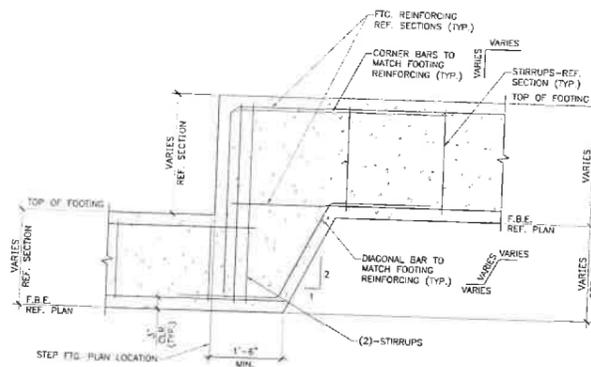
**TYP. RE-ENTRANT CORNER REINF.**  
SCALE: N.T.S.



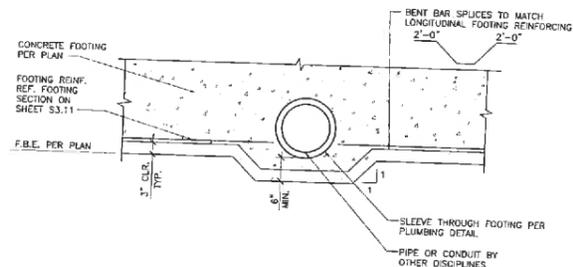
**TYP. DOOR STOOP DETAIL**  
SCALE: 3/4" = 1'-0"



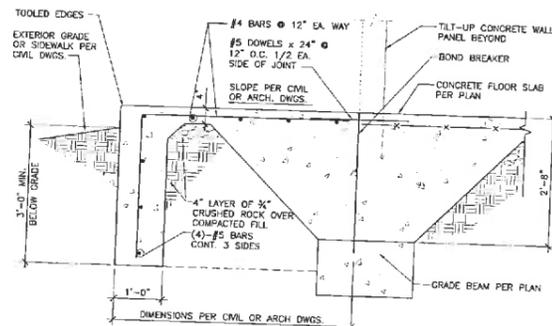
**TYP. OVERHEAD DOOR STOOP DETAIL**  
SCALE: 3/4" = 1'-0"



**TYP. STEPPED GRADE BEAM DETAIL**  
SCALE: 3/4" = 1'-0"



**TYP. PIPE UNDER FOOTING DETAIL**  
SCALE: N.T.S.



**TYP. LOWER DOOR STOOP DETAIL**  
SCALE: 3/4" = 1'-0"

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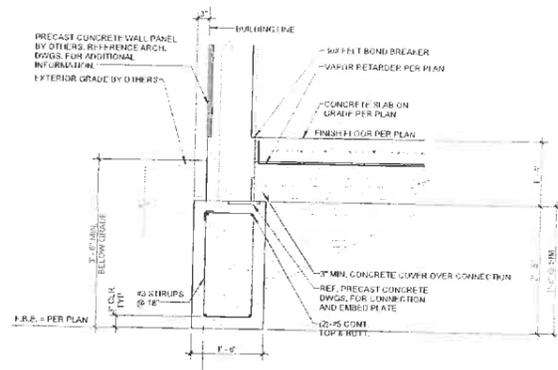
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5601 River Boulevard  
Lynchburg, VA 24502  
713.402.0407 www.gbateam.com

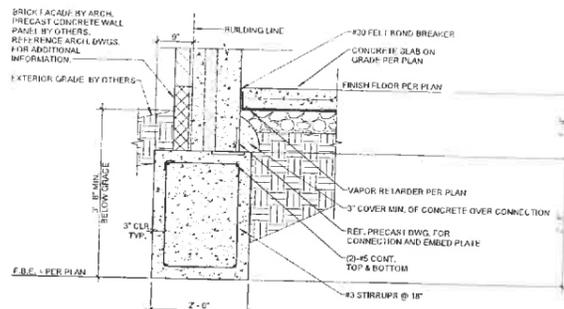
NOT FOR CONSTRUCTION

001 - ADMINISTRATION BUILDING  
TYP. FOUNDATION DETAILS

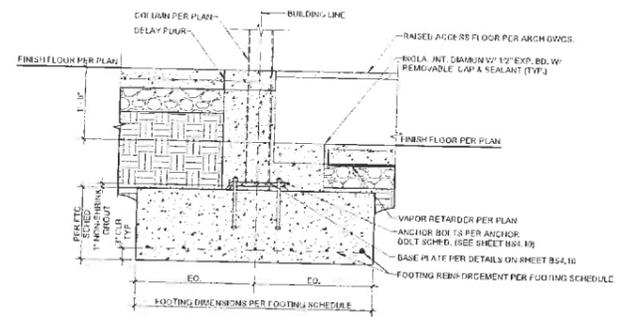
DRAWN BY: J. HENDER  
2014-087-001-BS3.10



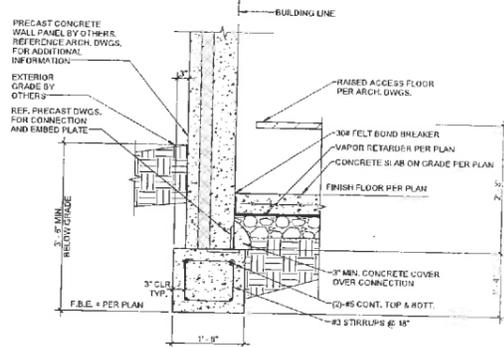
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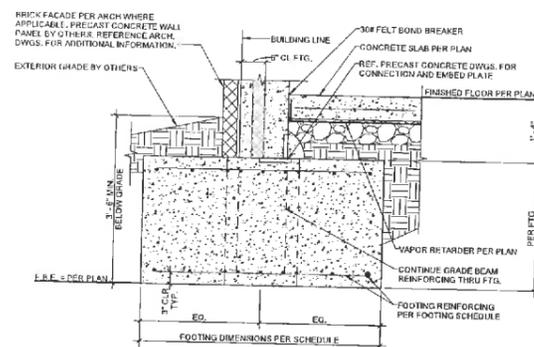
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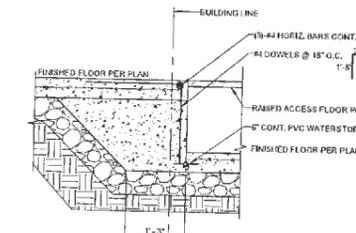
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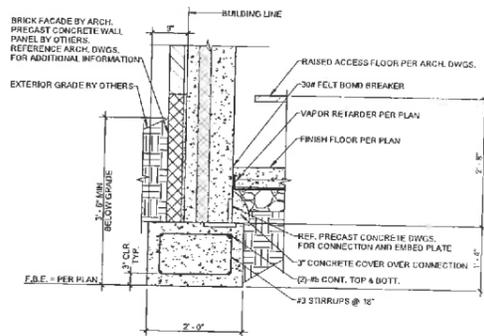
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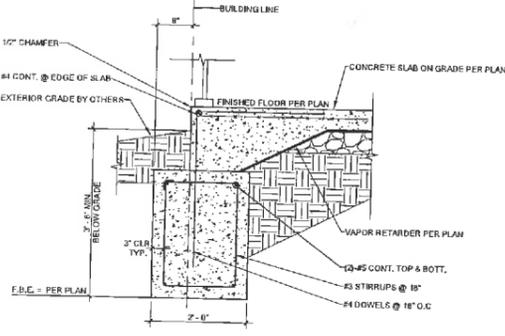
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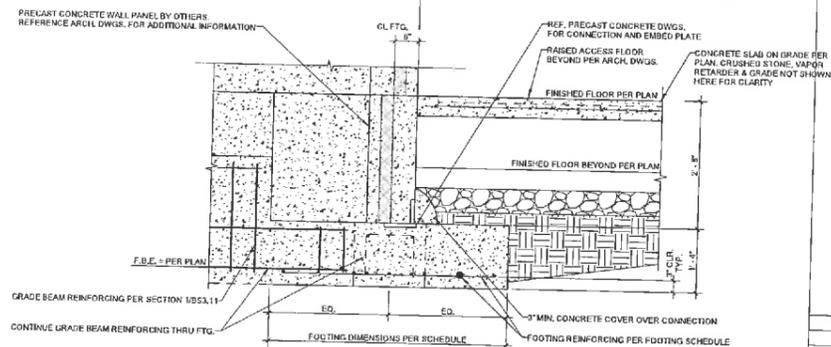
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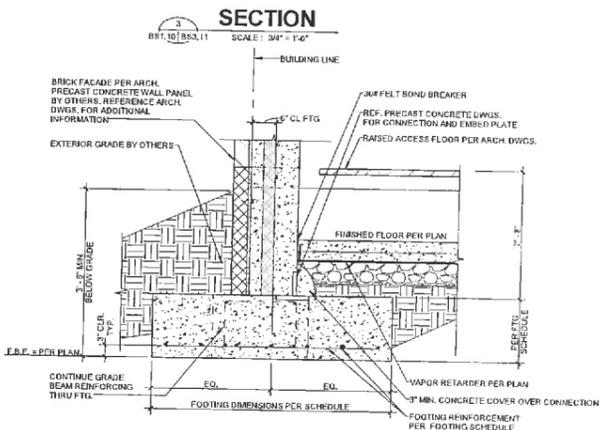
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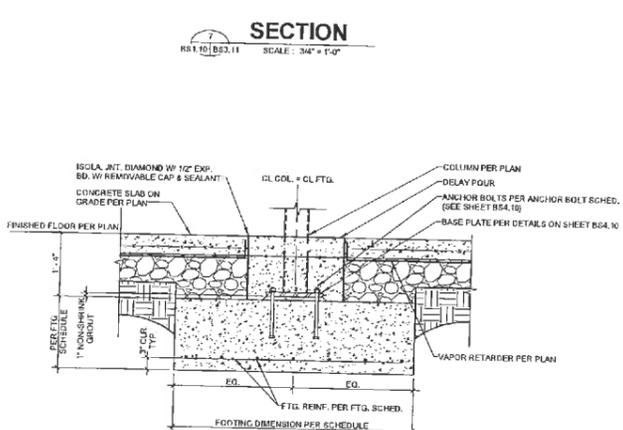
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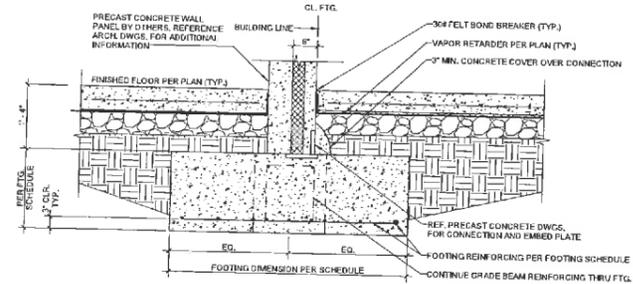
SECTION 11  
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SECTION 4  
SCALE: 3/4" = 1'-0"



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



SECTION 12  
SCALE: 3/4" = 1'-0"

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		DATE

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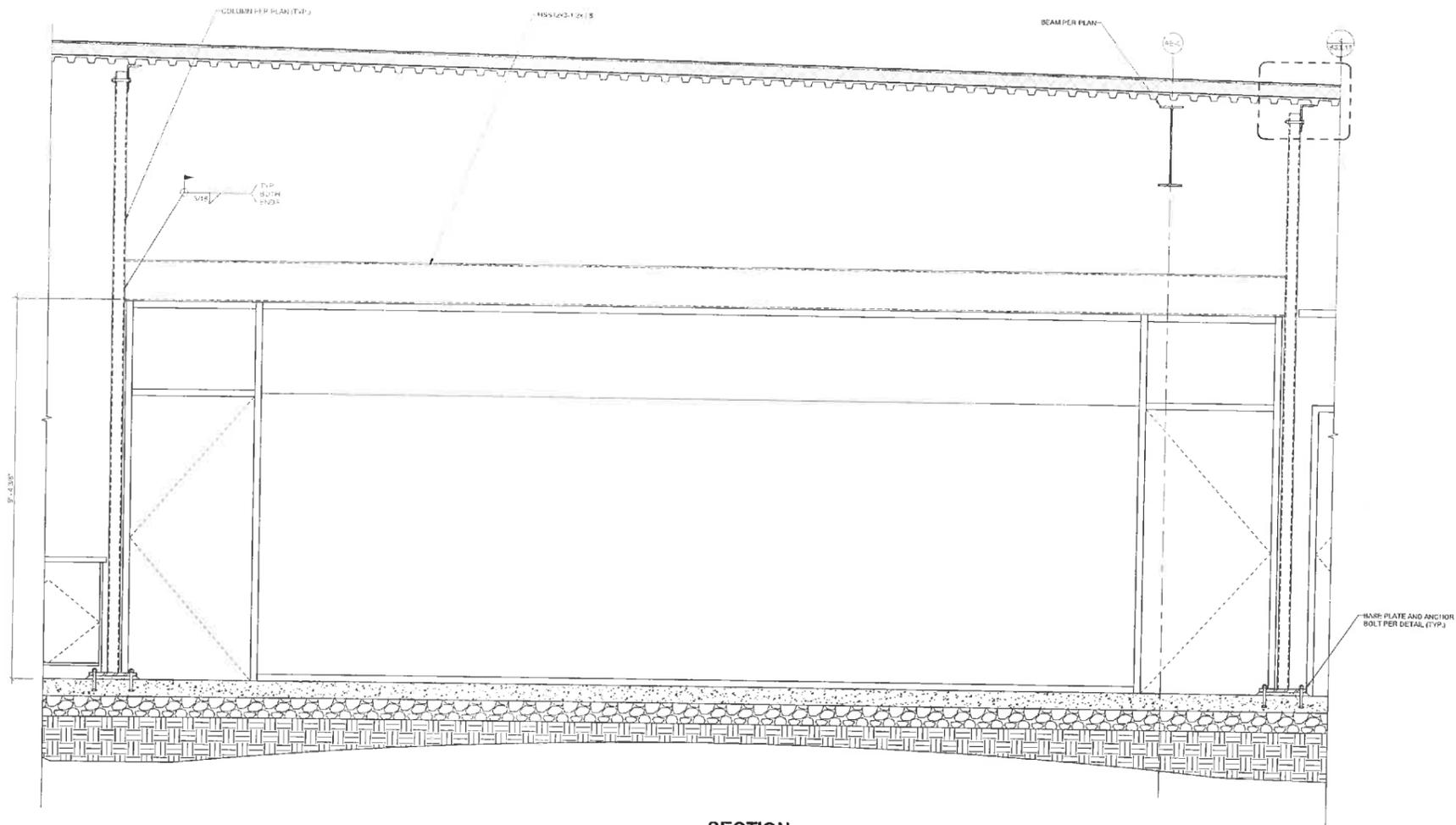
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8831 Revere Boulevard  
Lenexa, Kansas 66249  
913-482-9100 www.gbaem.com

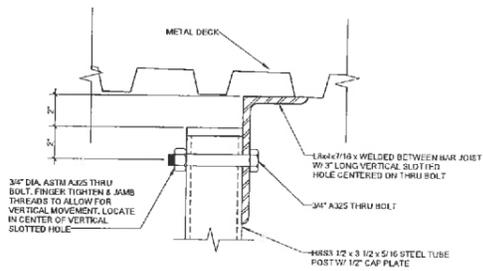
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001 - ADMINISTRATION BUILDING  
FOUNDATION SECTIONS & DETAILS

DRAWING NUMBER  
2014-087-001-BS3.11



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



SECTION 2  
SCALE: 3\"/>

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 DRAWN BY: KRH  
 CHECKED BY: KRH  
 DATE: 05/27/15

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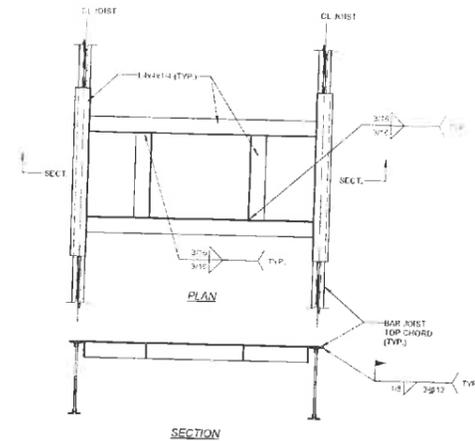
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 913.492.0403 www.gbateam.com

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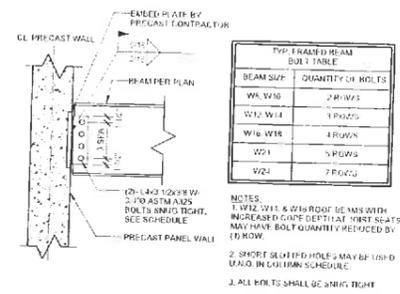
001 - ADMINISTRATION BUILDING  
 GLASS WALL HEADER ELEVATION

DRAWING NUMBER  
 2014-087-001-BS3.12

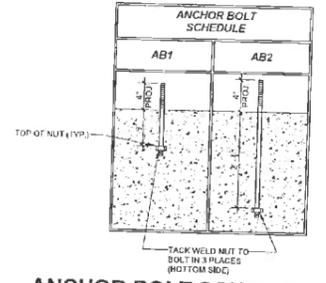




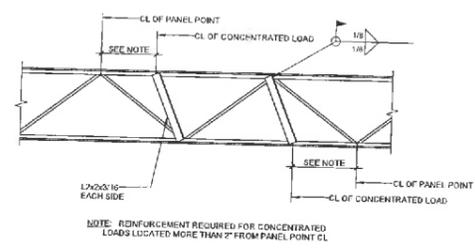
**TYP. ROOF OPENING DETAIL**  
SCALE: 3/4" = 1'-0"



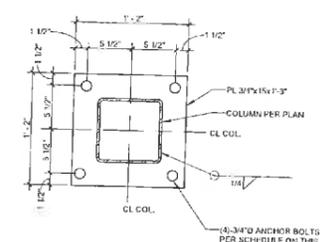
**TYP. BEAM TO EMBED PLATE CONN.**  
SCALE: 3/4" = 1'-0"



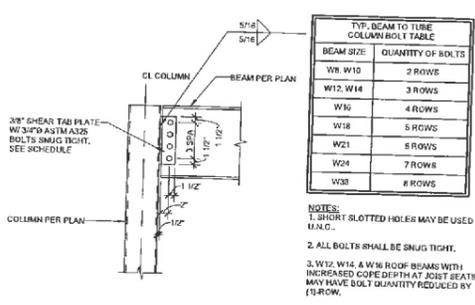
**ANCHOR BOLT SCHEDULE**  
SCALE: 3/4" = 1'-0"



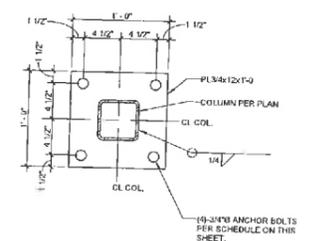
**TYP. JOIST REINFORCING AT CONCENTRATED LOADS**  
SCALE: NTS



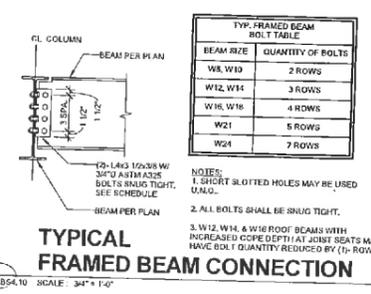
**TYP. 8x8 BASE PLATE DETAIL**  
SCALE: 1 1/2" = 1'-0"



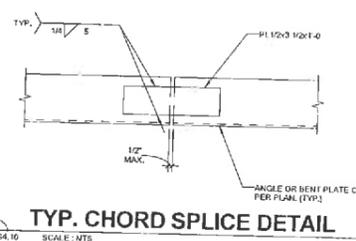
**TYP. BEAM TO TUBE COLUMN CONNECTION**  
SCALE: NTS



**TYP. 6x6 BASE PLATE DETAIL**  
SCALE: 1 1/2" = 1'-0"



**TYPICAL FRAMED BEAM CONNECTION**  
SCALE: 3/4" = 1'-0"



**TYP. CHORD SPLICE DETAIL**  
SCALE: NTS

**TYP. FRAMED BEAM BOLT TABLE**

BEAM SIZE	QUANTITY OF BOLTS
W8, W10	2 ROWS
W12, W14	3 ROWS
W16, W18	4 ROWS
W21	5 ROWS
W24	7 ROWS

**NOTES:**  
1. W12, W14 & W16 ROOF BEAMS WITH INCREASED COPE DEPTH AT JOIST SEATS MAY HAVE BOLT QUANTITY REDUCED BY (1) ROW.  
2. SHORT SLOTTED HOLES MAY BE USED U.N.O. IN COLUMN SCHEDULE.  
3. ALL BOLTS SHALL BE SNUG TIGHT.

**TYP. BEAM TO TUBE COLUMN BOLT TABLE**

BEAM SIZE	QUANTITY OF BOLTS
W8, W10	2 ROWS
W12, W14	3 ROWS
W16	4 ROWS
W18	5 ROWS
W21	5 ROWS
W24	7 ROWS
W30	8 ROWS

**NOTES:**  
1. SHORT SLOTTED HOLES MAY BE USED U.N.O.  
2. ALL BOLTS SHALL BE SNUG TIGHT.  
3. W12, W14 & W16 ROOF BEAMS WITH INCREASED COPE DEPTH AT JOIST SEATS MAY HAVE BOLT QUANTITY REDUCED BY (1) ROW.

**TYP. FRAMED BEAM BOLT TABLE**

BEAM SIZE	QUANTITY OF BOLTS
W8, W10	2 ROWS
W12, W14	3 ROWS
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W21	5 ROWS
W24	7 ROWS

**NOTES:**  
1. SHORT SLOTTED HOLES MAY BE USED U.N.O.  
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3. W12, W14 & W16 ROOF BEAMS WITH INCREASED COPE DEPTH AT JOIST SEATS MAY HAVE BOLT QUANTITY REDUCED BY (1) ROW.

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DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
DATE: \_\_\_\_\_  
Lackawanna Energy Center LLC

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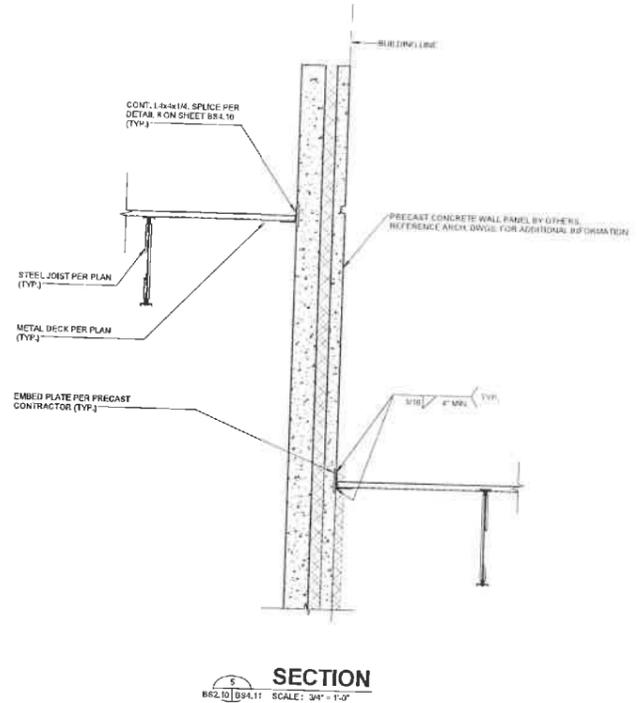
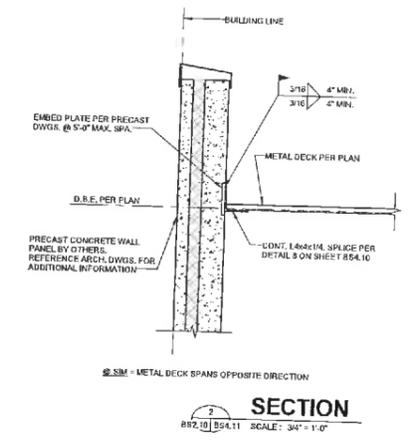
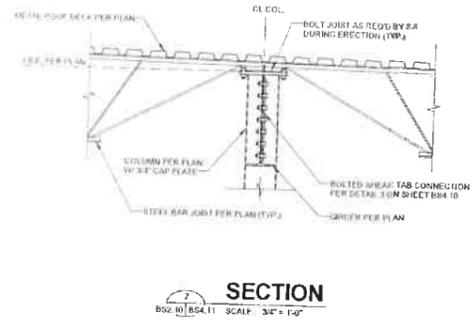
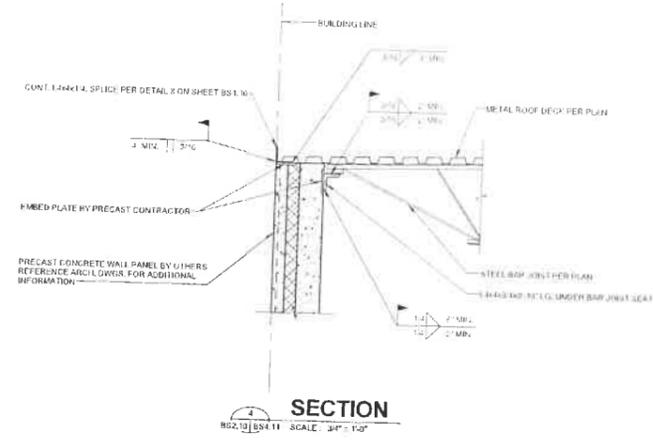
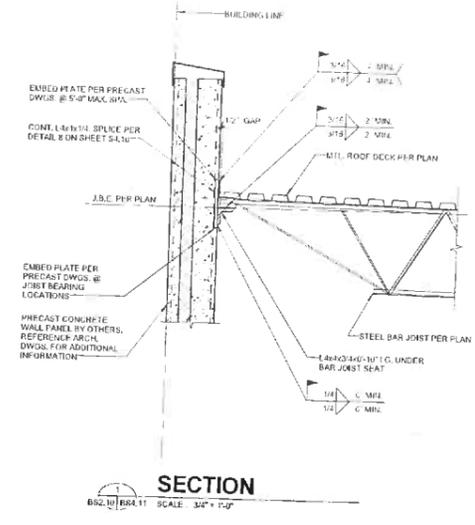
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Lenexa, Kansas 66212  
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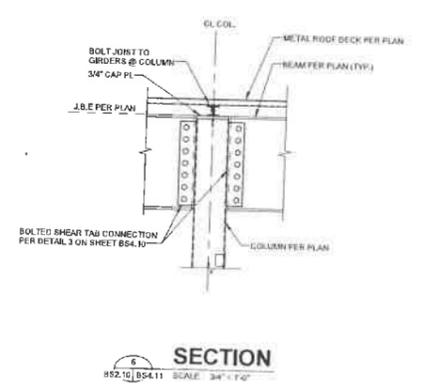
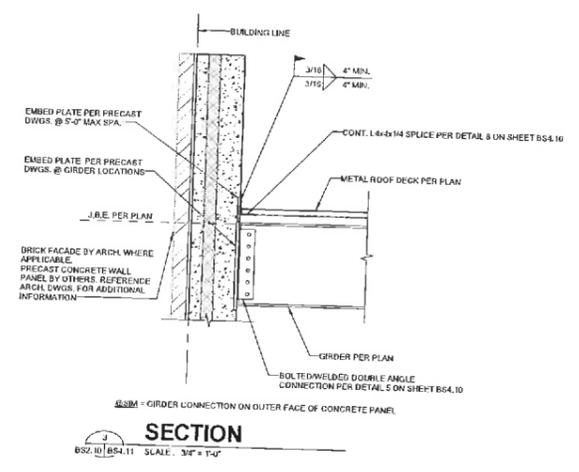
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001 - ADMINISTRATION BUILDING  
TYP. ROOF FRAMING DETAILS

DRAWING NUMBER  
2014-087-001-BS4.10



SSM = METAL DECK SPANS OPPOSITE DIRECTION



SSM = GIRDER CONNECTION ON OUTER FACE OF CONCRETE PANEL

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DESIGNER	AUTHOR	CHECKER	DATE

Tachikawa Energy Center LLC

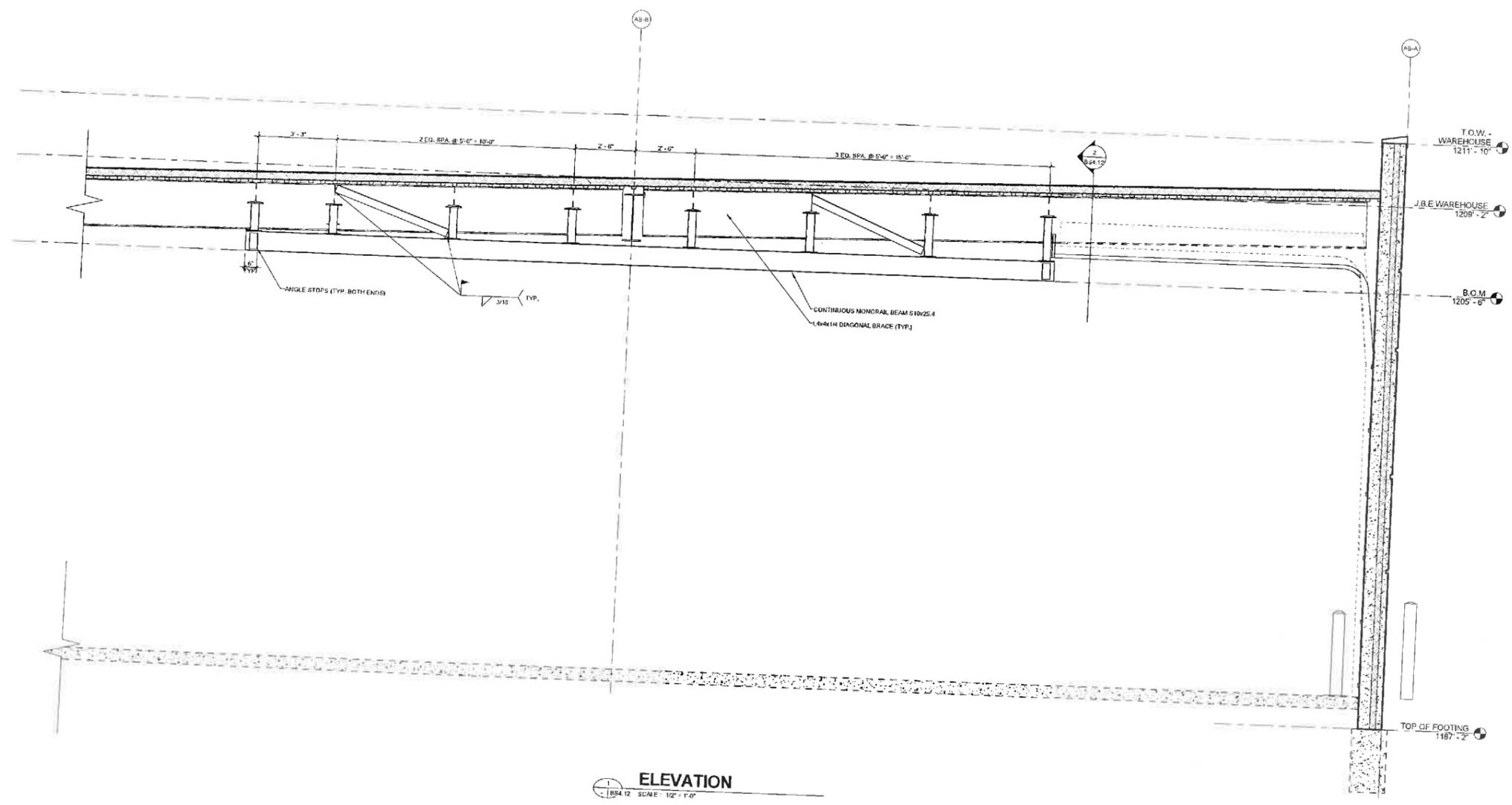
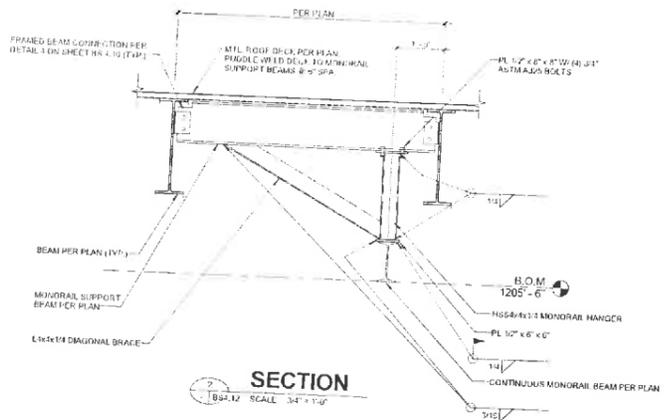
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001 - ADMINISTRATION BUILDING  
 ROOF FRAMING SECTIONS & DETAILS

DRAWING NUMBER  
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Lackawanna Energy Center LLC  
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 913-322-8800 www.gba.com

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 MONORAIL DETAILS

DRAWING NUMBER  
 2014-087-001-BS4.12

**DETAIL TITLE**

**DRAWING TITLE**

**NORTH ARROW**

**SECTION CUT**

DRAMA NUMBER  
DRAWING NAME  
DRAWING SCALE  
CURRENT SHEET NUMBER  
SHEET NUMBER OF TOTAL SHEETS  
DETAIL NUMBER  
SHEET NUMBER THE DETAIL IS ON  
BOUNDARY DEFINITION  
DIRECTION OF SECTION CUT  
SECTION NUMBER  
SHEET NUMBER THE SECTION IS ON

**GENERAL NOTES**

1. PRIOR TO ALL CONSTRUCTION SHALL MEET FOR COORDINATION PURPOSES. FINISH, COMPLETE, INTERFERE AND LOCATE THE COORDINATION WITH ALL CONTRACTORS.
2. ALL WORK SHALL COMPLY WITH ALL FEDERAL, LOCAL AND STATE LAWS AND REGULATIONS.
3. SEAL ALL ROOF WALL AND FLOOR PENETRATIONS WATER TIGHT.
4. COORDINATE ALL OUTDOOR CORPUSCLES AND RESULTS TO 1" (25.4) WITH FINAL FINISHING SURFACE. FLOOR FINISHES SHALL BE AS NOTED. PROVIDE COMPARTABLE AND UNIFORM COUNTERTOPS TO EACH OCCUPIED SPACE TO THE OWNER'S SATISFACTION.
5. MOUNT THERMOSTATS AND THERMOSTAT RECEPTORS AT ALL FINISHED FLOOR OR FINISHED FLOOR ABOVE FINISHED FLOOR LEVELS.
6. FLEXIBLE CONNECTORS SHALL BE PROVIDED IN ALL DUCTWORK CONNECTED TO ROOF AND OUTLET OR EXHAUST FANS. CONNECTORS SHALL BE COMPLY MAXIMUM LENGTH WITH 1" SLACK. RECTANGULAR DUCT SHALL BE PROVIDED WITH AIR EXHAUST FANS AND EXHAUST DAMPERS FOR ALL ROOF DUCTS. CONNECTORS TO DUCT SHALL BE FLEXIBLE UNLESS OTHERWISE NOTED. FLEXIBLE UNLESS OTHERWISE NOTED. FLEXIBLE UNLESS OTHERWISE NOTED. FLEXIBLE UNLESS OTHERWISE NOTED. FLEXIBLE UNLESS OTHERWISE NOTED.
7. COORDINATE WHERE FLEXIBLE UNLESS OTHERWISE NOTED. COORDINATE UNLESS OTHERWISE NOTED. COORDINATE UNLESS OTHERWISE NOTED. COORDINATE UNLESS OTHERWISE NOTED. COORDINATE UNLESS OTHERWISE NOTED.
8. ALL EXHAUST FANS SHALL BE IDENTIFIED BY MEANS OF A NAMEPLATE PERMANENTLY ATTACHED TO THE EQUIPMENT. REFER TO THE SPECIFICATIONS SECTION 230500 - IDENTIFICATION FOR FAN NAMEPLATE EQUIPMENT.
9. RIGGING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND REGULATIONS AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH THE ABOVE LISTED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES AND DESIGN PARTIES. ENGINEERED IN PROJECT.
10. PROVIDE FIRE STOPPING AT ALL PENETRATIONS THROUGH RATED PARTITIONS AS PER LOCAL CODES AND REGULATIONS AND PER ALL RECOMMENDATIONS FOR ASSEMBLIES ENGINEERED IN PROJECT.

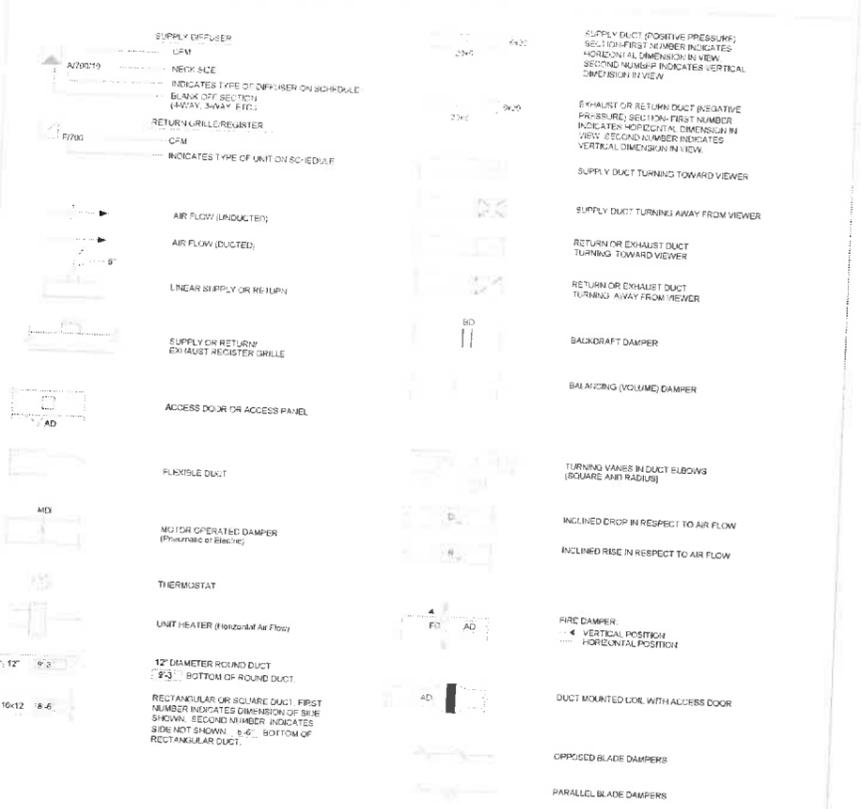
**CONTROL SYMBOLS**

- D PNEUMATIC DAMPER ACTUATOR
- D ELECTRIC DAMPER ACTUATOR
- F FLOW SENSOR
- H HUMIDITY SENSOR
- P PRESSURE SENSOR
- S SMOKE DETECTOR
- SP STATIC PRESSURE SENSOR
- T THERMOSTAT, SELF-CONTAINED
- T THERMOSTAT, PNEUMATIC
- T ELECTRIC THERMOSTAT

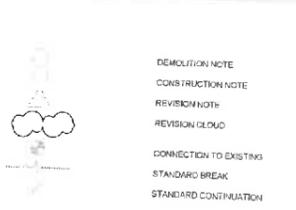
**ABBREVIATIONS**

<b>A</b>	AMPERES	<b>K</b>	KILOWATT
<b>AD</b>	ACCESS DOOR	<b>L</b>	LABORATORY
<b>AF</b>	AIR HANDLING UNIT	<b>LAB</b>	LABORATORY
<b>AP</b>	ACCESS PANEL	<b>LAT</b>	LEAVING AIR TEMPERATURE
<b>AS/AE</b>	AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS ATTENUATOR	<b>LESHN</b>	POUNDS PER HOUR
<b>ATTEN</b>	ATTENUATOR	<b>LTD</b>	LEAVING TEMPERATURE DETECTOR
<b>B</b>		<b>LVR</b>	LEAVING WATER TEMPERATURE
<b>BDD</b>	BACKDRAFT DAMPER	<b>M</b>	MAXIMUM
<b>BD</b>	BUTTERFLY DAMPER	<b>MSH</b>	UNITS OF THOUSANDS STUHR
<b>BS</b>	BRISTLE BRUSH	<b>MECH</b>	MECHANICAL
<b>BDD</b>	BACKDRAFT DAMPER	<b>MEZ</b>	MECHANICAL
<b>BDD</b>	BOTTOM OF DUCT	<b>MFG</b>	MANUFACTURER
<b>BDD</b>	BOTTOM OF STEEL	<b>MN</b>	MINIMUM
<b>BTH</b>	BRITISH THERMAL UNIT PER HOUR	<b>MTL</b>	MATERIAL
<b>BTH</b>	BRITISH THERMAL UNIT PER HOUR	<b>MTR</b>	MOTOR
<b>C</b>		<b>N</b>	NORMALLY CLOSED
<b>CAC</b>	CELSIUS (DEGREES)	<b>NC</b>	NORMALLY CLOSED
<b>CAE</b>	CLEAN AIR CENTER	<b>NEC</b>	NATIONAL ELECTRICAL CODE
<b>CE</b>	CONSTANT EXHAUST	<b>NEC</b>	NATIONAL ELECTRICAL CODE
<b>CFM</b>	CUBIC FEET PER MINUTE	<b>NO</b>	NORMALLY OPEN (MANUAL OPERATION)
<b>C</b>	COLUMN	<b>NS</b>	NOT TO SCALE
<b>COL</b>	COLUMN	<b>NTS</b>	NOT TO SCALE
<b>CONC</b>	CONCRETE	<b>O</b>	OUTSIDE AIR
<b>CONN</b>	CONNECTION	<b>OA</b>	OUTSIDE AIR
<b>CONTR</b>	CONTRACTOR	<b>OAI</b>	OUTDOOR AIR DAMPER
<b>CRV</b>	CONSTANT VOLUME REGULATOR	<b>OC</b>	OPPOSED BLADE
<b>D</b>		<b>OD</b>	OUTSIDE DIAMETER
<b>DB</b>	DRY BULB TEMPERATURE	<b>OZ</b>	OUNCE
<b>DC</b>	DOOR CHILLER	<b>P</b>	PRESSURE DROP
<b>DIA</b>	DIAMETER	<b>PF</b>	PRE-FILTER
<b>DIFF</b>	DIFFUSER	<b>PH</b>	PHASE
<b>DN</b>	DOWN	<b>PRO</b>	PROOF OF RUN
<b>DPR</b>	DIFFERENTIAL PRESSURE GAUGE	<b>PPM</b>	PARTS PER MILLION
<b>DPR</b>	DAMPEN	<b>PRESS</b>	PRESSURE
<b>DWS</b>	DOWNSTREAM TEMPERATURE DRAWING	<b>PSI</b>	POUNDS PER SQUARE INCH
<b>E</b>		<b>PSIA</b>	POUNDS PER SQUARE INCH ABSOLUTE
<b>EA</b>	ENTERING AIR TEMPERATURE	<b>PSIG</b>	POUNDS PER SQUARE INCH GAUGE
<b>EQR</b>	EQUIVALENT DIRECT RADIATION	<b>R</b>	RETURN AIR
<b>EL</b>	ELEVATION	<b>RA</b>	RELATIVE HUMIDITY
<b>ELC</b>	ELECTRICAL EQUIPMENT	<b>RH</b>	RELATIVE HUMIDITY
<b>ESP</b>	EXTERNAL STATIC PRESSURE	<b>RFM</b>	REVOLUTIONS PER MINUTE
<b>EXT</b>	EXTERNAL WATER TEMPERATURE	<b>S</b>	SUPPLY AIR
<b>EXH</b>	EXHAUST	<b>SA</b>	STANDARD CUBIC FEET PER HOUR
<b>EXIST</b>	EXISTING	<b>SCFM</b>	STANDARD CUBIC FEET PER MINUTE
<b>F</b>		<b>SP</b>	SQUARE FEET
<b>FA</b>	FAHRENHEIT (DEGREES)	<b>SPEC</b>	STATIC PRESSURE
<b>FC</b>	FACE AREA	<b>SQ</b>	SQUARE
<b>FD</b>	FACE DOWN	<b>SS</b>	STAINLESS STEEL
<b>FF</b>	FINISHED FLOOR	<b>STD</b>	STANDARD
<b>FFE</b>	FINISHED FLOOR ELEVATION	<b>T</b>	TEMPERATURE
<b>FL</b>	FLOOR	<b>TEMP</b>	TEMPERATURE
<b>FLX</b>	FLEXIBLE	<b>TOP</b>	TOP OF DUCT
<b>FLTR</b>	FILTER	<b>TR</b>	TOP OF STEEL
<b>FLC</b>	FLEXIBLE CONNECTOR	<b>TSP</b>	TOTAL STATIC PRESSURE
<b>FMD</b>	FLOW MEASURING DEVICE	<b>TSP</b>	TOTAL STATIC PRESSURE
<b>FO</b>	FACE OPEN	<b>TV</b>	TOTAL PRESSURE
<b>FOR</b>	FACE OPEN	<b>TYP</b>	TYPICAL
<b>FOT</b>	FACE OPEN TOP	<b>V</b>	VOLTS
<b>FT</b>	FEET PER MINUTE	<b>VAV</b>	VARIABLE AIR VOLUME
<b>FUT</b>	FUTURE	<b>VD</b>	VOLUME DAMPER (MANUAL)
<b>FV</b>	FACE VELOCITY	<b>VEL</b>	VELOCITY
<b>G</b>		<b>VERT</b>	VERTICAL
<b>GA</b>	GALVANIZED	<b>VFD</b>	VARIABLE FREQUENCY DRIVE
<b>GALV</b>	GALVANIZED	<b>VP</b>	VELOCITY
<b>H</b>		<b>W</b>	WET BULB TEMPERATURE
<b>HEPA</b>	HIGH EFFICIENCY PARTICULATE	<b>WB</b>	WET BULB TEMPERATURE
<b>HOR</b>	HORIZONTAL	<b>WG</b>	WATER GAUGE (COLUM)
<b>HP</b>	HORSEPOWER	<b>WP</b>	WORKING POINT
<b>HV</b>	HEATING AND VENTILATING	<b>WPD</b>	WATER PRESSURE DROP
<b>HVAC</b>	HEATING, VENTILATING AND AIR CONDITIONING	<b>WT</b>	WEIGHT
<b>HERTZ</b>	HERTZ		
<b>I</b>			
<b>ID</b>	INSIDE DIAMETER		
<b>IN</b>	INCHES		
<b>INSUL</b>	INSULATION		

**HVAC SYMBOLS**



**STANDARD SYMBOLS**



**DRAWING NO. SYSTEM**

**BM2.01**

COVER SHEET  
BM2.01 INDEX SYMBOLS ABBREVIATIONS GENERAL NOTES  
BM2.01 HVAC FLOOR AND HOOD PLANS  
BM2.01 SECTIONS AND ENLARGED PLANS  
BM2.01 DETAILS  
BM2.01 SCHEDULES  
BM2.01 CONTROL DIAGRAMS  
BM2.01 AIR FLOW DIAGRAMS

AREA SHEET NUMBER  
FLOOR SHEET NUMBER  
GROUP NUMBER  
DISCIPLINE PREFIX

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REV	DESIGN BY: KMT DRAWN BY: DLA CHECKED BY: DATE	04/22/16

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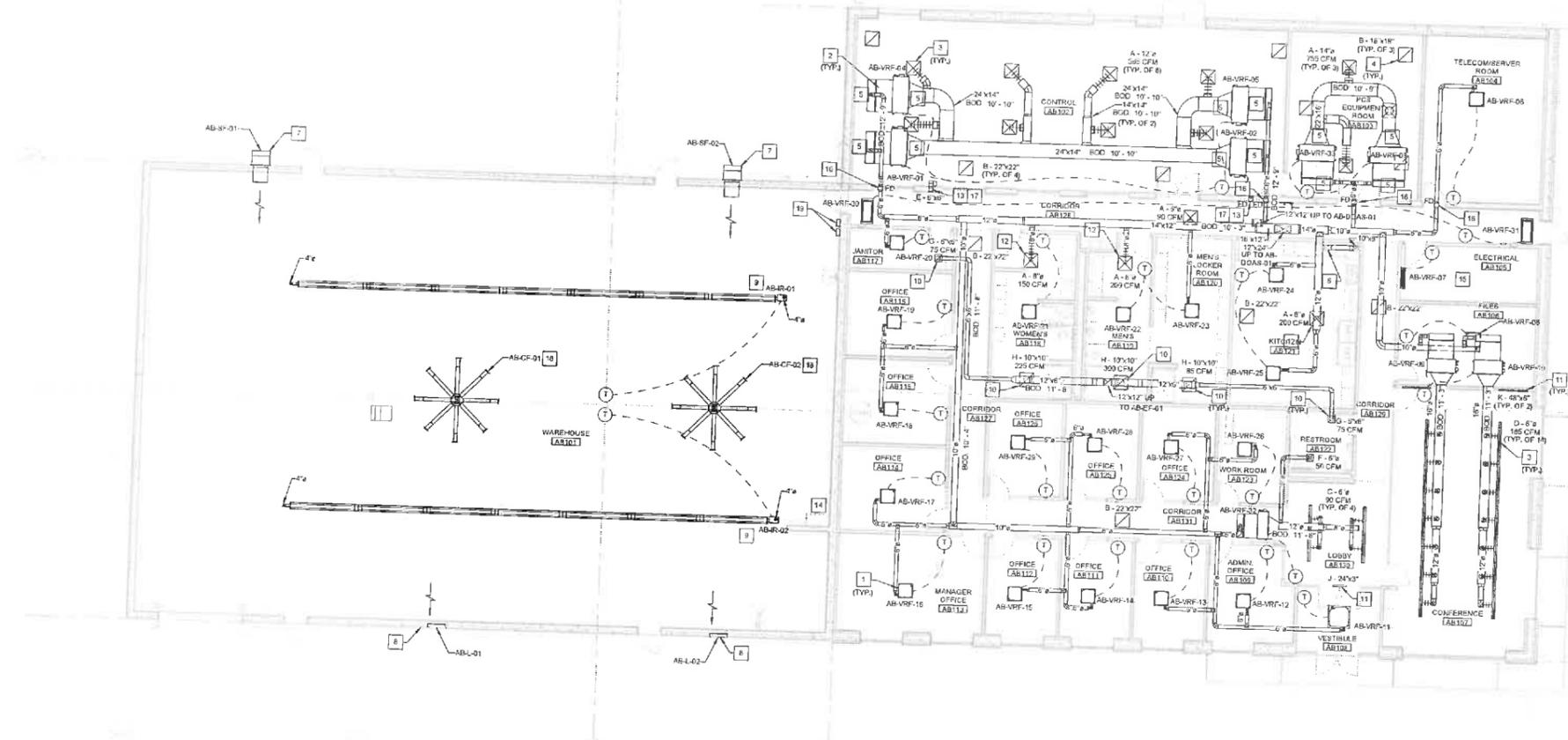
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**GBA P.A.**  
Association  
5801 River Boulevard  
Lenexa, Kansas 66215  
813.492.0403 www.gbaeam.com

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001 - ADMINISTRATION BUILDING  
MECHANICAL HVAC ABBREVIATIONS & SYMBOLS

DRAWING NUMBER  
2014-087-001-BM0.00



**MECHANICAL HVAC FIRST FLOOR PLAN**  
 1/8" = 1'-0" SCALE



- GENERAL NOTES**
1. ALL RETURN AND EXHAUST DUCTS TO UNITS AND SUPPLY AND OUTSIDE AIR DUCTS TO DIFFUSERS SHALL HAVE MINIMUM INSULATION (AMPI) AS INSTALLED PER ACCESSORY LOCATION FOR DAMPERS THAT SHALL BE PLACED ABOVE HARD CEILING. ACCESSORIES SHALL BE INSTALLED PER ACCESSORY LOCATION.
  2. AIRMATE DUCT PER SPECIFICATION SECTION 23.05.00 - DUCT INSULATION.
  3. REFERENCE SHEET BM1.11 FOR MECHANICAL PERMS PLAN.
  4. REFERENCE SHEET BM1.05 FOR MECHANICAL PERMS PLAN.
  5. REFERENCE SHEETS BM1.01 AND BM1.02 FOR MECHANICAL SCHEDULES.
  6. REFERENCE SHEETS BM1.01 AND BM1.02 FOR MECHANICAL CONTROLS DRAWINGS.
  7. REFERENCE SHEET BM1.03 FOR DEDICATED OUTDOOR AIR SYSTEM FLOW DIAGRAM.

- CONSTRUCTION NOTES**
1. FURNISH AND INSTALL VRF SYSTEM INCLUDING CASSETTE. MAKE CONNECTION WITH OUTSIDE AIR DUCT AND ROUTE AS SHOWN TO AB-LOAS-01 ON ROOF. REFERENCE SHEET BM1.01 FOR VRF TERMINAL UNIT SCHEDULE.
  2. FURNISH AND INSTALL VRF SYSTEM DUCTED INDOOR UNIT. MAKE CONNECTION WITH SUPPLY DUCT AND ROUTE AS SHOWN TO SUPPLY UNIT USERS. MAKE CONNECTION FROM MAIN DUCT TO THE FRIGERANT PIPING PLAN. REFERENCE SHEET BM1.01 FOR TERMINAL UNIT SCHEDULE.
  3. FURNISH AND INSTALL SUPPLY AIR DIFFUSER. REFERENCE SHEET BM1.01 FOR AIR TERMINAL SCHEDULE.
  4. FURNISH AND INSTALL RETURN AIR GRILLE. REFERENCE SHEET BM1.01 FOR RETURN AIR BOOT DETAIL. REFERENCE SHEET BM1.01 FOR AIR TERMINAL SCHEDULE.
  5. FURNISH AND INSTALL MOTORIZED DAMPER IN DUCT. REFERENCE VRF SYSTEM CONTROL DIAGRAM SHEET BM1.01.
  6. FURNISH AND INSTALL 10" x 8" EXHAUST AIR DUCT UP TO GROUND ON ROOF. MAKE CONNECTION TO EXHAUST HOOD. REFERENCE SHEET BM1.02 FOR KITCHEN HOOD CONTROL DIAGRAM.
  7. FURNISH AND INSTALL SUPPLY FAN AT 5'-0" ON CENTER ABOVE FINISH FLOOR. REFERENCE SHEET BM1.01 FOR SUPPLY FAN DETAIL. REFERENCE SHEET BM1.01 FOR SUPPLY FAN SCHEDULE. REFERENCE SHEET BM1.02 FOR SUPPLY FAN CONTROL DIAGRAM.
  8. FURNISH AND INSTALL RELIEF LOUVER. COLOR TO BE SELECTED BY ARCHITECT. FURNISH LOUVER WITH GRAVITY BACK DRAFT DAMPER MODEL 80242 WITH INFRARED HEATER PER DETAIL. ROUTE COMBUSTION EXHAUST AIR DUCT FROM INFRARED HEATER UP THROUGH ROOF. REFERENCE SHEET BM1.02 FOR CONTROLS. REFERENCE SHEET BM1.01 FOR INFRARED HEATER DETAIL. REFERENCE SHEET BM1.01 FOR INFRARED HEATER SCHEDULE.
  9. FURNISH AND INSTALL INFRARED HEATER PER MANUFACTURER'S RECOMMENDATIONS. INSTALL INFRARED HEATER WITH HEATER. REFERENCE SHEET BM1.01 FOR INFRARED HEATER UP THROUGH ROOF. REFERENCE SHEET BM1.02 FOR CONTROLS. REFERENCE SHEET BM1.01 FOR INFRARED HEATER DETAIL. REFERENCE SHEET BM1.01 FOR INFRARED HEATER SCHEDULE.
  10. FURNISH AND INSTALL EXHAUST GRILLE. REFERENCE SHEET BM1.01 AIR TERMINAL SCHEDULE.
  11. FURNISH AND INSTALL TRANSFER URLE AT 12'-0" ABOVE FINISHED FLOOR. REFERENCE SHEET BM1.01 AIR TERMINAL SCHEDULE.
  12. FURNISH AND INSTALL OUTSIDE AIR DIFFUSER. MAKE CONNECTION TO DEDICATED OUTDOOR AIR SYSTEM. REFERENCE SHEET BM1.01 FOR AIR TERMINAL SCHEDULE.
  13. FURNISH AND INSTALL TRANSFER URLE ON BOTH SIDES OF WALL AT 12'-0" ABOVE FINISHED FLOOR.
  14. FURNISH AND INSTALL VENT ROSS MODEL R110 PORTABLE WELDING VENT CAPTURE SYSTEM WITH MOVABLE 6" x 10" FLOW ARM.
  15. FURNISH AND INSTALL VRF SYSTEM WALL MOUNTED UNIT. REFERENCE SHEET BM1.11 FOR CONNECTION TO REFRIGERANT PIPING SYSTEM. REFERENCE SHEET BM1.01 FOR VRF TERMINAL UNIT SCHEDULE. FURNISH WALL MOUNTED UNIT WITH MINIMUM CONDENSATE REMOVAL PUMP WITH POWER CABLE WITH BREATHING TUBE. ANTI-SIPHON DEVICE INLET HOSE AND DRAIN CONNECTOR KIT.
  16. FURNISH AND INSTALL RUSKIN 6" ROUND FIRE DAMPER MODEL FDR2. DAMPER SHALL BE 1.5 HOUR DYNAMIC UL555 RATED. CURTAIN TYPE. DAMPER SHALL BE OUT OF THE AIR STRIP.
  17. FURNISH AND INSTALL RUSKIN 6" x 6" FIRE DAMPER MODEL DDB2. DAMPER SHALL BE 1.5 HOUR DYNAMIC UL555 RATED. CURTAIN TYPE. DAMPER SHALL BE OUT OF THE AIR STRIP.
  18. FURNISH AND INSTALL BIG ASS FAN MODEL PPH-12 OR APPROVED EQUAL FAN SHALL BE 12" FOOT DIAMETER WITH (8) STRIBED ALUMINUM RIBBED BLADES WITH MOTOR AND FACTORY PROGRAMMER AND A 15 FOOT POWER CORD WITH NEMA 3P-100TWIST LOCK PLUG. MOTOR SHALL BE 300 VOLT 3 PHASE. 30 AMP. 1200 RPM. TYPE DOUBLE BAKED CLASS F INSULATION FAN SHALL BE EQUIPPED WITH A SAFETY CABLE AND UPPER TEMPERATURE SENSOR. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
  19. FURNISH AND INSTALL BIG ASS FAN SMART SENSE WALL CONTROLLER AND AUXILIARY CONTROLLER. CONTROLLERS SHALL SERVE BOTH FANS AB-01 AND AB-02. CONTROLLERS SHALL INCLUDE 16-35 VDC PILOT RELAY FOR SCRAMSS FIRE CONTROL PANEL. INTERLOCK PROTECT 165 FOOT CAT5 CABLE TO BOTH FANS. WALL CONTROLLER SHALL BE PROVIDED WITH CLASS B AC ADAPTER POWER CORD.

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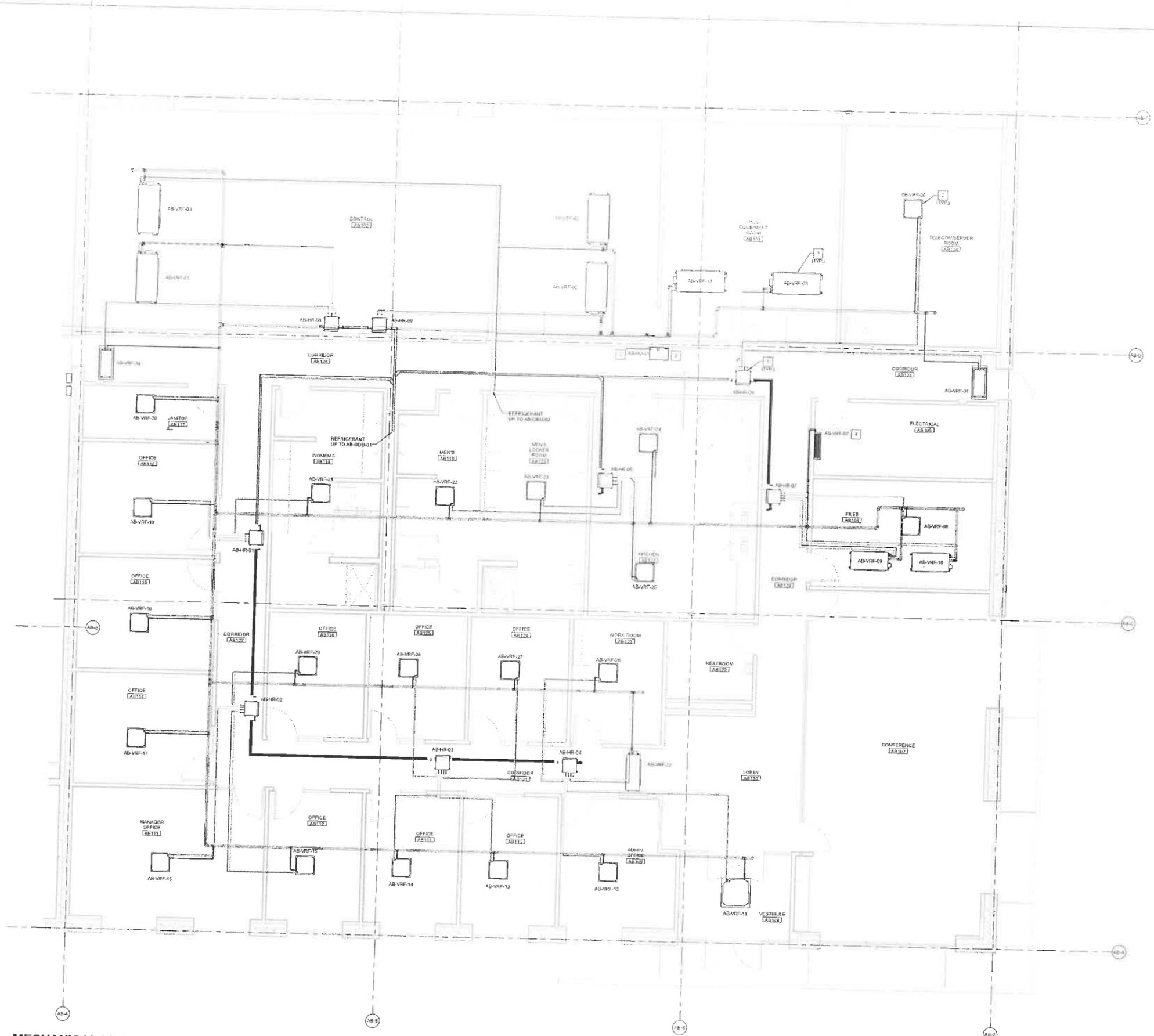
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**GBA P.A.**  
 Association  
 5801 Remmer Boulevard  
 Leesville, Kentucky 40349  
 502-492-0001 www.gba-tn.com

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**001 - ADMINISTRATION BUILDING  
 MECHANICAL HVAC FIRST FLOOR PLAN**

DRAWING NUMBER  
**2014-087-001-BM1.10**



- GENERAL NOTES**
1. REFRIGERANT PIPING TO BE SIZED BY SELECTED VRF MANUFACTURER.
  2. INSULATE PIP PER SPECIFICATION SECTION 28.0719 - HVAC PIPING/INSULATION.
  3. REFER TO SHEET BM1.10 FOR MECHANICAL HVAC PLAN.
  4. REFER TO SHEET BM1.09 FOR MECHANICAL DETAILS.
  5. REFER TO SHEETS BM1.01 AND BM1.02 FOR MECHANICAL CONTROLS DRAWINGS.
  6. REFER TO SHEET BM1.01 FOR VRF SYSTEM FLOW DIAGRAM.
  7. REFER TO SHEET BM1.01 FOR VRF CONDENSATE DRAIN PIPING.

- CONSTRUCTION NOTES**
1. FURNISH AND INSTALL HEAT COVER BOXES. MAKE CONNECTION WITH REFRIGERANT PIPING LIQUID SUCTION AND HEAT COVER MAINS AND ROUTE TO OUTDOOR UNIT ON ROOF AS SHOWN. MAKE CONNECTION WITH REFRIGERANT PIPING LIQUID AND SUCTION BRANCHES AND ROUTE TO VRF TERMINAL UNITS.
  2. MAKE CONNECTION TO VRF SYSTEM CEILING CASSETTE WITH REFRIGERANT PIPING LIQUID AND SUCTION BRANCHES.
  3. MAKE CONNECTION TO VRF SYSTEM DUCTED UNIT WITH REFRIGERANT PIPING LIQUID AND SUCTION BRANCHES.
  4. MAKE CONNECTION TO VRF SYSTEM WALL MOUNTED UNIT WITH REFRIGERANT PIPING LIQUID AND SUCTION BRANCHES.
  5. FURNISH AND INSTALL HUMIDIFIED SYSTEM ADJUST STEAM GENERATOR AT 3'-0" ABOVE FINISH FLOOR ON WALL WITH OPTIONAL WALL BRACKET. MOUNT DISPERSION UNIT IN VERTICAL DUCT 18" ABOVE FIFTH FLOOR. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. REFERENCE HANGER INSTALL SHEET BM1.01 AND HANGERS SCHEDULE SHEET BM1.01.
  6. FURNISH AND INSTALL 1/2" INSULATED DRISTEEM STEAM HOSE FROM STEAM GENERATOR TO DISPERSION UNIT. TUBING SHALL BE SLOPED BACK TO STEAM GENERATOR AT 1/8" PER FOOT.

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913 402 2403 www.gbapainc.com

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001 - ADMINISTRATION BUILDING  
MECHANICAL PIPING FIRST FLOOR PLAN

DRAWING NUMBER  
2014-087-001-BM1.11

**MECHANICAL PIPING FIRST FLOOR PLAN**  
SCALE: 1/4" = 1'-0"





- GENERAL NOTES**
1. REFRIGERANT PIPING TO BE MADE BY SELECTED VRF MANUFACTURER.
  2. INSULATE DUCT PER SPECIFICATION SECTION 23.05.01 INSULATION.
  3. INSULATE PIPE PER SPECIFICATION SECTION 23.07.01 - HVAC PIPING INSULATION.
  4. REFERENCE SHEET BM1.10 FOR MECHANICAL HVAC PLAN.
  5. REFERENCE SHEET BM1.20 FOR MECHANICAL DETAILS.
  6. REFERENCE SHEETS BM1.00 AND BM1.01 FOR MECHANICAL SCHEDULES.
  7. REFERENCE SHEETS BM1.01 AND BM1.02 FOR MECHANICAL CONTROLS DRAWINGS.
  8. REFERENCE SHEETS BM1.00 AND BM1.01 FOR FLOW DIAGRAMS.

- CONSTRUCTION NOTES**
1. FURNISH AND INSTALL DESIGNATED OUTDOOR AIR SYSTEM ON 12" ROOF CURB PROVIDED WITH GLASS SYSTEM. ROUTE 3" Ø SUPPLY AND 3" Ø RETURN DUCT DOWN TO FIRST FLOOR. REFERENCE SHEET BM1.10 FOR CURTAINMENT. REFERENCE SHEET BM1.01 FOR BURN DETAIL. REFERENCE SHEET BM1.01 OR PACKAGED GAS FUELED DESIGNATED OUTDOOR AIR SYSTEM SCHEDULE. REFERENCE BM1.01 FOR ROOF CONTROL DIAGRAM. REFERENCE BM1.00 FOR GAS FLOW DIAGRAM.
  2. FURNISH AND INSTALL VRF OUTDOOR UNITS AB-OU-01 AND AB-OU-02. ROUTE REFRIGERANT DOWN TO FIRST FLOOR PER MANUFACTURER'S REQUIREMENTS. REFERENCE SHEET BM1.10 FOR VRF SYSTEM OUTDOOR AIR SCHEDULE. REFERENCE BM1.01 FOR THE SYSTEM CONTROL DIAGRAM. REFERENCE BM1.01 FOR VRF SYSTEM FLOW DIAGRAM.
  3. FURNISH AND INSTALL EXHAUST FAN AB-EF-01 ON ROOF CURB. REFERENCE SHEET BM1.01 FOR EXHAUST FAN DETAIL. REFERENCE SHEET BM1.01 FOR FAN SCHEDULE. REFERENCE SHEET BM1.01 FOR EXHAUST FAN CONTROL DIAGRAM.
  4. FURNISH AND INSTALL EXHAUST AIR DUCT CONDENSER. REFERENCE SHEET BM1.01 FOR CONDENSER DETAIL.
  5. ROUTE COMMUNICATION AIR DUCT FROM ROOF DOWN TO INFRARED HEATER. FURNISH AND INSTALL AN APPROVED THIMBLE AND VENT CAP. REFERENCE BM1.10 FOR CONTINUATION.
  6. ROUTE EXHAUST DUCT FROM INFRARED HEATER UP THROUGH ROOF. FURNISH AND INSTALL AN APPROVED THIMBLE AND VENT CAP. REFERENCE BM1.10 FOR CONTINUATION.

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Association  
8001 Rensselaer Boulevard  
Lenexa, Kansas 66219  
913.492.5409 www.gbah.com

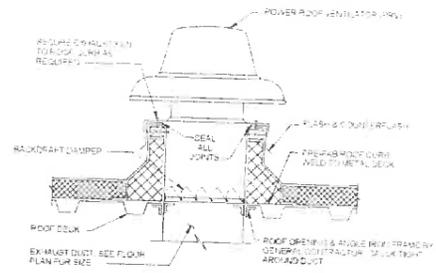
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001 - ADMINISTRATION BUILDING  
MECHANICAL HVAC ROOF PLAN

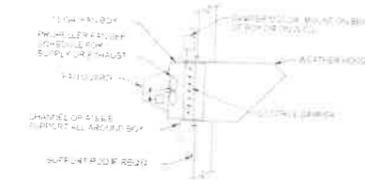
DRAWING NUMBER  
2014-087-001-BM1.20

**MECHANICAL HVAC ROOF PLAN**  
SCALE: 1/8" = 1'-0"

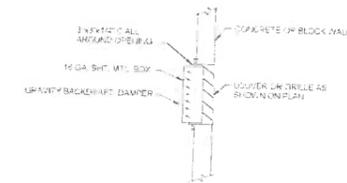




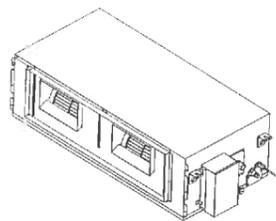
**TYP. POWER ROOF VENTILATOR**  
 1/8" = 1'-0" SCALE NONE



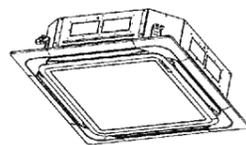
**TYPICAL WALL FAN**  
 1/8" = 1'-0" SCALE NONE



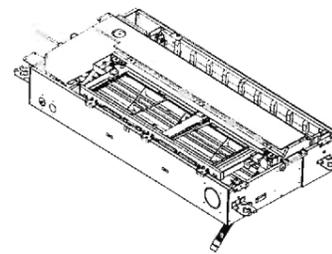
**INLET LOUVER OR GRILLE**  
 1/8" = 1'-0" SCALE NONE



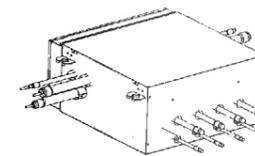
**VRF DUCTED UNIT DETAIL**  
 1/8" = 1'-0" SCALE NONE



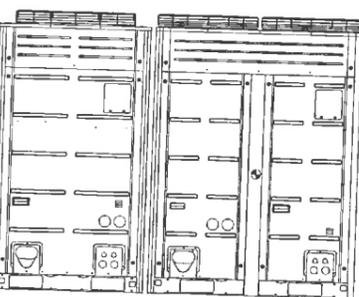
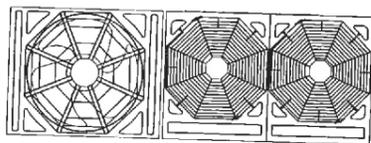
**VRF 4-WAY CASSETTE DETAIL**  
 1/8" = 1'-0" SCALE NONE



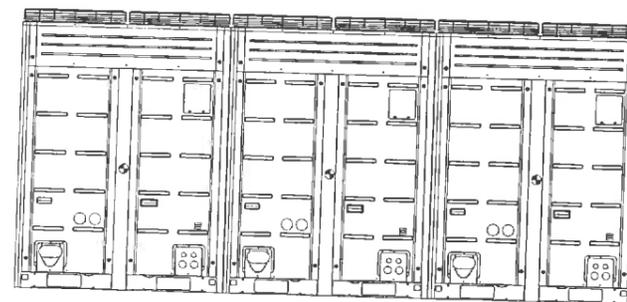
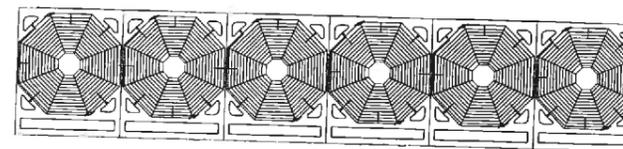
**VRF 1-WAY CASSETTE DETAIL**  
 1/8" = 1'-0" SCALE NONE



**VRF HR BOX DETAIL**  
 1/8" = 1'-0" SCALE NONE



**VRF OUTDOOR UNIT ODU-02 DETAIL**  
 1/8" = 1'-0" SCALE NONE



**VRF OUTDOOR UNIT ODU-01 DETAIL**  
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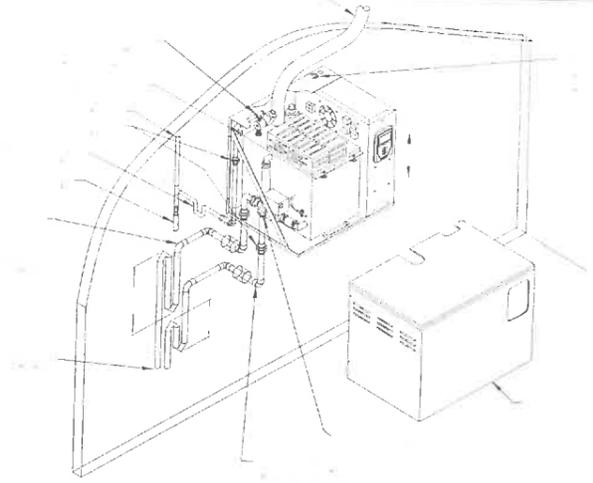
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 Lenexa, Kansas 66215  
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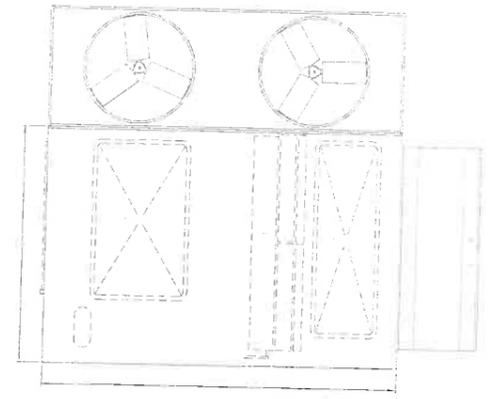
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001 - ADMINISTRATION BUILDING  
 MECHANICAL DETAILS

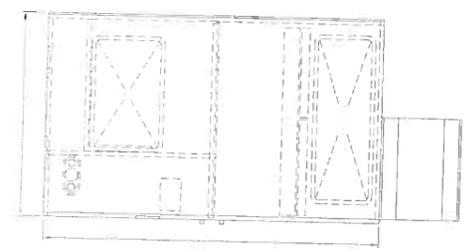
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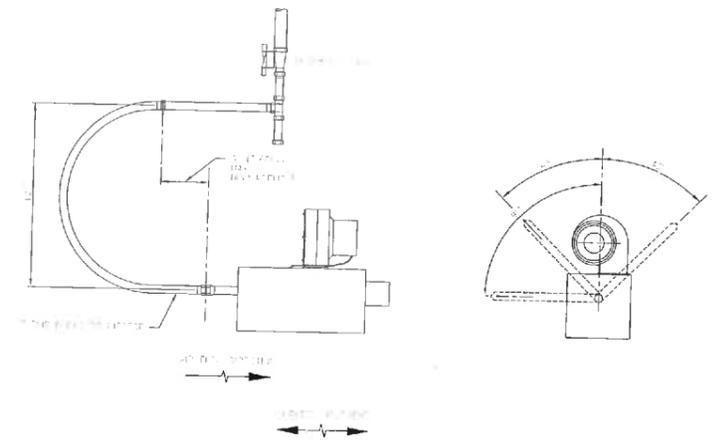
**HUMIDIFIER DETAIL**



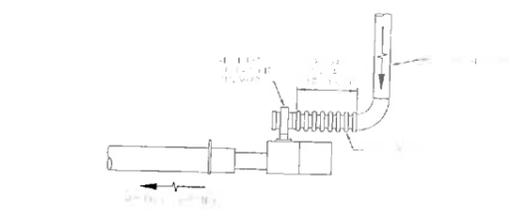
**AB-DOAS-01 DETAIL**



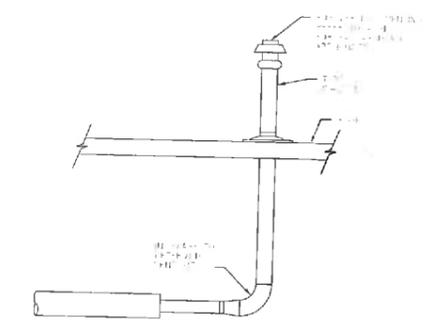
**AB-DOAS-02 DETAIL**



**INFRARED HEATER GAS CONNECTION DETAIL**



**INFRARED HEATER OUTSIDE AIR DETAIL**



**INFRARED HEATER VENT DETAIL**

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**GBA P.A.**  
 Association  
 8801 Kerner Boulevard  
 Lenexa, Kansas 66219  
 913-492-2400 www.gbapam.com

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001 - ADMINISTRATION BUILDING  
 MECHANICAL DETAILS

DRAWING NUMBER  
 2014-087-001-BM3.01



VARIABLE REFRIGERANT FLOW OUTDOOR UNIT SCHEDULE																				
MARK	UNIT TYPE	TOTAL CAPACITY / DERATED TOTAL CAPACITY		TOTAL POWER INPUT / DERATED POWER INPUT		INDOOR TEMPERATURES				OUTDOOR TEMPERATURES				ELECTRICAL DATA				REMARKS		
		COOLING (Tons)	HEATING (MBH)	COOLING (kW)	HEATING (kW)	WINTER (DB) (1)	WINTER (DB) (2)	WINTER (DB) (3)	WINTER (DB) (4)	WINTER (DB) (5)	WINTER (DB) (6)	WINTER (DB) (7)	WINTER (DB) (8)	WINTER (DB) (9)	WINTER (DB) (10)	WINTER (DB) (11)	WINTER (DB) (12)			
AB-200-01	TRIPLE FLOW HEAT RECOVERY UNIT	1340	53.0	247	25.2	15	45	15	45	15	45	15	45	15	45	15	45	15	45	1.2
AB-200-02	DOUBLE FLOW HEAT EXCHANGER	2150	85.0	415	42.0	15	45	15	45	15	45	15	45	15	45	15	45	15	45	1.2

NOTES:  
 1. UNIT CAPACITY RATED FOR AMBIENT TEMPERATURES OF 95°F IN COOLING AND 55°F IN HEATING.  
 2. FURNISH WITH DISCONNECT SWITCH.

LOUVER SCHEDULE						
MARK	AREA SERVED	DIMENSIONS		FRAME DEPTH	PRESSURE DROP	REMARKS
		WIDTH	HEIGHT			
AB-L-01	WAREHOUSE	30"	24"	4.75"	0.05 inwg	1.2
AB-L-02	WAREHOUSE	30"	24"	4.75"	0.05 inwg	1.2

NOTES:  
 1. FURNISH WITH 3/4" ALUMINUM BIRD SCREEN BY REMOVABLE FRAME.  
 2. LOUVER SHALL BE EXTRUDED ALUMINUM GRABRIT, STATIONARY TYPE.

FAN SCHEDULE														
MARK	AREA SERVED	FAN LOCATION	CFM	TOTAL SP	FAN RPM	OUTLET VELOCITY	MOTOR			FAN DATA			REMARKS	
							HP	ELECTRICAL VOLTAGE	ELECTRICAL PHASE	FAN TYPE	DRIVE	MANUFACTURER		MODEL
AB-F-01	OFFICE	ROOF	750 CFM	0.50 inwg	904	1.8	115 V	1	ALUMINUM	DIRECT	COOK	100 ACE-D	2	
AB-F-01	WAREHOUSE	WEST EXTERIOR WALL	2500 CFM	0.25 inwg	1026	5.5 FT/SEC	1.3	115 V	1	ALUMINUM PROPELLER	DIRECT	COOK	AWM-200ATD6	1
AB-F-02	WAREHOUSE	WEST EXTERIOR WALL	2500 CFM	0.25 inwg	1026	5.5 FT/SEC	1.3	115 V	1	ALUMINUM PROPELLER	DIRECT	COOK	AWM-200ATD6	1

NOTES:  
 1. FURNISH WITH MOTOR STARTER, DISCONNECT SWITCH, WEATHER HOOD, MOTORIZED CENTER PIVOT DAMPER, 115V WALL COLLAR AND CONDUIT UNLESS OTHERWISE NOTED.  
 2. FURNISH WITH MOTOR STARTER, DISCONNECT SWITCH, ALUMINUM BIRD SCREEN, AND SLOPED (1/4" PER FOOT) ALUMINUM RISK CURB WITH WOOD NAILER.

AIR TERMINAL SCHEDULE												
TAG	TYPE	NECK SIZE	MODULE SIZE	PRESSURE DROP	NECK CRITERIA (ft/min)	MATERIAL	FINISH	BLADE TYPE	BLADE SPACING	BLADE DEFLECTION	MANUFACTURER	MODEL
B	Lowered Square Diffuser for Lay-In Ceiling	NOTE 2	24" x 24"	0.07 inwg	25	Aluminum	STANDARD WHITE	LAY-BI			TUS	TDC-AA
C	High Capacity Linear Slot Diffuser		4" x 4"	0.05 inwg	25	Aluminum	STANDARD WHITE	SS			TUS	FL-35-1
D	High Capacity Linear Slot Diffuser		4" x 4"	0.08 inwg	25	Aluminum	STANDARD WHITE	SS			TUS	FL-35-1
E	Round Grid with 75 Degree Deflection		6" x 6"	0.05 inwg	25	Aluminum	STANDARD WHITE	SURFACE MOUNT	1/2"	25.00"	TUS	FL-15-1
F	High Performance Square Cone Diffuser		6" x 6"	0.07 inwg	25	Aluminum	STANDARD WHITE	LAY-BI			TUS	TDC-AA
G	Lowered Square Diffuser for Lay-In Ceiling		6" x 6"	0.07 inwg	25	Aluminum	STANDARD WHITE	LAY-BI			TUS	TDC-AA
H	Lowered Square Diffuser for Lay-In Ceiling		10" x 10"	0.05 inwg	25	Aluminum	STANDARD WHITE	LAY-BI			TUS	TDC-AA
J	High Capacity Linear Slot Diffuser		3" x 2-1/2"	0.05 inwg	25	Aluminum	STANDARD WHITE	SS			TUS	FL-35-1
K	High Capacity Linear Slot Diffuser		4" x 4"	0.06 inwg	25	Aluminum	STANDARD WHITE	SS			TUS	FL-35-1

NOTES:  
 1. SHALL BE COMPATIBLE WITH ARMSTRONG TECHZONE CEILING SYSTEM.  
 2. NETWORKING PLANS FOR NECK SIZE.

STEAM GENERATOR AND DISPERSION SCHEDULE																		
MARK	EAT	ENTERING RH	LAT	LEAVING RH	AIR FLOW (CFM)	OA PERCENTAGE	LOAD (BTU/H)	CURRENT DRAW	MANUFACTURER	GENERATOR MODEL	DISPERSION MODEL	TUBE QUANTITY	TUBE SPACING	ABSORPTION DISTANCE	STEAM OUTLET 2" HOSE	HEADER SIZE	TUBE SIZE	COMMENTS

NOTES:  
 1. FURNISH UNIT WITH OPTIONAL WALL BRACKET, DISCONNECT SWITCH, 7' OR 18" STEAM HOSE, END-OF-SEASON DRAIN, 304 STAINLESS STEEL TANK WITH INSULATION, VAPOR LOGIC HUMIDIFIER CONTROLLER WITH 85% OPERATING MODE, RAGNET INTEROPERABILITY, KEYPAD DISPLAY WITH FIVE FOOT CABLE, INPUT SIGNAL FOR ROOM MOUNTED HUMIDITY TRANSMITTER, ELECTRIC MODULATING HIGH LIMIT HUMIDISTAT, ELECTRIC PRESSURE AIR FLOW PULSING SWITCH, FACTORY MOUNTED CONTROL CABINET AND ROOM HUMIDITY TRANSMITTER.  
 2. CONTRACTOR SHALL ADJUST WATER SKIMMER TO ACTIVATE AS OFTEN AS POSSIBLE TO REDUCE SCALE.  
 3. FURNISH AND INSTALL CONDENSATE DRAIN AND TRAP ON HUMIDIFIER HEADER.

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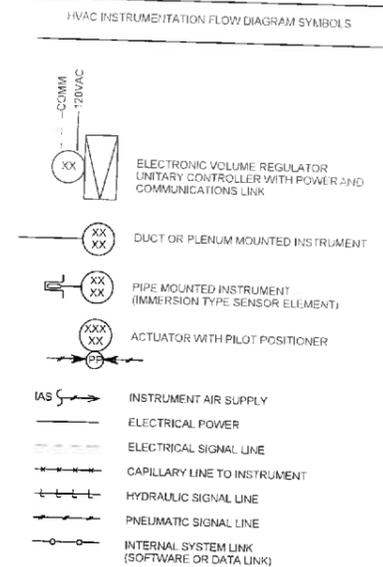
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001 - ADMINISTRATION BUILDING  
 MECHANICAL HVAC SCHEDULES

DRAWING NUMBER  
 2014-087-001-BM4.01

**SCHEMATIC DRAWING SYMBOLOGY**

**SCHEMATIC DRAWING SYMBOLOGY**



**CONTROL DEVICE LOCATIONS ABBREVIATIONS**

CW	CHILLED WATER
EA	EXHAUST AIR
HU	EXHAUST FAN
MA	MIXED AIR
MI	MASTER INTERLOCK
OA	OUTSIDE AIR
PH	PREHEAT
RA	RETURN AIR
RF	RETURN FAN
RM	ROOM
SA	SUPPLY AIR
SF	SUPPLY FAN
SS	SYSTEM STOP/START

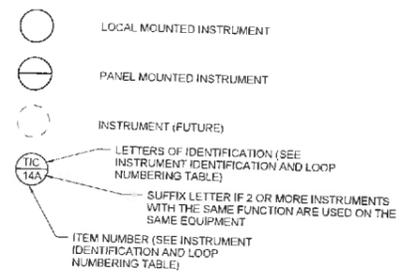
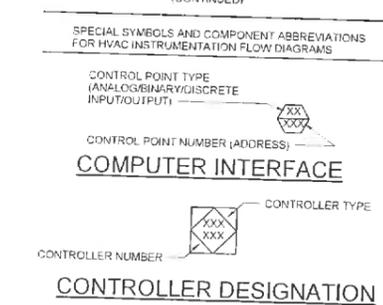
FACILITIES CONTROLS STANDARD INSTRUMENT IDENTIFICATION AND LOOP NUMBERING

ABBREV.	DESCRIPTION	OA	MA	PH	CW	HU	SF	SA	RA	EA	RF	EF	MI	SS	RM
CR	CONTROL RELAY	01	02	03	04	05	06	07	08	09	10	11	12	13	20
IS	CURRENT SWITCH	01	02	03	04	05	06	07	08	09	10	11	12	13	20
IP	CURRENT TO PRESSURE TRANSDUCER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
FCZ	FLOW CONTROL ACTUATOR	01	02	03	04	05	06	07	08	09	10	11	12	13	20
FC	FLOW CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
FE	FLOW ELEMENT	01	02	03	04	05	06	07	08	09	10	11	12	13	20
FIC	FLOW INDICATING CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
FSH	FLOW SWITCH HIGH	01	02	03	04	05	06	07	08	09	10	11	12	13	20
FSL	FLOW SWITCH LOW	01	02	03	04	05	06	07	08	09	10	11	12	13	20
FT	FLOW TRANSMITTER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
HS	HAND OPERATED SWITCH	01	02	03	04	05	06	07	08	09	10	11	12	13	20
LCZ	LEVEL CONTROL ACTUATOR	01	02	03	04	05	06	07	08	09	10	11	12	13	20
MCZ	MOISTURE CONTROL ACTUATOR	01	02	03	04	05	06	07	08	09	10	11	12	13	20
MC	MOISTURE CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
ME	MOISTURE ELEMENT	01	02	03	04	05	06	07	08	09	10	11	12	13	20
MIC	MOISTURE INDICATING CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
MSH	MOISTURE SWITCH HIGH	01	02	03	04	05	06	07	08	09	10	11	12	13	20
MSL	MOISTURE SWITCH LOW	01	02	03	04	05	06	07	08	09	10	11	12	13	20
MT	MOISTURE TRANSMITTER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PCZ	PRESSURE CONTROL ACTUATOR	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PC	PRESSURE CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PDSH	PRESSURE DIFFERENTIAL SWITCH HIGH	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PDSL	PRESSURE DIFFERENTIAL SWITCH LOW	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PDT	PRESSURE DIFFERENTIAL TRANSMITTER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PIC	PRESSURE INDICATING CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PSH	PRESSURE SWITCH HIGH	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PSL	PRESSURE SWITCH LOW	01	02	03	04	05	06	07	08	09	10	11	12	13	20
PT	PRESSURE TRANSMITTER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
NS	SMOKE DETECTOR	01	02	03	04	05	06	07	08	09	10	11	12	13	20
SV	SOLENOID VALVE	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TCZ	TEMPERATURE CONTROL ACTUATOR	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TC	TEMPERATURE CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TE	TEMPERATURE ELEMENT	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TIC	TEMPERATURE INDICATING CONTROLLER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TSH	TEMPERATURE SWITCH HIGH	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TSL	TEMPERATURE SWITCH LOW	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TT	TEMPERATURE TRANSMITTER	01	02	03	04	05	06	07	08	09	10	11	12	13	20
TW	THERMOWELL	01	02	03	04	05	06	07	08	09	10	11	12	13	20

CONTROL DEVICE LOCATIONS ABBREVIATIONS

CW	CHILLED WATER
EA	EXHAUST AIR
EF	EXHAUST FAN
HU	HUMIDIFIER
MA	MIXED AIR
MI	MASTER INTERLOCK
OA	OUTSIDE AIR
PH	PREHEAT
RA	RETURN AIR
RF	RETURN FAN
RM	ROOM
SA	SUPPLY AIR
SF	SUPPLY FAN
SS	SYSTEM STOP/START

**SCHEMATIC DRAWING SYMBOLOGY**



**PLAN DRAWING SYMBOLOGY**

- UNITARY CONTROLLER
- JUNCTION BOX
- ELECTRIC / ELECTRONIC INSTRUMENT OR CONTROL DEVICE
- PNEUMATIC INSTRUMENT OR CONTROL DEVICE
- △ #18 AWG TWISTED SHIELDED PAIR IN CONDUIT, QUANTITY INDICATED.
- △ #18 AWG TWISTED PAIR IN CONDUIT, QUANTITY INDICATED.
- ◇ #14 AWG SINGLE CONDUCTOR (TYPE THHN) IN CONDUIT, QUANTITY INDICATED.
- #12 AWG SINGLE CONDUCTOR (TYPE THHN) IN CONDUIT, QUANTITY INDICATED.
- COMMUNICATIONS CABLING BETWEEN UNITARY CONTROLLERS ON NETWORK TO BE #18 AWG TWISTED SHIELDED PAIR W/BUE JACKET IN CONDUIT, QUANTITY INDICATED.
- ▽ COMMUNICATIONS CABLING BETWEEN ICP's TO BE (3) INDIVIDUAL #18 AWG TWISTED SHIELDED PAIRS W/BUE JACKETS IN CONDUIT, QUANTITY INDICATED.
- CABLING BETWEEN UNITARY CONTROLLERS AND SOLOSTATS TO BE #18 AWG SIX SHIELDED CONDUCTORS IN CONDUIT, QUANTITY INDICATED. CABLING BETWEEN UNITARY CONTROLLERS AND TEGSTATS TO BE 6C TELEPHONE CABLE W/PLUG-IN JACK IN CONDUIT, QUANTITY INDICATED.

**PLAN DRAWING SYMBOLOGY**

(CONTINUED)

UNLESS OTHERWISE NOTED ON DRAWINGS THE FOLLOWING WIRE COLOR CODE IS TO BE USED FOR THE INSTRUMENTATION CONTROL SYSTEM.

POWER AND DIGITAL CONTROL WIRING

BLACK	AC LINE
WHITE	AC COMMON
GREEN	AC GROUND
BROWN/BLACK	24VAC LINE
BROWN/WHITE	24VAC COMMON
BROWN/GREEN	24VAC GROUND
RED	SAFETY INTERLOCK WIRING
PURPLE	DIGITAL INPUT WIRING
YELLOW	DIGITAL OUTPUT WIRING
RED/BLACK	5VDC-
RED/WHITE	5VDC+
ORANGE/BLACK	15VDC-
ORANGE/WHITE	15VDC+
ORANGE/GREEN	15VDC GROUND
BLUE/BLACK	24VDC-
BLUE/WHITE	24VDC+

ANALOG SIGNAL WIRING

CLEAR OR WHITE	24VDC-
BLACK	24VDC+

FOR TUBING RUNS, CROSS SECTIONAL AREA OF TUBING INSTALLED IN CONDUIT SHALL NOT EXCEED 50% OF THE TOTAL CROSS SECTIONAL AREA OF CONDUIT.

1/4" FLEXIBLE TUBING IN CONDUIT, QUANTITY INDICATED. MAX. NUMBER PER CONDUIT SIZE AS FOLLOWS:

CONDUIT SIZE	1/4" I.D.
1/2"	2
3/4"	5
1"	8
1 1/4"	13
1 1/2"	18

1/4" O.D. HD COPPER TUBING, QUANTITY INDICATED

GENERAL CONSTRUCTION NOTES:

- FURNISH AND INSTALL CONTROLS REQUIRED FOR A COMPLETE AND FUNCTIONAL SYSTEM. CONTROL SYSTEM SHALL CONSIST OF SENSORS, INDICATORS, ACTUATORS, FINAL CONTROL ELEMENTS, INTERFACE EQUIPMENT, OTHER APPARATUS, AND ACCESSORIES TO CONTROL MECHANICAL SYSTEMS.
- ALL INSTRUMENTATION CONDUIT TO BE ELECTRICAL METALLIC TUBING IN ALL AREAS EXCEPT WHERE SPECIFICALLY INDICATED THAT INTERMEDIATE METAL CONDUIT IS REQUIRED.
- EXCEPT WHERE NOTED OTHERWISE, CONCEAL CONDUITS IN FINISHED AREAS (THOSE AREAS IN BASEMENT AND ON FIRST FLOOR WITH SUSPENDED CEILINGS), WHERE POSSIBLE, FLUSH MOUNT DEVICES IN FINISHED AREAS. FOR DEVICES (I.E. THERMOSTATS) WHICH CANNOT BE FLUSH MOUNTED, SURFACE MOUNT THE DEVICE AND PROVIDE A BACK BOX WHOSE FACE IS FLUSH MOUNTED WITH FINISHED FACE OF WALL FOR DEVICES IN UNFINISHED AREAS (I.E. EQUIPMENT ROOMS, PENTHOUSE, MEZZANINES) AND FOR DEVICES WHICH MUST MOUNT ON POURED MASONRY WALLS, SURFACE MOUNT DEVICES AND CONDUIT.
- PROVIDE SEAL FITTINGS IN CONDUITS THAT ENTER CONDITIONED AREAS FROM NONCONDITIONED AREAS.
- CONTRACTOR IS RESPONSIBLE FOR ALL FLOOR AND WALL PENETRATIONS, FOR CONDUIT RUNS, ETC.

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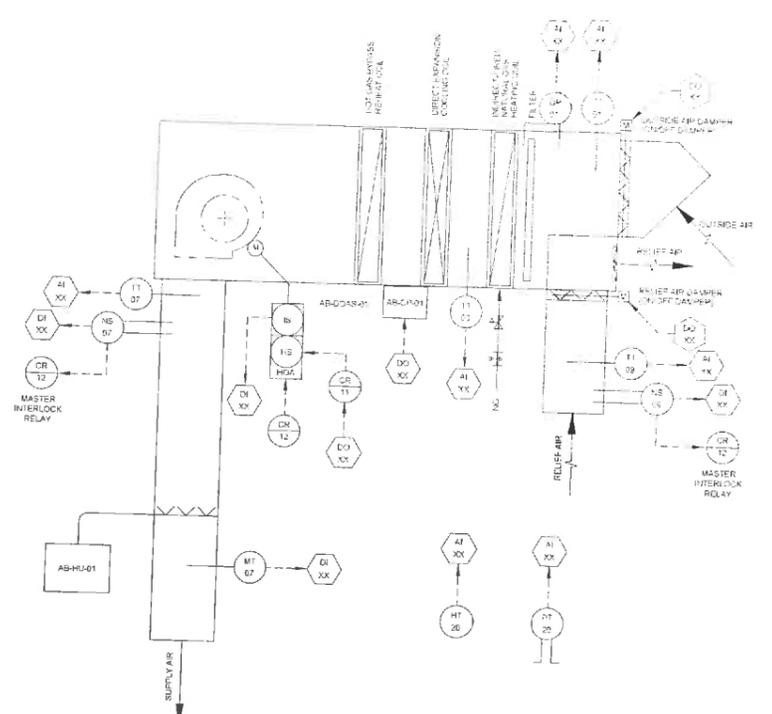
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**GBA P.A.**  
Association  
5501 Revere Boulevard  
Lansdale, PA 19382-5529  
610-692-0001 www.gbapainc.com

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001 - ADMINISTRATION BUILDING  
MECHANICAL HVAC FACILITY INSTRUMENTS & CONTROLS SYMBOLS & ABBREVIATIONS

DRAWING NUMBER  
2014-087-001-BM5.00



**GENERAL NOTES**

1. FINISH AND INSTALL CONDITIONS REQUIRED FOR A COMPLETE INSTRUMENTAL SYSTEM. CONTROL SYSTEM SHALL CONSIST OF SENSORS, INDICATORS, ACTUATORS, FINAL CONTROL ELEMENTS, INTERFACE EQUIPMENT, OTHER APPARATUS AND ACCESSORIES TO CONTROL MECHANICAL SYSTEMS.

**SEQUENCE OF OPERATION (DEDICATED OUTDOOR AIR SYSTEM, AB-DOAS-01)**

DEDICATED OUTDOOR AIR SYSTEM, AB-DOAS-01 IS LOCATED ON THE ROOF OF THE ADMIN BUILDING. IT IS SIZED TO SUPPLY THE ADMIN BUILDING WITH THE REQUIRED OUTDOOR AIR. AB-DOAS-01 SHALL BE CONTROLLED BY LOCAL PANEL AB-OP-01 BY THE DEDICATED OUTDOOR AIR SYSTEM MANUFACTURER.

**DESIGN CONDITIONS**  
 OUTDOOR: SUMMER - 105°F DB, WINTER - 10°F DB  
 INDOOR: COOLING LEAVING UNIT TEMPERATURE = 73°F DB @ 1 F/W; HEATING LEAVING UNIT TEMPERATURE = 70°F DB

**START/STOP**  
 UPON A MANUAL COMMAND TO START THROUGH THE CONTROL PANEL, AB-OP-01, THE SUPPLY AIR FAN SHALL ENERGIZE. UPON A COMMAND TO STOP THE CONTROL VALVES SHALL CLOSE AND THE FAN SHALL DE-ENERGIZE.

**FREEZE MODE**  
 WHEN THE FREEZESTAT BEFORE THE COOLING COIL TRIP (SET POINT @ 30 DEG F) THE SYSTEM SHALL BE IN THE FREEZE MODE. THE FOLLOWING SHALL OCCUR:  
 THE SUPPLY FANS SHALL DE-ENERGIZE.  
 THE OUTSIDE AIR DAMPER SHALL CLOSE.  
 THE CONTROL PANEL SHALL SHOW FREEZESTAT BY ALARM CONDITION.  
 WHEN THE FREEZESTAT IS RESET AS CONTROLLED BY THE LOCAL CONTROL PANEL AB-OP-01.

**INCORRECT FIBER OPTIC NATURAL GAS HEATING**  
 UPON A CALL FOR HEATING THE NATURAL GAS SHUTOFF VALVE IS OPENED AND THE MAIN BURNER CIRCUIT IS ENERGIZED. THE BURNER WILL FIRE TO MAINTAIN A LEAVING SUPPLY AIR TEMPERATURE OF 70.3 F (ADJUSTABLE).

**DIRECT EXPANSION COOLING COIL AND HOT GAS BYPASS REHEAT COIL**  
 UPON A CALL FOR COOLING THE DIRECT EXPANSION COOLING COIL SHALL MAINTAIN THE LEAVING COIL TEMPERATURE SETPOINT OF 54.3 DEG F (ADJUSTABLE). THE HOT GAS BYPASS REHEAT COIL SHALL MAINTAIN A LEAVING UNIT SUPPLY TEMPERATURE OF 72 DEG F.

**HUMIDITY CONTROL**  
 THE AIR-HANDLING UNIT SHALL MAINTAIN A SPACE RELATIVE HUMIDITY OF 40 TO 50%.

**IF THE PLENUM RELATIVE HUMIDITY FALLS BELOW 30%, THE STEAM ISOLATION VALVE OF THE STEAM HUMIDIFIER, AB-HU-01, SHALL OPEN AND THE STEAM HUMIDIFIER VALVE SHALL MODULATE TO MAINTAIN THE MINIMUM HUMIDITY SET POINT.**

**POWERED EXHAUST**  
 THE POWERED EXHAUST FAN SHALL MODULATE TO MAINTAIN THE BUILDING PRESSURE AT 0.02" W.C. AT THE PRESSURE SENSOR LOCATED IN THE PLENUM.

**ALARM CONDITIONS**  
 ALL SET POINTS ARE ADJUSTABLE. ALL ALARMS WILL SEND A SIGNAL TO THE ADMIN BUILDING CONTROL ROOM TO ALERT MAINTENANCE PERSONNEL.

**SMOKE DETECTION** - UPON AN ALARM OF THE SMOKE DETECTOR BOTH FANS SHALL DE-ENERGIZE AND THE VALVES SHALL MOVE TO THEIR NORMAL POSITIONS.

**HIGH RELIEF TEMPERATURE** - 70 DEG F (ADJUSTABLE)  
**LOW RELIEF TEMPERATURE** - 30 DEG F (ADJUSTABLE)  
**LOW PLENUM RELATIVE HUMIDITY** - BELOW 25%  
**HIGH PLENUM HUMIDITY** - ABOVE 55%  
**FAN START/STOP** - AN ALARM SHALL SOUND IF THE FAN IS ENABLED WITH NO PROOF OF RUN.  
**HIGH FILTER DIFFERENTIAL PRESSURE** - AN ALARM SHALL SOUND IF THE FILTER DIFFERENTIAL PRESSURE IS ABOVE 1" (ADJUSTABLE).

**SEQUENCE OF OPERATION (VARIABLE REFRIGERANT FLOW SYSTEMS, AB-ODU-01 AND AB-ODU-02)**

THE VARIABLE REFRIGERANT FLOW HEAT RECOVERY SYSTEM'S OUTDOOR UNIT, AB-ODU-01 IS LOCATED ON THE ROOF OF THE ADMIN BUILDING. THE OUTDOOR UNIT SERVES A VARIABLE REFRIGERANT FLOW SYSTEM CONSISTING OF REFRIGERANT PIPING, HEAT RECOVERY BOXES, CASSETTES AND LOCATED ON THE ROOF OF THE ADMIN BUILDING. THE VARIABLE REFRIGERANT FLOW HEAT PUMP SYSTEM'S OUTDOOR UNIT, AB-ODU-02 IS REFRIGERANT PIPING AND INDOOR DUCTED UNITS THAT SERVE THE PCS EQUIPMENT ROOM AND THE CONTROL ROOM AS A REDUNDANT SYSTEM. BOTH SYSTEMS SHALL BE CONTROLLED BY LOCAL PANEL, AB-CP-01 BY THE VARIABLE REFRIGERANT VOLUME MANUFACTURER.

**DESIGN CONDITIONS**  
 OUTDOOR: SUMMER - 105°F DB, WINTER - 10°F DB  
 INDOOR: 72°F DB

**START/STOP**  
 UPON A MANUAL COMMAND TO START THROUGH THE CONTROL PANEL, AB-CP-01, ALL SYSTEM COMPONENTS ON THE HEAT RECOVERY SYSTEM (AB-ODU-01) SHALL ENERGIZE. UPON A COMMAND TO STOP THE CONTROL VALVES SHALL CLOSE AND THE FAN SHALL DE-ENERGIZE.

**VRF TERMINAL UNITS**  
 EACH SPACE OF THE ADMIN BUILDING WILL BE SERVED BY AN INDIVIDUAL VRF TERMINAL UNIT EQUIPPED WITH A THERMOSTAT. THE TERMINAL UNIT SHALL MAINTAIN THE SPACE TEMPERATURE OF 72 DEG F (ADJUSTABLE).

**ALARM CONDITIONS**  
 ALL SET POINTS ARE ADJUSTABLE. ALL ALARMS WILL SEND A SIGNAL TO THE ADMIN BUILDING CONTROL ROOM TO ALERT MAINTENANCE PERSONNEL.

**SMOKE DETECTION** - UPON AN ALARM OF THE AB-ODU-01 SMOKE DETECTOR, AB-ODU-01 AND AB-ODU-02 AND ALL OTHER VRF SYSTEM FANS SHALL DE-ENERGIZE AND ALL VALVES SHALL RETURN TO NORMAL POSITIONS.

**OUTSIDE UNIT (AB-ODU-01) FAILURE** - UPON AN ALARM OF AB-ODU-01 FAILURE, AB-ODU-02 SHALL ENERGIZE AND UTILIZE THE VRF HEAT PUMP SYSTEM TO MAINTAIN THE 72 DEG F (ADJUSTABLE) SPACE TEMPERATURE SETPOINT OF THE PCS EQUIPMENT ROOM AND THE CONTROL ROOM.

**HIGH SPACE TEMPERATURE** - 75 DEG F (ADJUSTABLE)  
**LOW SPACE TEMPERATURE** - 58 DEG F (ADJUSTABLE)  
**LOW RELATIVE HUMIDITY** - BELOW 25%  
**HIGH RELATIVE HUMIDITY** - ABOVE 55%  
**FAN START/STOP** - AN ALARM SHALL SOUND IF THE FAN IS ENABLED WITH NO PROOF OF RUN.

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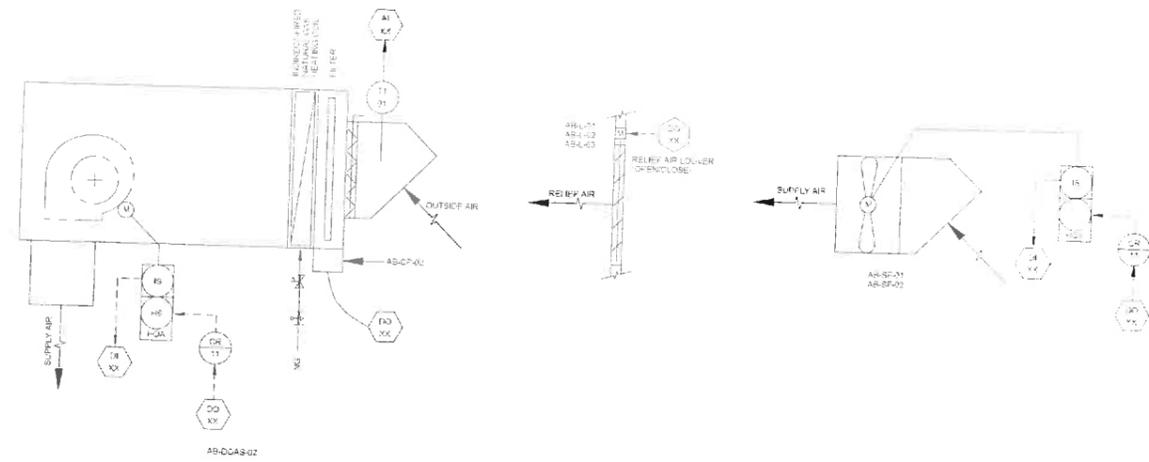
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001 - ADMINISTRATION BUILDING  
 MECHANICAL HVAC FACILITY INSTRUMENTS & CONTROLS

DRAWING NUMBER  
 2014-087-001-BM5.01



**GENERAL NOTES**

1. FOR VEHICULAR INSTALLATIONS REQUIRED FOR A COMPLETE AND FUNCTIONAL SYSTEM, CONTROL SYSTEM SHALL CONSIST OF SENSORS, INDICATORS, ACTUATORS, FINAL CONTROL ELEMENTS, INTERLOGIC EQUIPMENT, OTHER APPARATUS AND ACCESSORIES TO COMPLETE MECHANICAL SYSTEMS.

**SEQUENCE OF OPERATION (AB-DOAS-02, AB-SP-01 AND AB-SP-02)**

DECATATED OUTDOOR AIR SYSTEM AB-DOAS-02, SUPPLY FANS AB-SP-01 AND AB-SP-02 ARE MOUNTED ON THE WEST EXTERIOR WALL OF THE ADMIN BUILDING WAREHOUSE. MOTORIZED RELIEF LOUVERS AB-L01, AB-L02 AND AB-L03 ARE LOCATED ON THE EAST EXTERIOR WALL OF THE ADMIN BUILDING WAREHOUSE. SUPPLY FANS AB-SP-01 AND AB-SP-02 ARE SIZED TO SUPPLY THE MINIMUM REQUIRED VENTILATION AIRFLOW TO THE BUILDING WHEN THE SUPPLY FANS AB-SP-01 AND AB-SP-02 ARE NOT ENERGIZED. SUPPLY FANS AB-SP-01 AND AB-SP-02 ASSOCIATED MOTORIZED RELIEF LOUVERS AB-L01, AB-L02 AND AB-L03 AND DECATATED OUTDOOR AIR SYSTEM AB-DOAS-02 ARE CONTROLLED BY LOCAL CONTROL SYSTEM AB-CP-02.

**START/STOP:**  
UPON A MANUAL COMMAND TO START, MOTORIZED RELIEF LOUVERS AB-L01, AB-L02 AND AB-L03 SHALL OPEN AND THE SUPPLY AIR FANS AB-SP-01 AND AB-SP-02 SHALL ENERGIZE AND RUN CONTINUOUSLY AT A CONSTANT VOLUME AND CONSTANT SPEED.

**WARM WEATHER VENTILATION MODE:**  
WHEN THE TEMPERATURE AT DECATATED OUTDOOR AIR SYSTEM AB-DOAS-02'S OUTSIDE AIR TEMPERATURE SENSOR T101 IS GREATER THAN 70 F (ADJUSTABLE), MOTORIZED RELIEF LOUVERS AB-L01 AND AB-L03 SHALL OPEN AND THE SUPPLY AIR FANS AB-SP-01 AND AB-SP-02 SHALL ENERGIZE AND RUN CONTINUOUSLY AT A CONSTANT VOLUME AND CONSTANT SPEED.

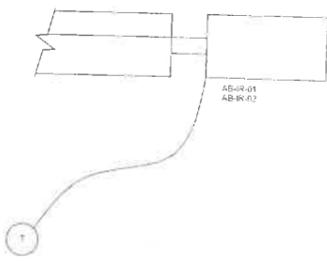
**COLD WEATHER VENTILATION MODE:**  
WHEN THE TEMPERATURE AT DECATATED OUTDOOR AIR SYSTEM AB-DOAS-02'S OUTSIDE AIR TEMPERATURE SENSOR T101 IS LESS THAN OR EQUAL TO 50 F (ADJUSTABLE), MOTORIZED RELIEF LOUVERS AB-L01 AND AB-L03 SHALL CLOSE AND THE SUPPLY AIR FANS AB-SP-01 AND AB-SP-02 SHALL DEENERGIZE. MOTORIZED RELIEF LOUVER AB-L02 WILL OPEN. THE SUPPLY FAN FOR DECATATED OUTDOOR AIR SYSTEM AB-DOAS-02 WILL ENERGIZE AND RUN CONTINUOUSLY TO MAINTAIN MINIMUM REQUIRED VENTILATION AIR. WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 60 F, THE NATURAL GAS SHUTOFF VALVE FOR AB-DOAS-02 SHALL OPEN, THE MAIN BURNER CIRCUIT SHALL ENERGIZE AND THE BURNER WILL FIRE TO MAINTAIN A SPACE AIR TEMPERATURE OF 65 F (ADJUSTABLE).

**ALARM CONDITIONS:**  
ALL SET POINTS ARE ADJUSTABLE. ALL ALARMS WILL SEND A SIGNAL TO THE ADMIN BUILDING CONTROL ROOM TO ALERT WAREHOUSE PERSONNEL.  
**FAN START/STOP:** AN ALARM SHALL SOUND IF THE FAN IS ENABLED WITH NO PROOF OF RUN.  
**HIGH SPACE TEMPERATURE:** 100 DEG F (ADJUSTABLE)  
**LOW SPACE TEMPERATURE:** 50 DEG F (ADJUSTABLE)  
**EMPTY FAN PROOF OF RUN**

**SEQUENCE OF OPERATION: INFRARED RADIANT HEATERS (AB-IR-01 AND AB-IR-02)**

INFRARED RADIANT HEATERS AB-IR-01 AND AB-IR-02 ARE LOCATED IN THE WAREHOUSE OF THE ADMIN BUILDING. THEY ARE SIZED TO MAINTAIN A SURFACE TEMPERATURE OF 90 F.

**START/STOP:**  
THE INFRARED RADIANT HEATERS AB-IR-01 AND AB-IR-02 SHALL OPERATE AS FOLLOWS. UPON A CALL FOR HEAT, THE NATURAL GAS SHUTOFF VALVE FOR AB-IR-01 AND AB-IR-02 SHALL OPEN, THE MAIN BURNER CIRCUIT SHALL ENERGIZE AND THE BURNER WILL FIRE TO MAINTAIN A SURFACE TEMPERATURE AT THE BLACK BULL THERMOSTAT OF 60 F (ADJUSTABLE).

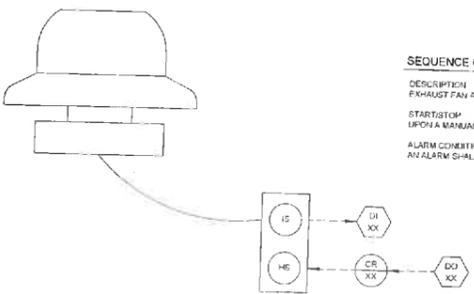


**SEQUENCE OF OPERATION: CONSTANT VOLUME EXHAUST FAN (AB-EF-01)**

**DESCRIPTION:**  
EXHAUST FAN AB-EF-01 IS LOCATED ON THE ROOF OF THE ADMIN BUILDING AND SERVES THE RESTROOMS, LOCKER ROOMS, AND JANITOR CLOSET.

**START/STOP:**  
UPON A MANUAL COMMAND TO START THE EXHAUST FAN SHALL ENERGIZE AND RUN CONTINUOUSLY.

**ALARM CONDITIONS:**  
AN ALARM SHALL BE SENT TO THE BMS IF THE FAN IS ENABLED WITH NO PROOF OF RUN.



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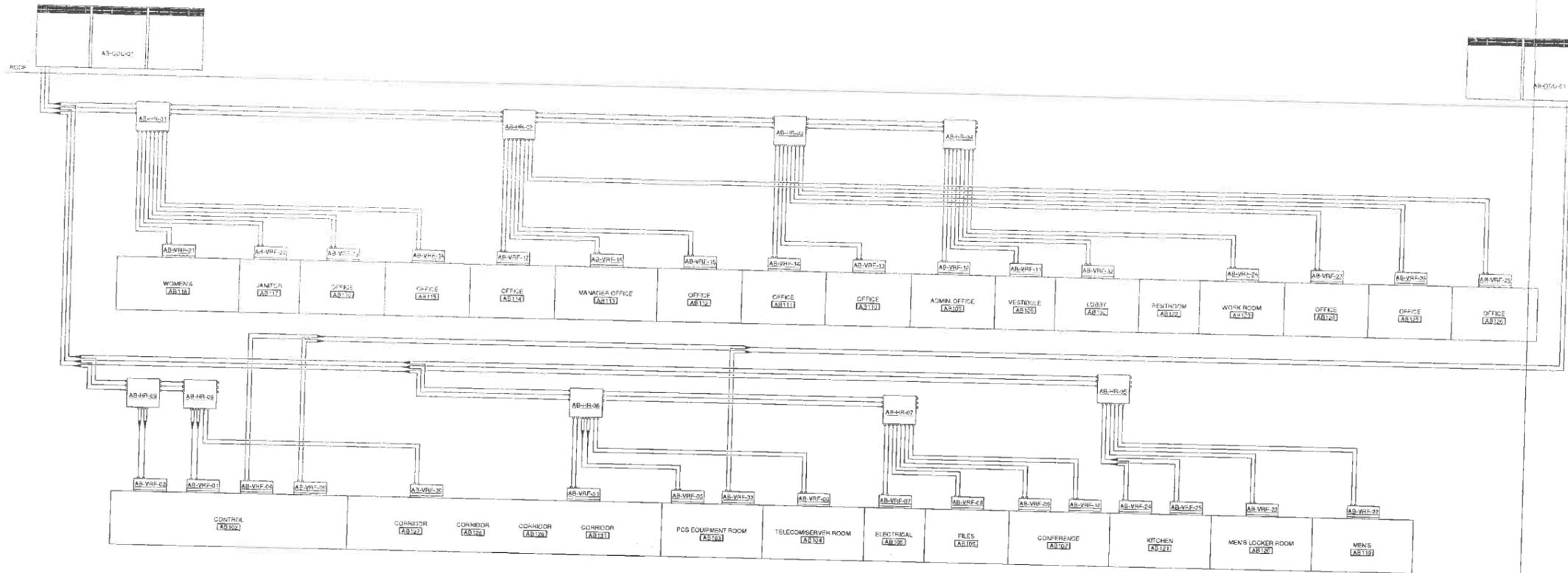
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913.492.0400 www.gbainc.com

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001 - ADMINISTRATION BUILDING  
MECHANICAL HVAC FACILITY INSTRUMENTS & CONTROLS

DRAWING NUMBER  
2014-087-001-BM5.02





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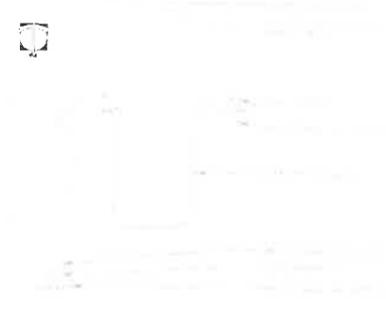
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**GBA P.A.**  
Association  
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Lenexa, Kansas 66219  
913.482.2800 www.gbam.com

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001 - ADMINISTRATION BUILDING  
MECHANICAL VRF SYSTEM DIAGRAM

DRAWING NUMBER  
2014-087-001-BM6.01



BP2.01  
C. J. AX

PLUMBING ABBREVIATIONS

PLUMBING SYMBOLS

1.1	WATER	W	WATER
1.2	SEWER	S	SEWER
1.3	VENT	V	VENT
1.4	CONDENSATE	C	CONDENSATE
1.5	RAIN	R	RAIN
1.6	REFRESHING AIR	RA	REFRESHING AIR
1.7	EXHAUST AIR	EA	EXHAUST AIR
1.8	EXHAUST AIR	EA	EXHAUST AIR
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STANDARD SYMBOLS

1.1	WATER	W	WATER
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1.3	VENT	V	VENT
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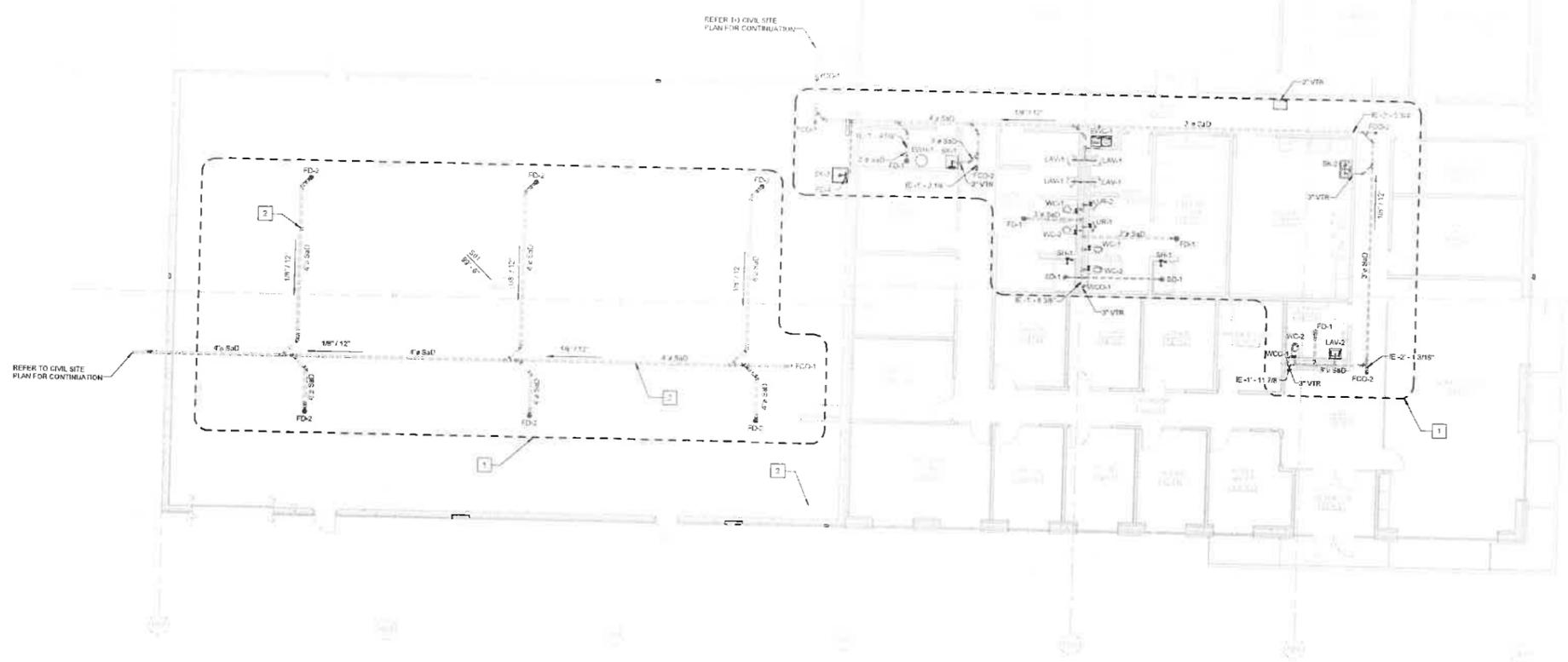
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DESIGN BY: [Name]      DRAWN BY: [Name]      CHECKED BY: [Name]      DATE: 06/07/16  
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**Invenergy**  
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 Lenexa, Kansas 66219  
 913-882-8400    www.gbaa.com

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 PLUMBING ABBREVIATIONS & SYMBOLS  
 DRAWING NUMBER  
 2014-087-001-BP.00



**PLUMBING FLOOR PLAN - SANITARY & VENT SYSTEM**

BP1.11 SCALE: 1/8" = 1'-0"



- GENERAL NOTES**
1. ALL HORIZONTAL SANITARY PIPES GREATER THAN 2" IN DIAMETER SHALL BE SUPPORTED AT A MINIMUM OF 1" PER FT. UNLESS NOTED OTHERWISE. ALL PIPES LESS THAN OR EQUAL TO 2" SHALL BE RIGID AT A MINIMUM OF 1/4" PER FT. UNLESS NOTED OTHERWISE.
  2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FOR ALL FEES AND FOR OBTAINING ALL APPLICABLE REGULATIONS GOVERNING THE WORK.
  3. INSTALL FLOOR UPSETS AND PLUMBING FIXTURES PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR FINISHED FLOOR ELEVATIONS.
  4. REFERENCE DRAWING BP100 FOR PLUMBING FIXTURE SCHEDULES.
  5. ALL PIPE ELEVATIONS ARE TO INVERT BOTTOM OF PIPE RELATIVE TO FIRST FLOOR.
  6. REFERENCE DRAWING BP200 FOR ISOMETRIC SANITARY AND VENT PIPER.

- CONSTRUCTION NOTES**
1. REFER TO SANITARY DRAIN/VENT ISOMETRIC RISER DETAIL 1 ON SHEET BP200 FOR PLUMBING FIXING LAYOUT IN OUTLETS AREAS.
  2. ALL UNDER FLOOR DRAINAGE PIPING SHOWN BY WAREHOUSE IS FOR REFERENCE ONLY. THE FINAL DESIGN AND INSTALLATION IS BY NEWBY.

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**GBA P.A.**  
Association  
8951 River Boulevard  
Lenexa, Kansas 66215  
781.892.5800 www.gbaa.com

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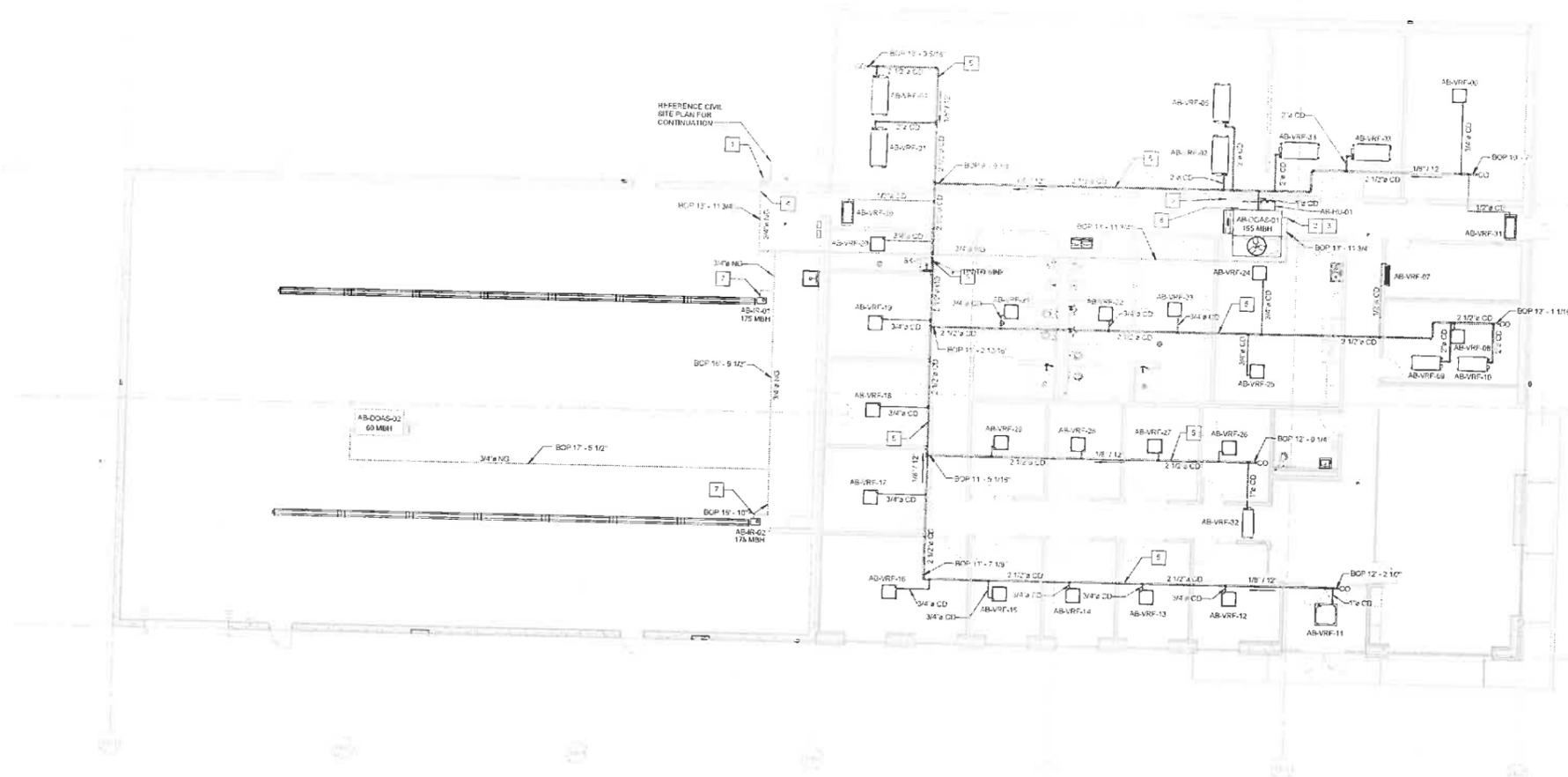
001 - ADMINISTRATION BUILDING  
PLUMBING FLOOR PLAN - SANITARY VENT SYSTEM

DRAWN BY: HANSEN  
2014-087-001-BP1.11



**PLUMBING FLOOR PLAN - NATURAL GAS & CONDENSATE DRAIN PIPING**

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



**GENERAL NOTES**

1. ALL HORIZONTAL CONDENSATE PIPES LARGER THAN 2" DIAMETER SHALL BE SLOPED AT A MINIMUM OF 1/8" PER 1' UNLESS NOTED OTHERWISE. ALL PIPES SHALL BE SLOPED AT A MINIMUM OF 1/4" PER 1' UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS REGARDING ALL FEES, AND FOR OBTAINING ALL NECESSARY APPROVALS REGARDING THE WORK.
3. INSTALL H FOR DRAINS AND PLUMBING FIXTURES PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR FINISHED FLOOR ELEVATIONS.
4. REFER TO DRAWING 001-00 FOR PLUMBING FIXTURE SCHEDULES.
5. ALL H/F ELEVATIONS ARE TO INVERT BOTTOM OF PIPE RELATIVE TO FIRST FLOOR.
6. REFER TO DRAWING 002-00 FOR ISOMETRIC NATURAL GAS AND CONDENSATE PIPING.

**CONSTRUCTION NOTES**

1. GAS METER 305 MBH TOTAL LOAD (REGULATE TO 5 PSI GAS PRESSURE).
2. ROUTE 3/4" GAS LINE UP THRU ROOF TO MAKE UP AIR UNIT (MUA 1) AND MAKE CONNECTION ON UNIT. PROVIDE GAS SHUT-OFF VALVE AND GAS PRESSURE REGULATING VALVE PER MANUFACTURER'S RECOMMENDATIONS.
3. REFER TO ARCHITECTURAL SHEET FOR PIPE THRU ROOF CURB INSTALLATION REQUIREMENTS.
4. ROUTE 1 1/2" GAS PIPING THRU EXTERIOR WALL ABOVE 11 OUR SLAB. EXTEND 1 1/2" GAS PIPING UP AND WALL TO ELEVATION SHOWN.
5. 2" GRAVITY CONDENSATE DRAIN LINE. SLOPE DRAIN LINE @ 1/8" PER FOOT. REFERENCE ISOMETRIC PIPING FOR SLOPE ON SHEET 002-00.
6. DROP 2 1/2" GRAVITY CONDENSATE DRAIN LINE DOWN AT OING WALL AND DAYLITE INTO MOP SINK (SINK 1). PROVIDE MINIMUM 3" AIR GAP ABOVE RESERVOIR OF MOP SINK.
7. DROP GAS LINE AS SHOWN ON PLAN DOWN TO RADIANT HEATER AND MAKE CONNECTION. REFER TO DETAIL 4 ON SHEET 002-00 FOR ADDITIONAL INFORMATION.
8. FURNISH AND INSTALL THERM-O-MECA-TECH 1/2" DIAMETER TEMPERING VALVE (TV) CONNECTED TO 1" CONDENSATE OUTLET FROM HEATER AND 1/2" COLD WATER SHOWN ON SHEET 002-00. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. ROUTE 1" CONDENSATE FROM TV TO CONDENSATE PUMP. AB-FU-01.
9. FURNISH AND INSTALL CONDENSATE PUMP AB-FU-01. WALL MOUNT UNIT ABOVE CEILING. PUMP SHALL BE LITTLE GIANT MODEL WPC-5 OR APPROVED EQUAL.

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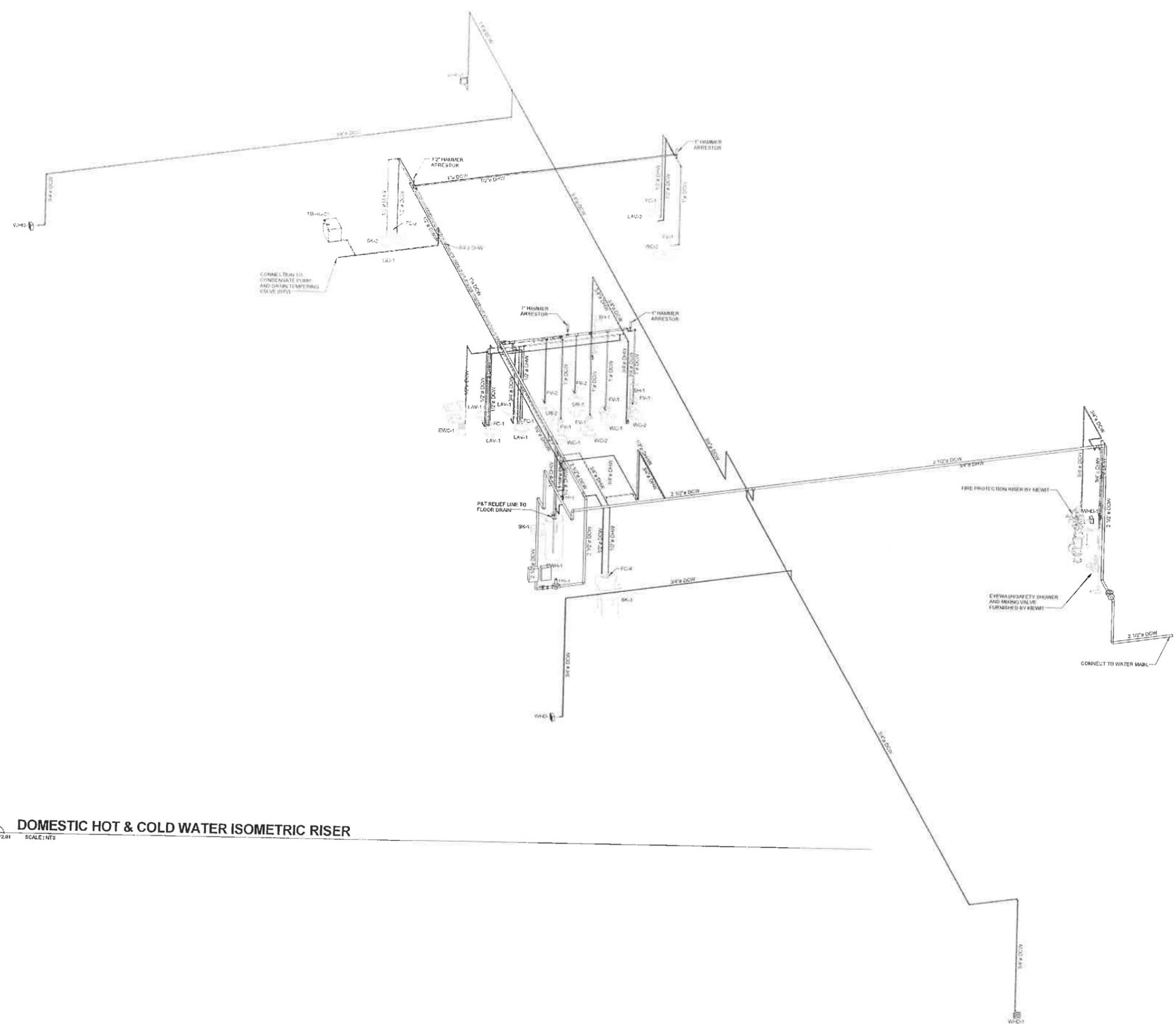
**GBA P.A.**  
Association  
8031 Renner Boulevard  
Lincoln, Kansas 66219  
913.867.0000 www.gbapla.com

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001 - ADMINISTRATION BUILDING  
PLUMBING PLAN - GAS AND CONDENSATE SYSTEM

DRAWING NUMBER  
2014-087-001-BP1.13





**DOMESTIC HOT & COLD WATER ISOMETRIC RISER**  
 SCALE: NTS

- GENERAL NOTES**
1. THE CONTRIBUTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS, PAYING ALL FEES AND FOR OTHERWISE COMPLYING WITH ALL APPLICABLE REGULATIONS GOVERNING THE WORK.
  2. INSTALL ALL WORK AND FINISHES IN ACCORDANCE WITH THE RELEVANT REVISIONS TO THE ARCHITECTURAL DRAWINGS AND FINISHED FLOOR ELEVATIONS.
  3. REFER TO DRAWING SP-1 FOR PLUMBING FIXTURE SCHEDULES.
  4. REFER TO DRAWING SP-2 FOR SANITARY AND VENTILATION RISER.
  5. REFER TO DRAWING SP-1 FOR PIPE ELEVATIONS.

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No.	Description	Date

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 LAKSHANEE ENGINEERING CONSULTANTS

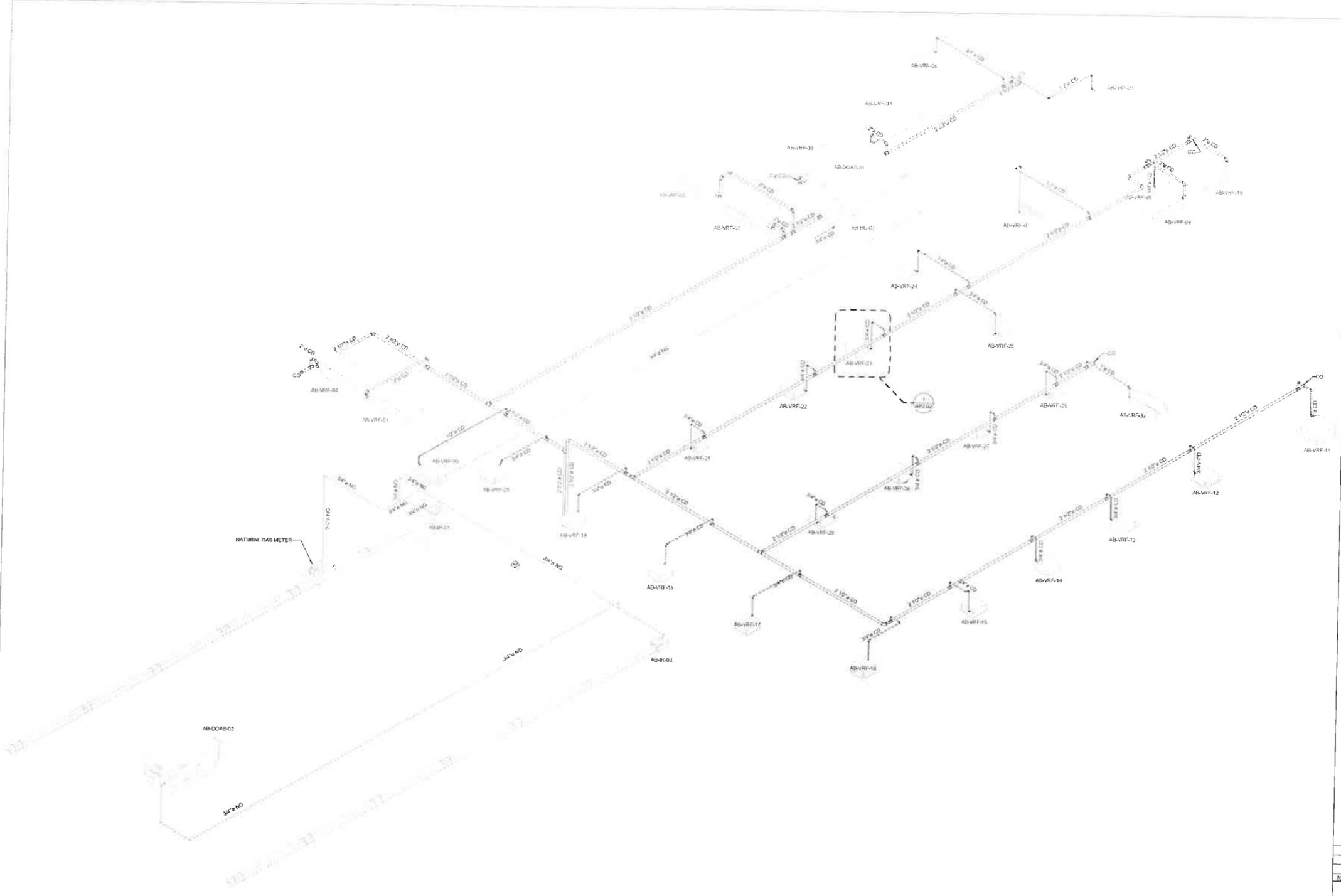
**Invenergy**  
 KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
 Association  
 3023 Kiewit Boulevard  
 Lenexa, Kansas 66219  
 816.492.0101 www.gba.org

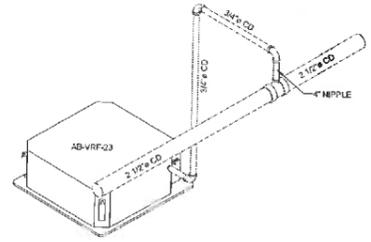
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001 - ADMINISTRATION BUILDING  
 DOMESTIC HOT & COLD WATER ISOMETRIC RISER

DRAWING NUMBER  
**2014-087-001-BP2.01**



**NATURAL GAS AND CONDENSATE PIPING ISOMETRIC RISER**  
 SCALE: NTS



**CONDENSATE CONNECTION DETAIL**  
 SCALE: NTS

- GENERAL NOTES**
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS, PAYING ALL FEES AND FOR OTHERWISE COMPLYING WITH ALL APPLICABLE REGULATIONS GOVERNING THE WORK.
  2. INSTALL FLOOR DRAINS AND PLUMBING FIXTURES PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR FLOOR FINISH ELEVATIONS.
  3. REFERENCE DRAWING BP2-04 FOR PLUMBING FIXTURE SCHEDULES.
  4. REFERENCE DRAWING BP1-13 FOR PIPE ELEVATIONS.

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Lockman Engineering Center LLC  
**Invenergy**

KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
 Association  
 3651 Renner Boulevard  
 Lenexa, Kansas 66219  
 913.492.9400 www.gbainc.com

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001 - ADMINISTRATION BUILDING  
 GAS & CONDENSATE DRAIN ISOMETRIC RISER

DRAWING NUMBER  
 2014-087-001-BP2.02





LIGHT FIXTURE SCHEDULE									
CALLOUT	SYMBOL	LAMP	DESCRIPTION	DRIVER/RECIPIENT	MOUNTING	MODEL	WATTAGE	VOLTS	NOTES
A		LED	GENERAL PURPOSE LED TRIMMER 2'x4' 4x12 LENS (4000K)	ELECTRONIC	CEILING	QVLS 4.0BL MULT 221 1742	15.0	120V	
B		LED	GENERAL PURPOSE LED TRIMMER 2'x4' 4x12 LENS (5000K)	ELECTRONIC	CEILING	QVLS 4.0BL MULT 221 1742	15.0	120V	
C		LED	GENERAL PURPOSE LED TRIMMER 2'x4' 4x12 LENS (5000K)	ELECTRONIC	CEILING	QVLS 4.0BL MULT 221 1742	15.0	120V	
E1		LED	EMERGENCY EXIT LIGHT (COMBO) (RECESSED) MOUNT AT 1'0" ABOVE CENTER OF WORK HEAD	ELECTRONIC	WALL	LH201 LED RHO	7.5	120V	
E2		LED	REMOTE EXPRESS LIGHT MOUNT AT 8'-0" AFF	ELECTRONIC	WALL	EL 4 T 5 (20W) 0259	7	120V	
E4		LED	EMERGENCY EXIT LIGHT (COMBO)	ELECTRONIC	CEILING	LH201 LED RHO	7.5	120V	
EM1		LED	EMERGENCY LIGHT MOUNT AT 8'-0" AFF	ELECTRONIC	WALL	EL 4 T 5 (20W) 0259	7	120V	
F		LED	TRACK LED FIXTURE WITH 2000 K NOMINAL LEMENS WIDE DISTRIBUTION AND 4000 K LENS LENS (5000K)	ELECTRONIC	SUSPENDED RECIPIENT	EATON 4 JULED 104 12-7AUR 24S 5421 1	1.5	120V	
G		LED	EXTERIOR LED WALL PACK MOUNT AT 17'-0" AFF	ELECTRONIC	WALL	QVLS 4.0BL WALL PACK	36.0	120V	
L		LED	RECESSED DOWNLIGHT FIXTURE (SHOWER)	ELECTRONIC	CEILING	EATON 4 JULED 104 12-7AUR 24S 5421 1	1.5	120V	
M		LED	PENDANT MOUNT LINEAR LED DIRECT/INDIRECT FIXTURE	ELECTRONIC	PENDANT	COOPER #4380 104 54W 4L UNV L840 00 5 0	24	120V	
N		LED	EXTERIOR LED WALL PACK MOUNT AT 17'-0" AFF	ELECTRONIC	WALL	QVLS 4.0BL WALL PACK	36.0	120V	
P		LED	PENDANT MOUNT INDUSTRIAL LIGHT FIXTURE	ELECTRONIC	PENDANT	COOPER #4380 104 54W 4L UNV L840 00 5 0	24	120V	

NOTE: ALL LIGHTING DESIGNED AROUND LITHONIA LIGHTING LIGHT FIXTURES. (WILL ACCEPT EX-ENGINEER APPROVED EQUAL BY COOPER LIGHTING OR H.E. WILLIAMS LIGHTING)

SWITCH SCHEDULE				
CALLOUT	SYMBOL	NOTE 1	NOTE 2	NOTE 3
TIMMER SWITCH		MOUNT BOTTOM @ 24" AFF		
FOURWAY SWITCH		MOUNT BOTTOM @ 48" AFF		
GENERAL SWITCH		MOUNT BOTTOM @ 48" AFF		
OCCUPANCY SENSOR O1		SENSOR WALL SWITCH	COOPER #4380 104 54W 4L UNV L840 00 5 0	MODEL # 4380 104 54W 4L UNV L840 00 5 0
OCCUPANCY SENSOR O2		CEILING MOUNT WITH HOOPER PACK (MODEL # 4380 104 54W 4L UNV L840 00 5 0) PER ROOM	WIRE PER WIRING SCHEDULE (SEE DRAWINGS) PER ROOM	MODEL # 4380 104 54W 4L UNV L840 00 5 0
OCCUPANCY SENSOR O3		CEILING MOUNT WITH HOOPER PACK (MODEL # 4380 104 54W 4L UNV L840 00 5 0) PER ROOM	WIRE PER WIRING SCHEDULE (SEE DRAWINGS) PER ROOM	MODEL # 4380 104 54W 4L UNV L840 00 5 0
THREEWAY SWITCH		MOUNT BOTTOM @ 48" AFF		

RECEPTACLE SCHEDULE						
CALLOUT	SYMBOL	NEMA	VOLTS	NOTE 1	NOTE 2	NOTE 3
CEILING OUTLET DUPLEX		5-20R	120V 1P 2W	PRINCE'S CEILING MOUNTED 500W 1P OUTLET FOR TV	* VERIFY CONNECTION POINT WITH OWNER	
DUPLEX		5-20R	120V 1P 2W	MOUNT @ BOTTOM 18" AFF. UNLESS OTHERWISE NOTED		
FLOOR BOX COMMUNICATION POWER/DATA		5-20R	120V 1P 2W	2 DUPLEX OUTLETS PROVIDED	2 DATA OUTLETS PROVIDED	* VERIFY CONNECTION POINT WITH OWNER
GFCI DUPLEX		20 AMP GFCI	120V 1P 2W	MOUNT @ BOTTOM 18" AFF. UNLESS OTHERWISE NOTED	* VERIFY WATER COOLER LOCATION WITH MECHANICAL CONTRACTOR	
QUAD		5-20R	120V 1P 2W	MOUNT @ BOTTOM 18" AFF. UNLESS OTHERWISE NOTED		
WEATHERPROOF DUPLEX		20 AMP WEATHER RESISTANT GFCI	120V 1P 2W	MOUNT BOTTOM @ 24" AFF	PROVIDE METAL WEATHERPROOF # USE COVER W/ WEATHER RESISTANT GFCI	

DATA SCHEDULE			
SYMBOL	NOTE 1	NOTE 2	NOTE 3
	MOUNT @ BOTTOM 18" AFF. UNLESS OTHERWISE NOTED	SINGLE GANG 2 PORT DATA (2 CAT 5A) PROVIDED	* VERIFY REQUIREMENTS WITH OWNER FOR FLOORBOX LOCATION
	TELEVISION COMMUNICATION CONNECTION(S)	SINGLE GANG 2 PORT DATA (1 CAT 5A & 1 RG6 COAX) PROVIDED	PROVIDE CONNECTION FROM CEILING MOUNT. VERIFY REQUIREMENTS WITH DCB VENDOR

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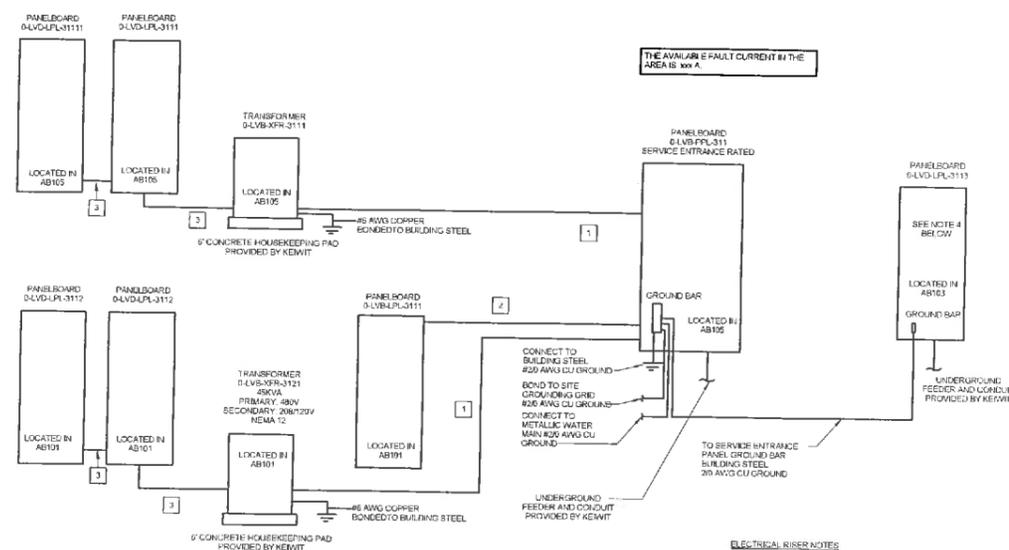
No.	Description	Date		
REV	WEY DEKIN BY	WEY DRAWN BY	FWL CHECKED BY	06/07/16 DATE
Lakavanna Energy Center LLC				
<b>Invenergy</b>				
KIEWIT POWER CONSTRUCTORS CO.				
<b>GBA P.A.</b> Association 2801 Renner Boulevard Lynchburg, VA 24502 434.802.2803 www.gbapain.com			<b>NOT FOR CONSTRUCTION</b>	
001 - ADMINISTRATION BUILDING LIGHT FIXTURE AND DEVICE SCHEDULES				
DRAWING NUMBER 2014-087-001-BE0.01				

**PANEL SCHEDULE**

CALLOUT	TOTAL CONNECTED KVA	TOTAL CALCULATED KVA	TOTAL CONNECTED AMPS	TOTAL (PHASE) AMPS	VOLTS	BUS BARS	MAIN DISCONNECT TYPE	THEIR RATING	NEUTRAL	PANEL NEUTRAL	POLES	LOUIS	NOTE 1	AC RATING	UPSTREAM OCP	FEEDER TYPE	UPSTREAM DEVICE	UPSTREAM BREAKER AND FAULTS
04-VB-PP-011	276	276	719	723	480 3P 3W	402	BREAKER	402	SURFACE	120%#	42	STANDARD	NEMA 1	15 000	400	BY OTHERS	04-VB-SW-11-02-11-08	1200
04-VB-PP-011	25.9	25.9	31	31	480 3P 3W	225	W/O		SURFACE	100%	52	STANDARD	NEMA 1	65 000	225	2" C 4000 400 N 400	04-VB-PP-011	225
04-VB-PP-011	25.9	25.9	31	31	208/120 3P 3W	225	BREAKER	225	SURFACE	100%	44	STANDARD	NEMA 1	22 000	225	2" C 4000 400 N 400	04-VB-PP-011	225
04-VB-PP-012	18.9	18.9	51	52	208/120 3P 3W	225	BREAKER	225	SURFACE	100%	44	STANDARD	NEMA 1	22 000	225	2" C 4000 400 N 400	04-VB-PP-012	225
04-VB-PP-013	5.5	5.5	23	23	120/120	225	HURTS SWITCH	225	SURFACE	100%	42	STANDARD	NEMA 1	22 000	225	BY OTHERS	04-VB-PP-013	225

**TRANSFORMER SCHEDULE**

CALLOUT	TOTAL CONNECTED KVA	TOTAL CALCULATED KVA	TOTAL CONNECTED AMPS	TOTAL CALCULATED AMPS	N/A	PRIMARY VOLTS	SECONDARY VOLTS	NUMBER OF PHASES	NOTE 1	SECONDARY BREAKER SIZE (Amps)	UPSTREAM OCP	FEEDER SIZE	UPSTREAM DEVICE	UPSTREAM CIRCUIT	UPSTREAM BREAKER AND FAULTS
04-VB-TR-011	29.9	29.9	36	36	45	480 3P 3W	208/120V 3P 4W	1	NEMA 1	75 000	75	1" C 304 400	75	03-PL-109-0561-19-21-23	200
04-VB-TR-012	18.9	18.9	22	23	45	480 3P 3W	208/120V 3P 4W	1	NEMA 1	22 000	75	1" C 304 400	75	03-PL-103-0501-19-22-24	700



- ELECTRICAL RISER NOTES:**
1. PROVIDE THE FOLLOWING SIGNAGE AT THE SERVICE ENTRANCE PANEL 04-VB-PP-011. ENTRANCE PANEL 04-VB-PP-011 IS ONE OF TWO SERVICES INTO THE BUILDING. THE OTHER IS THE UPS PANEL 04-VB-PP-013 LOCATED DGCS 101.
  2. PROVIDE THE FOLLOWING SIGNAGE AT THE SERVICE UPS PANEL 04-VB-PP-013. UPS PANEL 04-VB-PP-013 IS ONE OF TWO SERVICES INTO THE BUILDING. THE OTHER IS TO THE PANEL 04-VB-PP-011 LOCATED ELECTRICAL 101.
  3. THE ELECTRICAL CONTRACTOR SHALL VERIFY IF A NEUTRAL GROUND BOND IS REQUIRED ON PANEL 04-VB-PP-011. COORDINATE WITH THE ENGINEER.
  4. THE UPS PANEL 04-VB-PP-013 IS FURNISHED AND INSTALLED BY THE CLIENT. COORDINATE WITH THE ENGINEER.
  5. CONTRACTOR SHALL DETERMINE THE GROUNDING ARRANGEMENT FOR THE SOURCE OF ELECTRICITY SERVING THE BUILDING. IF THE BUILDING IS SERVED BY A SERVICE ON DEDICATED TRANSFORMER, PANEL 04-VB-PP-011 SHALL BE SERVICE RATED AND INCLUDE A NEUTRAL GROUND BONDING JUMPER. OTHERWISE THE CIRCUIT SHALL BE CONSIDERED A FEEDER. FEEDERS MUST INCLUDE AN EQUIPMENT GROUNDING CONDUCTOR AND THE MAIN PANEL SHALL NOT BE SERVICE RATED.

**FEEDER SCHEDULE**

ID	FEEDER AMPS	CONDUIT AND FEEDER	FEEDING THESE DEVICES
1	70	1" C 304 400	06-PP-114-0571 05-PP-114-0503
2	225	2" C 3040 400	00-PP-103-0503
3	175	2" C 4000 400 N 400	00-PP-114-0501 03-PP-114-0503

SIZING METHOD: COPPER, 90 C 412 THROUGH 407, 75 C 10 AND ABOVE

**ELECTRICAL ONE-LINE DIAGRAM**

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

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2	DRAWN BY	DATE
3	CHECKED BY	DATE

Lakeland Engineering LLC  
**Invenergy**  
 KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
 Association  
 9801 Renner Boulevard  
 Lenexa, Kansas 66215  
 913.622.3400 www.gbapaa.com

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001 - ADMINISTRATION BUILDING  
 EQUIPMENT SCHEDULE AND ONE-LINE DIAGRAM

DRAWING NUMBER  
 2014-087-001-BE0.02

EQUIPMENT SCHEDULE							
UNIT	SYMBOL	VOLTS	AMPS	KVA	HP	COMPONENT	DISCONNECT SUPPLIED BY
AB-R-01		120 1P 2W	1			P-114-5501-12	
AB-R-02		120 1P 2W	1			P-114-5501-12	
AB-ODU-01		480 3P 3W	25	23.4		P-109-5501-7, 9, 11	80A FUSED AT 80A
AB-EX-01		480 3P 3W	4	3.3		P-109-5501-7, 9, 11	80A FUSED AT 80A
AB-VRF-01		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-02		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-03		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-04		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-05		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-06		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-07		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-08		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-09		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-10		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-11		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-12		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-13		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-14		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-15		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-16		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-17		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-18		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-19		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-20		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-21		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-22		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-23		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-24		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-25		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-26		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-27		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-28		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-29		208 1P 2W		0.300		P-114-5501-3, 5	
AB-VRF-30		208 1P 2W		0.300		P-114-5501-13, 15	
AB-VRF-31		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-32		208 1P 2W		0.300		P-114-5501-2, 4	
AB-VRF-33		208 1P 2W		0.300		P-114-5501-2, 4	
AB-HR-01		208 1P 2W		0.300		P-114-5501-13, 15	
AB-HR-02		208 1P 2W		0.300		P-114-5501-3, 5	
AB-HR-03		208 1P 2W		0.300		P-114-5501-13, 15	
AB-HR-04		208 1P 2W		0.300		P-114-5501-13, 15	
AB-HR-05		208 1P 2W		0.300		P-114-5501-3, 5	
AB-HR-06		208 1P 2W		0.300		P-114-5501-3, 5	
AB-HR-07		208 1P 2W		0.300		P-114-5501-2, 4	
AB-HR-08		208 1P 2W		0.300		P-114-5501-2, 4	
AB-HR-09		208 1P 2W		0.300		P-114-5501-2, 4	
AB-ODU-01		480 3P 3W	23.2	21.3		P-109-5501-7, 9, 11	80A FUSED AT 80A
		480 3P 4W	35.8	29.8		P-109-5501-2, 4, 6	80A FUSED AT 80A
		480 3P 4W	35.8	29.8		P-109-5501-1, 3, 5	80A FUSED AT 80A
AB-ODU-02		480 3P 3W	32	28.6		P-109-5501-7, 9, 11	80A FUSED AT 80A
		480 3P 3W	17	14.1		P-109-5501-25, 27, 29	80A FUSED AT 80A
AB-EF-01		120 1P 2W		0.864		P-114-5501-31	80A FUSED AT 80A
AB-SF-01		120 1P 2W		0.529		P-114-5501-17	80A FUSED AT 80A
AB-SF-02		120 1P 2W		0.529		P-114-5501-18	80A FUSED AT 80A
AB-L-01		120 1P 2W		0.200		P-114-5501-15	
AB-L-02		120 1P 2W		0.200		P-114-5501-15	

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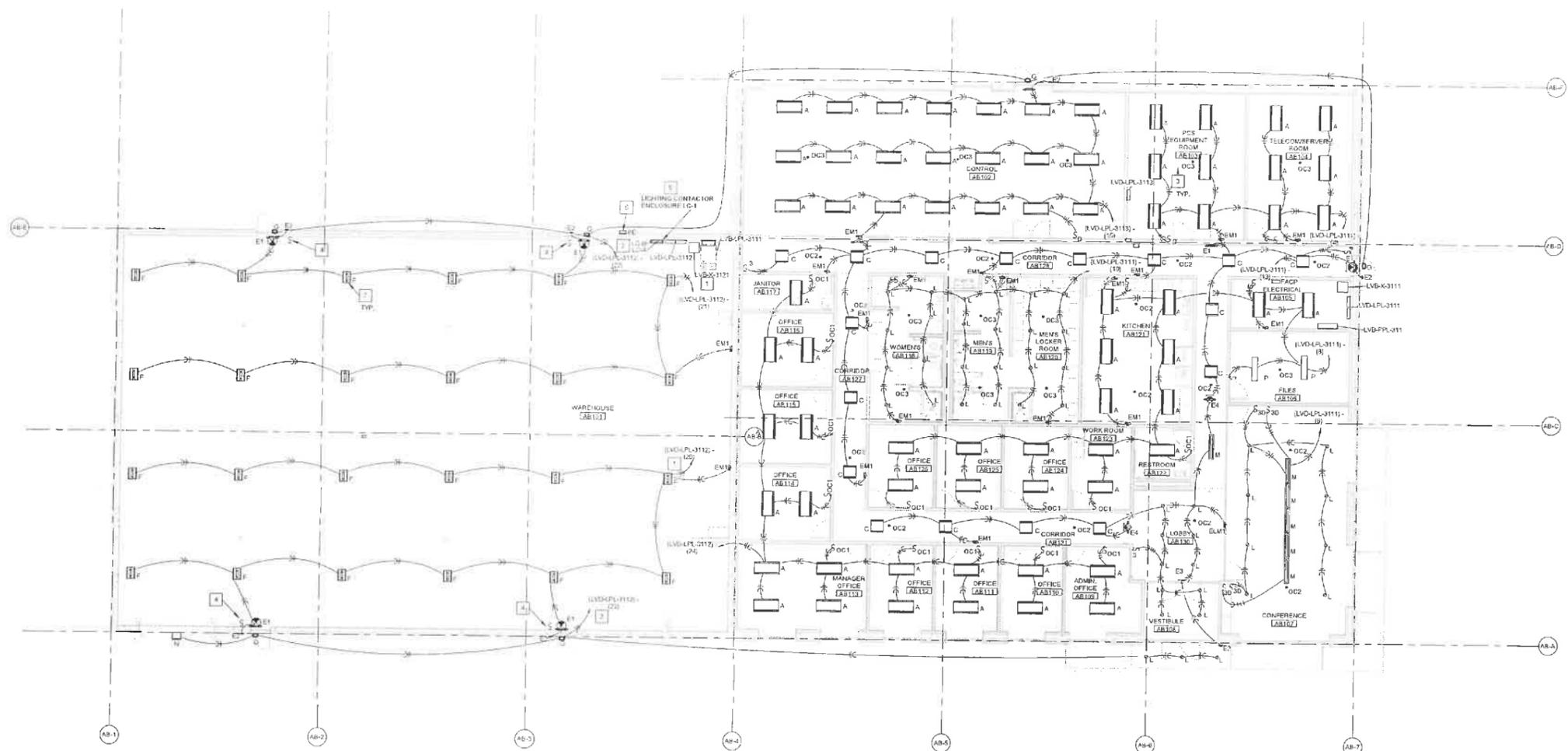
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001 - ADMINISTRATION BUILDING  
EQUIPMENT SCHEDULE

DRAWING NUMBER  
2014-087-001-BE0.03







**LIGHTING FLOOR PLAN**  
 1 BE1.11 SCALE: 1/8" = 1'-0"



**PANEL SCHEDULE & TRANSFORMER NAME ABBREVIATIONS SCHEDULE**

PANEL NAME	PANEL NAME ABBREVIATION
ELV-PPL-311	ELV-PPL-311
ELV-LPL-3111	ELV-LPL-3111
ELV-LPL-3112	ELV-LPL-3112
ELV-LPL-3113	ELV-LPL-3113
ELV-LPL-3114	ELV-LPL-3114
ELV-LPL-3115	ELV-LPL-3115

- CONSTRUCTION NOTES:**
1. LIGHTING CIRCUIT TO BE CONTROLLED BY LIGHTING CONTROLLER L.C. REFER TO DETAIL 1 ON DRAWING E3.00.
  2. EXTERIOR LIGHTING CIRCUIT TO BE CONTROLLED BY LIGHTING CONTROLLER L.C. AND PHOTOCELL. REFER TO DETAIL 2 ON DRAWING E3.00.
  3. FOR ON-OFF SPACED SWITCH AND POWER PAKS, WIRING CONNECTIONS REFER TO DETAIL 1 ON DRAWING E3.00.
  4. LIGHT SWITCH CONTROLS THE LIGHTING CONTACTOR. REFER TO DETAIL 1 ON DRAWING E3.00.
  5. HAND/OFF/AUTO AND LIGHTING CONTACTORS LOCATED IN ENCLOSURE L.C.1. REFER TO DETAILS 1 & 2 ON DRAWING E3.00.
  6. EXTERIOR PHOTOCELLS TO BE MOUNTED NEAR EAVE HEIGHT IN LOCATION SHOWN. EXCEPT THE PHOTOCELLS TO A JUNCTION BOX AND AWAY FROM EAST. REFER TO DETAIL 2 ON DRAWING E3.00.
  7. HIGH BAY LIGHT FIXTURE TO BE MOUNTED ON RIGGED POST TO A HEIGHT OF 15' TO THE BOTTOM OF FIXTURE.

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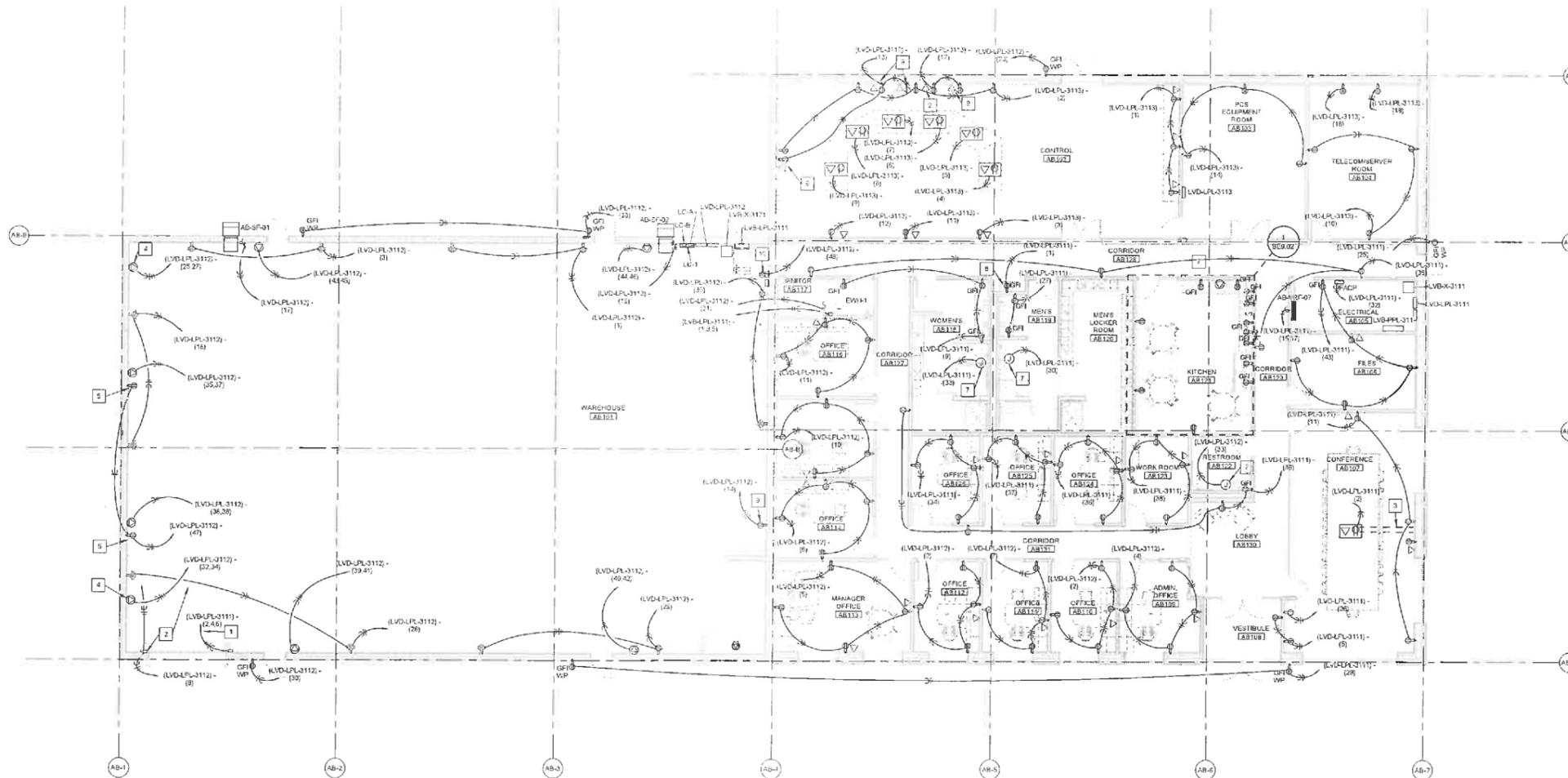
Lockman Engineering, Inc. ILL.  
**Invernergy**  
 KIEWIT POWER CONSTRUCTORS CO.

**GBA P.A.**  
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001 - ADMINISTRATION BUILDING  
 LIGHTING FLOOR PLAN

DRAWING NUMBER  
 2014-087-001-BE1.11



**POWER FLOOR PLAN**  
 BE-1.11 SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

**GENERAL NOTES**

1. ALL EXTERIOR RECEPTACLES DESIGNATED WEATHERPROOF (WP) ARE TO BE WITH WEATHERPROOF COVERPLATE.
2. REFERENCE DRAWING E-013 FOR EQUIPMENT CIRCULARITY AND CONNECTIONS.

**CONSTRUCTION NOTES**

1. 3EA. 480V, 3 PHASE DISCONNECT FOR 5TON MONORAIL CRANE POWER.
2. 2EA. 120V, 1 PHASE DISCONNECT AND JUNCTION BOX FOR OVERHEAD DOOR POWER.
3. 1B. 125' CONDUITS INSTALLED UNDERGROUND FROM FLOOR BOX TO INTERIOR WALL AND STUBBED UP ABOVE GROP CEILING FOR ROUTING COMMUNICATION CABLES FROM TV.
4. 6EA. 200V, 1 PHASE, NEMA 10-60R RECESSED RECEPTACLE FOR WELDING STATION. PROVIDE 2 1/2" HESH IN 4" CONDUIT TO FEED THIS RECEPTACLE.
5. 2EA. 120V, 1 PHASE, DUPLEX RECEPTACLE FOR WELDING PHASES 1/2 HOOK.
6. 1B. INSTALLED DUPLEX RECEPTACLE AND DATA FOR CEILING MOUNTED TV. CONDUITS TO BE ROUTED IN CONDUIT TO CONTROL DESK. REFER TO NOTE 3 ON THIS DRAWING.
7. JUNCTION BOX ABOVE CEILING WITH 120V SINGLE PHASE POWER FOR PLUMBING FIXTURE SENSORS.
8. 2EA. 120V, 1 PHASE, GFI DUPLEX RECEPTACLE FOR ELECTRIC WATER COOLER 230V.
9. 2EA. 120V RECEPTACLE AND AV OUTLET MOUNTED AT 8'-4" FOR TV/MONITOR. PROVIDE 1" CONDUIT INSTALLED UNDERGROUND FROM CONTROL DESK TO INTERIOR WALL TV OUTLET LOCATION FOR ROUTING OF CABLES TO TV'S.
10. 2EA. 120V, 1 PHASE, DUPLEX RECEPTACLE FOR FAN CONTROLLER. VERIFY LOCATION OF THE FAN PRIOR TO INSTALLATION. SEE MECHANICAL DRAWING RM1 B1.

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**Invernergy**

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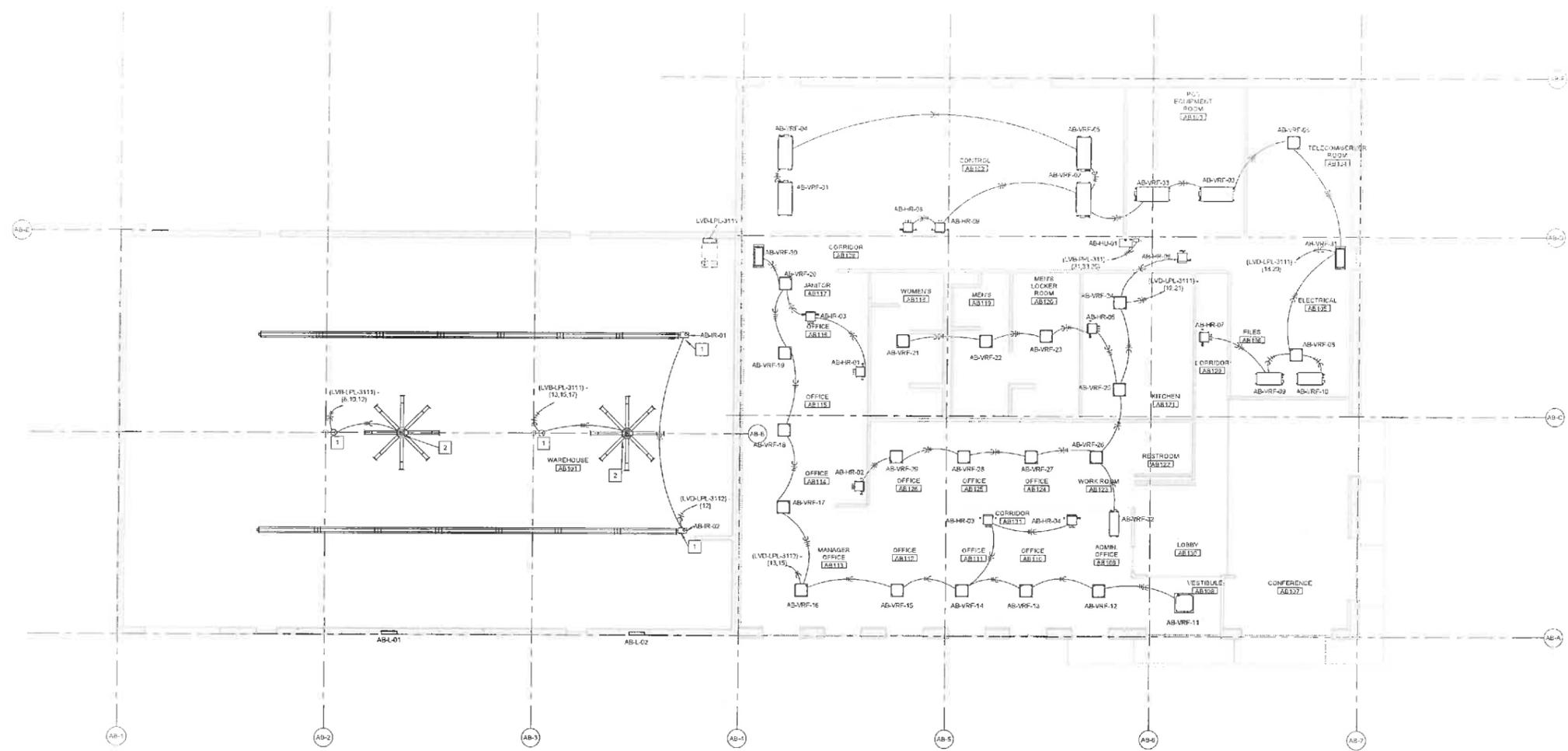
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001 - ADMINISTRATION BUILDING  
 POWER FLOOR PLAN - LEVEL 1

DRAWING NUMBER

2014-087-001-BE2.11



**POWER FLOOR PLAN ABOVE CEILING**

REF. 12 SCALE: 1/8" = 1'-0"



**GENERAL NOTES:**  
 1. REFERENCE DRAWING EA03 FOR EQUIPMENT CIRCUITRY AND DISCONNECTS.

**CONSTRUCTION NOTES:**  
 1. THE CONTRACTOR SHALL PROVIDE AND INSTALL A 3000K X 20W, 1 PHASE POWER ONLY FAN WITH 2" OF THE HEATER CONTROLLER. THE CONTROLLER COMES WITH A 3 PLUG IN CORD.  
 2. 20A 480V 3 PHASE NEMA 16-2UR TYPST-LOCK TYPE RECEPTACLE TO BE MOUNTED WITHIN 12" OF THE FAN. ROUTE THE CABLE THROUGH THE FAN TO THE FAN CONTROLLER.

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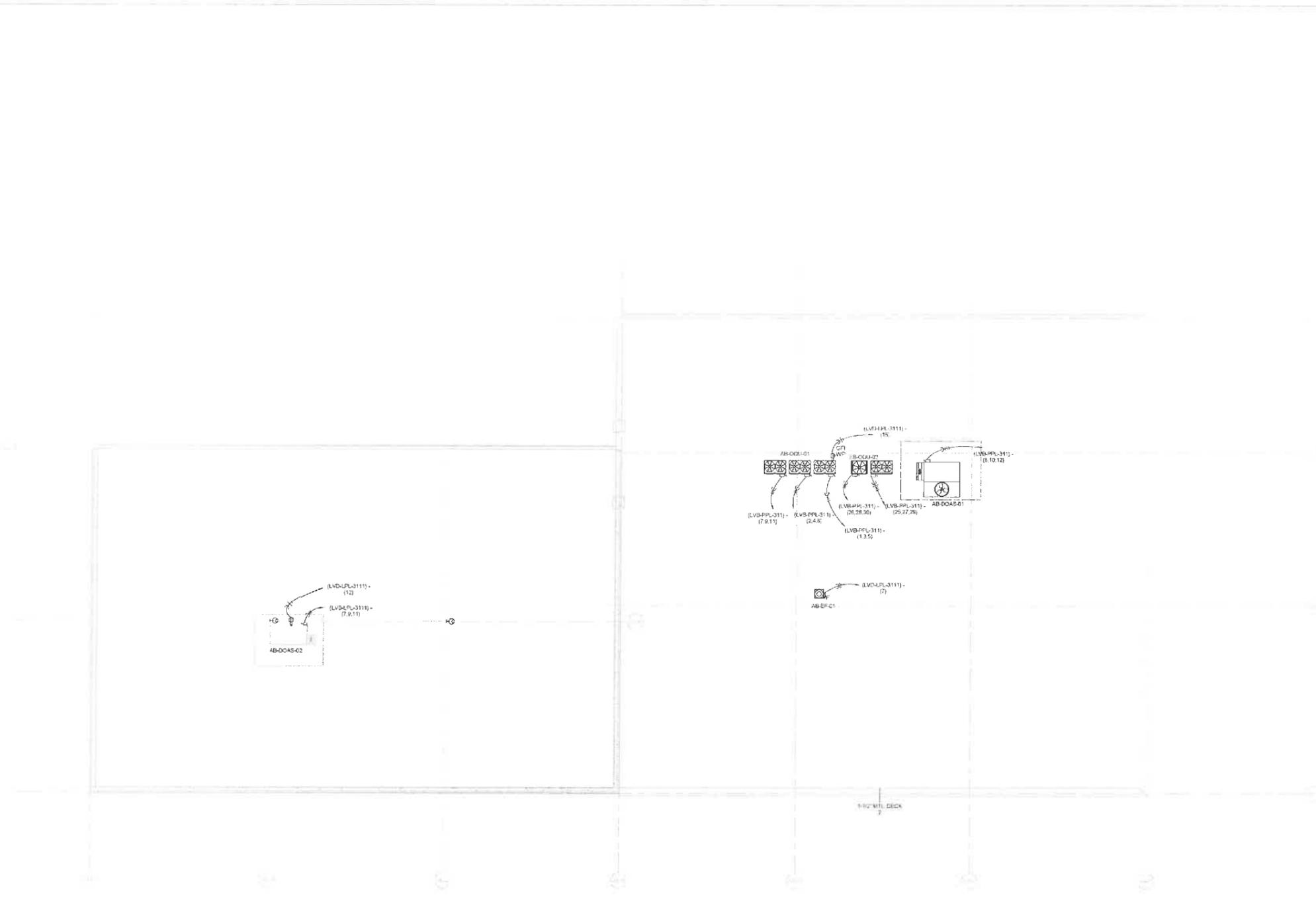
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Lackawanna Energy Center LLC  
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001 - ADMINISTRATION BUILDING  
 POWER FLOOR PLAN ABOVE CEILING  
 DRAWING NUMBER  
 2014-087-001-BE2.12



**ELECTRICAL ROOF PLAN**  
 BE2.13 SCALE: 1/8" = 1'-0"



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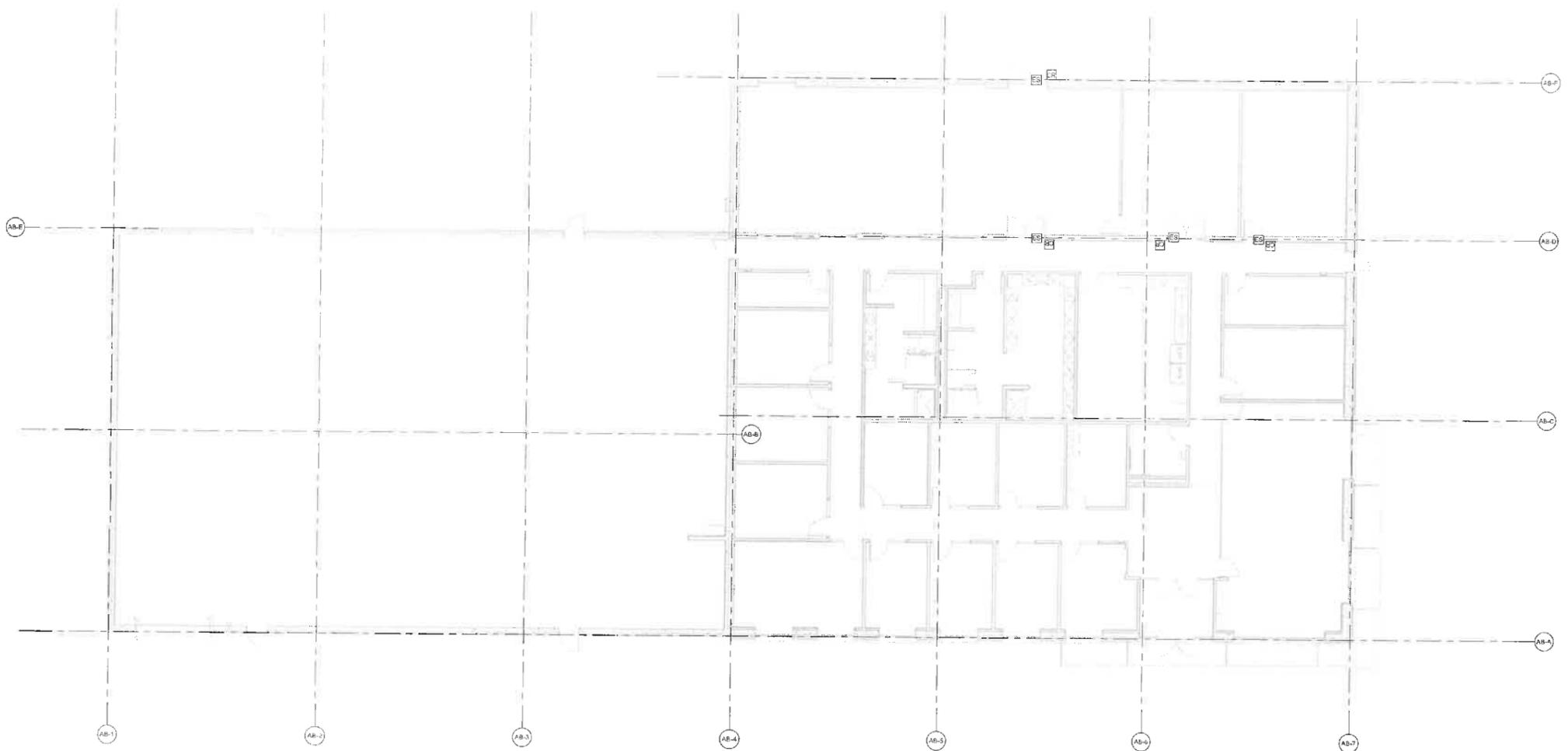
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001 - ADMINISTRATION BUILDING  
 ELECTRICAL ROOF PLAN

DRAWING NUMBER  
 2014-087-001-BE2.13



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

**SECURITY FLOOR PLAN - LEVEL 1**



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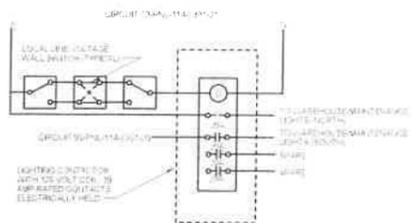
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Lockwood Green Center LLC  
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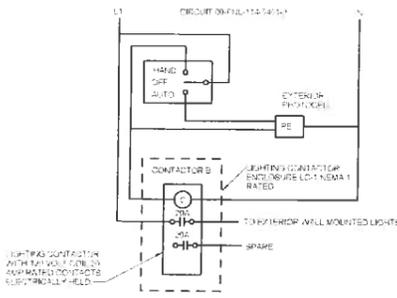
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**2014-087-001-BE4.11**



NOTE: LIGHTING CONTACTOR LOCATED IN LIGHTING CONTROL ENCLOSURE (SEE SHEET ELEC-121)

**INTERIOR LIGHTING CONTACTOR A**

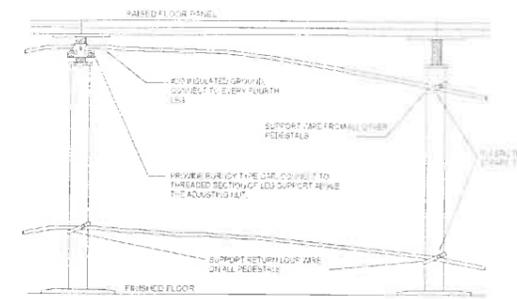
BE9.00 SCALE: 1/2" = 1'-0"



NOTE: LIGHTING CONTACTOR LOCATED IN LIGHTING CONTROL ENCLOSURE (SEE SHEET ELEC-121)

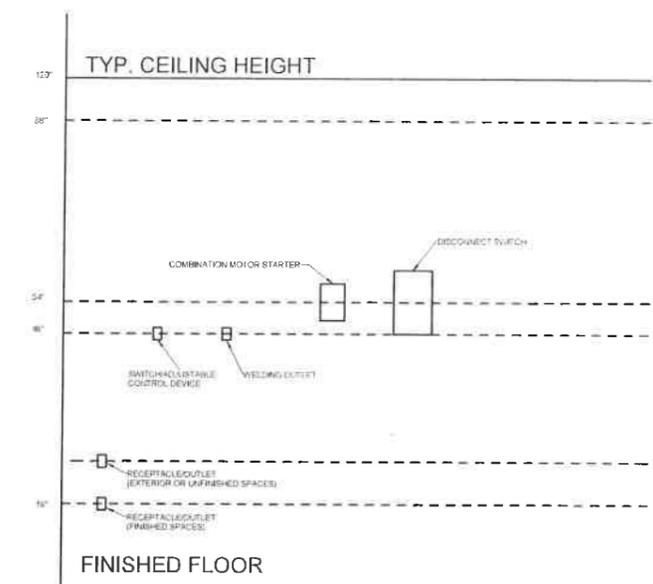
**EXTERIOR LIGHTING CONTACTOR B**

BE9.00 SCALE: 1/2" = 1'-0"



**RAISED FLOOR PEDESTAL GROUNDING CONNECTION**

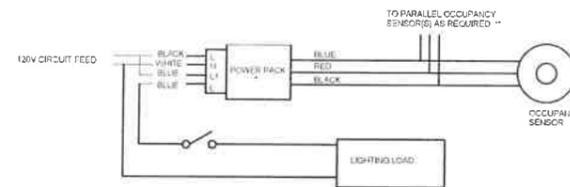
BE9.00 SCALE: 1/2" = 1'-0"



NOTE: ALL DEVICE HEIGHTS SHOWN ARE NOT TO EXCEED VALUES, UNLESS NOTED OTHERWISE. DETAIL INDICATES TYPICAL MOUNTING HEIGHTS ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

**TYPICAL MOUNTING HEIGHTS**

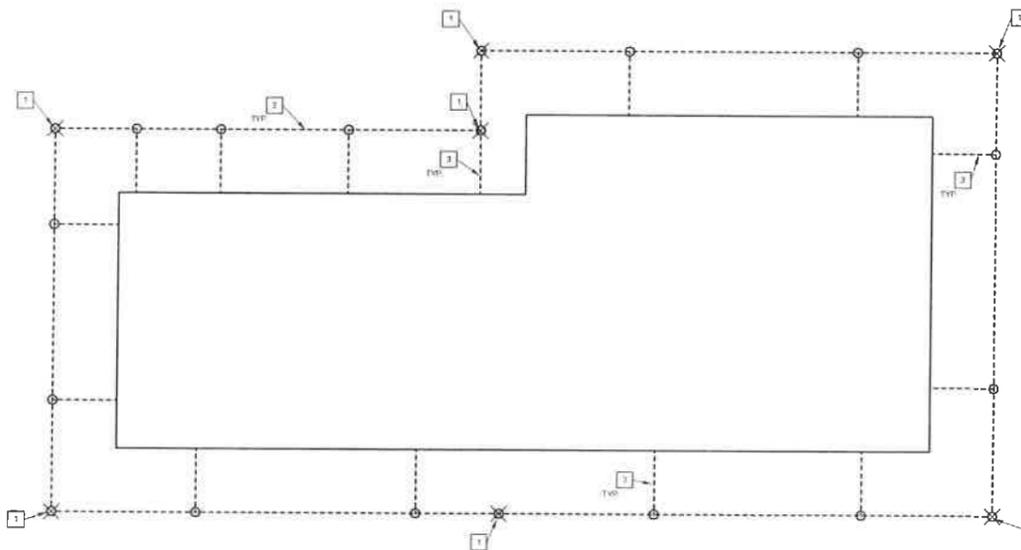
BE9.00 SCALE: 1/2" = 1'-0"



NOTES:  
1. OCCUPANCY SENSORS ARE WIRED AHEAD OF WALL SWITCHES.  
2. ACTUAL WIRE COLORS MAY VARY BY FIELD.  
- ONLY ONE POWER PACK REQUIRED FOR EACH ROOM.  
- IN ROOMS WITH MULTIPLE OCCUPANCY SENSORS ALL SENSORS ARE CONNECTED TOGETHER IN PARALLEL.

**OCCUPANCY SENSOR CONNECTION DIAGRAM**

BE9.00 SCALE: 1/2" = 1'-0"



**GENERAL GROUNDING NOTES:**

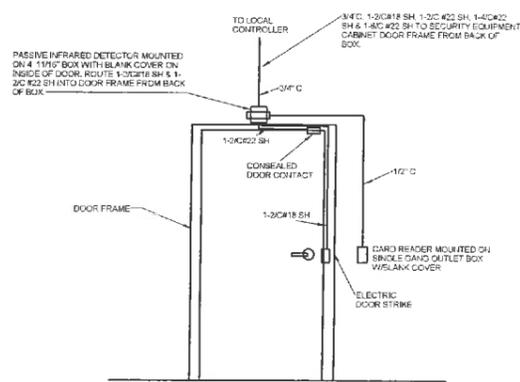
1. THE CONTRACTOR PROVIDE THE BUILDING GROUNDING PER THE SPECIFICATIONS.
2. CONNECT EXTERIOR BUILDING EQUIPMENT TO THE NEAREST GROUND LOOP LOCATION.

**GROUNDING DETAIL NOTES:**

1. 3/4"x1/2" GROUND RIGID COPPER CLAD CAD-WELD OR NON-REVERSING COMPRESSION CONNECTION, AND CONNECT TO THE GROUND LOOP.
2. INSTALL BARE TINNED-COPPER CONDUCTOR, NO. 2/0 AWG MINIMUM, BURY AT LEAST 24 INCHES BELOW GRADE 3' FROM THE BUILDING.
3. INSTALL TINNED COPPER #6 AWG TO BUILDING STEEL.

**GROUNDING DETAILS**

BE9.00 SCALE: 1/2" = 1'-0"



REF: PLAN NOTES ITEM 1, DWG. E4106

**SECURITY SYSTEM DOOR ROUGH-IN**

BE9.00 SCALE: 1/2" = 1'-0"

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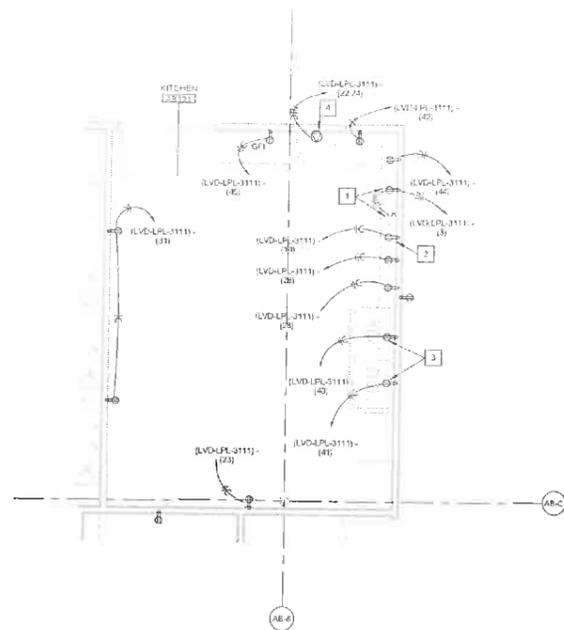
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ELECTRICAL DETAILS

DRAWING NUMBER  
2014-087-001-BE9.00





**ENLARGED POWER FLOOR PLAN**  
 SCALE: 1/4" = 1'-0"  
 PLAN NORTH

- CONSTRUCTION NOTES**
- 1 SWITCH ABOVE COUNTERTOP AND SWITCHED RECEPTACLE BELOW COUNTERTOP FOR POWER AND CONTROL OF GARBAGE DISPOSAL.
  - 2 DUPLEX RECEPTACLE BELOW COUNTERTOP FOR DISHWASHER.
  - 3 DUPLEX RECEPTACLE MOUNTED AT J AFF FOR REFRIGERATOR.
  - 4 99A 200V 1PHASE NEMA 19-60R RECESSED RECEPTACLE FOR RANGE.

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 ENLARGED POWER PLAN

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