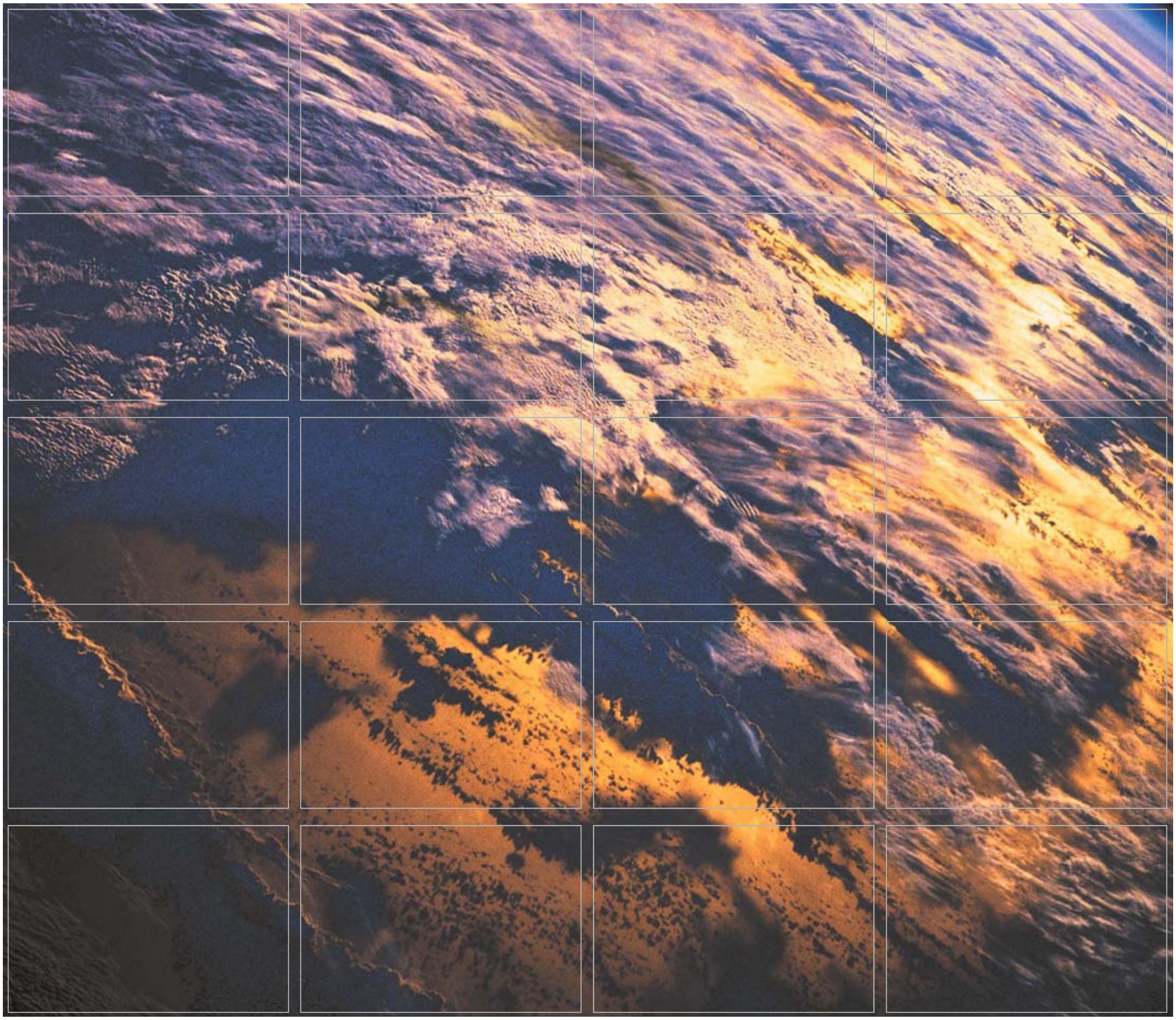

Dominion Energy Transmission, Inc.
Atlantic Coast Pipeline, LLC

Northampton County Compressor Station Air Quality Modeling Report

Northampton County, North Carolina

January 2018

Environmental Resources Management
75 Valley Stream Parkway, Suite 200
Malvern, PA 19355
www.erm.com

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APPENDICES

1.0 INTRODUCTION

Atlantic Coast Pipeline, LLC (Atlantic) and Dominion Energy Transmission, Inc. (DETI) submits this air quality modeling report to support the proposed construction and operation of a natural gas-fired compressor station located in Northampton County, North Carolina. Atlantic has contracted with DETI to construct and operate the proposed Atlantic Coast Pipeline (ACP). A Certificate application has been submitted to the Federal Energy Regulatory Commission (FERC) in support of the ACP. A general area map showing the proposed location of the compressor station is provided in **Appendix A** of this report.

1.1 PROJECT OVERVIEW

Atlantic and DETI propose to construct, install, and operate a new natural gas-fired compressor station (Project). The Project is one of three proposed compressor stations for the ACP. The other two compressor stations are proposed for Lewis County, West Virginia and Buckingham County, Virginia. The Project site is located in a rural setting in Northampton County, North Carolina. The project will consist of the installation and operation of the following combustion sources: three new combustion turbines, two emergency generators and two auxiliary boilers.

1.2 OVERVIEW OF METHODOLOGY

An air quality dispersion modeling analysis has been conducted for the Project in order to assess potential impacts to the ambient air quality in the vicinity of the Project site. The criteria pollutants NO_2, CO, $PM_{2.5}$ and PM_{10} are included in the modeling analysis, as well as the toxic pollutants, formaldehyde, benzene and hexane. Maximum modeled concentrations from the Project, combined with ambient background concentrations, were compared to the National Ambient Air Quality Standard (NAAQS) for each of the criteria pollutants consistent with requirements of the FERC process, while formaldehyde, benzene and hexane were compared to the Acceptable Ambient Levels (AALs) specified in 15A NCAC 02D.1104.

The modeling analysis was conducted using the most recent version of the EPA regulatory air dispersion model, AERMOD version 16216r. The model was run using supporting programs: AERMET (version 16216), AERMAP (version 11103), and BPIP (version 04274). Meteorological data for this analysis was provided by the North Carolina Department of Environmental Quality (NCDEQ). The modeling methodology also followed recommendations in the NCDEQ document “Guidelines for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina”, dated July 2017.

In lieu of a modeling protocol, the North Carolina Toxics Modeling Protocol Checklist has been completed, and is provided in **Appendix B**.

2.0 PROJECT EMISSIONS AND SOURCE CHARACTERIZATION

2.1 PROJECT DESCRIPTION

The Project site is located in Northampton County, NC. A plot plan of the proposed Project is presented in **Appendix C** of this report, along with a certified plat showing the facility property boundary.

The Project is part of the larger Atlantic Coast Pipeline, which proposes to transport up to 1.5 million dekatherms per day of natural gas to be used for generating electricity, heating homes, and running local businesses.

The emission sources associated with the Project are listed below. All combustion sources are to be fueled with natural gas. The station vent stacks are safety devices to vent natural gas (relieve pressure) from the facility during an emergency event. Once every five (5) years, venting from the stacks occurs to satisfy readiness testing of the emergency venting system as required by the Pipeline and Hazardous Materials Safety Administration (PHMSA). In addition to the three station vent stacks, each of the combustion turbines is equipped with a vent stack used for any purge/blowdown events.

- One (1) Solar Taurus 70 combustion turbine (CT) with a rated capacity of 10,915 hp;
- One (1) Solar Centaur 50 CT with a rated capacity of 6,200 hp;
- One (1) Solar Centaur 40 CT with a rated capacity of 4,700 hp;
- One (1) Auxiliary Boiler with a maximum heat input of 5.25 million British Thermal Units per hour (MMBtu/hr);
- One (1) Auxiliary Boiler with a maximum heat input of 0.08 million British Thermal Units per hour (MMBtu/hr);
- One (1) Caterpillar G3516B Emergency Generator with a rated capacity of 1,818 hp;
- One (1) Generac SG100 Emergency Generator with a rated capacity of 148.9 hp;
- One (1) Pipeline Liquids Tank with a 1,000 gallon capacity;
- One (1) Accumulator Tank (Waste Water) with a 2,500 gallon capacity; and

- Three (3) station vent stacks.

2.2 *PROJECT EMISSIONS*

Normal operations were modeled for all of the sources described in Section 2.1 above, with the exception of the station vent stacks and the emergency generators. The operation of the station vent stacks are described in more detail below. The emergency generators were modeled at 500 hours per year for the cases of NO_2, $PM_{2.5}$/PM_{10} and benzene. All other pollutants from the emergency generators were modeled at a short term maximum emission rate. Emissions from combustion turbines reflect full year operation with startup and shutdown events (See Appendix D-2 for details).

An additional scenario was modeled for a station-wide depressuring event associated with the blowdown system testing, expected to occur once every five years. The sources for a blowdown scenario include the three turbines and the three station vent stacks. Hexane emissions during the station-wide depressuring event exceeded the screening criteria in 15A NCAC 02Q .0711. Accordingly, hexane was modeled for the 24-hr averaging period. Even though it is an overestimate, as a conservative measure, hexane emissions from normal operations were modeled at the same time as the blowdown event.

The blowdown stacks have caps present. The POINTCAP source type is currently a default option in AERMOD that was used to characterize sources equipped with a stack cap. Stacks that were modeled using POINTCAP are identified in Appendix D-1.

A summary of modeled stack parameters and emission rates is shown in **Appendix D-1** of this report. Further detail about the calculation of the pollutant emission rates that were used in the modeling analysis is provided in **Appendix D-2**.

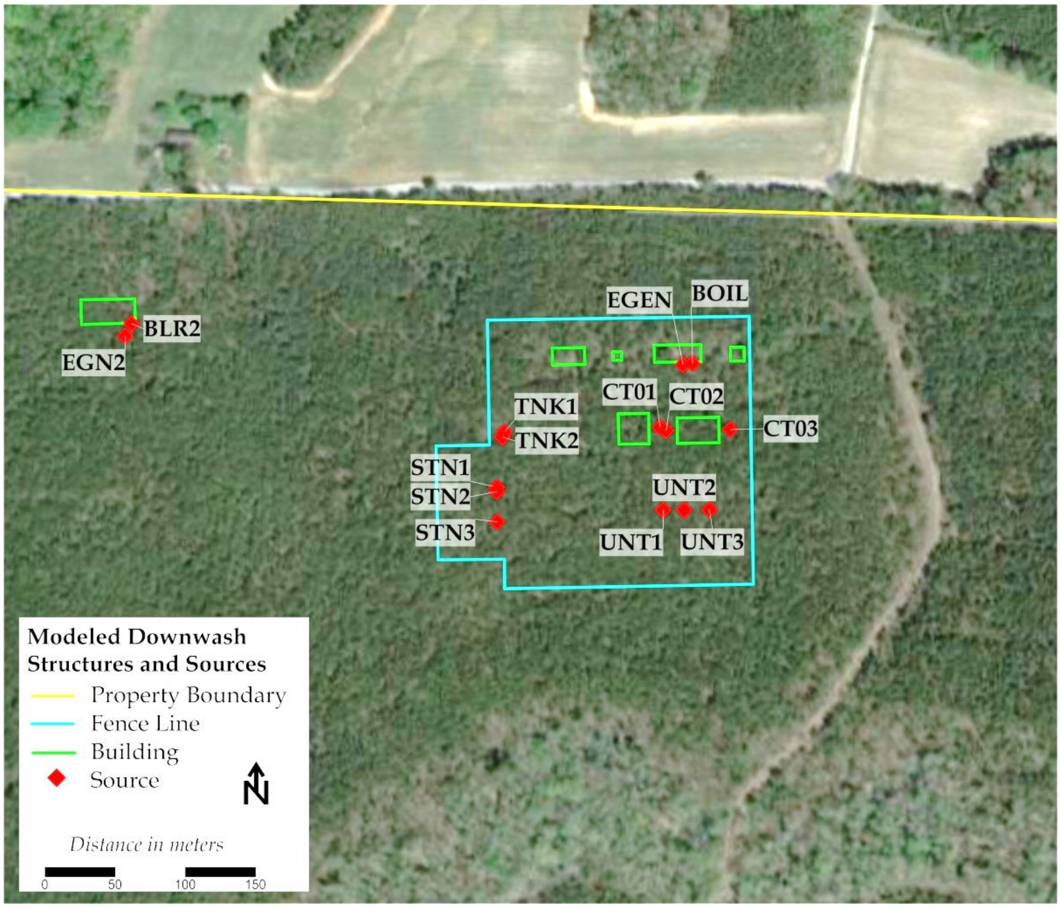
This analysis was conducted for all applicable averaging periods for NO_2, PM_{10}, $PM_{2.5}$, CO, benzene and formaldehyde. An air quality modeling analysis was also conducted for hexane during the blowdown event. The modeled design value concentrations were combined with ambient background values for comparison to the NAAQS, or compared directly to the AALs for the cases of formaldehyde, benzene and hexane.

2.3 *BUILDING WAKE EFFECTS*

The EPA's Building Profile Input Program (BPIP), Version 04274, was used to determine the appropriate building dimensions to use to calculate the effects of downwash on the modeled sources in AERMOD. Building, structure, and tank dimensions and locations relative to the modeled sources were obtained from engineering drawings of the planned facility and input into BPIP. The construction of the stacks for all sources at the facility will not exceed the greater of the GEP formula height calculated by BPIP or 65 m (213 feet).

The location of the downwash structures and sources used in the modeling analysis are shown in Figure 2-1. Building plans for the modeled structures are provided in **Appendix E** and indicate the building dimensions.

Figure 2-1 Location of Modeled Downwash Structures and Sources



3.0 MODELING METHODOLOGY

3.1 MODEL SELECTION AND APPLICATION

The latest version of EPA's AERMOD model (version 16216r) was used for predicting ambient impacts for each modeled compound.

Modeled design value concentrations of the criteria pollutants were used to demonstrate that the Project, in addition to existing ambient concentrations of pollutants, will not cause a violation of any NAAQS. The values of the NAAQS are shown in Table 3-1 of Section 3.2.

Maximum modeled concentrations of formaldehyde, benzene and hexane were compared with the AALs identified in the North Carolina Administrative Code (NCAC), shown in Table 3-2 of Section 3.2. Formaldehyde, benzene and hexane are the only toxic pollutants that exceeded the exemption emission rates in accordance with 15A NCAC 02Q.0711, and therefore require an air quality modeling assessment.

3.2 *AMBIENT AIR QUALITY STANDARDS*

Table 3-1 presents a summary of the NAAQS that are addressed for NO_2, PM_{10}, $PM_{2.5}$, and CO. Table 3-2 presents the significant concentrations of formaldehyde, benzene and hexane that are used to assess the toxic pollutants in accordance with 15A NCAC 02D.1104.

Table 3-1 Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS [a]
SO_2	1- Hour	196 [b,m]
	3-Hour	1300 [c,d]
	24-Hour	365 [c,f]
	Annual	80 [p,f]
PM_{10}	24-Hour	150 [g,o]
	Annual	50 [n]
$PM_{2.5}$	24-Hour	35 [i,e]
	Annual	12 [h,k]/15[d, h]
NO_2	1-Hour	188 [j,l]
	Annual	100 [p]
CO	1-Hour	40000 [c]
	8-Hour	10000 [c]

a) Primary standard unless otherwise noted.
b) The 3-year average of the 99th-percentile of the annual distribution of daily maximum 1-hour concentrations must not exceed standard.
c) One exceedance allowed per year.
d) Secondary standard.
e) For the $PM_{2.5}$ 24-hr NAAQS analysis, the modeled concentration is the 98th percentile of the 5-year averages of the maximum modeled 24-hour average $PM_{2.5}$ concentrations.
f) The 24-hour and annual SO_2 NAAQS were revoked, but are in effect until the SO_2 1-hour designations are finalized.
g) Expected number of days per calendar year, on average, with arithmetic time-averaged concentration above standard is equal to or less than one. For modeling analyses, compliance is evaluated by comparing the high, 6th-high modeled concentration over five years (plus an appropriate background concentration) to the NAAQS.
h) Based on 3-year average of the annual mean concentrations.
i) The 3-year average of the 98th percentile of 24-hour concentrations must not exceed standard.

j) The 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations must not exceed standard.
k) The highest average of the modeled annual averages across 5 years of NWS meteorological data is compared to the $PM_{2.5}$ annual average NAAQS.
l) For NO_2 1-hour NAAQS analysis, modeled concentration is the 98th percentile (H8H) of the annual distribution of daily maximum 1-hour concentrations averaged across 5 years of NWS data (EPA memorandum, dated June 28, 2010, from T. Fox, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard").
m) For SO_2 1-hour NAAQS analysis, modeled concentration is the 99th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across 5 years of NWS data (EPA memorandum dated August 23, 2010, from S. Page, "Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program").
n) NAAQS REVOKED.
o) For PM_{10} 24-hour average NAAQS analysis, modeled concentration is the highest 6th highest concentration over 5 years of NWS data.
p) No exceedances are allowed for annual averages to determine compliance with the NAAQS.

Table 3-2 NCAC Acceptable Ambient Levels

Pollutant	Averaging Period	Significant Concentration (μg/m³)
Formaldehyde	1- Hour	150
Benzene	Annual	0.12
Hexane	24-Hour	1100

Note: AALs are listed in 15A NCAC 02D.1104

3.3 BACKGROUND CRITERIA POLLUTANT CONCENTRATIONS

Background pollutant concentrations were included in the modeling analysis for criteria pollutants. Background concentrations were determined using existing ambient monitoring data in the region. The background monitors were selected based on proximity and data availability of the nearest monitoring sites to the Project site. The Hopewell, VA site is the closest monitor for the criteria pollutants of concern. However, this monitor only measures data for PM_{10}. The next closest monitor is the Charles County, Richmond, VA site, and this monitor was chosen for $PM_{2.5}$ and NO_2. This monitor has the most conservative concentrations of NO_2 over any other nearby monitor, and the second most conservative concentration for $PM_{2.5}$. The most conservative option for $PM_{2.5}$ is the monitor located in Raleigh-Durham, NC, which is 30 km further away from the Project site and located in a more urban environment that would not be considered representative for the Project. For CO, monitor sites located in Richmond and Norfolk, VA are approximately equidistant from the Project site, but do not have the most conservative concentrations. Raleigh-Durham, NC is only a few km further away and has the most conservative monitored concentrations of CO.

Table 3-3 summarizes the air quality data from the monitoring stations that were used for background concentrations. The locations of these air quality monitors in relation to the proposed Project site are presented in **Appendix F**.

Table 3-3 Summary of Background Concentrations

Pollutant	Averaging Period	Background Concentration (μg/m³)[a]	Station ID	Station Location	Distance from Project (km)	
NO_2	1-hour	78.96	510360002	Charles County, Richmond, VA	91.5	NNE
	Annual	5.64				
CO	1-hour	2633.5	371830014	Raleigh-Durham, NC	122.4	SW
	8-hour	1717.5				
$PM_{2.5}$	24-hour	16	510360002	Charles County, Richmond, VA	91.5	NNE
	Annual	7.3				
PM_{10}	24-hour	29	516700010	Hopewell, VA	84.9	NNE

[a] Background concentrations are the 2016 design values for all pollutants except for PM_{10}, which is the maximum value over the 2014-2016 period.

3.4 *NO_X TO NO_2 CONVERSION*

For the NO_2 modeling analyses, Atlantic and DETI have made use of the Ambient Ratio Method 2 (ARM2) option in AERMOD to account for the formation of NO_2 from the emissions of NO_X from the Project sources. Atlantic and DETI have utilized ARM2 with the national default range of NO_2 to NO_X ratios (50% to 90%). When ARM2 is used, AERMOD assigns the appropriate ratio for each hour and receptor based on the total modeled concentration of NO_X.

3.5 *GEOGRAPHIC SETTING*

3.5.1 *Land Use Characteristics*

The proposed facility will be located in rural Northampton County, NC. AERMOD therefore was executed in the default (rural) mode.

3.5.2 *Terrain*

The Project site is situated at approximately 95 feet with no significant terrain features nearby. Within about 10 km surrounding the Project site, the terrain is characterized by flat plains, which range in elevation from 65 feet to the northeast of the Project site to 165 feet to the west and south of the site. The latest version of EPA's AERMAP program (version 11103) was used to determine the ground elevation and hill scale for each modeled receptor, based on data obtained from the USGS National Elevation Database (NED), using the North American Datum of 1983 (NAD83). The NED data was obtained at a horizontal resolution of 1/3 arc-second (10-m) for use in this analysis.

3.6 RECEPTOR GRIDS

For this modeling analysis, a total of four (4) separate receptor grids were combined to create an overall grid pattern. The receptor grids varied slightly based on whether the grid was for criteria or toxic pollutant modeling, as explained below:

- 50-meter spacing along the fence line for criteria pollutants, or property boundary for toxics, and extending to 1.5 km from the facility;
- 100-meter spacing from 1.5 km to 2.5 km from the facility;
- 250-meter spacing from 2.5 km to 5 km from the facility; and
- 500-meter spacing from 5 km to 10 km from the facility.

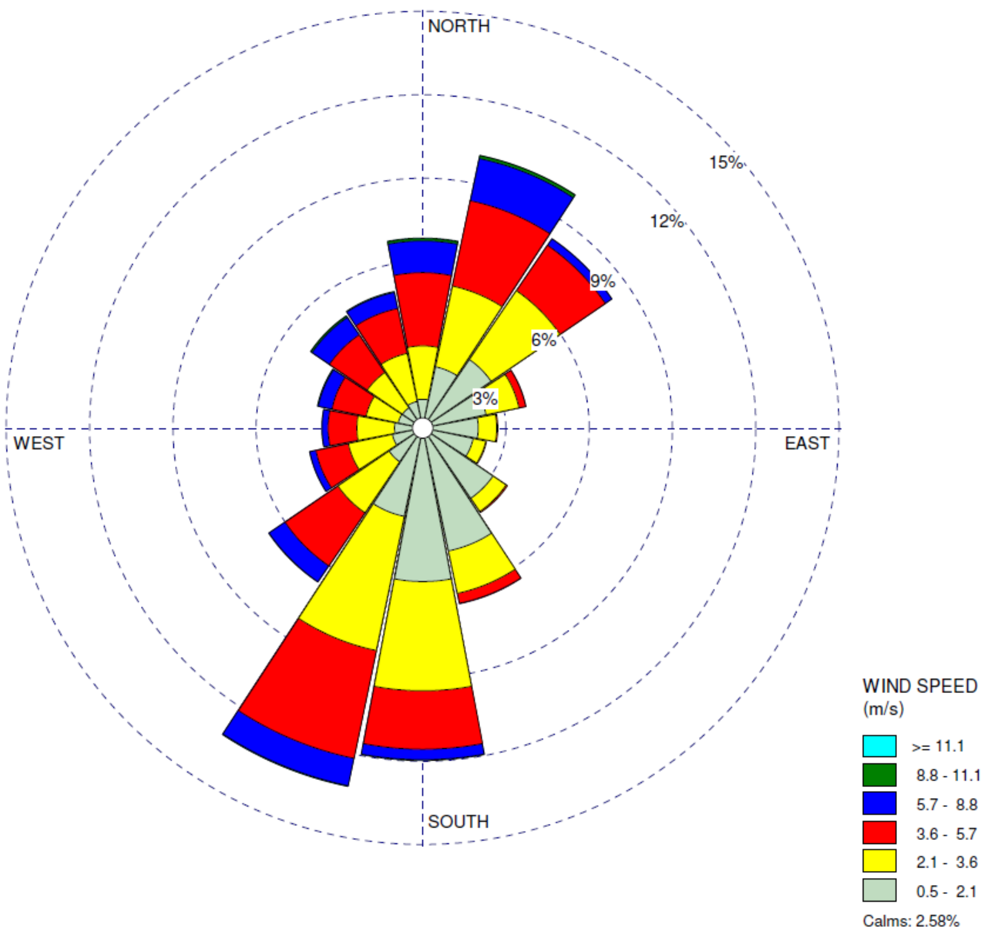
As noted previously, AERMAP was used to define ground elevations and hill scales for each receptor. The facility fence line was used as the boundary to determine ambient air for the criteria pollutants and the property boundary was used as the boundary for the air toxics. No receptors were placed within these boundaries.

A review of the model results revealed that for all averaging periods, maximum concentrations occur within the area with 50 meter receptor spacing, thus no refinement of the grid is necessary.

3.7 METEOROLOGICAL DATA FOR AIR QUALITY MODELING

Meteorological data prepared by the North Carolina Department of Environmental Quality (NCDEQ) has been used in this modeling analysis. NCDEQ guidance recommends using surface data from Rocky Mount – Wilson Airport (KRWI, WBAN 93759), along with upper air data from Newport, NC (KMHX, WBAN 93768) for air quality modeling conducted in Northampton County. The KRWI surface data is located approximately 84 km to the SW of the Project site. Meteorological data has been processed for the years 2012-2016 using AERMET version 16216. A wind rose of the meteorological data provided by NCDEQ is presented in Figure 3-1.

Figure 3-1 Wind Rose – RWI Meteorological Data 2012-2016



4.0 RESULTS OF AIR QUALITY MODELING ANALYSIS

Four (4) criteria pollutants were modeled in this analysis, namely NO_2, $PM_{2.5}$, PM_{10} and CO, and three (3) toxic pollutants, formaldehyde, benzene and hexane. The background concentrations (described in Section 3.3) for criteria pollutants were combined with the appropriate model design values, using the sum of these two values for comparison to the NAAQS. Maximum modeled concentrations of formaldehyde, benzene and hexane were also compared directly to the AALs.

4.1 NAAQS MODELING RESULTS

A modeling analysis was conducted for normal operations for 1-hr and annual NO_2, 1-hr and 8-hr CO, 24-hr and annual $PM_{2.5}$, and 24-hr PM_{10}. Background concentrations were combined with the modeled design value concentrations and compared to the NAAQS. The results of the NAAQS analysis are provided in Table 4-1 below.

Table 4-1 NAAQS Model Results

Pollutant	Averaging Period	Background Concentration (µg/m³)	Model Result (µg/m³)	NAAQS (µg/m³)	Background + Model Concentration (µg/m³)	Compliance (Yes/No)
NO_2	1-hour	79.0	13.9	188	92.9	Yes
	Annual	5.6	1.3	100	6.9	Yes
CO	1-hour	2633.5	175.4	40000	2809	Yes
	8-hour	1717.5	105.0	10305	1823	Yes
$PM_{2.5}$	24-hour	16	1.2	35	17.2	Yes
	Annual	7.3	0.2	12	7.5	Yes
PM_{10}	24-hour	29	3.8	150	32.8	Yes

Because the NAAQS are not exceeded for any compound for any of the modeled scenarios, the proposed Project will not cause or contribute to exceedances of the 1-hr or annual NO_2, the 1-hr or 8-hr CO, the 24-hr or annual $PM_{2.5}$, or the 24-hr PM_{10} NAAQS.

4.2 TOXICS

A modeling analysis was conducted for normal operations for 1-hr formaldehyde and annual benzene. Additionally, a blowdown scenario was modeled for 24-hr hexane. The highest modeled concentrations were compared with the significant ambient air concentrations. The results of the toxics analysis are provided in Table 4-2 below.

Table 4-2 Toxics Model Results

Pollutant	Averaging Period	Significant Concentration (μg/m³)	Model Concentration (μg/m³)	Compliance (Yes/No)
Formaldehyde	1-hour	150	16.1	Yes
Benzene	Annual	0.12	0.006	Yes
Hexane	24-hour	1100	588.5	Yes

Because the toxic pollutants do not exceed the significant ambient air concentration for any of the compounds or modeled scenarios, it can be determined that the proposed Project will not adversely affect human health.

4.3 CONCLUSIONS

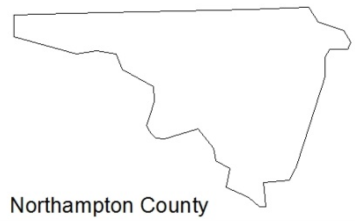
The results of the air quality modeling analysis demonstrate that the proposed Northampton Compressor Station Project does not cause or contribute to any exceedance of NAAQS for NO_2, $PM_{2.5}$, PM_{10} and CO, and also does not cause a danger to human health with respect to formaldehyde, benzene, and hexane.

All relevant electronic modeling files are contained on CD-ROM in **Appendix G** of this report. The following summarizes the contents of the CD-ROM:

- AERMOD input and output files for all NAAQS and toxics analyses
- AERMAP input and output
- AERMET meteorological data used in the analyses
- BPIP input and output

Proposed Facility Location

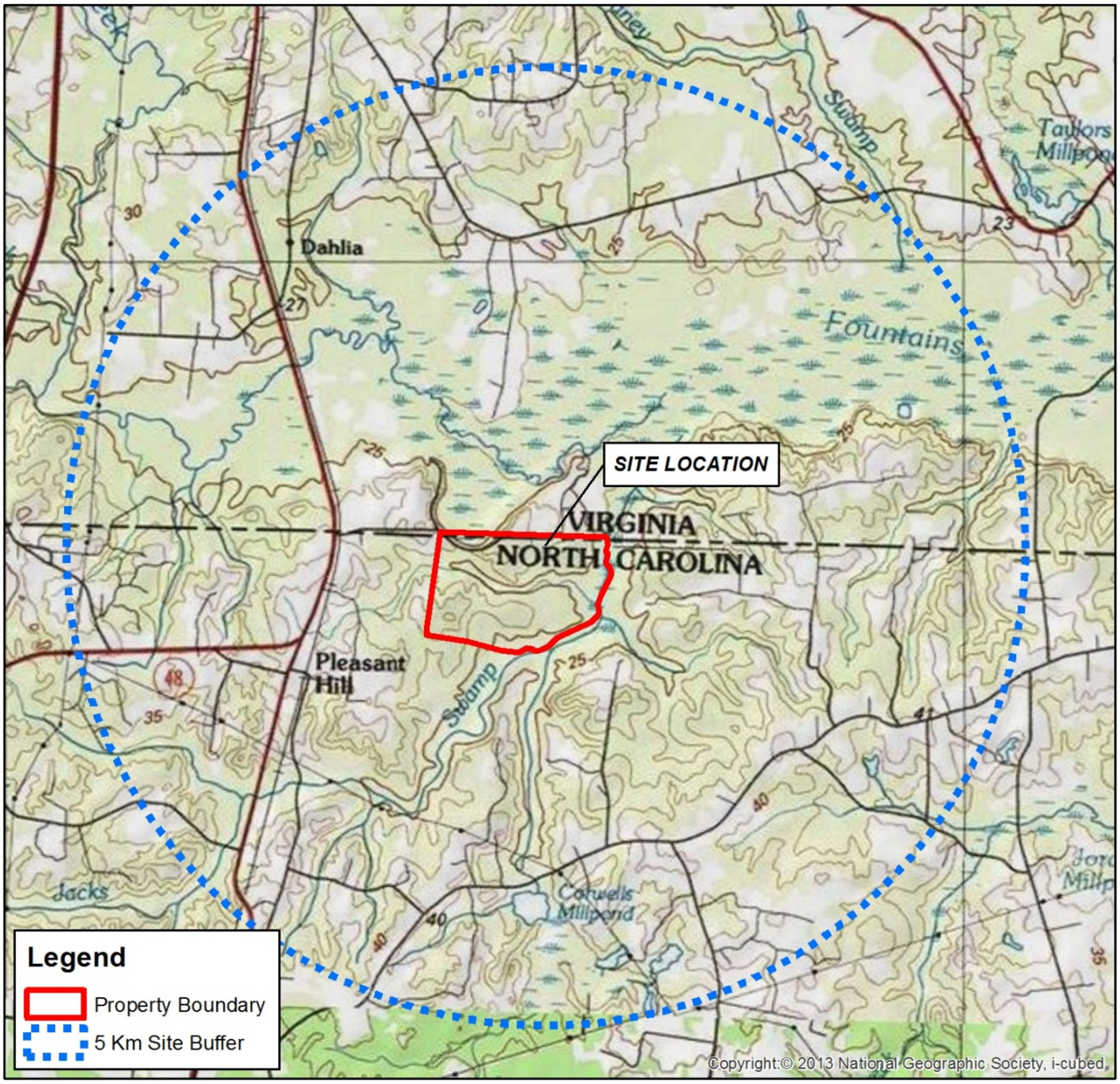
Appendix A



0 2,500 5,000 10,000
Feet

N

LAT. 36.543874 LON. -77.505712
NORTHAMPTON COUNTY
NORTH CAROLINA



USGS 1:24K 7.5' Quadrangle:
Skippers, VA

SITE LOCATION MAP

ERM	**Dominion Transmission, Inc.** Atlantic Coast Pipeline, LLC. Northampton County Compressor Station	GIS Review: JR CHK'D: JR 0345197
Drawn By: SRV-12/21/17	**Environmental Resources Management**	APPENDIX A

J:\Projects\ACP_Air Permitting_MXD\AppendixA-SiteLocationMap_20172112.mxd - 1/2/2018|SRV

North Carolina Modeling Protocol Checklist

Appendix B

A.1
North Carolina Modeling Protocol Checklist

The North Carolina Modeling Protocol Checklist may be used in lieu of developing the traditional written modeling plan for North Carolina toxics and criteria pollutant modeling. The protocol checklist is designed to provide the same level of information as requested in a modeling protocol as discussed in Chapter 2 of the *Guideline for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina*. The modeling protocol checklist is submitted with the modeling analysis.

Although most of the information requested in the modeling protocol checklist is self explanatory, additional comments are provided, where applicable, and are discussed in greater detail in the toxics modeling guidelines referenced above. References to sections, tables, figures, appendices, etc., in the protocol checklist are found in the toxics modeling guidelines.

INSTRUCTIONS: The modeling report supporting the compliance demonstration should include most of the information listed below. As appropriate, answer the following questions or indicate by check mark the information provided or action taken is reflected in your report.

FACILITY INFORMATION	
Name: Northampton Compressor Station **Facility ID:** TBD **Address:** 718 Forest Road Pleasant Hill, NC 27866	**Consultant (if applicable):** Environmental Resource Management (ERM)
Contact Name: Laurence A. Labrie	**Contact Name:** Jessica Ram
Phone Number: 804-273-3075 **Email:** laurence.a.labrie@dominionenergy.com	**Phone Number:** 484-913-0461 **Email:** Jessica.Ram@erm.com

GENERAL

Description of New Source or Source / Process Modification: provide a short description of the new or modified source(s) and a brief discussion of how this change affects facility production or process operation.	Sections 1.0, 1.1 and 2.1
Source / Pollutant Identification: provide a table of the affected pollutants, by source, which identifies the source type (point, area, or volume), maximum pollutant emission rates over the applicable averaging period(s), and, for point sources, indicate if the stack is capped or non-vertical (C/N).	Appendix D-1
Pollutant Emission Rate Calculations: indicate how the pollutant emission rates were derived (e.g., AP-42, mass balance, etc.) and where applicable, provide the calculations.	Appendix D-2
Site / Facility Diagram: provide a diagram or drawing showing the location of all existing and proposed emission sources, buildings or structures, public right-of-ways, and the facility property (toxics) / fence line (criteria pollutants) boundaries. The diagram should also include a scale, true north indicator, and the UTM or latitude/longitude of at least one point.	Appendix C
Certified Plat or Signed Survey: a certified plat (map) from the County Register of Deeds or a signed survey must be submitted to validate property boundaries modeled.	Appendix C
Topographic Map: A topographic map covering approximately 5km around the facility must be submitted. The facility boundaries should be annotated on the map as accurately as possible.	Appendix A
Cavity Impact Analysis: No cavity analysis is required if using AERMOD. *See Section 4.2*	✓

Background Concentrations (criteria pollutant analyses only**)**: Background concentrations must be determined for each pollutant for each averaging period evaluated. The averaged background value used (e.g., high, high-second-high, high-third-high, etc.) is based on the pollutant and averaging period evaluated. The background concentrations are added to the modeled concentrations, which are then compared to the applicable air quality standard to determine compliance.	Table 3-3
Offsite Source Inventories (criteria pollutant analyses only**)**: Offsite source inventories must be developed and modeled for all pollutants for which onsite sources emissions are modeled in excess of the specific pollutant significant impact levels (SILs) as defined in the PSD New Source Review Workshop Manual. The DAQ AQAB must approve the inventories. An initial working inventory can be requested from the AQAB.	N/A (non-PSD)

SCREEN LEVEL MODELING

Model: The latest version of the AERSCREEN model must be used. The use of other screening models should be approved by NCDAQ prior to submitting the modeling report.	NA
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. See NC Form 3 – Appendix A.	NA
Merged Sources: Identify merged sources and show all appropriate calculations. See Section 3.3	NA
GEP Analysis: See Section 3.2 and NC Form 1 – Appendix A	NA
Terrain: Indicate the terrain modeled: simple (Section 4.4), and complex (Section 4.5 and NC Form 4 – Appendix A). If complex terrain is within 5 kilometers of the facility, complex terrain must be evaluated. Simple terrain must include terrain elevations if any terrain is greater than the stack base of any source modeled. Simple: _______________ Complex:______________	NA
Meteorology: Refer to Section 4.1 for AERSCREEN inputs.	NA
Receptors: AERSCREEN – use shortest distance to property boundary for each source modeled and use sufficient range to find maximum (See Section 4.1 (i) and (j)). Terrain above stack base must be evaluated.	NA
Modeling Results: For each affected pollutant, modeling results should be summarized, converted to the applicable averaging period (See Table 3), and presented in tabular format indicating compliance status with the applicable AAL, SIL, or NAAQS. See NC Form S5 – Appendix A.	NA
Modeling Files: Either electronic or hard copies of AERSCREEN output must be submitted.	NA

REFINED LEVEL MODELING

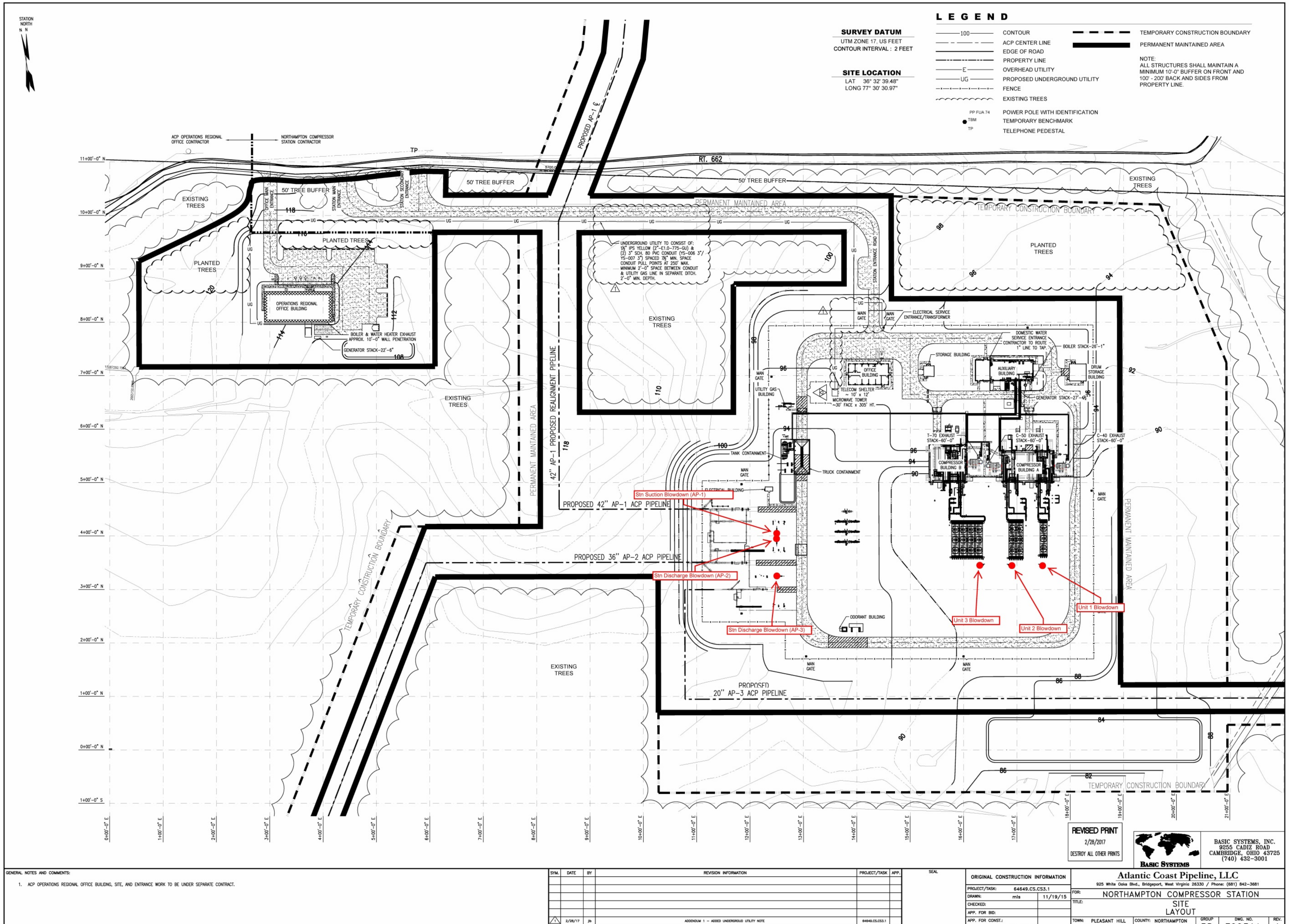
Model: The latest version of AERMOD should be used, and may be found at http://www.epa.gov/scram001/dispersion_prefrec.htm. The use of other refined models must be approved by NCDAQ prior to submitting the modeling report.	✓
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. See NC Form 3 - Appendix A.	Appendix D-1
GEP Analysis: Use BPIP-Prime with AERMOD.	✓
Cavity Impact Analysis: No separate cavity analysis is required when using AERMOD as long as receptors are placed in cavity susceptible areas. See Section 4.2 and 5.2.	N/A
Terrain: Use digital elevation data from the USGS NED database (http://seamless.usgs.gov/index.php). Use of other sources of terrain elevations or the non-regulatory Flat Terrain option will require prior approval from DAQ AQAB.	✓
Coordinate System: Specify the coordinate system used (e.g., NAD27, NAD83, etc.) to identify the source, building, and receptor locations. Note: Be sure to specify in the AERMAP input file the correct base datum (NADA) to be used for identifying source input data locations. Clearly note in both the protocol checklist and the modeling report which datum was used.	✓ NAD83 used
Receptors: The receptor grid should be of sufficient size and resolution to identify the maximum pollutant impact. See Section 5.3.	Section 3.6

Meteorology: Indicate the AQAB, pre-processed, 5-year data set used in the modeling demonstration: (See Section 5.5 and Appendix B) AERMOD____________________ If processing your own raw meteorology, then pre-approval from AQAB is required. Additional documentation files (e.g. AERMET stage processing files) will also be necessary. For NC toxics, the modeling demonstration requires only the last year of the standard 5 year data set (e.g., 2005) provided the maximum impacts are less than 50% of the applicable AAL(s).	Section 3.7 RWI (County # 66)
Modeling Results: For each affected pollutant and averaging period, modeling results should be summarized and presented in tabular format indicating compliance status with the applicable AAL, SIL or NAAQS. See NC Form R5 - Appendix A.	Table 4-1 Table 4-2
Modeling Files: Submit input and output files for AERMOD. Also include BPIP-Prime files, AERMAP files, DEM files, and any AERMET input and output files, including raw meteorological data.	Appendix G

Facility Plot Plan

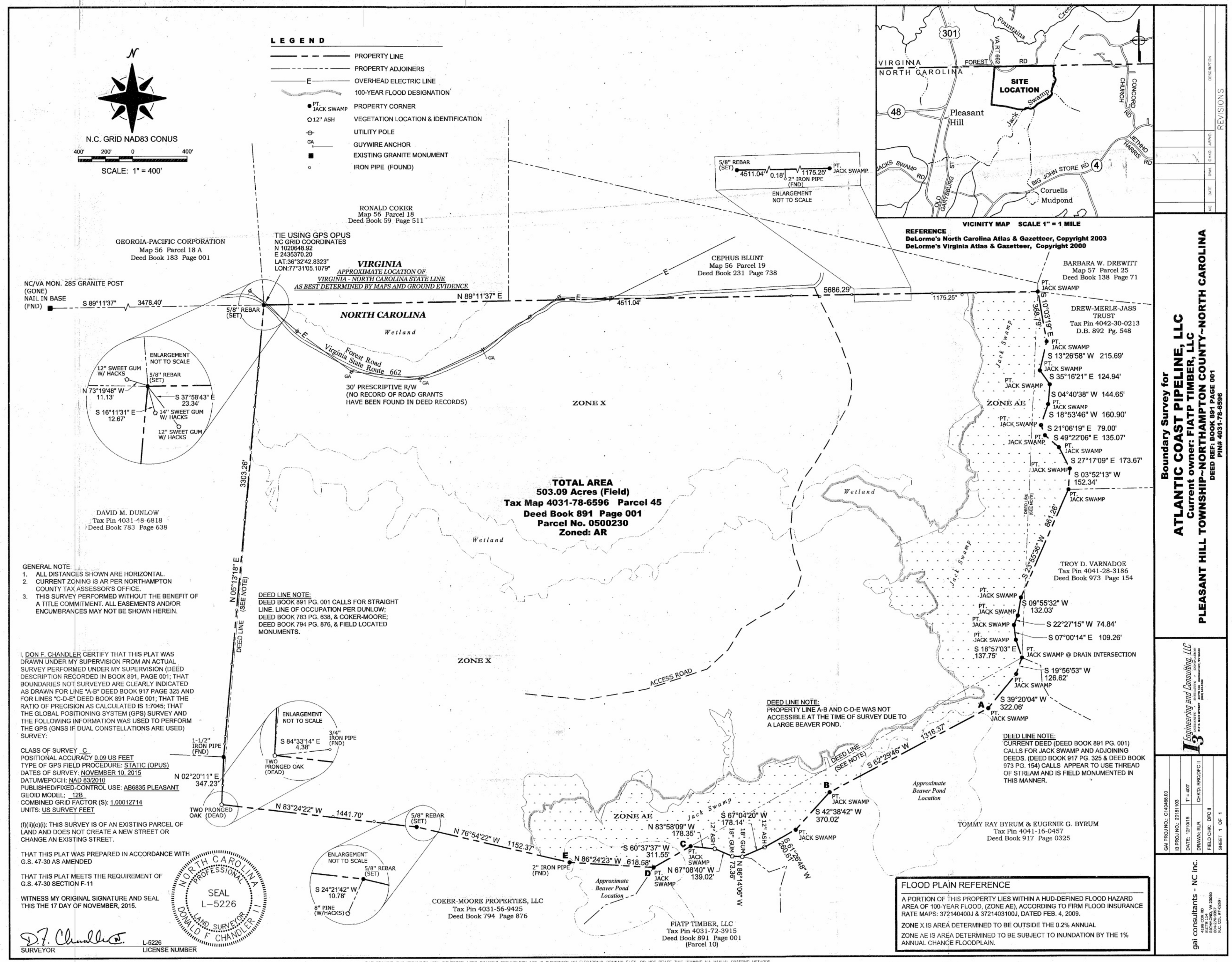
Appendix C

Figure C-1



For reference, Taurus 70 stack location is 275717.23 m E, 4047188.92 m N, UTM Zone 18S, NAD83

Figure C-2



LEGEND
PROPERTY LINE
PROPERTY ADJOINERS
OVERHEAD ELECTRIC LINE
100-YEAR FLOOD DESIGNATION
PROPERTY CORNER
VEGETATION LOCATION & IDENTIFICATION
UTILITY POLE
GUYWIRE ANCHOR
EXISTING GRANITE MONUMENT
IRON PIPE (FOUND)
N.C. GRID NAD83 CONUS
SCALE: 1" = 400'
RONALD COKER Map 56 Parcel 18 Deed Book 59 Page 511
GEORGIA-PACIFIC CORPORATION Map 56 Parcel 18 A Deed Book 183 Page 001
TIE USING GPS OPUS NC GRID COORDINATES N 1020648.92 E 2435370.20 LAT:36°32'42.8323" LON:77°31'05.1079"
VIRGINIA
APPROXIMATE LOCATION OF VIRGINIA - NORTH CAROLINA STATE LINE AS BEST DETERMINED BY MAPS AND GROUND EVIDENCE
NORTH CAROLINA
CEPHUS BLUNT Map 56 Parcel 19 Deed Book 231 Page 738
NC/VA MON. 285 GRANITE POST (GONE) NAIL IN BASE (FND)
S 89°11'37" 3478.40'
N 89°11'37" E
4511.04'
5686.29'
1175.25'
30' PRESCRIPTIVE R/W (NO RECORD OF ROAD GRANTS HAVE BEEN FOUND IN DEED RECORDS)
Forest Road Virginia State Route 662
ZONE X
ZONE AE
Wetland
Jack Swamp
TOTAL AREA
503.09 Acres (Field)
Tax Map 4031-78-6596 Parcel 45
Deed Book 891 Page 001
Parcel No. 0500230
Zoned: AR
DAVID M. DUNLOW Tax Pin 4031-48-6818 Deed Book 783 Page 638
BARBARA W. DREWITT Map 57 Parcel 25 Deed Book 138 Page 71
DREW-MERLE-JASS TRUST Tax Pin 4042-30-0213 D.B. 892 Pg. 548
TROY D. VARNADOE Tax Pin 4041-28-3186 Deed Book 973 Page 154
TOMMY RAY BYRUM & EUGENIE G. BYRUM Tax Pin 4041-16-0457 Deed Book 917 Page 0325
COKER-MOORE PROPERTIES, LLC Tax Pin 4031-56-9425 Deed Book 794 Page 876
FIATP TIMBER, LLC Tax Pin 4031-72-3915 Deed Book 891 Page 001 (Parcel 10)
GENERAL NOTE:
1. ALL DISTANCES SHOWN ARE HORIZONTAL.
2. CURRENT ZONING IS AR PER NORTHAMPTON COUNTY TAX ASSESSOR'S OFFICE.
3. THIS SURVEY PERFORMED WITHOUT THE BENEFIT OF A TITLE COMMITMENT. ALL EASEMENTS AND/OR ENCUMBRANCES MAY NOT BE SHOWN HEREIN.
DEED LINE NOTE: DEED BOOK 891 PG. 001 CALLS FOR STRAIGHT LINE. LINE OF OCCUPATION PER DUNLOW; DEED BOOK 783 PG. 638, & COKER-MOORE; DEED BOOK 794 PG. 876, & FIELD LOCATED MONUMENTS.
DEED LINE NOTE: PROPERTY LINE A-B AND C-D-E WAS NOT ACCESSIBLE AT THE TIME OF SURVEY DUE TO A LARGE BEAVER POND.
DEED LINE NOTE: CURRENT DEED (DEED BOOK 891 PG. 001) CALLS FOR JACK SWAMP AND ADJOINING DEEDS. (DEED BOOK 917 PG. 325 & DEED BOOK 973 PG. 154) CALLS APPEAR TO USE THREAD OF STREAM AND IS FIELD MONUMENTED IN THIS MANNER.
I, DON F. CHANDLER CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY PERFORMED UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK 891, PAGE 001; THAT BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS DRAWN FOR LINE "A-B" DEED BOOK 917 PAGE 325 AND FOR LINES "C-D-E" DEED BOOK 891 PAGE 001; THAT THE RATIO OF PRECISION AS CALCULATED IS 1:7045; THAT THE GLOBAL POSITIONING SYSTEM (GPS) SURVEY AND THE FOLLOWING INFORMATION WAS USED TO PERFORM THE GPS (GNSS IF DUAL CONSTELLATIONS ARE USED) SURVEY:
CLASS OF SURVEY C
POSITIONAL ACCURACY 0.09 US FEET
TYPE OF GPS FIELD PROCEDURE: STATIC (OPUS)
DATES OF SURVEY: NOVEMBER 10, 2015
DATUM/EPOCH: NAD 83/2010
PUBLISHED/FIXED-CONTROL USE: AB6835 PLEASANT
GEOID MODEL: 12B
COMBINED GRID FACTOR (S): 1.00012714
UNITS: US SURVEY FEET
(f)(ii)(c)(i): THIS SURVEY IS OF AN EXISTING PARCEL OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.
THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED
THAT THIS PLAT MEETS THE REQUIREMENT OF G.S. 47-30 SECTION F-11
WITNESS MY ORIGINAL SIGNATURE AND SEAL THIS THE 17 DAY OF NOVEMBER, 2015.
NORTH CAROLINA PROFESSIONAL SEAL L-5226 LAND SURVEYOR DONALD F. CHANDLER II
SURVEYOR
L-5226 LICENSE NUMBER
N 05°13'18" E (SEE NOTE)
3303.26'
N 02°20'11" E 347.23'
N 83°24'22" W 1441.70'
N 76°54'22" W 1152.37'
N 86°24'23" W 618.58'
S 62°29'46" W 1316.37'
VICINITY MAP SCALE 1" = 1 MILE
VIRGINIA
NORTH CAROLINA
SITE LOCATION
Pleasant Hill
REFERENCE
DeLorme's North Carolina Atlas & Gazetteer, Copyright 2003
DeLorme's Virginia Atlas & Gazetteer, Copyright 2000
FLOOD PLAIN REFERENCE
A PORTION OF THIS PROPERTY LIES WITHIN A HUD-DEFINED FLOOD HAZARD AREA OF 100-YEAR FLOOD, (ZONE AE), ACCORDING TO FIRM FLOOD INSURANCE RATE MAPS: 3721404000J & 3721403100J, DATED FEB. 4, 2009.
ZONE X IS AREA DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL
ZONE AE IS AREA DETERMINED TO BE SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOODPLAIN.
Boundary Survey for
ATLANTIC COAST PIPELINE, LLC
Current owner: FIATP TIMBER, LLC
PLEASANT HILL TOWNSHIP~NORTHAMPTON COUNTY~NORTH CAROLINA
DEED REF: BOOK 891 PAGE 001
PIN# 4031-78-6596
gai consultants - NC inc.
REVISIONS

Stack Parameters

Appendix D-1

Normal Operations

Source	Model ID	Stack Type	Stack Description	Stack Height (ft)	Exit Diameter (ft)	Exit Gas Velocity (ft/s)	Exit Gas Temperature (°F)	Pollutant Emission Rates NO_2 (lb/hr)	CO (lb/hr)	$PM_{2.5}/PM_{10}$ (lb/hr)	Formaldehyde (lb/hr)	Benzene (lb/hr)
Solar Taurus 70 Turbine	CT01	Point	Vertical	60	6.0	83.5	750	1.91	2.99	1.92	4.70	0.001
Solar Centaur 50 Turbine	CT02	Point	Vertical	60	6.0	58.8	750	1.19	1.87	1.20	1.17	0.0004
Solar Centaur 40 Turbine	CT03	Point	Vertical	60	6.0	50.1	750	1.00	1.67	1.02	1.16	0.0003
Emergency Generator 1	EGEN	Point	Vertical	27.4	0.5	1006	974	0.02[a]	9.98	0.01[a]	1.36	0.001
Emergency Generator 2	EGN2	Point	Vertical	22.5	0.21	423.4	1230	0.00001[a]	0.02	0.0005[a]	0.02	0.00004
Boiler 1	BOIL	Point	Vertical	26.1	0.7	247.3	838	0.31	0.52	0.05	0.0004	0.00001
Boiler 2	BLR2	Point	Vertical	10	0.7	247.3	838	0.31	0.52	0.05	0.00001	0.0000003
Tank 1[b]	TNK1	Point	Vertical	8.9	0.3	0.003	Ambient	0.0	0.0	0.0	0.0	0.0002
Tank 2[b]	TNK2	Point	Vertical	7.7	0.3	0.003	Ambient	0.0	0.0	0.0	0.0	0.00001

a - NO_2 and $PM_{2.5}/PM_{10}$ emission rates for the emergency generators have been scaled for 500 hours/year

b - Tanks 1 and 2 assumed to have a conservative exit velocity of 0.001 m/s and ambient stack temperatures (0 K in the model)

Hexane Modeling:

Blowdown Operations								
Source	Model ID	Stack Type	Stack Description	Stack Height (ft)	Exit Diameter (ft)	Exit Gas Velocity (ft/s)	Exit Gas Temperature (°F)[a]	Hexane (lb/hr)[b]
Solar Taurus 70 Turbine[c,d]	UNT1	Point	Capped Vertical	19.3	1.9	43.1	Ambient	0.31
Solar Centaur 50 Turbine[c,e]	UNT2	Point	Capped Vertical	19.3	1.9	49.0	Ambient	0.35
Solar Centaur 40 Turbine[c,f]	UNT3	Point	Capped Vertical	25.5	2.2	60.3	Ambient	0.60
Station Suction Blowdown	STN1	Point	Capped Vertical	11.4	6.4	47.9	Ambient	1.51
Station Discharge Blowdown 1	STN2	Point	Capped Vertical	11.4	7.3	26.0	Ambient	1.08
Station Discharge Blowdown 2	STN3	Point	Capped Vertical	11.5	6.4	27.3	Ambient	0.86

Normal Operations								
Source	Model ID	Stack Type	Stack Description	Stack Height (ft)	Exit Diameter (ft)	Exit Gas Velocity (ft/s)	Exit Gas Temperature (°F)[a]	Hexane (lb/hr)
Emergency Generator 1	EGEN	Point	Vertical	27.4	0.5	1006	974	0.002
Emergency Generator 2	EGN2	Point	Vertical	22.5	0.21	423.4	1230	0.0002
Boiler 1	BOIL	Point	Vertical	26.1	0.7	247.3	838	0.009
Boiler 2	BLR2	Point	Vertical	10	0.7	247.3	838	0.0003
Tank 1[g]	TNK1	Point	Vertical	8.9	0.3	0.003	Ambient	0.002
Tank 2[g]	TNK2	Point	Vertical	7.7	0.3	0.003	Ambient	0.00001

Source	Model ID	Stack Type	Stack Description	Release Height (ft)	Length (ft)	Width (ft)	Hexane (lb/hr)
Solar Taurus 70 Turbine	CT01	Area	Building Fugitives	45	72	72	0.01
Solar Centaur 50 Turbine	CT02	Area	Building Fugitives	35.5	98.7	60	0.01
Solar Centaur 40 Turbine	CT03	Area	Building Fugitives	35.5	98.7	60	0.01

a - Ambient stack temperatures are represented as 0 K in the model

b - Actual blowdown event occurs over 6 minutes; lbs/event are modeled as lb/24-hrs

c - Turbine emissions include blowdown startup; Parameters are blended to account for 10 minute startup + 6 minute blowdown. In total, the startup accounts for 62.5% and the blowdown accounts for 37.5% of the 16 minute period. See notes d, e, and f.

d - CT1: Blended exit velocity = 23.46 ft/s * 62.5% + 75.85 ft/s * 37.5%.   Blended emissions = (2.502 lb/event + 4.854 lb/event)/24 hours

e - CT2: Blended exit velocity = 23.46 ft/s * 62.5% + 91.7 ft/s * 37.5%.   Blended emissions = (2.502 lb/event + 5.868 lb/event)/24 hours

f - CT3: Blended exit velocity = 16.84 ft/s * 62.5% + 132.67 ft/s * 37.5%.   Blended emissions = (2.502 lb/event + 11.825 lb/event)/24 hours

g - Tanks 1 and 2 assumed to have a conservative exit velocity of 0.001 m/s and ambient stack temperatures (0 K in the model)

Note: In a conservative measure, blowdown operations and normal operations were modeled simultaneously.

Emission Rates Calculations

Appendix D-2

Table D-1 Permit to Construct Application Project Equipment List
ACP Compressor Station 3 - Northampton County, North Carolina

Emission Point ID	Source	Manufacturer	Model/Type	Rated Capacity
CT-01	Compressor Turbine	Solar Turbines	Taurus 70-10802S	10,915 hp
CT-02	Compressor Turbine	Solar Turbines	Centaur 50-6200LS	6,200 hp
CT-03	Compressor Turbine	Solar Turbines	Centaur 40-4700S	4,700 hp
EG-01	Emergency Generator	Caterpillar	G3516B	1,818 hp
EG-02	Emergency Generator	Generac	SG100	148.9 hp
WH-01	Boiler	Hurst	LPW-G-125-60W	5.25 MMBtu/hr
FUG-01	Fugitive Leaks - Blowdowns	--	--	--
FUG-02	Fugitive Leaks - Piping	--	--	--
TK-1	Pipeline Liquids Tank	--	--	1,000 gal
TK-2	Hydrocarbon (Waste Oil) Tank	--	--	2,500 gal
TK-3	Ammonia Tank	--	--	13,400 gal

Table D-2 Potential Emissions From Combustion Sources
ACP Compressor Station 3 - Northampton County, North Carolina

Turbine Operational Parameters:

Normal Hours of Operation:	8,677
Hours at Low Load (<50%)	0
Hours of Low Temp. (< 0 deg. F)	50
Hours of Start-up/Shut-down	33.3
Total Hours of Operation (hr/yr):	8,760

Emergency Generator Operational Hours:

Normal Hours of Operation:	500

Boiler/Heater Operational Parameters:

Normal Hours of Operation:	8,760

Pre-Control Potential to Emit

Combustion Sources	Power Rating	Units	Fuel	Criteria Pollutants (tpy)											GHG Emissions (tpy)				Ammonia (tpy)	HAP (tpy)
				NOx	CO	VOC	SO2	Total PM	Total PM10	Total PM2.5	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3	Total HAP
Solar Taurus 70 Turbine	10,915	hp	Natural Gas	14.9	23.8	1.36	1.43	8.41	8.41	8.41	2.42	2.42	2.42	5.99	49,980	3.62	1.26	50,446	5.77	1.16
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	9.25	14.8	0.834	0.894	5.26	5.26	5.26	1.51	1.51	1.51	3.74	31,295	2.26	0.788	31,587	3.58	0.726
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	22.0	25.6	0.702	0.760	4.47	4.47	4.47	1.29	1.29	1.29	3.18	26,718	1.92	0.671	26,966	3.02	0.617
Caterpillar G3516B Egen	1,818	hp	Natural Gas	0.501	2.49	0.541	0.002	0.159	0.159	0.159	0.127	0.127	0.127	0.033	505	4.29	0	612	0	0.369
Generac SG100 Egen	148.9	hp	Natural Gas	2.46E-04	0.005	0.014	1.59E-04	0.013	0.013	0.013	0.010	0.010	0.010	0.003	3,795	0.073	0	3,797	0	0.008
Boiler	5.25	MMBtu/hr	Natural Gas	1.13	1.89	0.124	0.014	0.171	0.171	0.171	0.043	0.043	0.043	0.129	2,705	0.052	0.050	2,721	0	0.043
Total (tons/yr)				**47.7**	**68.6**	**3.58**	**3.10**	**18.5**	**18.5**	**18.5**	**5.40**	**5.40**	**5.40**	**13.1**	**114,999**	**12.2**	**2.77**	**116,129**	**12.4**	**2.92**

Turbine Control Efficiencies

Control Technology	NOx	CO	VOC
Selective Catalytic Reduction (Centaur 40)	80%	-	-
Selective Catalytic Reduction (All Others)	44%	-	-
Oxidation Catalyst (Centaur 40)	-	90%	50%
Oxidation Catalyst (All Others)	-	80%	50%

Post-Control Potential to Emit

Combustion Sources	Power Rating	Units	Fuel	Criteria Pollutants (tpy)											GHG Emissions (tpy)				Ammonia (tpy)	HAP (tpy)
				NOx	CO	VOC	SO2	Total PM	Total PM10	Total PM2.5	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3	Total HAP
Solar Taurus 70 Turbine	10915	hp	Natural Gas	8.25	4.76	0.680	1.43	8.41	8.41	8.41	2.42	2.42	2.42	5.99	49,980	3.62	1.26	50,446	5.77	0.581
Solar Centaur 50L Turbine	6200	hp	Natural Gas	5.14	2.96	0.417	0.894	5.26	5.26	5.26	1.51	1.51	1.51	3.74	31,295	2.26	0.788	31,587	3.58	0.363
Solar Centaur 40 Turbine	4700	hp	Natural Gas	4.39	2.56	0.351	0.760	4.47	4.47	4.47	1.29	1.29	1.29	3.18	26,718	1.92	0.671	26,966	3.02	0.309
Caterpillar G3516B Egen	1818	hp	Natural Gas	0.501	2.49	0.541	0.002	0.159	0.159	0.159	0.127	0.127	0.127	0.033	505	4.29	0	612	0	0.369
Generac SG100 Egen	148.9	hp	Natural Gas	2.46E-04	0.005	0.014	1.59E-04	0.013	0.013	0.013	0.010	0.010	0.010	0.003	3,795	0.073	0	3,797	0	0.008
Boiler	5.25	MMBtu/hr	Natural Gas	1.13	1.89	0.124	0.014	0.171	0.171	0.171	0.043	0.043	0.043	0.129	2,705	0.052	0.050	2,721	0	0.043
Total (tons/yr)				**19.4**	**14.7**	**2.13**	**3.10**	**18.5**	**18.5**	**18.5**	**5.40**	**5.40**	**5.40**	**13.1**	**114,999**	**12.2**	**2.77**	**116,129**	**12.4**	**1.67**

Notes:
(1) Turbine emissions are calculated by the following formula: ER * Run Hours / 2000 * (1 - Control Efficiency)
ER = Emission Rate for particular equipment and pollutant (lbs/hr)
2000 = the amount of lbs in a ton
(2) Emergency Generator emissions are calculated by the following formula: Power Rating * Run Hours * EF / 2000
Power Rating = Engine hp rating (hp)
EF = Emission Factor from either manufacturer's data or AP-42 (lb/hp-hr)
2000 = the amount of lbs in a ton
(3) Boiler/Heater emissions calculated by the following formula: EF * Power Rating * Run Hours / HHV / 2000
EF = AP-42 Emission Factor (lb/MMSCF)
Power Rating = Boiler/Heater Heat Capacity (MMBtu/hr)
HHV = Natural Gas High Heating Value (1020 MMBtu/MMSCF)
(4) Turbines are equipped with Selective Catalytic Reduction (SCR) and oxidation catalyst for control of NOx (44%), CO (80%), and VOC (50%)
(5) Taurus Centaur 40 oxidation catalyst has a control of 90% for CO
(6) Emergency generator engine hp taken from manufacturer data
(7) Boiler assumed to have low-NOx burners
(8) See the "HAP Emissions" worksheet for a more detailed breakdown of HAP emissions
(9) See Emissions Factors table for Emissions Factors for each operating scenario.
(10) Each start-up/shut-down event assumed to last 10 minutes

Table D-3 Event Based Potential Emissions From Combustion Sources
ACP Compressor Station 3 - Northampton County, North Carolina

Start-up Emissions

Combustion Sources	Power Rating	Units	Fuel	Start-up Events	Criteria Pollutants (tpy)			GHG Emissions (tpy)			HAP
					NOx	CO	VOC	CO2	CH4	CO2e	Total HAP
Solar Taurus 70 Turbine	10,915	hp	Natural Gas	100	0.040	3.66	0.042	25.95	0.168	30.2	0.245
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	100	0.040	3.46	0.040	23.45	0.160	27.45	0.060
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	100	0.035	3.22	0.037	19.60	0.148	23.30	0.060
Total (tons/yr)					**0.115**	**10.33**	**0.119**	**69.0**	**0.476**	**80.9**	**0.365**

Shutdown Emissions

Combustion Sources	Power Rating	Units	Fuel	Shutdown Events	Criteria Pollutants (tpy)			GHG Emissions (tpy)			HAP
					NOx	CO	VOC	CO2	CH4	CO2e	Total HAP
Solar Taurus 70 Turbine	10,915	hp	Natural Gas	100	0.055	0.934	0.027	28.8	0.212	34.1	0.085
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	100	0.020	0.354	0.010	10.85	0.080	12.85	0.050
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	100	0.015	0.151	0.009	9.05	0.068	10.75	0.050
Total (tons/yr)					**0.090**	**1.44**	**0.045**	**48.7**	**0.360**	**57.7**	**0.185**

Total SUSD Emissions (tons/yr)	**0.205**	**11.8**	**0.164**	**117.7**	**0.836**	**139**	**0.550**

Compressor Blowdown Emissions

Source Designation:	FUG-01

Blowdown Start-up Events

Blowdown from Start-up	38000	scf/event
Volumetric flow rate	385	scf-lbmol
Methane Molecular Weight	16	lb-lbmol
Methane Percent Weight	93%	%
Start-up Blowdown	1691	lb/event

Blowdown Shutdown Events

Blowdown from Shutdown	63000	scf/event
Volumetric flow rate	385	scf-lbmol
Methane Molecular Weight	16	lb-lbmol
Methane Percent Weight	93%	%
Shutdown Blowdown	2803	lb/event

Gas Composition

Pollutant	Molecular Weight (lb/lb-mol)	Molar (Volume) Fraction (mol%)	Wt. Fraction (wt. %)
Total Stream Molecular Weight	16.89		
Non-VOC			
Carbon Dioxide	44.01	1.041%	**2.71%**
Nitrogen	28.01	0.994%	**1.65%**
Methane	16.04	94.21%	**89.47%**
Ethane	30.07	2.923%	**5.20%**
VOC			
Propane	44.10	0.546%	**1.43%**
n-Butane	58.12	0.084%	**0.29%**
IsoButane	58.12	0.079%	**0.27%**
n-Pentane	72.15	0.022%	**0.09%**
IsoPentane	72.15	0.024%	**0.10%**
n-Hexane	78.11	0.032%	**0.15%**
n-Heptane	100.21	0.049%	**0.29%**
Total VOC Fraction			**2.62%**
Total HAP Fraction			**0.15%**

Blowdown from Startup Events

Combustion Sources	Start-up Events	VOC	GHG Emissions (tpy)			HAPs
			CO2	CH4	CO2e	
Solar Taurus 70 Turbine	100	2.216	2.293	75.634	1,893	0.125
Solar Centaur 50L Turbine	100	2.216	2.293	75.634	1,893	0.125
Solar Centaur 40 Turbine	100	2.216	2.293	75.634	1,893	0.125
Total (tons/yr)		**6.649**	**6.880**	**227**	**5,679**	**0.375**

Blowdown from Shutdown Events

Combustion Sources	Startup Events	VOC	GHG Emissions (tpy)			HAPs
			CO2	CH4	CO2e	
Solar Taurus 70 Turbine	100	3.675	3.80	125.39	3,139	0.207
Solar Centaur 50L Turbine	100	3.675	3.80	125.39	3,139	0.207
Solar Centaur 40 Turbine	100	3.675	3.80	125.39	3,139	0.207
Total (tons/yr)		**11.024**	**11.41**	**376**	**9,416**	**0.622**

Site-Wide Blowdown Events

Site-Wide Blowdown	1,599,381	scf/event
Volumetric flow rate	385	scf-lbmol
Methane Molecular Weight	16	lb-lbmol
Methane Percent Weight	93%	%
Site-Wide Blowdown	71,165	lb/event

Blowdown from Site Wide Events

Combustion Sources	Startup Events	VOC	GHG Emissions (tpy)			HAPs
			CO2	CH4	CO2e	
ACP-3	1	0.933	0.965	31.8	797	0.053
Total (tons/yr)		**0.933**	**0.965**	**31.8**	**797**	**0.053**

Total Blowdown Emissions (tons/yr)	**18.6**	**19.3**	**635**	**15,892**	**1.05**

Table D-4 Combustion Source Criteria Pollutant Emission Factors
ACP Compressor Station 3 - Northampton County, North Carolina

Solar Turbine Normal Operation Emission Factors (lb/hr)																
Equipment Name	**Fuel**	**Units**	**NOx**	**CO**	**VOC**	**SO2**	**PMF**	**PMF-10**	**PMF-2.5**	**PMC**	**CO2**	**CH4**	**N2O**	**CO2e**	**NH3**	**Total HAP**
Solar Centaur 40 Turbine	Natural Gas	lb/hr	4.70	5.70	0.160	0.17	0.29	0.29	0.29	0.73	6100	0.44	0.15	6157	0.690	0.141
Solar Centaur 50L Turbine	Natural Gas	lb/hr	1.98	3.30	0.190	0.20	0.35	0.35	0.35	0.85	7145	0.52	0.18	7212	0.818	0.166
Solar Taurus 70 Turbine	Natural Gas	lb/hr	3.18	5.30	0.310	0.33	0.55	0.55	0.55	1.37	11411	0.83	0.29	11517	1.317	0.266

Notes
(1) Pre-Control Emission Rates for NOx, CO, VOC, PMF, PMC, and CO2 taken from Solar Turbine Data at 100% load and 0 degrees F
(2) Emission Factors for SO2, CH4, N2O, and HAP taken from AP-42 in (lbs/MMBtu) and multiplied by turbine fuel throughput by Solar Turbine at 100% load and 0 degree F to get Emission Rates
(3) Assume PMF=PMF-10=PMF-2.5; Filterable and Condensable based on Solar Turbine Emission Factor and ratio of AP-42 Table 3.1 factors
(4) NH3 emission rates based on a 10 ppm ammonia slip from the SCR based on manufacturer information
(5) CO2e emission rate calculated by multiplying each GHG (CO2, CH4, N2O) by its Global Warming Potential (GWP) and adding them together
(6) CO2 GWP = 1; CH4 GWP = 25; N2O GWP = 298 [40 CFR Part 98]

Solar Turbine Alternate Operation Emission Factors (lb/hr)								
			< 0 degrees F			**Solar Turbine Low Load F Operation**		
Equipment Name	**Fuel**	**Units**	**NOx**	**CO**	**VOC**	**NOx**	**CO**	**VOC**
Solar Centaur 40 Turbine	Natural Gas	lb/hr	62.7	34.2	0.320	36.6	2,280	6.40
Solar Centaur 50L Turbine	Natural Gas	lb/hr	26.4	19.8	0.380	15.4	1,320	7.60
Solar Taurus 70 Turbine	Natural Gas	lb/hr	42.4	31.8	0.620	24.7	2,120	12.4

Notes
(1) Pre-Control low temperature Emission Rates for NOx, CO, VOC. Conservatively assume 120 ppm NOx, 150 ppm CO, and 5 ppm VOC (10% of UHC) per Table 2 of Solar PIL 167
(2) Pre-Control low load Emission Rates for NOx, CO, VOC. Conservatively assume 70 ppm NOx, 10,000 ppm CO, and 100 ppm VOC (10% of UHC) per Table 4 of Solar PIL 167

Solar Turbine Start-up and Shutdown Emission Factors (lb/event)																
			Start-up EFs							**Shutdown EFs**						
Equipment Name	**Fuel**	**Units**	**NOx**	**CO**	**VOC**	**CO2**	**CH4**	**CO2e**	**Total HAP**	**NOx**	**CO**	**VOC**	**CO2**	**CH4**	**CO2e**	**Total HAP**
Solar Centaur 40 Turbine	Natural Gas	lb/event	0.7	64.4	0.7	392	3.0	466	1.2	0.3	30.2	0.3	181	1.4	215	2.0
Solar Centaur 50L Turbine	Natural Gas	lb/event	0.8	69.1	0.8	469	3.2	549	1.2	0.4	35.4	0.4	217	1.6	257	2.0
Solar Taurus 70 Turbine	Natural Gas	lb/event	0.8	73.1	0.8	519	3.4	603	4.9	1.1	93.4	1.1	575	4.2	681	3.4

Notes
(1) Start-up and Shutdown Emissions based on Solar Turbines Incorporated Product Information Letter 170: Emission Estimates at Start-up, Shutdown, and Commissioning for SoLoNOx Combustion Products (13 June 2012). Emission Estimates do not include SO2, PM, or N2O.
(2) Start-up and Shutdown Emissions of HAP based on Solar estimations.
(3) VOCs assumed to be 20% of UHC and CH4 assumed to be 80% of UHC.
(4) CO2e emission rate calculated by multiplying each GHG (CO2, CH4) by its Global Warming Potential (GWP) and adding them together
(5) CO2 GWP = 1; CH4 GWP = 25; [40 CFR Part 98]

Engine and Boiler Emission Factors																
Equipment Type	**Fuel**	**Units**	**NOx**	**CO**	**VOC**	**SO2**	**PMF**	**PMF-10**	**PMF-2.5**	**PMC**	**CO2**	**CH4**	**N2O**	**CO2e**	**NH3**	**Total HAP**
Boiler < 100 MMBtu	Natural Gas	lb/MMscf	50	84	5.5	0.6	1.9	1.9	1.9	5.7	120000	2.3	2.2	120713	0.00	1.89
1300 KW Caterpillar Egen	Natural Gas	lb/hp-hr	0.0011023	0.00549	0.00119	4.269E-06	0.000278822	0.000278822	0.000278822	7.19565E-05	1.111131	0.009445	0	1	0.00	8.12E-04
100 kW Generac Egen	Natural Gas	lb/hp-hr	0.000007	0.00013	0.00037	4.269E-06	0.000278822	0.000278822	0.000278822	7.19565E-05	101.9472	0.001954	0	102	0.00	2.03E-04

Notes
(1) Emission factors for natural gas boilers taken from AP-42 Tables 1.4-1 & 1.4-2
(2) Boiler assumed to have low-NOx burners
(3) NOx, CO, VOC, CO2, and CH4 emission factors for Caterpillar Egens taken from Caterpillar Manufacturer data
(4) NOx, CO, and VOC emission factors for Generac Egens taken from Generac manufacturer statement of exhaust emissions for SCAQMD certification
(5) SO2, PMF, PMF-10, PMF-2.5, PMC, and N2O Emission factors for Caterpillar Egens taken from AP-42 Table 3.2-1 and converted using manufacturer fuel data
(6) SO2, PMF, PMF-10, PMF-2.5, PMC, and N2O Emission factors for Generac Egens taken from AP-42 for natural gas combustion
(7) Assume PMF=PMF-10=PMF-2.5
(8) CO2e emission rate calculated by multiplying each GHG (CO2, CH4, N2O) by its Global Warming Potential (GWP) and adding them together
(9) CO2 GWP = 1; CH4 GWP = 25; N2O GWP = 298 [40 CFR 98]
(10) See the "HAP Emissions" worksheet for a more detailed breakdown of HAP emissions

__Table D-5 Hazardous Air Pollutant (HAP) Emissions From Combustion Sources__
ACP Compressor Station 3 - Northampton County, North Carolina

		Annual HAP Emissions (lb/yr)					
Quantity @ ACP-3		**1**	**1**	**1**	**1**	**1**	**1**
Pollutant	**HAP?**	**Solar Centaur 40 Turbine**	**Solar Centaur 50L Turbine**	**Solar Taurus 70 Turbine**	**Boiler < 100 MMBtu**	**1300 KW Caterpillar Egen**	**100 kW Generac Egen**
		4700	**6200**	**10915**	**5.25**	**1818**	**148.9**
		hp	**hp**	**hp**	**MMBTU/hr**	**hp**	**hp**
		9125	**8500**	**7205**			
		Btu/hp-hr	**Btu/hp-hr**	**Btu/hp-hr**			
1,1,2,2-Tetrachloroethane	Yes					0.153	0.013
1,1,2-Trichloroethane	Yes					0.122	0.010
1,1-Dichloroethane	Yes					0.090	0.007
1,2,3-Trimethylbenzene	No					0.082	0.007
1,2,4-Trimethylbenzene	No					0.257	0.021
1,2-Dichloroethane	Yes					0.098	0.008
1,2-Dichloropropane	Yes					0.103	0.008
1,3,5-Trimethylbenzene	No					0.042	0.003
1,3-Butadiene	Yes					1.897	0.155
1,3-Dichloropropene	Yes					0.101	0.008
2,2,4-Trimethylpentane	Yes					1.957	0.160
2-Methylnaphthalene	No				0.001	0.049	0.004
3-Methylchloranthrene	No				0.000		
7,12-Dimethylbenz(a)anthracene	No				0.001		
Acenaphthene	No				0.000	0.003	0.000
Acenaphthylene	No				0.000	0.007	0.001
Acetaldehyde	Yes					17.948	1.470
Acrolein	Yes					17.994	1.474
Anthracene	No				0.000	0.002	0.000
Benz(a)anthracene	No				0.000	0.001	0.000
Benzene	Yes				0.095	4.487	0.367
Benzo(a)pyrene	No				0.000	0.000	0.000
Benzo(b)fluoranthene	No				0.000	0.000	0.000
Benzo(e)pyrene	No					0.000	0.000
Benzo(g,h,i)perylene	No				0.000	0.000	0.000
Benzo(k)fluoranthene	No				0.000	0.000	0.000
Biphenyl	Yes					0.009	0.001
Butane	No				94.685	10.986	0.900
Butyr/Isobutyraldehyde	No					1.011	0.083
Carbon Tetrachloride	Yes					0.140	0.011
Chlorobenzene	Yes					0.103	0.008
Chloroethane	Yes						
Chloroform	Yes					0.1089	0.009
Chrysene	No				0.000	0.002	0.000
Cyclohexane	No					0.712	0.058
Cyclopentane	No					0.219	0.018
Dibenzo(a,h)anthracene	No				0.000		
Dichlorobenzene	Yes				0.054		
Ethane	No				139.774	163.980	13.430
Ethylbenzene	Yes					0.250	0.020
Ethylene Dibromide	Yes					0.170	0.014
Fluoranthene	No				0.000	0.001	0.000
Fluorene	No				0.000	0.004	0.000
Formaldehyde	Yes	541.000	664.779	992.029	3.382	681.361	10.456
Hexane (or n-Hexane)	Yes				81.159	1.029	0.084
Indeno(1,2,3-c,d)pyrene	No				0.000	0.000	0.000
Isobutane	No					8.673	0.710
Methanol	Yes					5.736	0.470
Methylcyclohexane	No					0.782	0.064
Methylene Chloride	Yes					0.340	0.028
n-Nonane	No					0.071	0.006
n-Octane	No					0.172	0.014
Naphthalene	Yes				0.028	0.223	0.018
PAH	Yes					0.310	0.025
Pentane (or n-Pentane)	No				117.229	3.539	0.290
Perylene	No					0.000	0.000
Phenanthrene	No				0.001	0.008	0.001
Phenol	Yes					0.097	0.008
Propane	No				72.141	66.378	5.437
Propylene Oxide	Yes						
Pyrene	No				0.000	0.001	0.000
Styrene	Yes					0.127	0.010
Tetrachloroethane	No						
Toluene	Yes				0.153	2.227	0.182
Vinyl Chloride	Yes					0.057	0.005
Xylene	Yes					0.620	0.051
Arsenic	Yes				0.009		
Barium	No				0.198		
Beryllium	Yes				0.001		
Cadmium	Yes				0.050		
Chromium	Yes				0.063		
Cobalt	Yes				0.004		
Copper	No				0.038		
Manganese	Yes				0.017		
Mercury	Yes				0.012		
Molybdenum	No				0.050		
Nickel	Yes				0.095		
Selenium	Yes				0.001		
Vanadium	No				0.104		
Zinc	No				1.308		
Lead	Yes				0.023		
Total HAPs		572.934	704.019	1050.586			15.084
Total HAP/unit (lb/yr)		**573**	**704**	**1,051**	**85.1**	**738**	**15.1**
Total HAP/unit (TPY)		**0.286**	**0.352**	**0.525**	**0.043**	**0.369**	**0.008**

Hazardous Air Pollutant

Notes:
(1) Emissions above are on a per unit basis
(2) Calculations for the emergency generators assume 500 hours of operation; all other calculations assume 8,760 hours of operation
(3) Heat rates for Solar Turbines taken from Solar Datasheets
(4) Solar turbines have a 50% HAP control efficiency due to the Oxidation Catalyst

Table D-6 Combustion Source HAP Emission Factors
ACP Compressor Station 3 - Northampton County, North Carolina

Pollutant	HAP?	Emission Factors					
		Solar Centaur 40 Turbine	Solar Centaur 50L Turbine	Solar Taurus 70 Turbine	Boiler < 100 MMBtu	1300 KW Caterpillar Egen	100 kW Generac Egen
		lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMscf	lb/hp-hr	lb/hp-hr
1,1,2,2-Tetrachloroethane	Yes					1.7E-07	1.7E-07
1,1,2-Trichloroethane	Yes					1.3E-07	1.3E-07
1,1-Dichloroethane	Yes					9.9E-08	9.9E-08
1,2,3-Trimethylbenzene	No					9.0E-08	9.0E-08
1,2,4-Trimethylbenzene	No					2.8E-07	2.8E-07
1,2-Dichloroethane	Yes					1.1E-07	1.1E-07
1,2-Dichloropropane	Yes					1.1E-07	1.1E-07
1,3,5-Trimethylbenzene	No					4.6E-08	4.6E-08
1,3-Butadiene	Yes					2.1E-06	2.1E-06
1,3-Dichloropropene	Yes					1.1E-07	1.1E-07
2,2,4-Trimethylpentane	Yes					2.2E-06	2.2E-06
2-Methylnaphthalene	No				2.4E-05	5.4E-08	5.4E-08
3-Methylchloranthrene	No				1.8E-06		
7,12-Dimethylbenz(a)anthracene	No				1.6E-05		
Acenaphthene	No				1.8E-06	3.4E-09	3.4E-09
Acenaphthylene	No				1.8E-06	8.1E-09	8.1E-09
Acetaldehyde	Yes					2.0E-05	2.0E-05
Acrolein	Yes					2.0E-05	2.0E-05
Anthracene	No				2.4E-06	1.8E-09	1.8E-09
Benz(a)anthracene	No				1.8E-06	8.5E-10	8.5E-10
Benzene	Yes				2.1E-03	4.9E-06	4.9E-06
Benzo(a)pyrene	No				1.2E-06	1.4E-11	1.4E-11
Benzo(b)fluoranthene	No				1.8E-06	2.2E-11	2.2E-11
Benzo(e)pyrene	No					6.0E-11	6.0E-11
Benzo(g,h,i)perylene	No				1.2E-06	6.3E-11	6.3E-11
Benzo(k)fluoranthene	No				1.8E-06	1.1E-11	1.1E-11
Biphenyl	Yes					1.0E-08	1.0E-08
Butane	No				2.1E+00	1.2E-05	1.2E-05
Butyr/Isobutyraldehyde	No					1.1E-06	1.1E-06
Carbon Tetrachloride	Yes					1.5E-07	1.5E-07
Chlorobenzene	Yes					1.1E-07	1.1E-07
Chloroethane	Yes						
Chloroform	Yes					1.2E-07	1.2E-07
Chrysene	No				1.8E-06	1.7E-09	1.7E-09
Cyclohexane	No					7.8E-07	7.8E-07
Cyclopentane	No					2.4E-07	2.4E-07
Dibenzo(a,h)anthracene	No				1.2E-06		
Dichlorobenzene	Yes				1.2E-03		
Ethane	No				3.1E+00	1.8E-04	1.8E-04
Ethylbenzene	Yes					2.7E-07	2.7E-07
Ethylene Dibromide	Yes					1.9E-07	1.9E-07
Fluoranthene	No				3.0E-06	9.2E-10	9.2E-10
Fluorene	No				2.8E-06	4.3E-09	4.3E-09
Formaldehyde	Yes	2.9E-03	2.9E-03	2.9E-03	7.5E-02	7.5E-04	1.4E-04
Hexane (or n-Hexane)	Yes				1.8E+00	1.1E-06	1.1E-06
Indeno(1,2,3-c,d)pyrene	No				1.8E-06	2.5E-11	2.5E-11
Isobutane	No					9.5E-06	9.5E-06
Methanol	Yes					6.3E-06	6.3E-06
Methylcyclohexane	No					8.6E-07	8.6E-07
Methylene Chloride	Yes					3.7E-07	3.7E-07
n-Nonane	No					7.8E-08	7.8E-08
n-Octane	No					1.9E-07	1.9E-07
Naphthalene	Yes				6.1E-04	2.5E-07	2.5E-07
PAH	Yes					3.4E-07	3.4E-07
Pentane (or n-Pentane)	No				2.6E+00	3.9E-06	3.9E-06
Perylene	No					1.3E-11	1.3E-11
Phenanthrene	No				1.7E-05	9.0E-09	9.0E-09
Phenol	Yes					1.1E-07	1.1E-07
Propane	No				1.6E+00	7.3E-05	7.3E-05
Propylene Oxide	Yes						
Pyrene	No				5.0E-06	1.5E-09	1.5E-09
Styrene	Yes					1.4E-07	1.4E-07
Tetrachloroethane	No						
Toluene	Yes				3.4E-03	2.5E-06	2.5E-06
Vinyl Chloride+A32	Yes					6.3E-08	6.3E-08
Xylene	Yes					6.8E-07	6.8E-07
Arsenic	Yes				2.0E-04		
Barium	No				4.4E-03		
Beryllium	Yes				1.2E-05		
Cadmium	Yes				1.1E-03		
Chromium	Yes				1.4E-03		
Cobalt	Yes				8.4E-05		
Copper	No				8.5E-04		
Manganese	Yes				3.8E-04		
Mercury	Yes				2.6E-04		
Molybdenum	No				1.1E-03		
Nickel	Yes				2.1E-03		
Selenium	Yes				2.4E-05		
Vanadium	No				2.3E-03		
Zinc	No				2.9E-02		
Lead	Yes				5.0E-04		
Total HAPs		3.1E-03	3.1E-03	3.1E-03	1.89E+00	8.12E-04	2.03E-04

Hazardous Air Pollutant

Notes:
(1) Emission factors for Solar natural gas turbines from AP-42 Table 3.1-3
(2) Emission factors for natural gas boilers from AP-42 Tables 1.4-2, 1.4-3, and 1.4-4
(3) Emission factors for Caterpillar and Generac natural gas emergency generators taken from AP-42 Table 3.2-1
(4) Emission factors for Solar natural gas turbines and Caterpillar and Generac natural gas emergency generators converted using 1 KWh = 3412
(5) Emission Factors (lb/MMBtu) for Formaldehyde and Total HAPs for Solar Turbines from Solar PIL 168
(6) Emission factor for formaldehyde for Caterpillar natural gas emergency generator from manufacturer's data

Table D-7 Potential Emissions From Fugitive Leaks
ACP Compressor Station 3 - Northampton County, North Carolina

Fugitive Emissions (FUG)

Source Designation:	FUG-02

Operational Parameters:

Annual Hours of Operation (hr/yr):	8,760

Pipeline Natural Gas Fugitive Emissions

Equipment	Service	Emission Factor[1]	Source Count[2]	Total HC Potential Emissions		VOC Weight Fraction	VOC Emissions	CO_2 Weight Fraction	CO_2 Emissions	CH_4 Weight Fraction	CH_4 Emissions	HAP Weight Fraction	HAP Emissions
		kg/hr/source		lb/hr	tpy		tpy		tpy		tpy		tpy
Valves	Gas	4.50E-03	646	6.41	28.1	0.026	0.736	0.027	0.761	0.895	25.1	1.48E-03	0.042
Pump Seals	Gas	2.40E-03		0.000	0.000	0.026	0.000	0.027	0.000	0.895	0.000	1.48E-03	0.000
Others (compressors and others)	Gas	8.80E-03	3	0.058	0.255	0.026	0.007	0.027	0.007	0.895	0.228	1.48E-03	3.77E-04
Connectors	Gas	2.00E-04	1	4.41E-04	0.002	0.026	5.06E-05	0.027	5.24E-05	0.895	0.002	1.48E-03	2.86E-06
Flanges	Gas	3.90E-04	340	0.292	1.28	0.026	0.034	0.027	0.035	0.895	1.15	1.48E-03	0.002
Open-ended lines	Gas	2.00E-03		0.000	0.000	0.026	0.000	0.027	0.000	0.895	0.000	1.48E-03	0.000
			Total	6.76	29.6	-	0.776	-	0.803	-	26.5	-	0.044

1. EPA Protocol for Equipment Leaks Emissions Estimate (EPA-453/R-95-017) Table 2-4: Oil and Gas Production Operations Emission Factors.
2. Component count based on Basic Systems Engineering Estimate.

Sample Calculations:

Potential Emissions (lb/hr) = Emission Factor (kg/hr/source) * Source Count * (2.20462 lb/1 kg)

Potential Emissions (tons/yr) = $(lb/hr)_{Potential}$ × Hours of Operation (hr/yr) × (1 ton/2,000 lb)

Table D-8 Tank Emissions
ACP Compressor Station 3 - Northampton County, North Carolina

Source Designation:	TK-1, TK-2, TK-3

Tank Parameters

Source	Type of Tank	Contents	Capacity (gal)	Throughput gal/yr	Tank Diam. ft	Tank Length ft	Paint Color	Paint Condition
TK-1	Horizontal, fixed	Produced Fluids	1,000	5,000	4.12	10	Light Grey	Good
TK-2	Horizontal, fixed	Lube Oil	2,500	12,500	4.61	20	Light Grey	Good

Total Emissions

Source	VOC Emissions							
	Flashing Losses		Working Losses		Breathing Losses		Total Losses	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
TK-1[1]	--	--	--	--	--	--	0.033	0.145
TK-2[2]	NA	NA	1.29E-06	5.65E-06	3.72E-06	1.63E-05	5.01E-06	2.19E-05

1. Losses were calculated for TK-1 using E&P Tanks Software. See attached for output.
2. Losses were calculated for TK-2 using EPA's TANKS 4.09d software with default breather vent settings.
3. Losses (Emissions) from TK-3 13,400-gallon Ammonia tank assumed to be insignficant. Tank is sealed and is not expected to vent to atmosphere.

Table D-9a Project Potential Emissions

ACP Compressor Station 3 - Northampton County, North Carolina

		Criteria Pollutants (tpy)								GHG Emissions (tpy)				Ammonia (tpy)	HAP (tpy)
Combustion Sources	**ID**	**NOx**	**CO**	**VOC**	**SO2**	**PMF**	**PMF-10**	**PMF-2.5**	**PMC**	**CO2**	**CH4**	**N2O**	**CO2e**	**NH3**	**Total HAP**
Solar Taurus 70 Turbine	CT-01	8.35	9.35	0.749	1.43	2.42	2.42	2.42	5.99	50,035	4.00	1.26	50,511	5.77	0.911
Solar Centaur 50L Turbine	CT-02	5.20	6.77	0.467	0.894	1.51	1.51	1.51	3.74	31,329	2.50	0.788	31,627	3.58	0.473
Solar Centaur 40 Turbine	CT-03	4.44	5.93	0.397	0.760	1.29	1.29	1.29	3.18	26,747	2.14	0.671	27,000	3.02	0.419
Caterpillar G3516B Egen	EG-01	0.501	2.49	0.541	0.002	0.127	0.127	0.127	0.033	505	4.29	0	612	0	0.369
Generac SG100 Egen	EG-02	2.46E-04	0.005	0.014	1.59E-04	0.010	0.010	0.010	0.003	3,795	0.073	0	3,797	0	0.008
Boiler	WH-01	1.13	1.89	0.124	0.014	0.043	0.043	0.043	0.129	2,705	0.052	0.050	2,721	0	0.043
Fugitive Leaks - Blowdowns	FUG-01	-	-	18.6	-	-	-	-	-	19.3	635		15,892	-	1.05
Fugitive Leaks - Piping	FUG-02	-	-	0.776	-	-	-	-	-	0.803	26.5	-	663	-	0.044
Pipeline Liquids Tank	TK-1	-	-	0.145	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbon (Waste Oil) Tank	TK-2	-	-	2.19E-05	-	-	-	-	-	-	-	-	-	-	-
Total (tons/yr)		**19.6**	**26.4**	**21.8**	**3.10**	**5.40**	**5.40**	**5.40**	**13.1**	**115,136**	**674**	**2.77**	**132,823**	**12.4**	**3.32**

Table D-9b Project Potential Emissions - Pre-Control

ACP Compressor Station 3 - Northampton County, North Carolina

Combustion Sources	ID	Criteria Pollutants (tpy)								GHG Emissions (tpy)				Ammonia (tpy)	HAP (tpy)
		NOx	CO	VOC	SO2	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3	Total HAP
Solar Taurus 70 Turbine	CT-01	15.0	32.1	1.46	1.43	2.42	2.42	2.42	5.99	50,035	4.00	1.26	50,511	5.77	1.58
Solar Centaur 50L Turbine	CT-02	9.31	20.0	0.894	0.894	1.51	1.51	1.51	3.74	31,329	2.50	0.788	31,627	3.58	0.886
Solar Centaur 40 Turbine	CT-03	22.0	30.3	0.756	0.760	1.29	1.29	1.29	3.18	26,747	2.14	0.671	27,000	3.02	0.777
Caterpillar G3516B Egen	EG-01	0.501	2.49	0.541	0.002	0.127	0.127	0.127	0.033	505	4.29	0	612	0	0.369
Generac SG100 Egen	EG-02	2.46E-04	0.005	0.014	1.59E-04	0.010	0.010	0.010	0.003	3,795	0.073	0	3,797	0	0.008
Boiler	WH-01	1.13	1.89	0.124	0.014	0.043	0.043	0.043	0.129	2,705	0.052	0.050	2,721	0	0.043
Fugitive Leaks - Blowdowns	FUG-01	-	-	18.6	-	-	-	-	-	19.3	635		15,892	-	1.05
Fugitive Leaks - Piping	FUG-02	-	-	0.776	-	-	-	-	-	0.803	26.5	-	663	-	0.044
Pipeline Liquids Tank	TK-1	-	-	0.145	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbon (Waste Oil) Tank	TK-2	-	-	2.19E-05	-	-	-	-	-	-	-	-	-	-	-
Total (tons/yr)		**47.9**	**86.9**	**23.3**	**3.10**	**5.40**	**5.40**	**5.40**	**13.1**	**115,136**	**674**	**2.77**	**132,823**	**12.4**	**4.75**

Table D-10 Toxic Air Pollutant (TAP) Emissions - Summary
ACP Compressor Station 3 - Northampton County, North Carolina

Pollutant	CAS No.	Exemption Threshold (ET)[1]		
		Hourly	Daily	Annual
		lb/hr	lb/day	lb/yr
1,1,2,2-Tetrachloroethane	79345	---	---	581.110
1,2-Dichloroethane	107062	---	---	350.511
1,3-Butadiene	106990	---	---	40.585
2,2,4-Trimethylpentane	540841	---	---	---
Acetaldehyde	75070	28.43	---	---
Acrolein	107028	0.08	---	---
Ammonia	7664417	2.84	---	---
Benzene	71432	---	---	11.069
Benzo(a)pyrene	50328	---	---	3.044
Beryllium	7440417	---	---	0.378
Cadmium	7440439	---	---	0.507
Carbon Tetrachloride	56235	---	---	618.006
Chlorobenzene	108907	---	92.7	---
Chloroform	67663	---	---	396.631
Ethylbenzene	100414	---	---	---
Ethylene Dibromide	106934	---	---	36.896
Formaldehyde	50000	0.16	---	---
Hexane	110543	---	23	---
Mercury	7439976	---	0.025	---
Methylene Chloride	75092	1.79	---	2,213.75
Naphthalene	91203	---	---	---
Nickel	7440020	---	0.3	---
PAH	---	---	---	---
Phenol	108952	1.00	---	---
Propylene Oxide	75569	---	---	---
Styrene	100425	11.16	---	---
Toluene	108883	58.97	197.96	---
Vinyl Chloride	75014	---	---	35.051
Xylenes	1330207	68.44	113.7	---

Potential Hourly Emissions (lb/hr)[2,3]														
Pollutant	CT-01	CT-02	CT-03	AP-1 Suctn.	AP-2 Dischrg.	AP-3 Dischrg.	EG-01	EG-02	WH-01	INSIG	TK-1	TK-2	Total	ET
1,1,2,2-Tetrachloroethane	---	---	---	---	---	---	3.07E-04	2.51E-05	---	---	---	---	3.32E-04	---
1,2-Dichloroethane	---	---	---	---	---	---	1.95E-04	1.60E-05	---	---	---	---	2.11E-04	---
1,3-Butadiene	4.22E-04	1.45E-04	1.44E-04	---	---	---	0.004	3.11E-04	---	---	---	---	0.005	---
2,2,4-Trimethylpentane	---	---	---	---	---	---	0.004	3.21E-04	---	---	0.000	5.01E-06	0.004	---
Acetaldehyde	0.152	0.051	0.051	---	---	---	0.036	0.003	---	---	---	---	0.292	28.43
Acrolein	0.024	0.008	0.008	---	---	---	0.036	0.003	---	---	---	---	0.079	0.08
Ammonia	1.32	0.818	0.690	---	---	---	---	---	---	---	---	---	2.83	2.84
Benzene	0.012	0.004	0.004	---	---	---	0.009	0.001	1.08E-05	3.29E-07	2.37E-04	5.01E-06	0.030	---
Benzo(a)pyrene	---	---	---	---	---	---	2.63E-08	2.15E-09	6.18E-09	1.88E-10	---	---	3.48E-08	---
Beryllium	---	---	---	---	---	---	---	---	6.18E-08	1.88E-09	---	---	6.36E-08	---
Cadmium	---	---	---	---	---	---	---	---	5.66E-06	1.73E-07	---	---	5.83E-06	---
Carbon Tetrachloride	---	---	---	---	---	---	2.81E-04	2.30E-05	---	---	---	---	3.04E-04	---
Chlorobenzene	---	---	---	---	---	---	2.05E-04	1.68E-05	---	---	---	---	2.22E-04	---
Chloroform	---	---	---	---	---	---	2.18E-04	1.78E-05	---	---	---	---	2.36E-04	---
Ethylbenzene	0.031	0.011	0.011	---	---	---	5.00E-04	4.09E-05	---	---	0.000	5.01E-06	0.053	---
Ethylene Dibromide	---	---	---	---	---	---	3.40E-04	2.78E-05	---	---	---	---	3.67E-04	---
Formaldehyde	18.4	4.43	4.42	---	---	---	1.36	0.021	3.86E-04	1.18E-05	---	---	28.7	0.16
Hexane[4]	4.85	5.87	11.8	36.2	25.9	20.6	0.002	1.69E-04	0.009	2.82E-04	0.002	5.01E-06	105	---
Mercury	---	---	---	---	---	---	---	---	1.34E-06	4.08E-08	---	---	1.38E-06	---
Methylene Chloride	---	---	---	---	---	---	0.001	5.57E-05	---	---	---	---	0.001	1.79
Naphthalene	1.28E-03	4.39E-04	4.35E-04	---	---	---	4.45E-04	3.65E-05	3.14E-06	9.57E-08	---	---	0.003	---
Nickel	---	---	---	---	---	---	---	---	1.08E-05	3.29E-07	---	---	1.11E-05	---
PAH	0.002	0.001	0.001	---	---	---	0.001	5.08E-05	---	---	---	---	0.004	---
Phenol	---	---	---	---	---	---	1.95E-04	1.59E-05	---	---	---	---	2.11E-04	1.00
Propylene Oxide	0.028	0.010	0.010	---	---	---	---	---	---	---	---	---	0.048	---
Styrene	---	---	---	---	---	---	2.53E-04	2.08E-05	---	---	---	---	2.74E-04	11.16
Toluene	0.128	0.044	0.043	---	---	---	0.004	3.65E-04	1.75E-05	5.33E-07	0.000	5.01E-06	0.220	58.97
Vinyl Chloride	---	---	---	---	---	---	1.14E-04	9.36E-06	---	---	---	---	1.24E-04	---
Xylenes	0.063	0.022	0.021	---	---	---	0.001	1.02E-04	---	---	0.000	5.01E-06	0.107	68.44

Table D-10 Toxic Air Pollutant (TAP) Emissions - Summary
ACP Compressor Station 3 - Northampton County, North Carolina

Potential Daily Emissions (lb/day)[2,3]														
Pollutant	CT-01	CT-02	CT-03	AP-1 Suctn.	AP-2 Dischrg.	AP-3 Dischrg.	EG-01	EG-02	WH-01	INSIG	TK-1	TK-2	Total	ET
1,1,2,2-Tetrachloroethane	---	---	---	---	---	---	0.007	0.001	---	---	---	---	0.008	---
1,2-Dichloroethane	---	---	---	---	---	---	0.005	3.84E-04	---	---	---	---	0.005	---
1,3-Butadiene	9.86E-04	4.81E-04	4.39E-04	---	---	---	0.091	0.007	---	---	---	---	0.100	---
2,2,4-Trimethylpentane	---	---	---	---	---	---	0.094	0.008	---	---	0.000	1.20E-04	0.102	---
Acetaldehyde	0.092	0.045	0.041	---	---	---	0.861	0.071	---	---	---	---	1.11	---
Acrolein	0.015	0.007	0.007	---	---	---	0.864	0.071	---	---	---	---	0.963	---
Ammonia	31.6	19.6	16.6	---	---	---	---	---	---	---	---	---	67.8	---
Benzene	0.028	0.013	0.012	---	---	---	0.215	0.018	2.59E-04	7.91E-06	0.006	1.20E-04	0.292	---
Benzo(a)pyrene	---	---	---	---	---	---	6.31E-07	5.16E-08	1.48E-07	4.52E-09	---	---	8.35E-07	---
Beryllium	---	---	---	---	---	---	---	---	1.48E-06	4.52E-08	---	---	1.53E-06	---
Cadmium	---	---	---	---	---	---	---	---	1.36E-04	4.14E-06	---	---	1.40E-04	---
Carbon Tetrachloride	---	---	---	---	---	---	0.007	0.001	---	---	---	---	0.007	---
Chlorobenzene	---	---	---	---	---	---	0.005	4.04E-04	---	---	---	---	0.005	92.7
Chloroform	---	---	---	---	---	---	0.005	4.28E-04	---	---	---	---	0.006	---
Ethylbenzene	0.073	0.036	0.033	---	---	---	0.012	0.001	---	---	0.000	1.20E-04	0.155	---
Ethylene Dibromide	---	---	---	---	---	---	0.008	0.001	---	---	---	---	0.009	---
Formaldehyde	9.17	3.91	3.63	---	---	---	32.7	0.502	0.009	2.82E-04	---	---	49.9	---
Hexane[4]	7.60	8.61	14.6	36.2	25.9	20.6	0.049	0.004	0.222	0.007	0.048	1.20E-04	114	23
Mercury	---	---	---	---	---	---	---	---	3.21E-05	9.79E-07	---	---	3.31E-05	0.025
Methylene Chloride	---	---	---	---	---	---	0.016	0.001	---	---	---	---	0.018	---
Naphthalene	0.003	0.001	0.001	---	---	---	0.011	0.001	7.54E-05	2.30E-06	---	---	0.017	---
Nickel	---	---	---	---	---	---	---	---	2.59E-04	7.91E-06	---	---	2.67E-04	0.3
PAH	0.005	0.002	0.002	---	---	---	0.015	0.001	---	---	---	---	0.026	---
Phenol	---	---	---	---	---	---	0.005	3.83E-04	---	---	---	---	0.005	---
Propylene Oxide	0.067	0.032	0.030	---	---	---	---	---	---	---	---	---	0.129	---
Styrene	---	---	---	---	---	---	0.006	4.98E-04	---	---	---	---	0.007	---
Toluene	0.298	0.145	0.133	---	---	---	0.107	0.009	4.20E-04	1.28E-05	0.000	1.20E-04	0.693	197.96
Vinyl Chloride	---	---	---	---	---	---	0.003	2.25E-04	---	---	---	---	0.003	---
Xylenes	0.147	0.072	0.065	---	---	---	0.030	0.002	---	---	0.000	1.20E-04	0.316	113.7

Potential Annual Emissions (lb/yr)[2,3]														
Pollutant	CT-01	CT-02	CT-03	AP-1 Suctn.	AP-2 Dischrg.	AP-3 Dischrg.	EG-01	EG-02	WH-01	INSIG	TK-1	TK-2	Total	ET
1,1,2,2-Tetrachloroethane	---	---	---	---	---	---	0.153	0.013	---	---	---	---	0.166	581.110
1,2-Dichloroethane	---	---	---	---	---	---	0.098	0.008	---	---	---	---	0.106	350.511
1,3-Butadiene	0.218	0.123	0.107	---	---	---	1.90	0.155	---	---	---	---	2.50	40.585
2,2,4-Trimethylpentane	---	---	---	---	---	---	1.96	0.160	---	---	0.000	0.044	2.16	---
Acetaldehyde	20.3	11.4	10.0	---	---	---	17.9	1.47	---	---	---	---	61.1	---
Acrolein	3.24	1.83	1.60	---	---	---	18.0	1.47	---	---	---	---	26.1	---
Ammonia	11,538	7,166	6,044	---	---	---	---	---	---	---	---	---	24,749	---
Benzene	6.08	3.42	3.00	---	---	---	4.49	0.367	0.095	0.003	2.08	0.044	19.6	11.069
Benzo(a)pyrene	---	---	---	---	---	---	1.31E-05	1.08E-06	5.41E-05	1.65E-06	---	---	7.00E-05	3.044
Beryllium	---	---	---	---	---	---	---	---	0.001	1.65E-05	---	---	0.001	0.378
Cadmium	---	---	---	---	---	---	---	---	0.050	0.002	---	---	0.051	0.507
Carbon Tetrachloride	---	---	---	---	---	---	0.140	0.011	---	---	---	---	0.152	618.006
Chlorobenzene	---	---	---	---	---	---	0.103	0.008	---	---	---	---	0.111	---
Chloroform	---	---	---	---	---	---	0.109	0.009	---	---	---	---	0.118	396.631
Ethylbenzene	16.2	9.13	7.99	---	---	---	0.250	0.020	---	---	0.000	0.044	33.7	---
Ethylene Dibromide	---	---	---	---	---	---	0.170	0.014	---	---	---	---	0.184	36.896
Formaldehyde	1,717	890	788	---	---	---	681	10.5	3.38	0.103	---	---	4,090	---
Hexane[4]	758	759	765	36.2	25.9	20.6	1.03	0.084	81.2	2.47	20.0	0.044	2,468	---
Mercury	---	---	---	---	---	---	---	---	0.012	3.57E-04	---	---	0.012	---
Methylene Chloride	---	---	---	---	---	---	0.340	0.028	---	---	---	---	0.368	2,213.752
Naphthalene	0.659	0.371	0.325	---	---	---	0.223	0.018	0.028	0.001	---	---	1.62	---
Nickel	---	---	---	---	---	---	---	---	0.095	0.003	---	---	0.098	---
PAH	1.12	0.628	0.549	---	---	---	0.310	0.025	---	---	---	---	2.63	---
Phenol	---	---	---	---	---	---	0.097	0.008	---	---	---	---	0.105	---
Propylene Oxide	14.7	8.27	7.24	---	---	---	---	---	---	---	---	---	30.2	---
Styrene	---	---	---	---	---	---	0.127	0.010	---	---	---	---	0.137	---
Toluene	65.9	37.1	32.5	---	---	---	2.23	0.182	0.153	0.005	0.000	0.044	138	---
Vinyl Chloride	---	---	---	---	---	---	0.057	0.005	---	---	---	---	0.062	35.051
Xylenes	32.4	18.3	16.0	---	---	---	0.620	0.051	---	---	0.000	0.044	67.4	---

Table D-10 Toxic Air Pollutant (TAP) Emissions - Summary
ACP Compressor Station 3 - Northampton County, North Carolina

Potential Emissions of Pollutants which Exceed the Exemption Thresholds									
Unit/Stack ID	Formaldehyde			Benzene			Hexane		
	lb/hr[5]	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day[6]	lb/yr[6]
CT-01	4.70	9.17	1,717	0.012	0.028	6.08	---	0.240	87.6
CT-02	1.17	3.91	890	0.004	0.013	3.42	---	0.240	87.6
CT-03	1.16	3.63	788	0.004	0.012	3.00	---	0.240	87.6
CT-01 Vent	---	---	---	---	---	---	4.85	7.36	670
CT-02 Vent	---	---	---	---	---	---	5.87	8.37	671
CT-03 Vent	---	---	---	---	---	---	11.8	14.3	677
AP-1 Suctn.	---	---	---	---	---	---	36.2	36.2	36.2
AP-2 Dischrg.	---	---	---	---	---	---	25.9	25.9	25.9
AP-3 Dischrg.	---	---	---	---	---	---	20.6	20.6	20.6
EG-01	1.36	32.7	681	0.009	0.215	4.49	0.002	0.049	1.03
EG-02	0.021	0.502	10.5	0.001	0.018	0.367	1.69E-04	0.004	0.084
WH-01	3.86E-04	0.009	3.38	1.08E-05	2.59E-04	0.095	0.009	0.222	81.2
INSIG	1.18E-05	2.82E-04	0.103	3.29E-07	7.91E-06	0.003	2.82E-04	0.007	2.47
FUG-01[7]	---	---	---	---	---	---	---	---	---
FUG-02[7]	---	---	---	---	---	---	---	---	---
TK-1	---	---	---	2.37E-04	0.006	2.08	0.002	0.048	20.0
TK-2	---	---	---	5.01E-06	1.20E-04	0.044	5.01E-06	1.20E-04	0.044
TOTAL	***8.41***	***49.9***	***4,090***	***0.030***	***0.292***	***19.6***	***105***	***114***	***2,468***

Key:
Potential Emissions Exceed Exemption Threshold

Notes:
1. Exemption Thresholds from 15A NCAC 02Q.0711(a) for hexane as emissions are primarily attributable to blowdown scenario, where blowdown emissions are from covered stacks. Thresholds from 15A NCAC 02Q.0711(b) for all other pollutants. CT-01 through CT-03, AP-1 Suctn., AP-2 Dischg., and AP-3 Dischrg. are vertical, obstructed stacks. The only TAP emitted from these stacks is hexane. All other stacks are vertical, unobstructed stacks.
2. The ammonia tank (TK-3) Is sealed and will have no emissions during normal operation. "INSIG" includes one boiler and one hot water heater each rated at 0.08 MMBtu/hr, each natural gas fired.
3. Calculated as follows:
   CT-01 through CT-03, AP-1 Suctn., AP-2 Dischg., and AP-3 Dischrg.: From Tables C-11 and C-12.
   EG-01, EG-02, WH-01, and INSIG: From Table C-5.
   TK-1: From E&P Tanks.
   TK-2: HAP composition unknown; assumed 100% of VOC emissions for each HAP commonly emitted from hydrocarbon tanks.
4. CT-01 through CT-03 include emissions from CT-01 Vent through CT-03 Vent.
5. Maximum hourly emissions for turbines based on one startup or shutdown event (whichever has higher emissions) and 50 minutes of normal operation.
6. CT-01 through CT-03 emissions are fugitive emissions.
7. Fugitive hexane emissions are distributed in CT-01 through CT-03, CT-01 Vent through CT-03 Vent, AP-1 Suctn., AP-2 Dischg., and AP-3 Dischrg..

Table D-11 Toxic Air Pollutant (TAP) Emissions from Combustion Turbines - Combustion
ACP Compressor Station 3 - Northampton County, North Carolina

Hourly Emissions - Normal Operations					
Pollutant	CAS No.	Emission Factor (lb/MMBtu)[1]	Emission Rates (lb/hr)[2,3]		
			CT-01	CT-02	CT-03
			87.27 MMBtu/hr	54.55 MMBtu/hr	46.39 MMBtu/hr
1,3-Butadiene	106990	4.30E-07	1.88E-05	1.17E-05	9.97E-06
Acetaldehyde	75070	4.00E-05	0.002	0.001	0.001
Acrolein	107028	6.40E-06	2.79E-04	1.75E-04	1.48E-04
Benzene	71432	1.20E-05	5.24E-04	3.27E-04	2.78E-04
Ethylbenzene	100414	3.20E-05	0.001	0.001	0.001
Formaldehyde	50000	2.88E-03	0.126	0.079	0.067
Naphthalene	91203	1.30E-06	5.67E-05	3.55E-05	3.02E-05
PAH	---	2.20E-06	9.60E-05	6.00E-05	5.10E-05
Propylene Oxide	75569	2.90E-05	0.001	0.001	0.001
Toluene	108883	1.30E-04	0.006	0.004	0.003
Xylenes	1330207	6.40E-05	0.003	0.002	0.001

Event Emissions - Startup					
Pollutant	CAS No.		Emission Rates (lb/event)[4]		
			CT-01	CT-02	CT-03
Total HAP	---		4.9	1.2	1.2
Formaldehyde	50000		4.6	1.1	1.1
Non-Formaldehyde HAP	---		0.3	0.1	0.1

Event Emissions - Startup					
Pollutant	CAS No.	Non-Formaldehyde HAP Composition[5]	Emission Rates (lb/event)[6]		
			CT-01	CT-02	CT-03
1,3-Butadiene	106990	0.136%	4.07E-04	1.36E-04	1.36E-04
Acetaldehyde	75070	12.6%	0.038	0.013	0.013
Acrolein	107028	2.02%	0.006	0.002	0.002
Benzene	71432	3.78%	0.011	0.004	0.004
Ethylbenzene	100414	10.1%	0.030	0.010	0.010
Formaldehyde	50000	---	4.60	1.10	1.10
Naphthalene	91203	0.410%	1.23E-03	4.10E-04	4.10E-04
PAH	---	0.693%	0.002	0.001	0.001
Propylene Oxide	75569	9.14%	0.027	0.009	0.009
Toluene	108883	41.0%	0.123	0.041	0.041
Xylenes	1330207	20.2%	0.061	0.020	0.020

Event Emissions - Shutdown					
Pollutant	CAS No.		Emission Rates (lb/event)[4]		
			CT-01	CT-02	CT-03
Total HAP	---		3.4	2.0	2.0
Formaldehyde	50000		3.2	1.9	1.9
Non-Formaldehyde HAP	---		0.2	0.1	0.1

Event Emissions - Shutdown					
Pollutant	CAS No.	Non-Formaldehyde HAP Composition[5]	Emission Rates (lb/event)[6,7]		
			CT-01	CT-02	CT-03
1,3-Butadiene	106990	0.136%	1.36E-04	6.78E-05	6.78E-05
Acetaldehyde	75070	12.6%	0.013	0.006	0.006
Acrolein	107028	2.02%	0.002	0.001	0.001
Benzene	71432	3.78%	0.004	0.002	0.002
Ethylbenzene	100414	10.1%	0.010	0.005	0.005
Formaldehyde	50000	---	1.60	0.95	0.95
Naphthalene	91203	0.410%	4.10E-04	2.05E-04	2.05E-04
PAH	---	0.693%	6.93E-04	3.47E-04	3.47E-04
Propylene Oxide	75569	9.14%	0.009	0.005	0.005
Toluene	108883	41.0%	0.041	0.020	0.020
Xylenes	1330207	20.2%	0.020	0.010	0.010

Total HAP Emission Factor (lb/MMBtu)	
AP-42	1.03E-03
Solar Data	3.05E-03

Formaldehyde Emission Factor (lb/MMBtu)	
AP-42	7.10E-04
Solar Data	2.88E-03

Non-Formaldehyde HAP Emission Factor (lb/MMBtu)	
AP-42	3.17E-04
Solar Data	1.70E-04

VOC Control Device Efficiency[12]	
Ox. Cat.	50%

Worst Case Schedule (hr/yr)[12]	
Normal Ops.	8,726.7
Startup	16.7
Shutdown	16.7

Max. Events (event/yr)[13]	
Startup	100
Shutdown	100

Table D-11 Toxic Air Pollutant (TAP) Emissions from Combustion Turbines - Combustion

ACP Compressor Station 3 - Northampton County, North Carolina

Maximum Hourly Emissions					
Pollutant	CAS No.		Emission Rates (lb/hr)[8,9]		
			CT-01	CT-02	CT-03
1,3-Butadiene	106990		4.22E-04	1.45E-04	1.44E-04
Acetaldehyde	75070		0.152	0.051	0.051
Acrolein	107028		0.024	0.008	0.008
Benzene	71432		0.012	0.004	0.004
Ethylbenzene	100414		0.031	0.011	0.011
Formaldehyde	50000		18.4	4.43	4.42
Naphthalene	91203		1.28E-03	4.39E-04	4.35E-04
PAH	---		2.16E-03	7.43E-04	7.36E-04
Propylene Oxide	75569		0.028	0.010	0.010
Toluene	108883		0.128	0.044	0.043
Xylenes	1330207		0.063	0.022	0.021

Maximum Daily Emissions					
Pollutant	CAS No.		Emission Rates (lb/day)[10]		
			CT-01	CT-02	CT-03
1,3-Butadiene	106990		9.86E-04	4.81E-04	4.39E-04
Acetaldehyde	75070		0.092	0.045	0.041
Acrolein	107028		0.015	0.007	0.007
Benzene	71432		0.028	0.013	0.012
Ethylbenzene	100414		0.073	0.036	0.033
Formaldehyde	50000		9.17	3.91	3.63
Naphthalene	91203		0.003	0.001	0.001
PAH	---		0.005	0.002	0.002
Propylene Oxide	75569		0.067	0.032	0.030
Toluene	108883		0.298	0.145	0.133
Xylenes	1330207		0.147	0.072	0.065

Maximum Annual Emissions					
Pollutant	CAS No.		Emission Rates (lb/yr)[11]		
			CT-01	CT-02	CT-03
1,3-Butadiene	106990		0.218	0.123	0.107
Acetaldehyde	75070		20.3	11.4	9.99
Acrolein	107028		3.24	1.83	1.60
Benzene	71432		6.08	3.42	3.00
Ethylbenzene	100414		16.2	9.13	7.99
Formaldehyde	50000		1,717	890	788
Naphthalene	91203		0.659	0.371	0.325
PAH	---		1.12	0.628	0.549
Propylene Oxide	75569		14.7	8.27	7.24
Toluene	108883		65.9	37.1	32.5
Xylenes	1330207		32.4	18.3	16.0

Notes:

1. Emission factors (except formaldehyde) from AP-42 Chapter 3, Section 3.1, Table 3.1-3. Formaldehyde emission factor from Solar PIL 168.
2. Calculated as: [Fuel Flow (MMBtu/hr) * Emission Factor (lb/MMBtu) * (1 - Control Efficiency)]
3. Based on lower heating value (LHV) of fuel in Solar Turbines Emissions Estimates.
4. Based on Solar estimations.
5. Calculated based on AP-42 Chapter 3, Section 3.1, Table 3.1-3 emission factors. An example is shown below for toluene.

    Non-Formaldehyde HAP Composition of Toluene:

    = Toluene Emission Factor / Total Non-Formaldehyde HAP Emission Factor

    = 1.30E-04 lb/MMBtu / 3.17E-04 lb/MMBtu

    = 41.0%
6. Calculated as (except for formaldehyde): [Non-Formaldehyde HAP Composition * Non-Formaldehyde HAP Emission Rate (lb/event)]
7. Assume oxidation catalyst control for shutdown events.
8. Emissions from startup and shutdown events are higher than emissions from normal operations. Startup and shutdown events are 10 minutes in duration each. However, only one startup or shutdown event would occur in a given hour. Therefore, maximum hourly emissions are calculated as the maximum of the following:

    [Startup Event Emission Rate (lb/event) * 1 event/hr + Normal Operation Emission Rate (lb/hr) * 1 hr / 60 min * 50 min]

    [Shutdown Event Emission Rate (lb/event) * 1 event/hr + Normal Operation Emission Rate (lb/hr) * 1 hr / 60 min * 50 min]
9. For acetaldehyde, acrolein, and formaldehyde: In accordance with 15A NCAC 02Q .0711(c), maximum hourly emissions are calculated as the highest emissions occurring for any 15-minute period multiplied by four. Therefore, maximum hourly emissions are calculated as the maximum of the following:

    [Startup Event Emission Rate (lb/event) * 1 event + Normal Operation Emission Rate (lb/hr) * 1 hr / 60 min * 5 min] * 4

    [Shutdown Event Emission Rate (lb/event) * 1 event + Normal Operation Emission Rate (lb/hr) * 1 hr / 60 min * 5 min] * 4
10. A maximum of one startup event and one shutdown event would occur in any given day, per turbine. Therefore, maximum daily emissions are based on one startup event, one shutdown event, and 23 hours and 40 minutes of normal operation.
11. Calculated as: [Normal Operations Emission Rate (lb/hr) * Worst-Case Normal Operations Schedule (hr/yr) + Startup Emission Rate (lb/event) * Max. Startup Events (event/yr) + Shutdown Emission Rate (lb/event) * Max. Shutdown Events (event/yr)]
12. From Table D-2.
13. From Table D-3.

Table D-12 Toxic Air Pollutant (TAP) Emissions from Combustion Turbines - Blowdowns & Fugitives
ACP Compressor Station 3 - Northampton County, North Carolina

Hexane Emissions - Blowdown from Startup Events			
Parameter	CT-01 Vent	CT-02 Vent	CT-03 Vent
Blowdown Gas (lb/event)[1]	1,691	1,691	1,691
Hexane Emissions (lb/event)[2]	2.50	2.50	2.50

Hexane Emissions - Blowdown from Shutdown Events			
Parameter	CT-01 Vent	CT-02 Vent	CT-03 Vent
Blowdown Gas (lb/event)[1]	2,803	2,803	2,803
Hexane Emissions (lb/event)[2]	4.15	4.15	4.15

Hexane Emissions - Blowdown from Sitewide Events						
Parameter	CT-01 Vent	CT-02 Vent	CT-03 Vent	AP-1 Suctn.	AP-2 Dischrg.	AP-3 Dischrg.
Blowdown Gas (lb/event)[1]	3,280	3,965	7,990	24,477	17,531	13,921
Hexane Emissions (lb/event)[2]	4.85	5.87	11.8	36.2	25.9	20.6

Hexane Emissions - Fugitive Leaks			
Parameter	CT-01	CT-02	CT-03
Fugitive Leak Gas (lb/hr)[3]	6.76	6.76	6.76
Hexane Emissions (lb/hr)[4]	0.010	0.010	0.010

Maximum Hourly Hexane Emissions[5]						
Parameter	CT-01 Vent	CT-02 Vent	CT-03 Vent	AP-1 Suctn.	AP-2 Dischrg.	AP-3 Dischrg.
Hexane Emissions (lb/hr)	4.85	5.87	11.8	36.2	25.9	20.6

Maximum Daily Hexane Emissions[6]						
Parameter	CT-01 Vent	CT-02 Vent	CT-03 Vent	AP-1 Suctn.	AP-2 Dischrg.	AP-3 Dischrg.
Hexane Emissions (lb/day)	7.36	8.37	14.3	36.2	25.9	20.6

Maximum Daily Hexane Emissions - Fugitives[6]			
Parameter	CT-01	CT-02	CT-03
Hexane Emissions (lb/day)	0.240	0.240	0.240

Maximum Annual Hexane Emissions[7]						
Parameter	CT-01 Vent	CT-02 Vent	CT-03 Vent	AP-1 Suctn.	AP-2 Dischrg.	AP-3 Dischrg.
Hexane Emissions (lb/yr)	670	671	677	36.2	25.9	20.6

Maximum Annual Hexane Emissions - Fugitives[8]			
Parameter	CT-01	CT-02	CT-03
Hexane Emissions (lb/yr)	87.6	87.6	87.6

Gas Composition (wt. %)[1]	
Hexane	0.148%

Maximum Sitewide Blowdown Gas (lb)[1]	
Per Event	71,165

Sitewide Blowdown Gas Stack Distribution (wt. %)[9]	
CT-01 Vent	4.61%
CT-02 Vent	5.57%
CT-03 Vent	11.23%
Stn. Suctn. 1	34.39%
Stn. Suctn. 2	24.63%
Stn. Dischrg. 1	19.56%

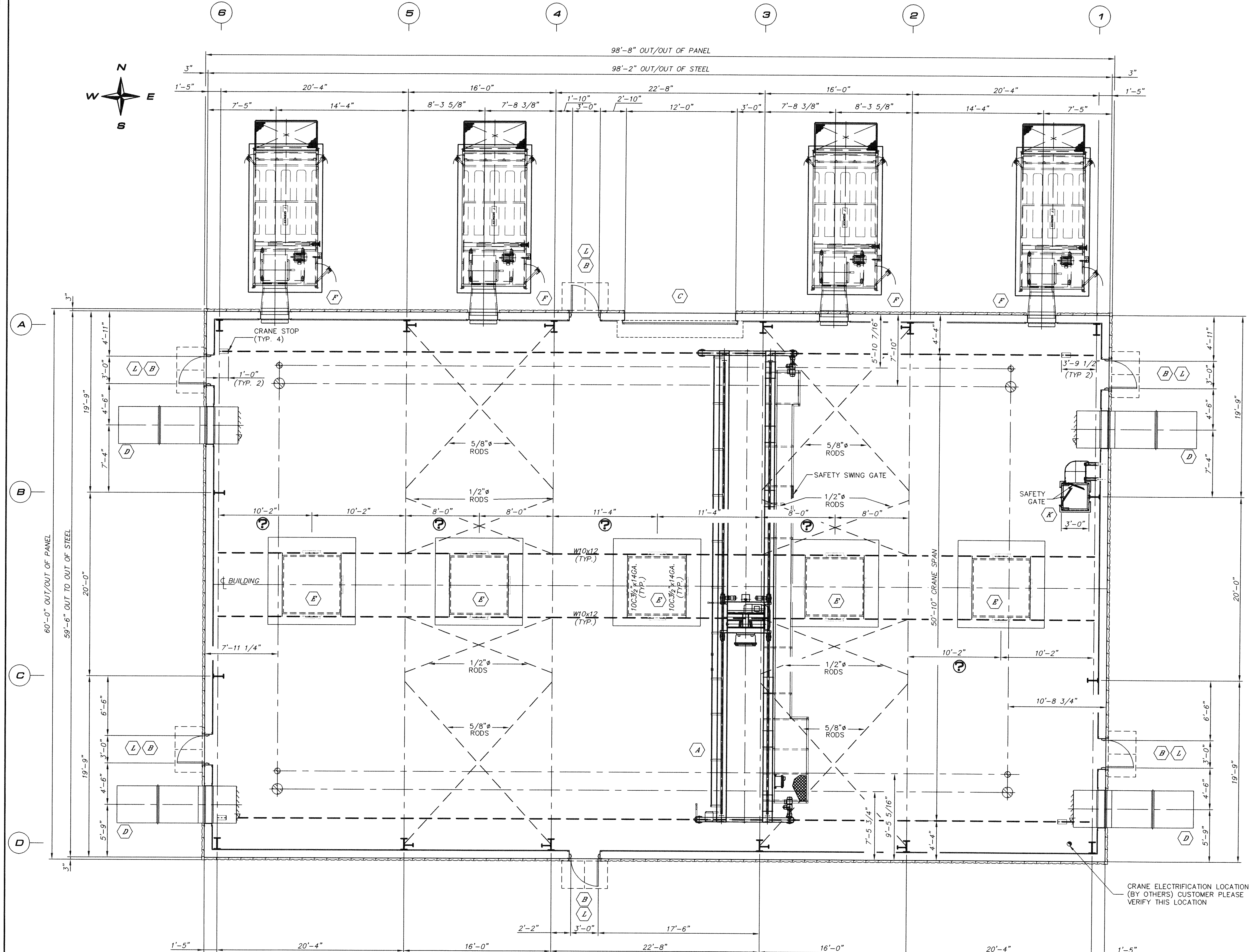
Max. Blowdown Events (event/yr)[1]	
Startup	100
Shutdown	100
Sitewide	1

Operating Schedule (hr/yr)[3]	
Fug. Leaks	8,760

Notes:

1. From Table D-3.
2. Calculated as: [Blowdown Gas (lb/event) * Hexane Gas Composition (wt. %)]
3. From Table D-7. To be conservative, assumed the total facility-wide fugitive leaks for each turbine.
4. Calculated as: [Fugitive Leak Gas (lb/hr) * Hexane Gas Composition (wt. %)]
5. Maximum hourly emissions are based on the sitewide blowdown event, which is when maximum facility-wide hexane emissions occur.
6. Maximum daily emissions are based on one startup event, one sitewide event, and 24 hours of fugitive leaks.
7. Calculated as: [Startup Event Emissions (lb/event) * Max. Startup Events (event/yr) + Shutdown Event Emissions (lb/event) * Max. Shutdown Events (event/yr) + Sitewide Event Emissions (lb/event) * Max. Sitewide Events (event/yr)]
8. Calculated as: [Fugitive Leak Emissions (lb/hr) * Operating Schedule (hr/yr)]
9. Based on engineering assumptions. Assumed vol. % is equivalent to wt. %.

Building Plans
Appendix E



FLOOR PLAN

Framed Openings

- (G) Two (2) each 8'-4" x 7'-4" framed openings with flashing for intake.
- (H) Two (2) each x framed openings with flashing for exhaust. (T.B.D.) (?)
- (J) Four (4) each 3'-0 3/4" x 3'-0 3/4" framed openings with simple flashing for air handler.
- (J.1) Two (2) each x framed openings with flashing for exhaust. (T.B.D.) (?)

Miscellaneous

- (K) One (1) caged ladder with platform for crane access with two (2) safety gates.
- (L) Six (6) each 5'-0" x 3'-0" ice canopies shall be provided above exterior personnel doors.
- (L1) Three (3) each 5'-0" x 3'-0" ice canopies (Basement) shall be provided above exterior personnel doors.
- (M) Snow retention devices shall be provided on building eaves.

PLEASE CONFIRM COLORS/FINISH SCHEDULE APPROVED BY: ____________

COLOR/FINISH SCHEDULE:

Primary Structural Members:	Hot-Dip Galvanized
Secondary Structural Members:	Pre-Galvanized
Roof Panels:	Fern Green
Wall Panels:	Light Stone
Liner:	White
Rake Trim:	Light Stone
Gutters:	Light Stone
Downspouts:	Light Stone
Exterior Wall Trim:	Light Stone
Liner Trim:	White
Personnel Doors:	Manufacturer's Standard Factory-Applied Primer Finish paint, if required, shall be by others
Roll-Up Doors:	Manufacturer's Standard Factory Applied Primer Finish paint, if required, shall be by others
Wall Mounted Supply Fans:	Light Stone
Roof Mounted Exhaust Cupolas:	Fern Green
Vertical Counter-Flow Draw Through Air Handling Units:	Mill Finish
Ice Canopies:	Light Stone
Caged Ladder/Platform:	Hot-Dip Galvanized
Crane:	Safety Yellow

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LEGEND:

- LIMITS OF MAIN HOIST TRAVEL.
- LIMITS OF AUXILIARY HOIST TRAVEL.

NO.	REVISIONS	BY	DATE	CHKD.
B	RE-ISSUED FOR APPROVAL; REVISED ENTIRE DWG.	JC	10/31/16	AM
A	ISSUED FOR APPROVAL	AM	07/18/16	JC

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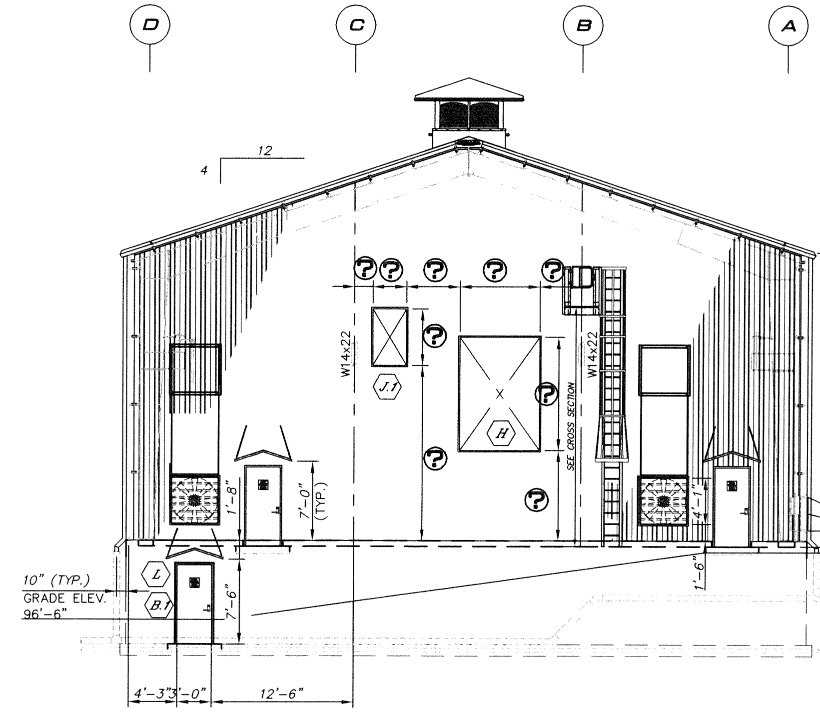
FLOOR PLAN, GENERAL NOTES & COLORS
COMPRESSOR BUILDING "A"

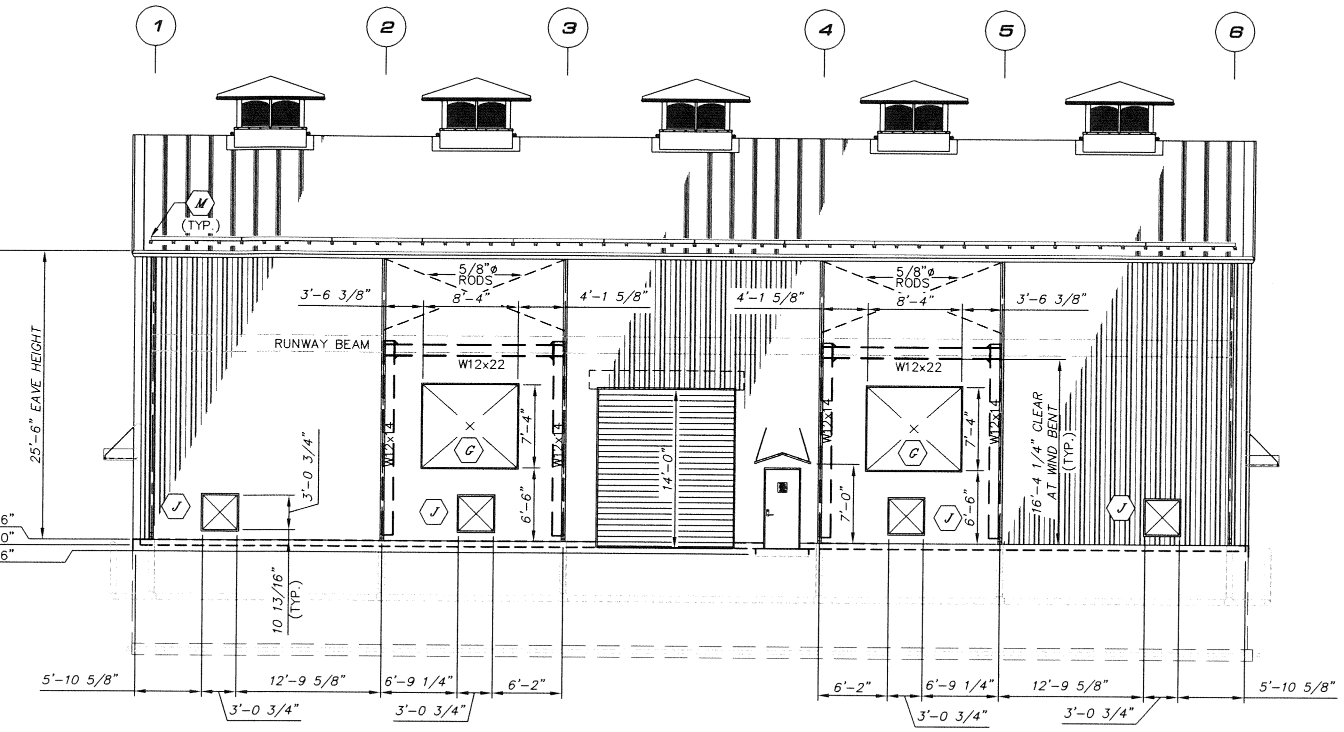
DOMINION TRANSMISSION, INC.

PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

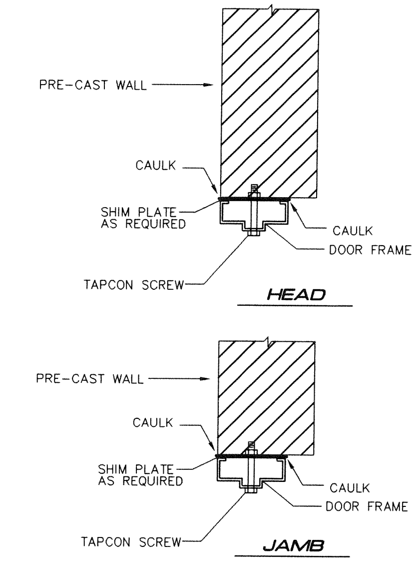
SCALE	DRAWN	CHECKED	APPR'D.	FILE No.	SHEET No.	JOB No.	REV.
3/16" = 1'	AM	JC		2998-01A2	A2 OF	2998-01	B
DATES	07/14/16	07/18/16					



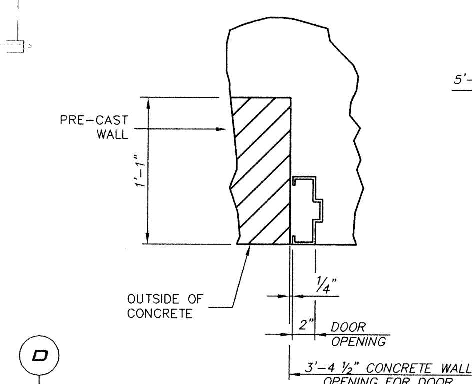
EAST ELEVATION AT COLUMN LINE "1"



NORTH ELEVATION AT COLUMN LINE "A"



SECTIONS AT WALK DOOR
(INSULATION OMITTED FOR CLARITY)
(AT PRE-CAST WALL)



BASE PLATE AT WALK DOOR
(AT PRE-CAST WALL)

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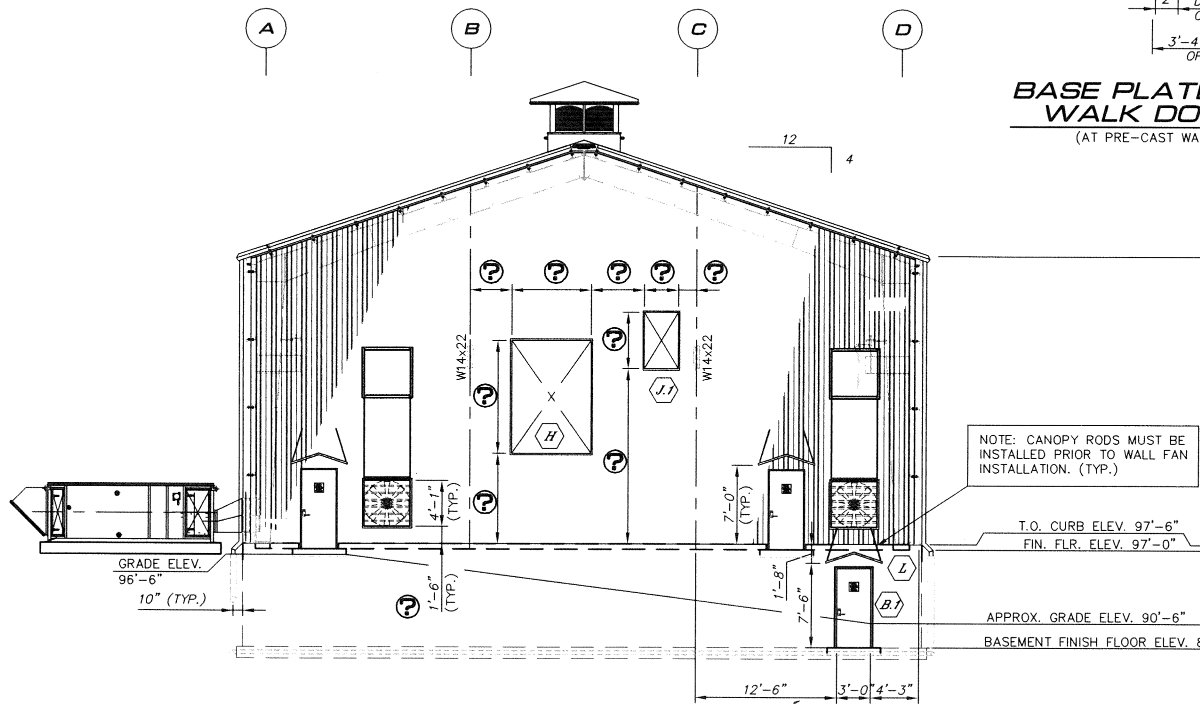

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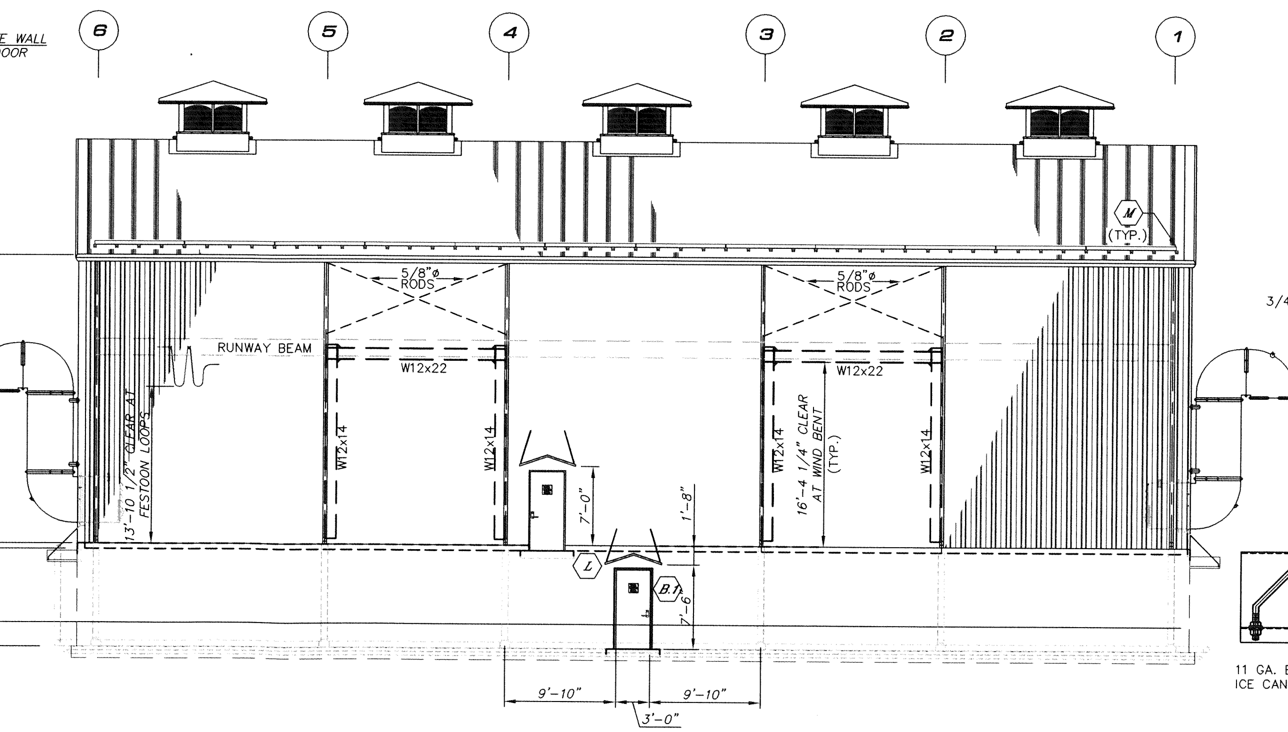
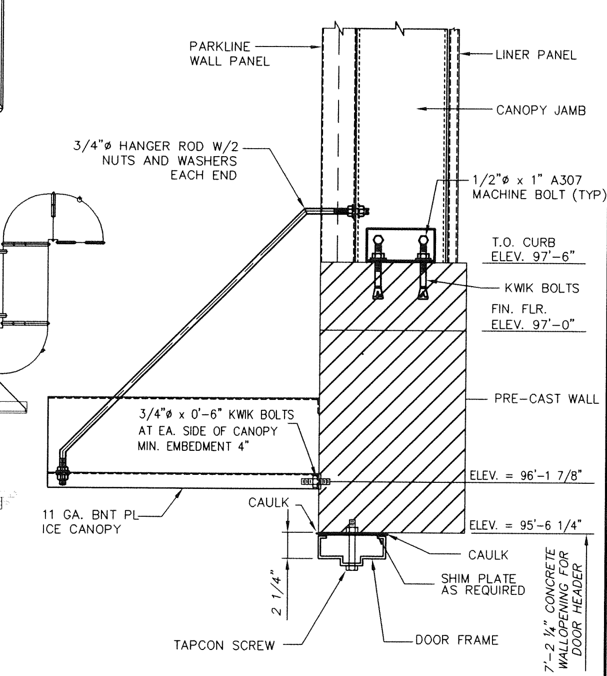


SOUTH ELEVATION AT COLUMN LINE "D"



CANOPY INSTALLATION DETAIL
(INSULATION OMITTED FOR CLARITY)
(AT PRE-CAST WALL)

NO.	REVISIONS	BY	DATE	CHKD.
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A	ISSUED FOR APPROVAL	AM	07/18/16	JC

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ELEVATIONS
COMPRESSOR BUILDING "A"
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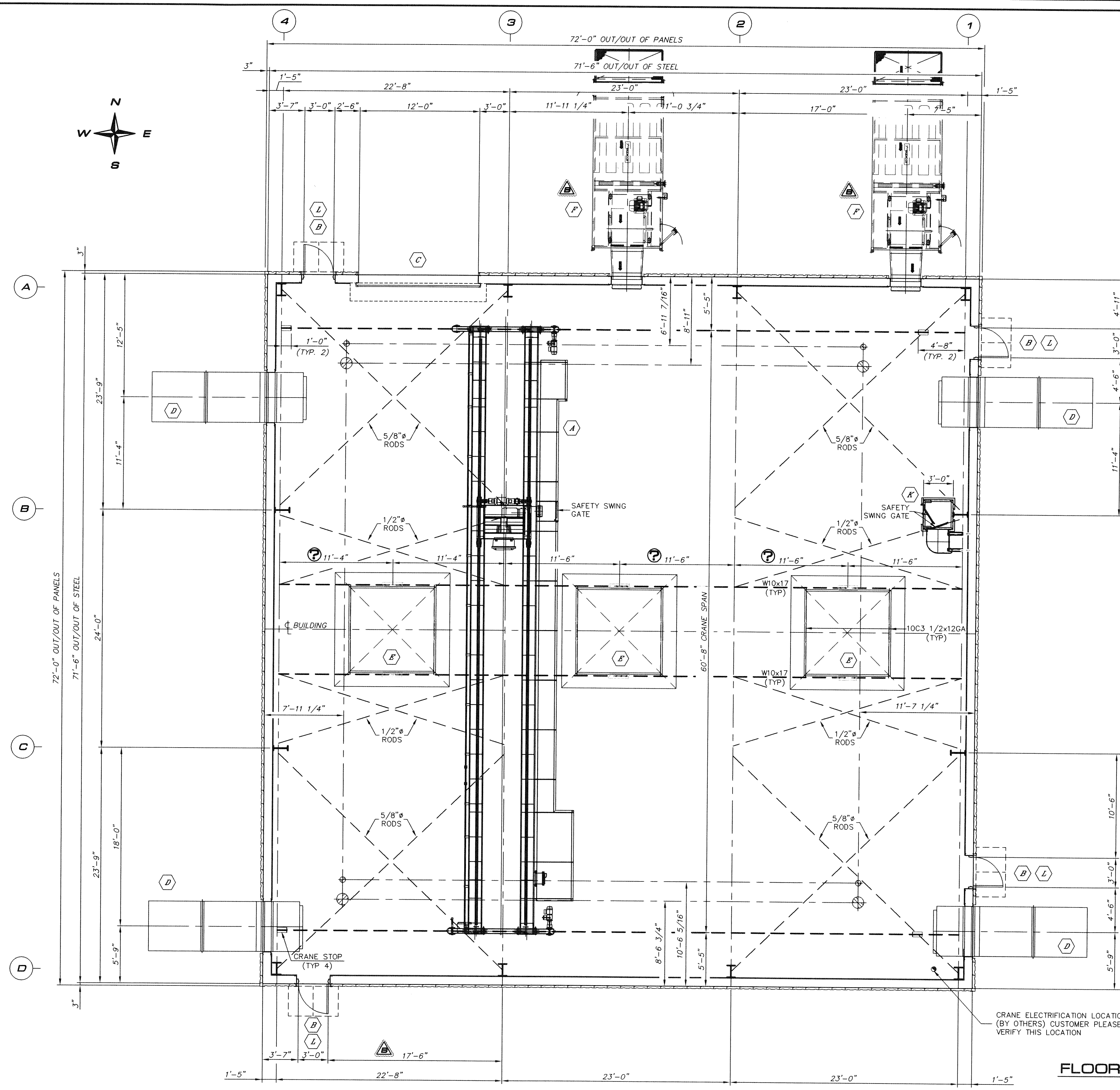
1/8" = 1'	AM			2998-01A3	A3 OF	2998-01	B
DATES	07/14/16						

PLEASE CONFIRM
COLORS/FINISH SCHEDULE
APPROVED BY: ____________

COLOR/FINISH SCHEDULE:

Primary Structural Members:	Hot-Dip Galvanized
Secondary Structural Members:	Pre-Galvanized
Roof Panels:	Fern Green
Wall Panels:	Light Stone
Liner Panels:	White
Rake Trim:	Light Stone
Gutters:	Light Stone
Downspouts:	Light Stone
Exterior Wall Trim:	Light Stone
Liner Trim:	White
Personnel Doors:	Manufacturer's Standard Factory-Applied Primer Finish paint, if required, shall be by others
Roll-Up Door:	Manufacturer's Standard Factory-Applied Primer Finish paint, if required, shall be by others
Wall Mounted Supply Fans: (exterior surface only):	Light Stone
Roof Mounted Exhaust Cupolas (exterior surface only):	Fern Green
Vertical Counter-Flow Draw Through Air Handling Units:	Mill Finish
Crane:	Safety Yellow
Caged Ladder/Platform:	Hot-Dip Galvanized
Ice/Snow Canopy:	Light Stone



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LEGEND:
- LIMITS OF MAIN HOIST TRAVEL.
- LIMITS OF AUXILIARY HOIST TRAVEL.

FLOOR PLAN

NO.	REVISIONS	BY	DATE	CHKD.
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A	ISSUED FOR APPROVAL	JC	07/18/16	AM

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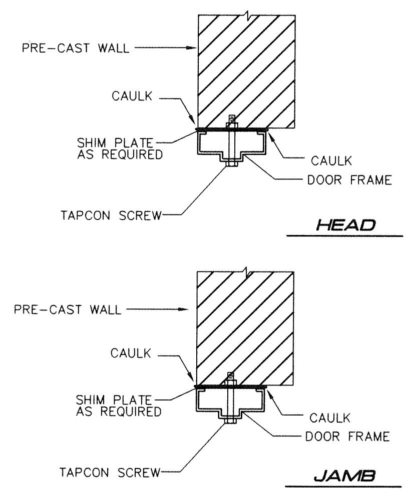
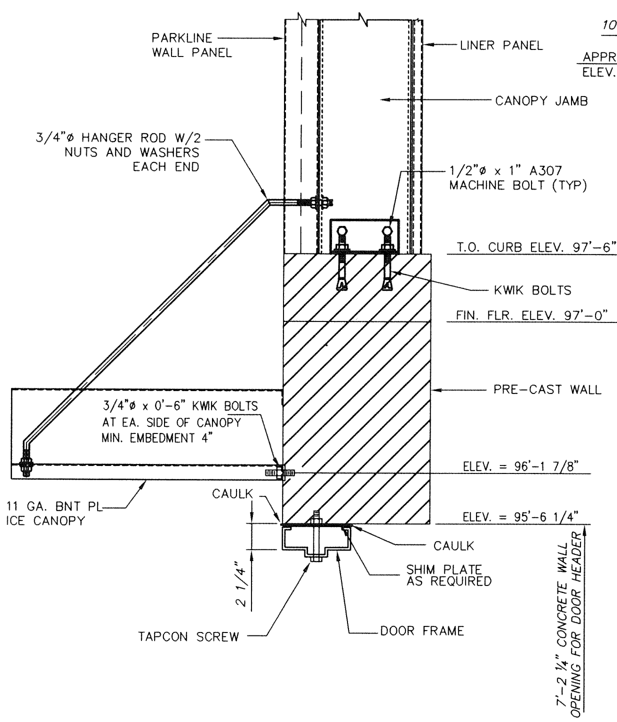
FLOOR PLAN & COLORS
COMPRESSOR BUILDING "B"
DOMINION TRANSMISSION, INC.
PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

SCALE	DRAWN	CHECKED	APPR'D.	FILE No.	SHEET No.	JOB No.	REV.
3/16" = 1'	JC	AM		2998-02A2	A2 OF	2998-02	B
DATES	07/14/16	07/18/16					



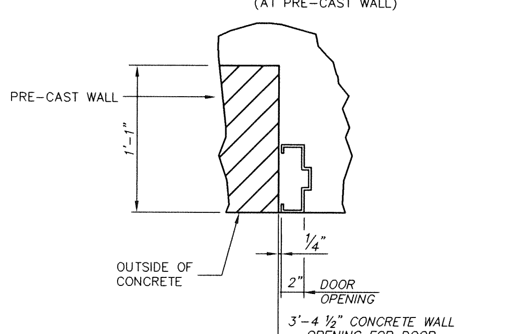
SECTIONS AT WALK DOOR

(INSULATION OMITTED FOR CLARITY)
(AT PRE-CAST WALL)



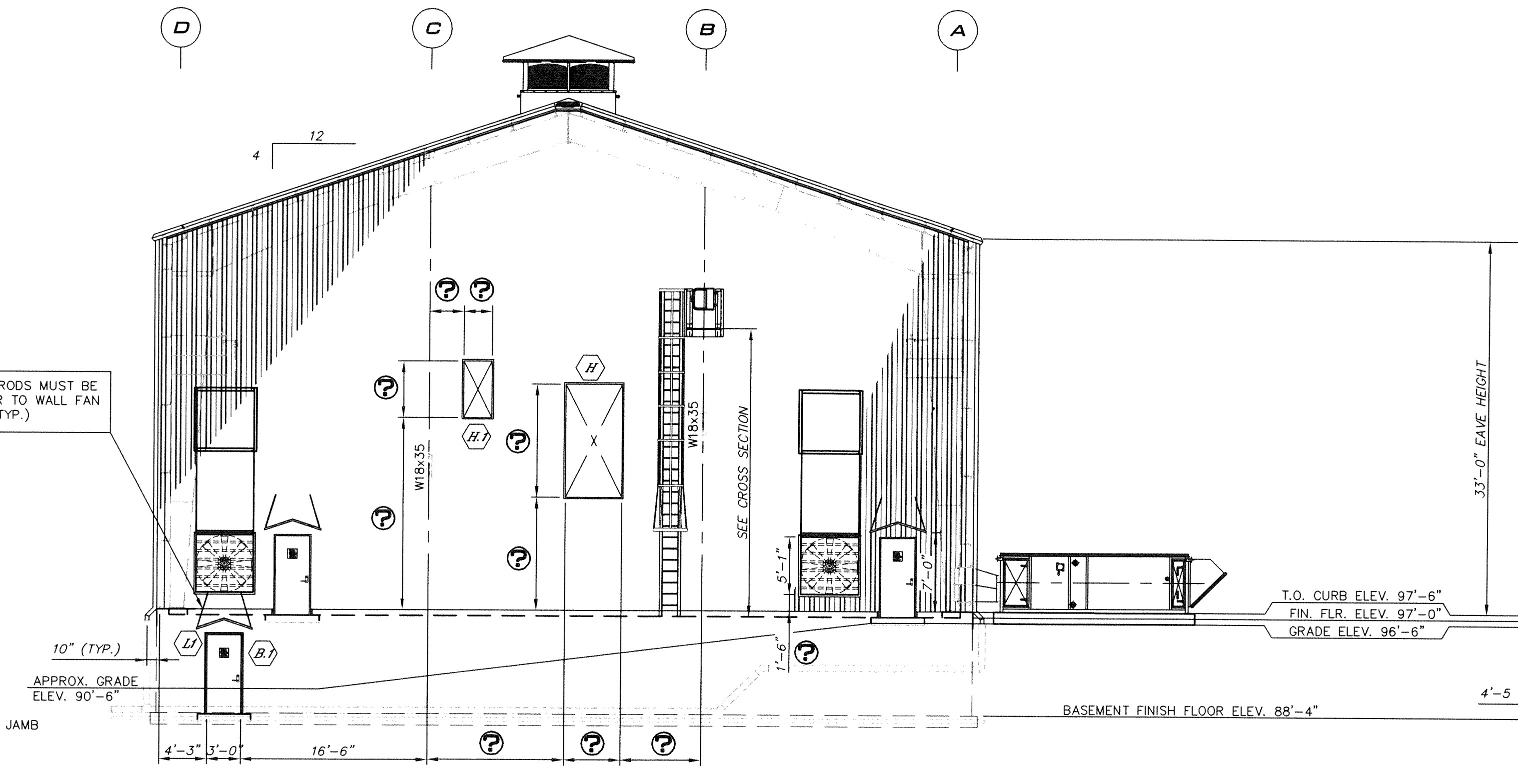
CANOPY INSTALLATION DETAIL

(INSULATION OMITTED FOR CLARITY)
(AT PRE-CAST WALL)

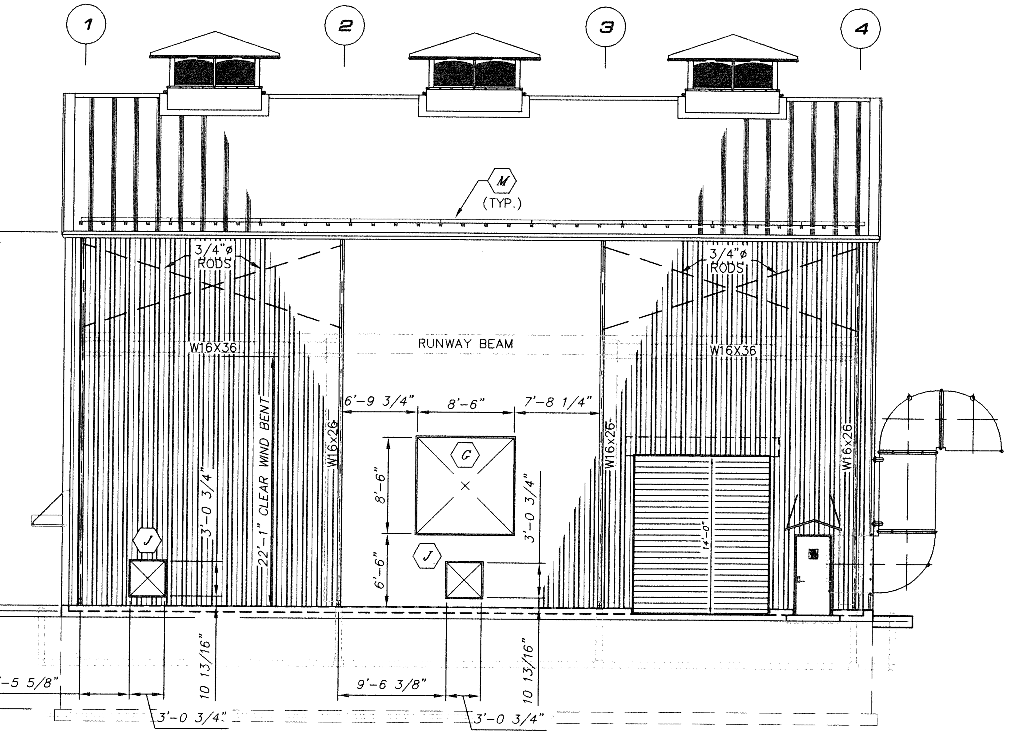


BASE PLATE AT WALK DOOR

(AT PRE-CAST WALL)



EAST ELEVATION AT COLUMN LINE "1"



NORTH ELEVATION AT COLUMN LINE "A"

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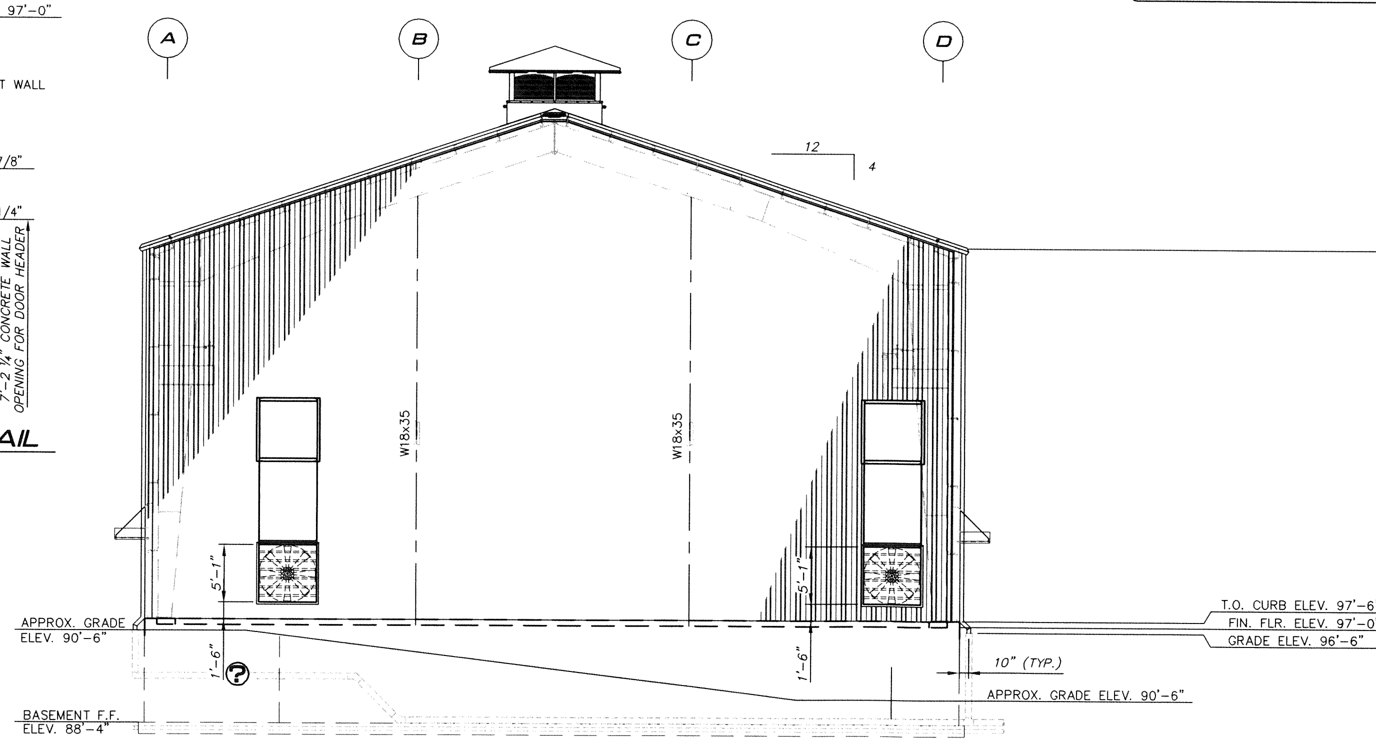
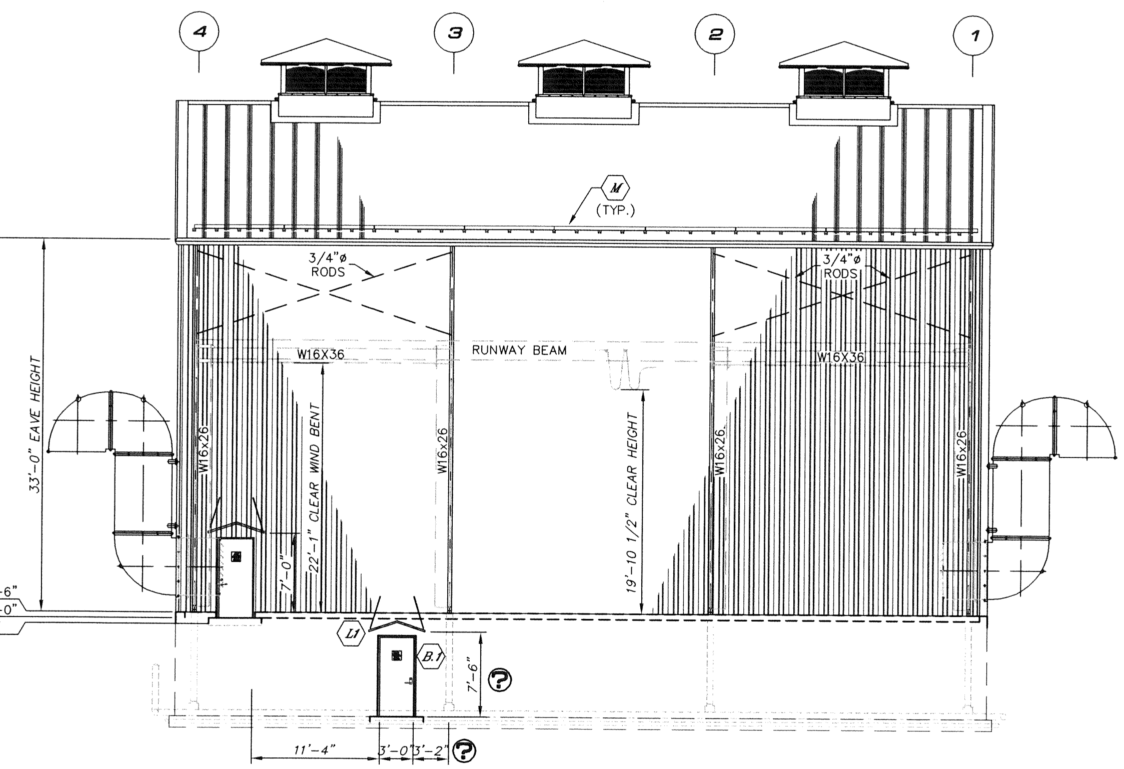


WEST ELEVATION AT COLUMN LINE "4"



SOUTH ELEVATION AT COLUMN LINE "D"

NO.	REVISIONS	BY	DATE	CHKD.
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COMPRESSOR BUILDING "B"
DOMINION TRANSMISSION, INC.
PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

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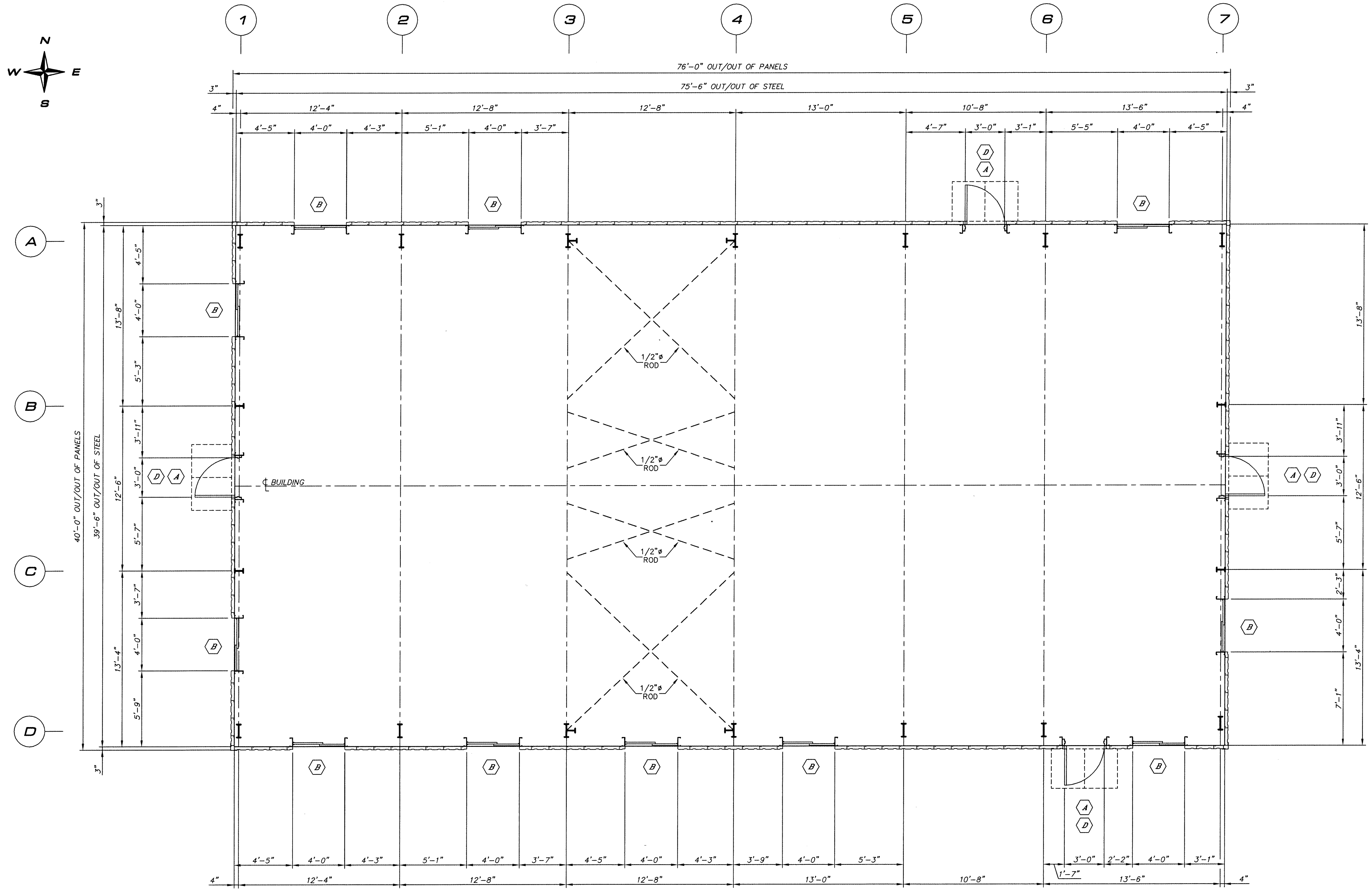
1/8" = 1'	JC	AM		2998-02A3	A3 OF	2998-02	B
DATES	07/14/16	07/18/16					



FLOOR PLAN

NO.	REVISIONS	BY	DATE	CHKD.
A	ISSUED FOR APPROVAL	JC	07/22/16	JRW

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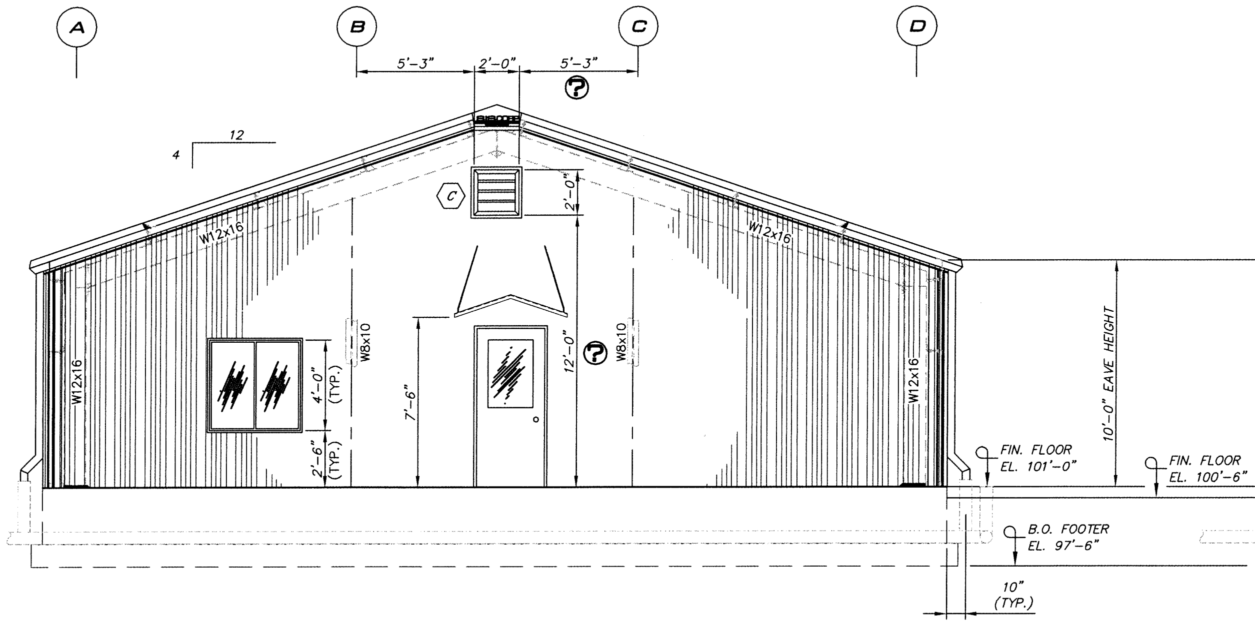
STANDARD INDUSTRIAL STRUCTURES CORPORATION

2665 WESTHOLLOW DRIVE, HOUSTON, TX. 77082 (281) 531-2800

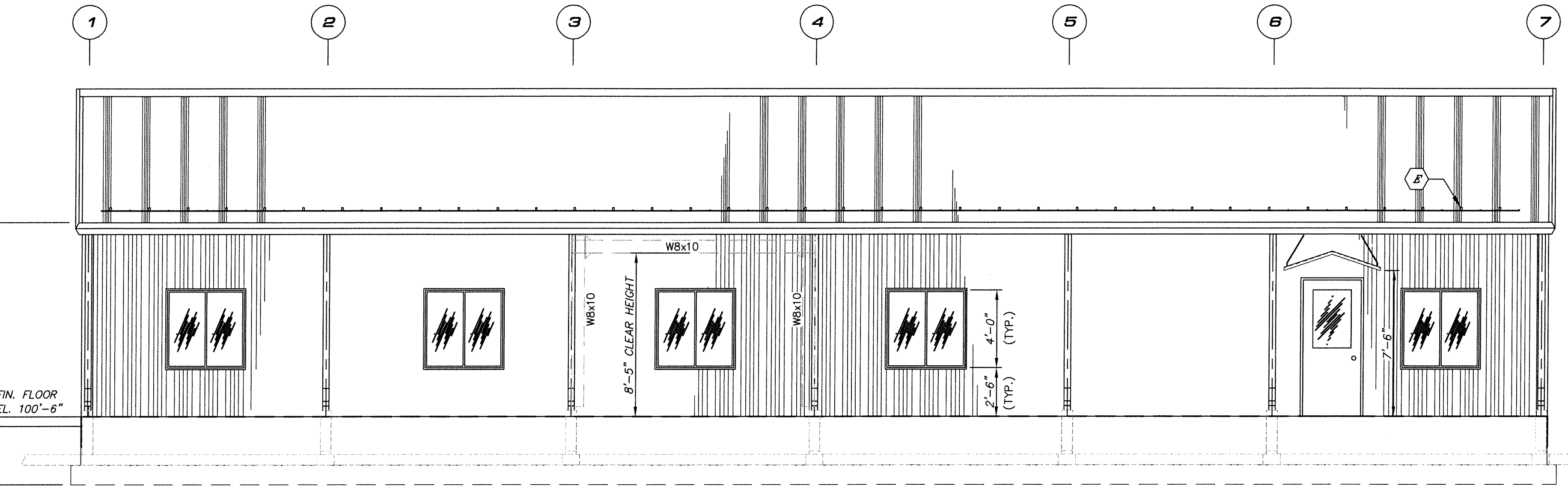
SIS CORP
STANDARD INDUSTRIAL STRUCTURES CORPORATION
HOUSTON, TEXAS

FLOOR PLAN
OFFICE BUILDING
DOMINION TRANSMISSION, INC.
PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

SCALE	DRAWN	CHECKED	APPR'D.	FILE No.	SHEET No.	JOB No.	REV.
1/4" = 1'	JC	JRW		2998-03A2	A2 OF	2998-03	A
DATES	07/20/16	07/22/16					

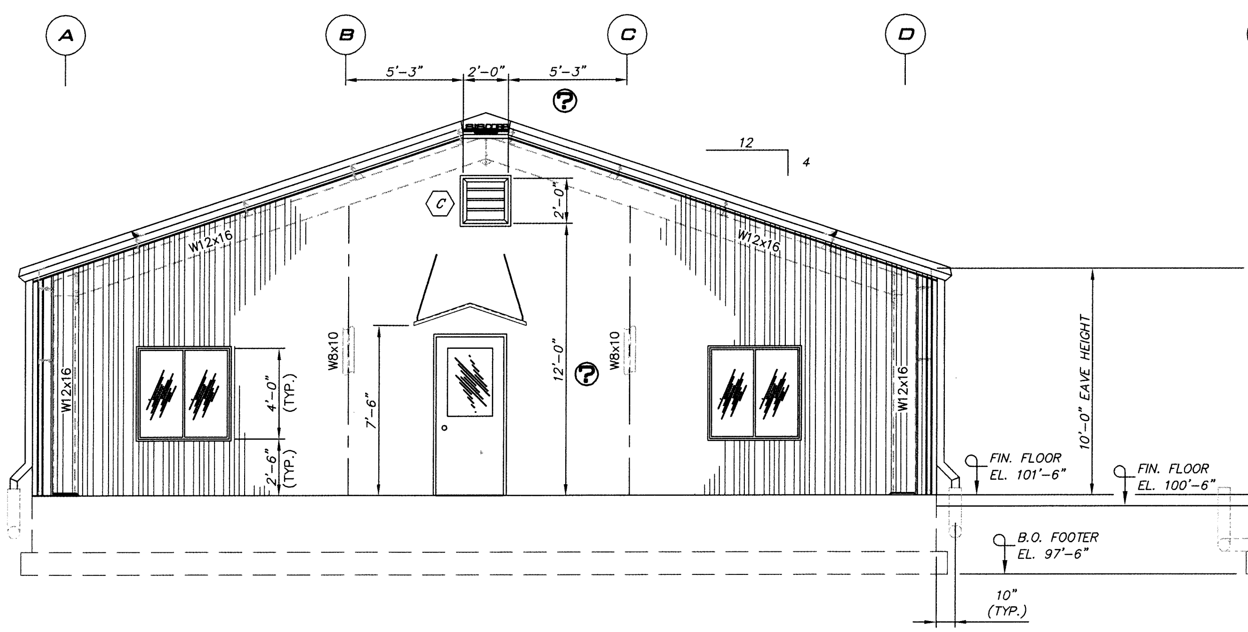


EAST ELEVATION AT COLUMN LINE "7"

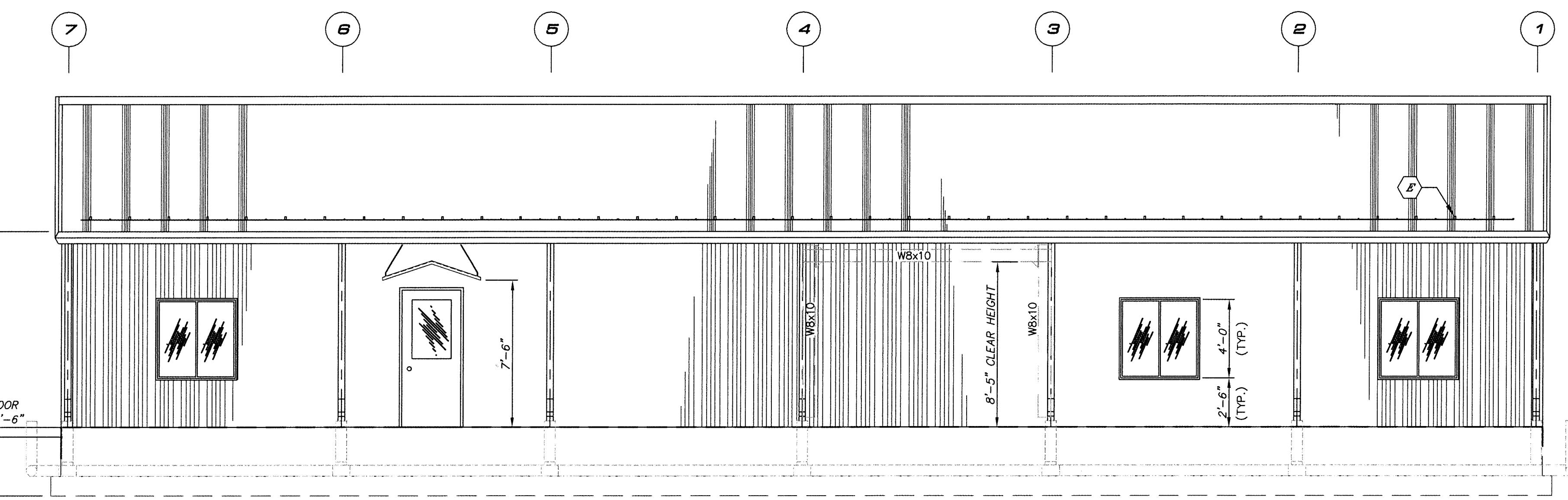


SOUTH ELEVATION AT COLUMN LINE "D"

THIS INFORMATION MISSING OR QUESTIONABLE. CUSTOMER PLEASE VERIFY AND RETURN WITH APPROVAL DRAWINGS. REQUIRED FOR ACCURACY AND CLEARANCES.



WEST ELEVATION AT COLUMN LINE "1"



NORTH ELEVATION AT COLUMN LINE "A"

NO.	REVISIONS	BY	DATE	CHKD.
A	ISSUED FOR APPROVAL	JC	07/22/16	JRW

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SISCORP
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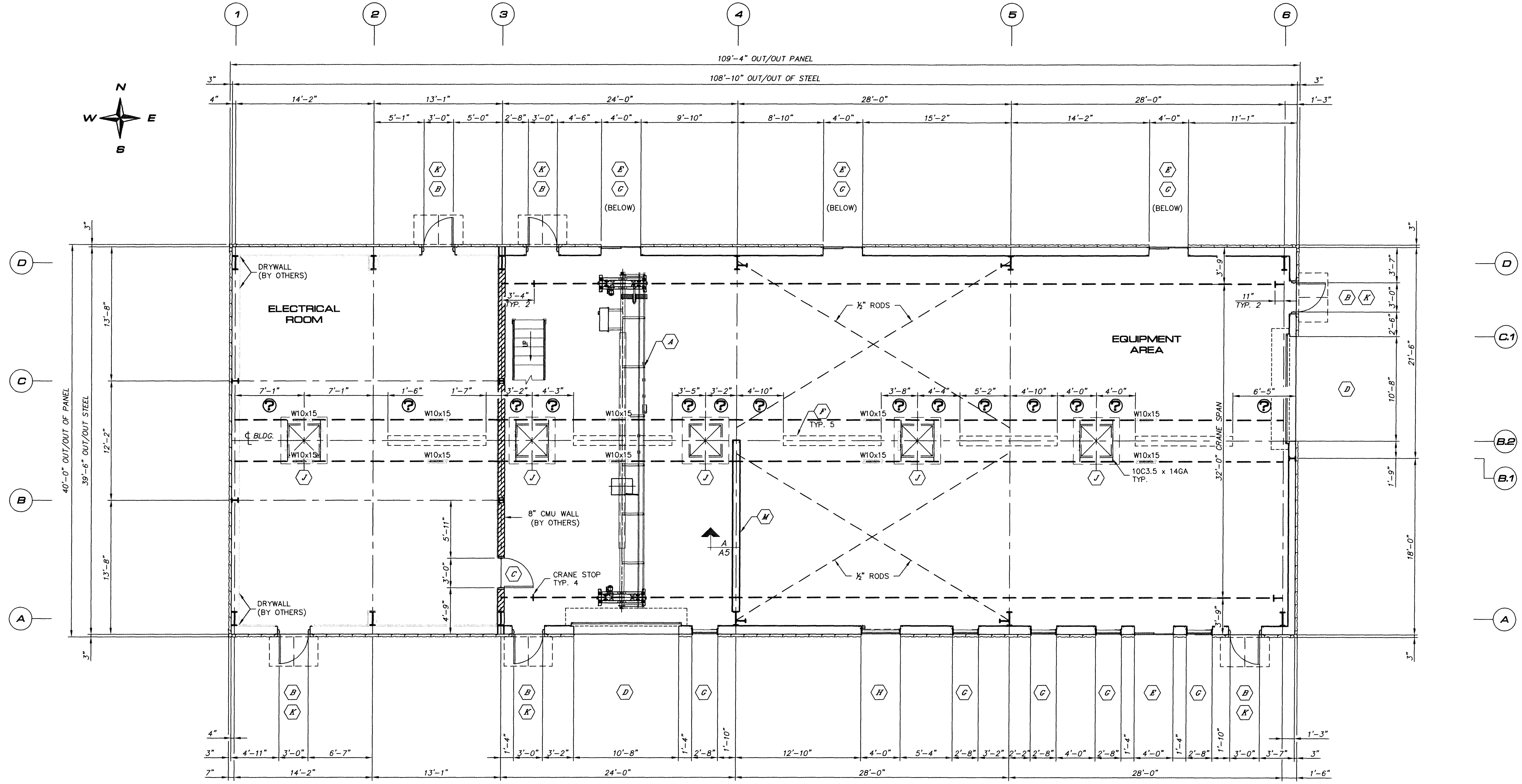
HOUSTON, TEXAS

ELEVATIONS
OFFICE BUILDING
DOMINION TRANSMISSION, INC.
PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

SCALE	DRAWN	CHECKED	APPR'D.	FILE No.	SHEET No.	JOB No.	REV.
1/4" = 1'	JC	JRW		2998-03A3	A3 OF	2998-03	A
DATES	07/20/16	07/22/16					



FLOOR PLAN

THIS INFORMATION MISSING OR QUESTIONABLE. CUSTOMER PLEASE VERIFY AND RETURN WITH APPROVAL DRAWINGS. REQUIRED FOR ACCURACY AND CLEARANCES.

LEGEND:

LIMITS OF CRANE HOOK TRAVEL.

NO.	REVISIONS	BY	DATE	CHKD.
A	ISSUED FOR APPROVAL	VR	07/26/16	AC

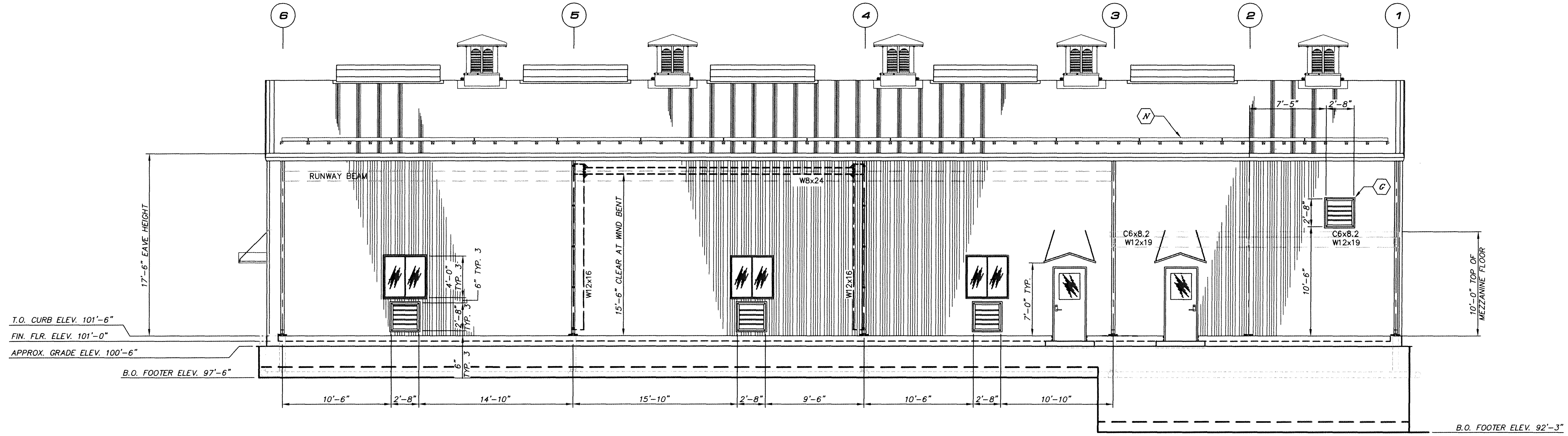
STANDARD INDUSTRIAL STRUCTURES CORPORATION

2665 WESTHOLLOW DRIVE, HOUSTON, TX. 77082 (281) 531-2800

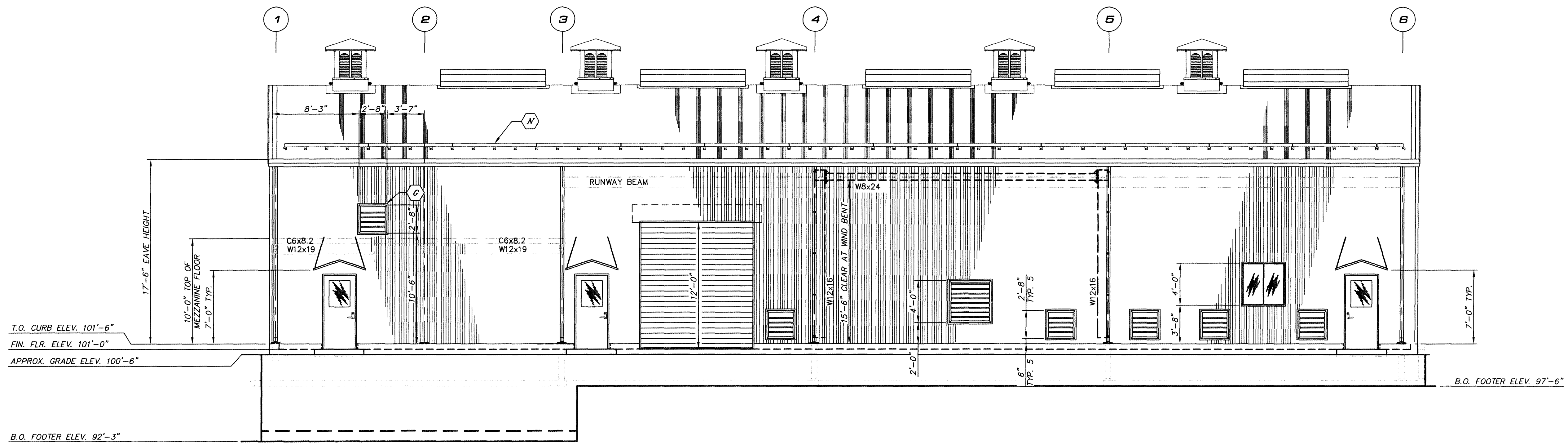
SISCORP
STANDARD INDUSTRIAL STRUCTURES CORPORATION
HOUSTON, TEXAS

FLOOR PLAN
AUXILIARY BUILDING
DOMINION TRANSMISSION, INC.
PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

SCALE	DRAWN	CHECKED	APPR'D.	FILE No.	SHEET No.	JOB No.	REV.
3/16" = 1'	VR	AC		2998-04A2	A2 OF	2998-04	A
DATES	7/22/16	07/26/16					



NORTH ELEVATION AT COLUMN LINE "D"



SOUTH ELEVATION AT COLUMN LINE "A"

NO.	REVISIONS	BY	DATE	CHKD.
A	ISSUED FOR APPROVAL	VR	07/26/16	AC

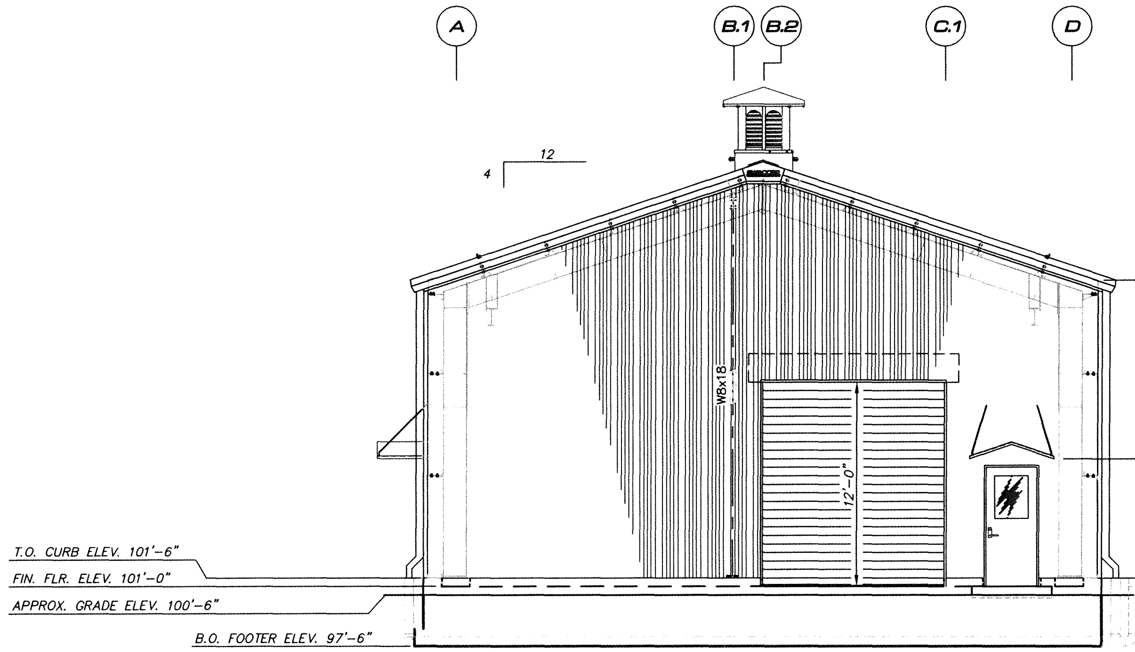
STANDARD INDUSTRIAL STRUCTURES CORPORATION

2665 WESTHOLLOW DRIVE, HOUSTON, TX. 77082 (281) 531-2800

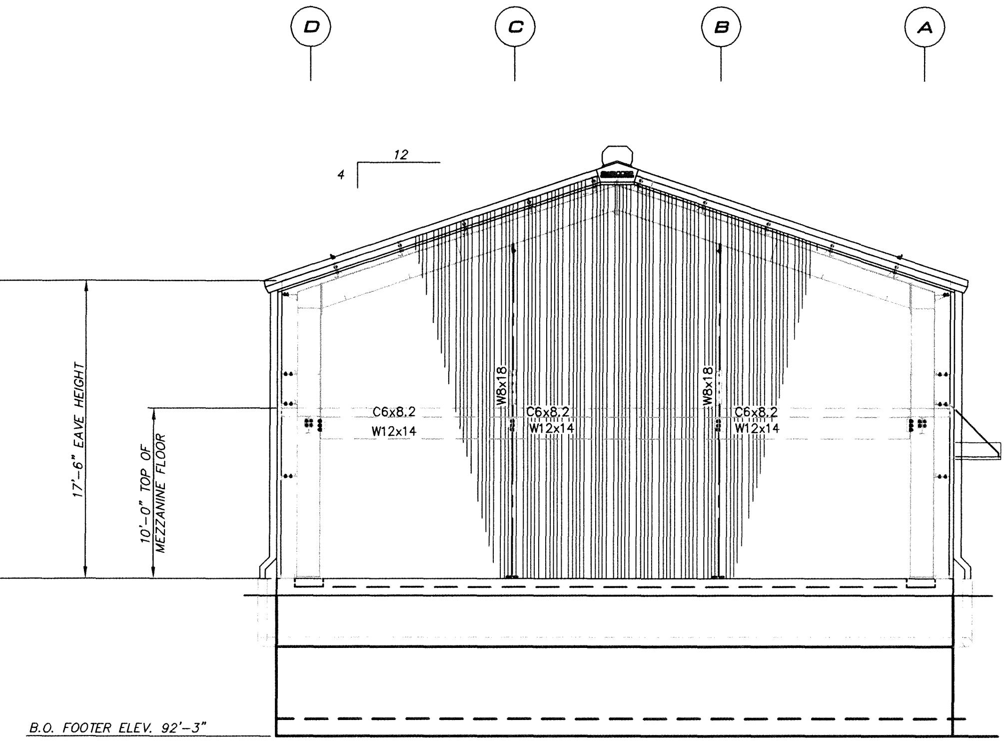
SISCORP
STANDARD INDUSTRIAL STRUCTURES CORPORATION
HOUSTON, TEXAS

ELEVATIONS
AUXILIARY BUILDING
DOMINION TRANSMISSION, INC.
PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

	SCALE	DRAWN	CHECKED	APPR'D.	FILE No.	SHEET No.	JOB No.	REV.
	3/16" = 1'	VR	AC		2998-04A3	A3 OF	2998-04	A
DATES		7/22/16	07/26/16					



EAST ELEVATION AT COLUMN LINE "6"



WEST ELEVATION AT COLUMN LINE "1"

A	ISSUED FOR APPROVAL	VR	07/26/16	AC
NO.	REVISIONS	BY	DATE	CHKD.

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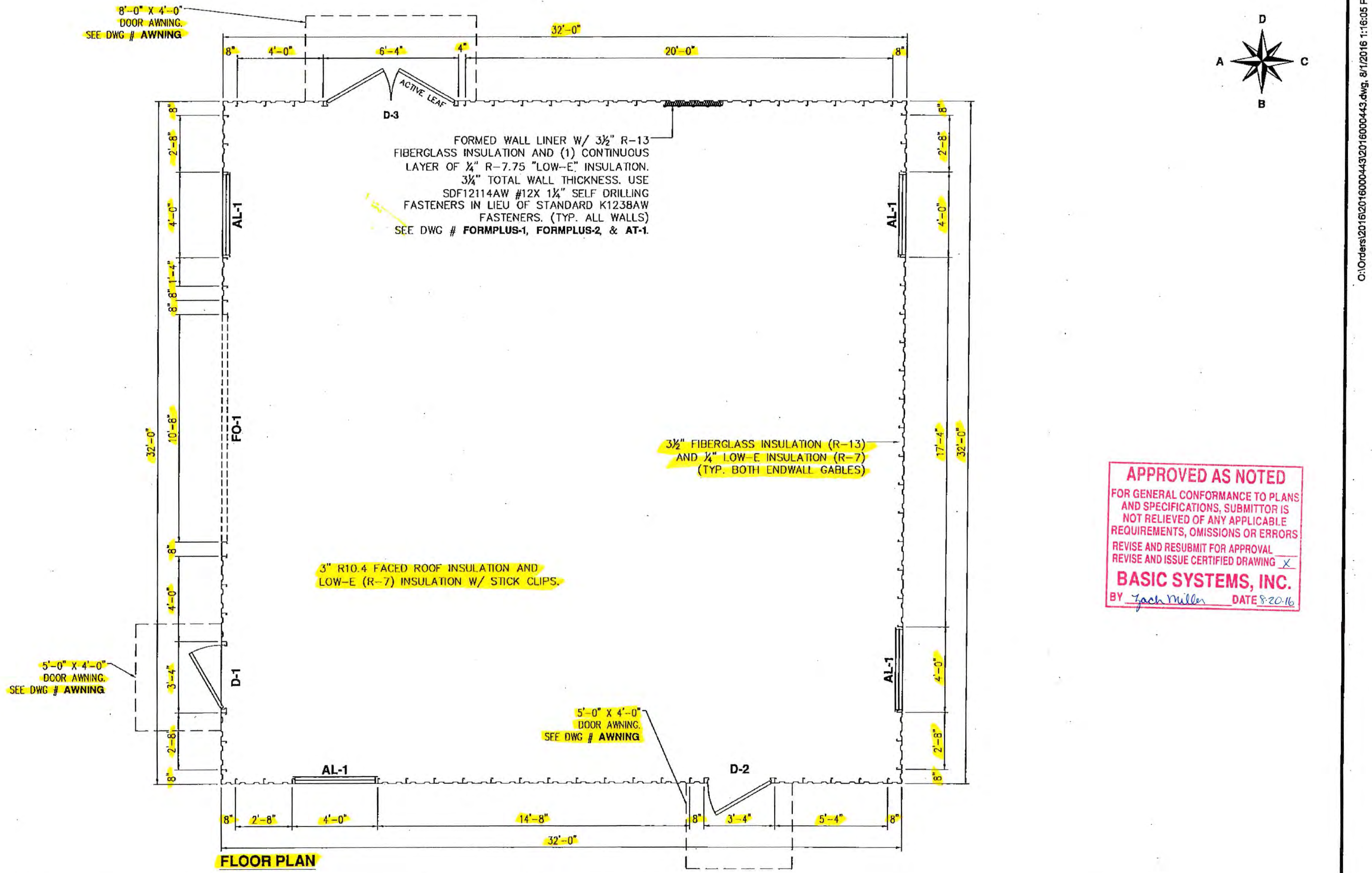
SIS CORP
STANDARD INDUSTRIAL STRUCTURES CORPORATION
HOUSTON, TEXAS

ELEVATIONS
AUXILIARY BUILDING
DOMINION TRANSMISSION, INC.
PLEASANT HILL, NORTHAMPTON COUNTY, NORTH CAROLINA

SCALE	DRAWN	CHECKED	APPR'D.	FILE No.	SHEET No.	JOB No.	REV.
3/16" = 1'	VR	AC		2998-04A4	A4 OF	2998-04	A
DATES	7/22/16	07/26/16					



APPROVED AS NOTED

FOR GENERAL CONFORMANCE TO PLANS AND SPECIFICATIONS, SUBMITTOR IS NOT RELIEVED OF ANY APPLICABLE REQUIREMENTS, OMISSIONS OR ERRORS

REVISE AND RESUBMIT FOR APPROVAL ___

REVISE AND ISSUE CERTIFIED DRAWING X

BASIC SYSTEMS, INC.

BY Zach Miller DATE 8-20-16

REVISIONS	BY

BUILDING FINISH

WALL COLOR: LIGHT STONE
WALL PANEL THICKNESS: .028
TRIM COLOR: FERN GREEN
ROOF COLOR: FERN GREEN
ROOF PANEL THICKNESS: .042
ROOF RIB HEIGHT: 6"

PARKLINE, INC.
RT. 62, ELEANOR INDUSTRIAL PARK
ELEANOR, WV 25070
EMAIL: PARKLINE@PARKLINE.COM
PHONE: 800-786-4855 FAX: 304-586-3842

DOMINION TRANSMISSION INC.
BRIDGEPORT ~~CLARKSBURG~~, WV.

REF: DRUM STORAGE BUILDING BL006
PO#: 4500308494
DESTINATION: PLEASANT HILL, NC.

FLOOR PLAN

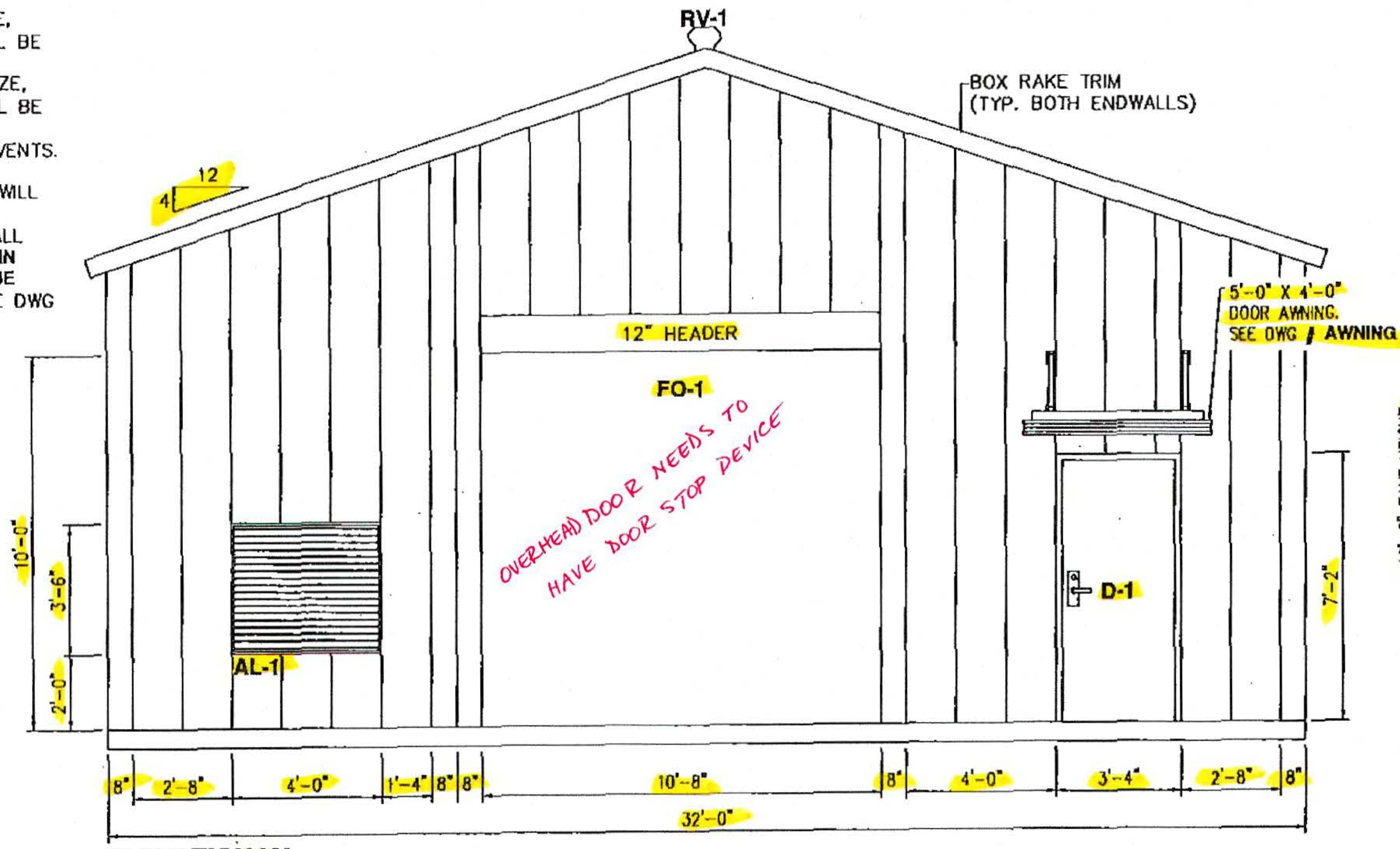
DATE:	8/1/2016
DRAWN BY:	MRW
SCALE:	NTS

2016000443-1

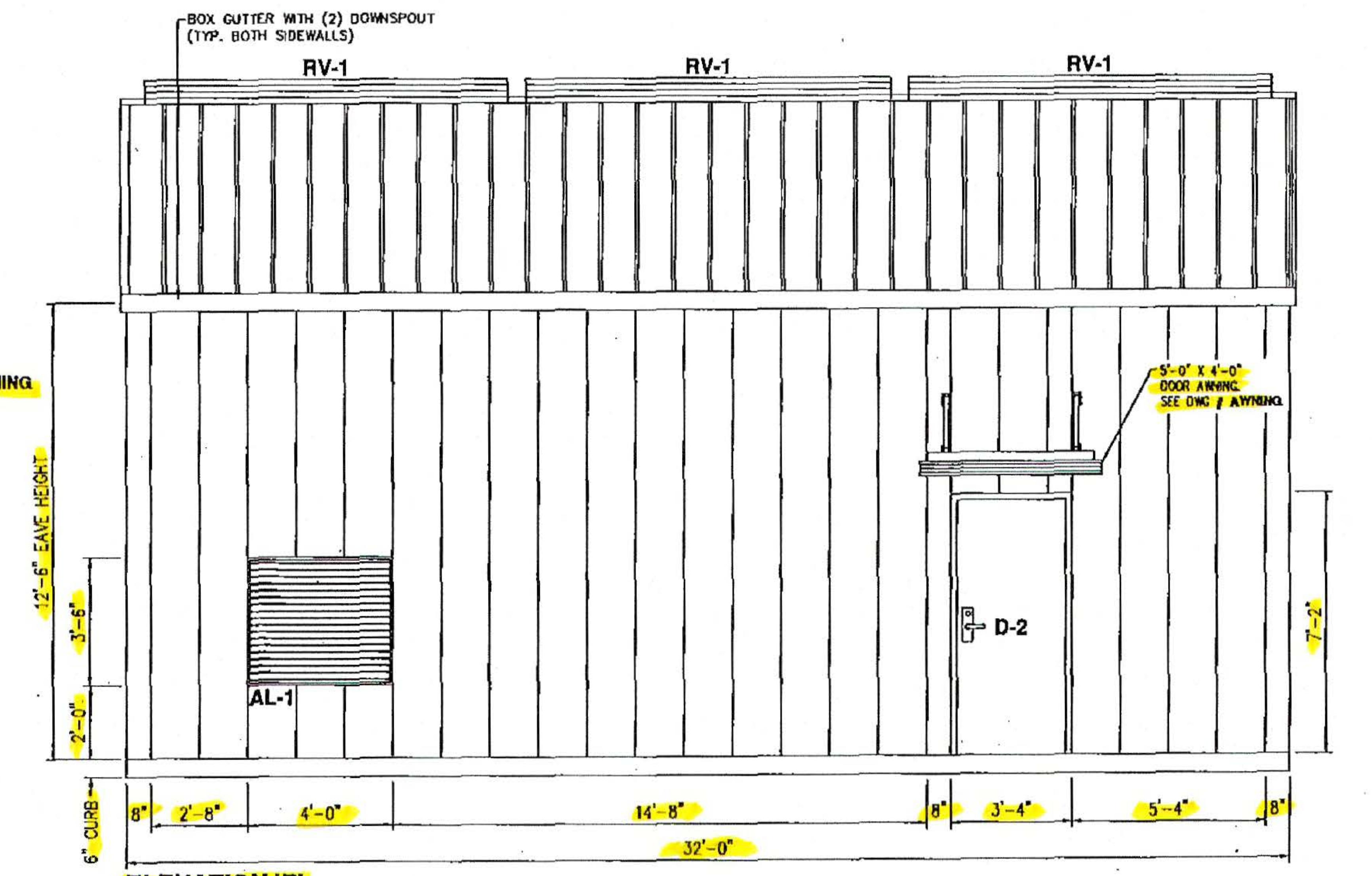
ORDER #: 2016000443 REVISION #: 0

NOTES:

1. DUE TO NON-STANDARD ROOF SLOPE, FIELD DRILLING AND/OR CUTTING WILL BE REQUIRED AT VARIOUS LOCATIONS.
2. DUE TO NON-STANDARD BUILDING SIZE, FIELD DRILLING AND/OR CUTTING WILL BE REQUIRED AT VARIOUS LOCATIONS.
3. 6" MINIMUM SPACE BETWEEN RIDGE VENTS. SEE DWG # **RIDGEVENT-AL**
4. DUE TO BUILDING DESIGN LOADS, IT WILL BE NECESSARY TO INSTALL (1) RIB STIFFENER AT EACH FULL HEIGHT WALL PANEL RIB. RIB STIFFENERS PROVIDED IN STANDARD LENGTHS. RIB STIFFENER TO BE INSTALLED CENTERED IN PANEL RIB. (SEE DWG # STIF-RIB)



ELEVATION 'A'

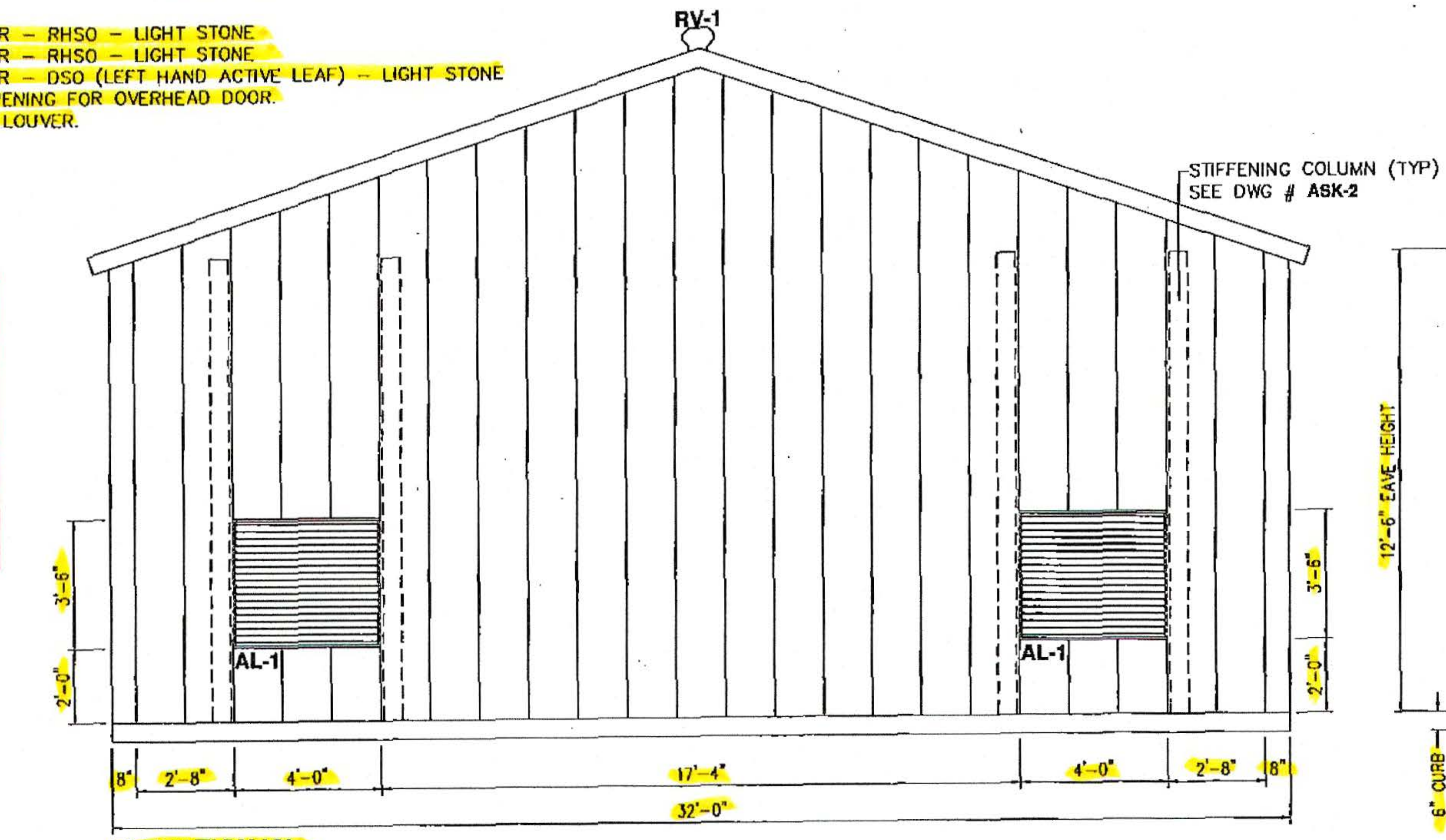


ELEVATION 'B'

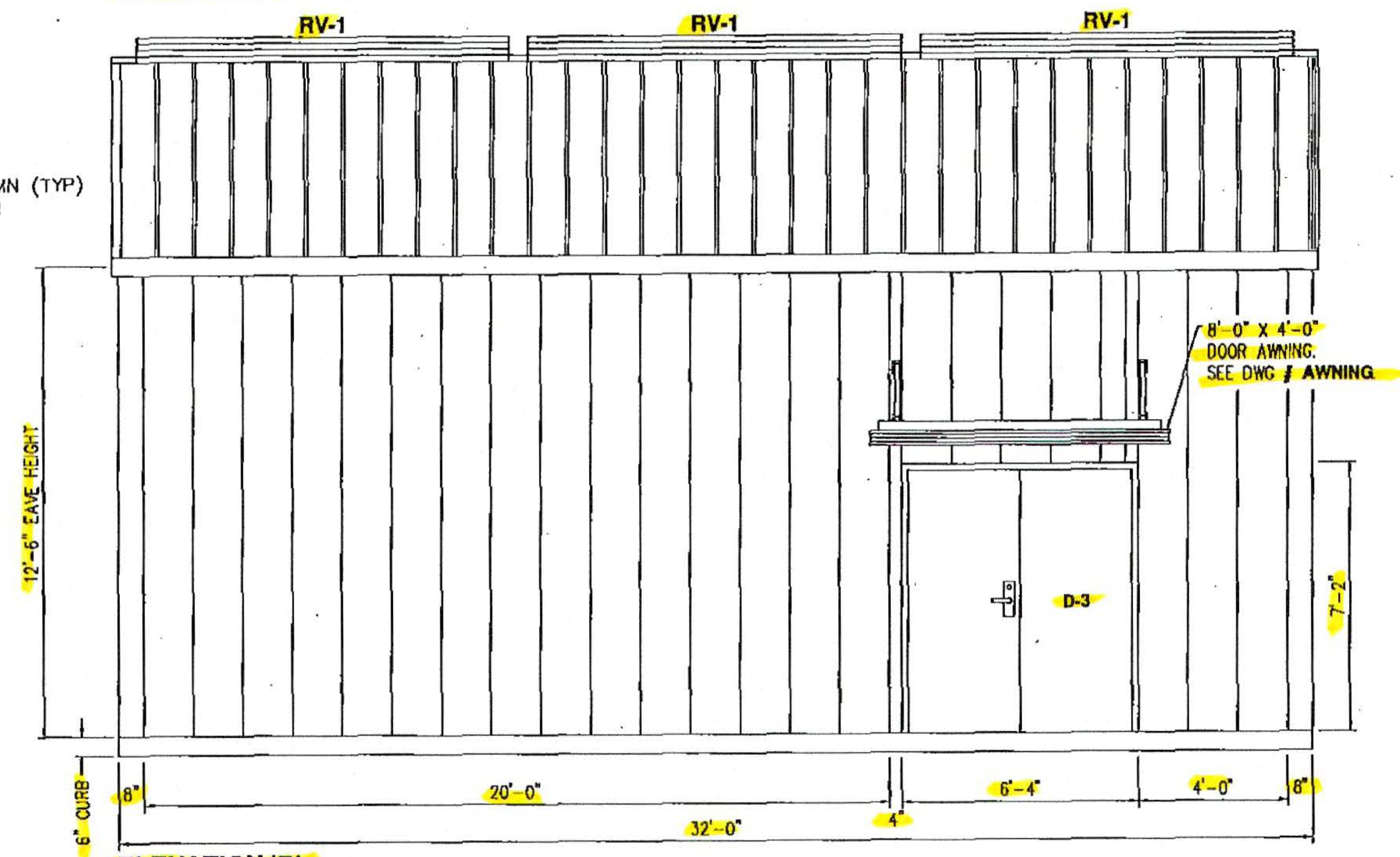
LEGEND:

D-1 – (1) 3'-0" X 7'-0" – WALK DOOR – RHSO – LIGHT STONE
D-2 – (1) 3'-0" X 7'-0" – WALK DOOR – RHSO – LIGHT STONE
D-3 – (1) 6'-0" X 7'-0" – WALK DOOR – DSO (LEFT HAND ACTIVE LEAF) – LIGHT STONE
FO-1 – (1) 10'-8" X 10'-0" FRAMED OPENING FOR OVERHEAD DOOR.
AL-1 – (4) 4'-0" X 3'-6" ADJUSTABLE LOUVER.
RV-1 – (3) 10'-0" RIDGE VENTILATOR

APPROVED AS NOTED
FOR GENERAL CONFORMANCE TO PLANS AND SPECIFICATIONS, SUBMITTOR IS NOT RELIEVED OF ANY APPLICABLE REQUIREMENTS, OMISSIONS OR ERRORS
REVISE AND RESUBMIT FOR APPROVAL ___
REVISE AND ISSUE CERTIFIED DRAWING X
BASIC SYSTEMS, INC.
BY Zach Miller DATE 8-2016



ELEVATION 'C'



ELEVATION 'D'

REVISIONS	BY

BUILDING FINISH
WALL COLOR: LIGHT STONE
WALL PANEL THICKNESS: .028
TRIM COLOR: FERN GREEN
ROOF COLOR: FERN GREEN
ROOF PANEL THICKNESS: .042
ROOF RIB HEIGHT: 6"

PARKLINE, INC.
RT. 62, ELEANOR INDUSTRIAL PARK
ELEANOR, WV 25070
EMAIL: PARKLINE@PARKLINE.COM
PHONE: 800-786-4855 FAX: 304-586-3842

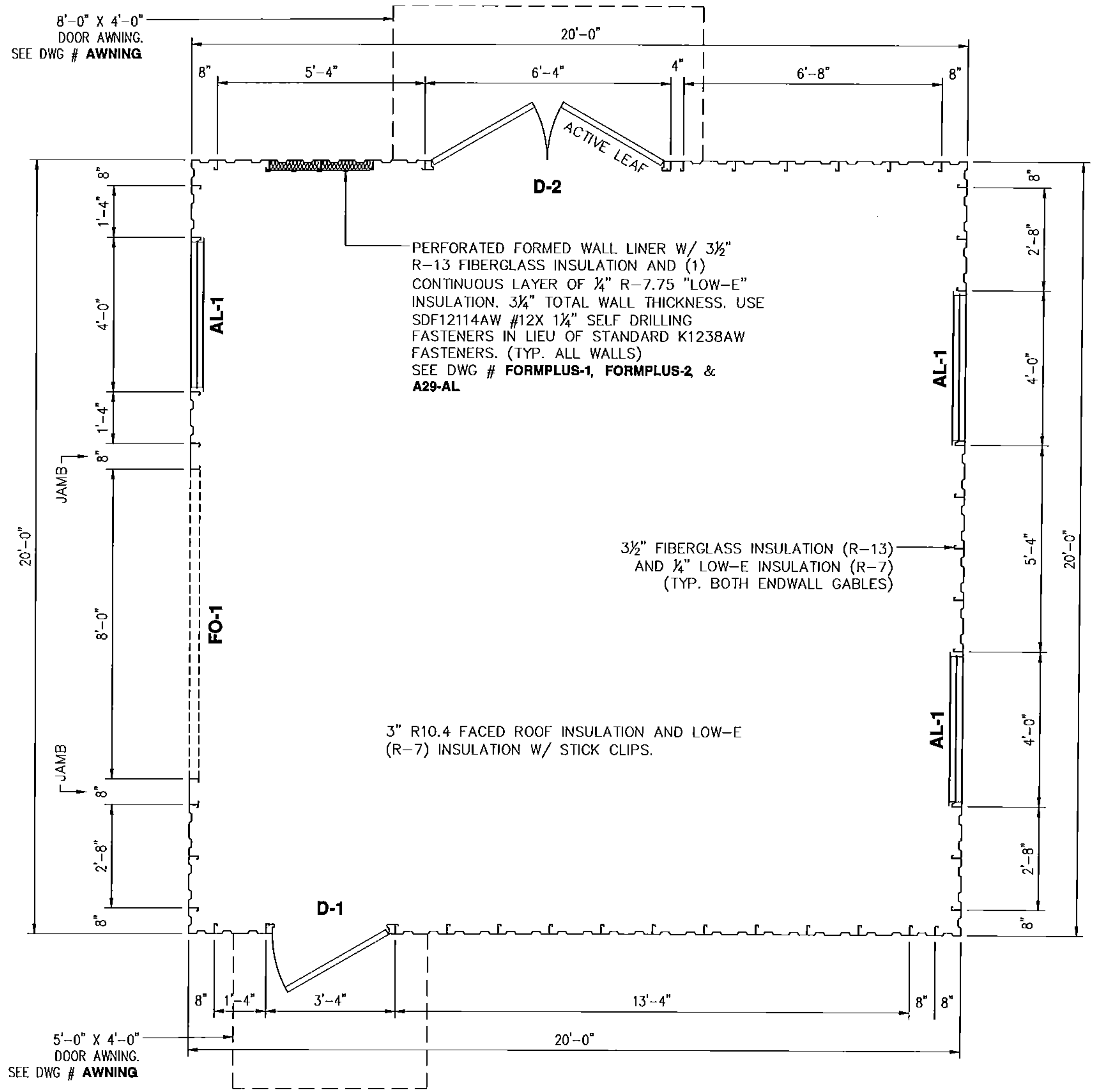
DOMINION TRANSMISSION INC.
BRIDGEPORT ~~CLARKSBURG~~, WV.

REF: DRUM STORAGE BUILDING BL006
PO#: 4500308494
DESTINATION: PLEASANT HILL, NC.

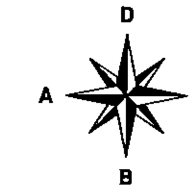
ELEVATIONS

DATE:	8/1/2016	2016000443-4	
DRAWN BY:	MRW		
SCALE:	NTS	ORDER #: 2016000443	REVISION #: 0

O:\Orders\2016\2016000443\2016000443.dwg, 8/1/2016 1:16:08 PM, mrw



FLOOR PLAN



Thomas W. Harding

NORTH CAROLINA PROFESSIONAL SEAL 20447 ENGINEER THOMAS W. HARDING

8-31-16

REVISIONS	BY
08-29-16	MRW
08-31-16	MRW

BUILDING FINISH

WALL COLOR: LIGHT STONE
WALL PANEL THICKNESS: .028
TRIM COLOR: FERN GREEN
ROOF COLOR: FERN GREEN
ROOF PANEL THICKNESS: .042
ROOF RIB HEIGHT: 4"

PARKLINE, INC.
RT. 62, ELEANOR INDUSTRIAL PARK
ELEANOR, WV 25070
EMAIL: PARKLINE@PARKLINE.COM
PHONE: 800-786-4855 FAX: 304-586-3842

DOMINION TRANSMISSION INC.
BRIDGEPORT, WV.

REF: STORAGE BUILDING BL007
PO#: 4500308494
DESTINATION: PLEASANT HILL, NC.

FLOOR PLAN

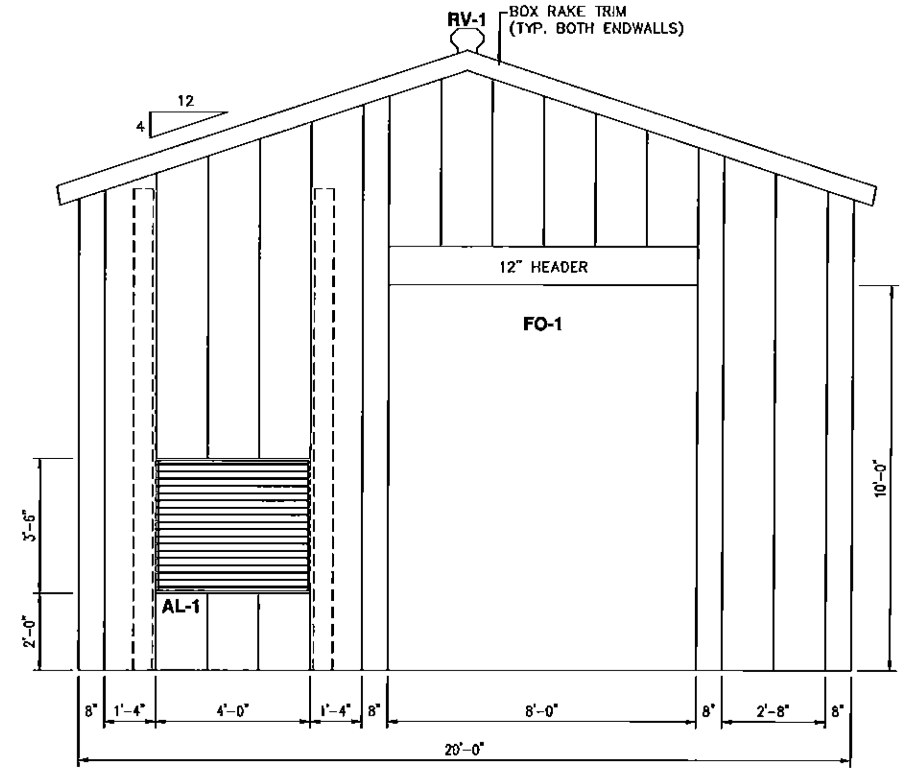
DATE: 7/29/2016
DRAWN BY: MRW
SCALE: NTS

2016000442-1

ORDER #: 2016000442
REVISION #: 2

LEGEND:
D-1 – (1) 3'–0" X 7'–0" – WALK DOOR – RHSO – LIGHT STONE
D-2 – (1) 6'–0" X 7'–0" – WALK DOOR – DSO (LEFT HAND ACTIVE LEAF) – LIGHT STONE
FO-1 – (1) 8'–0" X 8'–0" FRAMED OPENING FOR ROLL DOOR W/ DOOR STOP.
AL-1 – (3) 4'–0" X 3'–6" ADJUSTABLE LOUVER.
RV-1 – (2) 10'–0" RIDGE VENTILATOR

NOTES:
1. DUE TO NON–STANDARD ROOF SLOPE, FIELD DRILLING AND/OR CUTTING WILL BE REQUIRED AT VARIOUS LOCATIONS.
2. DUE TO NON–STANDARD BUILDING SIZE, FIELD DRILLING AND/OR CUTTING WILL BE REQUIRED AT VARIOUS LOCATIONS.
3. 6" MINIMUM SPACE BETWEEN RIDGE VENTS. SEE DWG # **RIDGEVENT-AL**
4. DUE TO BUILDING DESIGN LOADS, IT WILL BE NECESSARY TO INSTALL (1) RIB STIFFENER AT EACH FULL HEIGHT WALL PANEL RIB. **RIB STIFFENERS PROVIDED IN STANDARD LENGTHS. RIB STIFFENER TO BE INSTALLED CENTERED IN PANEL RIB.** (SEE DWG # **STIF-RIB**)



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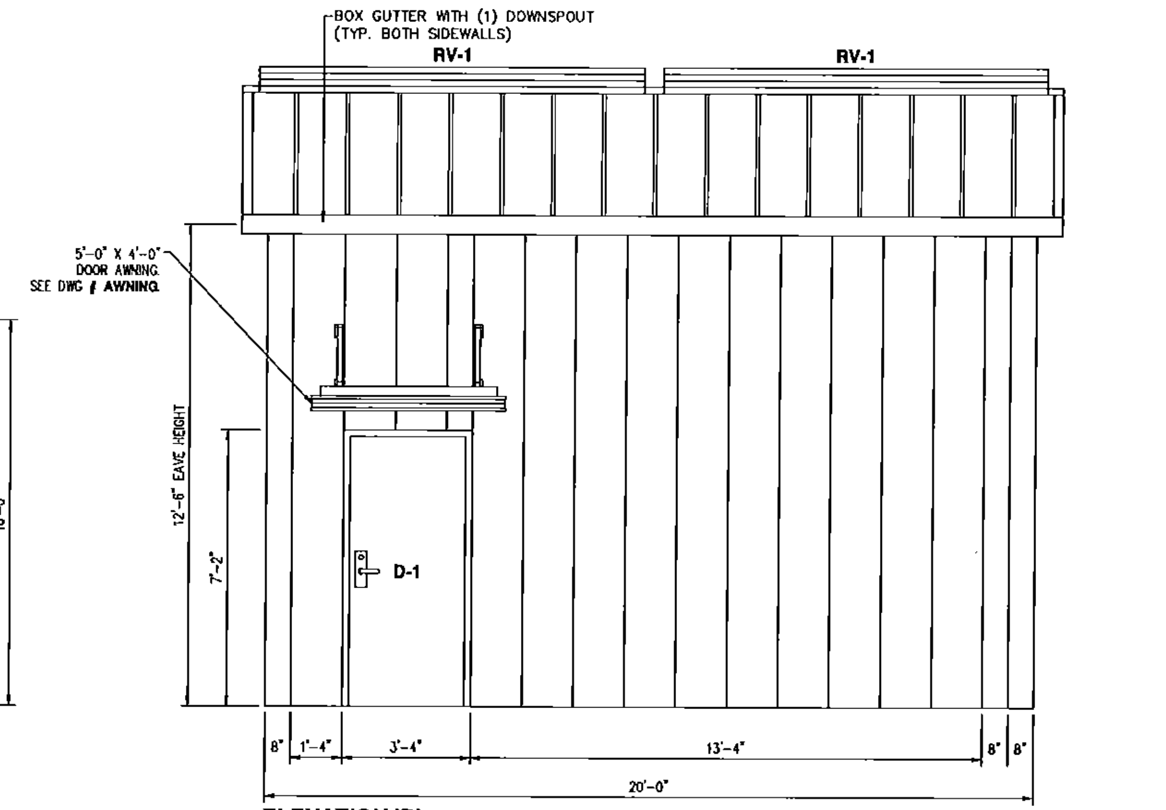
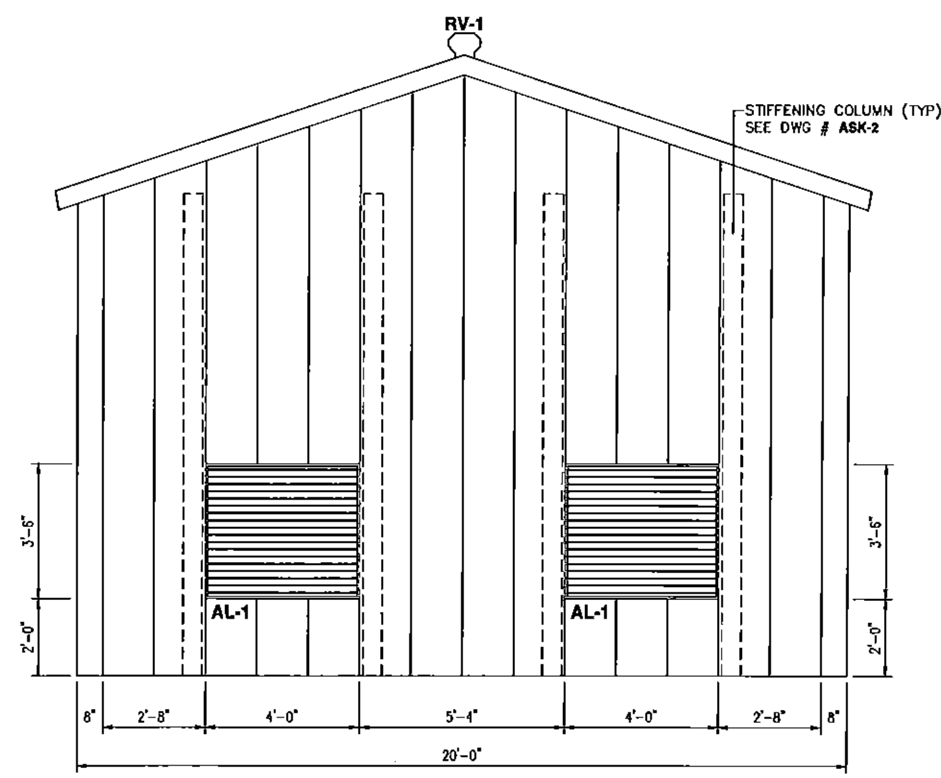
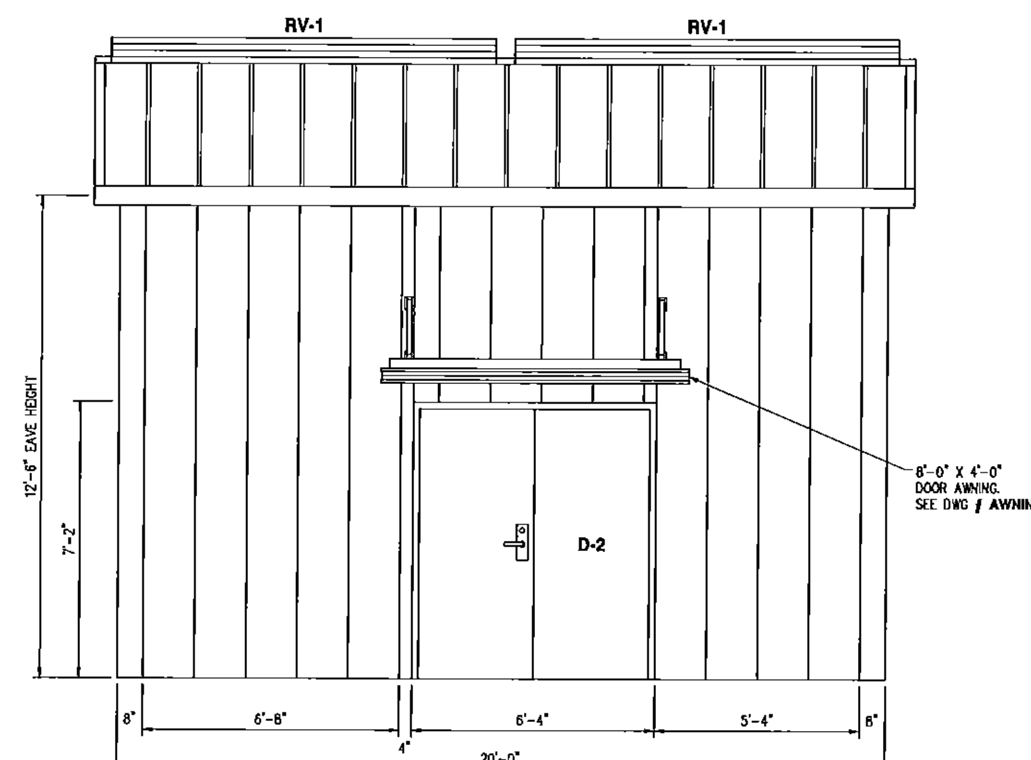


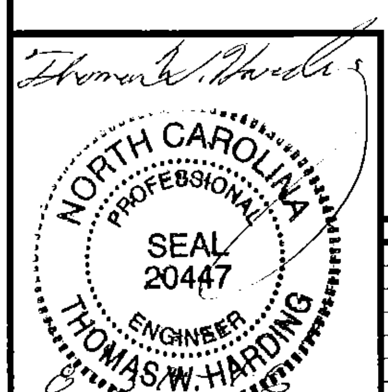
ELEVATION 'B'



ELEVATION 'C'



ELEVATION 'D'



REVISIONS	BY
08–29–16	MRW
08–31–16	MRW

BUILDING FINISH
WALL COLOR: LIGHT STONE
WALL PANEL THICKNESS: .028
TRIM COLOR: FERN GREEN
ROOF COLOR: FERN GREEN
ROOF PANEL THICKNESS: .042
ROOF RIB HEIGHT: 4"

PARKLINE, INC.
RT. 62, ELEANOR INDUSTRIAL PARK
ELEANOR, WV 25070
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PHONE: 800-786-4855 FAX: 304-586-3842

DOMINION TRANSMISSION INC.
BRIDGEPORT, WV.

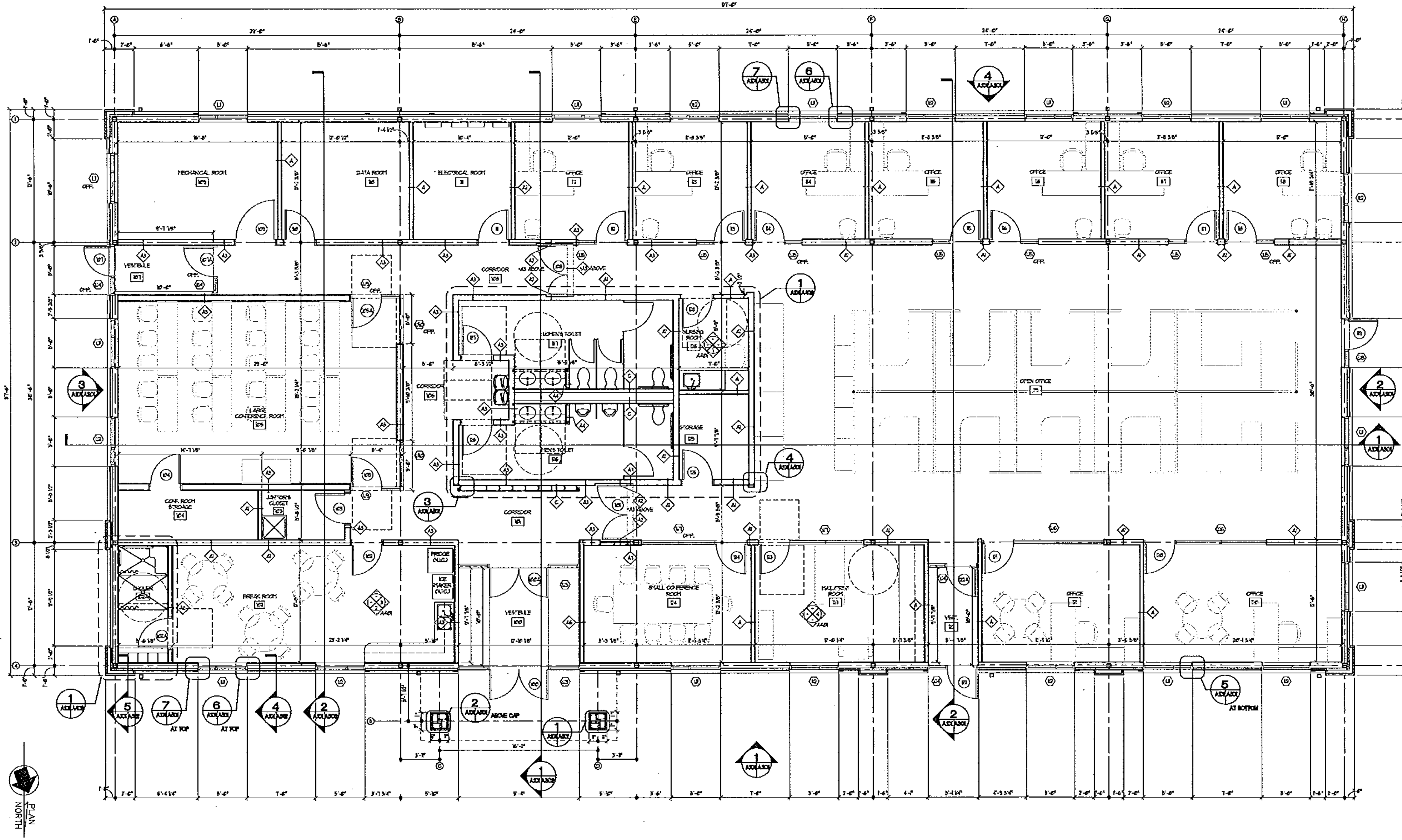
REF: STORAGE BUILDING BL007
PO#: 4500308494
DESTINATION: PLEASANT HILL, NC.

ELEVATIONS

DATE:	7/29/2016
DRAWN BY:	MRW
SCALE:	NTS

2016000442 -4

ORDER #: 2016000442 REVISION #: 2



1 A101 FLOOR PLAN
SCALE: 1/4" = 1'-0"

nbj ARCHITECTURE
A Professional Limited Company
Grove Park Square
11537-D Nuckols Road
Glen Allen, Virginia 23059
tel (804) 273-9843
fax (804) 273-9811

ARCHITECT'S PROJECT NUMBER: 2016026

ISSUED FOR BID
ATLANTIC COAST PIPELINE
REGIONAL OFFICE
OWNER: ACP LLC

FOREST ROAD, NORTHAMPTON, NC 27866

FLOOR PLAN

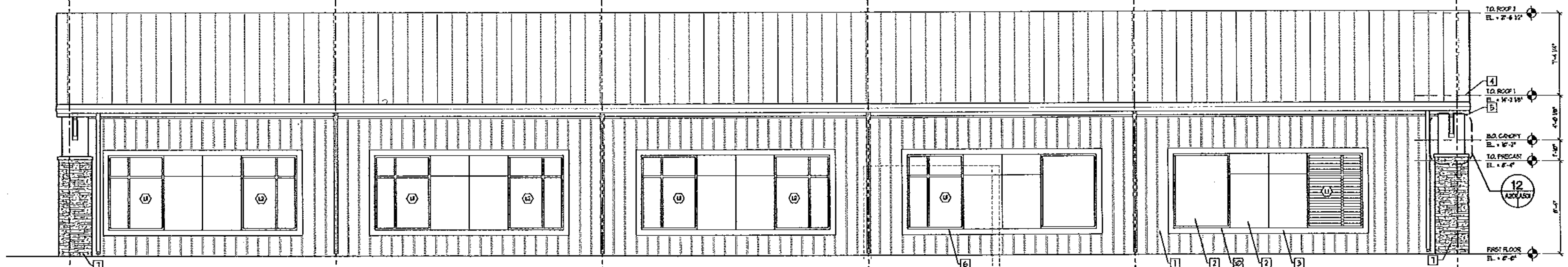
Date: APRIL 21, 2017

REVISIONS

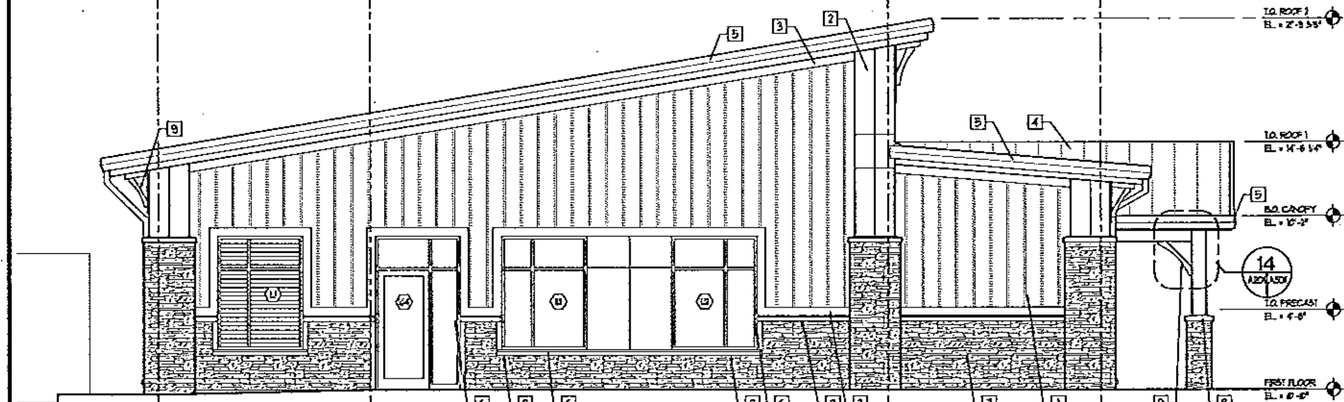
NO.	DATE

Sheet
A101
ISSUED FOR BID

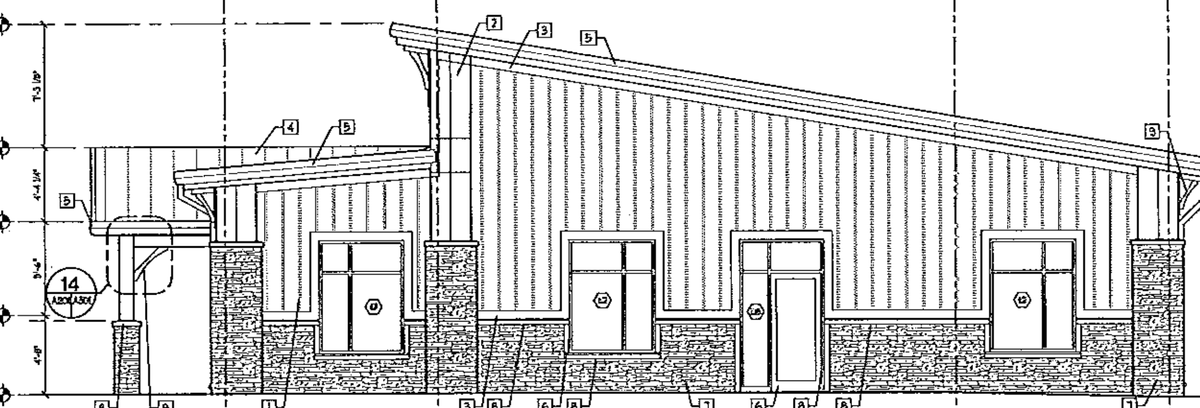
Architect's Project Number: 2016026
File Name: A101-PLAN



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



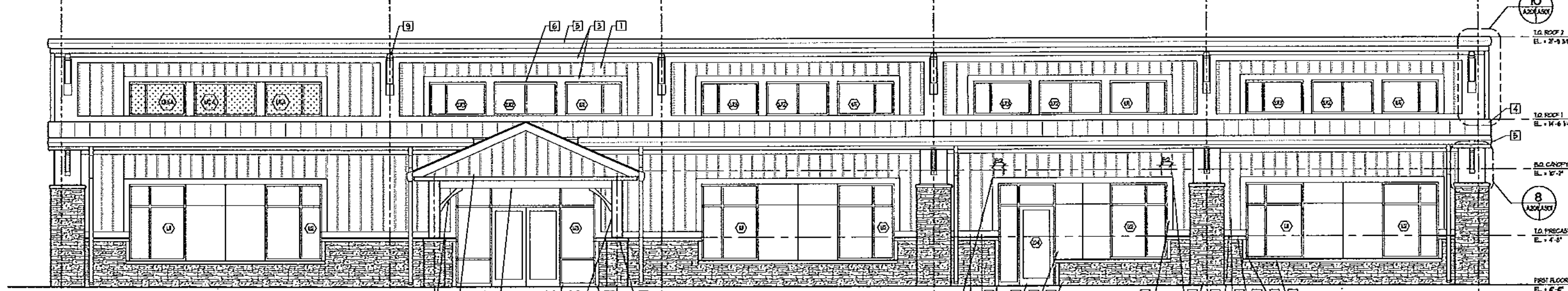
3 LEFT SIDE ELEVATION
SCALE: 1/4" = 1'-0"



2 RIGHT SIDE ELEVATION
SCALE: 1/4" = 1'-0"

EXTERIOR FINISH LEGEND

1	PAINTED FIBER CEMENT BOARD & 1X2 BATTENS (PT-6)	7	MANUFACTURED STONE VENEER
2	PAINTED FIBER CEMENT BOARD (PT-7)	8	PRECAST CONCRETE SHAPES
3	PAINTED FIBER CEMENT BOARD (PT-8)	9	PAINTED SOLID WOOD OUTLOOKER
4	STANDING SEAM METAL ROOF	10	PAINTED 1X2 FIBER CEMENT TRIM TO MATCH ALUM. STOREFRONT.
5	METAL TRIM (COLOR TO MATCH STANDING SEAM ROOF		
6	ALUMINUM STOREFRONT		



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

nbj ARCHITECTURE
A Professional Limited Company
Grove Park Square
11527-D Nuckols Road
Glen Allen, Virginia 23059
tel: (804) 273-9043
fax: (804) 273-9511

ARCHITECT'S PROJECT NUMBER: [illegible]

ISSUED FOR BID
ATLANTIC COAST PIPELINE
REGIONAL OFFICE
OWNER: ACP LLC

FORREST ROAD, NORTHAMPTON, NC 27866

EXTERIOR ELEVATIONS

Date: APRIL 21, 2017

REVISIONS

NO.	DATE

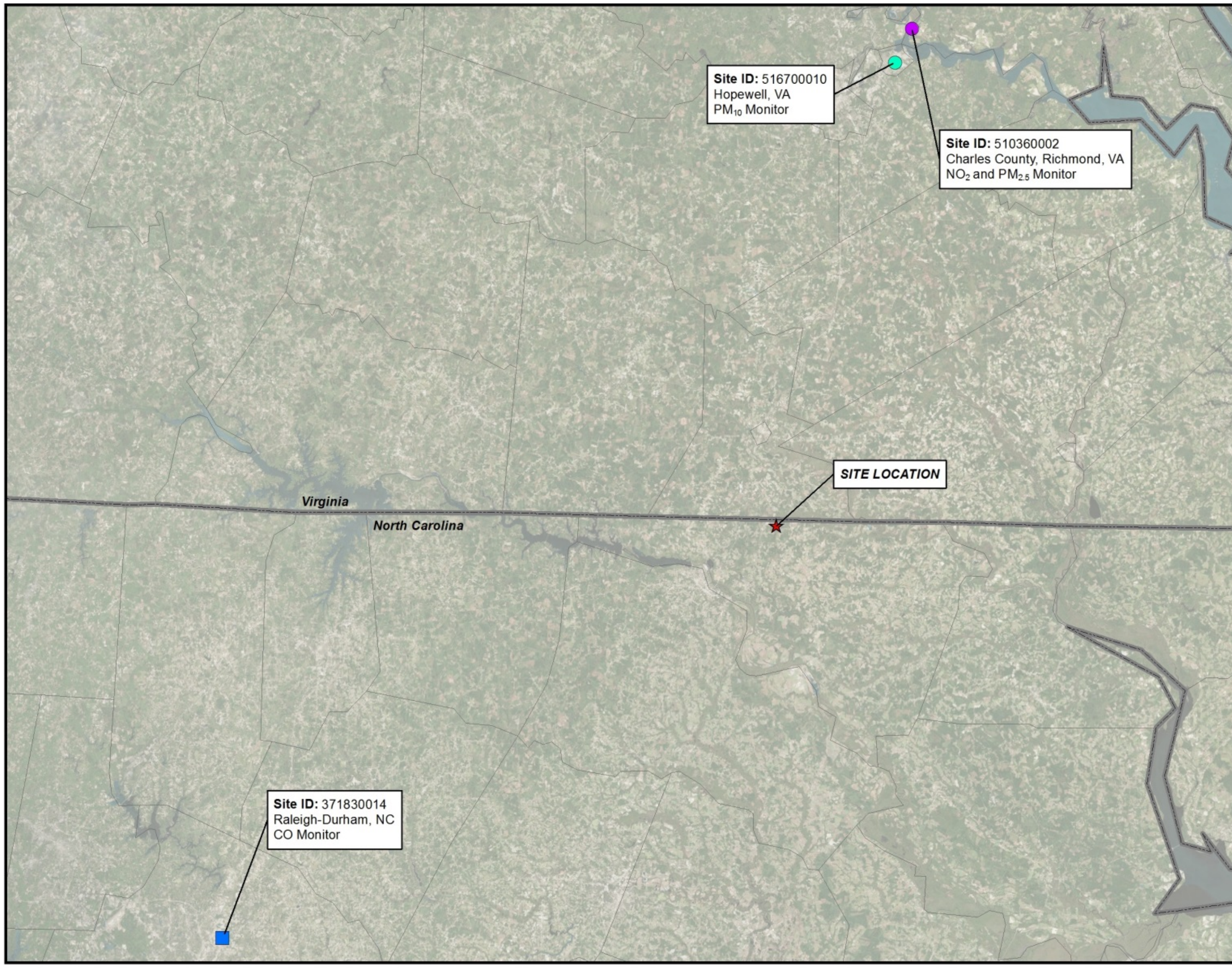
Sheet
A201
ISSUED FOR BID

Architect's Project Number: [illegible]

File Name: A201-ELEVS

Regional Air Quality Monitoring Locations

Appendix F



Legend

- Project Location
- CO Monitor
- NO_2 and $PM_{2.5}$ Site
- PM_{10} Site
- State Boundary

NOTES:

1. Aerial Imagery: ESRI World Imagery Reproduced under license in ArcGIS 10.3

0 5.5 11 22
Miles

APPENDIX F

Air Quality Monitoring Stations

Dominion Transmission, Inc.
Atlantic Coast Pipeline, LLC
North Carolina/Virginia
January 2018

ERM

Air Quality Modeling Files (CD-ROM)
Appendix G