DOCKETED	
Docket Number:	01-AFC-07C
Project Title:	01-AFC-7C Russell City Energy Company
TN #:	224019
Document Title:	Applicant's Responses to Staff's Data Requests, Set 1, A1 through A15
Description:	N/A
Filer:	Deric Wittenborn
Organization:	Ellison Schneider Harris & Donlan LLP
Submitter Role:	Applicant
Submission Date:	6/29/2018 1:49:15 PM
Docketed Date:	6/29/2018

Russell City Energy Company, LLC

717 TEXAS AVENUE
SUITE 1000
HOUSTON, TX 77002

June 29, 2018

John Heiser
Compliance Project Manager
Siting, Transmission and
Environmental Protection (STEP Division)
California Energy Commission
1516 Ninth Street, MS-2000
Sacramento, CA 95814
John.Heiser@energy.ca.gov

RE: Docket No. 01-AFC-07C: Petition for Modification
Responses to Staff's Data Requests, Set 1, A1 through A15

Dear Mr. Heiser:

On behalf of the Russell City Energy Center, Russell City Energy Company, LLC ("Project Owner") submits the following responses to California Energy Commission ("Commission") Staff's Data Requests Set 1.

If you have any questions regarding these responses, please contact Barbara McBride at 925-570-0849 or Barbara.McBride@calpine.com.

Sincerely,

/S/

Barbara McBride

RUSSELL CITY ENERGY COMPANY, LLC

RESPONSES TO STAFF'S DATA REQUESTS, SET 1, A1 THROUGH A15

AIR QUALITY

A1. Please provide proposed edits and modifications to the current conditions of certification necessary for the licensing, construction, commissioning, operation, testing, and maintenance of the black start system and associated components.

RESPONSE: The Project Owner proposes the following modifications to the current conditions of certification for the Project:

Russell City Energy Center
Permit Conditions
(A) Definitions:

Black Start Emergency Operations: Operations of the black start-designated gas turbine, battery energy storage system and associated electrical, data control and continuous emissions monitoring systems, including start-up, shutdown, restart, full speed no load operation, and block loading and ramping of the black start designated gas turbines (i.e., S-1 or S-3) from minimum load to normal operating ranges in order to restore grid electrical power in the event of an outage. Start-up and shutdown of the designated gas turbine during black start emergency operations shall not constitute start-up and shutdown events subject to the limits provided by condition AQ-20.

AQ-SC7 The facility's emissions shall not exceed 1,225 lbs of NOx per day during the June 1 to September 30 periods, **except on days during which black start emergency operations occur**. In addition, NOx emissions in excess of 848 lbs per calendar day shall be mitigated through the surrender of emission reduction credits (ERCs). The amount of credits to be surrendered shall be the difference between 848 lbs per day and the actual daily emissions.

AQ-19. The owner/operator shall ensure that the gas turbines (S-1 & S-3) and HRSGs (S-2 & S-4) comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode. Requirements (a) through (h) do not apply during a gas turbine start-up, combustor tuning operation, **black start emergency operations** or shutdown. (BACT, PSD, and Regulation 2, Rule 5)

AQ-22. The owner/operator shall not allow total combined emissions from the gas turbines and HRSGs (S-1, S-2, S-3 & S-4), S-5 Cooling Tower, and S-6 Fire Pump Diesel Engine, including emissions generated during gas turbine start-ups, combustor tuning, and shutdowns to exceed the following limits during

any calendar day, **except on days during which black start emergency operations occur**:

New Condition

AQ-50. The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM10, and sulfur dioxide that are emitted by Gas Turbines S-1 and S-3 during black start emergency operations shall be reported to the District Engineering and Enforcement Division within 60 days following the conclusion of black start emergency operations.

A2. Please provide copies of all substantive District correspondence regarding the application to the District, including application supplements and e-mails, within one week of submittal or receipt. This request is in effect until the final Commission Decision has been docketed.

RESPONSE: The Project Owner will provide copies of substantive correspondence with the District regarding the Petition in a timely manner.

A3-A7. Please confirm whether or not any commissioning or annual readiness testing would be required by California ISO.

RESPONSE: The Air Quality Permit Application to the Bay Area Air Quality Management District ("BAAQMD") is provided as Attachment DR-A3. As explained in the application, all required commissioning and readiness testing will be conducted within existing permitted limits set forth in the Conditions of Certification for the Project. The low load operation required during readiness testing will be minimal and the only time compliance with the permitted emissions may not be achieved is during emergency events as defined by the California Independent System Operator ("CAISO").

A3. Please provide the estimated schedule of commissioning and black start readiness testing of the black start system if required by California ISO.

RESPONSE: The estimated commissioning schedule is 28 business days or approximately 6 weeks. Once the unit has been commissioned, then routine "readiness testing" will need to be performed at least once in three years per CAISO black start operating procedures (procedure 5360). The Battery Energy Storage System ("BESS") can be ready to test in less than 30 minutes after notification assuming that the facility (operations staff, plant mechanical and electrical equipment etc.) is ready, but these tests are typically planned well in advance. The actual duration of the readiness test after start is expected to be less than 1 hour.

A4. Please describe commissioning activities and a typical readiness test for the black start system.

RESPONSE: The readiness test for the black start system will require the system to effectively start the gas turbine within three start up attempts. Once the gas turbine has been successfully started, the gas turbine will only need to run for a short period of time (< 30 minutes) at full speed no load operation. At that point, the gas turbine will continue on with a normal start up. This procedure will be identical for any readiness testing required by the CAISO on a periodic basis.

Commissioning activities include the following:

Switchgear Modifications and BESS System
Motor Control Center ("MCC") Tie Breakers Commission and Test
MCC Back Feed to BESS MV switchgear Commission and Test
MV Switchgear - Commission & Test
BESS Auxiliary Transformer - Commission & Test
BESS Isolation Transformer - Commission & Test
BESS Power Conversion System ("PCS") - Commission & Test
BESS Energy Storage Plant Controller ("ESPC") - Commission & Test
BESS Enclosure - Commission & Test
Direct Current ("DC") Block - Commission & Test
BESS Diagnostic Test
Step & Limit Test
BESS System Integration Test
Capacity Test
Grid Forming test- BESS only
MCC Grid Forming testing - simulate a plant 1x0 startup
Synchronize across MCC Auxiliary Power transformer between BESS and GT
Turbine Blackstart testing
Synchronize of MCC and Turbine in black start mode

A5. Please estimate facility emissions during the commissioning and annual readiness testing of the black start system, and provide any calculation spreadsheets with the embedded calculations live and intact.

RESPONSE: Facility emissions during the commissioning and readiness testing will be in compliance with all existing permit conditions. The calculations are included in Attachment DR-A3.

A6. Please provide exhaust stack parameters (including temperature, air pollutant emissions, and vertical velocity) over the black start

combustion turbine operating range during commissioning, or readiness testing.

RESPONSE: There are no changes in exhaust stack parameters associated with black start. The exhaust stack parameters will be identical to normal operations during a normal start up.

A7. Please provide facility air quality modeling during the commissioning and annual readiness testing of the black start system. Compare ground level incremental impacts for minimum combustion turbine load and normal operation combustion turbine loads.

RESPONSE: Emissions will be in the range already analyzed in the Final Decision and within the limits authorized by the Project's Conditions of Certification. Therefore, there will be no significant impacts from the modification, and additional modeling is not necessary.

CULTURAL RESOURCES

A8. Please describe any new piping or conduit that would involve ground disturbing activities such as trenching, boring or excavation for footings or other structures. Include a description of the size of the ground disturbance and the depth of excavation required.

RESPONSE: PVC pipe and conduit are expected to be six inches in diameter or smaller. The maximum depth for piping and conduit will be 36 inches. The estimated maximum size of the cable trench is 36 inches wide by 2 feet deep, with a potential one to two foot buffer for over trenching. The estimated depth for drilled piers is six feet. The maximum expected over excavation depth for concrete slab-type foundations is 6 feet.

A9. Please note and label on the site plan (Figure 1) the areas where additional ground-disturbance beyond the concrete pad is proposed (see# 1 above).

RESPONSE: Please see Attachments DR-A9P and DR-A12S, which modify Figures 2 and 3 to show the expected areas where ground-disturbance beyond concrete would occur. Attachment DR-A9P represents the primary site while Attachment DR-A12S attached represents the secondary (north) site.

A10. Please note on the site plan (Figure 1) the location of the proposed laydown and parking area(s) and describe the surface conditions and whether any ground disturbing activities would occur at the location(s).

RESPONSE: For construction the areas for parking and laydown are shown on Attachment DR-A10. The site surface for temporary parking and laydown is gravel and there are no ground disturbing activities expected at that location. For operations, no new parking locations are proposed because existing parking spaces around the main administrative building (directly north of switchyard) will be utilized.

GEOLOGY/ PALEONTOLOGY

A11. Please provide information on the depth and lateral extent of ground disturbance associated with construction of the foundation for both of the proposed BESS systems.

RESPONSE: For the drilled pier type foundations, there will be minimal disturbance to lateral areas. For slab-type foundations, adjacent areas approximately 2 feet beyond all sides of the foundations will be disturbed for formwork placement and removal. Drilled piers, up to an estimated depth of 8 feet, are planned for the inverters and battery container foundations.

A12. Please provide a plan showing the footprint of the proposed area of excavation and cross-section of excavations that will be required for foundation construction.

RESPONSE: Attachment DR-A12P (primary site) and Attachment DR-A12S (secondary site) show the estimated footprint and cross-section of excavation for foundation construction.

TRAFFIC AND TRANSPORTATION

A13. Please provide the average and peak number of truck trips during construction.

RESPONSE: There will be an average of eight truck trips during construction, with an estimated peak number of 14.

VISUAL RESOURCES

A14. Please provide the heights of the batteries, inverters, collector switchgears, and transformers.

RESPONSE: Batteries will be housed in a modified ISO container that will measure 40 feet long by eight feet wide by nine feet high. The inverters will measure 11 feet, six inches long by four feet, six inches wide by seven feet, ten inches high. Selection of the switchgear and isolation transformers will be made during detailed design, with the estimated dimensions of the switchgear will be 18 feet long by six feet wide by nine feet high and the estimated dimensions of the isolation transformer will be 11 feet wide by six feet wide by 11 feet high. The control house will be reach in style and will measure approximately 10 feet, six inches long X three feet, six inches wide X eight feet high. The site may be raised by 18" to 24" which can add to the equipment height from the existing grade.

PROJECT DESCRIPTION

A15. Please indicate how these batteries will be kept in either a raking system or enclosure. Please provide drawings of the BESS indicating dimensions and call outs.

RESPONSE: Please see Attachment DR-A15. Each container has a series of four double doors down each side of the container to provide access to the battery racks. HVAC, fire protection, communication, auxiliary power supply is included on either end of the enclosure, accessible through dedicated doors located on either end.

RUSSELL CITY ENERGY COMPANY, LLC

RESPONSES TO STAFF'S DATA REQUESTS, SET 1, A1 THROUGH A15

ATTACHMENT DR-A3

Application for Authority to Construct

BAAQMD Permit Modification

Russell City Energy Center

Hayward, California

Submitted to

Bay Area Air Quality Management District

Submitted by

Russell City Energy Company, LLC

Prepared by

Atmospheric Dynamics, Inc.

ATMOSPHERIC DYNAMICS, INC
Meteorological & Air Quality Modeling

June 2018

Introduction

In December 2017, the California Independent System Operator (CAISO) selected Russell City Energy Company, LLC (Applicant) for "black start" capability at its Russell City Energy Center (RCEC) as a result of a competitive bid process. Black start capability refers to the ability of a generating unit or facility to begin operating and delivering electric power without external assistance from the electric system. Black start resources are essential to restart other generation and to restore power to the grid in the event of a regional system outage (CAISO, 2017). The restoration of power to the grid ensures the continued operation of essential public services for public safety and convenience and helps curb the use and associated emissions of diesel backup generators in response to a widespread system outage. The CAISO is procuring black start resources to enhance the system restoration time in the greater San Francisco Bay Area to ensure that the area's service restoration following a widespread system outage is reasonably consistent with service restoration for other major population centers in the state. The CAISO requires black start resources to have a number of attributes in place including the ability to start without external power from the grid, make a minimum number of startups, operate in stand-alone and parallel modes, have start-up load pickup capability, and produce and absorb reactive power.

To provide the black start capability, the Applicant is proposing to modify RCEC's design to install a lithium-ion Battery Energy Storage System (BESS). The BESS ranges in size from six (6) to ten (10) megawatts (MW) and is designed for a duty large enough to start either of the two (2) gas turbines in a 1x0 mode to energize a 230kV bus within three hours of a grid-wide blackout (. This system would play a vital role in restoring power to the grid in accordance with CAISO requirements.

In order to respond to the grid-wide blackout as determined by CAISO, the turbine in a 1x0 configuration would need to operate up to 48 hours in full speed no load (FSNL) while grid stability is restored. During this time, the turbine emissions would not be compliant with the permitted limits for oxides of nitrogen (NOx), carbon monoxide (CO) and precursor organic compounds (POCs).

The Applicant is seeking an amendment to RCEC's existing Permit to Operate, Major Facility Review (Title V) Permit and Prevention of Significant Deterioration (PSD) Permit to allow it to assist in restoring the power grid in the event of a system outage by operating a single turbine at FSNL and at minimum load for up to 48 hours per the instructions of the CAISO.

Included with the application is the Bay Area Air Quality Management District (BAAQMD) form P-101B and the application fee of $3,581 which is based on Regulation 3, Schedule P for a minor permit revision.

Project Description

Current Configuration

RCEC is an electric generating facility located in the City of Hayward located on Depot Road. The facility began selling electricity to the grid as a nominal 600- MW combined-cycle power plant in

August of 2013. The permitted equipment at RCEC includes two (2) Siemens Westinghouse "F-class" combustion turbine generators (CTGs) equipped with dry, low NO_x combustors and steam injection capability; two heat recovery steam generators (HRSG); a single condensing steam turbine-generator (STG); a dearerating surface condenser; a mechanical draft hybrid (wet/dry); plume-abated cooling tower; and, support equipment.

In accordance with theBAAQMD Regulation 2, Rule 2, Section 206, the facility currently meets the requirements of Best Available Control Technology (BACT) with the following limits:

- NO_x 2.0 ppm (1-hour)
- CO 2.0 ppm (1-hour)
- POC 2.86 lb/hr
- PM10 7.5 lb/hr
- SO_x 6.21 lb/hr

Proposed RCEC Project Specifications

The proposed modification is necessary to provide Black start capabilities. RCEC was selected by the CAISO to provide Black Start Services. The North American Electric Reliability Corporation (NERC) has adopted various reliability standards for operation of the electricity grid, including standards for restoration in the event of a widespread system outage. The CAISO has recently adopted revisions to its tariff, which have been approved by the Federal Energy Regulatory Commission (FERC) (161 FERC ¶ 61,116, Doc. No. ER17-2237-000, Oct. 30, 2017). Those tariff revisions enable the CAISO to procure incremental black start capability to enhance system restoration times in the greater San Francisco Bay Area. The resources selected must be able to operate to reenergize the grid in the event of a system outage at the instruction of the CAISO.

In order to fulfill these capabilities, the Applicant will install a battery capable of starting a single gas turbine in the event that such an outage occurs and there is no power available from the grid. RCEC would operate pursuant to the instructions of the CAISO to restore power to the electricity grid upon the occurrence of a system outage. This could require operation of a gas turbine at FSNL for an extended period of time, when emissions controls will not be operable or achieving optimal control efficiencies, resulting in emissions in excess of currently permitted hourly or daily limits for normal operations. It bears emphasizing, however, that the operation of RCEC to provide black start capabilities would shorten the duration of time of any outage in the greater San Francisco Bay Area and, accordingly, any such operation will reduce the duration of operation of emergency backup generators and the corresponding emissions from same in the Bay Area.

The BESS will be located on either the Northern Location (Site A) or the Southern Location (Site B) shown on Figure 1. The BESS project includes an installation of a 6 to 10 MW lithium-ion (Li-ion) Battery. This energy storage system is comprised of the storage device, the interconnection and the communication system.

The Northern Location has a footprint of approximately 15,000 square feet and includes a larger battery system than the Southern Location. However,

Figure 1

both BESS configurations meet the black start system requirements. The BESS will include a combination of battery modules, inverters and transformers. If built at the Southern Location, which is approximately 10,000 square feet, the BESS will have fewer inverters with switched capacitor banks to support the high amount, but short time frame, of reactive power needed to the start the large motors associated with startup cycle during a Black Start event.

The BESS will be tied into the power plant's Motor Control Centers (MCC)s. The two primary MCCs will be modified by the inclusion of tie breakers to enable one continuous MCC with a single BESS connection enabling the start of either gas turbine. The turbine controls and facility SCADA will be adjusted to enable operation and control of this new Black Start capability from the existing facility control room.

In addition, the project will include an interconnection of the battery to the existing 4160V auxiliary bus through which energy will flow to and from the grid using existing electrical infrastructure and installation of a new and separate revenue meter for monitoring battery activity.

RCEC Emissions During a Black Start

The BESS is being designed to enable black start capabilities on either turbine to support emergency recovery of the electrical grid from a regional blackout event. To do this, the following operational scenarios were considered:

1. Black start of a single turbine from an offline condition
2. Base case, which is FSNL operation of a single turbine up to 48 hours. There may be hours where minimal loads are applied to the turbine.
3. Safe shutdown of a black-start turbine in the event of load rejection/grid blackout and subsequent restart of that unit, up to three (3) starts.

The base case is to successfully start a single turbine and run in a 1x0 mode, carrying all RCEC plant loads until further instructions are provided by CAISO or PG&E. The turbines output would be increased as CAISO begins starting up other units or adds load to the system. The timeframe for system recovery is situation-dependent and cannot be known in advance of an actual grid emergency and resolution of that emergency. However, to emissions estimations from the gas turbine during any such emergency, the Applicant has assumed up to 48 hours of FSNL operation, which includes up to three (3) cold starts[1] and three (3) shutdown events. The additional two startup/shutdown events would cover the scenario where the turbine trips from FSNL and the unit would then be restarted and maintains FSNL. Additionally, after some hours

[1] While referred to here as "cold starts" for purposes of understanding, these consecutive startup event would not meet the definition of a "cold startup" event because, at least in the case of the second and third startup event and possibly in the case of the first as well, black start emergency operations may begin less than 48 hours after the gas turbine was last shutdown. Rather, the successive start-ups and shutdowns occurring as part of a black start would not constitute cold, warm or hot start-ups or shutdown events, as defined by the permit, but would instead comprise part of the proposed newly defined "black start emergency operations."

of FSNL operation, minimal load would be applied to the turbine within a range of 10 to 60 percent. It is possible that the CAISO would then order the black start unit to quickly ramp to base load, at which point it would no longer be operating out of compliance with emissions controls, and request that the second gas turbine be quickly brought online. This may occur while the facility is operating in bypass mode, i.e., without the steam turbine operating. The second turbine's operations would not constitute black start emergency operations, but a normal start-up subject to the limits at condition 20 applicable to same.

During the FSNL and low-load cases occurring as part of black start emergency operations, the turbine exit temperature will not be hot enough for effective NOx control through the use of ammonia injection into the SCR. As a consequence, it is assumed that no level of NOx control would occur, including no control by the dry low NO_x combustors (DLN) which are not effective (operational) at loads less than 50 percent. If the temperature of the catalyst bed reaches the minimum operating temperature, the facility would begin injecting ammonia into the SCR. For control of CO, it was estimated that for the first 24 hours the gas turbine exit temperature will not be hot enough for effective control of CO in the CO catalyst. After 24 hours, the CO catalyst will be at a temperature where CO control will be effective. Table 1 presents the operational scenario and assumed hours of operation for the emergency black start operation.

Table 1
Black Start Schedule

Stage	Activities	Emissions Controls	Duration (time, hrs)
1	1) Three turbine cold starts*	DLN: None SCR/CO: None/None	18 hrs
2	1) Combustion turbine FSNL operation	DLN: None SCR/CO: None/Partial	48 hrs
3	1) Three turbine Shutdowns**	DLN: None SCR/CO: None/None	1.5 hrs

Note:
CO = carbon monoxide
DLN = Dry Low NO_x
SCR = Selective Catalytic Reduction
*** Each startup is a six hour event**
**** Each shutdown is a 0.5 hour event**

Emissions of PM10/2.5 and SO_x would not be expected to exceed any of the existing permit limits. For the emissions of NO_x, CO and POCs, no controls were assumed to be effective during this emergency event. If the operational scenario has an effective exit temperature that would allow for ammonia injection into the SCR, then some level of NO_x controls could be achieved. With the CO catalyst, control of CO and POCs would be based on catalyst temperature, thus some level of control may be achieved.

The emissions presented in Table 2 are based on RCEC CEMS data for NO_x and CO recorded during startup events and during the plant commissioning activities occurring prior to the plant becoming commercially available. For POCs, the emissions are based on data from Siemens and

represent the maximum case at 20 percent load. The cold start and shutdown event emissions are based on currently permitted levels.

Table 2
Estimated Maximum Hourly and Event Emissions Rates During Commissioning

		NO_X	CO	POC	PM_{10}	SO_x
FSNL/Min Load	lb/hr	240	5,700 240[1]	455	7.5	6.21
Cold Start	lb/event	480	2,514	83	45	34
Shutdown	lb/event	40	100	16	3.75	3.11

Source: RCEC Title V, 2016

Note:

CO = carbon monoxide

lb/hr = pounds per hour

[1]CO emissions assume operation of the CO catalyst after 24 hours of operation.

lb/event = pounds per event

NO_x = nitrogen oxide

PM_{10} = sub 10-micron particulate matter

SO_x = sulfur oxide

POC = volatile organic compounds

The maximum emissions are based on 48 hours of FSNL or minimum load operation (whichever is greater) with three startup events and three shutdown events and are summarized in Table 3.

Table 3
Estimated Emissions Rates During the Black Start Emergency Event

		NO_X	CO	POC	PM_{10}	SO_x
Total Emissions	tons/event	6.54	68.43	11.06	0.25	0.21

Event assumes 48 hours FSNL/Min Load with three cold starts (18 hours) and three shutdowns (1.5 hours). The additional starts would account for turbine trips during FSNL or min load operation.
CO emission assume some control of the CO catalyst after 24 hours of operation.

During the black start event, only one turbine would be operating as part of black start operations.

Proposed Modifications to Permit Conditions

Russell City Energy Center
Permit Conditions
(A) Definitions:

Black Start Emergency Operations: Operations of the black start-designated gas turbine, battery energy storage system and associated electrical, data control and continuous emissions monitoring systems, including start-up, shutdown, restart, full speed no load operation, and block loading and ramping of the black start designated gas turbines (i.e., S-1 or S-3) from minimum load to normal operating ranges in order to restore grid electrical power in the event of an outage. Start-up and shutdown of the designated gas turbine during black start emergency operations shall not constitute start-up and shutdown events subject to the limits provided by condition 20.

19. The owner/operator shall ensure that the Gas Turbines (S-1 & S-3) and HRSGs (S-2 & S-4) comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode. Requirements (a) through (h) do not apply during a gas turbine start-up, combustor tuning operation, black start emergency operations or shutdown. (BACT, PSD, and Regulation 2, Rule 5)

…22. The owner/operator shall not allow total combined emissions from the Gas Turbines and HRSGs (S-1, S-2, S-3 & S-4), S-5 Cooling Tower, and S-6 Fire Pump Diesel Engine, including emissions generated during gas turbine start-ups, combustor tuning, and shutdowns to exceed the following limits during any calendar day, except on days during which black start emergency operations occur:

(a) 1,553 pounds of NOx (as NO_2) per day (Cumulative Emissions)

(b) 1,225 pounds of NOx per day during ozone season from June 1 to September 30 (CEC Condition of Certification)

(c) 10,774 pounds of CO per day (PSD)

(d) 295 pounds of POC (as CH4) per day (Cumulative Emissions)

(e) 626 pounds of PM10 per day (PSD)

(f) 292 pounds of SO_2 per day (BACT)

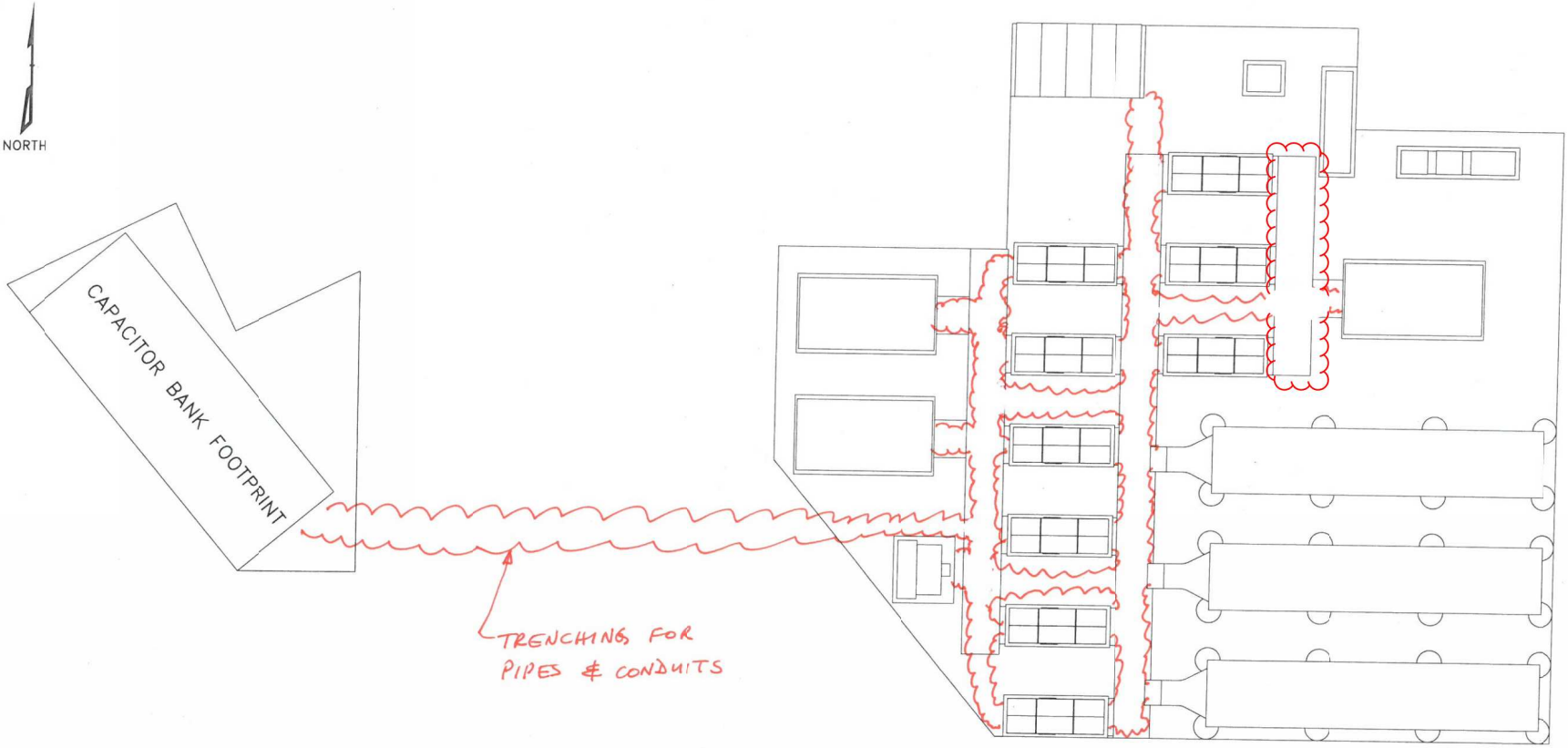
New Condition

50. The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM10, and sulfur dioxide that are emitted by Gas Turbines S-1 and S-3 during black start emergency operations shall be reported to the District Engineering and Enforcement Division within 60 days following the conclusion of black start emergency operations.

RUSSELL CITY ENERGY COMPANY, LLC

RESPONSES TO STAFF'S DATA REQUESTS, SET 1, A1 THROUGH A15

ATTACHMENT DR-A9P



BESS LAYOUT FOR SITE B (PRIMARY SITE)

ENGINEERING NOTES:

1. EQUIPMENT ARRANGEMENT AS SHOWN ON THIS DRAWING IS PRELIMINARY AND SUBJECT TO CHANGE DURING DETAILED DESIGN PHASE.
2. SITE DIMENSIONS BASED ON SK-C-0058-01, REV A AND SK-C-0058-02, REV A.
3. ASSUMED THAT THE BATTERY AREA CONSTRUCTION LIMITS APPLY ONLY TO PERMANENT STRUCTURES AND FOUNDATIONS. DOOR SWINGS AND CLEARANCE REQUIREMENTS (ELECTRICAL/MAINTENANCE) MAY EXTEND BEYOND THE CONSTRUCTION LIMITS, GIVEN THAT THERE IS NO OBSTRUCTION PRESENT.
4. ASSUMED THAT NO FENCE WILL BE REQUIRED.
5. ASSUMED THAT UNDERGROUND COMPONENTS (CONDUITS/GROUNDING) MAY EXTEND BEYOND THE CONSTRUCTION LIMITS, GIVEN THAT THERE IS NO OBSTRUCTION PRESENT.

SKETCH A9P

PRELIMINARY

This document is preliminary in nature, and is not a final signed and sealed document.

Rev	Date	Description	Drawn	Checked	Approved
A	08-JUN-18	PRELIMINARY - FOR BID PURPOSES ONLY	J RAMSEY		

Grid Solutions

Scale	1" = 6'	Standard	
First Issued	Name	Date	
Drawn By			
Checked			
Approved			

CAD File Name: 17061098770-D-200_P

Contract No.

Size: D

Customer: CALPINE CORPORATION
RUSSELL CITY ENERGY CENTER
HAYWARD, CALIFORNIA

Drawing Title: BATTERY ENERGY STORAGE SYSTEM
PRIMARY LOCATION
GENERAL ARRANGEMENT

Drawing Number: 17061098770-D-200_P

Sheet: 1 | Last Sh: 1 | Rev: A

RUSSELL CITY ENERGY COMPANY, LLC

RESPONSES TO STAFF'S DATA REQUESTS, SET 1, A1 THROUGH A15

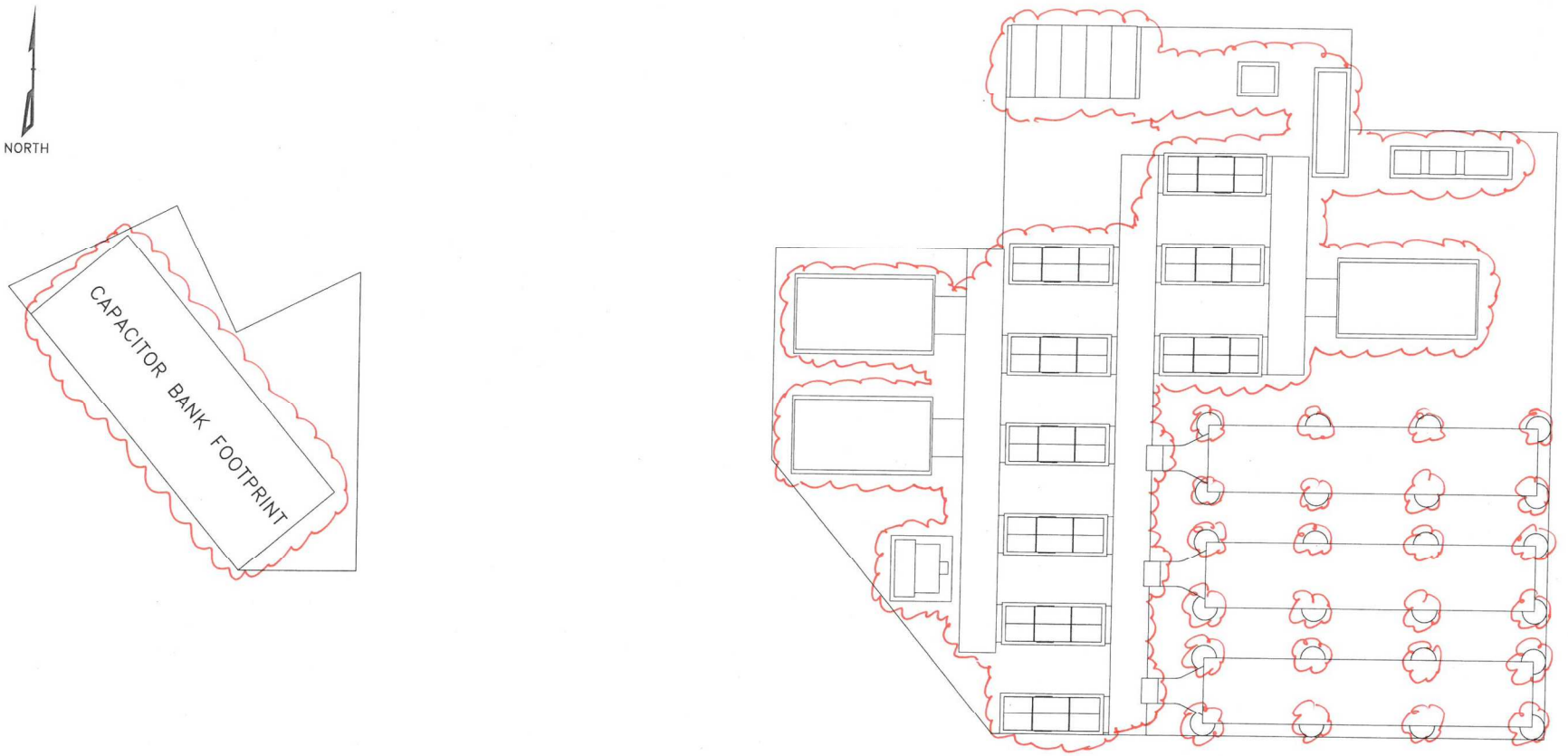
ATTACHMENT DR-A10


SITE A
Contractor parking and laydown
Russell City Energy Center
SITE B
© 2018 Google

RUSSELL CITY ENERGY COMPANY, LLC

RESPONSES TO STAFF'S DATA REQUESTS, SET 1, A1 THROUGH A15

ATTACHMENT DR-A12P



BESS LAYOUT FOR SITE B (PRIMARY SITE)

Attachment DR-A12P

ENGINEERING NOTES:

1. EQUIPMENT ARRANGEMENT AS SHOWN ON THIS DRAWING IS PRELIMINARY AND SUBJECT TO CHANGE DURING DETAILED DESIGN PHASE.
2. SITE DIMENSIONS BASED ON SK-C-0058-01, REV A AND SK-C-0058-02, REV A.
3. ASSUMED THAT THE BATTERY AREA CONSTRUCTION LIMITS APPLY ONLY TO PERMANENT STRUCTURES AND FOUNDATIONS. DOOR SWINGS AND CLEARANCE REQUIREMENTS (ELECTRICAL/MAINTENANCE) MAY EXTEND BEYOND THE CONSTRUCTION LIMITS, GIVEN THAT THERE IS NO OBSTRUCTION PRESENT.
4. ASSUMED THAT NO FENCE WILL BE REQUIRED.
5. ASSUMED THAT UNDERGROUND COMPONENTS (CONDUITS/GROUNDING) MAY EXTEND BEYOND THE CONSTRUCTION LIMITS, GIVEN THAT THERE IS NO OBSTRUCTION PRESENT.

PRELIMINARY

This document is preliminary in nature, and is not a final signed and sealed document.

Dwg Rev	Date	Description	Drawn	Checked	Approved
A	08-JUN-18	PRELIMINARY - FOR BID PURPOSES ONLY	J.RAMSEY		

Grid Solutions

Scale	1" = 6'	Standard	
First Issued	Name	Date	
Drawn By			
Checked			
Approved			

Customer: CALPINE CORPORATION
RUSSELL CITY ENERGY CENTER
HAYWARD, CALIFORNIA

Drawing Title: BATTERY ENERGY STORAGE SYSTEM
PRIMARY LOCATION
GENERAL ARRANGEMENT

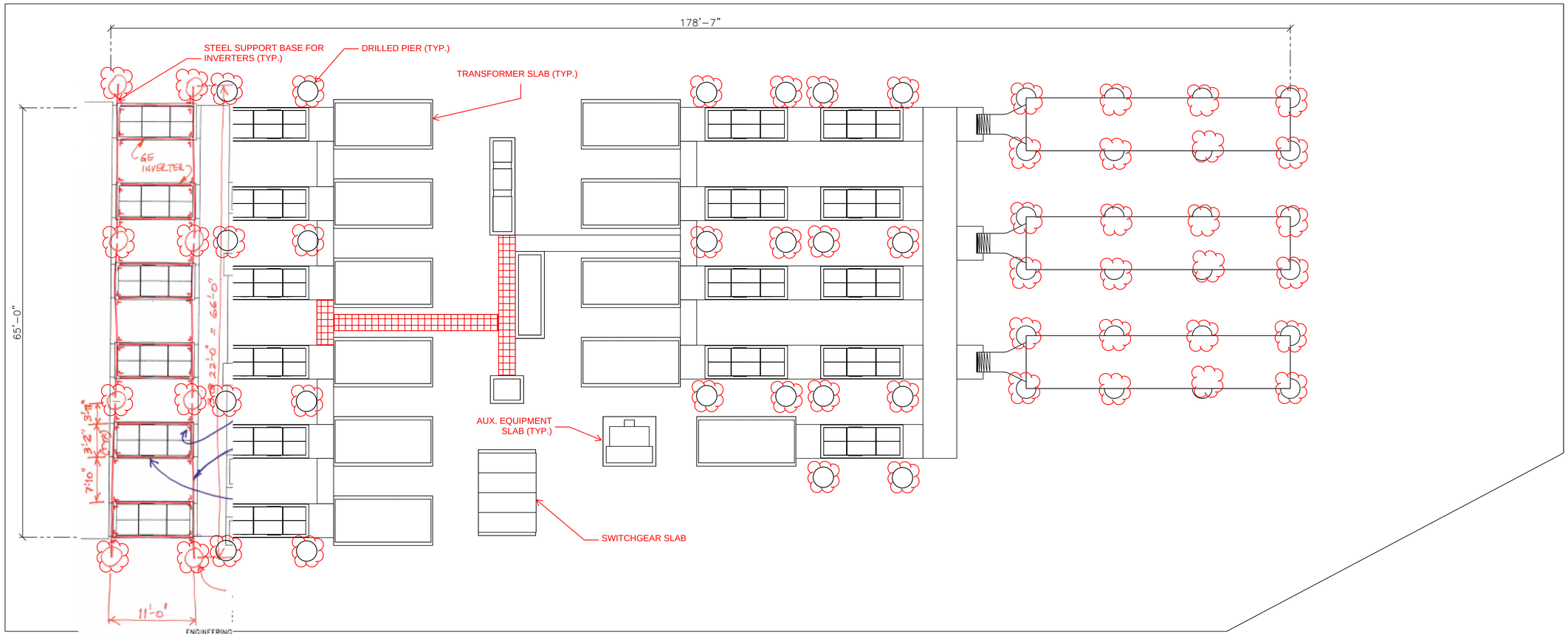
CAD File Name	Contract No.	Size	Drawing Number	Sheet	Last Sht	Rev
17061098770-D-200_P		D	17061098770-D-200_P	1	1	A

RUSSELL CITY ENERGY COMPANY, LLC

RESPONSES TO STAFF'S DATA REQUESTS, SET 1, A1 THROUGH A15

ATTACHMENT DR-A12S

NORTH



BESS LAYOUT FOR SITE A (SECONDARY SITE)

ENGINEERING NOTES:

1. EQUIPMENT ARRANGEMENT AS SHOWN ON THIS DRAWING IS PRELIMINARY AND SUBJECT TO CHANGE DURING DETAILED DESIGN PHASE.

TRENCH

SKETCH A12S

PRELIMINARY

This document is preliminary in nature, and is not a final signed and sealed document.

Dwg Rev	Date	Description	Drawn	Checked	Approved
A	11-JUN-18	PRELIMINARY - FOR BID PURPOSES ONLY	A.BECK		

Grid Solutions

Scale	1" = 8'	Standard	
First Issued	Name	Date	
Drawn By			
Checked			
Approved			

Customer: CALPINE
RUSSELL CITY ENERGY CENTER
HAYWARD, CALIFORNIA

Drawing Title: BATTERY ENERGY STORAGE SYSTEM
GENERAL ARRANGEMENT
SECONDARY LOCATION SITE LAYOUT

CAD File Name	Contract No	Size	Drawing Number	Sheet	Last Sh	Rev
17061098770-D-200_S		D	17061098770-D-200_S	1	1	A

RUSSELL CITY ENERGY COMPANY, LLC

RESPONSES TO STAFF'S DATA REQUESTS, SET 1, A1 THROUGH A15

ATTACHMENT DR-A15

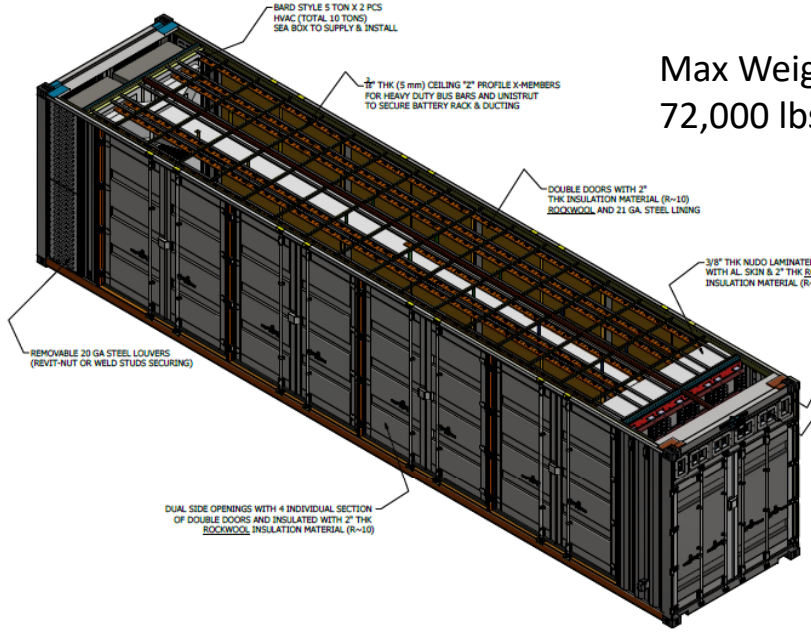
NOTES UNLESS OTHERWISE SPECIFIED

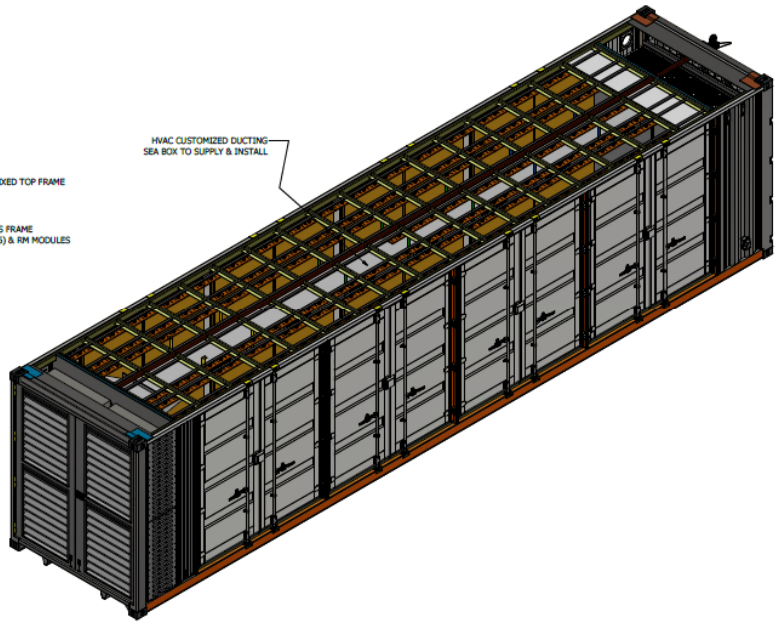
1. DIMENSIONING AND TOLERANCEING TO BE INTERPRETED IN ACCORDANCE WITH ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS, SECONDARY DIMENSIONS ARE IN INCHES.
3. ALL ASSEMBLY DIMENSIONS +1.6/-1.6 mm, (+1/16/-1/16") IF NOT SPECIFIED.

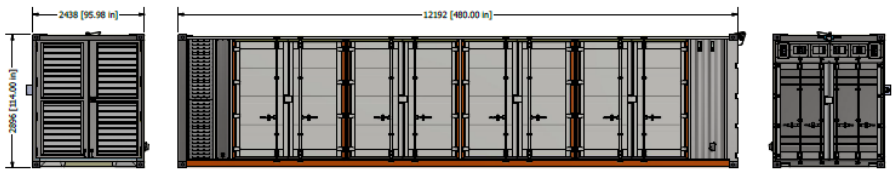
NOTE:
THIS PROPOSAL DRAWING IS BASED ON CUSTOMER CONCEPTUAL DESIGN REQUEST AND IT HAD NOT BEEN APPROVED BY CUSTOMER YET. ONLY PRELIMINARY DESIGN & FOR DISCUSSION.

Max Weight with full battery load
72,000 lbs

DIMENSIONS & WEIGHTS FOR 18063		
DESCRIPTION	IN METRIC UNIT	IN IMPERIAL UNIT
EXTERNAL LENGTH	12,192 mm	480" (40')
EXTERNAL WIDTH	2,438 mm	96" (8'-0")
EXTERNAL HEIGHT	2,896 mm	114" (9'-6")
INTERNAL LENGTH (MIDDLE SECTION)	10,169 mm	400.35" (33'-4 11/16")
INTERNAL WIDTH (SIDE DOOR TO SIDE DOOR)	2,126 mm	83.69" (6'-11 11/16")
INTERNAL HEIGHT (STEEL FLOOR TO ROOF FRP)	2,628 mm	103.47" (8'-7 11/16")
REAR END CARGO DOOR OPENING WIDTH	2,340 mm	92.13" (7'-8 1/4")
REAR END CARGO DOOR OPENING HEIGHT	2,135 mm	84.06" (7')
SIDE CARGO DOOR OPENING WIDTH	2,344	92.28 " (7'-8 1/4")
SIDE CARGO DOOR OPENING HEIGHT	2,543 mm	100.13" (8'-4 1/4")
MAXIMUM GROSS WEIGHT (CUSTOMER TO VERIFY)	30,480 kg	67,200 lbs
TARE WEIGHT (ESTIMATE ONLY)	8,500 kg	18,740 lbs
MAXIMUM PAYLOAD	21,980 kg	48,460 lbs
INTERNAL VOLUM (MIDDLE SECTION)	56.82 cu m	2,006 cu ft







SHOWN CONTAINER ISOMETRIC VIEW (ROOF REMOVED FOR CLARITY)

SEA BOX	CUSTOMER: TBD		JOB QUANTITY: 1	JOB NUMBER: 11491	
	TITLE: 40 ft L x 8 ft W x 9 ft-6" H SIDES OPENER SPECIAL CONTAINER			PROJECT MANAGER: DARREN, C	
	CATEGORY: SB-PROD /CUSTOM CONTAINER			APPROVAL: KEVIN, E	
	DRAWN BY: DARREN	SHEET: 1 OF 4	LAST MODIFIED: 09/05/2017	EPN#: EPN# 00XXXXXX	REVISION: P4

Typical support locations

- Dimensions are standard 40 ft High Cube ISO Container for corners, fixed,
- Middle locations evenly distributed, floating