

Application for General Permit G60-C

**for Construction, Modification, Relocation,
Administrative Update and Operation of**

Three (3) New Emergency Electrical Generators

Prepared for:

**National Conservation Training Center
U.S. Fish & Wildlife Service
698 Conservation Way
Shepherdstown, WV 25443**

Prepared by:

**Amec Foster Wheeler Environment & Infrastructure, Inc.
271 Mill Road
Chelmsford, Massachusetts 01824
Amec Foster Wheeler Project No. 3271G13044.7.71**

January 2015

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**APPLICATION FOR
GENERAL PERMIT REGISTRATION**



WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF AIR QUALITY
 601 - 57th Street
 Charleston, WV 25304
 Phone: (304) 926-0475 www.dep.wv.gov/daq

APPLICATION FOR GENERAL PERMIT REGISTRATION
 CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE
 A STATIONARY SOURCE OF AIR POLLUTANTS

- CONSTRUCTION** **MODIFICATION** **RELOCATION** **CLASS I ADMINISTRATIVE UPDATE**
 CLASS II ADMINISTRATIVE UPDATE

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

- | | |
|---|--|
| <input type="checkbox"/> G10-D – Coal Preparation and Handling | <input type="checkbox"/> G40-C – Nonmetallic Minerals Processing |
| <input type="checkbox"/> G20-B – Hot Mix Asphalt | <input type="checkbox"/> G50-B – Concrete Batch |
| <input type="checkbox"/> G30-D – Natural Gas Compressor Stations | <input checked="" type="checkbox"/> G60-C - Class II Emergency Generator |
| <input type="checkbox"/> G33-A – Spark Ignition Internal Combustion Engines | <input type="checkbox"/> G65-C – Class I Emergency Generator |
| <input type="checkbox"/> G35-A – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit) | <input type="checkbox"/> G70-A – Class II Oil and Natural Gas Production Facility |

SECTION I. GENERAL INFORMATION

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE): 2. FEDERAL EMPLOYER ID NO. (FEIN):

U.S. Fish & Wildlife Service

841024566

3. APPLICANT'S MAILING ADDRESS:

**National Conservation Training Center (NCTC)
 U.S. Fish & Wildlife Service
 698 Conservation Way
 Shepherdstown, WV 25443**

4. APPLICANT'S PHYSICAL ADDRESS:

**National Conservation Training Center
 U.S. Fish & Wildlife Service
 698 Conservation Way
 Shepherdstown, WV 25443**

5. IF APPLICANT IS A SUBSIDIARY CORPORATION, PLEASE PROVIDE THE NAME OF PARENT CORPORATION: **N/A**

6. **WV BUSINESS REGISTRATION.** IS THE APPLICANT A RESIDENT OF THE STATE OF WEST VIRGINIA? **YES** **NO** **N/A**

- IF **YES**, PROVIDE A COPY OF THE **CERTIFICATE OF INCORPORATION / ORGANIZATION / LIMITED PARTNERSHIP** (ONE PAGE) INCLUDING ANY NAME CHANGE AMENDMENTS OR OTHER **BUSINESS CERTIFICATE AS ATTACHMENT A.**
- IF **NO**, PROVIDE A COPY OF THE **CERTIFICATE OF AUTHORITY / AUTHORITY OF L.L.C. / REGISTRATION** (ONE PAGE) INCLUDING ANY NAME CHANGE AMENDMENTS OR OTHER **BUSINESS CERTIFICATE AS ATTACHMENT A.**

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.).

Standby/Emergency Generator at NCTC

8a. Standard Industrial Classification (SIC) Code:

9512

8b. North American Industry Classification System (NAICS) for the facility:

924120

9. DAQ plant ID No. (for an existing facility):

N/A

10. List all current 45CSR13 and other General permit numbers associated with this process (for existing facility only):

N/A

A: PRIMARY OPERATING SITE INFORMATION

11A. Name of primary operating site: National Conservation Training Center (NCTC)	12A. Address of primary operating site: 698 Conservation Way Shepherdstown, WV 25443	
13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the <i>proposed site</i> ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO – IF YES , PLEASE EXPLAIN: <u>OWNER</u> – IF NO , YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.		
14A. - For MODIFICATIONS or ADMINISTRATIVE UPDATES at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; - For Construction or Relocation permits , please provide directions to <i>the proposed new site location</i> from the nearest state road. From I-81, take exit 16 (Rt 9 East - Edwin Miller Blvd.) Travel 1.7 miles East on Rt 9. Take left at light onto Rt 45 E. Travel 8.3 miles East on Rt. 45 - to Shepherdstown. Proceed through ALT 480 light. Take left at 4-way stop in Shepherdstown. Travel 0.2 miles North on Rt. 480. Take the third left onto Shepherd Grade Road (SGR). Travel 3.3 miles on SGR. Turn right into NCTC gate. Include a Map as Attachment F .		
15A. Nearest city or town: Shepherdstown	16A. County: Jefferson	17A. UTM Coordinates: Northing (km): 4374.8561 Easting (km): 258.1728 Zone: 18
18A. Briefly describe the proposed new operation or change (s) to the facility: The addition of three diesel-fired 800 kW emergency power generators.		19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: 39.48933 Longitude: -77.81198

B: 1ST ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11B. Name of 1 st alternate operating site: <p align="center">N/A</p>	12B. Address of 1 st alternate operating site: _____ _____ _____
13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the <i>proposed site</i> ? <input type="checkbox"/> YES <input type="checkbox"/> NO – If YES , please explain: _____ _____ _____	
– If NO , YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.	

14B. - For modifications or administrative updates , at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; - For construction or relocation permits , please provide directions to <i>the proposed new site location</i> from the nearest state road. Include a MAP as Attachment F. <hr/>		
15B. Nearest city or town:	16B. County:	17B. UTM Coordinates: Northing (km): Easting (km): Zone:
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: <hr/> Longitude: <hr/>

B: 2nd ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)

11C. Name of 2 ND alternate operating site: N/A <hr/>	12C. Address of 2 ND alternate operating site: <hr/> <hr/>	
13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the <i>proposed site</i> ? <input type="checkbox"/> YES <input type="checkbox"/> NO - If YES, please explain: <hr/> <hr/> - If NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.		
14C. - For modifications or administrative updates , at an existing facility, please provide directions to the <i>present location</i> of the facility from the nearest state road; - For construction or relocation permits , please provide directions to <i>the proposed new site location</i> from the nearest state road. Include a MAP as Attachment F. <hr/> <hr/>		
15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (km): Easting (km): Zone:
18C. Briefly describe the proposed new operation or change (s) to the facility:		19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: <hr/> Longitude: <hr/>

<p>20. Provide the date of anticipated installation or change: 05/01/2015</p> <p>If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: ____/____/____</p>	<p>21. Date of anticipated start- up if registration is granted:</p> <p>06/01/2015</p>
<p>22. Provide maximum projected Operating Schedule of activity/activities outlined in this application:</p> <p>Hours per day: 24 Days per week: 3 Weeks per year: 7 Percentage of operation: 5.7</p> <p>Note: The anticipated maximum operations are < 500 hours per year per generator and will be approximately 52 hours per year per generator under non-emergency situations.</p>	

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

<p>23. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).</p>
<p>24. Include a Table of Contents as the first page of your application package.</p>
<p>All of the required forms and additional information can be found under the Permitting Section (General Permits) of DAQ's website, or requested by phone.</p>
<p>Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.</p> <ul style="list-style-type: none"> <input type="checkbox"/> ATTACHMENT A : CURRENT BUSINESS CERTIFICATE <input checked="" type="checkbox"/> ATTACHMENT B: PROCESS DESCRIPTION <input type="checkbox"/> ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS <input checked="" type="checkbox"/> ATTACHMENT D: PROCESS FLOW DIAGRAM <input checked="" type="checkbox"/> ATTACHMENT E: PLOT PLAN <input checked="" type="checkbox"/> ATTACHMENT F: AREA MAP <input checked="" type="checkbox"/> ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM <input type="checkbox"/> ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS <input checked="" type="checkbox"/> ATTACHMENT I: EMISSIONS CALCULATIONS <input checked="" type="checkbox"/> ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT <input checked="" type="checkbox"/> ATTACHMENT K: ELECTRONIC SUBMITTAL <input checked="" type="checkbox"/> ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE <input type="checkbox"/> ATTACHMENT M: SITING CRITERIA WAIVER <input checked="" type="checkbox"/> ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS) <input checked="" type="checkbox"/> ATTACHMENT O: EMISSIONS SUMMARY SHEETS <input type="checkbox"/> OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.) <p>Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.</p>

SECTION IV. CERTIFICATION OF INFORMATION

This General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of a Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, Emission Inventory, Certified Emission Statement, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

- I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

- I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

- I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

- I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

- I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

- I certify that I am the Owner and Proprietor

- I hereby certify that (please print or type) _____
is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Office of Air Quality immediately, and/or,

I hereby certify that all information contained in this General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible

Signature _____

(please use blue ink)

Responsible Official

Date

Name & Title _____

(please print or type)

Jim Willis, Deputy Director (NCTC)

Signature _____

(please use blue ink)

Authorized Representative (If applicable)

Date

Applicant's Name

National Conservation Training Center

Phone & Fax

(304) 876-7263

Phone

(304) 876-7775

Fax

Email:

jim_willis@fws.gov

Attachments and Supporting Documents

Attachment A: Current Business Certificate

If the registrant is a resident of the State of West Virginia the registrant should provide a copy of the registrant's current Business Registration Certificate issued to them from the West Virginia State Tax Department. If the registrant is not a resident of the State of West Virginia, the registrant should provide a copy of the Certificate of Authority/Authority of LLC/Registration.

Not Applicable

Attachment B: Process Description

Provide a detailed written description of the operation, plant and/or affected facilities. The Process Description is used in conjunction with the Process Flow Diagram to provide the reviewing engineer a complete understanding of the activity at the operation or plant. Describe in detail and order the complete process.

Use the following guidelines to ensure a complete Process Description:

1. The Process Flow Diagram should be prepared first and used as a guide when preparing the Process Description. The written description shall follow the logical order of the Process Flow Diagram.
2. All sources, affected facilities, and air pollution control devices must be included in the Process Description.
3. When modifications are proposed, describe the modifications and the effect the changes will have on affected facilities, equipment or operation.
4. Proper Source Identification Numbers are used consistently in the Process Description.
5. Additional information that may facilitate the reviewer's understanding of the Process Flow Diagram and/or Process Description is included.

The National Conservation Training Center (NCTC) proposes to install three (3) new diesel-fired, standby/emergency generators (EG-1, EG-2, and EG-3) for the purpose of producing emergency electrical power at the NCTC located in Shepherdstown, West Virginia.

Each emergency electrical generator is driven by a Cummins 4-cycle, turbocharged and charge air-cooled engine as shown in Attachment D and as provided in the attached manufacturers' specifications. There will be one 10,000-gallon aboveground tank which will store diesel fuel to supply all three emergency generators. Additionally, each generator will have its own 120-gallon diesel fuel day tank.

Attachment C: Description of Fugitive Emissions

This information is not required for General Permit G60-C. However, the Director may require a detailed written description of fugitive emissions associated with the process if there is reason to believe the affected facility is close to major source thresholds.

Not Applicable

Attachment D: Process Flow Diagram

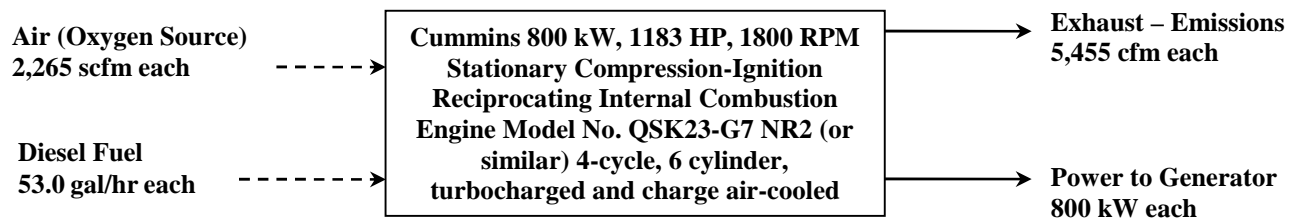
Provide a diagram or schematic that supplements the Process Description of the operation or plant. The Process Flow Diagram shall show all sources, components or facets of the operation or plant in an understandable line sequence of operation. Appropriate sizing and specifications of equipment should also be shown on the Process Flow Diagram. For a proposed modification, clearly identify the process areas, affected facilities and equipment that will be modified or added, and specify the nature and extent of the modification.

Use the following guidelines to ensure a complete Process Flow Diagram:

1. The Process Flow Diagram shall logically follow the entire process from beginning to end.
2. Identify each source, air pollution control device and transfer point with proper and consistent Source Identification Numbers, Control Device Identification Numbers and Transfer Point Identification Numbers.
3. Include material handling rates for all lines of the Process Flow Diagram. If applicable, include pre- and post-modification material handling rates and identify accordingly.
4. Transfer Point Identification Numbers, consistent with assignments in any emission calculation sheet, should be shown at each transfer point.
5. The process flow lines may appear different for clarity. For example, dot-dash-dot for raw material, and a solid line for finished product. Refuse flow may be identified by a dotted line
6. The process flow lines may be color coded. For example, new or modified equipment may be red, old or existing equipment may be blue; different stages of preparation such as raw material may be green and finished product or refuse another color.

PROCESS FLOW DIAGRAM

EG-1, EG-2, and EG-3 (identical processes)



Attachment E: Plot Plan

Provide an accurately scaled and detailed Plot Plan showing the locations of all process equipment and/or affected facilities and air pollution control devices. Show all equipment, affected facilities, enclosures, buildings and plant entrances and exits from the nearest public road(s) as appropriate. Note height, width and length of proposed or existing buildings and structures.

A scale between 1"=10' and 1"=200' should be used with the determining factor being the level of detail necessary to show operation or plant areas, affected facilities, sources, transfer points, etc. An overall small scale plot plan (e.g., 1"=300') should be submitted in addition to larger scale plot plans for process or activity areas (e.g., 1"=50') if the plant is too large to allow adequate detail on a single plot plan. Process or activity areas may be grouped for the enlargements as long as sufficient detail is shown.

Use the following guidelines to ensure a complete Plot Plan:

1. Operation, plant or facility name
2. Company name
3. Company ID number
4. Plot scale, north arrow, date drawn, and submittal date.
5. Fence lines
6. Property lines
7. Base elevation
8. UTM reference coordinates from the Area Map and corresponding reference point elevation
9. Location of all sources labeled with proper and consistent Source Identification numbers

This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

See attached Figures 1 and 2



NCTC Emergency Generators
EG1, EG2, EG3

Easting: 258173m
Northing: 4374856m
UTM 18N, NAD 83

PLOT PLAN

**National Conservation
Training Center (NCTC)**

**U.S. Fish &
Wildlife Service
Sheperdstown, WV**

Figure 1

Legend

- Emergency Generators

0 100
Meters

0 300
Feet
1 in = 300 ft

Prepared For:



Prepared By:



**Amec Foster Wheeler
Environment & Infrastructure, Inc.**
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

Imagery: ESRI, 2012.
Projection: NAD 1983 UTM Zone 18N
Drawn by: AKN, Submitted: 01-19-2015

258106

258206

4374897

4374897



258106

258206

4374797

PLOT PLAN

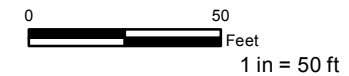
National Conservation Training Center (NCTC)

U.S. Fish &
Wildlife Service
Sheperdstown, WV

Figure 2

Legend

- Emergency Generators



Prepared For:



Prepared By:



Amec Foster Wheeler
Environment & Infrastructure, Inc.
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

Imagery: ESRI, 2012.
Projection: NAD 1983 UTM Zone 18N
Drawn by: AKN, Submitted: 01-19-2015

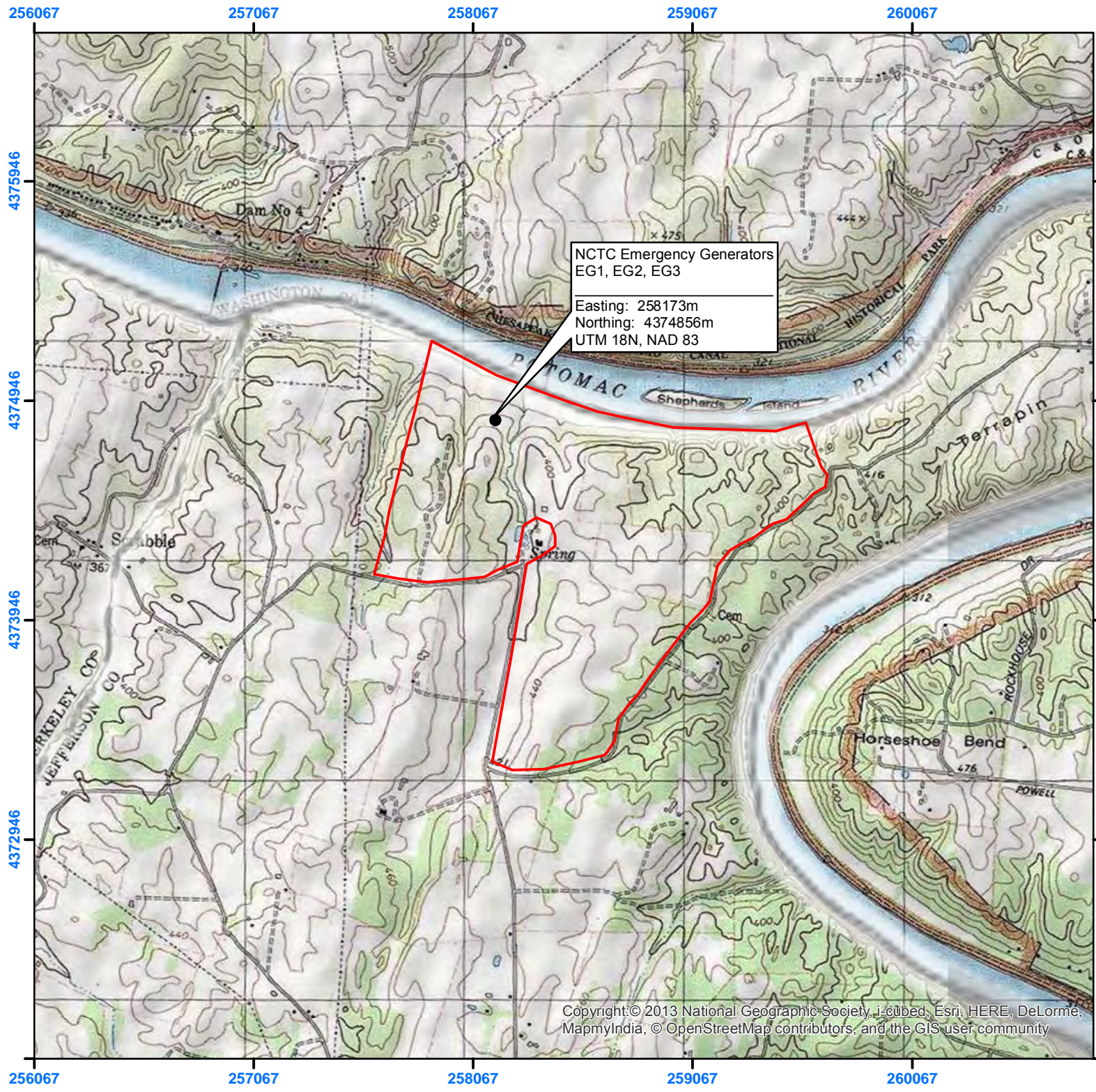
Attachment F: Area Map

Provide a USGS 7.5 minute topographic Area Map showing the current or proposed location of the operation or plant. On this map, identify plant or operation property lines, access roads and any adjacent dwelling, business, public building, school, church, cemetery, community or institutional building or public park.

Mark and reference UTM coordinates (not latitude and longitude) and the corresponding elevation above mean sea level for the operation or plant. UTM coordinates may be acquired from the USGS 7.5" topographical map. UTM coordinates are marked as blue tick marks along the outside edges of the map. These coordinates must be provided for a point inside the plant boundary near the center of the property and be accurate to within fifty meters.

This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

See attached Figure 3



NCTC Emergency Generators
EG1, EG2, EG3

Easting: 258173m
Northing: 4374856m
UTM 18N, NAD 83

AREA MAP

**National Conservation
Training Center (NCTC)**

**U.S. Fish &
Wildlife Service
Sheperdstown, WV**

Figure 3

Legend

- Emergency Generators
- NCTC Boundary

0 650
Meters

0 2,000
Feet
1 in = 2,000 ft

Prepared For:



Prepared By:



**Amec Foster Wheeler
Environment & Infrastructure, Inc.**
271 Mill Road
Chelmsford, MA 01824
(978) 692-9090

Copyright: © 2013 National Geographic Society, i-cubed, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Imagery: ESRI, 2012.
Projection: NAD 1983 UTM Zone 18N
Drawn by: AKN, Submitted: 01-19-2015

Attachment G: General Permit G60-C Registration Section Applicability Form

General Permit G60-C was developed to allow qualified registrants to seek registration for emergency generator(s).

General Permit G60-C allows the registrant to choose which sections of the permit that they wish to seek registration under. Therefore, please mark which sections that you are applying for registration under. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

Section 5	Reciprocating Internal Combustion Engines (R.I.C.E.)*	<input checked="" type="checkbox"/>
Section 6	Tanks	<input checked="" type="checkbox"/>
Section 7	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (40CFR60 Subpart IIII)	<input checked="" type="checkbox"/>
Section 8	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (40CFR60 Subpart JJJJ)	<input type="checkbox"/>

* **Affected facilities that are subject to Section 5 may also be subject to Sections 7 or 8. Therefore, if the applicant is seeking registration under both sections, please select both.**

Attachment H: Air Pollution Control Device Data Sheet

This information is not required for General Permit G60-C.

Not Applicable.

Attachment I: Emissions Calculations

Provide detailed emission calculations which lists the plant or operation's potential to emit (PTE) for criteria and hazardous/toxic pollutants.

Use the following guidelines to ensure complete emission calculations

1. All emission sources are included in the emission calculations, as well as all methods used in the emissions calculations.
2. Proper Source Identification Numbers and Control Device Identification Numbers are used consistently in the Emission Calculations.
3. A printout of the Emission Summary Sheets is attached to the Registration Application.

Emission Calculations for Diesel Generators > 600 HP
National Conservation Training Center

Emission Calculations for Diesel Generators > 600 HP

Emission Unit	Engine Model	Gross Engine Power Output	
		(kw)	(hp)
EG-1	Cummins QSK23-G7 NR2	910	1,220
EG-2	Cummins QSK23-G7 NR2	910	1,220
EG-3	Cummins QSK23-G7 NR2	910	1,220
Total:		2,730	3,661

Oil Firing Rate (each)	53.8	gal/hr
Heat content of fuel -	140,000	BTU/gal
Sulfur content of fuel -	0.0015	wt%

Emission Factors from Cummins Exhaust Emission Data Sheet

Constituent	Emission Factor
CO	0.33 g/hp-hr
NOx	6.51 g/hp-hr
PM	0.05 g/hp-hr
SO ₂	0.10 g/hp-hr
VOC	0.10 g/hp-hr

GHG Emission factors, from Table C-1 and C-2 to Subpart C of 40 CFR 98

Constituent	Emission Factor
CO ₂	73.96 kg/MMBtu
CH ₄	3.0E-03 kg/MMBtu
N ₂ O	6.0E-04 kg/MMBtu

Calculation of Criteria Pollutant Emissions

Constituent	Emergency Gen. Hourly PTE (lb/hr)	Annual Restricted Potential to Emit ¹ TPY	Annual Unrestricted Potential to Emit TPY
CO	2.66	0.7	11.7
NOx	52.54	13.1	230.1
PM	0.40	0.1	1.8
SO ₂	0.81	0.2	3.5
VOC	0.81	0.2	3.5
CO ₂	1,671.20	417.8	7,319.9
CH ₄	0.07	0.02	0.3
N ₂ O	0.01	0.003	0.06

¹ Annual restricted potential to emit is based on 500 hr/yr for emergency generators.

Calculation of Hourly PTE:

Emission Factor (g/hp-hr) x Engine Power Output (hp) / 453.6 g/lb = Emissions (lb/hr)

Emission Factor (kg/mmBtu) x 2.205 lb/kg x Total Hourly Heat Input (mmBtu/hr) = Emissions (lb/hr)

Calculation of Annual Restricted PTE:

Hourly PTE (lb/hr) x 500 hr/yr = Emissions (lb/yr)

Calculation of Annual Unrestricted PTE:

Hourly PTE (lb/hr) x 8,760 hr/yr = Emissions (lb/yr)

Calculation of HAP Emissions

HAP constituent emission factors obtained from AP-42, Section 3.4, Table 3.4-3

Constituent	Emission Factor (lb/MMBtu)	Emergency Gen: Hourly PTE (lb/hr)	Annual Restricted Potential to Emit ¹ TPY	Annual Unrestricted Potential to Emit TPY
Acetaldehyde	2.52E-05	1.90E-04	4.75E-05	8.31E-04
Acrolein	7.88E-06	5.94E-05	1.48E-05	2.60E-04
Benzene	7.76E-04	5.84E-03	1.46E-03	2.56E-02
Formaldehyde	7.89E-05	5.94E-04	1.49E-04	2.60E-03
Naphthalene	1.30E-04	9.79E-04	2.45E-04	4.29E-03
Toluene	2.81E-04	2.12E-03	5.29E-04	9.27E-03
Xylenes	1.93E-04	1.45E-03	3.63E-04	6.37E-03
Total:		0.01	0.003	0.05

¹ Annual restricted potential to emit is based on 500 hr/yr for emergency generators.

Calculation of Hourly PTE:

Emission Factor (lb/MMBtu) x Heat Content of Fuel (MMBtu/gal) x Fuel Firing Rate (gal/hr) = Emissions (lb/hr)

Calculation of Annual Restricted PTE:

Hourly PTE (lb/hr) x 500 hr/yr = Emissions (lb/yr)

Calculation of Annual Unrestricted PTE:

Hourly PTE (lb/hr) x 8,760 hr/yr = Emissions (lb/yr)

Summary of Stationary Source Potential Emissions National Conservation Training Center							
Activities	Annual Potential Emissions ¹ (tons/yr)						
	CO	NOx	PM	SO ₂	VOCs	HAPs	CO _{2e}
Combustion Sources							
910 kW (output) Cummins Emergency Generator - E1	0.2	4.4	0.03	0.1	0.1	0.001	139.3
910 kW (output) Cummins Emergency Generator - E2	0.2	4.4	0.03	0.1	0.1	0.001	139.3
910 kW (output) Cummins Emergency Generator - E3	0.2	4.4	0.03	0.1	0.1	0.001	139.3
Total, Stationary Sources, ton/yr	0.7	13.1	0.1	0.2	0.2	0.003	417.8

¹ Potential emissions are based on 500 hours per year for each of the emergency generators.

Attachment J: Class I Legal Advertisement

Publication of the below Class I legal advertisement is a requirement of the application process and will be submitted to the Martinsburg Journal (or other newspaper with largest local circulation) for publication.

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that the National Conservation Training Center has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a General Permit Registration for three new emergency generators located on 698 Conservation Way in Shepherdstown, in Jefferson County, West Virginia. The latitude and longitude coordinates are 39.489 °N and -77.812 °E.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be: 13.1 tons per year nitrogen oxides, 0.7 tons per year carbon monoxide, 417.8 tons per year carbon dioxide equivalent emissions, 0.2 tons per year volatile organic compounds, 0.1 tons per year particulate matter, 0.2 tons per year sulfur dioxide, and 0.003 tons per year hazardous air pollutants.

Startup of operation is planned to begin on or about the 1st day of June, 2015. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the Division of Air Quality at (304) 926-0499, extension 1227, during normal business hours.

Dated this the 21th day of January 2015.

By: National Conservation Training Center
Jim Willis
Deputy Director
698 Conservation Way
Shepherdstown, West Virginia 25443

Attachment K: Electronic Submittal (Optional)

Provide an Electronic Submittal Diskette(s) for all files that are available electronically. The Electronic Submittal Diskette should have the following files in their respective formats (if available):

1. Registration Application file (Microsoft Word or Word Perfect format)
2. Affected Source Sheets (Microsoft Word or Word Perfect format)
3. Process Flow Diagram file
4. Process Description file (Microsoft Word or Word Perfect format)
5. Area Map file
6. Plot Plan file
7. Emission Calculations Spreadsheet (Microsoft Excel format)
8. Air Pollution Control Device Sheet, if required (Microsoft Word or Word Perfect format)

Not Applicable.

Attachment L: General Permit Registration Application Fee

A person submitting a Class II General Permit Registration Application to construct, modify, relocate or administratively update an emergency generator shall pay a Class II General Permit registration fee pursuant to 45CSR13. The registration fee shall be paid by a negotiable instrument (check, draft, warrant or money order) to DEP - Division of Air Quality. The fees associated with General Permit G60-C include:

- a. \$500.00 for Class II General Permit Registrations (Construction/Modification)
- b. \$300.00 for Class II administrative updates
- c. \$1000.00 for New Source Performance Standard (NSPS) fee for applicable emergency generators.

Any submitted Registration Application shall not be deemed to have been received nor administratively complete unless payment of the proper Class II General Permit registration fee(s) is (are) included (45CSR22);

Any General Permit registration fee paid hereunder is not refundable (45CSR22).

General Permit Levels Construction, Modification, Relocation, Administrative Update

Class II General Permits – G10-C (Coal Preparation and Handling), G20-B (Hot Mix Asphalt), G30-D (Natural Gas Compressor Stations), G35-A (Natural Gas Compressor Stations with Flares/Glycol Dehydration Units), G40-B (Nonmetallic Minerals Processing), G50-B (Concrete Batch Plant), G60-C (Emergency Generators), and Class I General Permit - G65-C (Emergency Generators)

General Permit	Public Notice	Review Period as per 45CSR13	Application Fee	Criteria	Application Type
Class II General Permit (Construction)	30 days (applicant)	90 days	\$500 + applicable NSPS fees	6 lb/hr and 10 tpy of any regulated air pollutant OR 144 lb/day of any regulated air pollutant, OR 2 lb/hr of any hazardous air pollutant OR 5 tpy of aggregated HAP OR 45CSR27 TAP (10% increase if above BAT triggers or increase to BAT triggers) or subject to applicable standard or rule, but subject to specific eligibility requirements	Registration Application
Class II General Permit (Modification)	30 days (applicant)	90 days	\$500 + applicable NSPS fees	Same as Class II General Permit (Construction) but subject to specific eligibility requirements	Registration Application
Administrative Update (Class I)	None	60 days	None	Decrease in emissions or permanent removal of equipment OR more stringent requirements or change in MRR that is equivalent or superior	Registration Application or Written Request
Administrative Update (Class II)	30 days (applicant)	60 days	\$300 + applicable NSPS fees	No change in emissions or an increase less than Class II Modification levels	Registration Application
Relocation	30 days (applicant)	45 days	\$500 + applicable NSPS fees	No emissions increase or change in facility design or equipment	Registration Application
Class I General Permit	None	45 days	\$250	Same as Class II General Permit (Construction) but subject to specific eligibility requirements	Registration Application

Fees applicable to this Application:

- a. \$500 for Class II General Permit Registration
- b. \$1,000 for New Source Performance Standard (NSPS) fee for emergency generators

Attachment M: Siting Criteria Waiver

If registrant is seeking a waiver from the siting criteria in G60-C Section 2.1, please complete the siting criteria waiver. This waiver needs to be completed by the registrant and person(s) granting the waiver, and notarized by an authorized West Virginia Notary Public. The waiver is only good for the submitted registration application. Therefore, any further modification or administrative update requiring public notice will require a new waiver.

Not Applicable.

Attachment N: Material Safety Data Sheet (MSDS)

Colonial Pipeline Company

PRODUCT SPECIFICATIONS

3.23.1 SPECIFICATIONS FOR FUNGIBLE 15 ppm SULFUR DIESEL FUEL GRADE 62

EPA Designation: MVNRLM, Motor vehicle diesel fuel, 15 ppm sulfur

Cancels Previous Issues of Grade 62

PRODUCT PROPERTY	ASTM Test Method	Test Results		Note
		Minimum	Maximum	
Gravity API	D287, D1298, D4052	30		
Flash Point, °F				
Pensky-Martin	D93	130		
Physical Distillation, °C(°F)	D86			5
50%			Report	
90%		282(540)	338(640)	
End Point			366(690)	
or Simulated Distillation, °C(°F)	D2887			5
50% recovered			Report	
90% recovered		300(572)	356(673)	
End Point			421(790)	
Color ASTM	D1500, D6045		2.5	
Color Visual		Undyed		
Viscosity, cSt @ 40°C (104°F)	D445	1.9	4.1	
Pour Point	D97, D5949, D5950, D5985			2
Cloud Point	D2500, D5771, D5772, D5773			2
	OR			
LTFT/CFPP	D4539, D6371			2
Corrosion, 3 hrs. @ 50°C (122°F)	D130		1	
Total Sulfur, ppmwt	D2622, D5453, D7039, other		11	Origin
			14	Delivery
Cetane Number	D613, D6890, D7170	40		4
Aromatics (Volume %)	D1319		31.7	
or Aromatics by Cetane Index	D976	40		
Ash, wt. %	D482		0.01	
Carbon Residue: Ramsbottom on 10% Bottom	D524		0.35	
BS&W, vol. %	D2709 or equivalent		< 0.05	
Thermal stability, 90 minutes				
150°C Pad rating, DuPont scale			7	
	OR			
Thermal stability	D6468			
Y/Green		73%		
W Unit		65%		
	OR			
Oxidation stability, mg/100 ml	D2274		2.5	
Haze rating @ 25°C (77°F)	D4176 Procedure 2		2	
Nace Corrosion	TM0172	B+ (Origin)		
Electrical				
Conductivity, pS/m @ 21°C (70°F)	D2624		250	

Colonial Pipeline Company

PRODUCT SPECIFICATIONS

3.23.2 SPECIFICATIONS FOR FUNGIBLE 15 ppm SULFUR DIESEL FUEL GRADE 62

Cancels Previous Issues of Grade 62

NOTES:

1. Additive requirements/restrictions - refer to section 3.2.
2. This schedule denotes the fluidity of the distillate at the time and place of origin.

Pour Point – August 1st through March 14th	Maximum: -18°C (0°F).
Pour Point – March 15th through July 31st	Maximum: -12°C (+10°F)

Cloud Point – August 1st through March 14th	Maximum: -9°C (+15°F)
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Cloud Point – March 15th through July 31st	Maximum: -7°C (+20°F)
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The referee method will be Pour point D97 and Cloud point D2500

3. Origin laboratory certifying sulfur content must qualify the test method used per EPA Performance based testing criteria (see CFR 80.584). The referee test method will be ASTM D5453.
4. Where cetane number by test method D613 is not available, test method D4737A can be used as an approximation.
5. Either physical or simulated distillation can be used. The referee test method will be ASTM D 86.
6. Deliveries of 62 grade will not be allowed at delivery locations that are serviced through Colonial's breakout tank farms south of Greensboro which include Pelham, Atlanta, Athens, Belton, Spartanburg, and Charlotte. At these non-allowed locations, shippers must request a product re-grade to [N]61 or 63 grade.

Delivery test results may vary by the smaller of ASTM reproducibility for a given test or any test tolerance as allowed by state or EPA regulations at the point of delivery.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : GN MV #2D R5 (S-15 ppm)
Product Code : 002D3203
Uses : Fuel for use in diesel powered engines.

Manufacturer/Supplier : Motiva Enterprises LLC
PO BOX 4540
Houston TX 77210-4540
USA

SDS Request : (+1) 8772767285

Emergency Telephone Number
Spill Information : +1- 877-242-7400
Health Information : +1- 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Identity	CAS No.	Concentration
Fuels, diesel	68334-30-5	95.00 - 100.00 %
Alkanes, C10-20, branched and linear	928771-01-1	0.00 - 5.00 %
CONTAINS:		
Cumene	98-82-8	0.00 - 0.50 %
Naphthalene	91-20-3	0.00 - 0.50 %

Dyes and markers can be used to indicate tax status and prevent fraud.
Complex mixture of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons with carbon numbers predominantly in the C9 to C25 range.
May contain cetane improver (Ethyl Hexyl Nitrate) at <0.2% v/v.
May also contain several additives at <0.1% v/v each.

3. HAZARDS IDENTIFICATION

Emergency Overview	
Appearance and Odour	: Clear yellow. Liquid. May contain a reodorant.
Health Hazards	: Limited evidence of carcinogenic effect. Harmful by inhalation. Irritating to skin. Harmful: may cause lung damage if swallowed.
Safety Hazards	: Combustible liquid. This material is a static accumulator. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Environmental Hazards	: Toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Material Safety Data Sheet**Health Hazards**

- Inhalation** : Harmful by inhalation. Slightly irritating to respiratory system.
Skin Contact : Irritating to skin.
Eye Contact : May cause slight irritation to eyes.
Ingestion : Harmful: may cause lung damage if swallowed.
Other Information : Limited evidence of carcinogenic effect.
Signs and Symptoms : If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure.
 Skin irritation signs and symptoms may include a burning sensation, redness, or swelling.

- Environmental Hazards** : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

- Additional Information** : This product is intended for use in closed systems only.

4. FIRST-AID MEASURES

- Inhalation** : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop.
Eye Contact : Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion : If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth.
Advice to Physician : Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

- Flash point** : Typical 55 - 75 °C / 131 - 167 °F
Upper / lower : 1 - 6 %(V)
Flammability or Explosion limits
Auto ignition temperature : > 220 °C / 428 °F
Specific Hazards : Hazardous combustion products may include: A complex

Material Safety Data Sheet

- mixture of airborne solid and liquid particulates and gases (smoke). Oxides of sulphur. Unidentified organic and inorganic compounds. Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
- Suitable Extinguishing Media** : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- Unsuitable Extinguishing Media** : Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.
- Protective Equipment for Firefighters** : Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).
- Additional Advice** : Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly. Take precautionary measures against static discharges.

- Protective measures** : Do not breathe fumes, vapour. Do not operate electrical equipment. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area and evacuate all personnel. Attempt to disperse the gas or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas meter. Take measures to minimise the effects on groundwater. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- Clean Up Methods** : Take precautionary measures against static discharges. For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an

Material Safety Data Sheet

- appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Shovel into a suitable clearly marked container for disposal or reclamation in accordance with local regulations.
- Additional Advice** :
- Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26. U.S. regulations may require reporting releases of this material to the environment which exceed the reportable quantity (refer to Chapter 15) to the National Response Center at (800) 424-8802. Under Section 311 of the Clean Water Act (CWA) this material is considered an oil. As such, spills into surface waters must be reported to the National Response Center at (800) 424-8802. This material is covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Petroleum Exclusion. Therefore, releases to the environment may not be reportable under CERCLA.

7. HANDLING AND STORAGE

- General Precautions** :
- Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Air-dry contaminated clothing in a well-ventilated area before laundering. Prevent spillages. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Never siphon by mouth. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse.
- Handling** :
- Avoid inhaling vapour and/or mists. Avoid prolonged or repeated contact with skin. When using do not eat or drink. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Earth all equipment. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
- Storage** :
- Drum and small container storage: Drums should be stacked to a maximum of 3 high. Use properly labelled and closeable

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containers. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Vapours from tanks should not be released to atmosphere. Breathing losses during storage should be controlled by a suitable vapour treatment system. The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Keep container tightly closed and in a cool, well-ventilated place. Keep in a cool place. Electrostatic charges will be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk. The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable. Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

- Product Transfer** : Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. Keep containers closed when not in use. Contamination resulting from product transfer may give rise to light hydrocarbon vapour in the headspace of tanks that have previously contained gasoline. This vapour may explode if there is a source of ignition. Partly filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling activities need special care. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.
- Container Advice** : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.
- Additional Information** : Ensure that all local regulations regarding handling and storage facilities are followed.
See additional references that provide safe handling practices for liquids that are determined to be static accumulators:

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American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity). CENELEC CLC/TR 50404 (Electrostatics – Code of practice for the avoidance of hazards due to static electricity).

3. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Fuels, diesel	ACGIH	SKIN_DES(Inhalable fraction and vapor.)			Can be absorbed through the skin.as total hydrocarbons
Fuels, diesel	ACGIH	TWA(Inhalable fraction and vapor.)		100 mg/m3	as total hydrocarbons
Cumene	ACGIH	TWA	50 ppm		
Cumene	OSHA Z1	PEL	50 ppm	245 mg/m3	
Cumene	OSHA Z1	SKIN_DES			Can be absorbed through the skin.
Naphthalene	ACGIH	TWA	10 ppm		
Naphthalene	ACGIH	STEL	15 ppm		
Naphthalene	ACGIH	SKIN_DES			Can be absorbed through the skin.
Naphthalene	OSHA Z1	PEL	10 ppm	50 mg/m3	

Additional Information : Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes.

Biological Exposure Index (BEI)

Material	Determinant	Sampling Time	BEI	Reference

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Naphthalene	1-Naphthol, with hydrolysis + 2-Naphthol, with hydrolysis	Sampling time: End of shift.		ACGIH BEL (02 2013)
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- Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use. Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Firewater monitors and deluge systems are recommended. Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle.
- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. All respiratory protection equipment and use must be in accordance with local regulations. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
- Hand Protection** : Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a

Material Safety Data Sheet

non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable. (Breakthrough time of > 240 minutes.) For incidental contact/splash protection Neoprene, PVC gloves may be suitable.

- Eye Protection** : Chemical splash goggles (chemical monogoggles). If a local risk assessment deems it so, then chemical splash goggles may not be required and safety glasses may provide adequate eye protection.
- Protective Clothing** : Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
- National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods <http://www.cdc.gov/niosh/>
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/>

9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Clear yellow. Liquid.
Odour : May contain a reodorant.
Initial Boiling Point and Boiling Range : 170 - 390 °C / 338 - 734 °F
Pour point : <= 6 °C / 43 °F
Flash point : Typical 55 - 75 °C / 131 - 167 °F
Upper / lower Flammability or Explosion limits : 1 - 6 %(V)

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Auto-ignition temperature	: > 220 °C / 428 °F
Vapour pressure	: < 1 hPa at 20 °C / 68 °F
Density	: Typical 0.820 - 0.860 g/cm ³ at 15 °C / 59 °F
n-octanol/water partition coefficient (log Pow)	: 3 - 6
Kinematic viscosity	: 2 - 4.5 mm ² /s at 40 °C / 104 °F
Electrical conductivity	: Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid.

10. STABILITY AND REACTIVITY

Stability	: Stable under normal use conditions.
Conditions to Avoid	: Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	: Strong oxidising agents.
Hazardous Decomposition Products	: Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Sensitivity to Static Discharge	: Yes, in certain circumstances product can ignite due to static electricity.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	: Information given is based on product data, a knowledge of the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
Acute Oral Toxicity	: Low toxicity: LD ₅₀ >2000 mg/kg , Rat Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Acute Dermal Toxicity	: Low toxicity: LD ₅₀ >2000 mg/kg , Rabbit
Acute Inhalation Toxicity	: Harmful if inhaled. LC ₅₀ > 1.0 - <= 5.0 mg/l / 1.00 h, Rat High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
Skin Irritation	: Irritating to skin.
Eye Irritation	: Expected to be slightly irritating.
Respiratory Irritation	: Inhalation of vapours or mists may cause irritation to the respiratory system.
Sensitisation	: Not expected to be a sensitiser.

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Repeated Dose Toxicity : May cause damage to organs or organ systems through prolonged or repeated exposure. Blood. Thymus. Liver.
Mutagenicity : Mutagenic; positive in in-vivo and in-vitro assays.
Carcinogenicity : Limited evidence of carcinogenic effect.
 Repeated skin contact has resulted in irritation and skin cancer in animals.

Material	Carcinogenicity Classification
Fuels, diesel	ACGIH Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Fuels, diesel	GHS / CLP: Carcinogenicity Category 2
Alkanes, C10-20, branched and linear	GHS / CLP: No carcinogenicity classification
Cumene	IARC 2B: Possibly carcinogenic to humans.
Cumene	GHS / CLP: No carcinogenicity classification
Naphthalene	ACGIH Group A4: Not classifiable as a human carcinogen.
Naphthalene	NTP: Reasonably Anticipated to be a Human Carcinogen.
Naphthalene	IARC 2B: Possibly carcinogenic to humans.
Naphthalene	GHS / CLP: Carcinogenicity Category 2

Reproductive and Developmental Toxicity : Not expected to impair fertility. Not expected to be a developmental toxicant.
Additional Information : Classifications by other authorities under varying regulatory frameworks may exist.

12. ECOLOGICAL INFORMATION

Information given is based on a knowledge of the components and the ecotoxicology of similar products. Fuels are typically made from blending several refinery streams. Ecotoxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Acute Toxicity : Expected to be toxic: LL/EL/IL50 > 1 <= 10 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract.
Chronic Toxicity
Fish : NOEC/NOEL expected to be > 0.01 - <= 0.1 mg/l (based on modeled data)
Aquatic crustacea : NOEC/NOEL expected to be > 0.1 - <= 1.0 mg/l (based on modeled data)
Mobility : Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. If product enters soil, one or more constituents will be mobile and may contaminate groundwater. Large volumes may penetrate soil and could contaminate groundwater. Floats on water.
Persistence/degradability : Major constituents are inherently biodegradable. The volatile

Material Safety Data Sheet

- constituents will oxidize rapidly by photochemical reactions in air.
- Bioaccumulation** : Contains constituents with the potential to bioaccumulate. Log Kow > =4
- Other Adverse Effects** : Films formed on water may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Container Disposal** : Send to drum recoverer or metal reclaimer. Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard if heated above the flash point. Do not puncture, cut or weld uncleaned drums. Do not pollute the soil, water or environment with the waste container. Comply with any local recovery or waste disposal regulations.
- Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be in compliance.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)

Identification number UN 1202
Proper shipping name Diesel fuel
Class / Division 3

Packing group III
Emergency Response Guide No. 128

IMDG

Identification number UN 1202
Proper shipping name DIESEL FUEL
Class / Division 3
Packing group III
Marine Pollutant: Yes

Material Safety Data Sheet

IATA (Country variations may apply)

Identification number	UN 1202
Proper shipping name	Diesel fuel
Class / Division	3
Packing group	III

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

TSCA All components listed.

Additional Information : IARC has classified diesel exhaust emissions as a Class 1 carcinogen - carcinogenic to humans. Steps should be taken to prevent personal exposure to diesel exhaust emissions.

Comprehensive Environmental Release, Compensation & Liability Act (CERCLA)

GN MV #2D R5 (S-15 ppm ()	Reportable quantity: 20000 lbs
Cumene (98-82-8)	Reportable quantity: 5000 lbs
Naphthalene (91-20-3)	Reportable quantity: 100 lbs

Shell classifies this material as an "oil" under the CERCLA Petroleum Exclusion, therefore releases to the environment are not reportable under CERCLA. The components with RQs are given for information.

Clean Water Act (CWA) Section 311

Naphthalene (91-20-3)	Reportable quantity: 100 lbs
-----------------------	------------------------------

Under Section 311 of the Clean Water Act (CWA) this material is considered an oil. As such, spills into surface waters must be reported to the National Response Center at (800) 424-8802.

SARA Hazard Categories (311/312)

Material Safety Data Sheet

Immediate (Acute) Health Hazard. Delayed (Chronic) Health Hazard. Fire Hazard.

SARA Toxic Release Inventory (TRI) (313)

Cumene (98-82-8)	0.50%
Naphthalene (91-20-3)	0.50%

State Regulatory Status**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**

This product contains a chemical known to the State of California to cause cancer.

New Jersey Right-To-Know Chemical List

Cumene (98-82-8) 0.50%	Listed.
Naphthalene (91-20-3) 0.50%	Listed.

Pennsylvania Right-To-Know Chemical List

Fuels, diesel (68334-30-5) 100.00%	Listed.
Cumene (98-82-8) 0.50%	Environmental hazard. Listed.
Naphthalene (91-20-3) 0.50%	Environmental hazard. Listed.

16. OTHER INFORMATION

Additional Information : This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.

NFPA Rating (Health, Fire, Reactivity) : 2, 2, 0

SDS Version Number : 1.1

SDS Effective Date : 02/06/2014

SDS Revisions : A vertical bar (|) in the left margin indicates an amendment from the previous version.

SDS Regulation : The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SDS Distribution : The information in this document should be made available to all who may handle the product.

Material Safety Data Sheet

Disclaimer

: The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Attachment O: Emissions Summary Sheets

EMERGENCY GENERATOR ENGINE DATA SHEET

Source Identification Number ¹		EG-1		EG-2		EG-3	
Engine Manufacturer and Model		Cummins Gen QSK23-G7 NR2		Cummins Gen QSK23-G7 NR2		Cummins Gen QSK23-G7 NR2	
Manufacturer's Rated bhp/rpm		1,220 HP		1,220 HP		1,220 HP	
Source Status ²		NS		NS		NS	
Date Installed/Modified/Removed ³		May 1, 2015		May 1, 2015		May 1, 2015	
Engine Manufactured/Reconstruction Date ⁴		2014/2015		2014/2015		2014/2015	
Is this a Certified Stationary Compression Ignition Engine according to 40CFR60 Subpart IIII? (Yes or No) ⁵		Yes		Yes		Yes	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No) ⁶		No		No		No	
Engine, Fuel and Combustion Data	Engine Type ⁷	RB4S		RB4S		RB4S	
	APCD Type ⁸	NA		NA		NA	
	Fuel Type ⁹	2FO		2FO		2FO	
	H ₂ S (gr/100 scf)	NA		NA		NA	
	Operating bhp/rpm	1,183 HP @ 1800 RPM		1,183 HP @ 1800 RPM		1,183 HP @ 1800 RPM	
	BSFC (Btu/bhp-hr)	6,272		6,272		6,272	
	Fuel throughput (ft ³ /hr)	53.8 gals diesel/hr.		53.8 gals diesel/hr.		53.8 gals diesel/hr.	
	Fuel throughput (MMft ³ /yr)	< 26,900 gals diesel/yr.		< 26,900 gals diesel/yr.		< 26,900 gals diesel/yr.	
	Operation (hrs/yr)	< 500		< 500		< 500	
Reference ¹⁰	Potential Emissions ¹¹	lbs/hr	tons/yr	lbs/hr	lbs/hr	lbs/hr	tons/yr
Mfr.: Cummins	NO _x	17.51	4.38	17.51	4.38	17.51	4.38
Mfr.: Cummins	CO	0.89	0.22	0.89	0.22	0.89	0.22
Mfr.: Cummins	VOC	0.27	0.07	0.27	0.07	0.27	0.07
AP-42/Mfr.	SO ₂	0.27	0.07	0.27	0.07	0.27	0.07
Mfr.: Cummins	PM ₁₀	0.13	0.03	0.13	0.03	0.13	0.03
AP-42	Formaldehyde	1.98E-04	4.95E-05	1.98E-04	4.95E-05	1.98E-04	4.95E-05

STORAGE TANK DATA SHEET

Source ID # ¹	Status ²	Content ³	Volume ⁴	Dia ⁵	Throughput ⁶	Orientation ⁷	Liquid Height ⁸
T01	NEW	2FO	10,000	Cylindrical 8.5' dia	80,700	HORZ	6.4
T02	NEW	2FO	120	Rectangular 40" deep x 34" wide x 38" high	26,900	HORZ	2.1
T03	NEW	2FO	120	Rectangular 40" deep x 34" wide x 38" high	26,900	HORZ	2.1
T04	NEW	2FO	120	Rectangular 40" deep x 34" wide x 38" high	26,900	HORZ	2.1

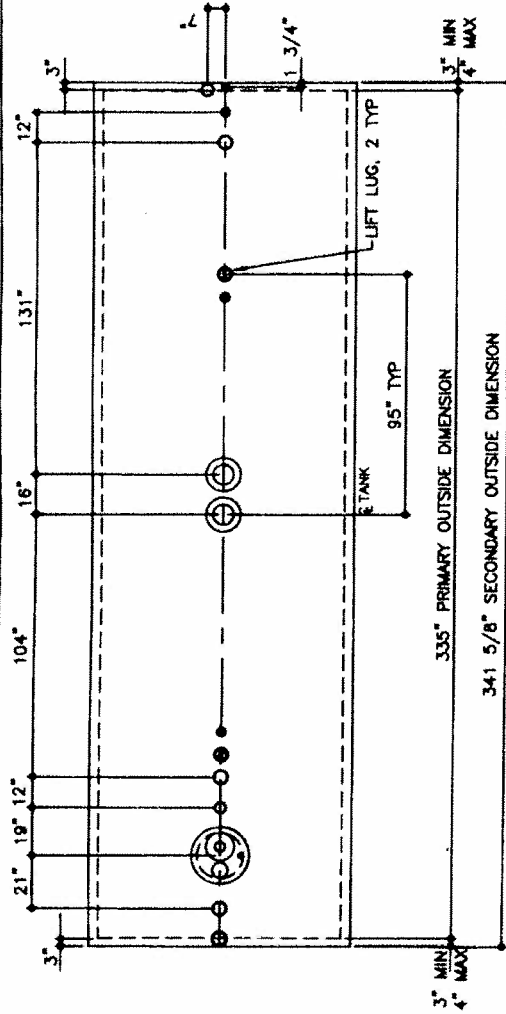
EMERGENCY GENERATOR EMISSION SUMMARY SHEET FOR CRITERIA POLLUTANTS

Emergency Generator Location: <u>National Conservation Training Center</u>						Registration Number (Agency Use) <u>G60-C</u>				
	Potential Emissions (lbs/hr)					Potential Emissions (tons/yr)				
Source ID No.	NO _x	CO	VOC	SO ₂	PM ₁₀	NO _x	CO	VOC	SO ₂	PM ₁₀
EG-1	17.51	0.89	0.27	0.27	0.13	4.38	0.22	0.07	0.07	0.03
EG-2	17.51	0.89	0.27	0.27	0.13	4.38	0.22	0.07	0.07	0.03
EG-3	17.51	0.89	0.27	0.27	0.13	4.38	0.22	0.07	0.07	0.03
Total	52.5	2.7	0.8	0.8	0.4	13.1	0.7	0.2	0.2	0.1

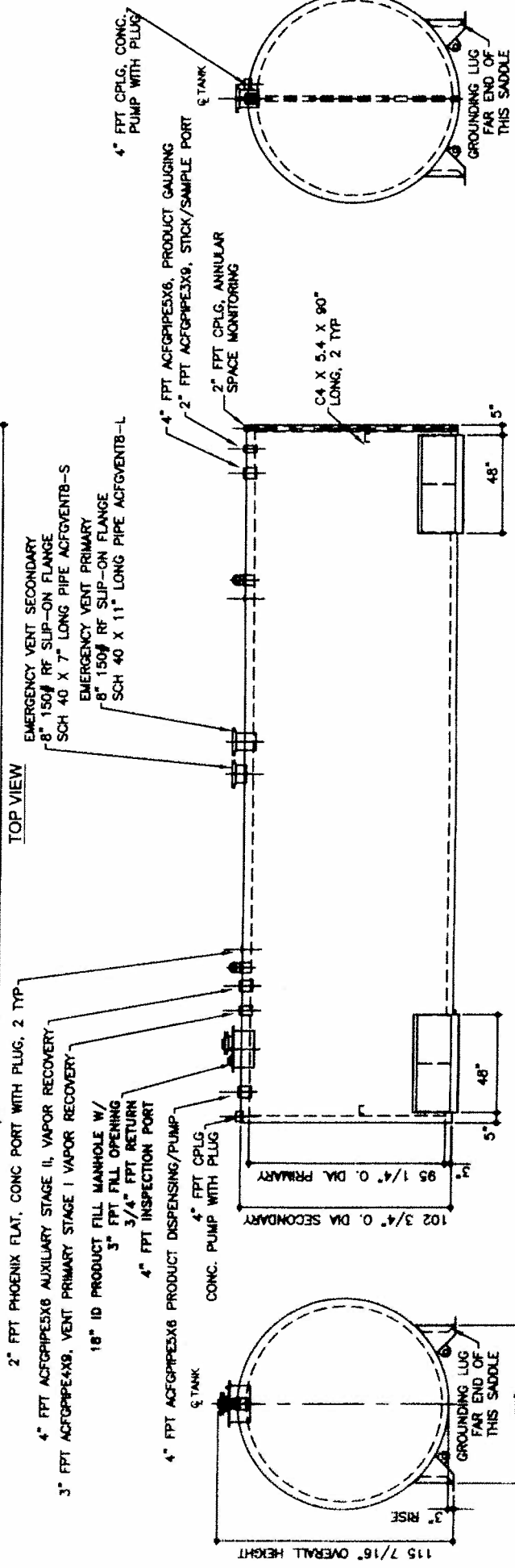
EMERGENCY GENERATOR EMISSION SUMMARY SHEET FOR HAZARDOUS/TOXIC POLLUTANTS

Emergency Generator Location: <u>National Conservation Training Center</u>							Registration Number (Agency Use) <u>G60-C</u>					
	Potential Emissions (lbs/hr)						Potential Emissions (tons/yr)					
Source ID No.	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formaldehyde	Benzene	Ethyl-benzene	Toluene	Xylenes	n-Hexane	Formaldehyde
EG-1	0.00026	Not Available	0.00009	0.00006	Not Available	0.00003	0.00049	Not Available	0.00018	0.00012	Not Available	0.00005
EG-2	0.00026	Not Available	0.00009	0.00006	Not Available	0.00003	0.00049	Not Available	0.00018	0.00012	Not Available	0.00005
EG-3	0.00026	Not Available	0.00009	0.00006	Not Available	0.00003	0.00049	Not Available	0.00018	0.00012	Not Available	0.00005
Total	0.0008	Not Available	0.0003	0.0002	Not Available	0.0001	0.025	Not Available	0.009	0.006	Not Available	0.003

**Other Supporting Documentation Not Described Above
(Equipment Drawings, Etc.)**



TOP VIEW



ELEVATION - SIDE VIEW

ELEVATION - END VIEW

<p>TOLERANCES</p> <p>CAPACITY: ±1% / 10</p> <p>OVERALL LENGTH: ±1/4"</p> <p>OVERALL WIDTH: ±1/4"</p> <p>OVERALL HEIGHT: ±1/2" / ±1/4"</p> <p>OTHER DIMENSIONS: ±1/8" / ±1/4"</p> <p>1-300-261-8000</p>		<p>STEEL: ASTM A36</p> <p>PRIMARY TANK SHELL: 2 GAUGE (1/4") HEAD: 2 GAUGE (1/4")</p> <p>SECONDARY TANK SHELL: 2 GAUGE (1/4") HEAD: 0 GAUGE (S/16")</p>		<p>COATING:</p> <p>EXTERIOR ACE 3A COATING: SP-6 GRIT BLAST 3A COLOR: #WH01 (WHITE) 1 CT TN-161 EPOXY 3.0-5.0 MILS 1 CT TN-74 URETHANE 2.0-3.0 MILS TDFT: 5.0-8.0 MILS</p> <p>INTERIOR: BARE STEEL</p>		<p>SPECIAL INSTRUCTIONS</p> <p>FILL ANNULAR SPACE WITH PORTLAND CEMENT / PERLITE, CEMENT GRADE MIX. LEAVE 1" AIR GAP BETWEEN PERLITE & SECONDARY TANK</p> <p>INTERSTITIAL SPACE: 254 CUBIC FEET</p>		<p>APPROXIMATE SHIPPING WEIGHT</p> <p>30,100 LBS. 22,000 LBS. (WITHOUT CEMENT) TANK VENT CAPACITY 392,000 PRIMARY 428,000 SECONDARY</p>		<p>DRIFT</p> <p>1</p>	
<p>UL 142 (BUILT & LABELED) UL 2065 (BUILT & LABELED) STI-F941 (BUILT & LABELED) HOLDOWNS ARE SEISMIC RATED DOUBLE WALL WITH 3" INSULATION CYLINDRICAL FIREGUARD WITH SUPPORTS</p>		<p>AC10000U2G1</p>		<p>QTY: 1</p>		<p>ACER TANK & EQUIPMENT</p> <p>01-01-02 SUPERCEDES 10-01-01</p>		<p>SHEET</p> <p>2</p> <p>OF</p>			

FIREGUARD - 10,000 GALLON





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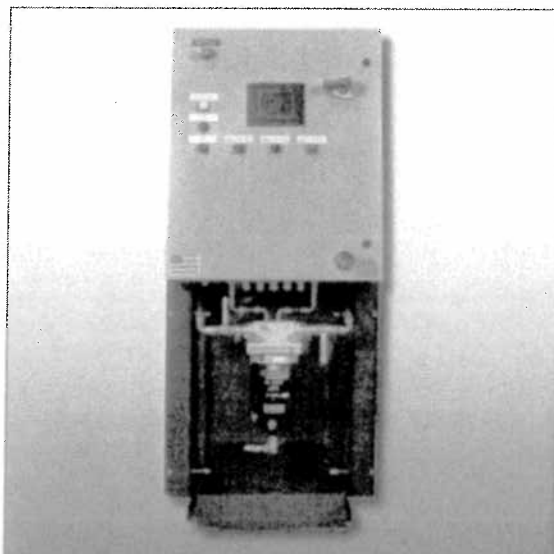
Day Tank Systems

Ace FuelSafe Day Tank systems are designed to seamlessly integrate with other Ace FuelSafe systems to include bulk storage systems, pump sets, fuel maintenance systems, tank monitor systems and filling systems.



Download this information as a PDF

([../wp-content/uploads/2014/06/DayTankBrochure.pdf](#))



FuelSafe Day Tanks integrate a bulk tank of a required capacity with a level controller and fill control. Integral supply (fill) pumps and return pumps are typical. Remote fuel supply systems are available for management of multiple bulk tanks, filling of multiple day tanks, or when required by pipe run limitations.

Controllers are UL-508A listed, NEMA 3R, 4, 12 indoor/outdoor. Hazardous location controllers are available. Controllers are PLC based with a touchscreen interface and are network compatible. Appropriately sized atmospheric and emergency vents for both primary and

secondary compartments are included as standard.

FuelSafe systems include overflow return pumps as a standard offering. The Infinite Loop Overfill Prevention System (ILOP) and Fuel Filtration/Maintenance systems are offered as options.

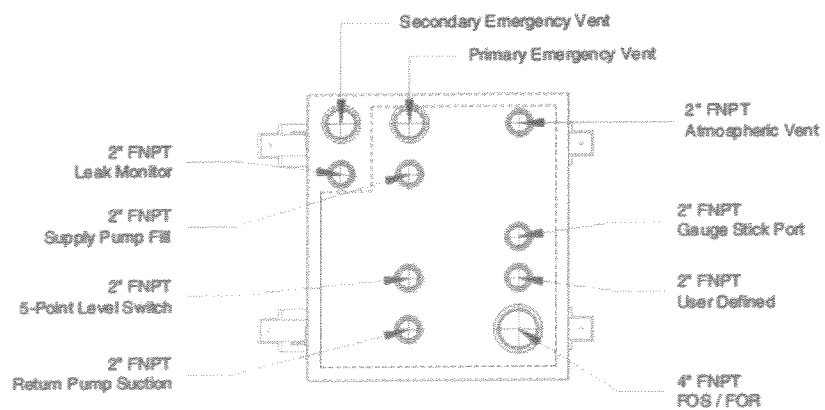
Recommendations

- Fuel oil supply lines should be sized to not exceed more than 20 inches of mercury as measured at the pump inlet manifold.
- It is very important to carefully size the fuel oil supply and return lines to minimize the friction losses and not exceed this restriction.
- It is recommended to install a foot valve in the supply line for priming purposes. It is also recommended to install a fusible link valve and anti-siphon valve in the fuel supply line at the high point in the system.
- To minimize friction losses a solenoid actuated anti-siphon valve may be used in lieu of a mechanical valve.

Each System Includes:

- Double Wall UL-142 Mild Steel Tank w/ Industrial Powder Coat Finish
- UL-508A Digital PLC Based Pump Control Panel
- 5-Point Level Switch (High, Pump Off, Pump On, Low, Critical Low)
- Leak Sensor
- Tank Venting Package
 - Atmospheric Vent, Emergency Vents
- Manual Gauge Stick Port with Wooden Gauge Stick
- Day Tank Fuel Oil Supply Package:
 - Suction Stub, Foot Valve, Flex Connector, Manual Isolation Valve
- Day Tank Fuel Oil Return Package:
 - Flex Connector, Maintenance Isolation Valve

Double Wall Day Tank		
Gallons	Model No.	Overall Dimensions W"x D"x H"
60	00060U2Q2	34" x 29" x 38"
120	00120U2Q2	34" x 40" x 38"
180	00180U2Q2	34" x 53" x 38"
280	00280U2Q2	34" x 74" x 38"





**Power
Generation**

Exhaust Emission Data Sheet

800DQCC

60 Hz Diesel Generator Set

EPA NSPS Stationary Emergency

Engine Information:

Model:	Cummins Inc QSK23-G7 NR2	Bore:	6.69 in. (170 mm)
Type:	4 Cycle, In Line, 6 Cylinder Diesel	Stroke:	6.69 in. (170 mm)
Aspiration:	Turbocharged and CAC	Displacement:	1413 cu. in. (23.1 liters)
Compression Ratio:	16.0:1		
Emission Control Device:	Turbocharged with Charge Air Cooled		

	1/4	1/2	3/4	Full	Full
PERFORMANCE DATA	Standby	Standby	Standby	Standby	Prime
Engine HP @ Stated Load (1800 RPM)	305	610	915	1183	1085
Fuel Consumption (gal/hr)	16.5	30.3	43.3	53.8	49.5
Exhaust Gas Flow (CFM)	2401	3725	4768	5337	5089
Exhaust Temperature (°F)	649	746	803	861	830
EXHAUST EMISSION DATA					
HC (Total Unburned Hydrocarbons)	0.59	0.27	0.16	0.10	0.12
NOx (Oxides of Nitrogen as NO2)	2.86	3.42	4.45	6.51	5.89
CO (Carbon Monoxide)	0.79	0.27	0.16	0.33	0.28
PM (particular Matter)	0.24	0.06	0.04	0.05	0.05
SO2 (Sulfur Dioxide)	0.12	0.11	0.10	0.10	0.10
Smoke (Bosch)	0.86	0.41	0.32	0.40	0.37

All values are Grams per HP-Hour

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load ($\pm 2\%$). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification: 46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.

Fuel Temperature: 99 ± 9 °F (at fuel pump inlet)

Intake Air Temperature: 77 ± 9 °F

Barometric Pressure: 29.6 ± 1 in. Hg

Humidity: NOx measurement corrected to 75 grains H2O/lb dry air

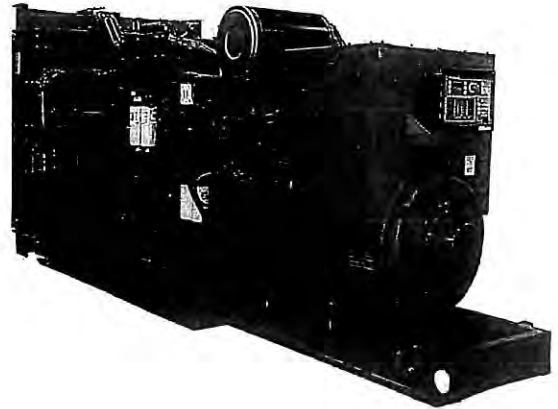
Reference Standard: ISO 8178

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



Specification sheet

Diesel generator set QSK23 series engine



545 kW - 800 kW

Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.

Features

Cummins® heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent magnet generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

Enclosures - Optional weather protective and sound attenuated enclosures are available.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DQCA	600 (750)		545 (681)				D-3352	
DQCB	750 (938)		680 (850)				D-3353	
DQCC	800 (1000)		725 (906)				D-3354	

Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 801.2 through IEC 801.5; MIL STD 461C, Part 9

Engine specifications

Bore	169.9 mm (6.69 in)
Stroke	169.9 mm (6.69 in)
Displacement	23.15 litres (1413 in3)
Configuration	Cast iron, in line 6 cylinder
Battery capacity	1400 amps minimum at ambient temperature of 0 °C to 10 °C (32 °F to 50 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element with restriction indicator
Lube oil filter type(s)	Fleetguard dual venturi spin-on, combination full flow and bypass filters
Standard cooling system	High ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Single bearing flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby at 40 °C ambient
Exciter type	PMG (permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

Available voltages

60 Hz line-neutral/line-line	50 Hz line-neutral/line-line
<ul style="list-style-type: none"> • 110/190 • 127/220 • 230/380 • 277/480 • 115/200 • 139/240 • 240/416 • 347/600 • 120/208 • 220/380 • 255/440 	

Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- Fuel/water separator
- Heavy duty air cleaner

Control Panel

- 120/240 V 100 W control anti-condensation heater
- Paralleling configuration
- Remote fault signal package
- Run relay package

Alternator

- 80 °C rise
- 105 °C rise
- 125 °C rise
- 120/240 V anti-condensation heater
- Temperature sensor - alternator bearing RTD

Cooling system

- 50 °C ambient

Exhaust System

- Industrial grade exhaust silencer
- Residential grade exhaust silencer
- Critical grade exhaust silencer

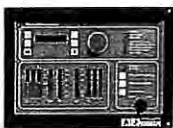
Generator set

- AC entrance box
- Battery
- Battery rack with hold-down - floor standing

- Circuit breaker - set mounted
- Disconnect switch - set mounted
- PowerCommand Network
- Remote annunciator panel
- Spring isolators
- 2 year warranty
- 5 year warranty
- 10 year major components warranty

Note: Some options may not be available on all models - consult factory for availability.

Control system PCC2100 or PCC3201



PowerCommand control is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LonWorks® network interface.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

Operator/display panel

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- Configurable for local language

Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history

Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

Paralleling (Option)

- Active digital phase lock loop synchronizer
- Isochronous kW and kVar load sharing controls
- kW import/export and kVar/PF control for utility (mains) paralleling

Options

- PCC 3201 paralleling control
- LED bargraph AC data display
- Thermostatically controlled space heater
- Key-type mode switch
- Ground fault module
- Auxiliary relays (3)
- Echelon LONWORKS interface
- Modicon Gateway to convert to Modbus (loose)
- PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- Digital input and output module(s) (loose)
- Remote annunciator (loose)

For further detail on PCC 2100 see document S-1409.
For further detail on PCC 3201 see document S-1444.

Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-time running power (LTP):

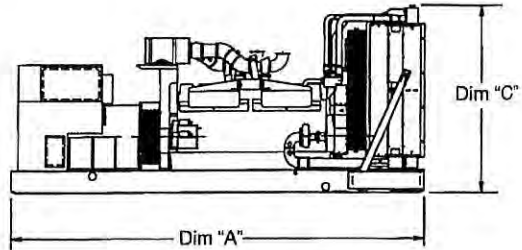
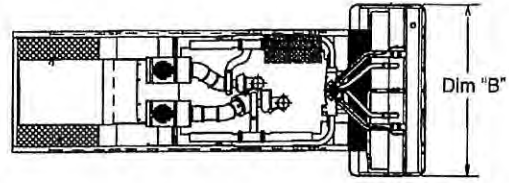
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Dimensions and weights with standard cooling system

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DQCA	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCB	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)
DQCC	4395.4 (173)	1855.5 (73)	2065.7 (81)	6075 (13395)	6337 (13973)





Dimensions and weights with optional cooling system with seismic feature codes L228-2 and/or L225-2

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DQCA	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCB	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)
DQCC	4395.4 (173)	1715 (68)	2060.1 (81.1)	6377 (14061)	6518 (14372)

* Weights represent a set with standard features. See outline drawings for weights of other configurations.

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

 <p>This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.</p>	 <p>The generator set is available listed to UL 2200, Stationary Engine Generator Assemblies for all 60 Hz low voltage models. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.</p>
 <p>The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.</p>	<p>U.S. EPA</p> <p>Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.</p>
 <p>All low voltage models are CSA certified to product class 4215-01.</p>	<p>International Building Code</p> <p>The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012.</p>

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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 S-1551j (3/14)



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Generator set data sheet

Model: DQCC
Frequency: 60
Fuel type: Diesel
KW rating: 800 standby
 725 prime
Emissions level: EPA NSPS Stationary Emergency Tier 2

Exhaust emission data sheet:	EDS-1088
Exhaust emission compliance sheet:	EPA-1122
Sound data sheet:	MSP-1160
Sound data sheet - with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD):	MSP-1014
Cooling system data in various ambient conditions:	MCP-249
Cooling system data in various ambient conditions - with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD):	MCP-175
Prototype test summary data sheet:	PTS-160

Fuel consumption	Standby				Prime				Continuous
	kW (kVA)				kW (kVA)				kW (kVA)
Ratings	800 (1000)				725 (906)				
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full	
US gph	17.0	29.0	41.0	53.0	15.5	27.5	38.0	48.0	
L/hr	64.4	109.8	155.2	200.6	58.7	104.1	143.8	181.7	

Engine	Standby rating	Prime rating	Continuous rating
Engine manufacturer	Cummins Inc.		
Engine model	QSK23-G7 NR2		
Configuration	Cast Iron, in line 6 cylinder		
Aspiration	Turbocharged and air-to-air aftercooled		
Gross engine power output, kWm (bhp)	910 (1220)	809 (1085)	
BMEP at set rated load, kPa (psi)	2510 (364)	2282 (331)	
Bore, mm (in)	170 (6.69)		
Stroke, mm (in)	170 (6.69)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	10.21 (2010)		
Compression ratio	16:1		
Lube oil capacity, L (qt)	102 (108)		
Overspeed limit, rpm	2100		
Regenerative power, kW	93		

Fuel flow

Maximum fuel flow, L/hr (US gph)	685 (181)	
Maximum fuel inlet restriction, kPa (in Hg)	13.44 (4)	
Maximum fuel inlet temperature, °C (°F)	71 (160)	

Air	Standby rating	Prime rating	Continuous rating
Combustion air, m ³ /min (scfm)	64 (2265)	62 (2201)	
Maximum air cleaner restriction, kPa (in H ₂ O)	6.2 (25)		
Alternator cooling air, m ³ /min (cfm)	117 (4156)		

Exhaust

Exhaust flow at set rated load, m ³ /min (cfm)	155 (5455)	147 (5191)	
Exhaust temperature, °C (°F)	483 (902)	461 (862)	
Maximum back pressure, kPa (in H ₂ O)	10.1 (40.8)		

Standard set-mounted radiator cooling (non-seismic)

Ambient design, °C (°F)	50 (122)		
Fan load, kW _m (HP)	24 (32)		
Coolant capacity (with radiator), L (US gal)	109.5 (29)		
Cooling system air flow, m ³ /min (scfm)	998 (35233)		
Total heat rejection, MJ/min (Btu/min)	33.52 (31793)	30.22 (28672)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction kPa (in Hg)	30.47 (9)		

Optional set-mounted radiator cooling (with seismic feature codes L228-2 (IBC) and/or L225-2 (OSHPD))

Ambient design, °C (°F)	45 (113)		
Fan load, kW _m (HP)	27 (36)		
Coolant capacity (with radiator), L (US gal)	89 (23.5)		
Cooling system air flow, m ³ /min (scfm)	1252 (44183)		
Total heat rejection, MJ/min (Btu/min)	33.52 (31793)	30.22 (28672)	
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction, kPa (in Hg)	30.47 (9)		

Optional heat exchanger cooling

Set coolant capacity, L (US gal)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, aftercooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, aftercooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, aftercooler circuit, L/min (US gal/min)			
Minimum raw water flow at 27 °C (80 °F) inlet temp, fuel circuit, L/min (US gal/min)			
Raw water delta P at min flow, jacket water circuit, kPa (psi)			
Raw water delta P at min flow, aftercooler circuit, kPa (psi)			
Raw water delta P at min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum fuel return line restriction, kPa (in Hg)			

Optional remote radiator cooling¹	Standby rating	Prime rating	Continuous rating
Set coolant capacity, L (US gal)			
Max flow rate at max friction head, jacket water circuit, L/min (US gal/min)			
Max flow rate at max friction head, aftercooler circuit, L/min (US gal/min)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum friction head, jacket water circuit, kPa (psi)			
Maximum friction head, aftercooler circuit, kPa (psi)			
Maximum static head, jacket water circuit, m (ft)			
Maximum static head, aftercooler circuit, m (ft)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp at 25 °C (77 °F) ambient, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum fuel flow, L/hr (US gph)			
Maximum fuel return line restriction, kPa (in Hg)			

Weights²

Unit dry weight kgs (lbs)	6075 (13395)
Unit wet weight kgs (lbs)	6337 (13973)

Notes:

¹ For non-standard remote installations contact your local Cummins Power Generation representative.

² Weights represent a set with standard features. See outline drawing for weights of other configurations.

Derating factors

Standby	Engine power available up to 1137 m (3730 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 4.4% per 305 m (1000 ft). Above 40 °C (104 °F) derate 10% per 10 °C (18 °F).
Prime	Engine power available up to 754 m (2475 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 4.5% per 305 m (1000 ft). Above 40 °C (104 °F) derate 20.9% per 10 °C (18 °F).
Continuous	

Ratings definitions

Emergency standby power (ESP):	Limited-time running power (LTP):	Prime power (PRP):	Base load (continuous) power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

Alternator data

Voltage	Connection ¹	Temp rise degrees C	Duty ²	Single phase factor ³	Max surge kVA ⁴	Winding No.	Alternator data sheet	Feature Code
277/480	Wye	125/105	S/P		2944	312	ADS-309	B276-2
277/480	Wye	105	S		3313	312	ADS-310	B280-2
347/600	Wye	125/105	S/P		2944	7	ADS-309	B550-2
220/380	Wye	105/80	S/P		4234	312	ADS-312	B599-2
277/480	Wye	80	S		3866	312	ADS-311	B601-2
347/600	Wye	105/80	S/P		3866	7	ADS-311	B603-2
347/600	Wye	80	S		3866	7	ADS-311	B604-2
220/380	Wye	80	P		3866	312	ADS-311	B687-2
277/480	Wye	80	P		3866	312	ADS-311	B694-2
208/416	Wye	125/105	S/P		3313	311	ADS-310	B732-2
208/416	Wye	105/80	S/P		3866	311	ADS-311	B733-2
208/416	Wye	80	S		4234	311	ADS-312	B734-2
220/380	Wye	125	P		3313	312	ADS-310	B736-2
220/380	Wye	125/105	S/P		3866	312	ADS-311	B737-2
255/440	Wye	125/105	S/P		3313	312	ADS-310	B741-2

Notes:

¹ Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor³. All single phase ratings are at unity power factor.

² Standby (S), Prime (P) and Continuous ratings (C).

³ Factor for the *Single Phase Output from Three Phase Alternator* formula listed below.

⁴ Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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D-3354h (3/14)



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U.S. FISH AND WILDLIFE SERVICE



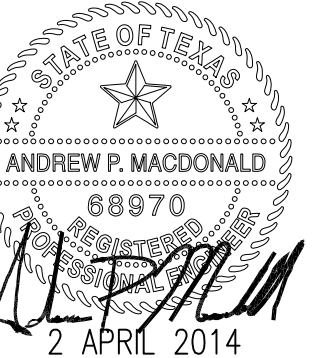
NATIONAL CONSERVATION TRAINING CENTER JEFFERSON COUNTY, WEST VIRGINIA

U.S. DEPARTMENT OF THE INTERIOR
U.S.
FISH AND WILDLIFE
SERVICE



NATIONAL CONSERVATION
TRAINING CENTER

SHEPHERDSTOWN
JEFFERSON COUNTY WEST VIRGINIA



SCHEDULE OF DRAWINGS

<u>TITLE</u>	
G0.0	COVER SHEET
<u>CIVIL</u>	
C1.0	CIVIL SITE PLAN
C2.0	CIVIL DETAILS
<u>STRUCTURAL</u>	
S1.0	EXISTING STRUCTURAL PLAN & NEW SLAB -ON GRADE PLAN
S1.1	STRUCTURAL SECTIONS AND DETAILS
S1.2	STRUCTURAL SECTIONS AND DETAILS
<u>MECHANICAL</u>	
M0.0	MECHANICAL SYMBOLS AND ABBREVIATIONS
M1.0	MECHANICAL SITE PLAN
M2.0	GENERATOR FUEL PIPING PLAN
M3.0	FUEL PIPING AND INSTRUMENTATION DIAGRAM
M4.0	MECHANICAL DETAILS
<u>ELECTRICAL</u>	
E0.0	ELECTRICAL SYMBOLS AND ABBREVIATIONS
EDS1.0	EMERGENCY GENERATOR DEMOLITION SITE PLAN
EDS1.1	EMERGENCY GENERATOR DEMOLITION PLAN
EDS1.2	EMERGENCY GENERATOR DEMOLITION PLAN
ES1.0	EMERGENCY POWER SITE PLAN
ES2.0	PARTIAL ELECTRICAL POWER EQUIPMENT PLAN
ES2.1	PARTIAL ELECTRICAL POWER EQUIPMENT GROUNDING PLAN
ES2.2	HAZARDOUS AREA CLASSIFICATION PLAN
ES3.0	SITE ELECTRICAL POWER ONE LINE DIAGRAM
ES3.1	SITE ELECTRICAL POWER ONE LINE DIAGRAM - CONTINUED
ES4.0	ELECTRICAL SCHEDULES
ES4.1	ELECTRICAL SCHEDULES
ES5.0	ELECTRICAL DETAILS
ES5.1	ELECTRICAL DETAILS
ES5.2	ELECTRICAL DETAILS
ES5.3	ELECTRICAL DETAILS

1 VICINITY MAP
SCALE: 1" = 5000'



2 LOCATION MAP
SCALE: 1" = 1000'

KEY PLAN

REVISIONS

NO.	DATE	DESCRIPTION

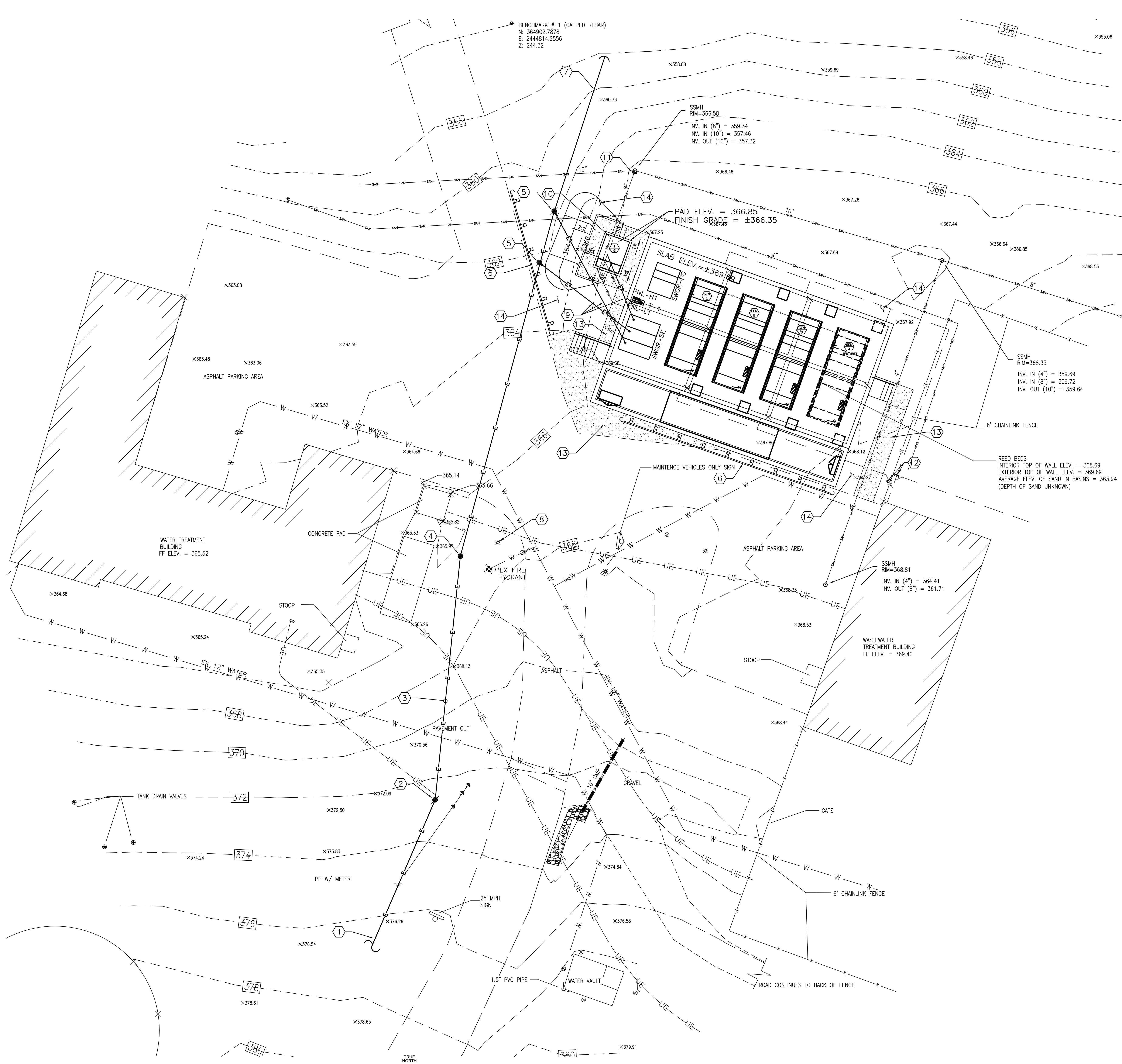
DATE: 04/02/2014
DRAWN BY: EJC
CHECKED BY: APM



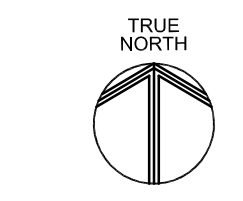
EMERGENCY POWER
UPGRADES
NCTC - SHEPHERDSTOWN, WV

COVER SHEET

DRAWING NO. GO.0
Scale: SHEET 001 OF 027
DRAWING NO. XXX-XX-xxxx-000.0



1 CIVIL SITE PLAN
 SCALE 1"=10'



KEYNOTES: ①

- EXISTING OVERHEAD ELECTRIC UTILITY COMPANY METERING POLE.
- EXISTING NFWS RISER POLE TO BE REPLACED. SEE ELECTRICAL DRAWINGS.
- NEW OVERHEAD PRIMARY CONDUCTORS. SEE ELECTRICAL DRAWINGS.
- NEW POWER POLE, SEE ELECTRICAL DRAWINGS.
- NEW RISER POLE, SEE ELECTRICAL DRAWINGS.
- NEW GUARDRAIL, SEE DETAIL 1/C2.0.
- NEW GUY WIRE, SEE ELECTRICAL DRAWINGS.
- VERIFY IEEE/ANSI C2 CLEARANCE AND REMOVE EXISTING LIGHT POLE AND CONCRETE BASE, IF CLEARANCE NOT POSSIBLE. SEE ELECTRICAL DRAWINGS.
- NEW CONCRETE ENCASED DUCTBANK. SEE DETAIL 3/C2.0.
- NEW TRANSFORMER AND TRANSFORMER PAD. SEE ELECTRICAL AND STRUCTURAL DRAWINGS.
- CUT AND CAP 8" DRAIN LINE AT EXISTING MANHOLE.
- CUT AND CAP 3" PIPE TO ABANDONED SLUDGE DEWATERING REED BED.
- PLACE 6" THICKNESS OF CLEAN CRUSHER RUN GRAVEL ON NON-WOVEN VEGETATION BARRIER FABRIC. SEE DETAIL 2/C2.0.
- HYDROSEED OR TURF ALL DISTURBED AREAS WITH APPROVED SEED MIX AND TURF AS DIRECTED BY THE CONTRACTING OFFICER.

EROSION CONTROL NOTES:

- STATE OF WEST VIRGINIA, EROSION AND SEDIMENT CONTROL BMP MANUAL, CURRENT EDITION, SHALL APPLY TO THIS PROJECT.
- THE CONTRACTOR, SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATE IN, THE PUBLIC RIGHTS-OF-WAY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS CONSTRUCTION PROJECT.
- ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED BY THE OWNER AND HIS OR HER AGENTS DUE TO UNFORSEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS INTENDED AND BY FEDERAL REGULATIONS.
- TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY.
- AT A MINIMUM, THE CONTRACTOR SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS, AND EQUIPMENT, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMP'S WEEKLY, PRIOR TO A FORECASTED RAIN EVENT AND WITHIN 24 HOURS AFTER ANY ACTUAL RAIN EVENT.
- ACCUMULATED SEDIMENT IN BMP'S SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT.
- DISTURBED AREAS SHALL BE ADEQUATELY REVEGETATED BY HYDROSEEDING WITH FIBER MATRIX SOIL GUARD.
- ALL AREAS NOT SUBJECT TO CONSTRUCTION SHALL BE MARKED AND PROTECTED FROM SOIL DISTURBANCE.
- CONCRETE WASTE SHALL BE DISPOSED OF PROPERLY PER BMP REQUIREMENTS. ALL WASTE SHALL BE DISPOSED OF OUTSIDE GOVERNMENT PROPERTY.
- CONTRACTOR SHALL MODIFY THIS PLAN AS NEEDED TO PROVIDE CONTINUOUS PROTECTION FROM STORM WATER RUNOFF.
- REFER TO THE BMP SECTION OF THE EROSION AND SEDIMENT CONTROL BMP MANUAL FOR ADDITIONAL INFORMATION REGARDING THE INSTALLATION AND MAINTENANCE OF THE BMP'S REQUIRED FOR THE PROJECT.
- AREAS NOT SHOWN HEREON BUT WILL BE REQUIRED TO FOLLOW BMP REQUIREMENTS ARE AT A MINIMUM: SITE ENTRANCES TO OPEN SPACE AREAS, SOLID WASTE MANAGEMENT, MATERIAL DELIVERY AND STORAGE AND VEHICLE EQUIPMENT MAINTENANCE, CLEANING AND REFUELING.
- CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS REQUIRED BY EITHER THE STATE OF WEST VIRGINIA OR THE FEDERAL GOVERNMENT IN REGARDS TO EROSION CONTROL, AIR-BORNE DUST CONTROL, STORMWATER MANAGEMENT, ETC.
- NO STRAW OR HAY SHALL BE PERMITTED ON-SITE.

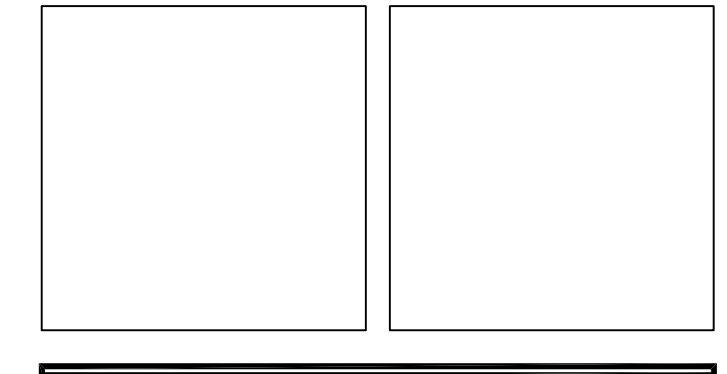


KEY PLAN

REVISIONS

NO.	DESCRIPTION

DATE: 04/02/2014
 DRAWN BY: JNB
 CHECKED BY: JNB



EMERGENCY POWER UPGRADES
 NCTC - SHEPHERDSTOWN, WV

EMERGENCY POWER SITE PLAN

DRAWING NO. C1.0
 SHEET 02 OF 027
 DRAWING NO. XXX-XX-xxxx-000.0



NOTES

- West Virginia Division of Highways Standard Specification, Roads and Bridges, Adopted 2010, Section 607 shall apply to guardrail materials and construction.
- West Virginia Department of Transportation Standard Details Book shall apply to guardrail details and construction.
- Guardrail shall be secured to the blocks, posts and other elements by 5/8" dia. bolts and nuts conforming to the details herein and to the requirements of 712.4 of the Standard Specifications. Nuts shall conform to ASTM A563, Grade A or better.
- Approach and Trailing End Treatments shall be as shown or specified on the Plans or directed by the Engineer. Approach and trailing ends shall be the straight layout configuration.
- All guardrail and accessories shall be hot-dipped galvanized,

SPECIFICATIONS

SECTION 607 GUARDRAIL

607.1-DESCRIPTION:
This work shall consist of the construction of guardrail in accordance with these Specifications and in reasonably close conformity with the lines and grades shown on the Plans or established by the Contracting Officer.
The type of guardrail are designated as follows: Type 1, Galvanized Steel Deep Beam Type Guardrail

All installations of Type 1 Guardrail will be Class I: 6 ft. - 3 in. post spacing with blocks
The construction of the guardrail shall include the complete furnishing, assembling and erecting of all component parts and materials at the location shown on the Plans or directed by the Contracting Officer.

607.2-MATERIALS:
Materials shall meet the following requirements.

Pressure Treated Wood Guardrail Posts shall meet the requirements of AWPA C1. Zinc Rich Primer (Galvanized Repair). Organic zinc primer may be used in the shop on new steel or in the field on existing steel.
Galvanized Steel Deep Beam Type Guardrail Fasteners and Anchor Bolts shall conform to AASHTO M180, Typ II, Class A.

All materials must be protected from damage during storage and handling. All materials, including materials which have been approved previously, will be subject to inspection by the Contracting Officer as to condition at any time prior to or during incorporation of the material in the work. Materials which have been damaged shall not be used.

CONSTRUCTION METHODS

607.3-SETTING POSTS AND PLACING FOOTERS:
607.3.1-General: Posts shall be of wood. Post dimensions and details shall conform to the requirements shown on the Plans. Guardrail posts shall be placed as shown on the Plans.
Posts shall be set plumb in holes dug by hand or mechanically. Post holes shall be backfilled with acceptance material placed in maximum six inch loose layers and thoroughly compacted. All posts damaged during erection shall be removed and replaced without additional cost.

607.3.3-Pressure Treated Wood Posts: All wood posts shall meet the requirements of Section 710.

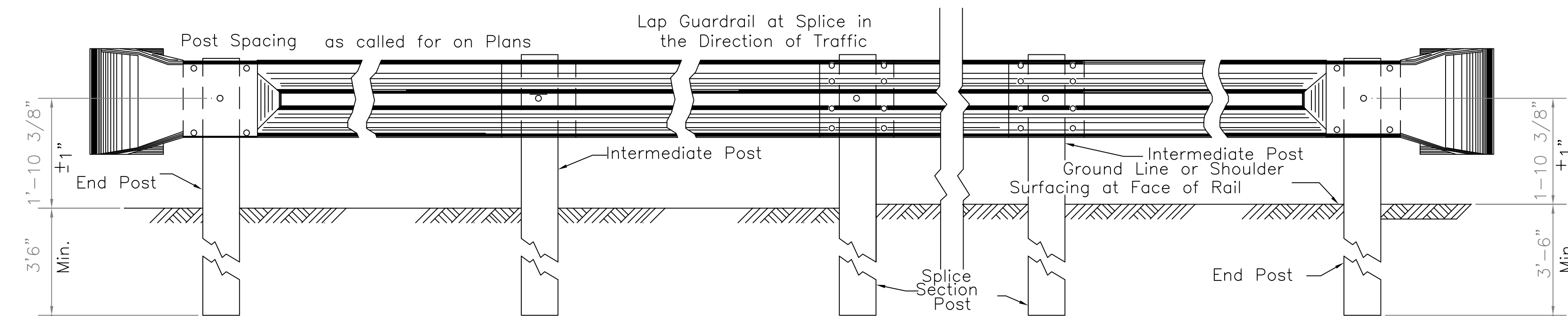
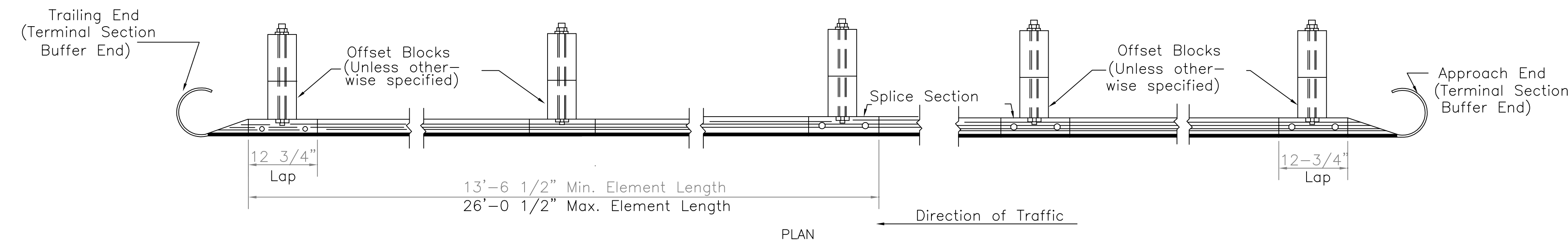
607.3.5-Offset Blocks: Offset blocks shall be used when called for by the Plans.

607.4-ERECTING RAIL ELEMENTS:

607.4.1-General: Rail elements shall be erected in a manner resulting in a smooth, continuous installation.
All bolts, except where otherwise required, such as expansion joint bolts and adjustment bolts, shall be drawn tight. Bolts through expansion joints shall be drawn up as tight as possible without being tight enough to prevent the rail elements from slipping past one another longitudinally. Bolts shall be sufficiently long to extend at least 1/4 in. beyond the nuts. Except where required for adjustment, bolts shall not extend more than 1/2 in. beyond the nuts. Bolts through variable thickness posts shall be cut off a maximum of 1/2 in. beyond the nuts.
All metal shall be fabricated in the shop. Burning, drilling or welding may be done in the field when shown on the Plans. Field punching, cutting, and drilling may be permitted after it has been demonstrated that it will not result in damage to the surrounding metal and if approved by the Contracting Officer.
Galvanized surfaces which have been abraded so that the base metal is exposed, any field welded surfaces, threaded portions of all fittings and fasteners, and cut ends of bolts shall be protected with zinc rich primer or by field galvanizing, when approved by the Engineer.

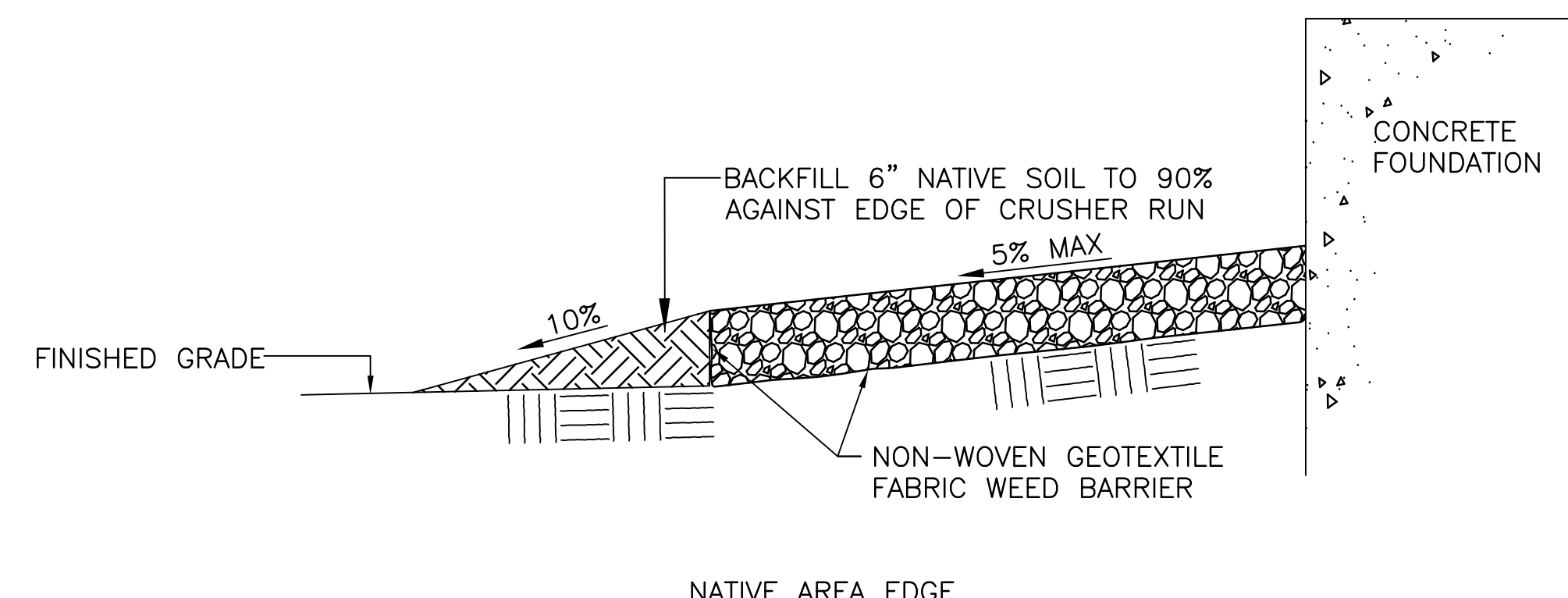
607.4.2-Type 1 Guardrail (Galvanized Steel Deep Beam): The rail shall be erected so that the bolts at expansion joints will be located near the centers of the slotted holes. The rail elements shall be spliced by lapping in the direction of traffic. The rail elements at each splice shall make contact throughout the area of the splice. Shop-curved rail shall be used on curves with radii less than 150 ft.
Any surface damage to galvanized beams shall be repaired with a material specified. When called for, guardrail end terminals conforming to the details shown on the Plans shall be constructed.

TYPICAL GUARDRAIL INSTALLATION
(UNANCHORED ENDS - WOOD POSTS AND BLOCKS SHOWN)

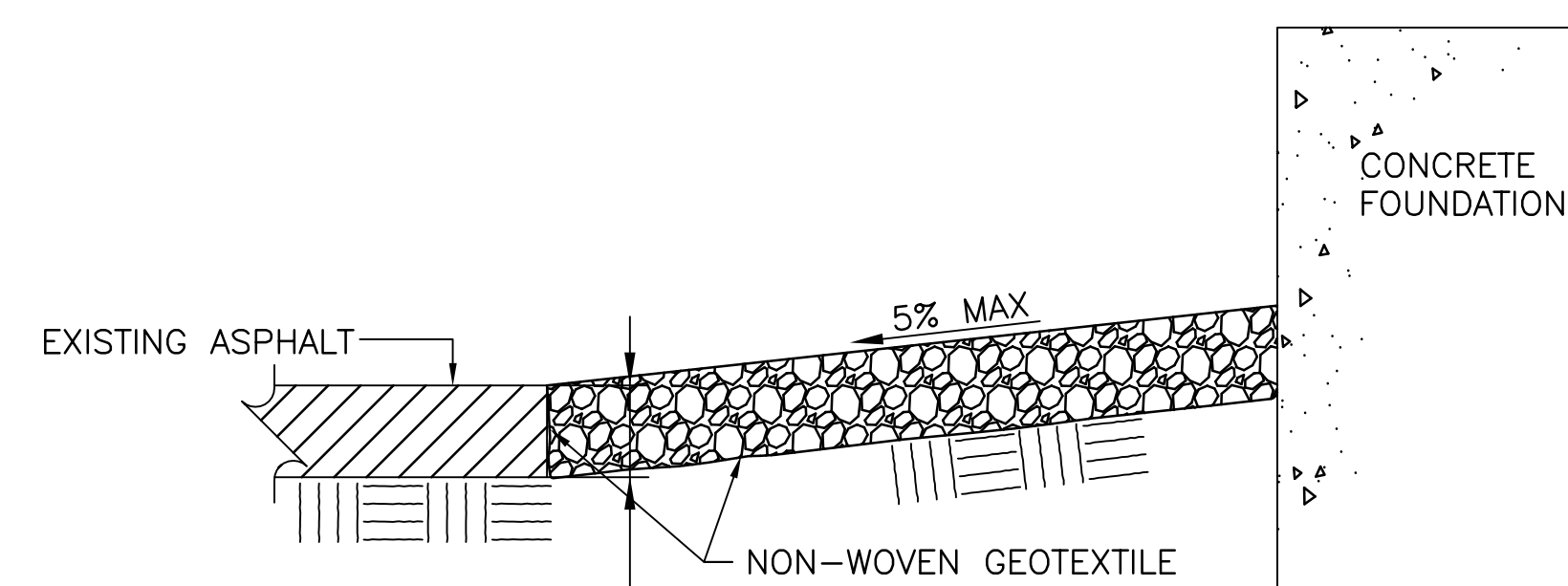


ELEVATION

1 GUARDRAIL DETAIL
NO SCALE

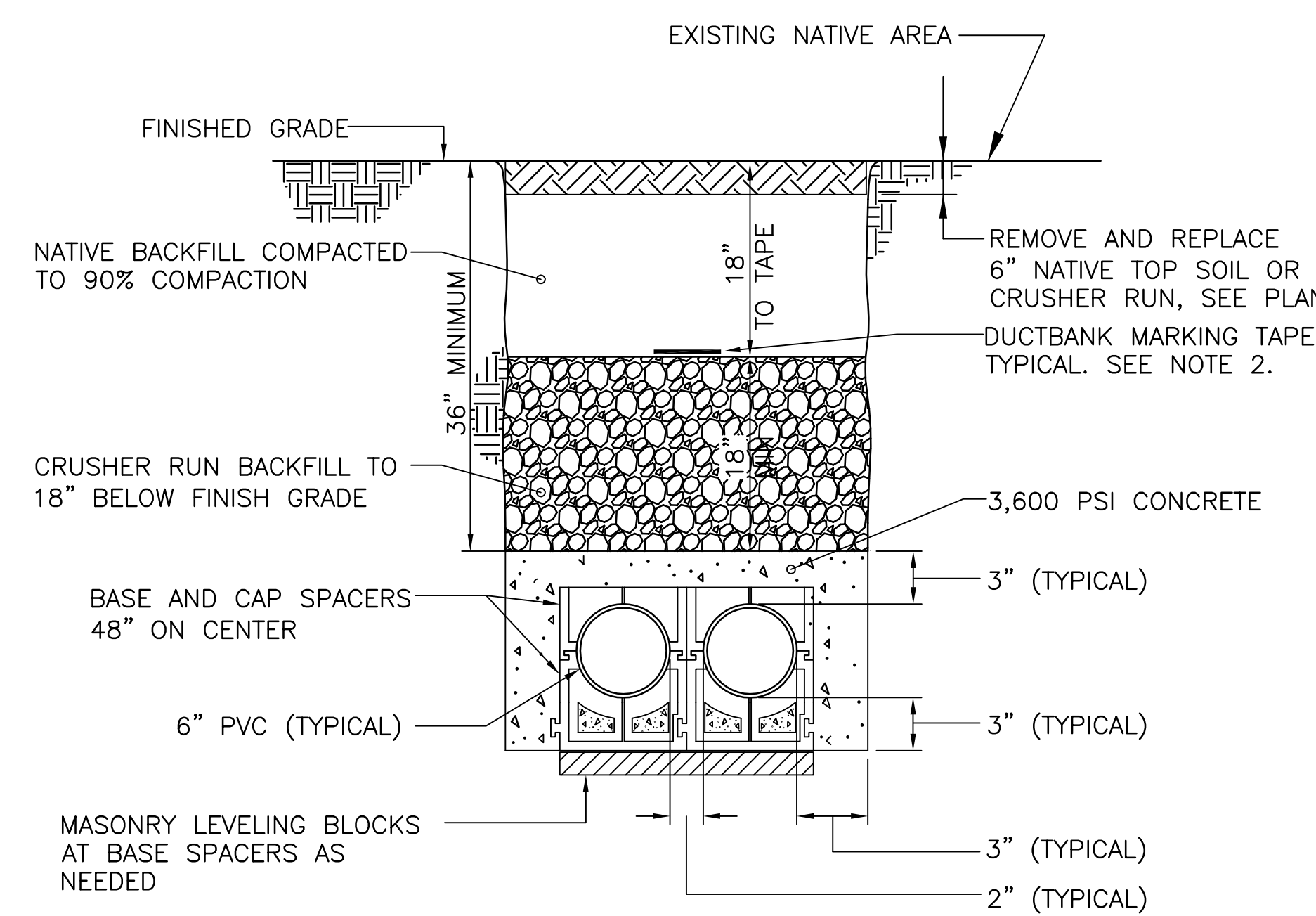


NATIVE AREA EDGE



ASPHALT AREA EDGE

2 CRUSHER RUN SURFACE EDGE DETAILS
NO SCALE



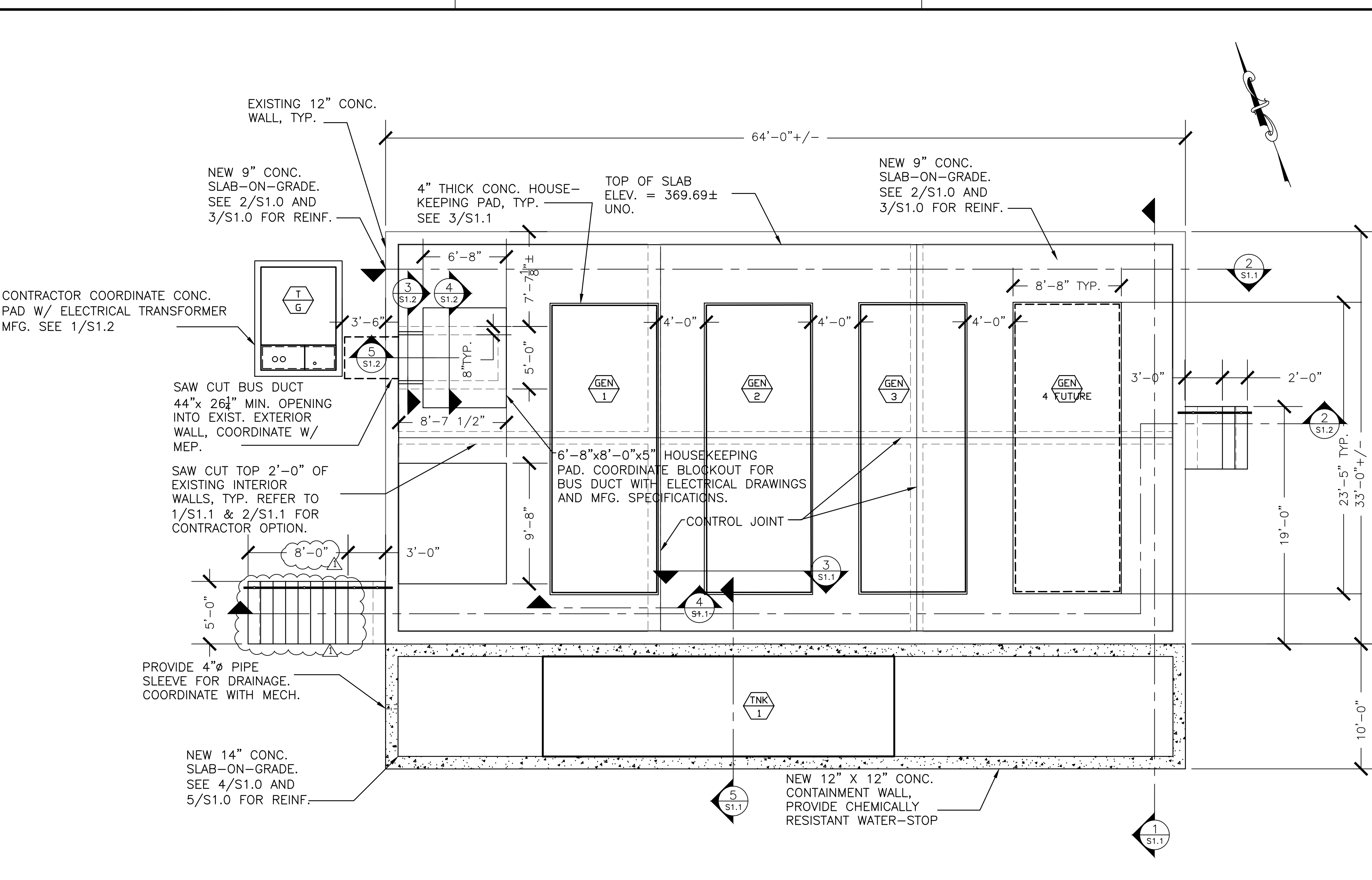
- NOTES:**
- CONCRETE PLACEMENT SHALL BE AGAINST UNDISTURBED INSITU MATERIAL. DISTURBED MATERIAL SHALL BE REPLACED WITH CRUSHER RUN MATERIAL.
 - BURIED MARKING TAPE SHALL BE 6" WIDE, HAVE A DETECTABLE METALLIC CORE, AND READ "CAUTION: BURIED ELECTRIC LINE BELOW". PRO-LINE SAFETY PRODUCTS OR APPROVED EQUAL.

3 2x6" PVC CONDUIT DUCTBANK DETAIL
NO SCALE

KEY PLAN

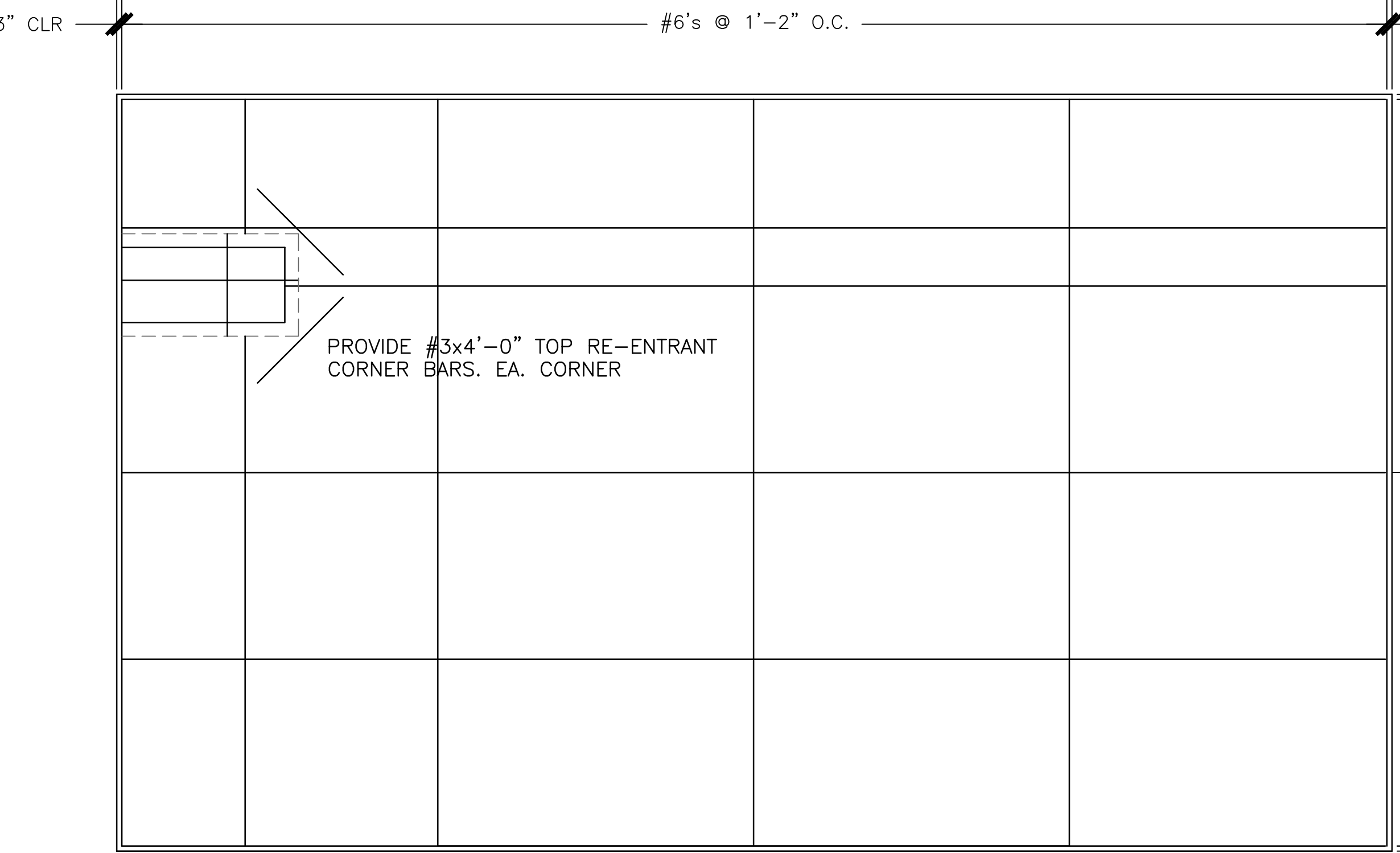
REVISIONS

DATE: 04/02/2014
DRAWN BY: JNB
CHECKED BY: JNB

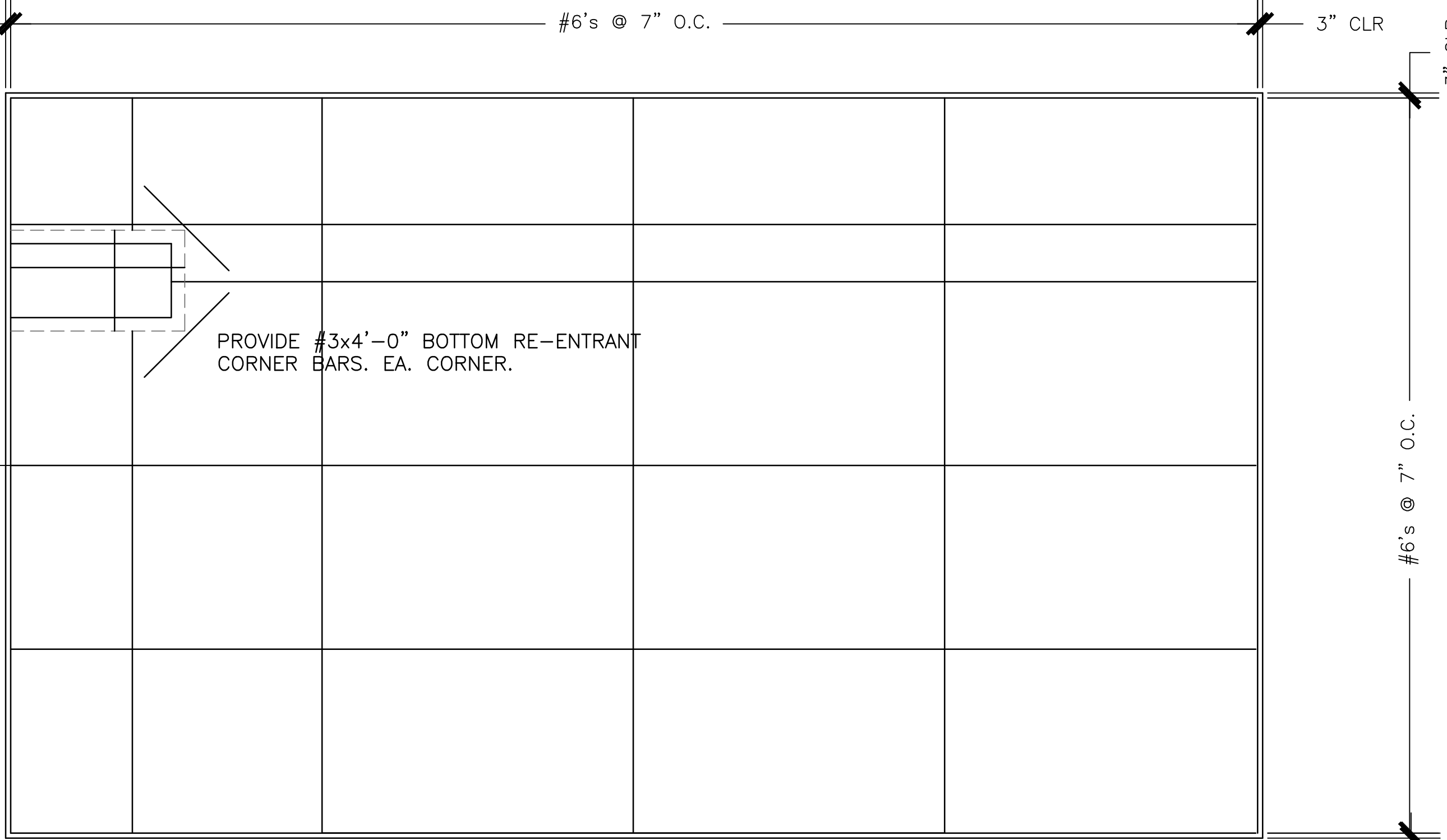


1 NEW CONCRETE SLAB-ON-GRADE PLAN
SCALE: 3/16" = 1'-0"

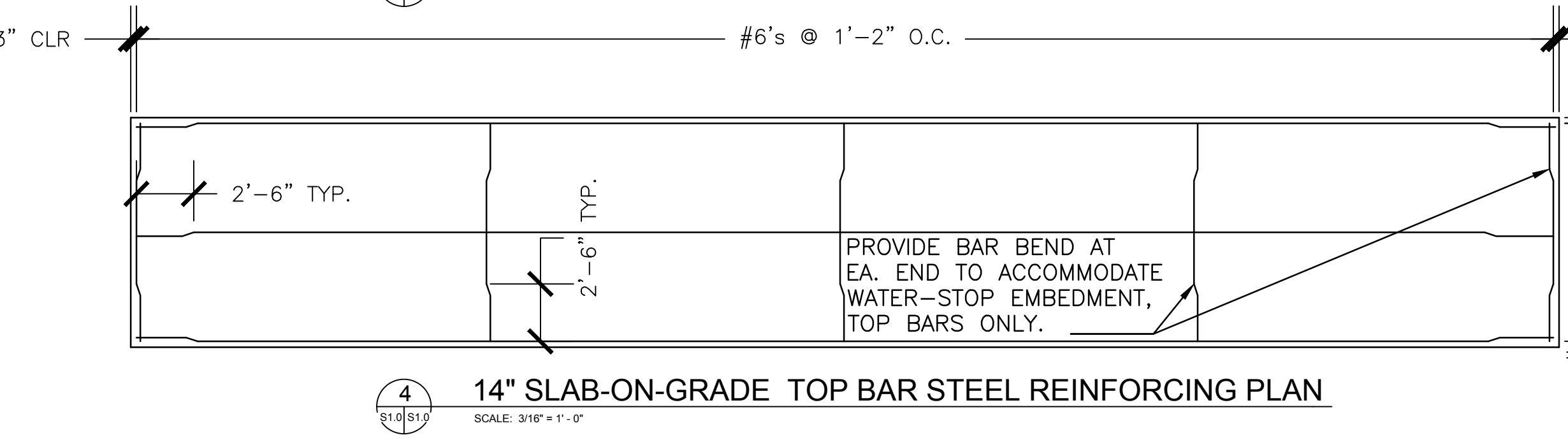
NOTES:
ALL REBAR IS NOT SHOWN FOR CLARITY.
CONC. HOUSEKEEPING PADS NOT SHOWN FOR CLARITY.



2 9" SLAB-ON-GRADE TOP BAR STEEL REINFORCING PLAN
SCALE: 3/16" = 1'-0"

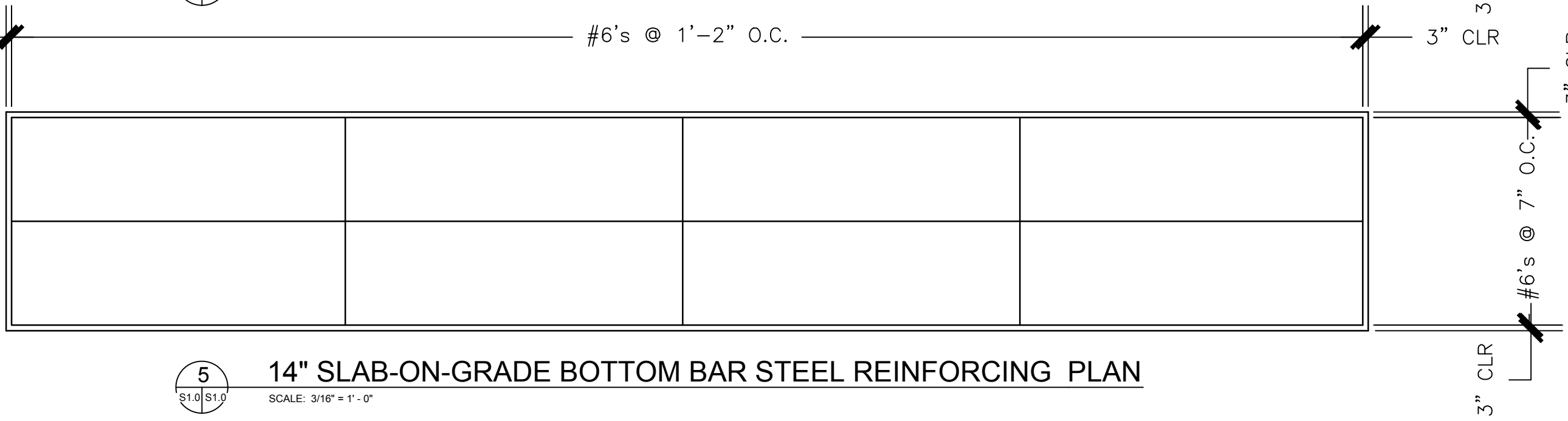


3 9" SLAB-ON-GRADE BOTTOM BAR STEEL REINFORCING PLAN
SCALE: 3/16" = 1'-0"



4 14" SLAB-ON-GRADE TOP BAR STEEL REINFORCING PLAN
SCALE: 3/16" = 1'-0"

NOTE:
CONC. CURB NOT SHOWN FOR CLARITY.
ALL REBAR IS NOT SHOWN FOR CLARITY.
CONC. HOUSEKEEPING PADS NOT SHOWN FOR CLARITY.



5 14" SLAB-ON-GRADE BOTTOM BAR STEEL REINFORCING PLAN
SCALE: 3/16" = 1'-0"

NOTE:
CONC. CURB NOT SHOWN FOR CLARITY.
ALL REBAR IS NOT SHOWN FOR CLARITY.
CONC. HOUSEKEEPING PADS NOT SHOWN FOR CLARITY.

STRUCTURAL NOTES:

- ALL STRUCTURAL LOADS WERE CALCULATED IN ACCORDANCE WITH IBC 2012 AND ASCE 7-10 UNLESS OTHERWISE NOTED.
- A) LOAD SUMMARY
- 1) DEAD LOADS
 - CONCRETE - NORMAL WEIGHT.....150 PSF
 - EQUIPMENT ALLOWANCES:
 - 10,000 GALLON FUEL TANK W/ FUEL.....110,170 LBS
 - 10,000 GALLON FUEL TANK (EMPTY).....30,100 LBS
 - GENERATORS - CAT 750KW WITH ENCLOSURE.....20,895 LBS
 - TRANSFORMER - EATON 2500KVA.....14,500 LBS
 - CENTRIFUGAL TRANSFER PUMP.....500 LBS
 - MAX. SWITCHGEAR WEIGHT.....6,250 LBS
 - 2) WIND LOADS: ALL WIND LOADS WERE CALCULATED IN ACCORDANCE WITH ASCE 7-10 AND IBC 2012.
 - EXPOSURE CATEGORY.....C
 - RISK CATEGORY.....I
 - WIND VELOCITY.....105 mph
 - 3) SEISMIC LOADS: ALL SEISMIC LOADS WERE CALCULATED IN ACCORDANCE WITH ASCE 7-10 AND IBC 2012.
 - SEISMIC RESISTING SYSTEM - WELDED TANKS ON HORIZONTAL SADDLES (FUEL TANK ONLY).....C
 - SEISMIC DESIGN CATEGORY (FUEL TANK).....C
 - RISK CATEGORY (FUEL TANK).....IV
 - IMPORTANCE FACTOR, IE (FUEL TANK).....1.5
 - SEISMIC DESIGN CATEGORY (GEN. & ELECTRICAL).....B
 - RISK CATEGORY (GEN. & ELECTRICAL).....I
 - IMPORTANCE FACTOR, IE (GEN. & ELECTRICAL).....1.0
 - DESIGN SHORT PERIOD SPECTRAL RESPONSE ACCELERATION SDS (0.2S).....0.137 g
 - DESIGN LONG PERIOD SPECTRAL RESPONSE ACCELERATION, S1S (1.0S).....0.084 g
 - RESPONSE MODIFICATION FACTOR, R.....3
 - OVERSTRENGTH FACTOR.....2
 - DEFLECTION AMPLIFICATION FACTOR, CD.....3.5
 - FUEL TANK SEISMIC BASE SHEAR Vx = Vy.....±12.6 KIPS
 - FUEL TANK VERTICAL SEISMIC REACTION, Vv.....±3.02 KIPS
- PER ASCE 7-10 SECTION 13.4.1.4 - MECHANICAL AND ELECTRICAL COMPONENTS IN A SEISMIC DESIGN CATEGORY B DO NOT REQUIRE SEISMIC ANALYSIS.

- B) GEOTECHNICAL PARAMETERS:
- 1) THE FOLLOWING SOIL PARAMETERS HAVE BEEN ASSUMED FOR THE DESIGN OF THE REINFORCED CONCRETE SLAB-ON-GRADE DESIGN.
 - ALLOWABLE SOIL BEARING PRESSURE.....3,000 PSF
 - MODULUS OF SUBGRADE REACTION.....150 PCI
 - 2) ALL COMPACTED FILL SHALL CONSIST OF CRUSHER RUN CLASS 2 AGGREGATE OR APPROVED EQUIVALENT. COMPACTED FILL SHALL BE INSTALLED IN 6 INCH LIFTS AND MECHANICALLY COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D698.

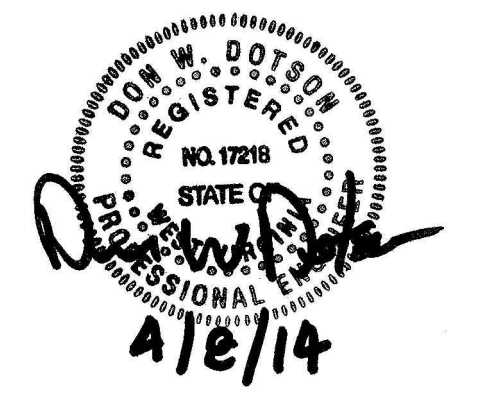
- C) SELECTIVE DEMOLITION:
- 1) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL 10" DIAMETER PIPING AND SUPPORTING PIPE STEEL LOCATED ON THE INTERIOR WALLS OF THE DEWATERING BASIN PRIOR TO BACKFILLING.
 - 2) ALL METAL REMOVED DURING DEMOLITION SHALL BE TURNED OVER TO THE GOVERNMENT AS SALVAGED MATERIALS OR FOR RECYCLING.
- D) CONCRETE:
- 1) ALL CONCRETE SHALL BE AIR ENTRAINED AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
 - 2) ALL CONCRETE DOWELS AND REINFORCING STEEL SHALL BE ASTM A-615 GR. 60 UNLESS NOTED OTHERWISE.
 - 3) THE CONTRACTOR SHALL PROVIDE CHEMICALLY RESISTANT WATER-STOPS AROUND THE PERIMETER OF THE FUEL TANK CONTAINMENT STRUCTURE. WATER-STOPS SHALL BE RESISTANT TO PETROLEUM PRODUCTS SUCH AS DIESEL FUEL.
 - 4) CONTRACTOR SHALL PROVIDE 3/4" CHAMFERS FOR THE EDGES OF ALL CONC. CURBS, HOUSEKEEPING PADS, AND SLAB-ON-GRADE.
 - 5) VERTICAL AND HORIZONTAL REINFORCING STEEL FOR CONCRETE CURBS SHALL HAVE STANDARD 90° HOOKS AT EACH END.
 - 6) CONTRACTOR SHALL PROVIDE A 1/2" ASPHALTIC STRIP BETWEEN THE EXISTING CONCRETE CONTAINMENT WALLS AND THE NEW GENERATOR, FUEL TANK SLAB ON GRADE, AND NEW STAIR LANDINGS.
 - 7) PRE-CAST CONCRETE STAIRS AND LANDINGS SHALL BE PERMITTED AS A SUBSTITUTE FOR THE CAST IN PLACE CONC STAIRS ONLY WITH THE APPROVAL OF THE CONTRACTING OFFICER.
 - 8) THE CONTRACTOR SHALL FIELD COORDINATE THE EXACT STAIR GEOMETRY WITH THE EXISTING FIELD CONDITIONS AND TOPOGRAPHY. ALL RISERS, TREADS, NOSINGS, AND HAND RAILS REQUIREMENTS SHALL COMPLY WITH IBC 2012 REQUIREMENTS.
- E) STEEL AND MISC. METALS:
- 1) ALL HANDRAILS, POSTS, PLATES, ANCHOR BOLTS AND ANCHOR BOLT ACCESSORIES SHALL BE HOT DIP GALVANIZED UNLESS NOTED OTHERWISE.

KEY PLAN

REVISIONS

NO.	DATE	DESCRIPTION
1	04/08/14	STAR GEOMETRY & DUCT ELEVATION

DATE: 04/08/2014
DRAWN BY: PJG
CHECKED BY: APM

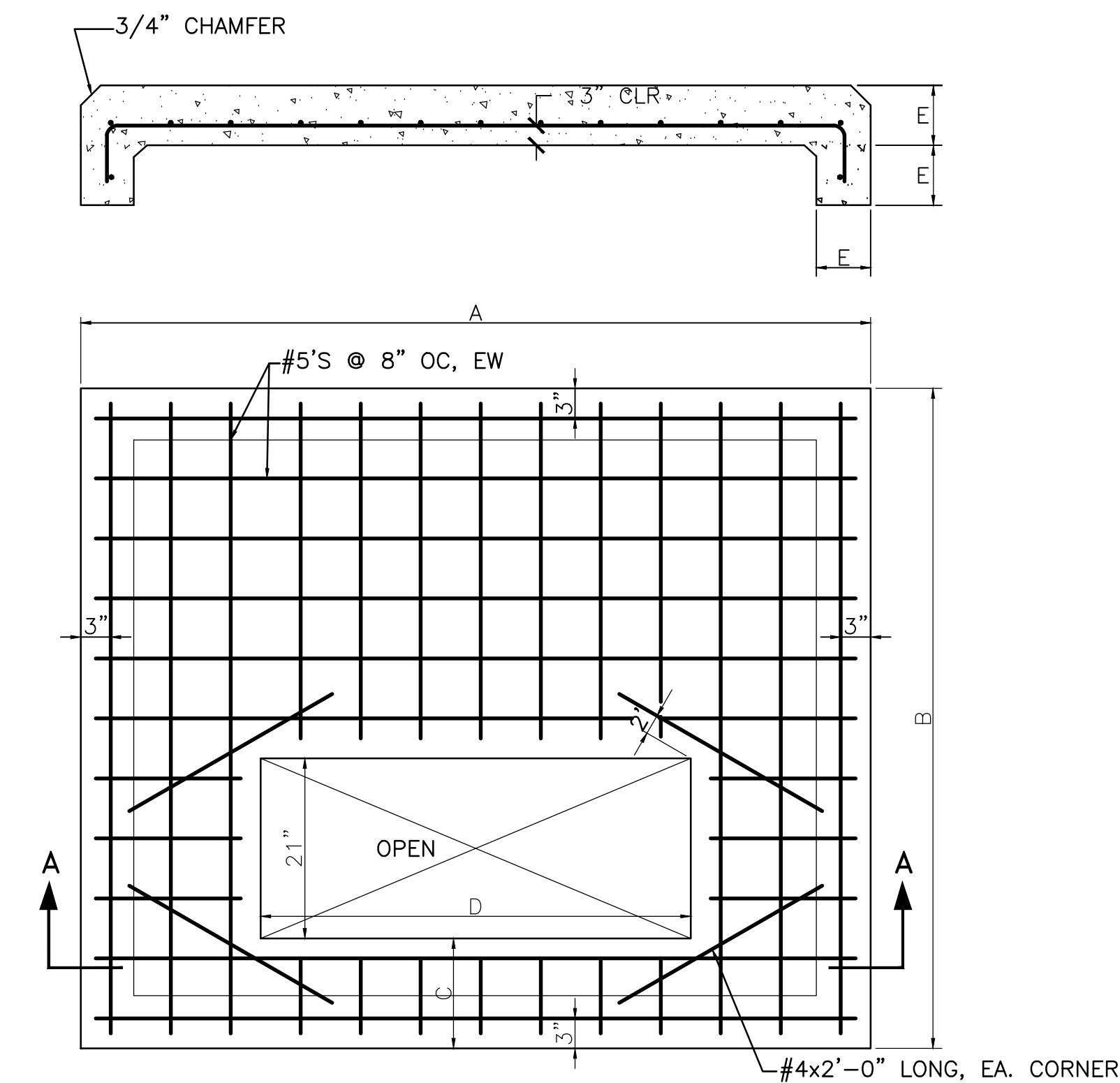


KEY PLAN

REVISIONS

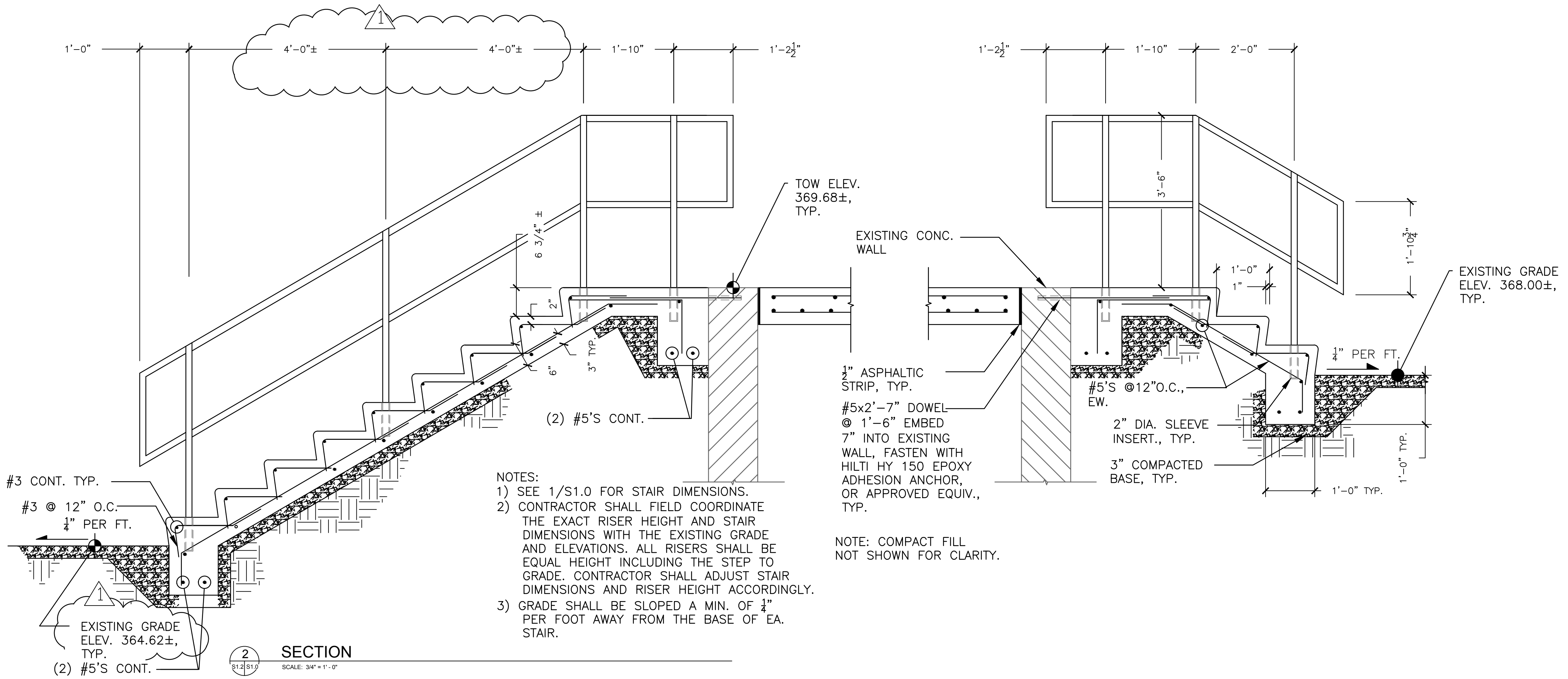
NO.	DATE	DESCRIPTION
1	04/08/14	STAIR GEOMETRY & DUCT ELEVATION

DATE: 04/08/2014
DRAWN BY: VIS
CHECKED BY: JJA



NOTE: CONTRACTOR SHALL VERIFY ALL DIMENSIONS W/ TRANSFORMER MFG. PRIOR TO PRODUCTION OF SHOP DRAWINGS.

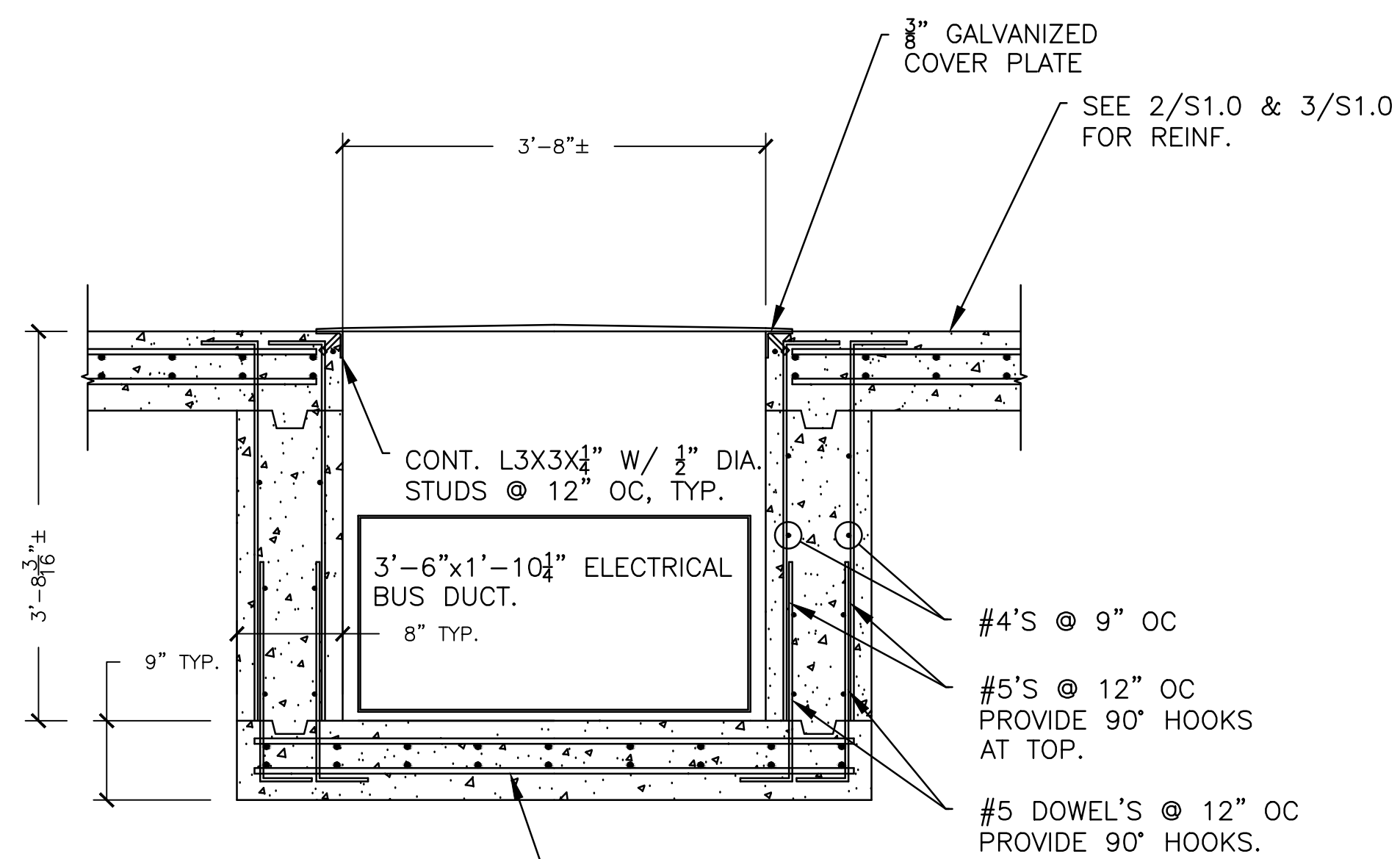
3-PHASE TRANSFORMER KVA	PAD DIMENSIONS				
	A	B	C	D	E
2500	8'-0"	9'-8"	1'-0"	5'-9"	8"



NOTES:
1) SEE 1/S1.0 FOR STAIR DIMENSIONS.
2) CONTRACTOR SHALL FIELD COORDINATE THE EXACT RISER HEIGHT AND STAIR DIMENSIONS WITH THE EXISTING GRADE AND ELEVATIONS. ALL RISERS SHALL BE EQUAL HEIGHT INCLUDING THE STEP TO GRADE. CONTRACTOR SHALL ADJUST STAIR DIMENSIONS AND RISER HEIGHT ACCORDINGLY.
3) GRADE SHALL BE SLOPED A MIN. OF 1/4 PER FOOT AWAY FROM THE BASE OF EA. STAIR.

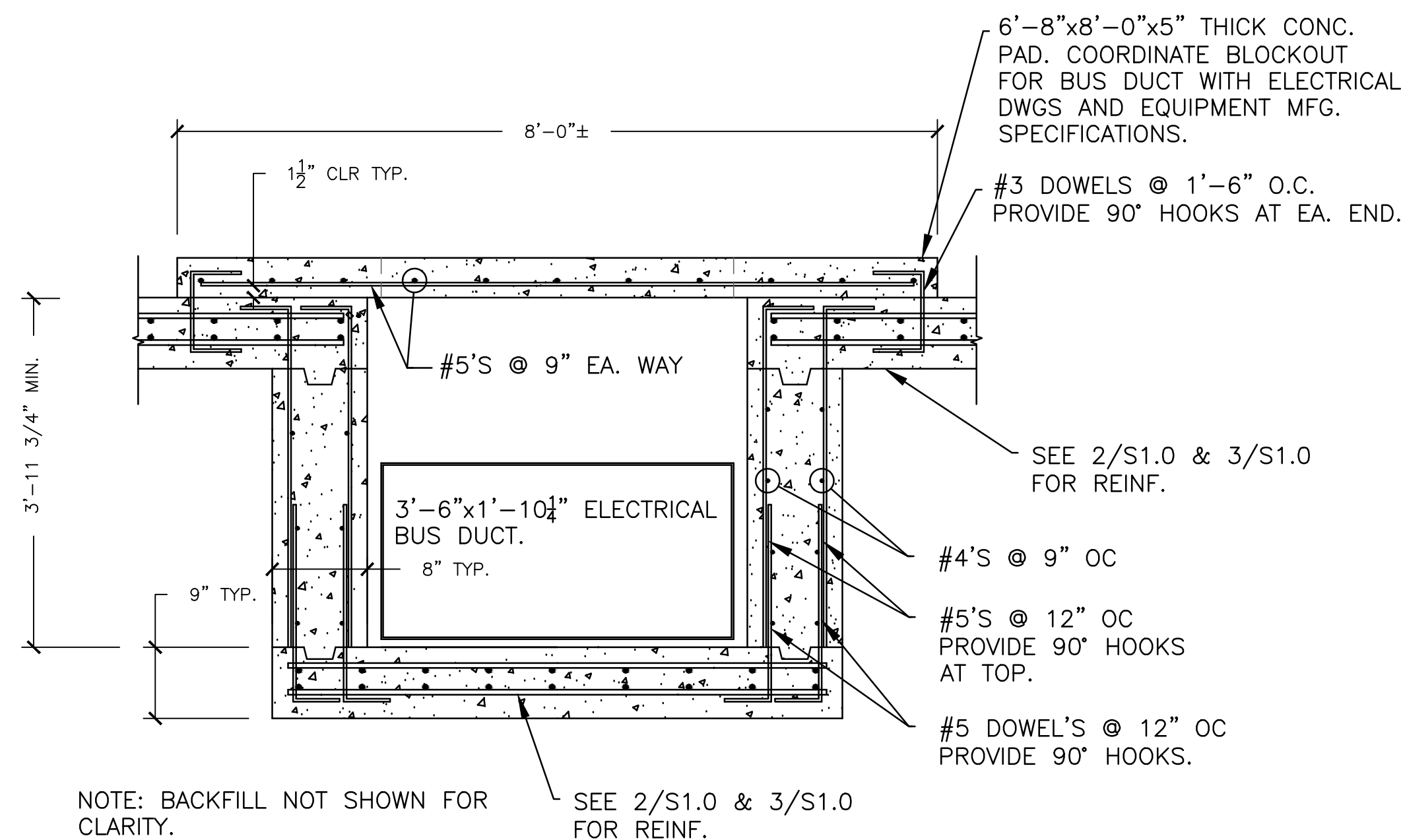
NOTE: COMPACT FILL NOT SHOWN FOR CLARITY.

1 ELECTRICAL TRANSFORMER CONC. PAD REINF. PLAN AND SCHEDULE
SCALE: NTS



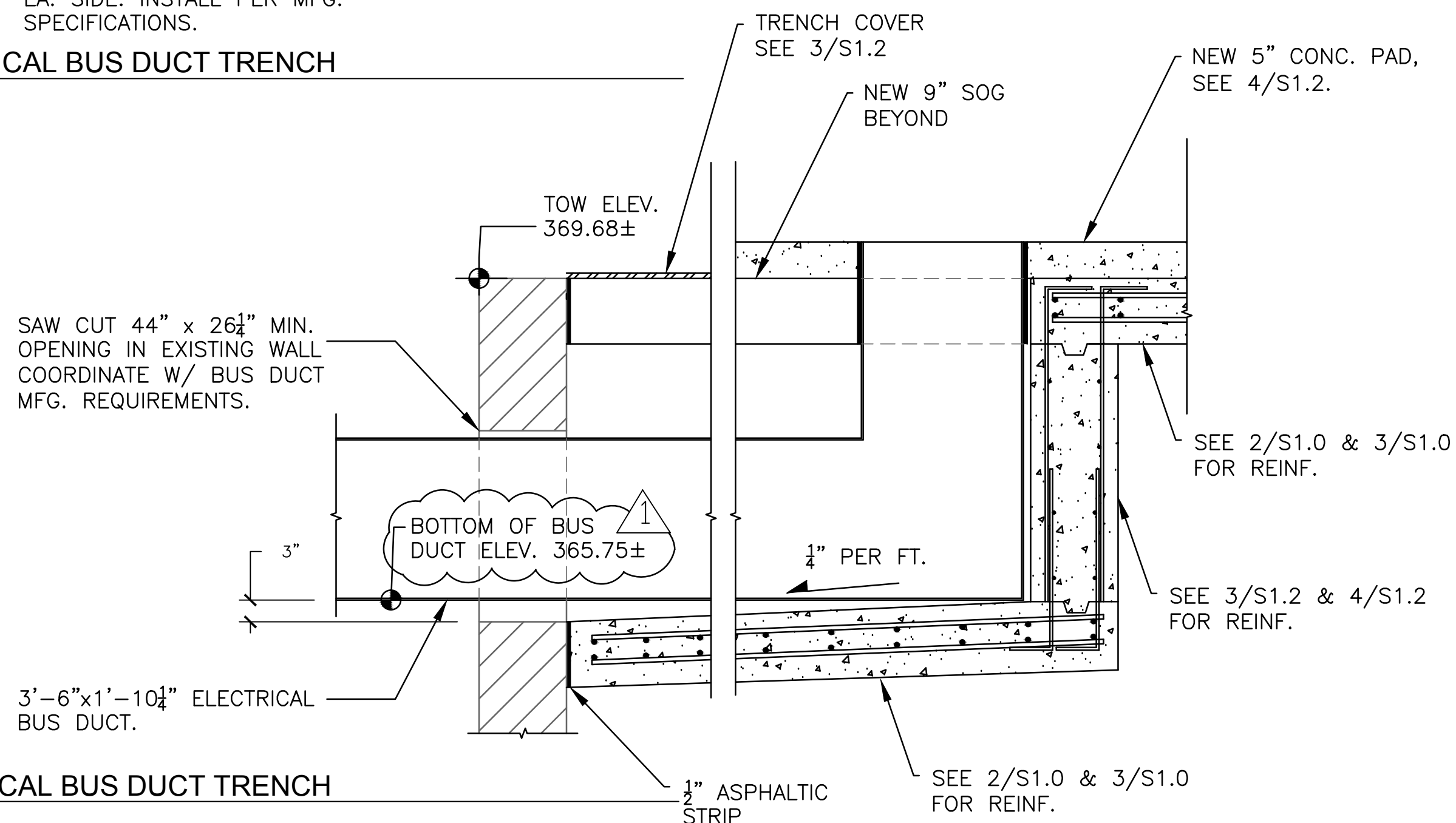
NOTE:
1. BACKFILL NOT SHOWN FOR CLARITY.
2. FASTEN TRENCH COVER W/ (2) HILTI HDI SS DROP IN ANCHORS W/ 1/2" SS COUNTER SUNK BOLTS, EA. SIDE. INSTALL PER MFG. SPECIFICATIONS.

3 ELECTRICAL BUS DUCT TRENCH
SCALE: 3/4"=1'-0"



NOTE: BACKFILL NOT SHOWN FOR CLARITY.

4 ELECTRICAL BUS DUCT TRENCH
SCALE: 3/4"=1'-0"



NOTES:
1) BACKFILL NOT SHOWN FOR CLARITY.
2) COORDINATE EXACT PLACEMENT OF BUS DUCT AND CONC. BLOCKOUTS WITH TRANSFORMER, ELECTRICAL COMPONENT REQUIREMENTS, & FINAL SITE GRADING.
3) CONTRACTOR TO COORDINATE THE EXACT DEPTH OF TRENCH WITH BOTTOM OF THE BUS DUCT.
4) PROVIDE 1/4 PER FOOT SLOPE TO BOTTOM OF TRENCH TO FACILITATE DRAINAGE AT WALL OPENING.

5 ELECTRICAL BUS DUCT TRENCH
SCALE: 3/4"=1'-0"

MECHANICAL SYMBOLS AND ABBREVIATIONS

STANDARD SYMBOLS				ABBREVIATIONS	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
PIPING-MECHANICAL		VALVES		MISCELLANEOUS	
—FOS—	FUEL OIL SUPPLY	—G—	BALL VALVE	PUMP	
—FOR—	FUEL OIL RETURN	—GV—	GATE VALVE	NUMBER	
—FOV—	FUEL OIL TANK VENT	—GV—	GLOBE VALVE	DETAIL BUBBLE	
		—SCV—	SWING CHECK VALVE	EQUIPMENT MARK (P-1 SHOWN)	
PIPING-FITTINGS		—BV—	BUTTERFLY VALVE	KEYED NOTE CONSTRUCTION	
+	SCREWED JOINT	—MGOV—	MOTOR OPERATED GATE VALVE	LETTER SECTION BUBBLE	
—FJ—	FLANGED JOINT	—SOV—	SOLENOID OPERATED VALVE	BREAK	
+	WELDED JOINT	THREE WAY VALVE, ELECTRICAL		METER	
—U—	UNION	RELIEF VALVE			
—CR—	CONCENTRIC REDUCER	—BV—	BALL VALVE		
—ED—	ELBOW, TURNED DOWN	FLOW SENSOR			
—EU—	ELBOW, TURNED UP	CONTROLS			
—TU—	TEE, TURNED UP	FLOW SWITCH			
—TD—	TEE, TURNED DOWN	RELAY			
—E90—	90° ELBOW	—E—	ELECTRIC		
—T—	TEE				
—C—	CAP				
—EJ—	EXPANSION JOINT				
—LS—	LINE STRAINER				
—DF—	DIRECTION AND FLOW				
—PG—	PRESSURE GAUGE				

TITLE

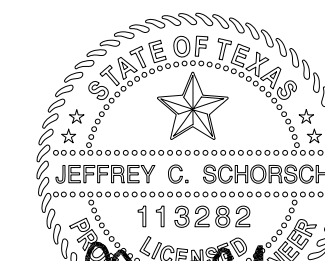
NOT TO SCALE

DETAIL BUBBLE
 TITLE - INDICATES THE TITLE OF THE DETAIL
 SCALE - INDICATES THE SCALE OF THE DETAIL (IF APPLICABLE)
 X - DENOTES DETAIL NUMBER
 Y - DENOTES SHEET NUMBER
 Z - DENOTES REFERENCE SHEET NUMBER

GENERAL NOTES:

THESE MECHANICAL GENERAL NOTES APPLY TO ALL MECHANICAL DRAWINGS:

- COORDINATE WITH AND OBTAIN APPROVAL FROM COR FOR ALL UTILITY OUTAGES A MINIMUM OF 72 HOURS IN ADVANCE.
- SECURE OPENINGS THROUGH FLOORS FROM WEATHER DURING CONSTRUCTION.
- SECURE OPENINGS THROUGH FLOORS FROM FALL AND PROVIDE ALL APPROPRIATE FALL PROTECTION MEASURES PER OSHA REQUIREMENTS.
- SALVAGE EQUIPMENT ITEMS TO A DESIGNATED STORAGE OR DISPOSAL AREA AS DIRECTED BY THE COR.
- THE DRAWINGS ARE PART DIAGRAMMATIC IN NATURE AND THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL NEW PIPING AND NEW EQUIPMENT WITH OTHER TRADES PRIOR TO SUBMISSION OF PIPING LAYOUT SHOP DRAWINGS AND COMMENCEMENT OF WORK. CONTRACTOR SHALL FURNISH AND INSTALL ALL BENDS, OFFSETS, ADDITIONAL PIPING ROUTING ETC. AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL SYSTEMS.
- THESE DRAWINGS ARE ACCOMPANIED BY SPECIFICATIONS OF THE DETAILS OF THE INSTALLATIONS INDICATING THE LOCATIONS OF EQUIPMENT, PIPING, OUTLETS, ETC. ITEMS SPECIFICALLY MENTIONED IN THE SPECIFICATIONS BUT NOT SHOWN ON THE DRAWINGS AND ITEMS SHOWN ON THE DRAWINGS BUT NOT SPECIFICALLY MENTIONED IN THE SPECIFICATIONS SHALL BE INSTALLED BY THE CONTRACTOR UNDER THE APPROPRIATE SECTION OR WORK AS IF THEY WERE INDICATED BY BOTH.
- THE SPECIFICATIONS DETERMINE THE NATURE AND SETTING OF THE SEVERAL MATERIALS. THE DRAWINGS ESTABLISH THE QUANTITIES, DIMENSIONS, DETAILS AND THE SCHEDULES WHICH GIVE THE PERFORMANCE CHARACTERISTICS.
- SHOULD THE DRAWINGS DISAGREE IN THEMSELVES AND WITH THE SPECIFICATIONS AND WITH VARIOUS CODES AND REGULATIONS, THE BETTER QUALITY OR GREATER QUANTITY OF WORK OR MATERIALS SHALL BE ASSUMED AND ESTIMATED AND UNLESS OTHERWISE DIRECTED BY THE COR AND ENGINEER IN WRITING SHALL BE PERFORMED OR FURNISHED. IN CASE THE SPECIFICATIONS SHOULD NOT FULLY AGREE WITH THE SCHEDULES, THE LATER SHALL GOVERN.
- CONTRACTOR SHALL PROVIDE ALL FLUIDS FOR GENERATOR STARTUP AND TESTING EXCEPT FOR FUEL WHICH WILL BE PROVIDED BY THE GOVERNMENT.
- ALL DIESEL FUEL PIPING SHALL BE INSULATED AND SHALL HAVE HEAT TRACE.
- CONTRACTOR SHALL PROVIDE A COORDINATION DRAWING TO SHOW ALL SIZES, INTERRELATIONSHIPS, AND LOCATIONS OF ALL THE VARIOUS COMPONENTS TO INCLUDE FUEL PIPING, CONDUIT, STUB UPS, GROUNDING CONDUCTORS, GENERATORS, WEATHER ENCLOSURES, ETC. AND TO ENSURE THAT ALL NECESSARY AND REQUIRED CLEARANCES ARE MET PER CODE REQUIREMENTS AND MAINTENANCE REQUIREMENTS.



04/02/2014

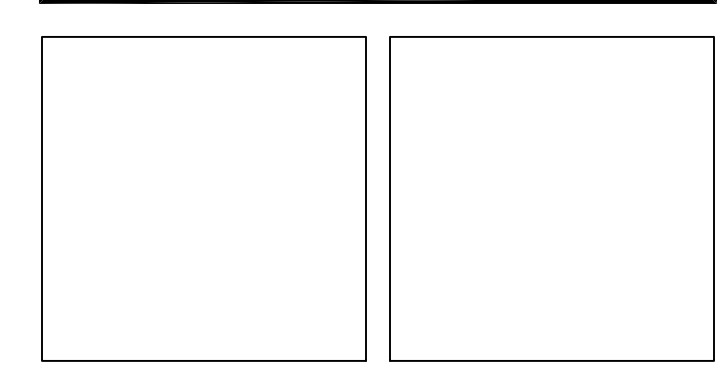


KEY PLAN

REVISIONS

NO.	DATE	DESCRIPTION

DATE: 04/02/2014
 DRAWN BY: JCS
 CHECKED BY: APM



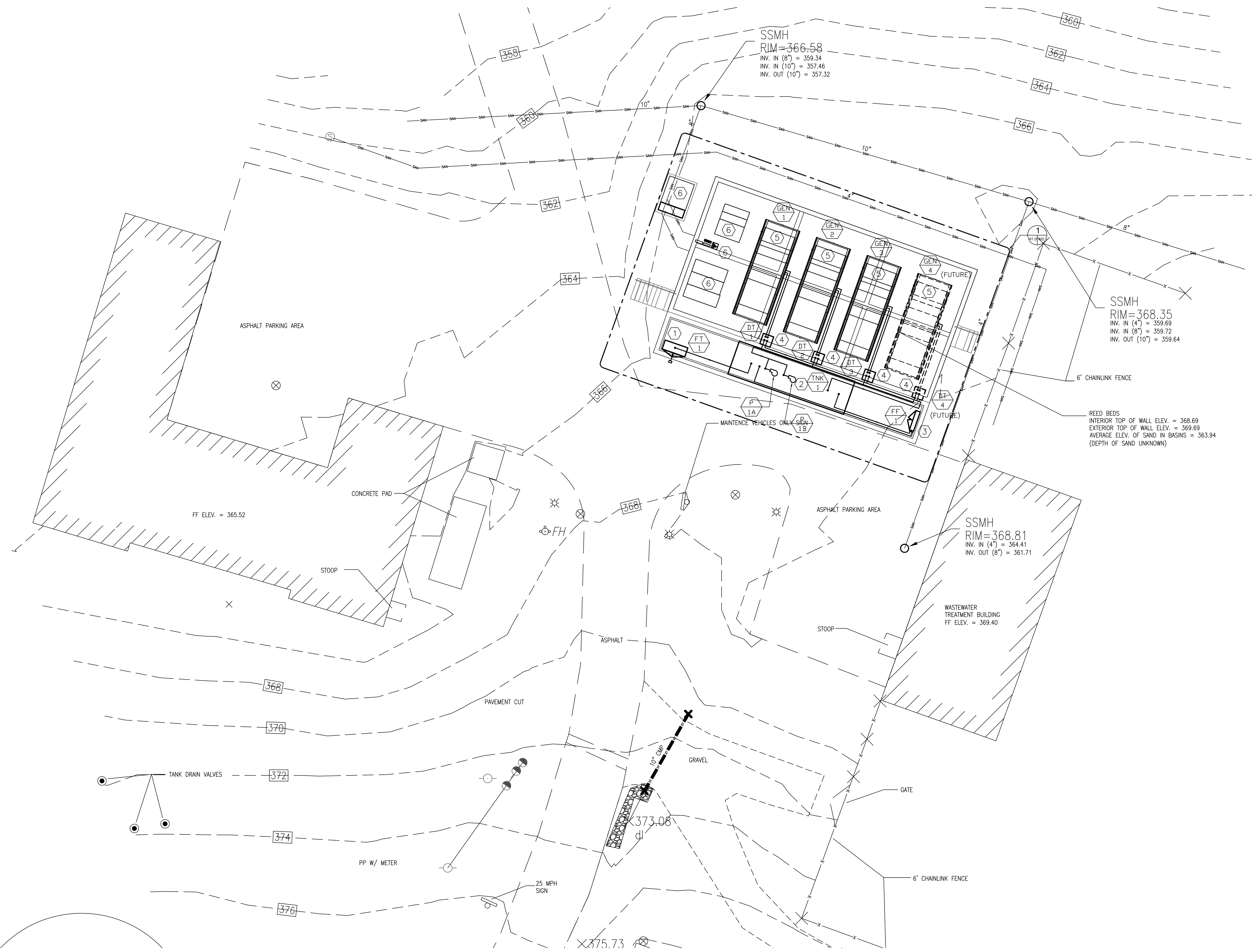
EMERGENCY POWER UPGRADES
 NCTC - SHEPHERDSTOWN, WV

MECHANICAL SYMBOLS AND ABBREVIATIONS

DRAWING NO. MO.0

Scale: SHEET 007 OF 027

DRAWING NO. XXX-XX-xxxx-000.0



MECHANICAL SITE PLAN
SCALE: 1" = 10'-0"
TRUE NORTH

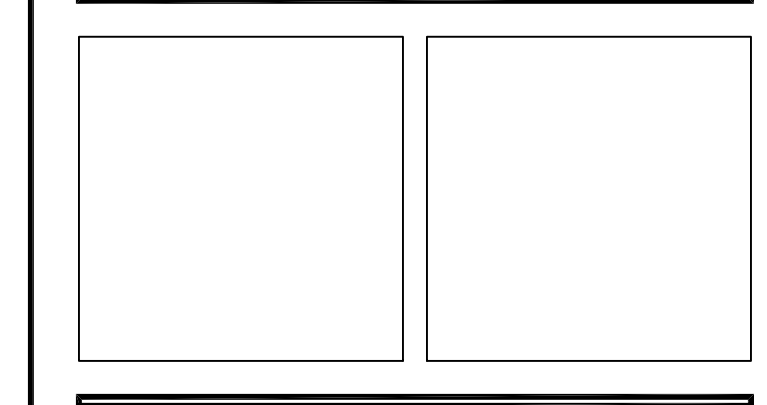
- KEYNOTES: (X)
- 1. FUEL TRANSFER SYSTEM.
 - 2. 10,000 GALLON FUEL STORAGE TANK.
 - 3. FUEL QUALITY MANAGEMENT SYSTEM.
 - 4. 120 GALLON DAY TANK.
 - 5. DIESEL GENERATOR. REFERENCE ELECTRICAL DRAWINGS.
 - 6. ELECTRICAL EQUIPMENT. REFERENCE ELECTRICAL DRAWINGS.

KEY PLAN

REVISIONS

NO.	DATE	DESCRIPTION

DATE: 04/02/2014
 DRAWN BY: JCS
 CHECKED BY: APM



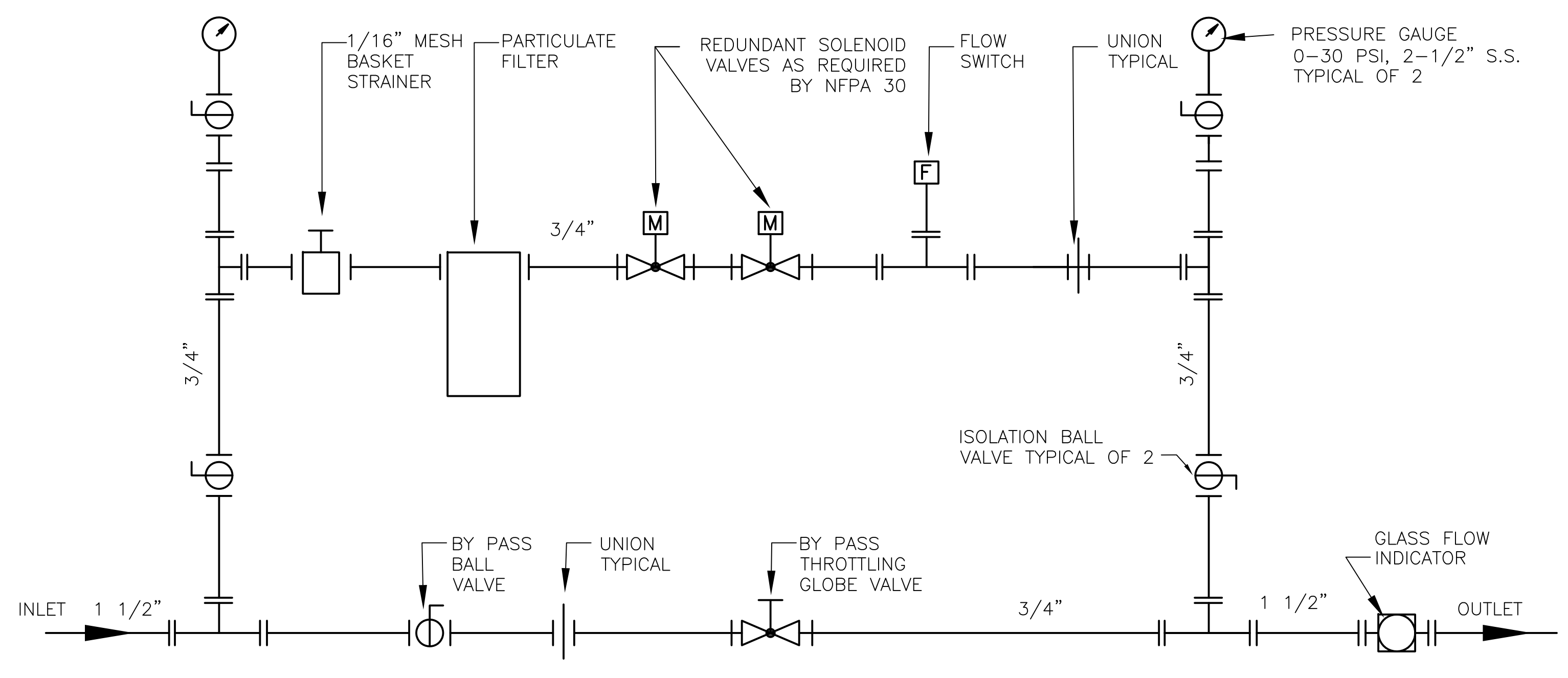
EMERGENCY POWER UPGRADES
 NCTC - SHEPHERDSTOWN, WV

MECHANICAL SITE PLAN

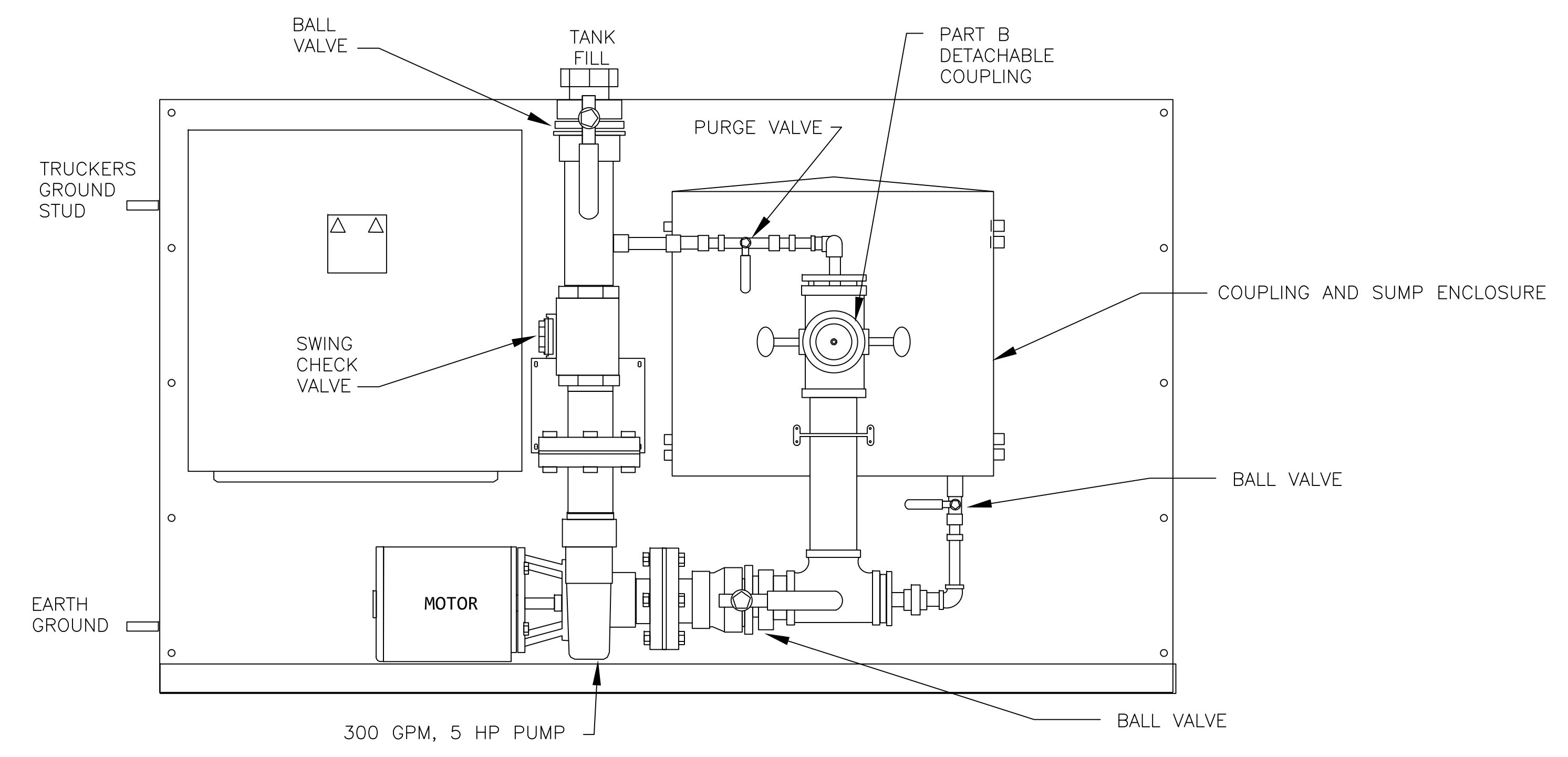
DRAWING NO. M1.0

Scale: SHEET 008 OF 027

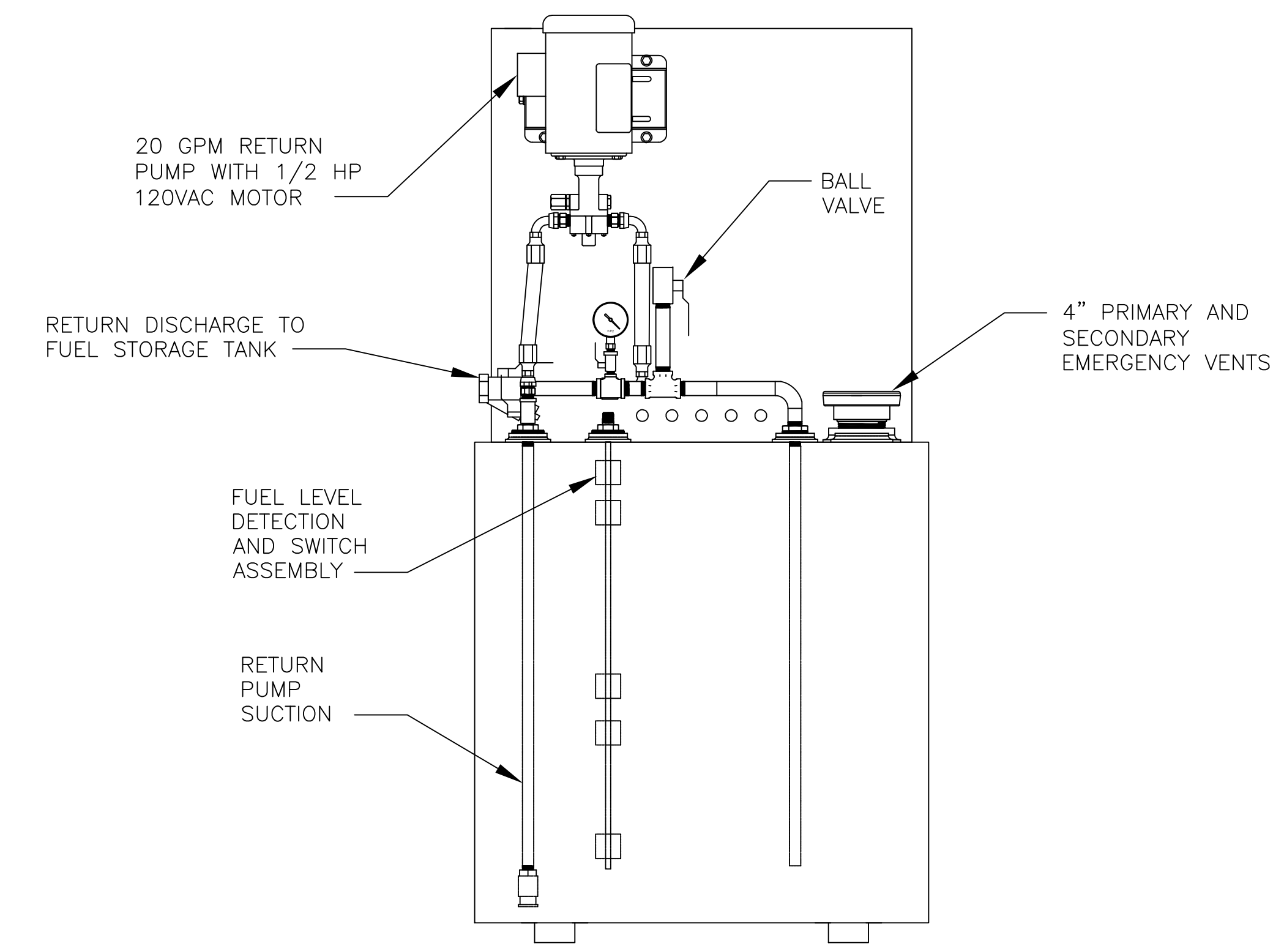
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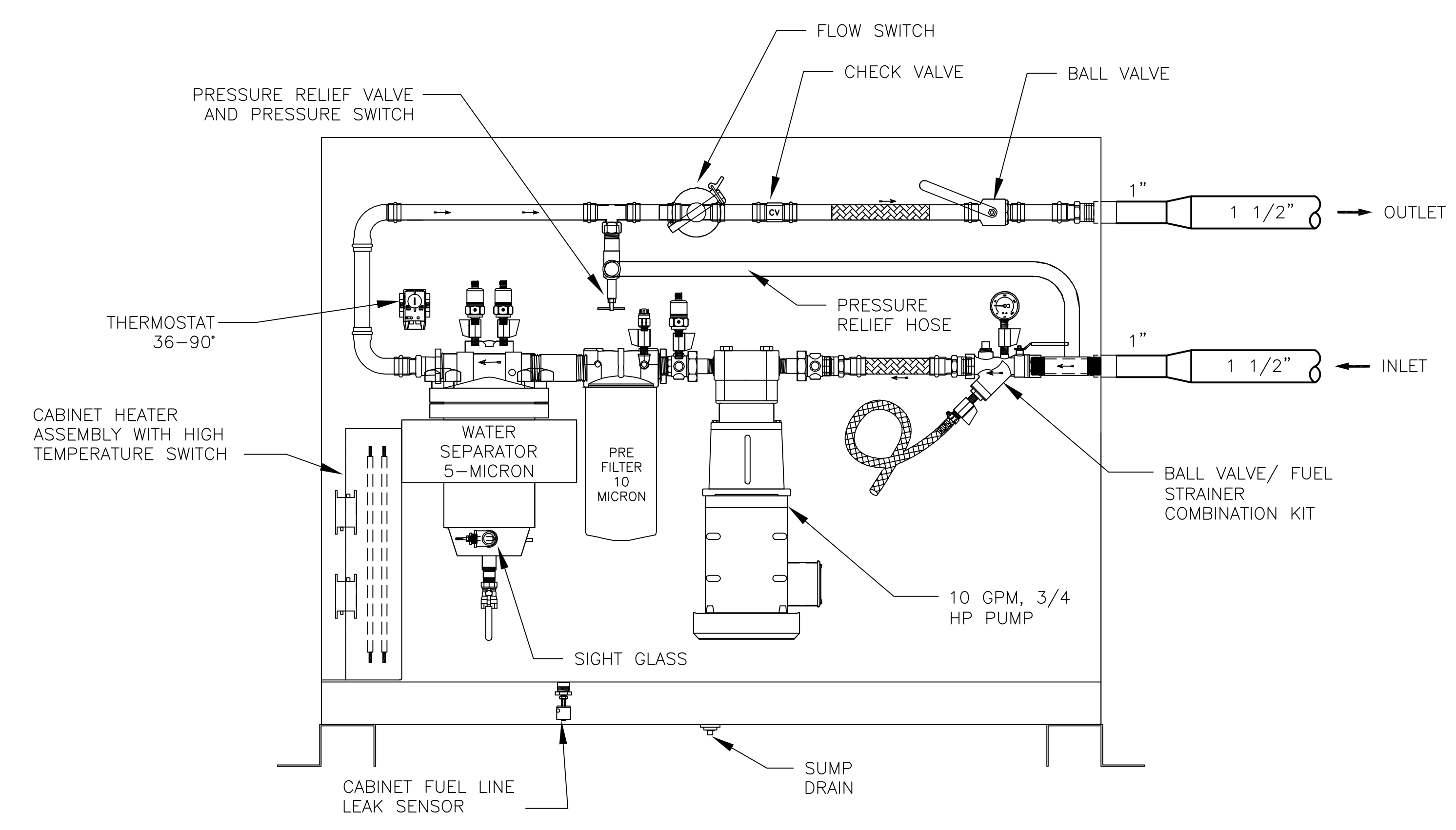
1 DAY TANK FILL MANIFOLD DIAGRAM
M4.QM2.0 SCALE: N.T.S.



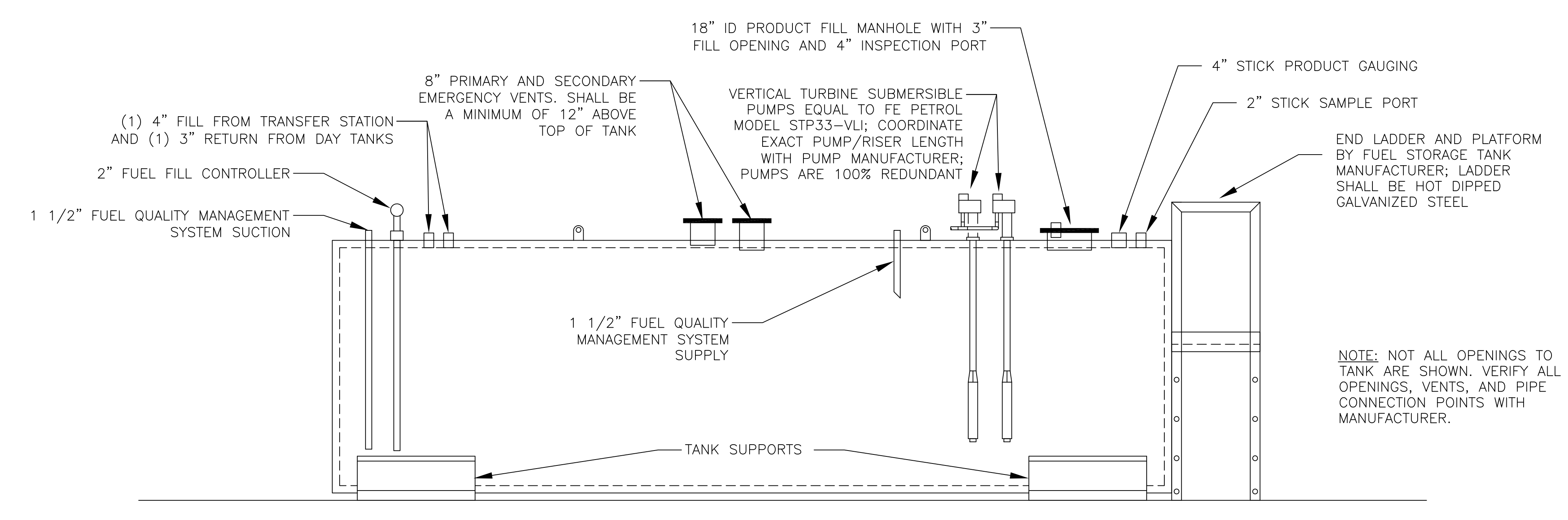
2 FUEL TRANSFER STATION AND PUMP DETAIL
M4.QM2.0 SCALE: N.T.S.



3 PACKAGED DAY TANK ASSEMBLY
M4.QM2.0 SCALE: N.T.S.



4 FUEL QUALITY MANAGEMENT SYSTEM
M4.QM2.0 SCALE: N.T.S.



5 FUEL STORAGE TANK
M4.QM2.0 SCALE: N.T.S.

POINT DESCRIPTION	HARDWARE				SOFTWARE				Comments
	OUTPUT		INPUT		ALARMS		MANAGEMENT SYSTEM FUNCTIONS		
	DIGITAL	ANALOG	DIGITAL	ANALOG	DIGITAL	ANALOG	START	STOP	
Utility Power									
Normal					X				
Utility Failure							X	X	
Utility Restoration							X	X	
Generator Power									
Standby Mode					X				
Emergency Mode					X	X		X	
Transfer To Emergency Mode					X				
No Load Test Mode					X				
Utility Fail Test Mode					X				Initiates Utility Power Failure / Emergency Mode
Generator #1 Alarm					X				
Generator #2 Alarm					X				
Generator #3 Alarm					X				
Generator #4 Alarm (N.I.C.)					X				
Fuel System Alarm					X		X	X	
Fuel Pump #1 Alarm					X				
Fuel Pump #2 Alarm					X				
Fuel Quality Management System						X			
Fuel Level									
High					X				
Normal					X				
Low					X				
Critical Low <10%					X		X	X	

6 EMCS POINT MATRIX
M3.QM2.0 SCALE: N.T.S.

ELECTRIC STANDARD SYMBOLS AND ABBREVIATIONS

STANDARD SYMBOLS - POWER		STANDARD SYMBOLS - POWER		ABBREVIATIONS	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION		
	PANELBOARD, 480V, SURFACE MOUNT		ELECTRICAL SECONDARY, AERIAL, EXISTING	A	AMPERE(S)
	PANELBOARD, 240V OR 208V, SURFACE MOUNT		ELECTRICAL SECONDARY, UNDERGROUND	A.C.	ABOVE COUNTER
	CONTROL PANEL, SURFACE MOUNT		ELECTRICAL SECONDARY, UNDERGROUND, EXISTING	A/C	AIR CONDITIONED
	JUNCTION BOX, SIZE FOR WIRE FILL OR AS SPECIFIED		ELECTRICAL DUCTBANK	A.D.	ACCESS DOOR
	JUNCTION BOX, FLOOR MOUNT		ELECTRICAL DUCTBANK, EXISTING	A.F.F.	ABOVE FINISHED FLOOR
	GENERATOR, AS SPECIFIED ON PLANS		ELECTRICAL FLEX CONDUIT	AHU	AIR HANDLING UNIT
	GROUND ROD		ELECTRICAL DEVICE TO BE REMOVED AND DEMOLISHED, HEAVY DASHED LINE DENOTES ITEM TO BE DEMOLISHED AND REMOVED	AP	ACCESS PANEL
	TRANSFORMER, PAD MOUNT		MOTOR, THREE PHASE, "X" IS THE MOTOR HORSEPOWER	AS	AIR SEPARATOR
	SAFETY SWITCH AND MOTOR CONTROLLER, COMBINATION, PROVIDE WITH ELECTRICAL LOCK-OUT PROVISIONS. MOUNT TOP AT 72" ABOVE FLOOR UNLESS NOTE OTHERWISE		MOTOR, SINGLE PHASE, "X" IS THE MOTOR HORSEPOWER	B	BOILER
	FUSED DISCONNECT, MOUNT TOP AT 72" ABOVE FLOOR UNLESS NOTE OTHERWISE		EXPOSED RACEWAY, CROSS LINES INDICATE WIRE NUMBER (-PHASE, -NEUTRAL, -SWITCH, -GROUND)	B.F.	BELOW FLOOR
	SAFETY SWITCH, MOUNT TOP AT 72" ABOVE FLOOR UNLESS NOTE OTHERWISE		HOMERUN, NUMBER OF ARROWS INDICATES NUMBER OF PHASES	B.G.	BELOW GRADE
	MOTOR CONTROLLER, MOUNT TOP AT 72" ABOVE FLOOR UNLESS NOTE OTHERWISE		POINT OF CONNECTION FROM NEW TO EXISTING CONSTRUCTION	CB	CIRCUIT BREAKER
	DUPLX RECEPTACLE, GFCI, WEATHERPROOF, 125V, 20A, NEMA 5-20R		POWER POLE	CH	WATER COOLED CHILLER
		ANNOTATIVE SYMBOLS			
	ELECTRICAL PRIMARY, AERIAL		DIRECTIONAL ARROW INDICATOR	CISP	CAST IRON SOIL PIPE
	ELECTRICAL PRIMARY, AERIAL, EXISTING		KEY NOTE, X - DENOTES THE KEY NOTE NUMBER	CKT	CIRCUIT
	ELECTRICAL PRIMARY, UNDERGROUND		CIRCUIT IDENTIFICATION, XX - DENOTES FEEDER NUMBER/IDENTIFICATION	CLG.	CELLING
	ELECTRICAL PRIMARY, UNDERGROUND, EXISTING	TITLE NOT TO SCALE DETAIL BUBBLE, TITLE - INDICATES THE TITLE OF THE DETAIL SCALE - INDICATES THE SCALE OF THE DETAIL (IF APPLICABLE) X - DENOTES DETAIL NUMBER Y - DENOTES SHEET NUMBER Z - DENOTES REFERENCE SHEET NUMBER			
	ELECTRICAL SECONDARY, AERIAL				
STANDARD SYMBOLS - SITE LIGHTING					
	LIGHT, FLOOD				
	SWITCH, SINGLE POLE, WEATHERPROOF SWITCH, SMALL LETTER INDICATES DEVICE SWITCHED (IF USED)				



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FIRM F-1784

KEY PLAN

REVISIONS

DATE: 04/02/2014

DRAWN BY: EJC

CHECKED BY: APM

EMERGENCY POWER
UPGRADES
NCTC - SHEPHERDSTOWN, WV

ELECTRICAL SYMBOLS
AND ABBREVIATIONS

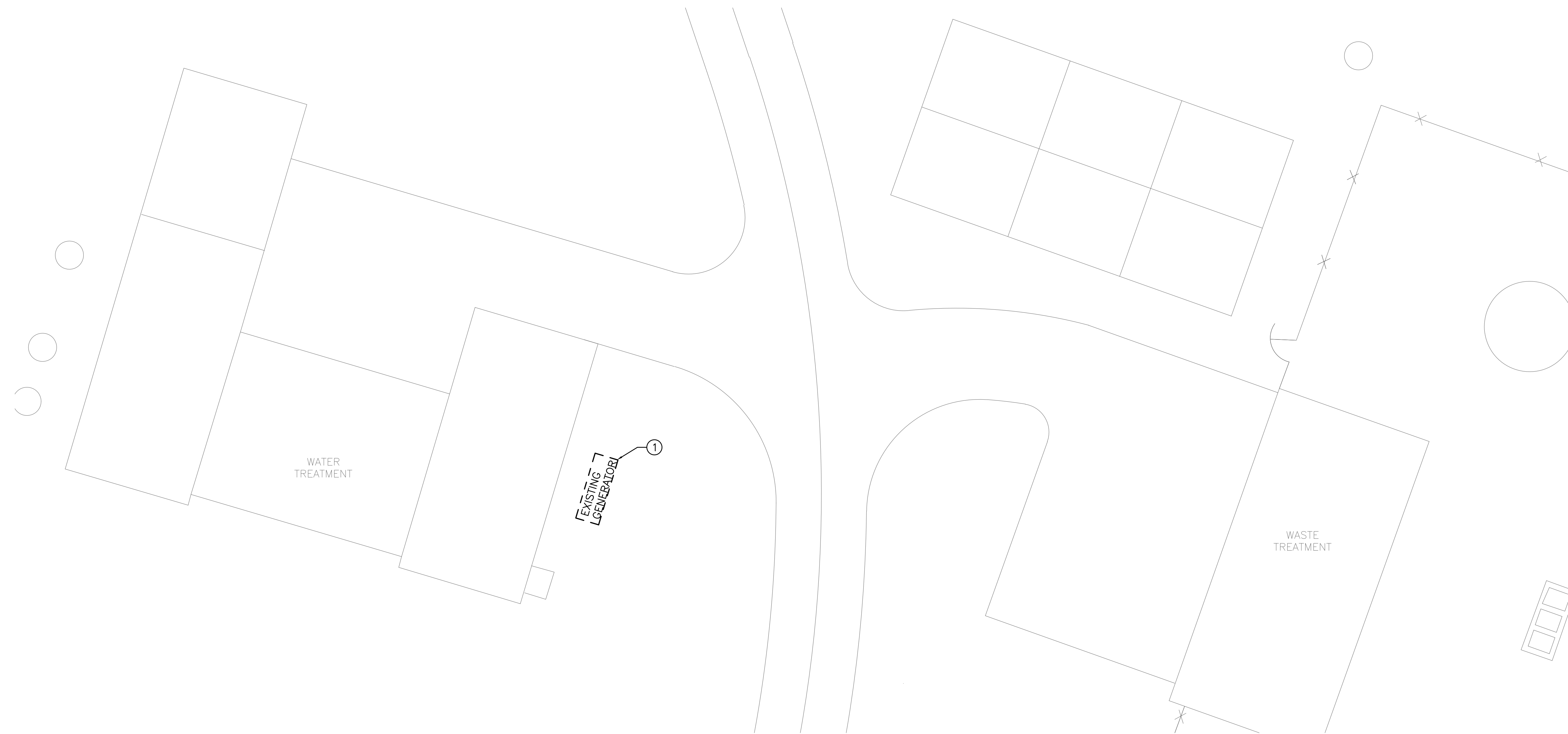
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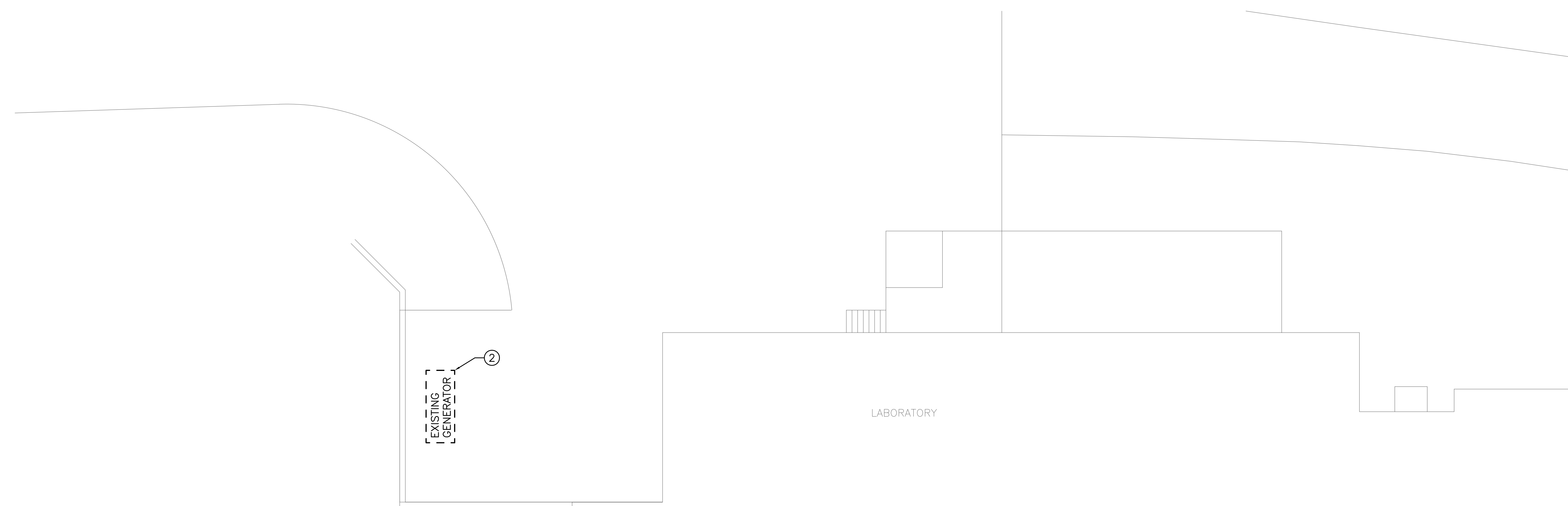
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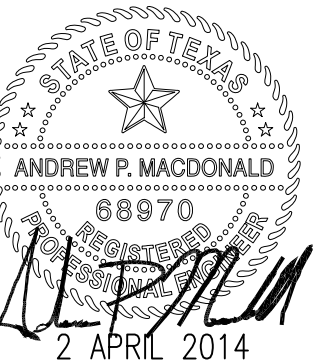
1
EMERGENCY GENERATOR
DEMOLITION PLAN - WATER TREATMENT
EDS1.1 EDS1.0 SCALE: 1" = 10'-0"
TRUE NORTH



2
EMERGENCY GENERATOR
DEMOLITION PLAN - LABORATORY
EDS1.1 EDS1.0 SCALE: 1" = 10'-0"
TRUE NORTH

KEYNOTES: (X)

- EXISTING 300kW GENERATOR "GEN-WT" WITH 450 GALLON DAY TANK TO BE REMOVED. REMOVAL OF THE EXISTING GENERATOR CANNOT TAKE PLACE UNTIL THE NEW SITE WIDE GENERATORS ARE COMMISSIONED AND PLACED IN SERVICE. REMOVE THE GENERATOR AND ITS WEATHER ENCLOSURE IN ITS ENTIRETY. REMOVE THE CONDUCTORS FROM THE TRANSFER SWITCH TO THE GENERATOR. CIRCUITS ASSOCIATED WITH THE TRANSFER SWITCH CANNOT BE DOWN FOR MORE THAN ONE (1) HOUR. TRANSFER SWITCHES SHALL BE LOCKED IN MANUAL MODE. DEMOLISH CONCRETE MAINTENANCE PADS. CONDUCTORS ARE TO BE REMOVED FROM THE TRANSFER SWITCH WHEN THE TRANSFER SWITCH IS HOT IF IT CAN BE DONE IN A SAFE MANNER USING APPROPRIATE PROTECTIVE GEAR. SHUT DOWN OF THE SYSTEM FOR THIS WORK TO BE PERFORMED IS TO BE A LAST RESORT. REMOVE CONDUITS TO 18 INCHES BELOW GRADE. MECHANICALLY CAP ALL CONDUITS. BACKFILL, TOPSOIL, SEED AND MULCH THE GENERATOR DEMOLITION AREA TO BLEND IN WITH SURROUNDING GRADE. ANY FUEL IN THE DAY TANK AT THE TIME OF DEMOLITION SHALL BE THE PROPERTY OF THE CONTRACTOR. GENERATOR SHALL BE PROPERTY OF THE CONTRACTOR.
- EXISTING 400kW GENERATOR "GEN-LB" WITH 600 GALLON DAY TANK TO BE REMOVED. REMOVAL OF THE EXISTING GENERATOR CANNOT TAKE PLACE UNTIL THE NEW SITE WIDE GENERATORS ARE COMMISSIONED AND PLACED IN SERVICE. REMOVE THE GENERATOR AND ITS WEATHER ENCLOSURE IN ITS ENTIRETY. REMOVE THE CONDUCTORS FROM THE TRANSFER SWITCH TO THE GENERATOR. CIRCUITS ASSOCIATED WITH THE TRANSFER SWITCH CANNOT BE DOWN FOR MORE THAN ONE (1) HOUR. TRANSFER SWITCHES SHALL BE LOCKED IN MANUAL MODE. DEMOLISH CONCRETE MAINTENANCE PADS. CONDUCTORS ARE TO BE REMOVED FROM THE TRANSFER SWITCH WHEN THE TRANSFER SWITCH IS HOT IF IT CAN BE DONE IN A SAFE MANNER USING APPROPRIATE PROTECTIVE GEAR. SHUT DOWN OF THE SYSTEM FOR THIS WORK TO BE PERFORMED IS TO BE A LAST RESORT. REMOVE CONDUITS TO 18 INCHES BELOW GRADE. MECHANICALLY CAP ALL CONDUITS. BACKFILL, TOPSOIL, SEED AND MULCH THE GENERATOR DEMOLITION AREA TO BLEND IN WITH SURROUNDING GRADE. ANY FUEL IN THE DAY TANK AT THE TIME OF DEMOLITION SHALL BE THE PROPERTY OF THE CONTRACTOR. GENERATOR SHALL BE PROPERTY OF THE CONTRACTOR.



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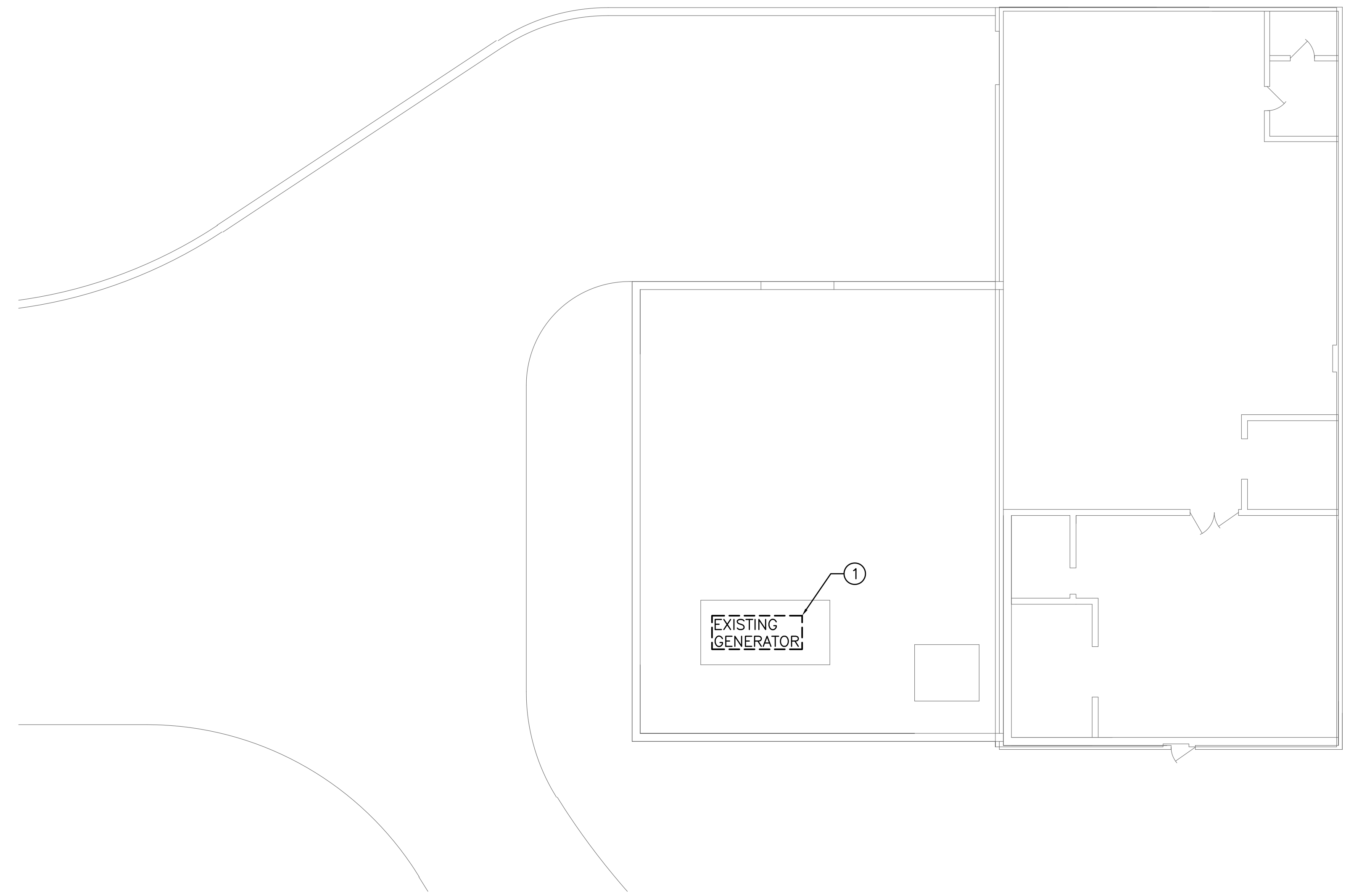
EMERGENCY POWER UPGRADES
NCTC - SHEPHERDSTOWN, WV

EMERGENCY GENERATOR DEMOLITION PLAN

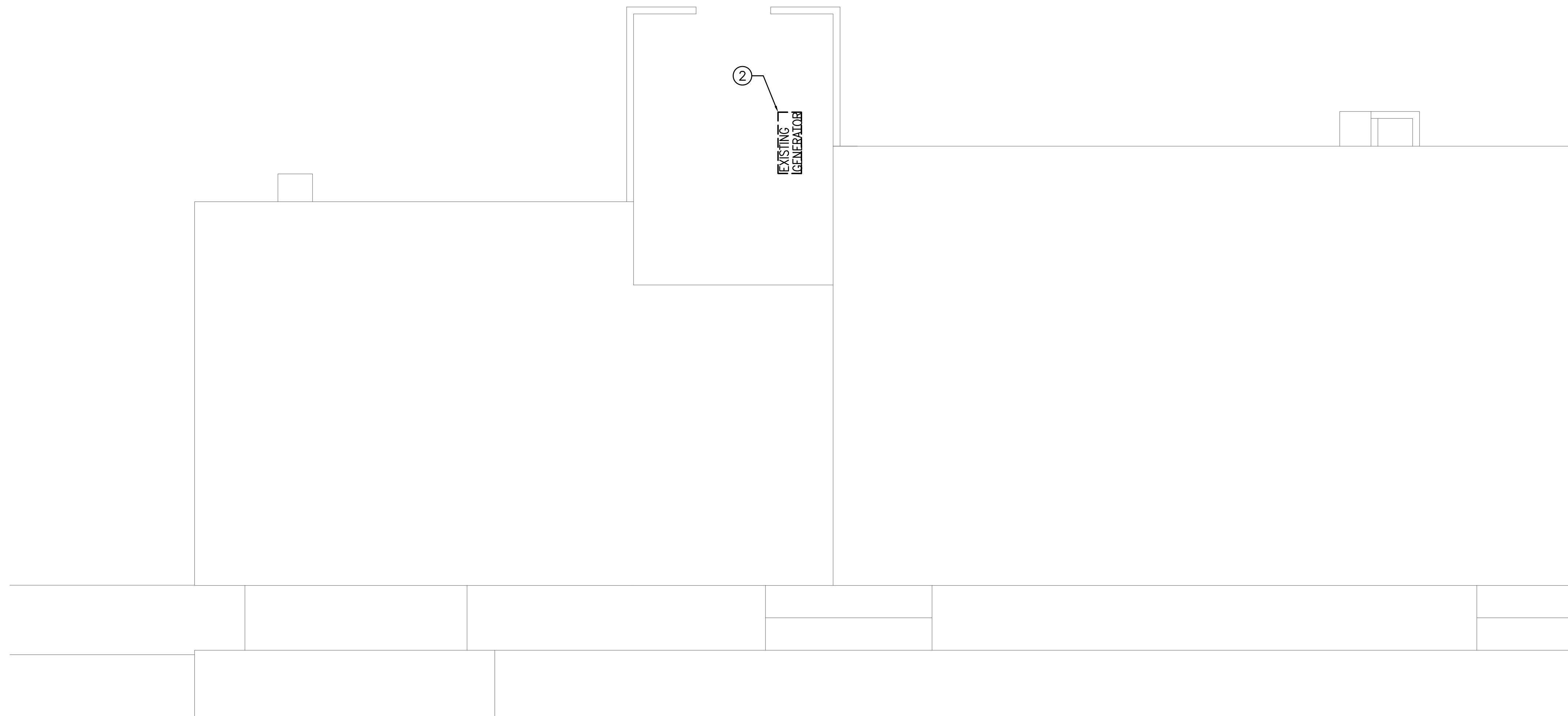
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Scale: SHEET 014 OF 027

DRAWING NO. XXX-XX-xxxx-000.0



1
EMERGENCY GENERATOR
DEMOLITION PLAN - CENTRAL PLANT
EDS1.2 EDS1.0 SCALE: 1" = 10'-0"
TRUE NORTH



2
EMERGENCY GENERATOR
DEMOLITION PLAN - SUPPORT SERVICES
EDS1.2 EDS1.0 SCALE: 1" = 10'-0"
TRUE NORTH

KEYNOTES: Ⓞ

1. EXISTING 250kW GENERATOR "GEN-CP" WITH 19.3 GALLON DAY TANK TO BE REMOVED. REMOVAL OF THE EXISTING GENERATOR CANNOT TAKE PLACE UNTIL THE NEW SITE WIDE GENERATORS ARE COMMISSIONED AND PLACED IN SERVICE. REMOVE THE GENERATOR AND ITS WEATHER ENCLOSURE IN ITS ENTIRETY. REMOVE THE CONDUCTORS FROM THE TRANSFER SWITCH TO THE GENERATOR. CIRCUITS ASSOCIATED WITH THE TRANSFER SWITCH CANNOT BE DOWN FOR MORE THAN ONE (1) HOUR. TRANSFER SWITCHES SHALL BE LOCKED IN MANUAL MODE. CONDUCTORS ARE TO BE REMOVED FROM THE TRANSFER SWITCH WHEN THE TRANSFER SWITCH IS HOT IF IT CAN BE DONE IN A SAFE MANNER USING APPROPRIATE PROTECTIVE GEAR. SHUT DOWN OF THE SYSTEM FOR THIS WORK TO BE PERFORMED IS TO BE A LAST RESORT. EXISTING FUEL LINES THAT ARE CONNECTED TO THE CENTRAL PLANT FUEL SYSTEM SHALL BE DRAINED, DISCONNECTED, MADE SAFE, AND CAPPED. ANY FUEL IN THE DAY TANK AT THE TIME OF DEMOLITION SHALL BE THE PROPERTY OF THE CONTRACTOR. GENERATOR SHALL BE PROPERTY OF THE CONTRACTOR.
2. EXISTING 100kW GENERATOR "GEN-SS" WITH 11.8 GALLON DAY TANK TO BE REMOVED. REMOVAL OF THE EXISTING GENERATOR CANNOT TAKE PLACE UNTIL THE NEW SITE WIDE GENERATORS ARE COMMISSIONED AND PLACED IN SERVICE. REMOVE THE GENERATOR AND ITS WEATHER ENCLOSURE IN ITS ENTIRETY. REMOVE THE CONDUCTORS FROM THE TRANSFER SWITCH TO THE GENERATOR. CIRCUITS ASSOCIATED WITH THE TRANSFER SWITCH CANNOT BE DOWN FOR MORE THAN ONE (1) HOUR. TRANSFER SWITCHES SHALL BE LOCKED IN MANUAL MODE. CONDUCTORS ARE TO BE REMOVED FROM THE TRANSFER SWITCH WHEN THE TRANSFER SWITCH IS HOT IF IT CAN BE DONE IN A SAFE MANNER USING APPROPRIATE PROTECTIVE GEAR. SHUT DOWN OF THE SYSTEM FOR THIS WORK TO BE PERFORMED IS TO BE A LAST RESORT. MECHANICALLY CAP ALL CONDUITS. EXISTING FUEL LINES THAT ARE CONNECTED TO THE CENTRAL PLANT FUEL SYSTEM SHALL BE DRAINED, DISCONNECTED, MADE SAFE, AND CAPPED. ANY FUEL IN THE DAY TANK AT THE TIME OF DEMOLITION SHALL BE THE PROPERTY OF THE CONTRACTOR. GENERATOR SHALL BE PROPERTY OF THE CONTRACTOR.

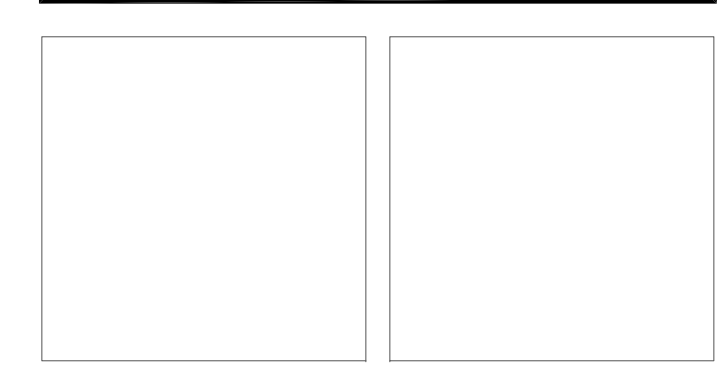


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EMERGENCY POWER UPGRADES
NCTC - SHEPHERDSTOWN, WV

EMERGENCY GENERATOR DEMOLITION PLAN

DRAWING NO. EDS1.2

Scale: SHEET 015 OF 027

DRAWING NO. XXX-XX-xxxx-000.0



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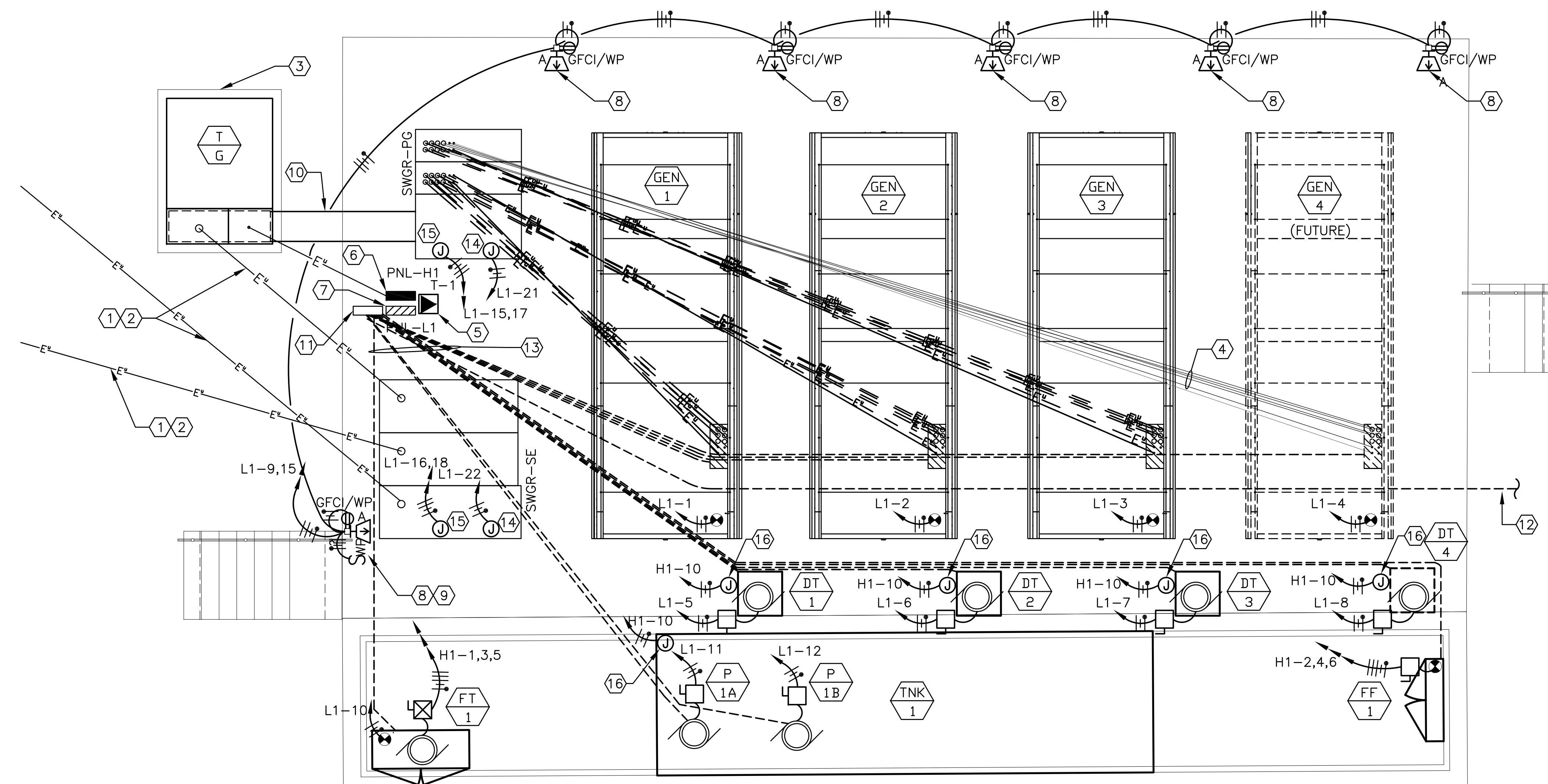
JEFFERSON COUNTY WEST VIRGINIA



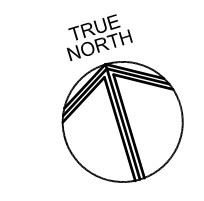
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KEYNOTES: (X)

- THREE (3) SINGLE (1/C) 500 KCMIL TYPE MV105 CONDUCTORS IN 6" CONCRETE ENCASED SCH. 40 PVC CONDUIT, SEE NOTE 2. TRANSITION TO GALVANIZED RIGID CONDUIT AT POLE BASE. SEE ONE LINE DIAGRAM ON SHEET ES3.0.
- TWO (2) 6" CONCRETE ENCASED SCH. 40 PVC CONDUITS. CAP SPARE CONDUIT AT EACH END ABOVE GRADE FOR FUTURE USE. SEE DETAIL 3, SHEET C2.0.
- MOUNT NEW TRANSFORMER "T-G" ON NEW CONCRETE PAD. SEE STRUCTURAL DRAWINGS. SEE DETAIL 1, SHEET ES5.1 FOR MOUNTING DETAIL.
- EMPTY (WITHOUT CONDUCTORS) CONDUIT RUN TO FUTURE GENERATOR "GEN-4". CONDUITS ARE TO BE CAPPED AT END END ABOVE GRADE FOR FUTURE USE.
- NEW 45KVA, 480V TO 120/208V, 3φ TRANSFORMER "T-1". SEE ONE LINE DIAGRAM, SHEET ES3.0 AND DETAILS 2 AND 3, SHEET ES5.1.
- NEW 225A, 277/480V, 3φ PANELBOARD "H-1". SEE ONE LINE DIAGRAM, SHEET ES3.0 AND DETAIL 3, SHEET ES5.1.
- NEW 100A, 120/208V, 3φ PANELBOARD "L-1". SEE ONE LINE DIAGRAM, ES3.0 AND DETAIL 3, SHEET ES5.1.
- NEW 30W LED POLE MOUNTED FLOOD FIXTURE AND GFCI RATED RECEPTACLE WITH WEATHERPROOF "IN USE" COVER ATTACHED TO STEEL POLE. MOUNT RECEPTACLE AT 18" AFF. SEE DETAIL 2, SHEET ES5.0.
- NEW LIGHT SWITCH WITH WEATHERPROOF IN USE COVER ATTACHED TO STEEL POLE. MOUNT SWITCH AT 48" AFF. SEE DETAIL 2, SHEET ES5.0.
- NEW 4000A, OUTDOOR ENCLOSED, WEATHERPROOF BUSWAY WITH ALUMINUM BUS AND STEEL HOUSING. PROVIDE WITH GALVANIZED STRUCTURAL SUPPORTS, EQUIPMENT ENTRANCE SEAL, TRANSFORMER CONNECTION, EXPANSION FITTINGS, AND SEISMIC BELLOWS. INCLUDE STRIP HEATERS WITH THERMOSTAT FOR CONDENSATION CONTROL. ROUTE FROM SIDE WALL OF GENERATOR TO STRUCTURAL CHASE TO BOTTOM OF SWITCHGEAR.
- NEW FUEL SYSTEM CONTROL PANEL AND EMCS NETWORK INTERFACE CABINET.
- 1" CONDUIT TO WASTE TREATMENT PLANT WITH PULL STRING FOR EMCS CONTROL WIRING, SEE SHEET ES1.0.
- 3/4" CONDUIT TO EQUIPMENT WITH PULL STRING FOR EMCS CONTROL WIRING.
- VERIFY CONNECTION TO LIGHTING CIRCUIT WITH SWITCHGEAR MANUFACTURER. ADJUST AS APPROPRIATE.
- VERIFY CONNECTION TO SWITCHGEAR HEATER CIRCUIT WITH EQUIPMENT MANUFACTURER. ADJUST AS APPROPRIATE.
- VERIFY CONNECTION TO TANK PIPING HEAT CIRCUIT WITH EQUIPMENT MANUFACTURER. ADJUST AS APPROPRIATE.



1 PARTIAL ELECTRICAL PLAN
ES2.0ES1.0 SCALE: 1/4" = 1'-0"



KEY PLAN

REVISIONS

NO.	DATE	DESCRIPTION

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EMERGENCY POWER UPGRADES
NCTC - SHEPHERDSTOWN, WV

PARTIAL ELECTRICAL POWER EQUIPMENT PLAN

DRAWING NO. ES2.0

Scale: SHEET 017 OF 027
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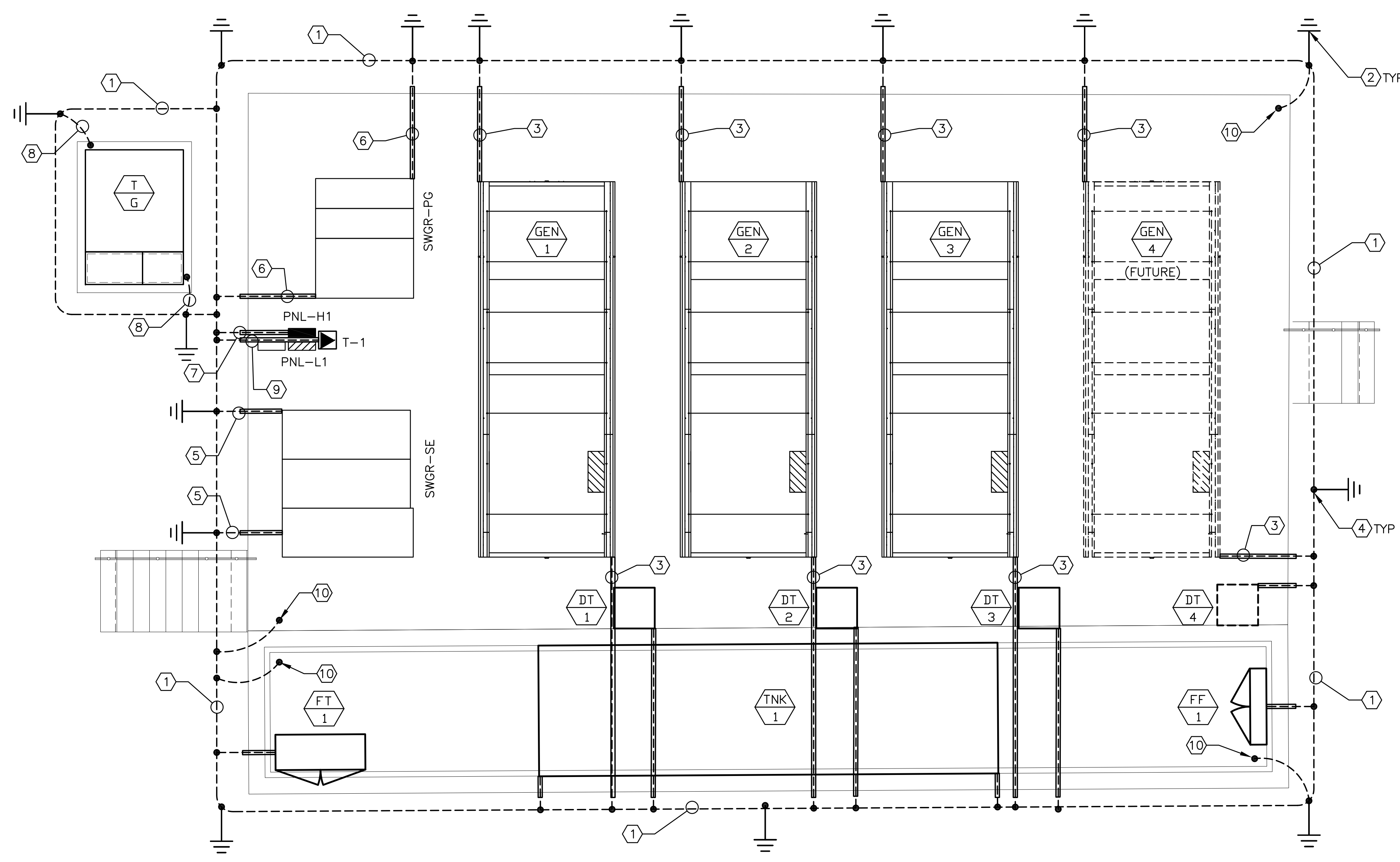


GENERAL NOTES:

- 1. MAJOR FACILITY GROUNDING SHOWN ONLY. PROVIDE GROUNDING FOR CONTROL PANELS AND DISCONNECT SWITCHES AS APPROPRIATE.
- 2. OTHER SYSTEMS TO BE BONDED TO GROUNDING ELECTRODE SYSTEM.
 - 2.1. METALLIC FUEL PIPE
 - 2.2. METAL HANDRAILS AND STAIRS
 - 2.3. OTHER METAL COMPONENTS
- 3. GROUND PER NFPA 70, NATIONAL ELECTRICAL CODE, ARTICLE 250 AND IEEE/ANSI C2, NATIONAL ELECTRICAL SAFETY CODE.
- 4. CONTRACTOR SHALL VERIFY THAT GROUNDING OF ELECTRICAL POWER COMPLY WITH THIS GROUNDING PLAN AS SPECIFIED IN NEC 250.56.

KEYNOTES: (X)

- 1. PROVIDE #3/0 AWG BARE STRANDED COPPER COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR DIRECT BURIED A MINIMUM OF 30 INCHES BELOW FINISHED GRADE. CONTRACTOR SHALL COORDINATE GROUNDING LOOP MINIMUM DISTANCE LOCATION ALONG SOUTH SIDE OF CONCRETE WALL WITH GUARD RAIL LOCATION.
- 2. PROVIDE 3/4" DIAMETER BY 10 FT LONG COPPER CLAD STEEL GROUND ROD. EXOTHERMIC WELD GROUND ROD TO GROUNDING ELECTRODE CONDUCTOR. TYPICAL OF ALL. FOR GROUND ROD INSTALLATION, SEE DETAIL 1 ON SHEET ESS.0.
- 3. PROVIDE #3/0 AWG BARE STRANDED COPPER GROUNDING CONDUCTOR IN 1-1/2" CONCRETE ENCASED PVC CONDUIT BETWEEN GENERATOR SKID PAD AND COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR. EXOTHERMIC WELD GROUNDING CONDUCTOR TO GENERATOR SKID PAD. TYPICAL OF ALL GENERATORS.
- 4. EXOTHERMIC WELD GROUNDING CONDUCTOR TO COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR. TYPICAL OF ALL.
- 5. PROVIDE #1/0 AWG BARE STRANDED COPPER GROUNDING CONDUCTOR IN 1-1/2" CONCRETE ENCASED PVC CONDUIT BETWEEN SWGR-SE AND COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR. EXOTHERMIC WELD GROUNDING CONDUCTOR TO SWITCHGEAR ENCLOSURE.
- 6. PROVIDE #2/0 AWG BARE STRANDED COPPER GROUNDING CONDUCTOR IN 1-1/2" CONCRETE ENCASED PVC CONDUIT BETWEEN SWGR-PG AND COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR. EXOTHERMIC WELD GROUNDING CONDUCTOR TO SWITCHGEAR ENCLOSURE.
- 7. PROVIDE #2 AWG BARE STRANDED COPPER GROUNDING CONDUCTOR IN 1-1/2" CONCRETE ENCASED PVC CONDUIT BETWEEN PANEL H-1 AND COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR. EXOTHERMIC WELD GROUNDING CONDUCTOR TO PANELBOARD ENCLOSURE.
- 8. PROVIDE #2/0 AWG BARE STRANDED COPPER GROUNDING CONDUCTOR IN 1-1/2" CONCRETE ENCASED PVC CONDUIT BETWEEN TRANSFORMER T-1 AND COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR. EXOTHERMIC WELD GROUNDING CONDUCTOR TO TRANSFORMER ENCLOSURE.
- 9. PROVIDE #8 AWG BARE STRANDED COPPER GROUNDING CONDUCTOR IN 1-1/2" CONCRETE ENCASED PVC CONDUIT BETWEEN TRANSFORMER T-1 AND COUNTERPOISE GROUNDING ELECTRODE CONDUCTOR. EXOTHERMIC WELD GROUNDING CONDUCTOR TO TRANSFORMER ENCLOSURE.
- 10. BOND TO REBAR MAT.



1 PARTIAL ELECTRICAL POWER EQUIPMENT GROUNDING PLAN
 ES2.1ES1.0 SCALE: 1/4" = 1'-0"

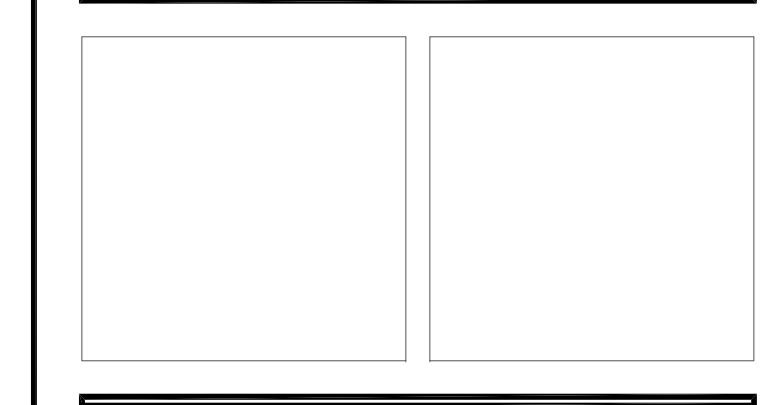


KEY PLAN

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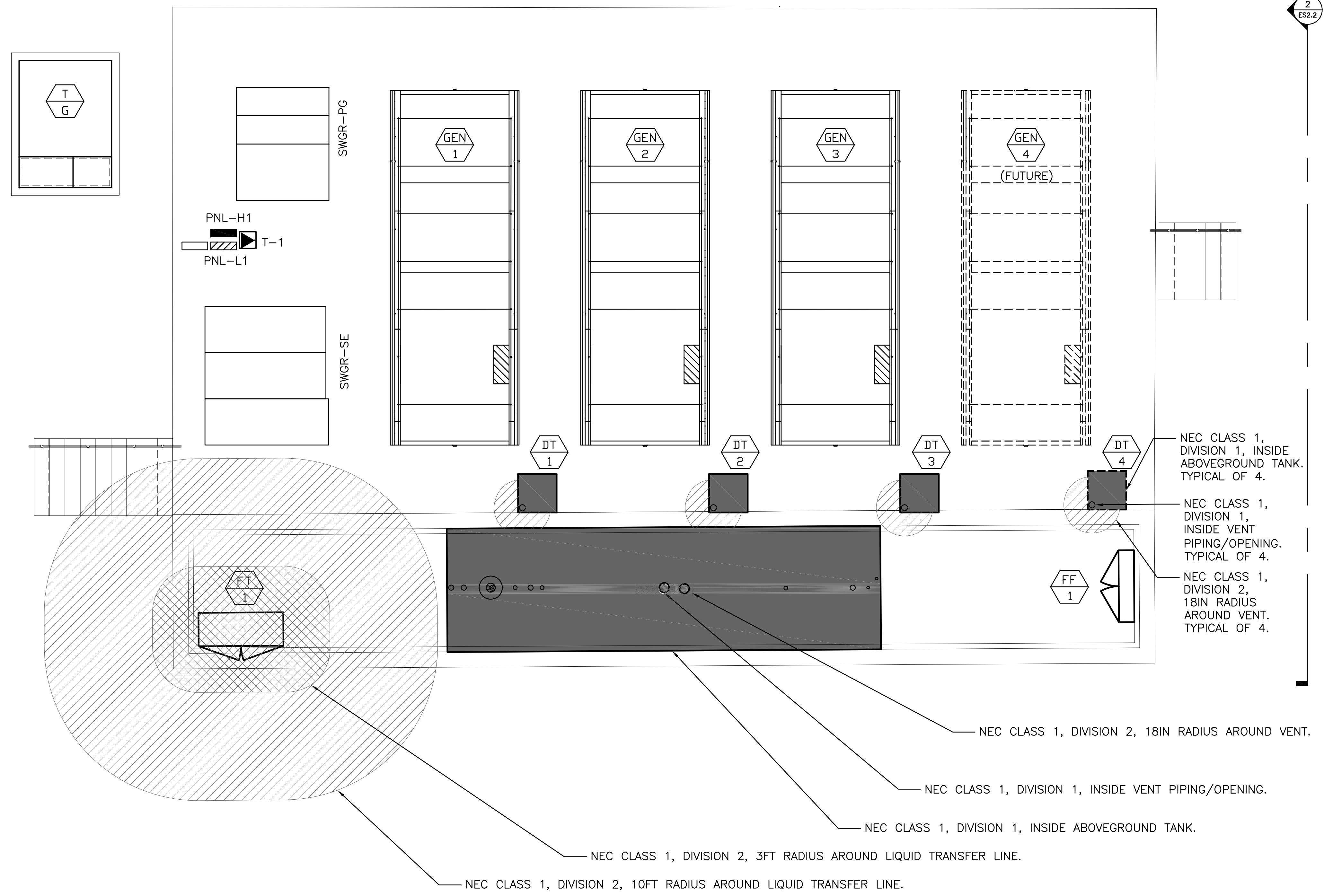
EMERGENCY POWER UPGRADES
 NCTC - SHEPHERDSTOWN, WV

PARTIAL ELECTRICAL POWER EQUIPMENT GROUNDING PLAN

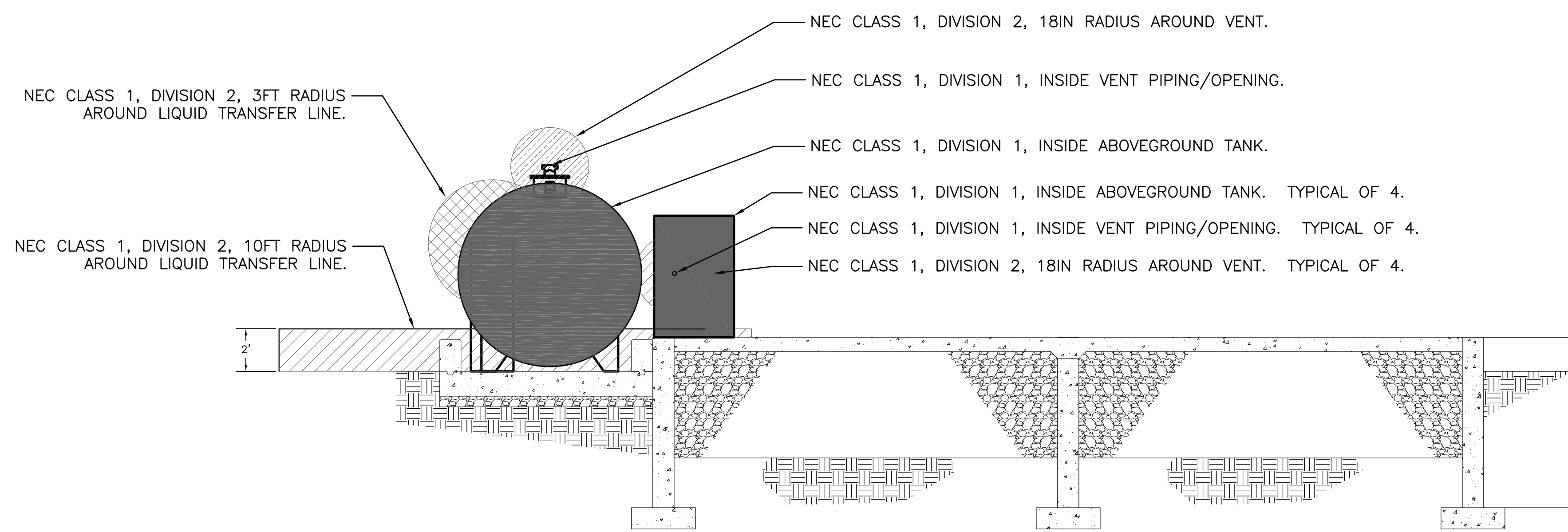
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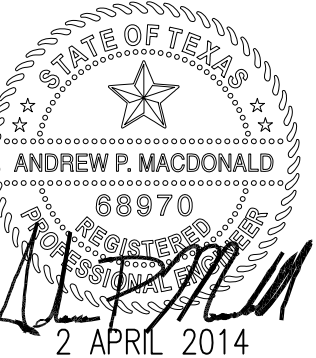
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1
HAZARDOUS AREA
CLASSIFICATION PLAN
ES2.2ES1.0 SCALE: 1/4" = 1'-0"



2
HAZARDOUS AREA
CLASSIFICATION VERTICAL SECTION
ES2.2ES2.2 SCALE: 1/4" = 1'-0"



KEY PLAN

REVISIONS

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EMERGENCY POWER
UPGRADES
NCTC - SHEPHERDSTOWN, WV

HAZARDOUS AREA
CLASSIFICATION PLAN

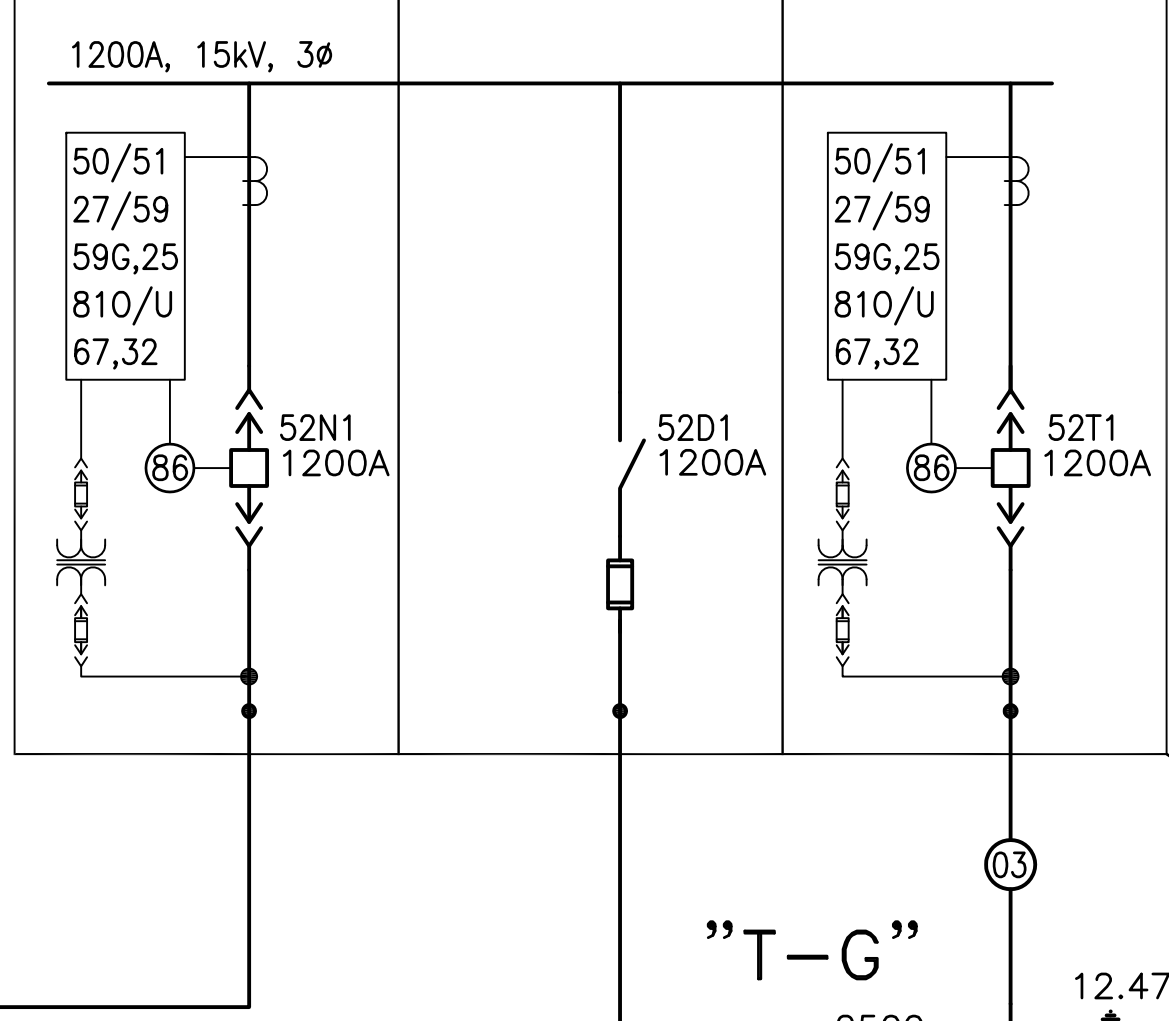
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Scale: SHEET 019 OF 027
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XXX-XX-xxxx-000.0

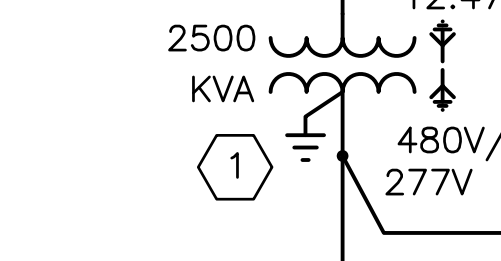
EXISTING INCOMING UTILITY 12.47KV

LIGHTNING ARRESTOR

NEW MAIN SWGR "SWGR-SE"



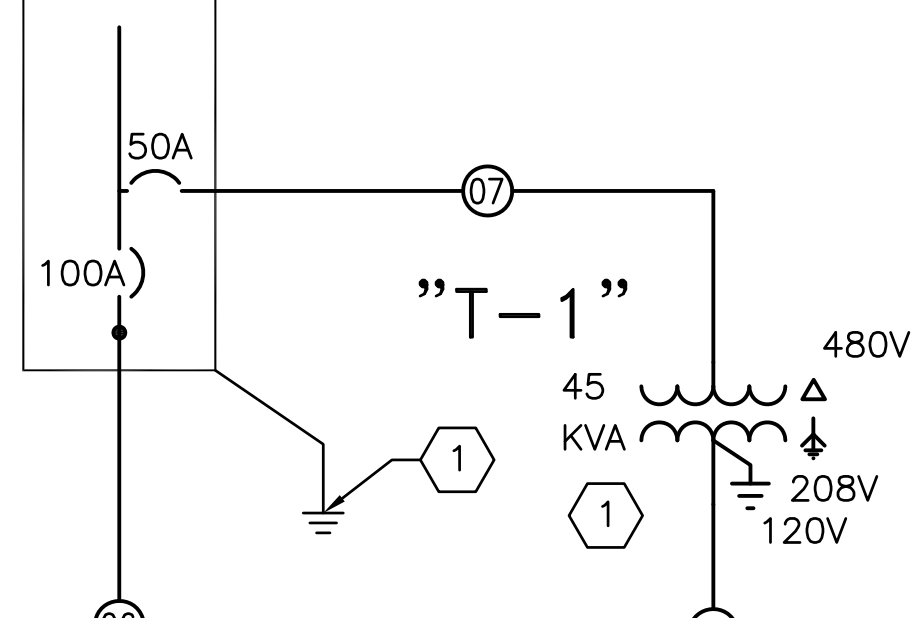
"T-G"



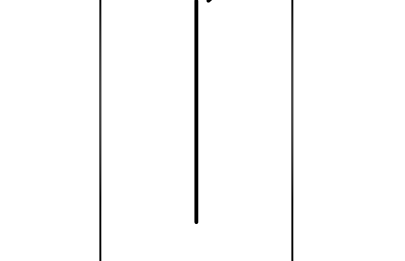
LIGHTNING ARRESTOR

LIGHTNING ARRESTOR

PNL-H1 125A, 480V, 3Ø 42k AIC RMS SYM.

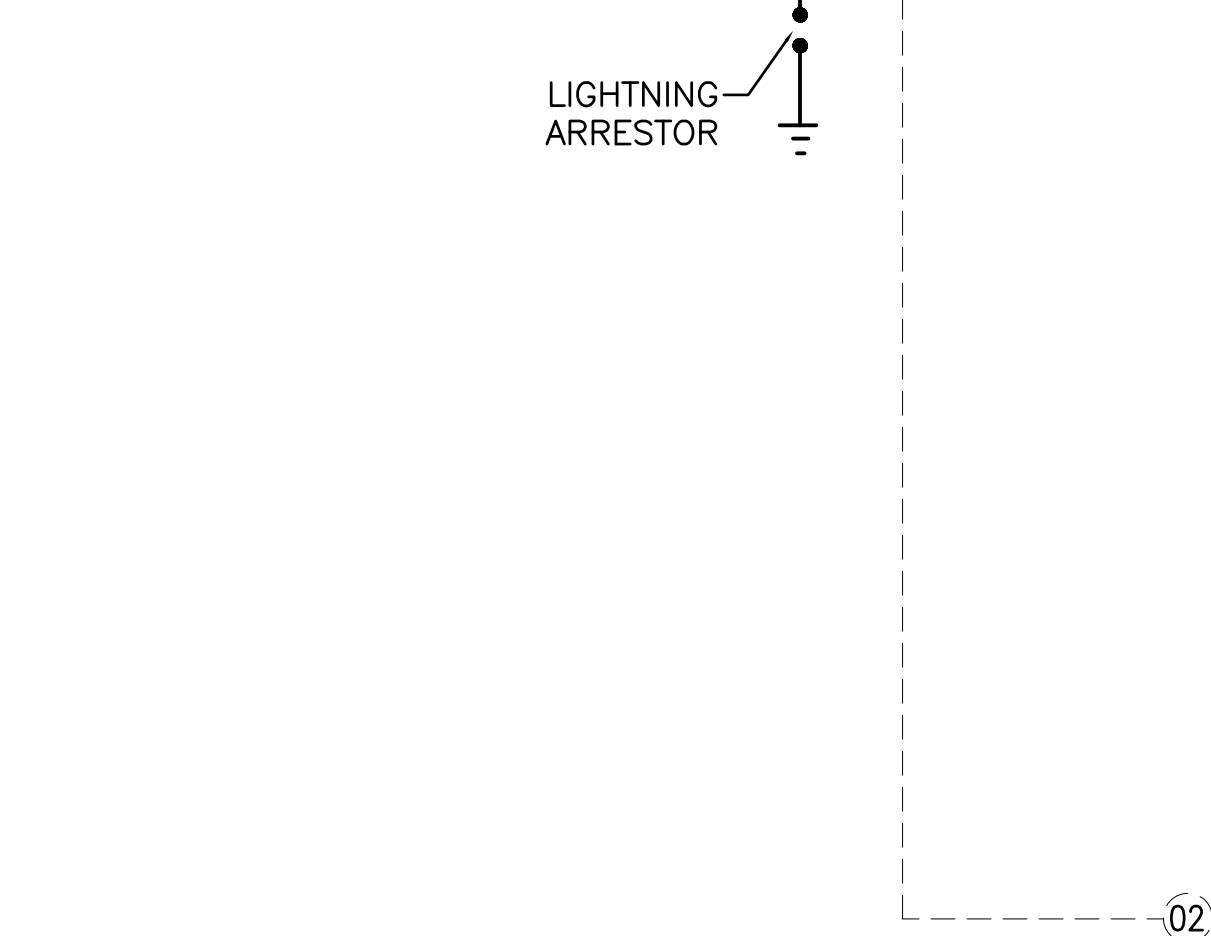
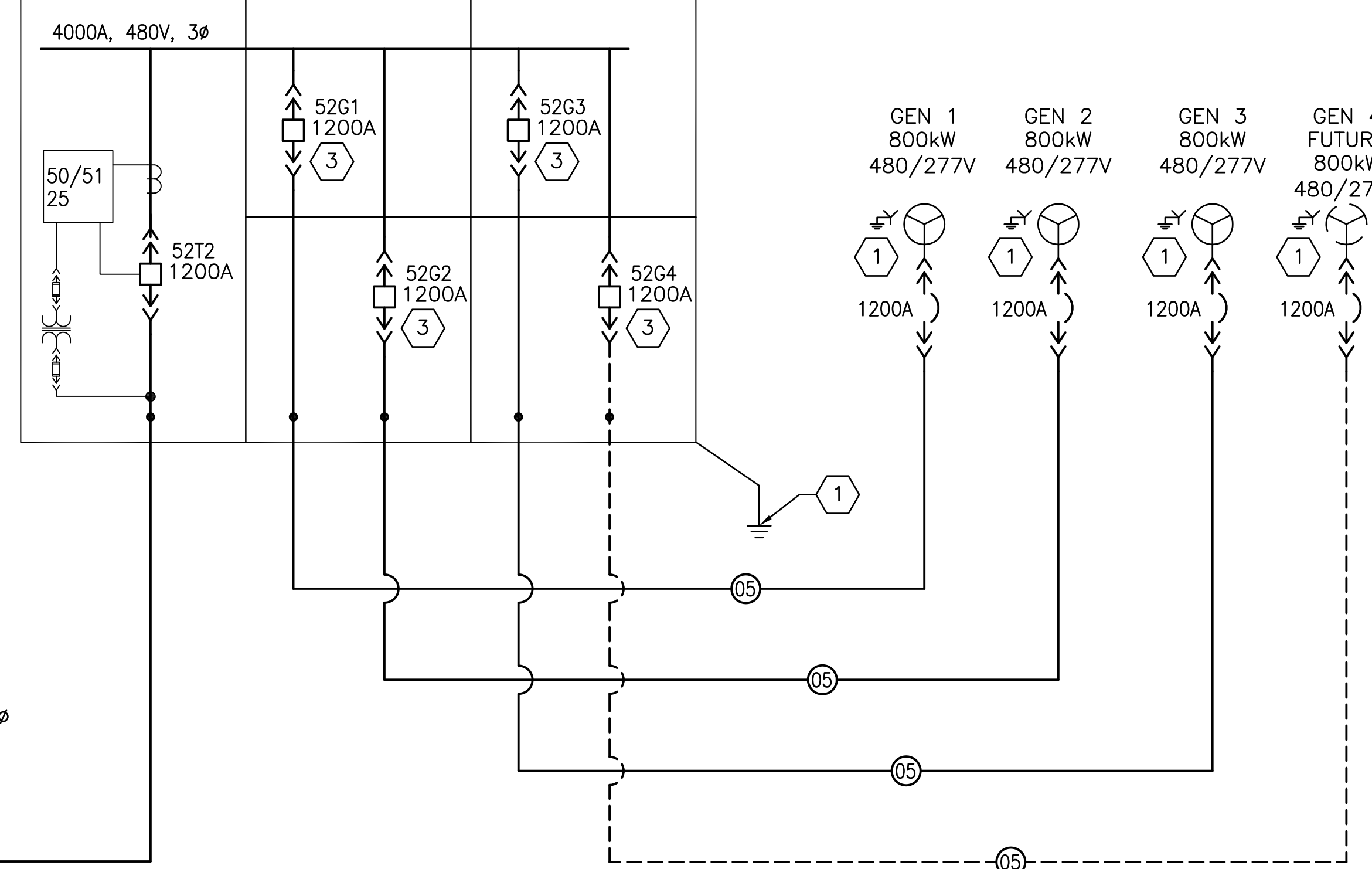


"T-1"



PNL-L1 125A, 120/208V, 3Ø 14k AIC RMS SYM.

NEW GENERATOR PARALLELING SWGR "SWGR-PG"



SITE ELECTRICAL POWER ONE LINE DIAGRAM

ES3.0ES3.0 SCALE: NOT TO SCALE

KEYNOTES (X)

- 1. GROUND PER NFPA 70, NATIONAL ELECTRICAL CODE, ARTICLE 250. BOND TO LIGHTNING PROTECTION, METALLIC FUEL PIPING, METAL HANDRAILS AND STAIRS, VEHICLE GROUND CONNECTIONS, AND OTHER METAL COMPONENTS. PROVIDE UFER GROUND AT EACH GENERATOR. SEE SHEET ES2.1 FOR ADDITIONAL INFORMATION.
2. CONTINUATION OF SITE ELECTRICAL POWER ONE LINE DIAGRAM. SEE SHEET ES3.1.
3. RELAY PROTECTION NOT SHOWN FOR CLARITY. SEE SPECIFICATIONS.

FEEDER SCHEDULE

Table with columns MARK, FEEDER, and (X) = NUMBER OF SETS. It lists feeders 00 through 07 with their respective conductor types and quantities.

NOTE: 1. ALL CONDUCTORS ARE TO BE COPPER TYPE THHW/THWN PER 2014 NFPA 70, NATIONAL ELECTRICAL CODE, TABLE 310.15 (B) UNLESS OTHERWISE NOTED. 2. (PVC) = SCH 40 PVC CONDUIT



NATIONAL CONSERVATION TRAINING CENTER SHEPHERDSTOWN JEFFERSON COUNTY WEST VIRGINIA



KEY PLAN

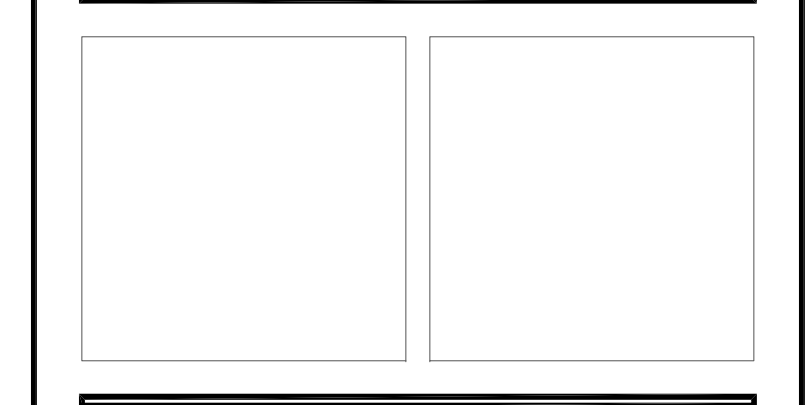
REVISIONS

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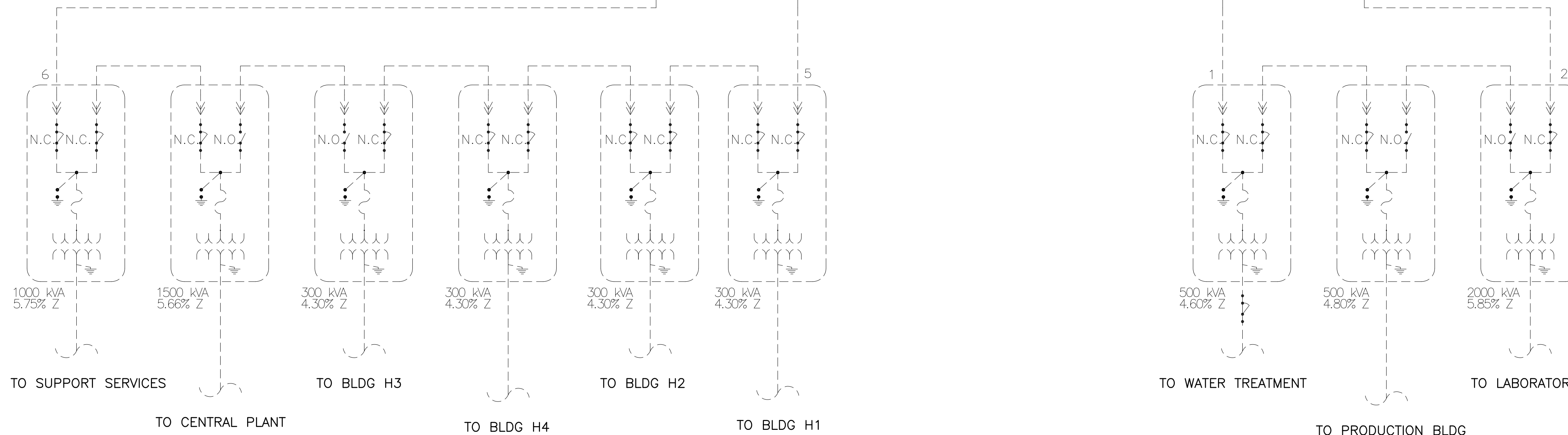
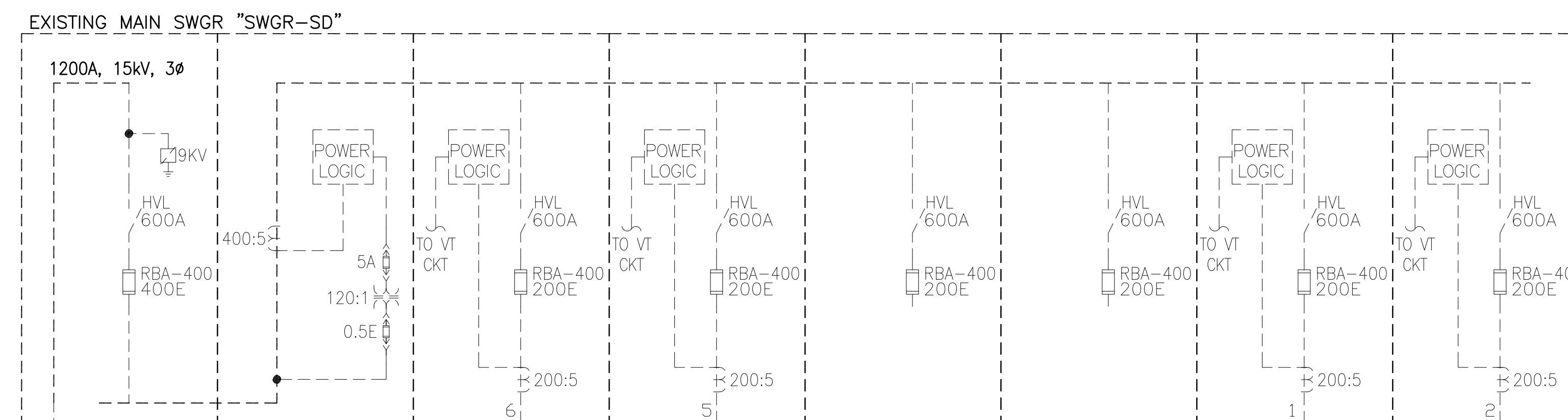
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SITE ELECTRICAL POWER ONE LINE DIAGRAM

DRAWING NO. ES3.0

Scale: SHEET 020 OF 027

DRAWING NO. XXX-XX-xxxx-000.0



1 SITE ELECTRICAL POWER ONE LINE DIAGRAM - CONTINUED
ES3.1ES3.0 SCALE: NOT TO SCALE

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EMERGENCY POWER UPGRADES
NCTC - SHEPHERDSTOWN, WV

SITE ELECTRICAL POWER ONE LINE DIAGRAM - CONTINUED

DRAWING NO. ES3.1

Scale: SHEET 021 OF 027

DRAWING NO. XXX-XX-xxxx-000.0

GENERATOR SEQUENCE OF OPERATION

AUTOMATIC/STANDBY MODE

- 1. BREAKER 52N1 CLOSED.
2. BREAKER 52D1 CLOSED.
3. BREAKER 52T1 CLOSED.
4. BREAKER 52T2 OPENED.
5. BREAKERS 52G1, 52G2, 52G3, AND 52G4 (FUTURE) OPENED.

EMERGENCY MODE

1. UTILITY FAILURE

- 1.1. UTILITY VOLTAGE OR FREQUENCY OUT OF TOLERANCE IS SENSED AND BREAKER 52N1 OPENS.
1.2. BREAKER 52T1 OPENS.
1.3. FIRST GENERATOR STARTS AND ASSOCIATED BREAKER 52GX CLOSES.
1.4. SECOND GENERATOR STARTS AND SYNCHRONIZES; ASSOCIATED BREAKER 52GX CLOSES.
1.5. BREAKERS 52T1 AND 52T2 CLOSE WITHIN 10 SECONDS FROM BREAKER 52T1 OPENING.
1.6. THIRD GENERATOR STARTS AND SYNCHRONIZES; ASSOCIATED BREAKER 52GX CLOSES.
1.7. FOURTH GENERATOR (FUTURE) STARTS AND SYNCHRONIZES; ASSOCIATED BREAKER 52GX (FUTURE) CLOSES.
1.8. SYSTEM IS NOW IN EMERGENCY MODE.
1.9. EPS AUTOMATION CONTROL SYSTEM MONITORS LOAD AND SHEDS/ADDS GENERATORS AS LOAD REQUIRES.

2. UTILITY RESTORATION AND EXIT FROM EMERGENCY MODE

- 2.1. UTILITY VOLTAGE OR FREQUENCY WITHIN TOLERANCE IS SENSED.
2.2. GENERATOR PLANT PASSIVELY SYNCHRONIZED AND PARALLELED (LESS THAN 0.1 SEC) TO UTILITY POWER.
2.3. BREAKER 52N1 CLOSSES AND BREAKER 52T2 OPENS.
2.4. BREAKERS 52G1, 52G2, 52G3, AND 52G4 (FUTURE) OPEN.
2.5. GENERATORS RUN FOR A PROGRAMMED COOL DOWN PERIOD THEN SHUTDOWN.
2.6. SYSTEM IS RETURNED TO AUTOMATIC/STANDBY MODE.

TRANSFER TO EMERGENCY MODE (TESTING/USER DIRECTED TRANSFER)

1. ENTRY

- 1.1. "TRANSFER TO EMERGENCY MODE" REQUEST IS SENT TO GENERATOR PLANT BY OPERATOR.
1.2. FIRST GENERATOR STARTS AND ASSOCIATED BREAKER 52GX CLOSES.
1.3. REMAINING GENERATORS ARE SYNCHRONIZED AND PARALLELED TO EMERGENCY BUS.
1.4. BREAKER 52T2 CLOSSES.
1.5. GENERATORS ARE SOFT RAMP LOADED UNTIL THE GENERATOR PLANT ASSUMES ENTIRE LOAD.
1.6. BREAKER 52N1 OPENS.

2. EXIT FROM EMERGENCY MODE

- 2.1. "TRANSFER TO EMERGENCY MODE" REQUEST IS CANCELED BY OPERATOR.
2.2. REFER TO "UTILITY RESTORATION AND EXIT FROM EMERGENCY MODE".

NO LOAD TEST MODE

1. ENTRANCE INTO NO LOAD TEST MODE

- 1.1. NO LOAD TEST INITIATED BY OPERATOR.
1.2. ALL AVAILABLE GENERATORS START, SYNCHRONIZE AND REMAIN RUNNING DISCONNECTED FROM BUS.
1.3. SYSTEM IS NOW IN NO LOAD TEST MODE.

2. EXIT FROM NO LOAD TEST MODE

- 2.1. NO LOAD TEST TERMINATED BY OPERATOR.
2.2. GENERATORS RUN FOR A PROGRAMMED COOL DOWN PERIOD THEN SHUTDOWN.
2.3. SYSTEM IS RETURNED TO AUTOMATIC/STANDBY MODE.

UTILITY FAIL TEST MODE

1. ENTRANCE INTO UTILITY FAIL TEST MODE

- 1.1. UTILITY FAIL TEST INITIATED BY OPERATOR.
1.2. SYSTEM ENTERS EMERGENCY MODE. REFER TO "EMERGENCY MODE - UTILITY FAILURE".

2. EXIT FROM UTILITY FAIL TEST MODE

- 2.1. UTILITY FAIL TEST TERMINATED BY OPERATOR.
2.2. SYSTEM EXITS EMERGENCY MODE. REFER TO "EMERGENCY MODE - TRANSFER TO EMERGENCY MODE".

GENERATOR SCHEDULE

Table with 4 columns: MARK, GEN-1, GEN-2, GEN-3. Rows include kW, POWER FACTOR, KVA, STARTING KVA, VOLTAGE, PHASE, FREQUENCY, FREQUENCY BANDWIDTH, VOLTAGE REGULATION, VOLTAGE BANDWIDTH, ENGINE TYPE, SPEED, ENGINE COOLING TYPE, HEAT EXCHANGER TYPE, GOVERNOR, MINIMUM GENERATOR REACTANCE, MAXIMUM STEP LOAD INCREASE, MAXIMUM TIME TO START AND TRANSFER, OPERATING TEMPERATURE, INSTALLATION ELEVATION, ENCLOSURE.

- NOTES:
1. PROVIDE WITH SOUND ATTENUATED WEATHERPROOF ENCLOSURE.
2. MOUNT ON SEISMIC RATED SPRING ISOLATORS.

TRANSFORMER SCHEDULE

Table with 3 columns: MARK, T-G, T-1. Rows include kVA, VOLTAGE PRIMARY, VOLTAGE SECONDARY, PHASE, FREQUENCY, %Z, EFFICIENCY, AUSIBLE SOUND, INSULATING LIQUID, NO. TAPS.

NOTES: INCLUDE LOW VOLTAGE BUSHING SUPPORTS, STEP-UP DESIGN, EXTERNAL GAUGES IN PADLOCKABLE BOX, BAYONET FUSING, DRAIN/SAMPLING VALVE IN HIGH VOLTAGE COMPARTMENT, ANSI BELL GREEN COATING, HIGH VOLTAGE WARNING SIGNS, AND SHOCK AND ARC FLASH WARNING DECAL.

NEW MAIN SWITCHGEAR 'SWGR-SE' table containing voltage, bus, main, location, and detailed load descriptions with columns for note, kva, load, amp, phase, and other electrical parameters.

NEW GENERATOR PARALLELING SWITCHGEAR 'SWGR-PG' table containing voltage, bus, main, location, and detailed load descriptions with columns for note, kva, load, amp, phase, and other electrical parameters.

NEW MAIN PANEL 'PNL-H1' table containing voltage, bus, main, location, and detailed load descriptions with columns for note, kva, load, amp, phase, and other electrical parameters.

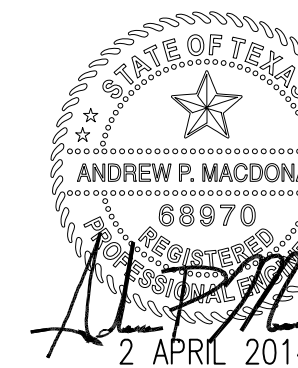
NEW PANELBOARD 'PNL-L1' table containing voltage, bus, main, location, and detailed load descriptions with columns for note, kva, load, amp, phase, and other electrical parameters.



NATIONAL CONSERVATION TRAINING CENTER

SHEPHERDSTOWN

JEFFERSON COUNTY WEST VIRGINIA



KEY PLAN

REVISIONS

DATE: 04/02/2014
DRAWN BY: EJC
CHECKED BY: APM

EMERGENCY POWER UPGRADES NCTC - SHEPHERDSTOWN, WV

ELECTRICAL SCHEDULES

DRAWING NO. ES4.0

Scale: SHEET 022 OF 027

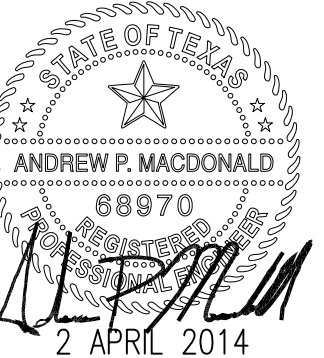
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CONTROL CIRCUIT CONDUIT SCHEDULE (SEE NOTE 1)							
NO.	FROM	TO	QUANTITY - SIZE	CONDUCTOR	FUNCTION	CONDUIT SIZE	CONDUIT TABLE
1	GEN-1	SWGR-PG 52G1 CONTROL SECTION	(1) - 2 CONDUCTOR #16 AWG SHIELDED TWISTED PAIR	GEN-1 EMCP (DATA LINK)		NOTES 4 AND 5	TYPE D / NOTE 6
			(1) - 3 CONDUCTOR #16 AWG SHIELDED TWISTED TRIPLET	GEN-1 ADEM 4 (SPEED BRICK)			
			(1) - 2 CONDUCTOR #16 AWG SHIELDED TWISTED PAIR	GEN-1 CDVR (ANALOG VOLTAGE CONTROL) VOLTAGE REGULATION			
			(3) - 1#14 AWG	GEN-1 CDVR (MANUAL VOLTAGE CONTROL) VOLTAGE REGULATION			
			(4) - 1#10 AWG	24Vdc POWER			
2	GEN-2	SWGR-PG 52G2 CONTROL SECTION	(1) - 2 CONDUCTOR #16 AWG SHIELDED TWISTED PAIR	GEN-2 EMCP (DATA LINK)		NOTES 4 AND 5	TYPE D / NOTE 6
			(1) - 3 CONDUCTOR #16 AWG SHIELDED TWISTED TRIPLET	GEN-2 ADEM 4 (SPEED BRICK)			
			(1) - 2 CONDUCTOR #16 AWG SHIELDED TWISTED PAIR	GEN-2 CDVR (ANALOG VOLTAGE CONTROL) VOLTAGE REGULATION			
			(3) - 1#14 AWG	GEN-2 CDVR (MANUAL VOLTAGE CONTROL) VOLTAGE REGULATION			
			(4) - 1#10 AWG	24Vdc POWER			
3	GEN-3	SWGR-PG 52G3 CONTROL SECTION	(1) - 2 CONDUCTOR #16 AWG SHIELDED TWISTED PAIR	GEN-3 EMCP (DATA LINK)		NOTES 4 AND 5	TYPE D / NOTE 6
			(1) - 3 CONDUCTOR #16 AWG SHIELDED TWISTED TRIPLET	GEN-3 ADEM 4 (SPEED BRICK)			
			(1) - 2 CONDUCTOR #16 AWG SHIELDED TWISTED PAIR	GEN-3 CDVR (ANALOG VOLTAGE CONTROL) VOLTAGE REGULATION			
			(3) - 1#14 AWG	GEN-3 CDVR (MANUAL VOLTAGE CONTROL) VOLTAGE REGULATION			
			(4) - 1#10 AWG	24Vdc POWER			
4	EMERGENCY POWER PANEL	PANEL L-1	(3) - 1#10 AWG	120Vac FOR 24Vdc BATTERY CHARGER (10, 20A)		NOTE 5	TYPE C
5	24Vdc STATION BATTERIES	SWGR-PG 52T2 CONTROL SECTION	(4) - 1#10 AWG	24Vdc POWER		NOTE 5	TYPE A
6	BUILDING MANAGEMENT SYSTEM	SWGR-PG 52T2 CONTROL SECTION	(1) - 2 CONDUCTOR #18 AWG SHIELDED TWISTED PAIR	COMMUNICATION SIGNAL TO BUILDING MANAGEMENT SYSTEM		NOTE 5	TYPE D
7	REMOTE PC FOR MONITORING AND CONTROL	SWGR-PG 52T2 CONTROL SECTION	(1) - 4 PAIR #24 AWG CAT5 CABLE (ETHERNET)	REMOTE PC COMMUNICATIONS		NOTE 5	TYPE D
8	SPACE HEATERS	SWGR-PG 52T2 CONTROL SECTION	(3) - 1#10 AWG	120Vac FOR SPACE HEATERS (10, 30A)		NOTE 5	TYPE C

- NOTES:
- ELECTRICAL CONTRACTOR RESPONSIBLE FOR ADHERENCE TO ALL APPLICABLE STANDARDS AND CODES.
 - ELECTRICAL CONTRACTOR MAY MODIFY ROUTING AND COMBINE CONDUITS OF THE SAME TYPE.
 - ELECTRICAL CONTRACTOR TO TERMINATE FIELD WIRING AT BOTH ENDS.
 - CONDUIT TYPES 'A' AND 'D' MAY BE COMBINED IN THE SAME METALLIC CONDUIT.
 - CONDUIT TO BE SIZED BY INSTALLER.
 - SEPARATE METALLIC CONDUIT MUST BE USED FOR EACH WIRE TYPE (A, B, C, AND D). SEE NOTE 4 FOR EXCEPTION.
 - SPARES TO BE LEFT TEN (10) FEET LONG, COILED AND TAPED IN BOTTOM OF ENCLOSURE.
 - ELECTRICAL CONTRACTOR SHALL PROVIDE 20% SPARES OF EACH SIZE SINGLE CONDUCTOR AND ONE OF EACH MULTI-CONDUCTOR CABLE.
 - ALL ELECTRICAL WIRING TO BE STRANDED COPPER UNLESS SPECIFIED OTHERWISE. CONDUCTOR SIZE MAY HAVE TO BE INCREASED FOR VOLTAGE DROP OVER LONG DISTANCES.
 - 4 POLE, 10A, 120Vac, FORM C DRY CONTACTS FOR LOAD SHED PURPOSES.

CONDUIT TYPE TABLE	
A	DC CONTROL ≤ 30V
B	DC CONTROL > 30V
C	AC CONTROL
D	SIGNAL LEVEL
E	FIBER OPTIC

LIGHTING FIXTURE SCHEDULE						
FIXTURE TYPE	MANUFACTURER / MODEL #	DESCRIPTION	VOLTAGE VA	MOUNTING TYPE	# OF LAMPS TYPE OF LAMP	REMARKS
A	LITHONIA DSXF1LED-1-A530/40K-MFL-120-XX-SF-DDAXD	LED FLOOD LUMINAIRE	120V/26	TENNON	1 LED 4000K	PROVIDE WITH 8' GRAY COLORED 4"x4" STEEL POLE WITH TENNON AND KNUCKLE FITTING AT TOP OF POLE.
NOTES: THE FIXTURES SPECIFIED ON THIS SCHEDULE FORM A BASIS OF DESIGN FOR THE PROJECT REFLECTING THE QUALITY AND PERFORMANCE EXPECTED FOR THE FIXTURES. CONTRACTOR MAY SUBMIT "OR EQUAL" PRODUCTS FOR APPROVAL DETERMINATION BY CONTRACTING OFFICER. SUBMITTALS FOR "OR EQUAL" FIXTURES WILL BE MADE WITHIN 14 DAYS OF CONTRACT AWARD AND WILL INCLUDE THE FOLLOWING: 1) STATEMENT BY CONTRACTOR AS HOW SUBSTITUTED PRODUCT WILL IMPACT COMPLETION OF THE PROJECT; 2) THE DIFFERENCE IN COST BETWEEN THE SUBSTITUTED PRODUCT AND THE LISTED PRODUCT; 3) A DETAILED ANALYSIS OF THE DIFFERENCE BETWEEN THE LISTED PRODUCT AND THE PROPOSED PRODUCT; 4) COMPLETE DATA SHEETS FROM MANUFACTURER THAT ALSO INCLUDE COLOR PICTURE, PRODUCT IDENTIFICATION, AND PERFORMANCE DATA; 5) NAME AND ADDRESS OF THE MANUFACTURER'S REPRESENTATIVE; AND 6) SUBMIT COMPLETE POINT BY POINT PHOTOMETRICS FOR EACH FACILITY ON 1' GRID WITH SUBMITTAL.						



KEY PLAN

REVISIONS

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EMERGENCY POWER
UPGRADES
NCTC - SHEPHERDSTOWN, WV

ELECTRICAL SCHEDULES

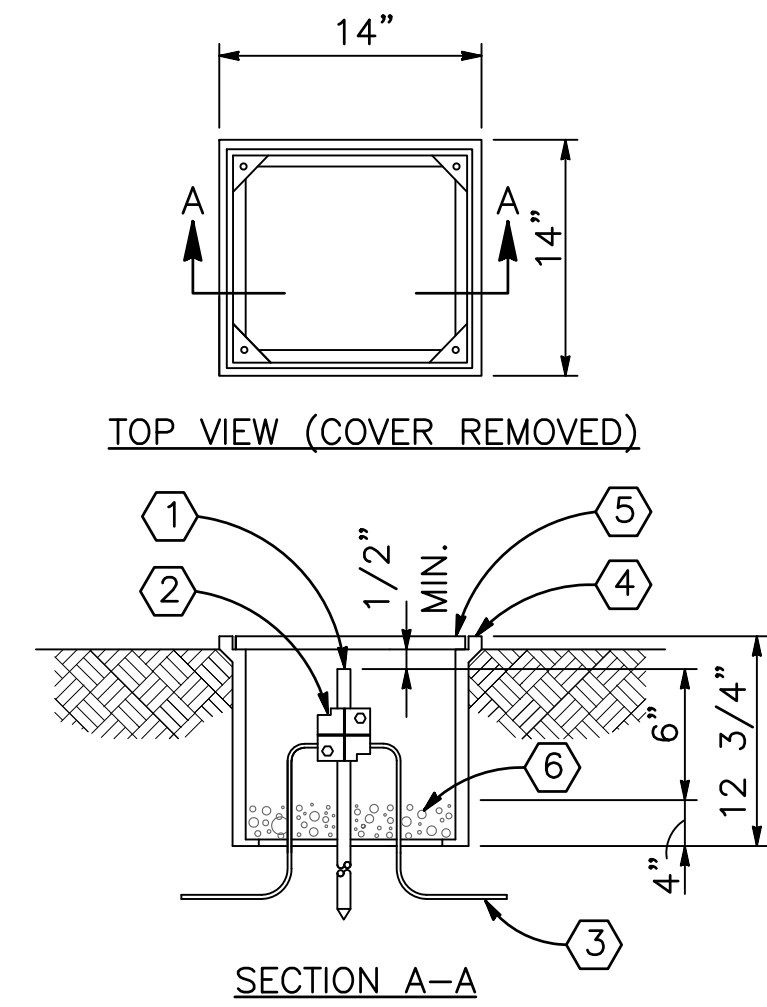
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ES4.1

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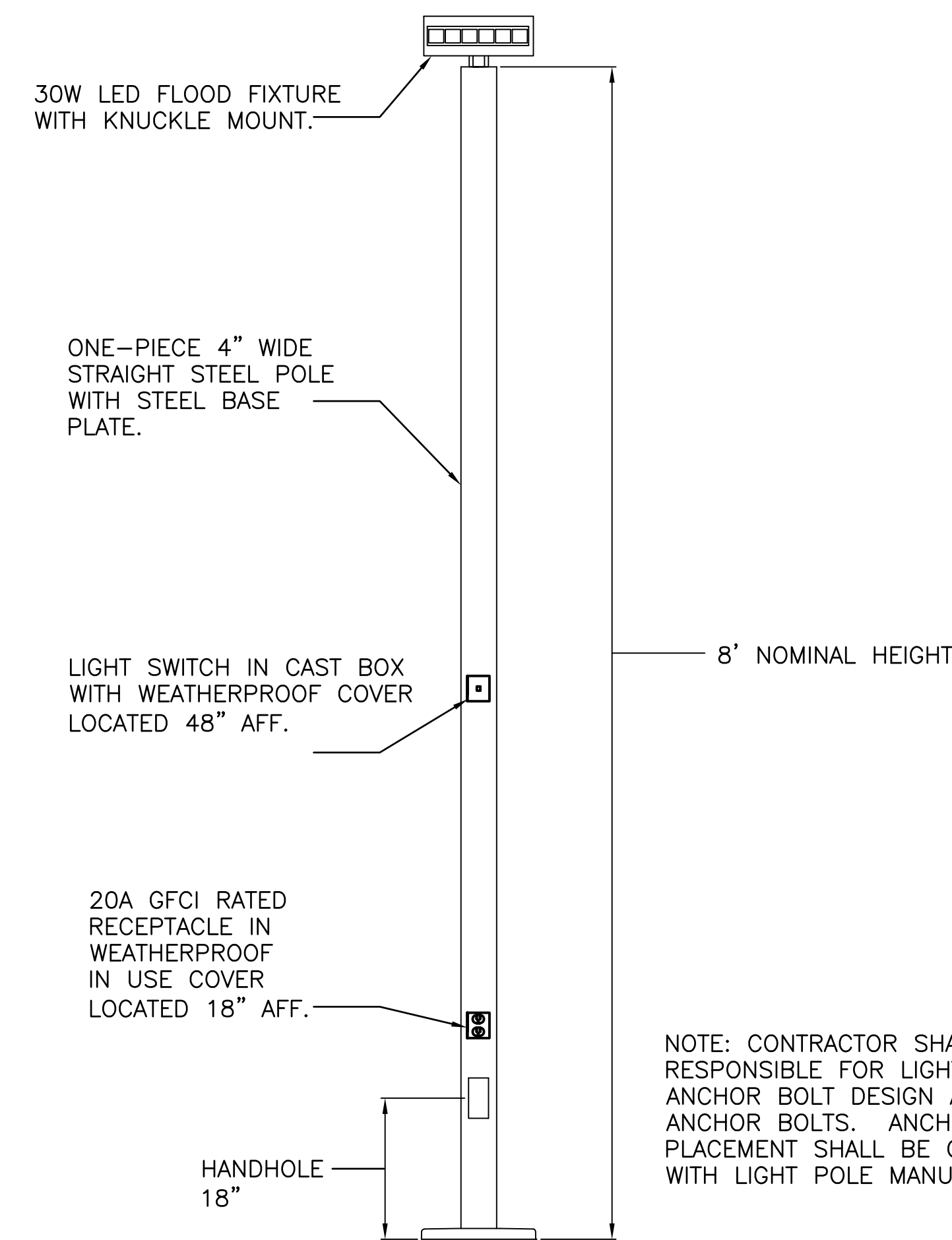
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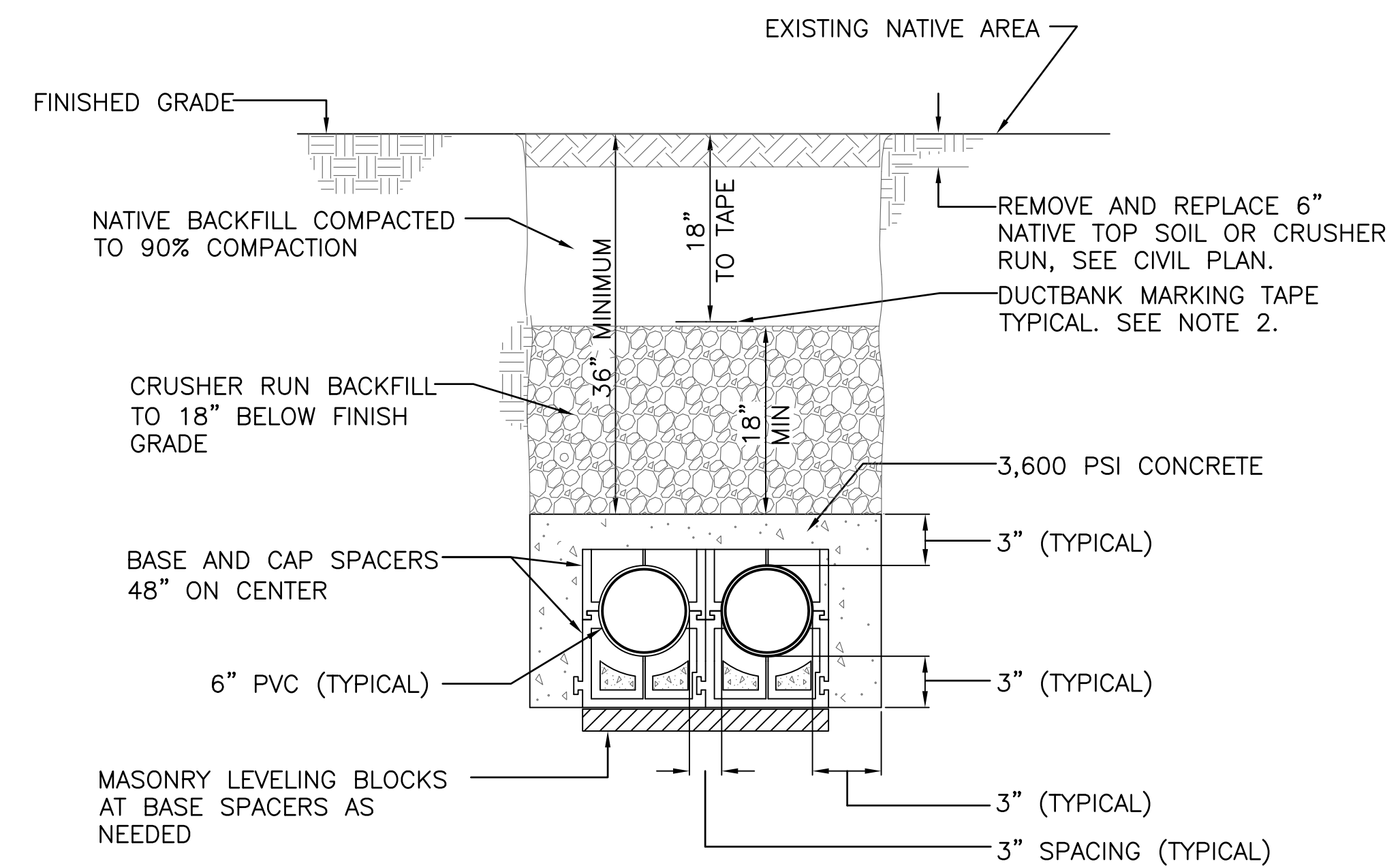
- MATERIAL LIST (X)**
1. 3/4" x 10' GROUND ROD.
 2. GROUND CLAMP.
 3. GROUNDING CONDUCTOR.
 4. POLYMER CONCRETE FIBERGLASS REINFORCED BOX.
 5. COVER FOR ABOVE BOX.
 6. GRAVEL OR CRUSHED STONE.

1 GROUND ROD INSTALLATION DETAIL
 ES5.0ES5.0 SCALE: NOT TO SCALE



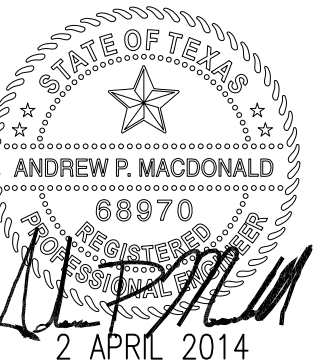
2 EXTERIOR LIGHT POLE DETAIL
 ES5.0ES5.0 SCALE: NOT TO SCALE

NOTE: CONTRACTOR SHALL BE RESPONSIBLE FOR LIGHT POLE ANCHOR BOLT DESIGN AND ALL ANCHOR BOLTS. ANCHOR BOLT PLACEMENT SHALL BE COORDINATED WITH LIGHT POLE MANUFACTURER.



- NOTES:**
1. CONCRETE PLACEMENT SHALL BE AGAINST UNDISTURBED INSITU MATERIAL. DISTURBED MATERIAL SHALL BE REPLACED WITH CRUSHER RUN MATERIAL.
 2. BURIED MARKING TAPE SHALL BE 6" WIDE, HAVE A DETECTABLE METALLIC CORE, AND READ "CAUTION: BURIED ELECTRIC LINE BELOW". PRO-LINE SAFETY PRODUCTS OR APPROVED EQUAL.

3 2 x 6" PVC CONDUIT DUCTBANK DETAIL
 ES5.0ES5.0 SCALE: NOT TO SCALE



KEY PLAN

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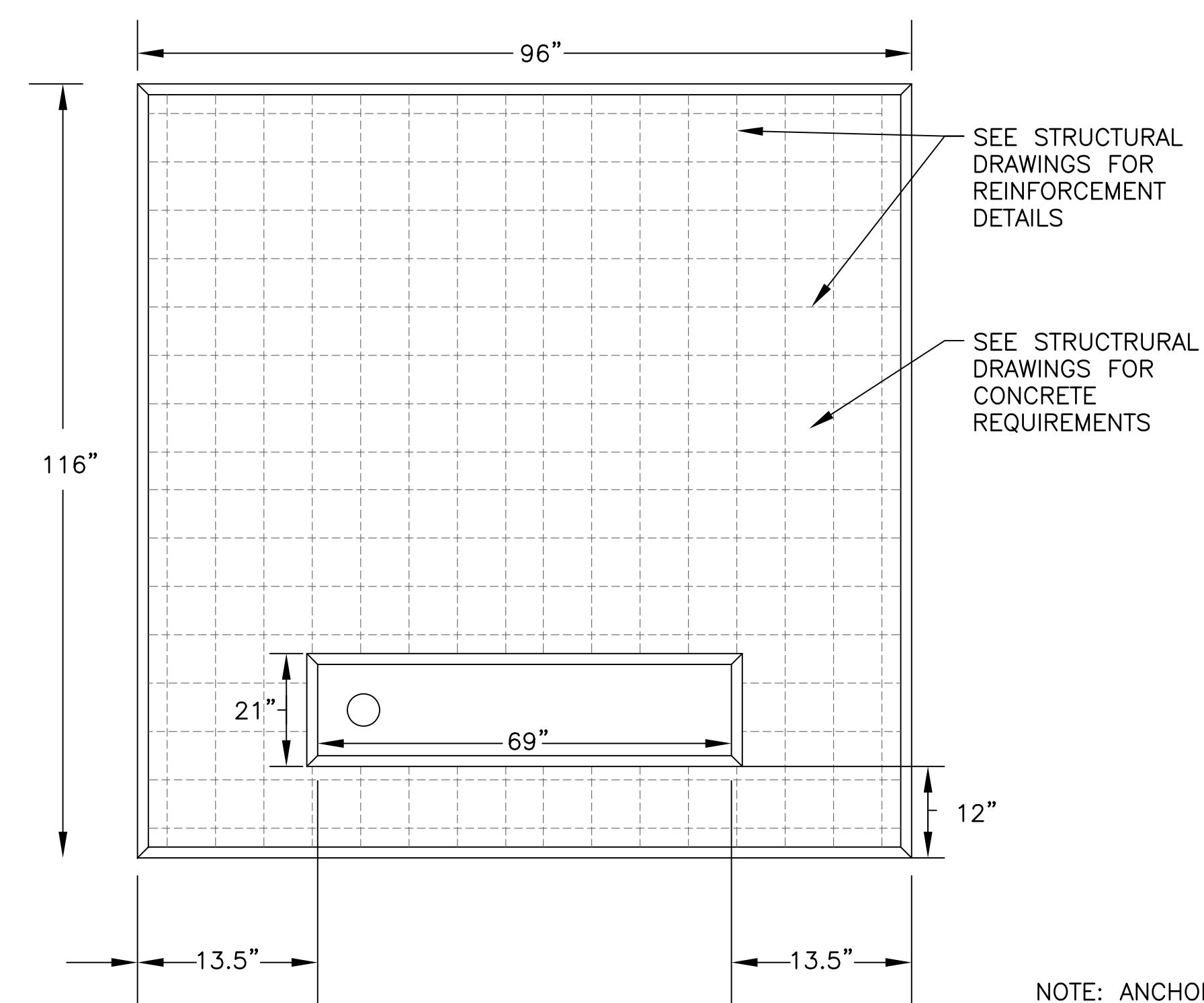
EMERGENCY POWER UPGRADES
 NCTC - SHEPHERDSTOWN, WV

ELECTRICAL DETAILS

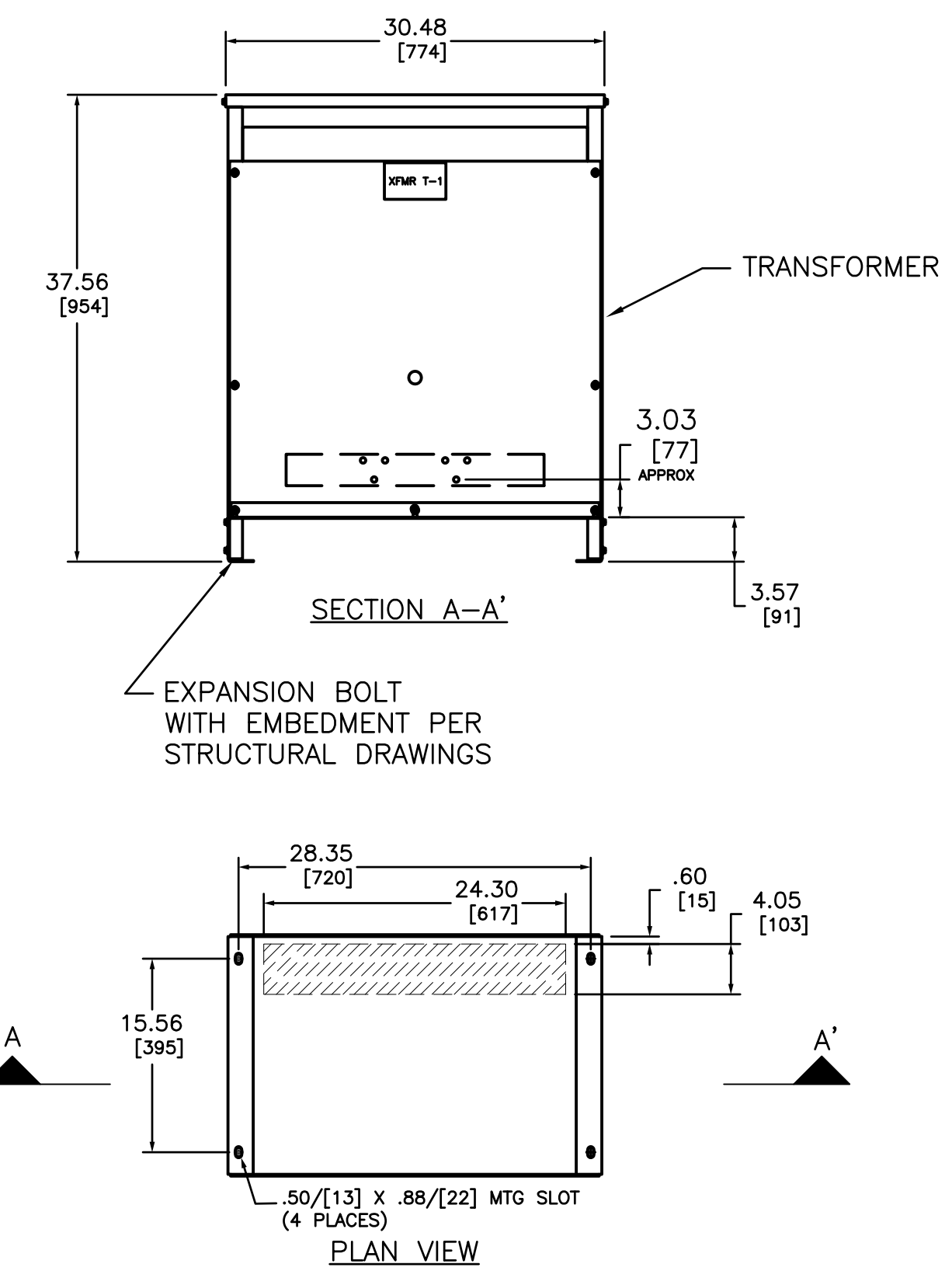
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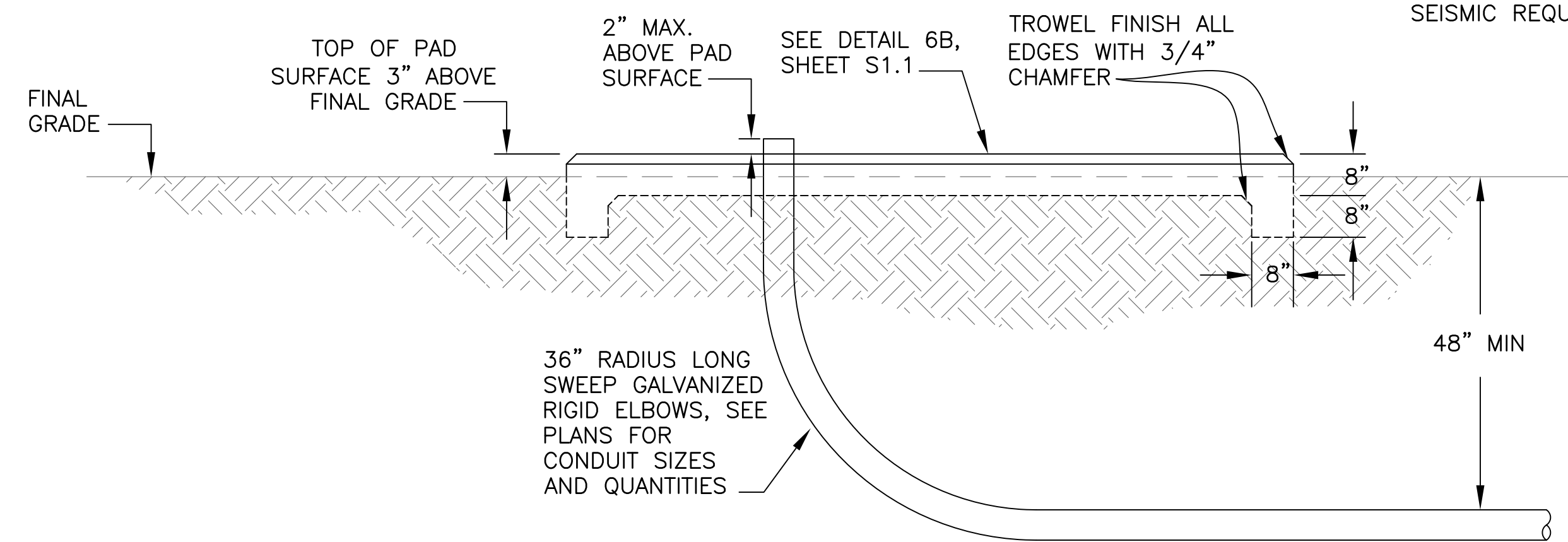
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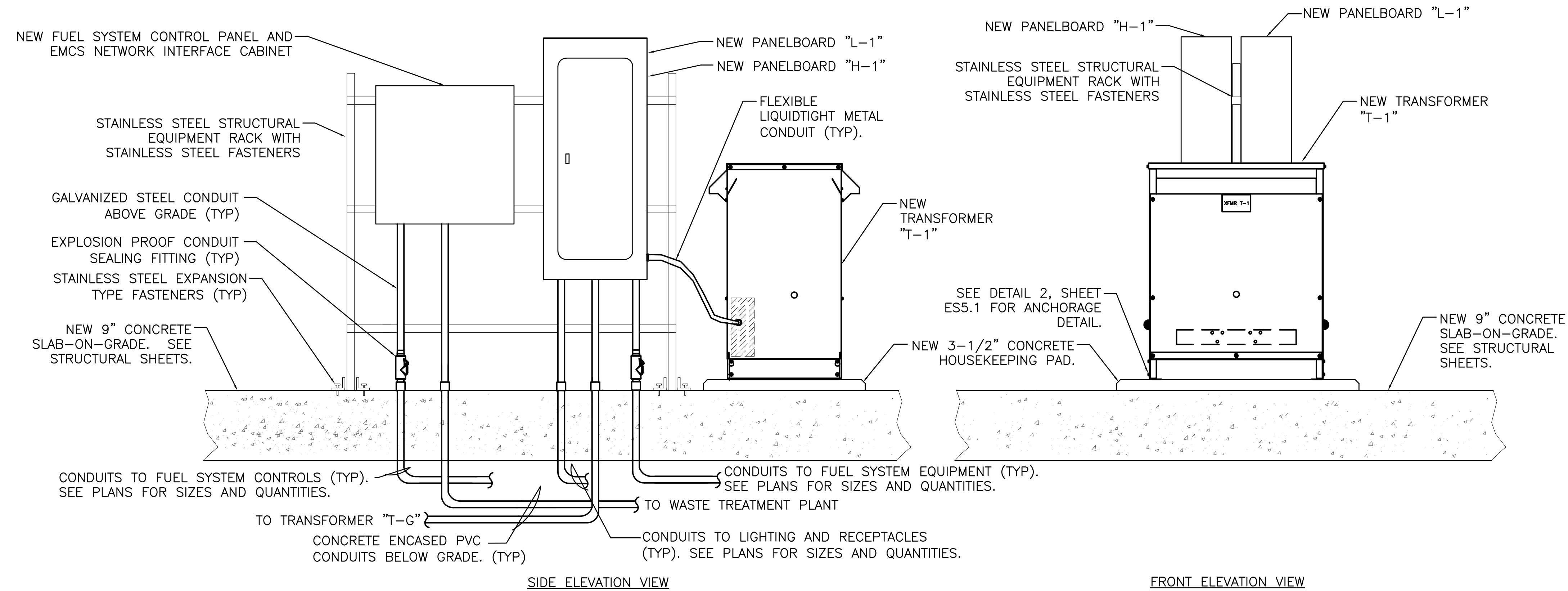
NOTE: ANCHOR
 TRANSFORMER TO PAD IN
 ACCORDANCE WITH
 MANUFACTURER'S
 RECOMMENDATIONS FOR
 SEISMIC REQUIREMENTS.



2 LOW VOLTAGE
 TRANSFORMER ANCHORAGE DETAIL
 ES5.1ES2.0 SCALE: NOT TO SCALE



1 PAD MOUNTED TRANSFORMER MOUNTING DETAIL
 ES5.1ES2.0 SCALE: NOT TO SCALE



3 PANELBOARD EQUIPMENT RACK DETAIL
 ES5.1ES2.0 SCALE: NOT TO SCALE

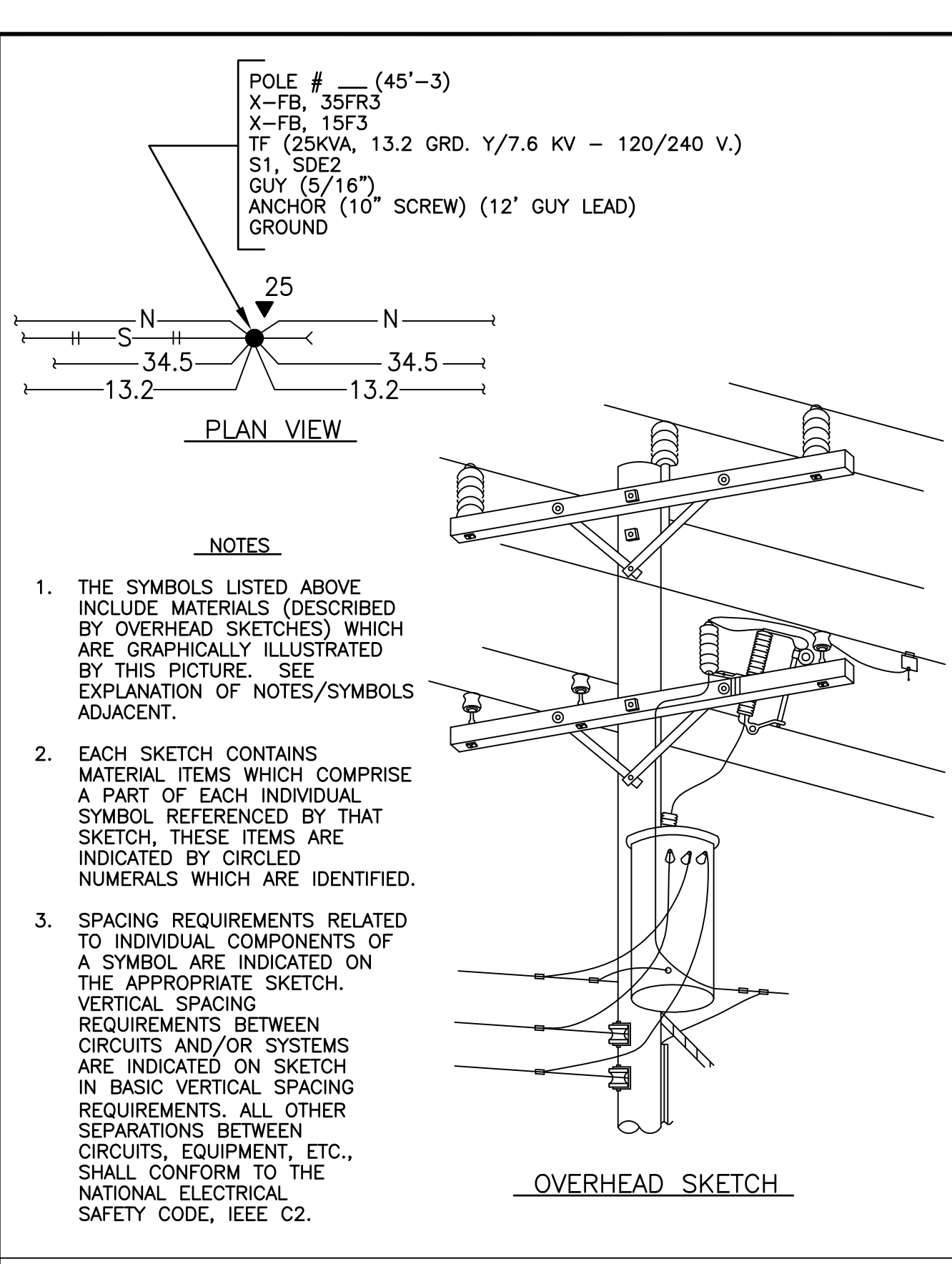
KEY PLAN

REVISIONS

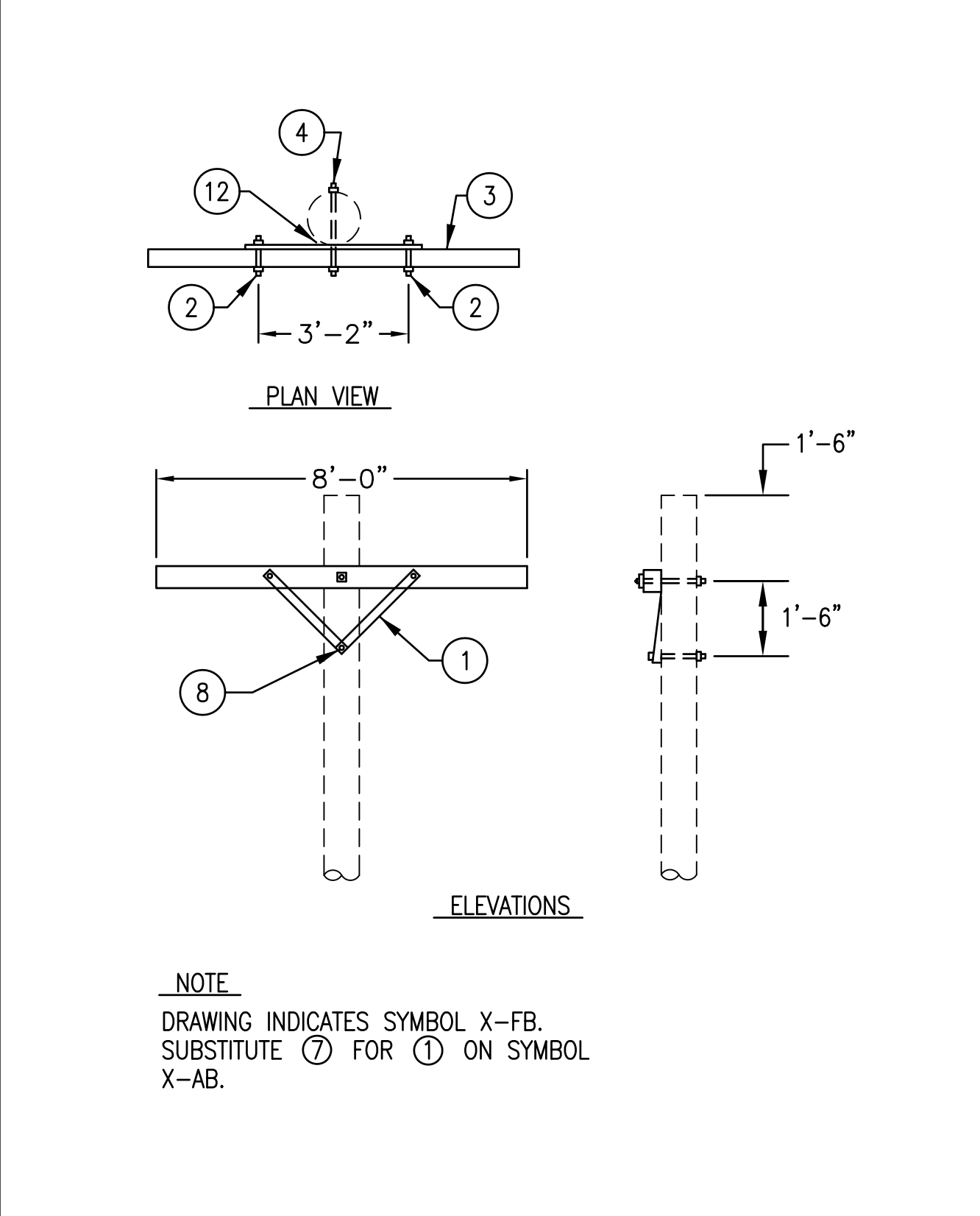
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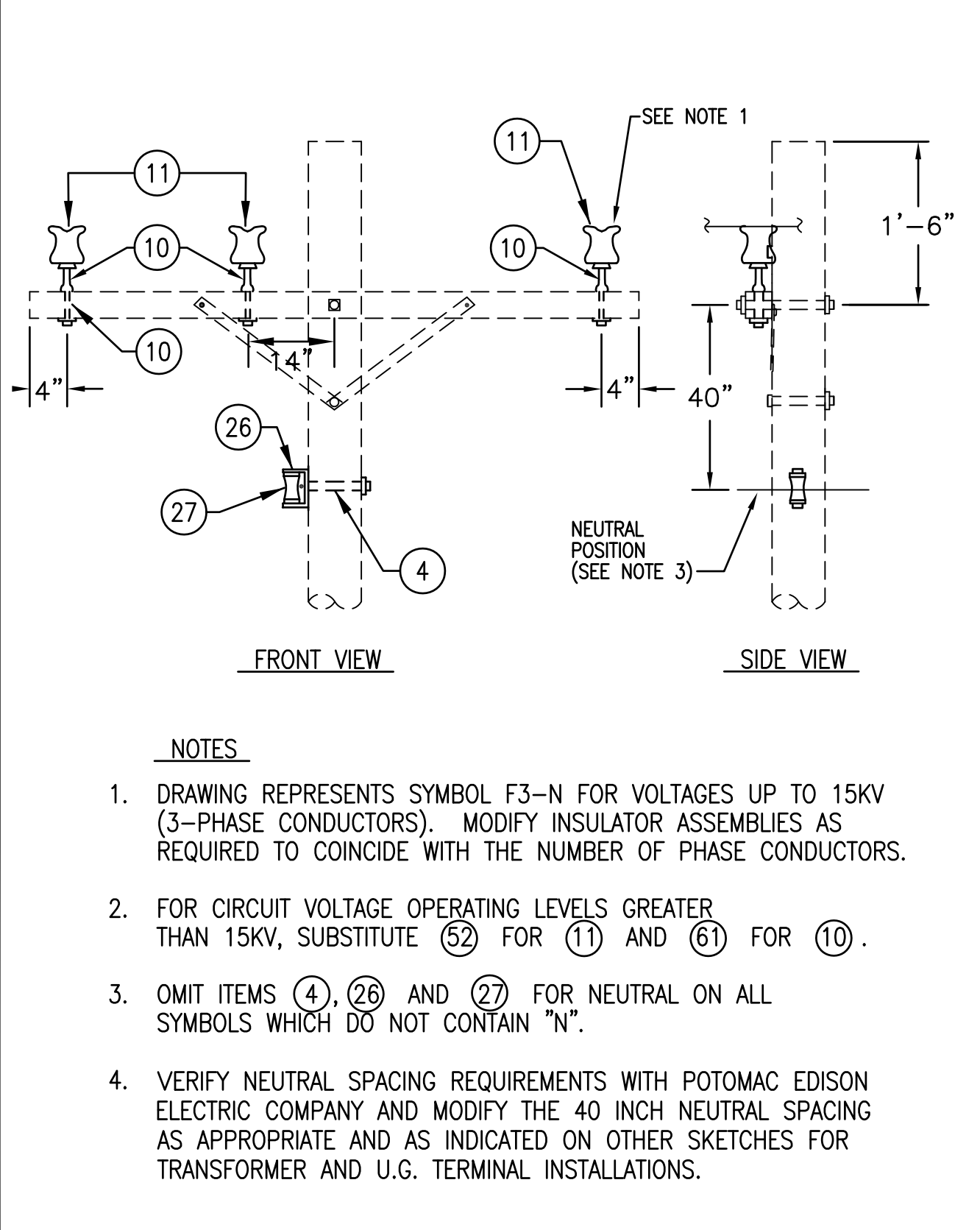




METHOD OF SHOWING SYMBOLS



X-FB / X-AB

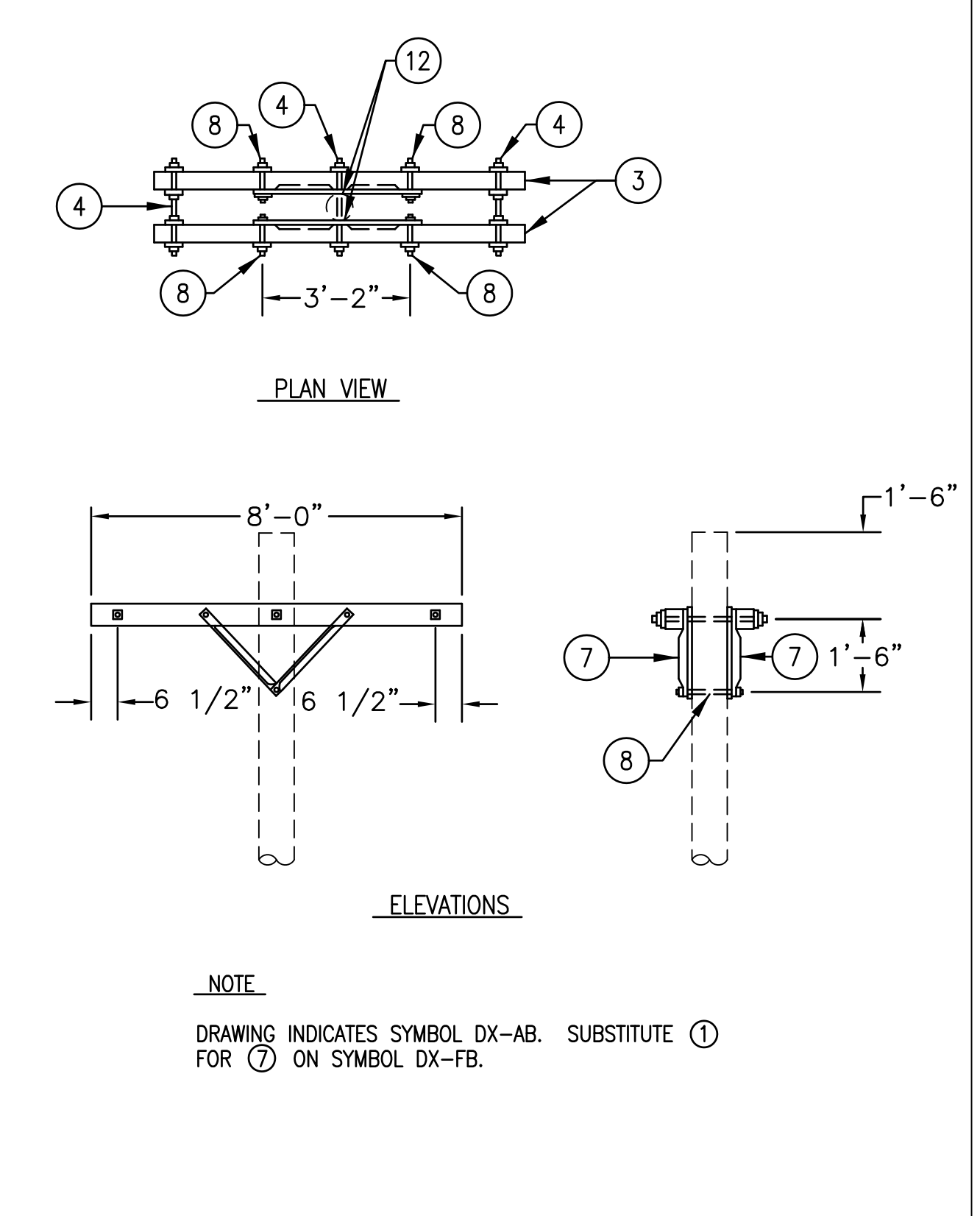


F3-N, F3 (0-50KV)

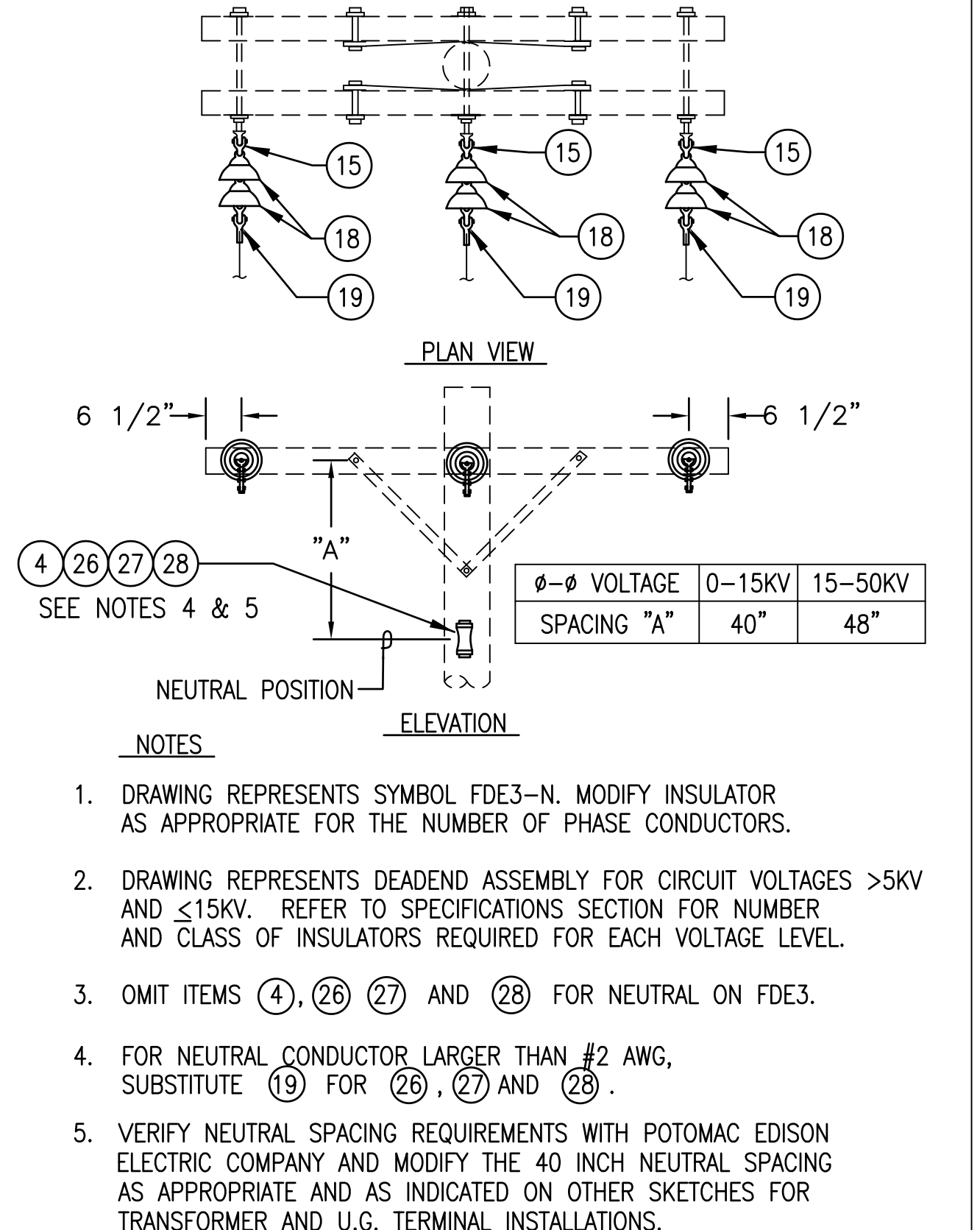
EXPLANATORY NOTES - METHOD OF SHOWING SYMBOLS. 1. SYMBOLS ARE SHOWN IN THE BASIC ORDER AS THEY APPEAR ON THE POLE... 2. NUMERALS PRECEDING THE SYMBOL INDICATE THE MINIMUM REQUIRED VOLTAGE (KV) RATING... 3. NUMERAL FOLLOWING THE SYMBOL INDICATES THE NUMBER OF CONDUCTORS ASSOCIATED WITH THE ASSEMBLY... 4. NUMERAL IN PARENTHESIS FOLLOWING THE SYMBOL DENOTES THE NUMBER OF ASSEMBLIES REQUIRED, IF MORE THAN ONE... 5. DATA IN PARENTHESIS FOLLOWING THE SYMBOL PROVIDES INFORMATION RELATIVE TO THE SYMBOL.

EXPLANATION OF SYMBOLS LISTED FOR POLE ON OVERHEAD SKETCH. PROVIDE 45 TO 50 FEET LONG, CLASS 3 POLE, AS APPROPRIATE, CONTAINING:
X-FB - 8' CROSSARM WITH FLAT BRACE
35FR3 - 35KV INSULATORS, FLAT (MOUNTED HORIZONTAL ON CROSS-ARM), RIDGE PIN (CENTER PHASE ON POLE TOP PIN), THREE CONDUCTORS
X-FB - 8' CROSSARM WITH FLAT BRACE
15F3 - 15KV INSULATORS, FLAT (MOUNTED HORIZONTAL ON CROSSARM), THREE CONDUCTORS. NOTE: THIS SYMBOL CALLS FOR THREE CROSSARM MOUNTED PINS IN LIEU OF RIDGE PIN ON CENTER PHASE.
TF - TRANSFORMER ON FLAT (HORIZONTAL) CONSTRUCTION. DATA IN PARENTHESIS DESCRIBES THE TRANSFORMER CHARACTERISTICS.
S1 - SECONDARY, ONE CONDUCTOR, TANGENT CONSTRUCTION (COMMON NEUTRAL).
SDE2 - SECONDARY DEADEND, TWO CONDUCTORS, OPEN WIRE
GUY (5/16") - DOWN GUY - WIRE SIZE 5/16"
ANCHOR - 10" SCREW TYPE ANCHOR WITH 12 FT. GUY LEAD.
GROUND - NO EXPLANATION NECESSARY

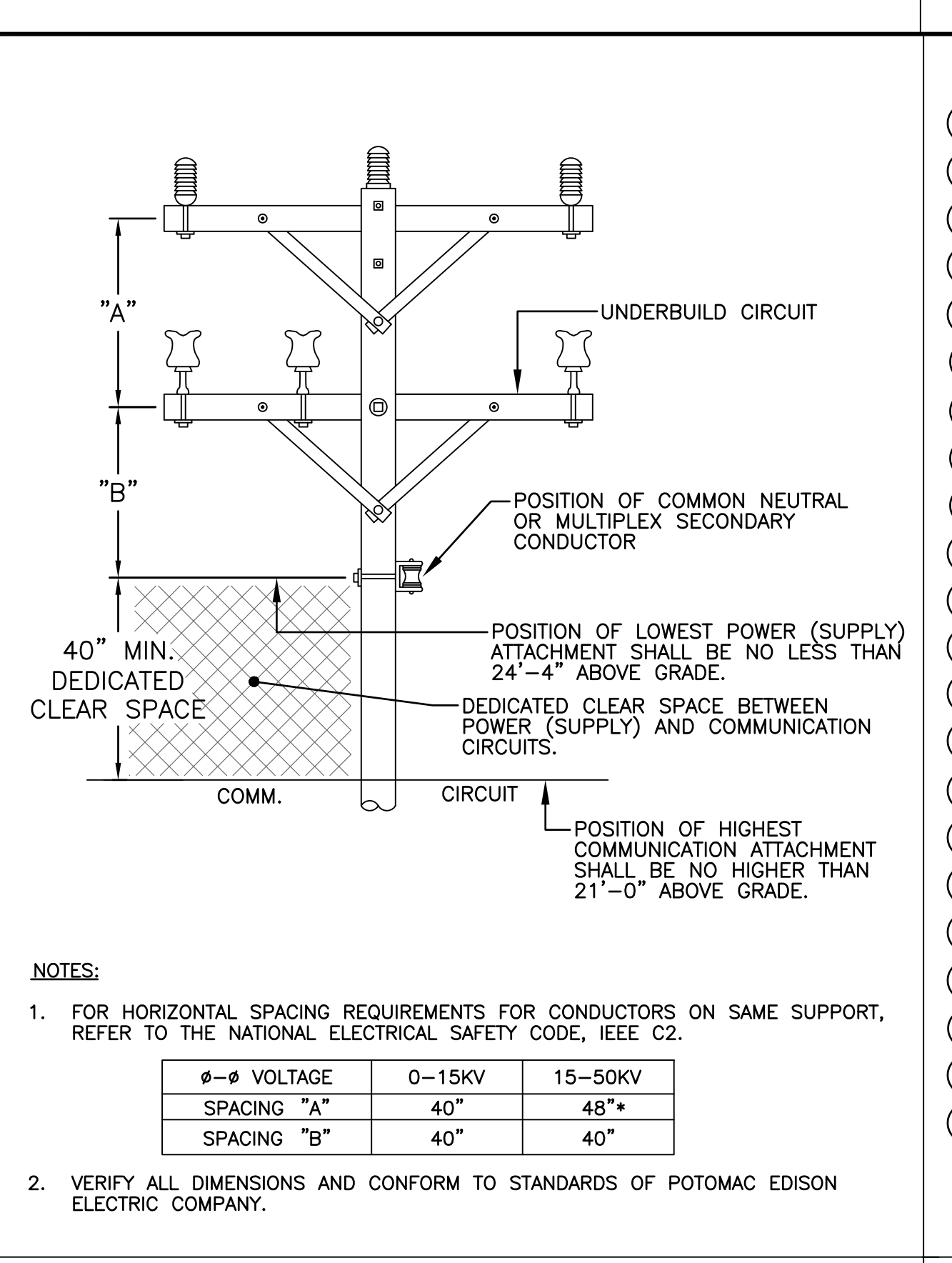
EXPLANATION OF NOTES/SYMBOLS



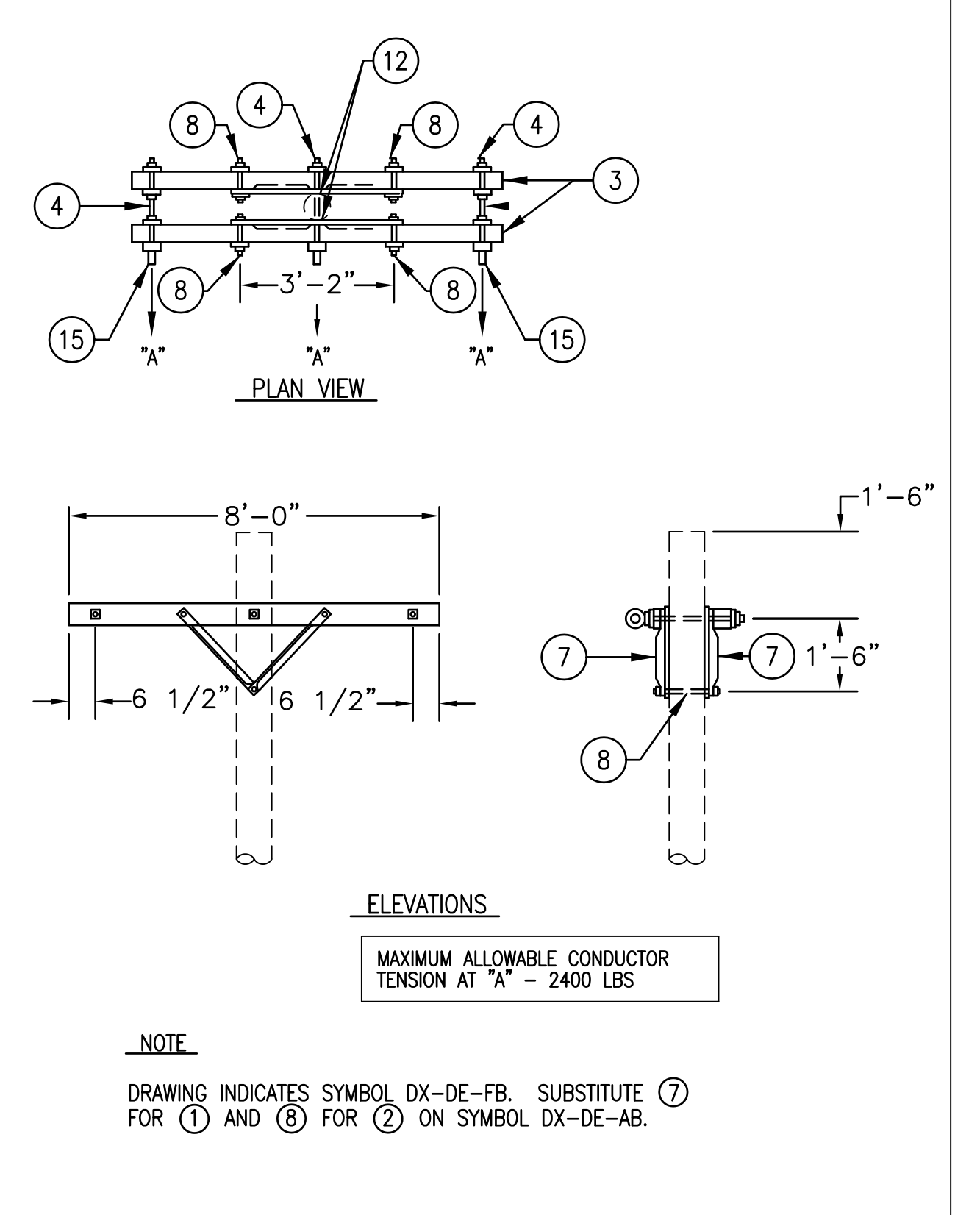
DX-FB / DX-AB



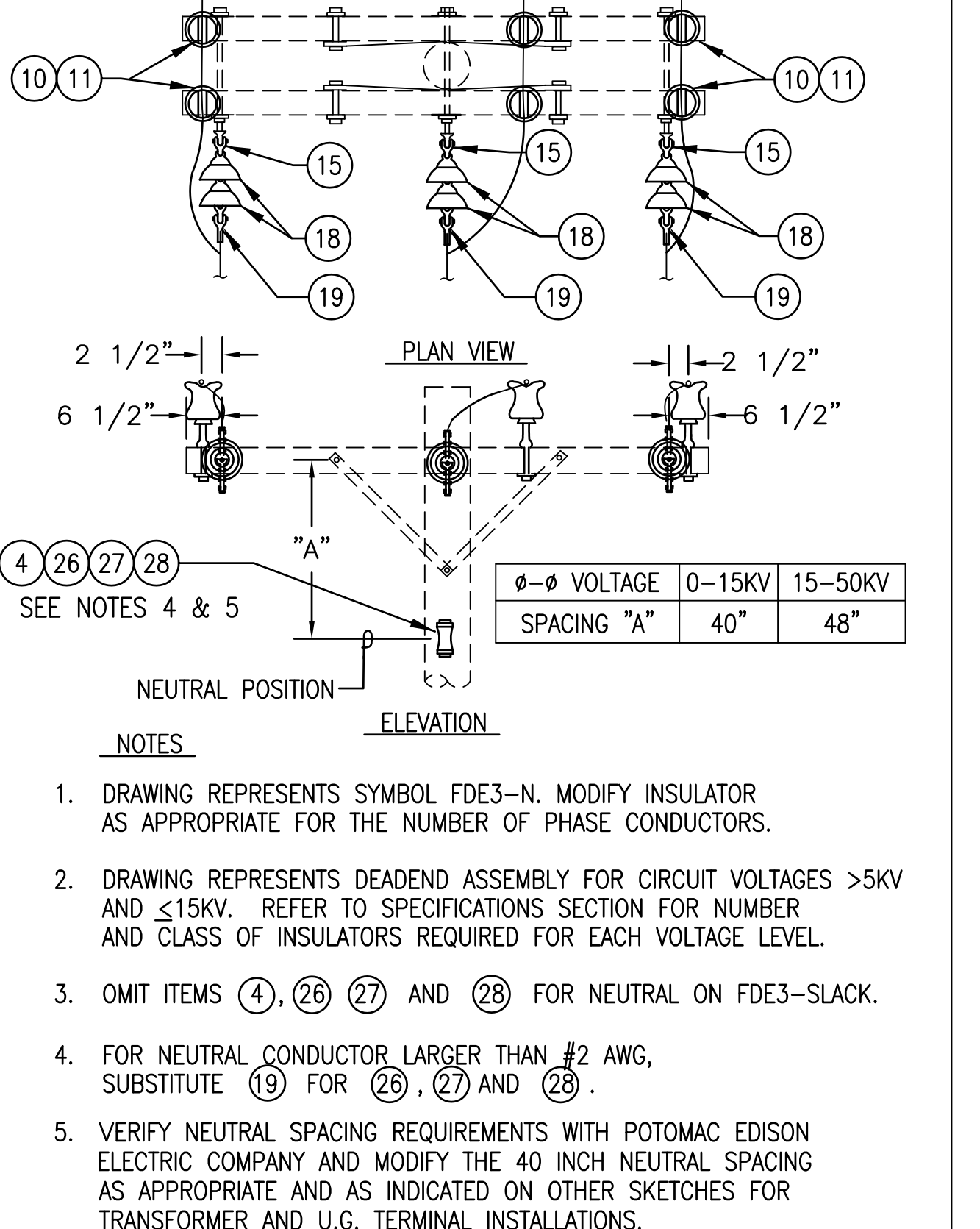
FDE3-N, FDE3 (0-50KV)



BASIC VERTICAL SPACING REQUIREMENTS



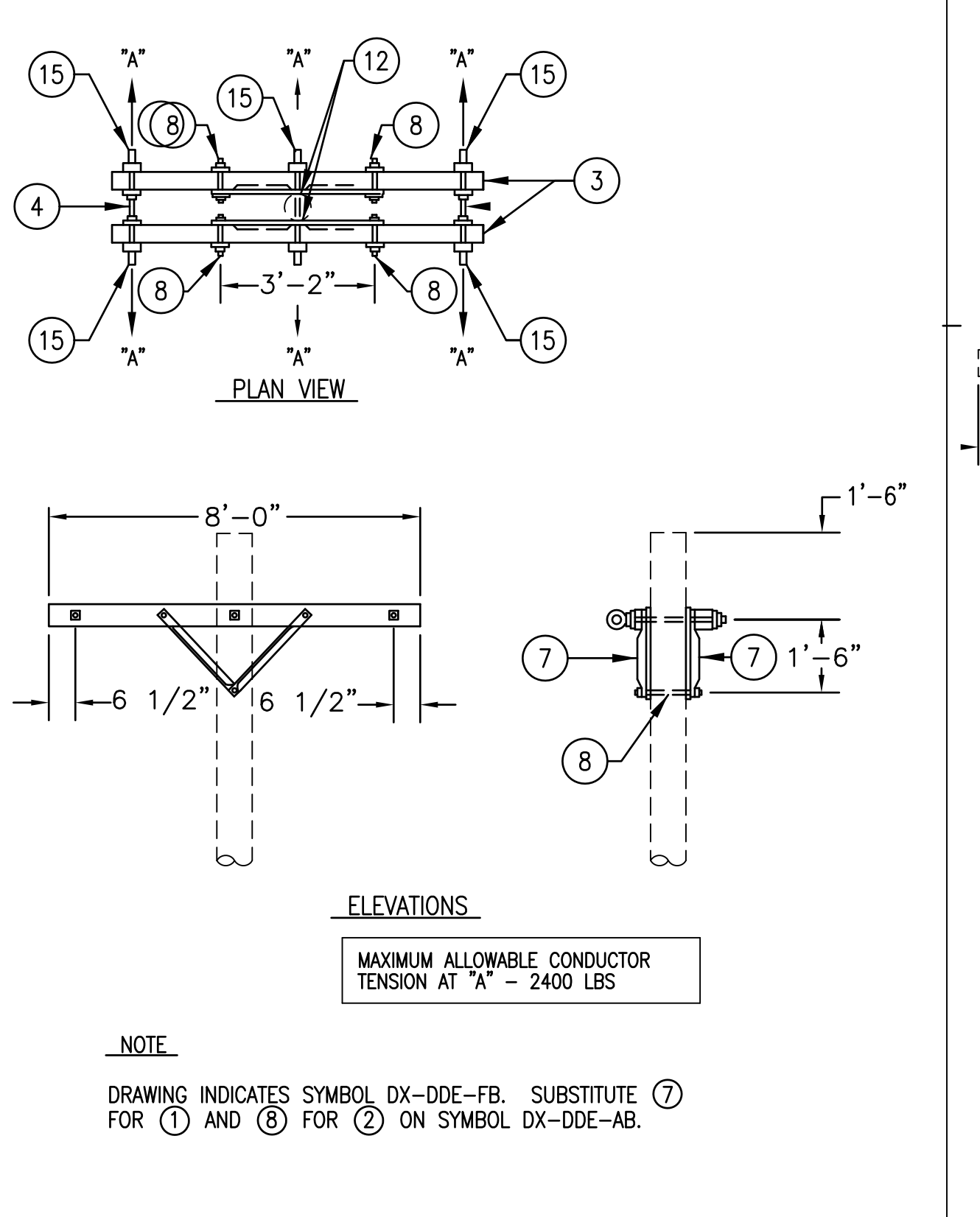
DX-DE-FB / DX-DE-AB



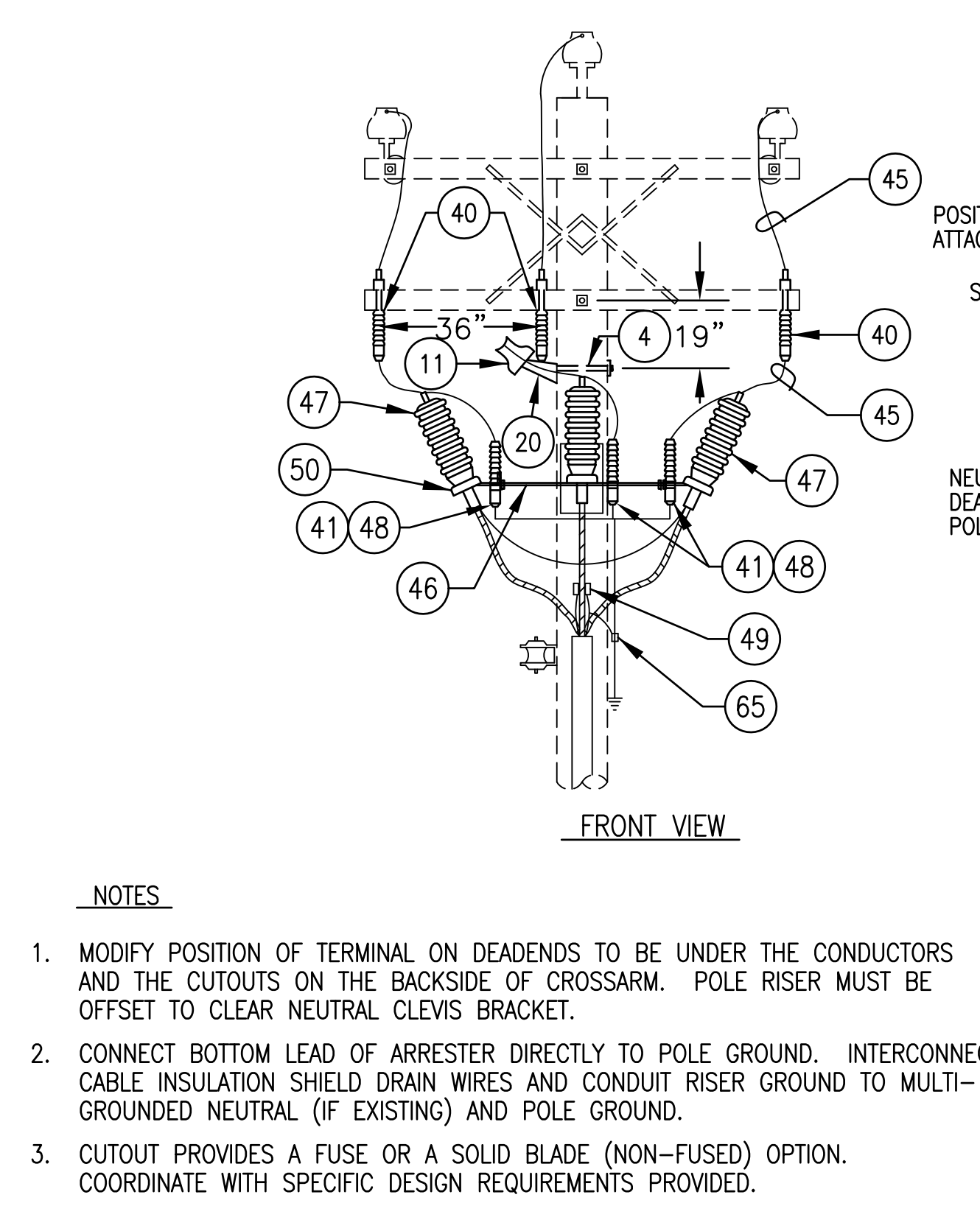
FDE3-N-SLACK, FDE3-SLACK (0-50KV)

- POLE LINE MATERIAL LIST
- FLAT STEEL BRACE (TWO PIECES)
- MACHINE BOLT, 3/8" X LENGTH NEEDED WITH WASHER, NUT AND LOCKWASHER
- 8' WOOD CROSSARM WITH CROSS SECTION DIMENSIONS OF 3 1/2" X 4 1/2"
- MACHINE BOLT, 5/8" X LENGTH NEEDED WITH WASHER, NUT AND LOCKWASHER
- TIMBER CONNECTOR
- LAGSCREW, 1/2" X 4"
- ANGLE STEEL BRACE (TWO PIECES)
- MACHINE BOLT, 1/2" X LENGTH NEEDED, WITH WASHER, NUT & LOCKWASHER
- DEADEND BOX
- STEEL PIN
- PIN INSULATOR
- GRID GAIN, USED ONLY WHEN THERE IS NO POLE GAIN
- ANGLE STEEL BRACE (ONE PIECE)
- 10' WOOD CROSSARM WITH CROSS SECTION DIMENSIONS OF 3 1/2" X 4 1/2"
- 5/8" EYE NUT
- 5/8" EYE BOLT, LENGTH AS NEEDED, WITH WASHER, NUT & LOCKWASHER
- EXTENSION LINK
- BELL TYPE SUSPENSION INSULATOR WITH CONNECTING HARDWARE
- STRAIN CLAMP
- STEEL ANGLE PIN
- CLUSTER MOUNTING BRACKET, STEEL
- TRANSFORMER GROUNDING CONNECTION
- STIRRUP
- SECONDARY LEAD SUPPORT BRACKET
- ADAPTER PLATE FOR CLUSTER MOUNTING
- CLEVIS BRACKET FOR SPOOL INSULATOR
- SPOOL INSULATOR
- U BOLT CLAMP
- PREFORMED GUY GRIP
- GUY HOOK
- GUY STRAIN INSULATOR
- GUY WIRE, SIZE AS SPECIFIED
- #4 WP CU. SOFT DRAWN GROUND WIRE
- GROUND CLAMP
- CONDUIT COUPLING
- CONDUIT BEND
- INSULATED BUSHING
- PERFORATED STRAPPING, 1-1/2" WIDE
- HOT LINE CLAMP
- FUSED CUTOFF, AS SPECIFIED
- SURGE ARRESTER, AS SPECIFIED
- POLE TOP PIN (RIDGE PIN) - 24 INCHES LONG
- CROSSARM ANGLE PIN
- ANGLE POLE TOP PIN
- WEATHERPROOF SOFT DRAWN WIRE-SIZE (g) TO MATCH OR EXCEED AMPACITY OF CONNECTING CABLE, OR (b) AT 125% OF TRANSFORMER FULL LOAD CURRENT, BUT NOT LESS THAN NO. 4 AWG

POLE LINE MATERIAL LIST



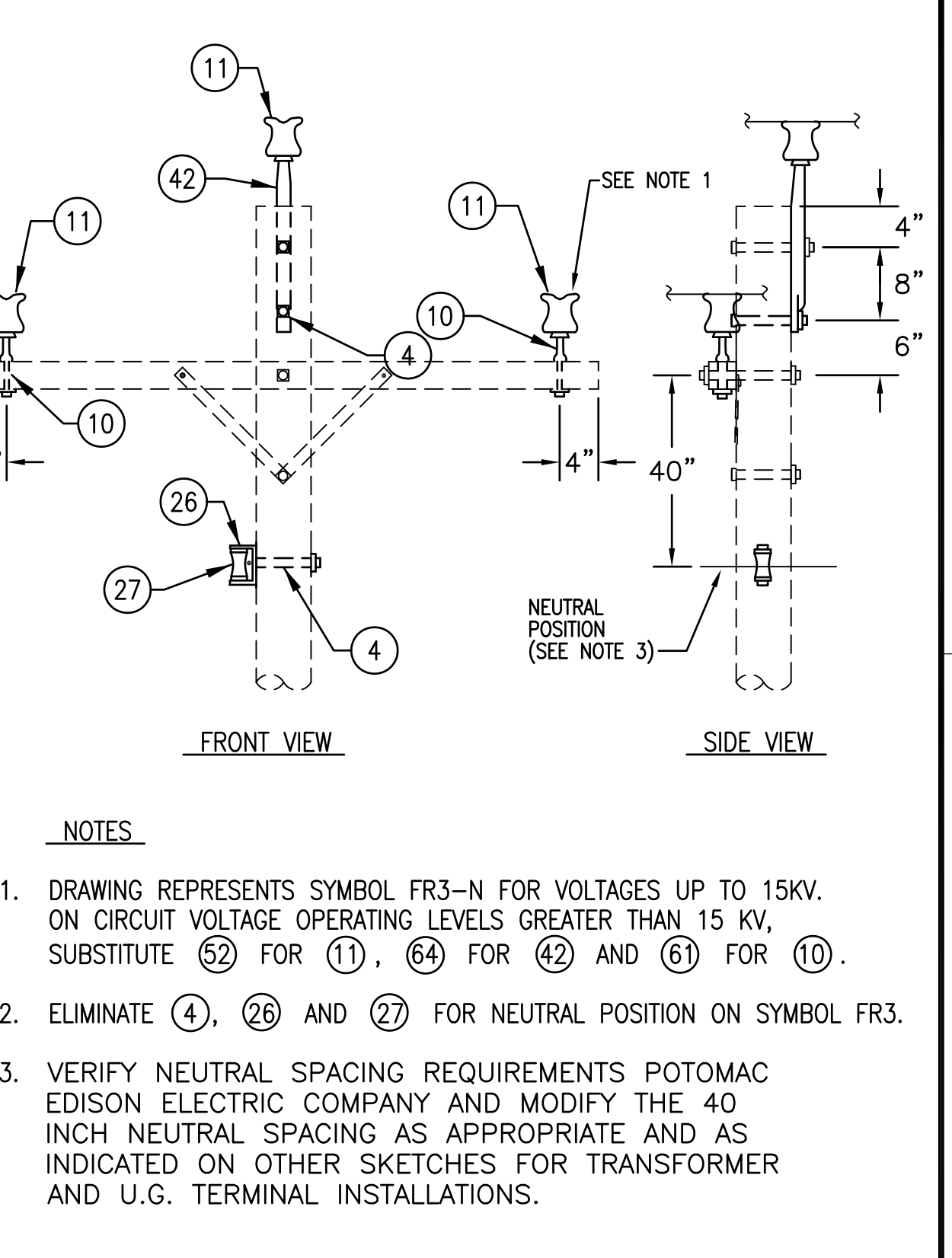
DX-DDE-FB / DX-DDE-AB



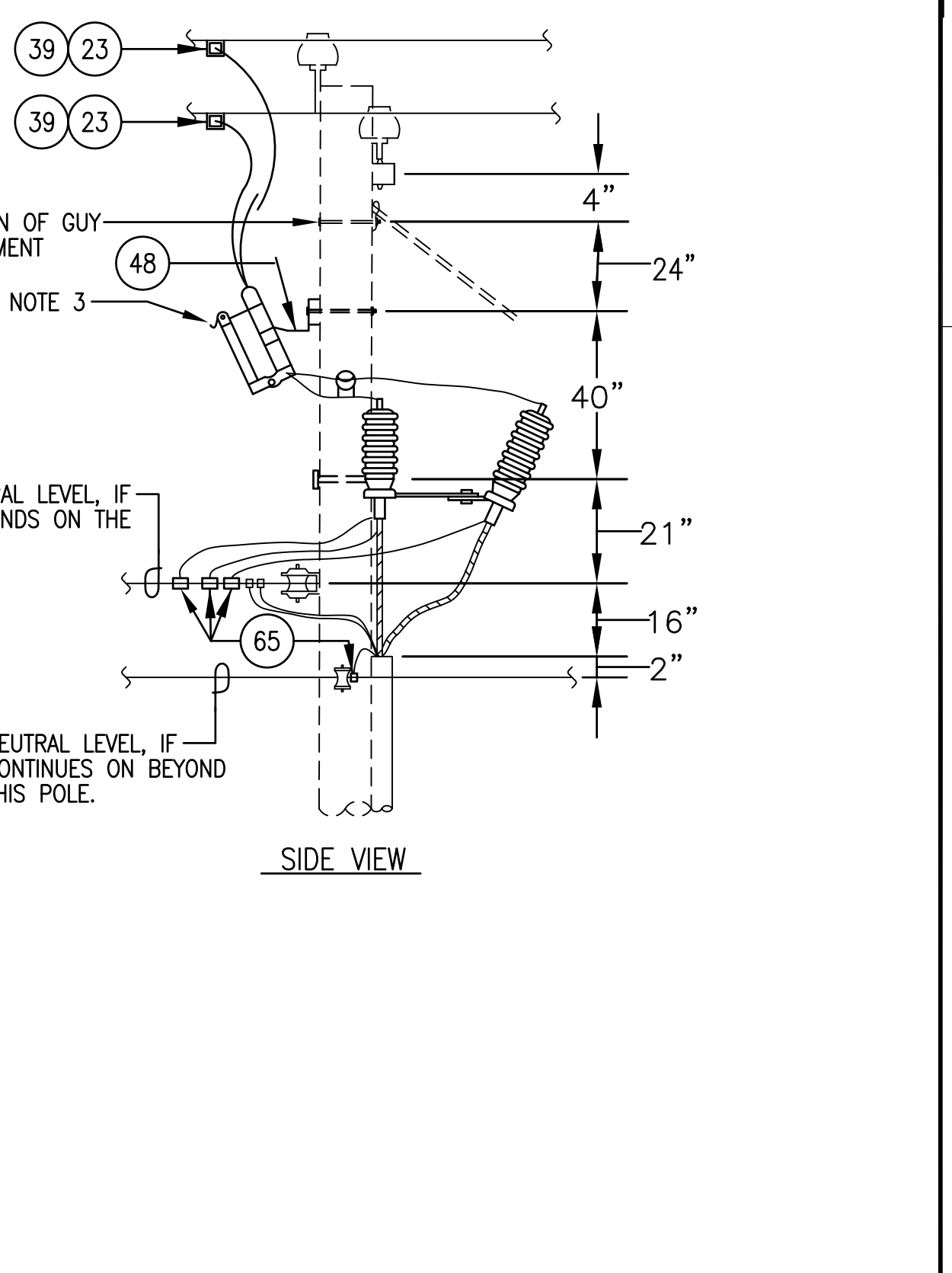
U.G. TERMINAL (0-25KV)

- POLE LINE MATERIAL LIST
- TRI-MOUNT BRACKET
- TERMINATOR
- MOUNTING BRACKET
- CABLE GRIP HANGER
- LINE POST INSULATOR
- STUD, 3/4" X 1-3/4"
- LINE POST INSULATOR
- TRIPLE INSULATOR BRACKET
- ANGLE CLAMP
- INSULATOR, LINE POST CLAMP
- 4' CROSSARM
- CROSSARM GAIN BRACKET
- PULLEY BRACKET
- WEDGE CLAMP
- MIDSPAN SERVICE CLAMP
- STUD, 7"
- SADDLE, ANGLE
- SADDLE CROSSARM
- FITTING, POLE TOP
- CONNECTOR
- SUSPENSION CLAMP
- TIE, SERVICE CABLE
- 54" FIBERGLASS STRAIN INSULATOR
- PVC RISER SHIELD
- PVC EXTENSION SHIELD
- PVC BACK PLATE
- 8' WOOD CROSSARM WITH CROSS SECTION DIMENSIONS OF 4 3/4" X 5 3/4"
- 10' WOOD CROSSARM WITH CROSS SECTION DIMENSIONS OF 4 3/4" X 5 3/4"
- BACK-UP CURRENT LIMITING FUSE

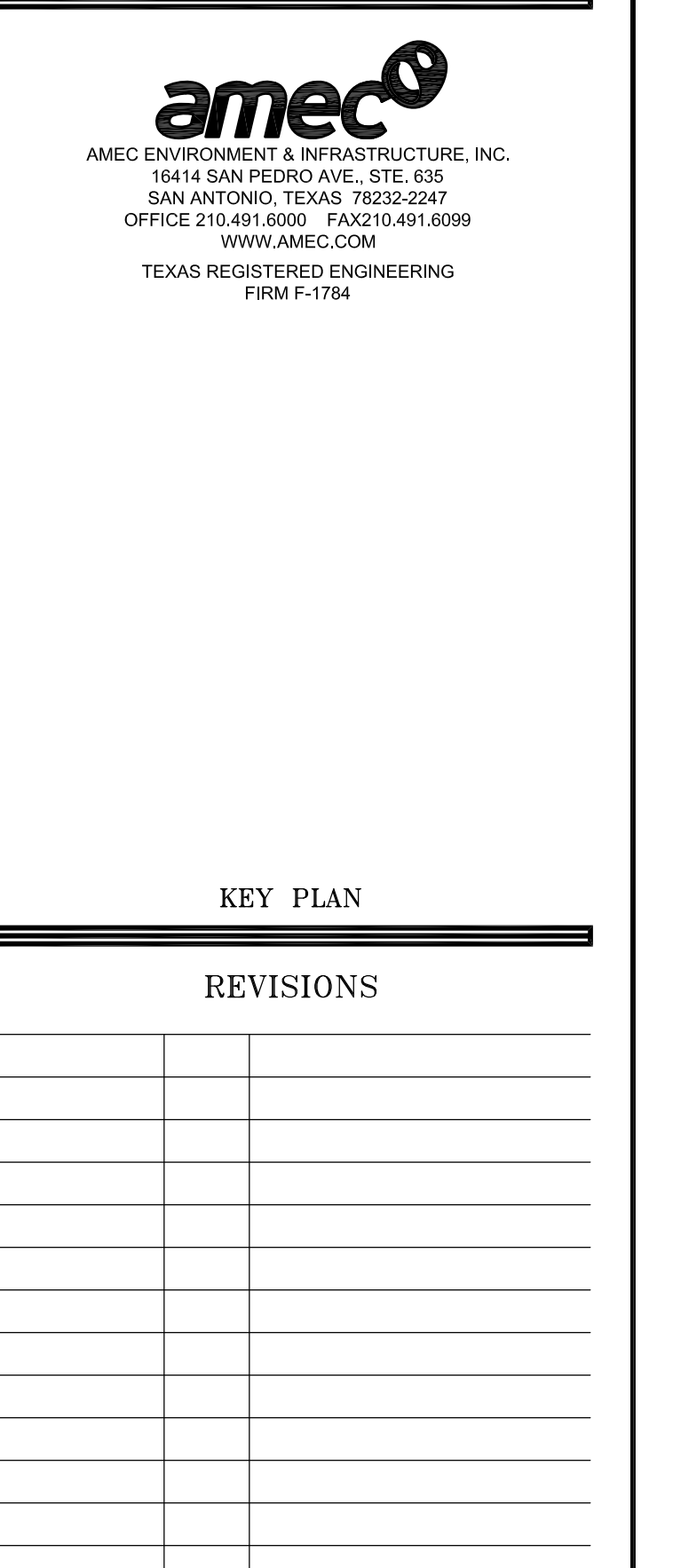
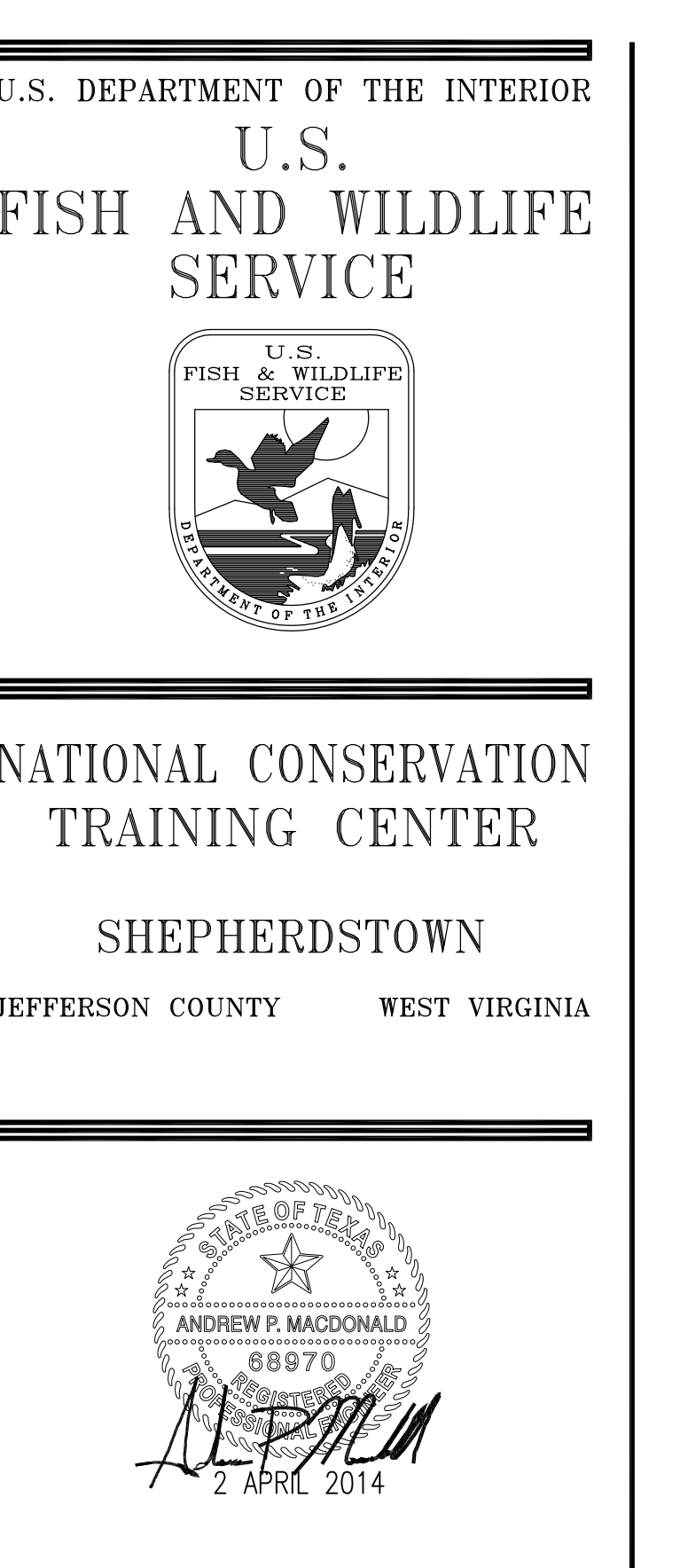
POLE LINE MATERIAL LIST



FR3-N, FR3 (0-50KV)



U.G. TERMINAL (0-25KV)



KEY PLAN

REVISIONS

NO.	DESCRIPTION

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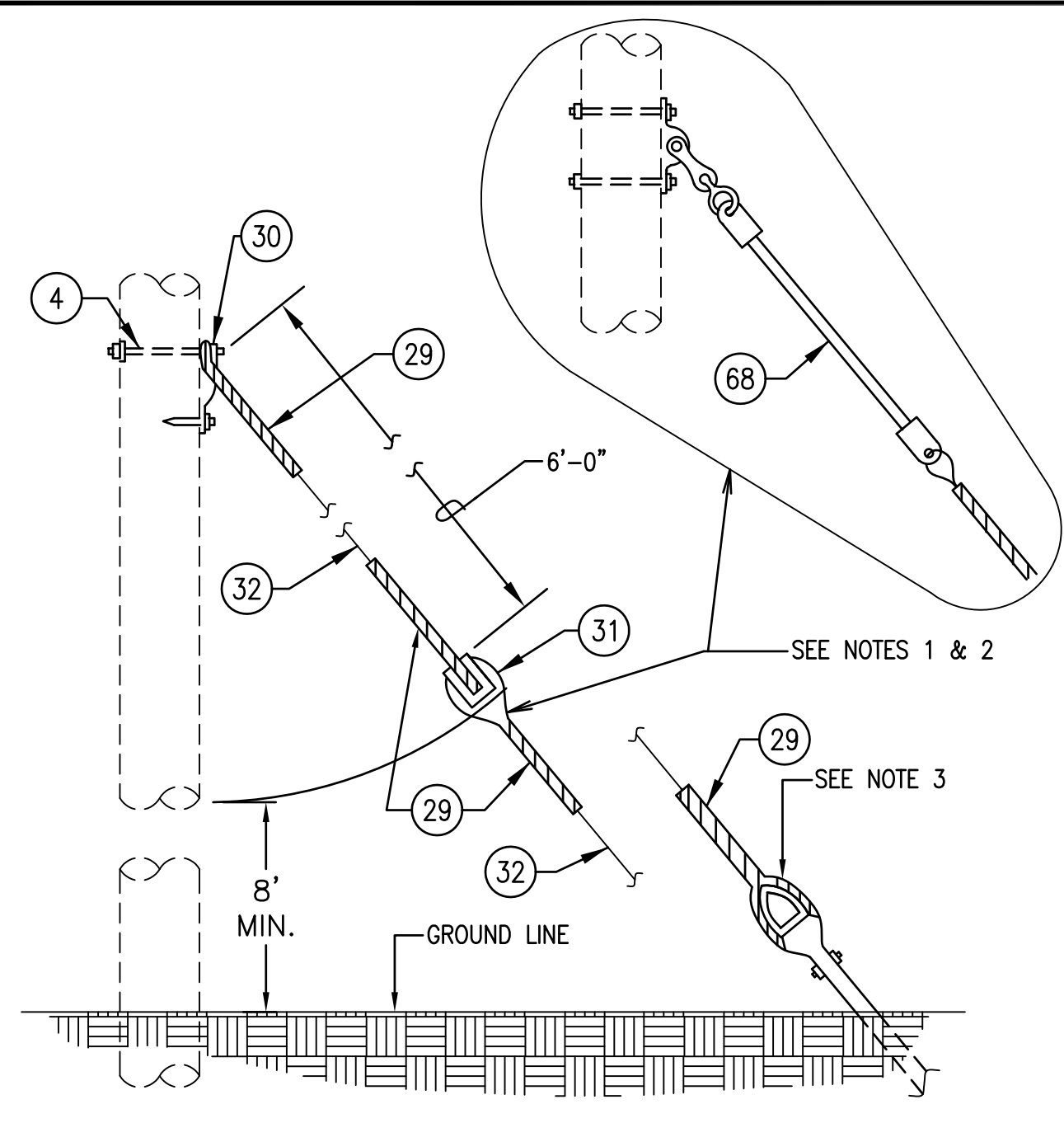
EMERGENCY POWER UPGRADES
NCTC - SHEPHERDSTOWN, WV

ELECTRICAL DETAILS

DRAWING NO. ES5.2

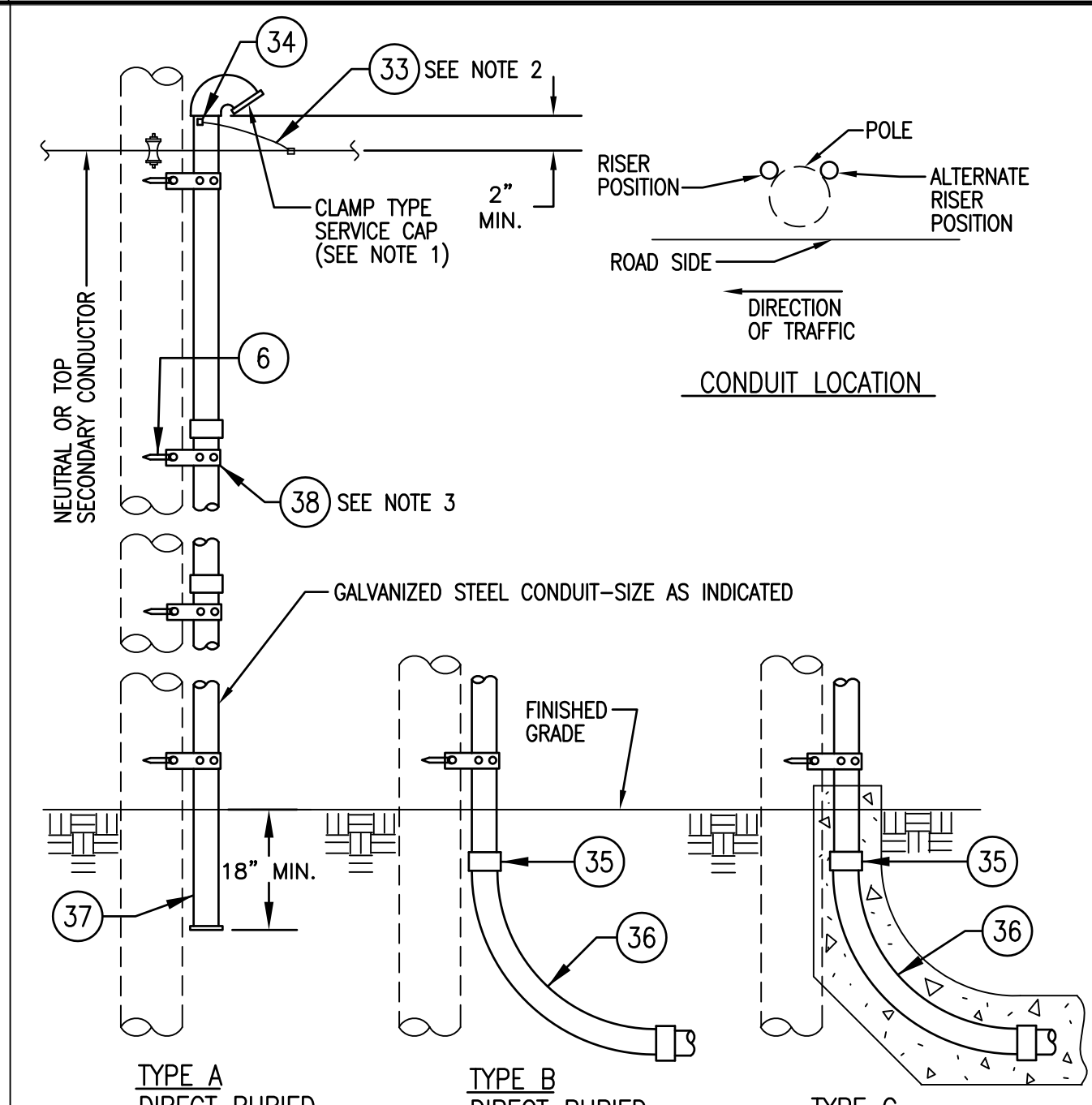
Scale: SHEET 026 OF 027

DRAWING NO. XXX-XX-xxxx-000.0



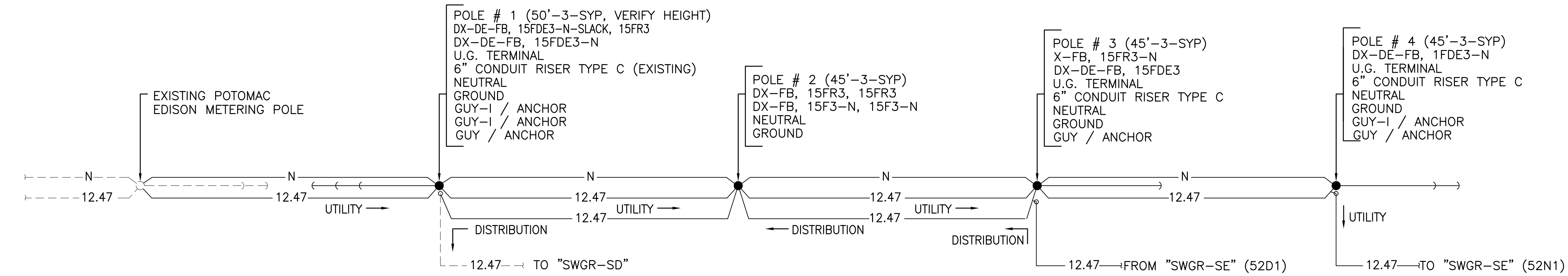
- NOTES**
- DRAWING REPRESENTS SYMBOL FOR "GUY-I". OMIT ITEM (31) FOR THE "GUY" SYMBOL.
 - ON CIRCUIT OPERATING VOLTAGES GREATER THAN 15KV, SUBSTITUTE (68) FOR (31).
 - COORDINATE INSTALLATION WITH ANCHOR AS SPECIFIED.
 - UTILIZE ITEM (68) WHEN GUYING ATTACHMENT IS LOCATED IN THE PRIMARY AREA OF THE POLE AS INDICATED BY SPECIFIC DESIGN REQUIREMENTS PROVIDED.
 - BOND ALL GUYS (SUPPLY & COMMUNICATION) AND CONNECT TO POLE GROUND AND SYSTEM NEUTRAL (IF EXISTING).

GUY-I / GUY



- NOTES**
- ON CONDUIT RISER FOR PRIMARY CIRCUITS, ELIMINATE SERVICE CAP AND PROVIDE GROUNDING TYPE INSULATING BUSHING.
 - BOND CONDUIT TO POLE GROUND AND SYSTEM NEUTRAL (IF EXISTING). SEE GROUNDING NOTES ON SKETCH OH-41.
 - SPACE STRAPS AT MAXIMUM OF 4' INTERVALS.

CONDUIT RISER (SIZE AND TYPE AS INDICATED)



- NOTE**
- SEE SYMBOL DETAIL METHODOLOGY ON SHEET ES5.2 AND SYMBOL DETAILS ON SHEET ES5.2 AND ES5.3.

1 OVERHEAD PRIMARY SCHEMATIC
ES5.3/ES5.3 SCALE: NOT TO SCALE



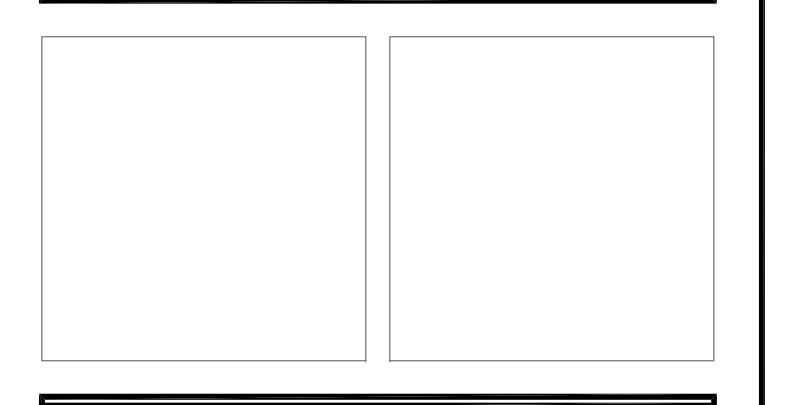
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FIRM F-1784

KEY PLAN

REVISIONS

NO.	DATE	DESCRIPTION

DATE: 04/02/2014
DRAWN BY: APM
CHECKED BY: APM



EMERGENCY POWER UPGRADES
NCTC - SHEPHERDSTOWN, WV

ELECTRICAL DETAILS

DRAWING NO.
ES5.3

Scale: SHEET 027 OF 027
DRAWING NO.
XXX-XX-xxxx-000.0