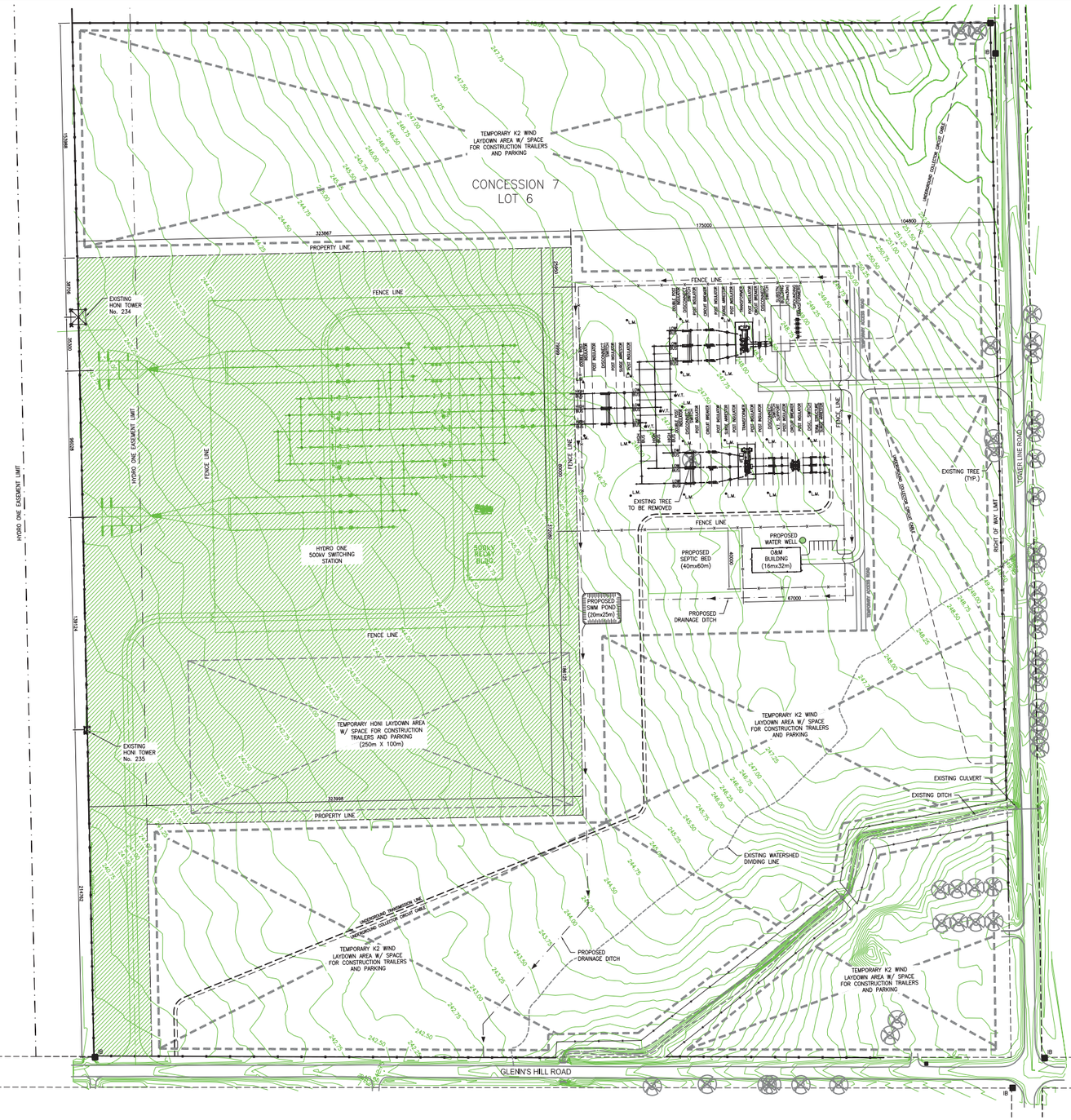
APPENDIX B:
Conceptual Plans and Specifications



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. FENCED AREA IS APPROXIMATE ONLY AND IS CONTINGENT ON GROUNDING GRID DESIGN AND SOIL RESISTIVITY TESTS.
3. PROPERTY AREA INCLUDES K2 SUBSTATION, HONI SWITCHING STATION AND SPACE FOR CONSTRUCTION PARKING, CONSTRUCTION LAYDOWN AREA & CONSTRUCTION TRAILERS.
4. SUBSTATION LAYOUT IS PRELIMINARY ONLY AND MAY CHANGE DUE TO DETAILED DESIGN REQUIREMENTS.

25m 0m 25m 50m 75m 100m
SCALE

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
N	26JUL12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
M	18JUL12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
L	17JUL12	GROUNDING TRANSFORMERS ADDED	M.HALL	BJN	JHM			
K	06JUL12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
J	05JUL12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
I	28JUN12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
H	21JUN12	SWM ADDED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
G	14JUN12	LAYDOWN AREAS ADDED & ISSUED FOR INFO	M.HALL	BJN	JHM			
F	29MAY12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
E	16MAY12	CONTOURS ADDED & ISSUED FOR INFO.	M.HALL	BJN	JHM			
D	27MAR12	DWG SCALE REVISED & ISSUED FOR INFO.	M.HALL	BJN	JHM			
C	13MAR12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
B	09MAR12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
A	25OCT11	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE

REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

PROJECT NO.	ACTIVITY NO.
161973	
SCALE	PACKAGE CODE
1:15,000	

	BY	DDMMMYY
DSN	BJN	OCT.'11
DRN	M.HALL	OCT.'11
CHK	BJN	OCT.'11
APP	JHM	OCT.'11

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00 — K2 WIND POWER PROJECT

SUBJECT

SUBSTATION SITE LAYOUT

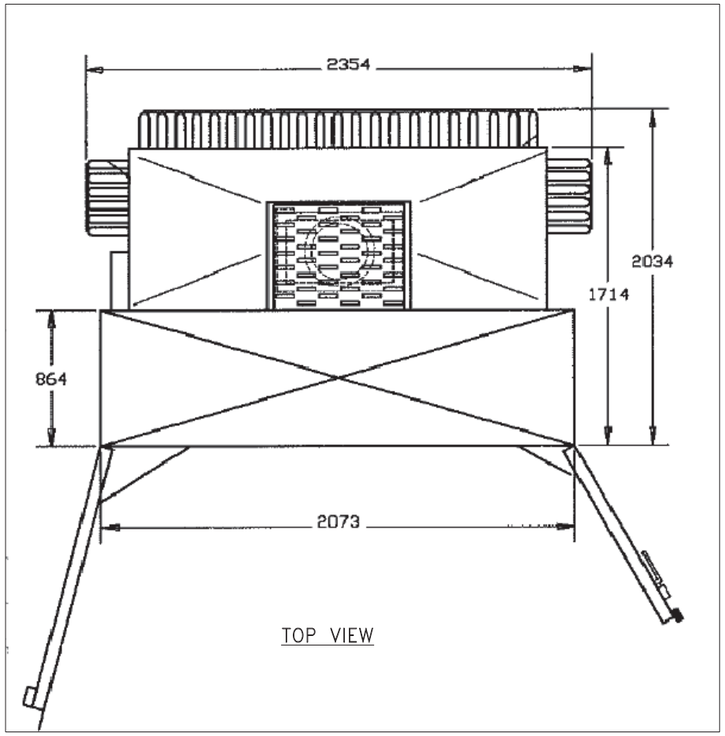
amec

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0053

REV. N

CAD FILE:



TOP VIEW

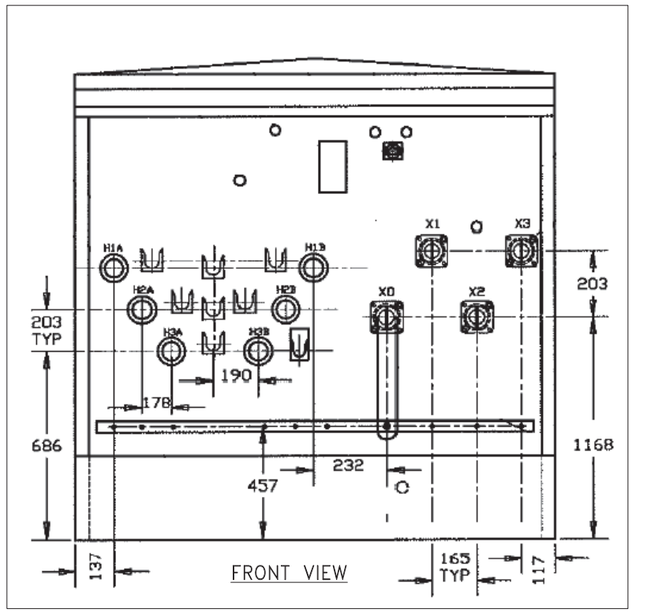
TRANSFORMER DATA

COMPONENT	ESTIMATED MASS IN KGS
CORE AND WINDINGS	2913
TANK AND FITTINGS	1300
OIL (TRANSFORMER – 1847L)	1639

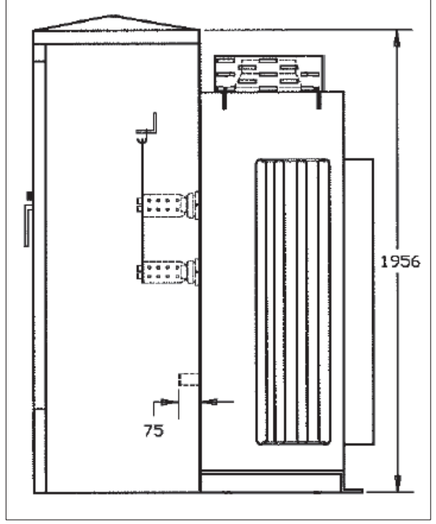
TYPE	OIL FILLED
kVA SIZE	2600
HIGH VOLTAGE	34.5kV
LOW VOLTAGE	120/208kV
NUMBER OF PHASEES	3
TEMP. RISE	65°C
FREQUENCY	60 Hz
IMPEDANCE	6%
CONFIGURATION	Ynd1
NO LOAD LOSSES	2226 @ 100%
LOAD LOSSES	16800 @ 100%

NOTES

1. DIMENSIONS AND DATA SHOWN ARE TYPICAL ONLY AND MAY CHANGE DUE TO ACTUAL TRANSFORMER ORDERED FOR PROJECT.



FRONT VIEW



RIGHT SIDE VIEW

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
A	06JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE
REFERENCES		

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00 — K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.		BY	DDMMMYY
161973		DSN	BJN	JUL.'12
		DRN	M.HALL	JUL.'12
SCALE	PACKAGE CODE	CHK	BJN	JUL.'12
NTS		APP	JHM	JUL.'12

SUBJECT: TYPICAL STATION SERVICE TRANSFORMER PLAN & ELEVATIONS

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0903 — REV. A

CAD FILE: P:\CAD\ELE\SKETCHES\A1-161973-00-141-0903.DWG

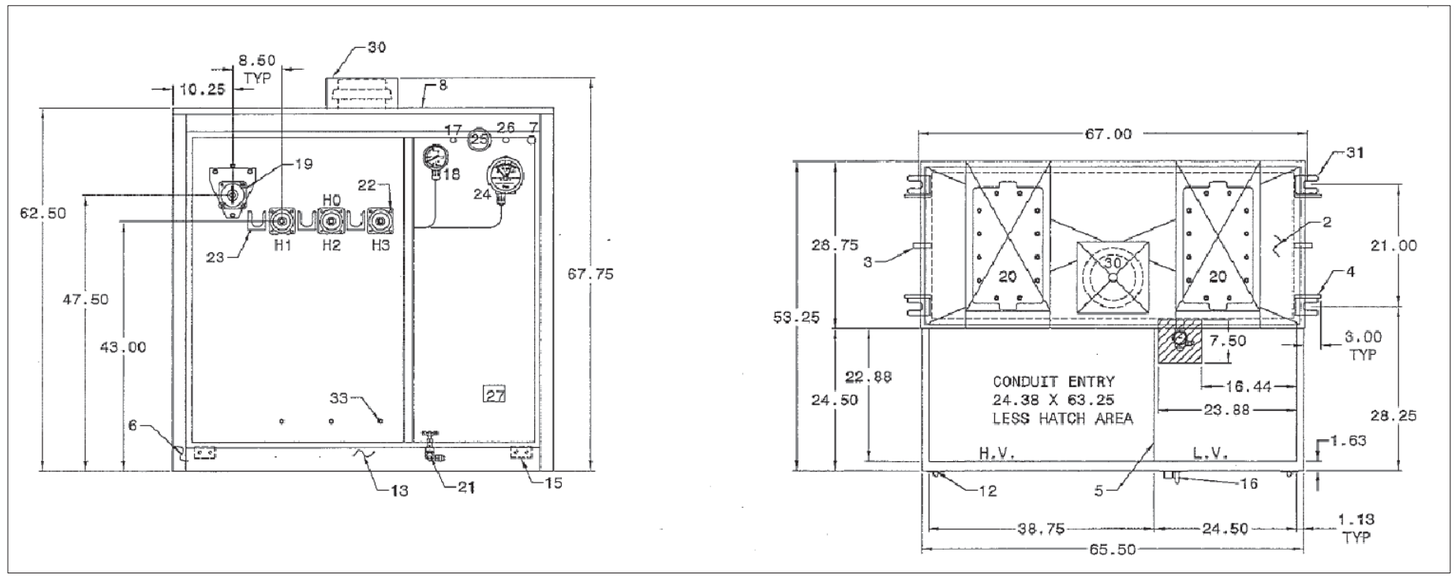
PLOTTED: 06-Jul-12 4:57 PM — USER: MICHAEL DANVILLE

TRANSFORMER DATA

TYPE	OIL FILLED ZIG ZAG
HIGH VOLTAGE	34.5kV
NUMBER OF PHASEES	3
TEMP. RISE	65°C
FREQUENCY	60 Hz
BIL RATING	150kV
OIL VOLUME	1120 L
TOTAL WEIGHT	3340 kg

NOTES

1. DIMENSIONS AND DATA SHOWN ARE TYPICAL ONLY AND MAY CHANGE DUE TO ACTUAL TRANSFORMER ORDERED FOR PROJECT.



FRONT VIEW

TOP VIEW

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
A	06JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE
REFERENCES		

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

K2 WIND ONTARIO LIMITED PARTNERSHIP

PROJECT PHASE

AREA 00

K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.		BY	DDMMMYY
161973		DSN	BJN	JUL.'12
		DRN	M.HALL	JUL.'12
SCALE	PACKAGE CODE	CHK	BJN	JUL.'12
NTS		APP	JHM	JUL.'12

SUBJECT

TYPICAL GROUNDING TRANSFORMER PLAN & ELEVATIONS

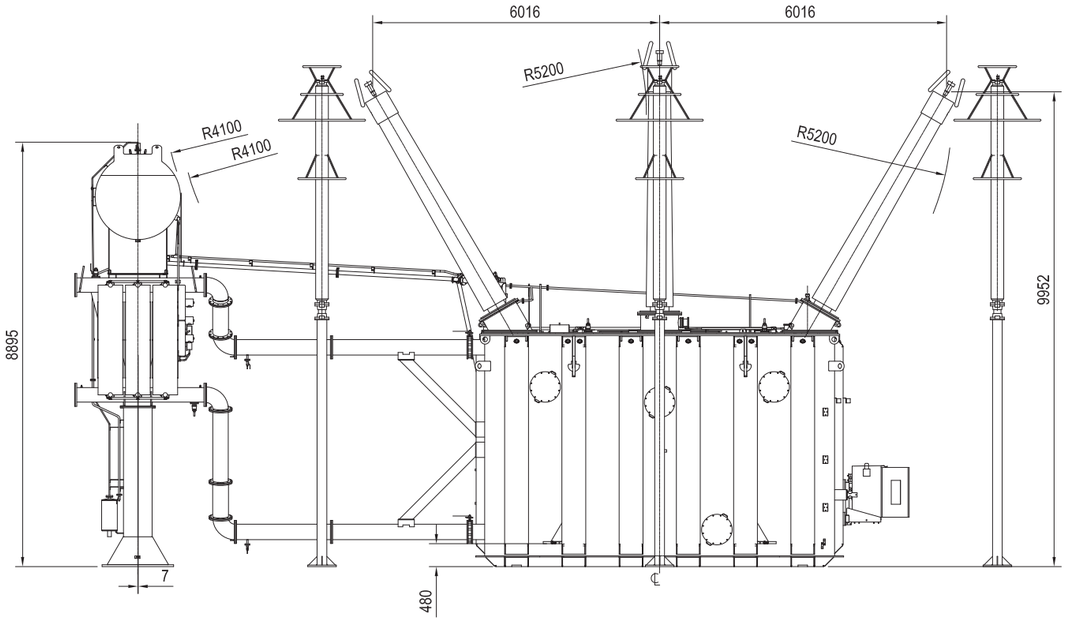
CLIENT DWG. NO.

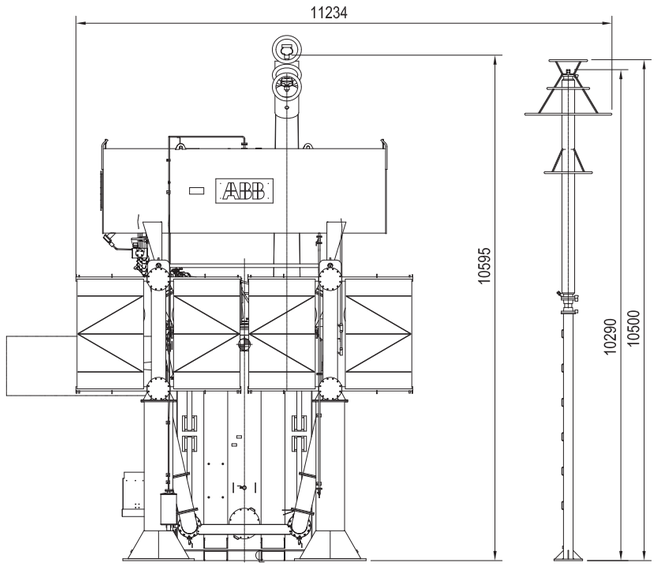
DRAWING NO. A1-161973-00-141-0904

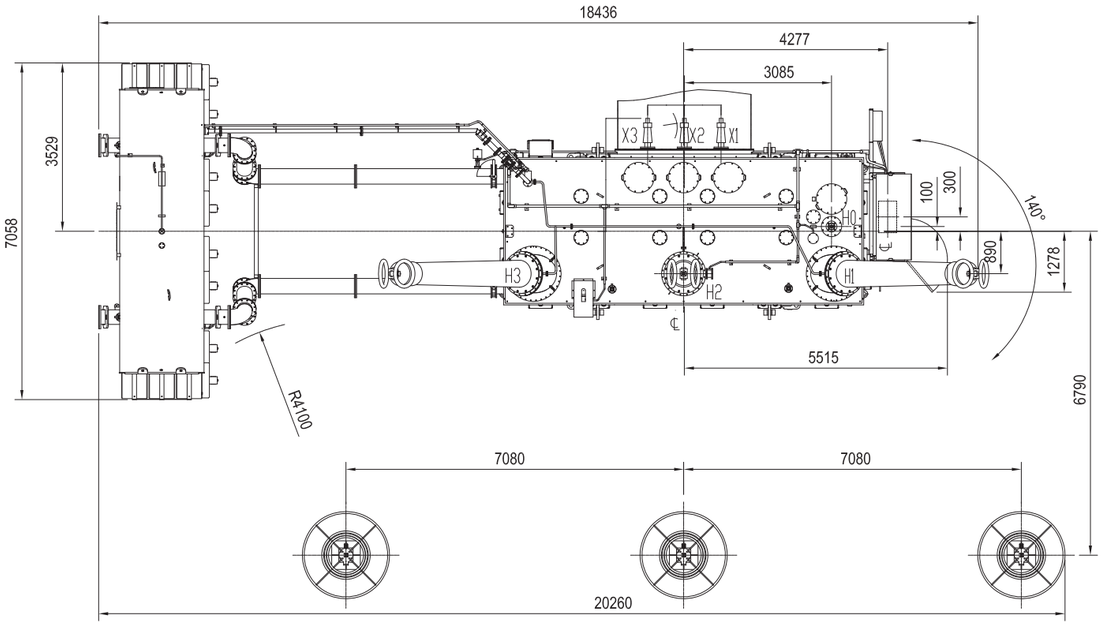
REV. A

CAD FILE: P:\CAD\ELE\SKETCHES\A1-161973-00-141-0904.DWG

PLOTTED: 06-JUL-12 4:36 PM BY: MICHAEL (OAKVILLE)







NOTES

1. DIMENSIONS AND DATA SHOWN ARE TYPICAL ONLY AND MAY CHANGE DUE TO ACTUAL TRANSFORMER ORDERED FOR PROJECT.

ABB

60 Hz THREE PHASE GENERATOR STEP-UP TRANSFORMER

MINERAL OIL IMMERSED ONAN/ONAF/ONAF SERIAL No. 12170-01

TERMINALS	CONNECTION	MVA AT 65°C TEMPERATURE RISE ONAN	ONAF	ONAF	VOLTAGE kV	LIGHTNING IMPULSE LEVEL kV PHASE	NEUTRAL	SWITCHING IMPULSE LEVEL kV
H1,H2,H3	YN	105	140	175	550 ± 2 x 2.5% (ORD.) 1306	1800	200	1360
X1,X2,X3	Δ	105	140	175	34.5	200	–	–

POSITIVE IMPEDANCE (105 MVA)
7.5 % @ 530 / 34.5 kV

STANDARD No. CAN/CSA-C88-M90
CUSTOMER P.O. No. 150030-401
INSTRUCTION MANUAL 12170
WINDING CONDUCTOR COPPER
YEAR OF MANUFACTURE 2007

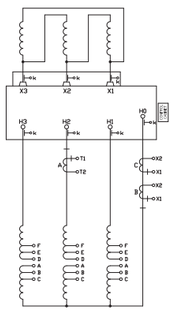
INSULATION FLUID IS INHIBITED MINERAL OIL WITH NO DETECTABLE PCB's

TANK, RADIATORS AND CONSERVATOR ARE SUITABLE FOR VACUUM AND 10 PSI POSITIVE PRESSURE.

BUSHINGS	LV VOLTAGE (kV)	LV CURRENT AT 175 MVA (A)
X1,X2,X3	34500	2929

BUSHINGS	HV DEENERGIZED TAP CHANGER POS.	CONNECTS	HV VOLTAGE (kV)	HV CURRENT AT 175 MVA (A)
H1,H2,H3	1	A – 1	556500	182
	2	B – 2	543250	186
	3	C – 3	530000	191
	4	D – 4	516750	196
	5	E – 5	503500	201

WARNING OPERATE TAP CHANGER ONLY WHEN TRANSFORMER IS DEENERGIZED



BUSHINGS	CT's	TERMINALS	RATIO	ACCURACY
H2	A	T1 – T2	2000:5	C400 0.6 B2.0
H0	B,C	X1 – X2	400:5	C200 0.6 B1.0
N	CAPACITIVE TAP			

MASS ±2%	
ACTIVE PART	96 860 kg
TANK AND ACCESSORIES	58 680 kg
OIL	85 060 kg
TOTAL	240 600 kg
OIL QUANTITY ±2% @ 15°C	98 000 L
SHIPPING MASS <DRY AIR FILLED>	130 000 kg

MADE IN VARENNES, QUEBEC, CANADA

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
A	06JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE
		REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00

K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.
161973	
SCALE	PACKAGE CODE
NTS	

	BY	DDMMMYY
DSN	BJN	JUL.'12
DRN	M.HALL	JUL.'12
CHK	BJN	JUL.'12
APP	JHM	JUL.'12

SUBJECT

500kV – 34.5kV
MAIN TRANSFORMER
PLAN & ELEVATIONS

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0905

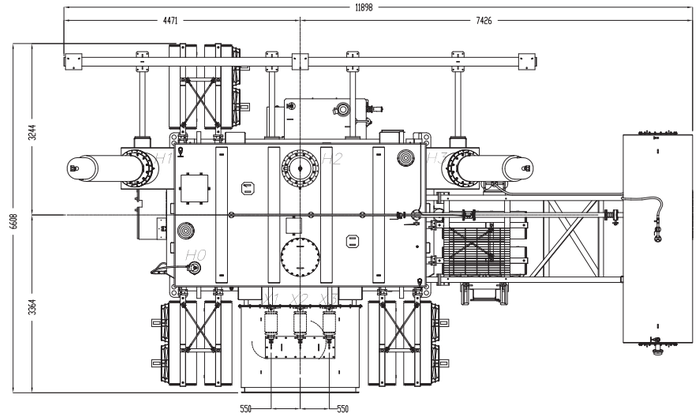
REV. A

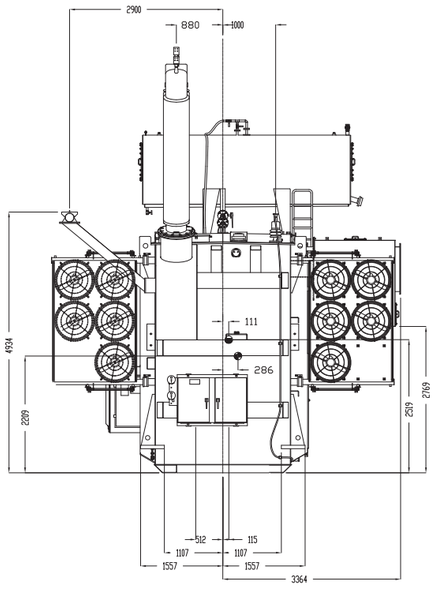
TRANSFORMER DATA

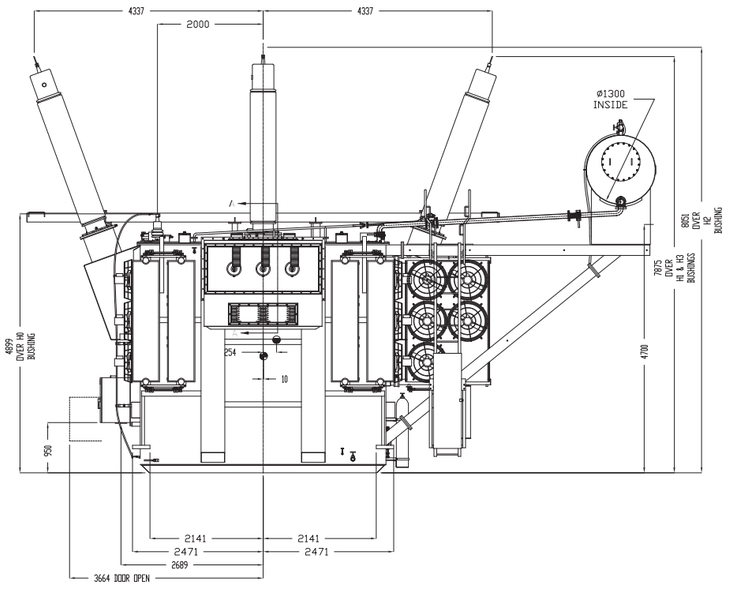
TYPE	ONAN/ONAF/ONAF
MVA SIZE	96/128/160
LOW VOLTAGE	34.5kV
NUMBER OF PHASEES	3
TEMP. RISE	65°C
FREQUENCY	60 Hz
IMPEDANCE	8%
CONFIGURATION	Dyn1

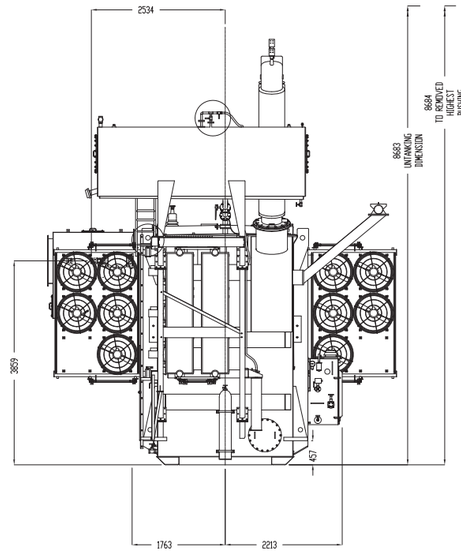
NOTES

1. DIMENSIONS AND DATA SHOWN ARE TYPICAL ONLY AND MAY CHANGE DUE TO ACTUAL TRANSFORMER ORDERED FOR PROJECT.









REV	DDMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
B	26JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
A	06JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE
REFERENCES		

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00

K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.
161973	

SCALE	PACKAGE CODE
NTS	

	BY	DDMMYY
DSN	BJN	JUL.'12
DRN	M.HALL	JUL.'12
CHK	BJN	JUL.'12
APP	JHM	JUL.'12

SUBJECT

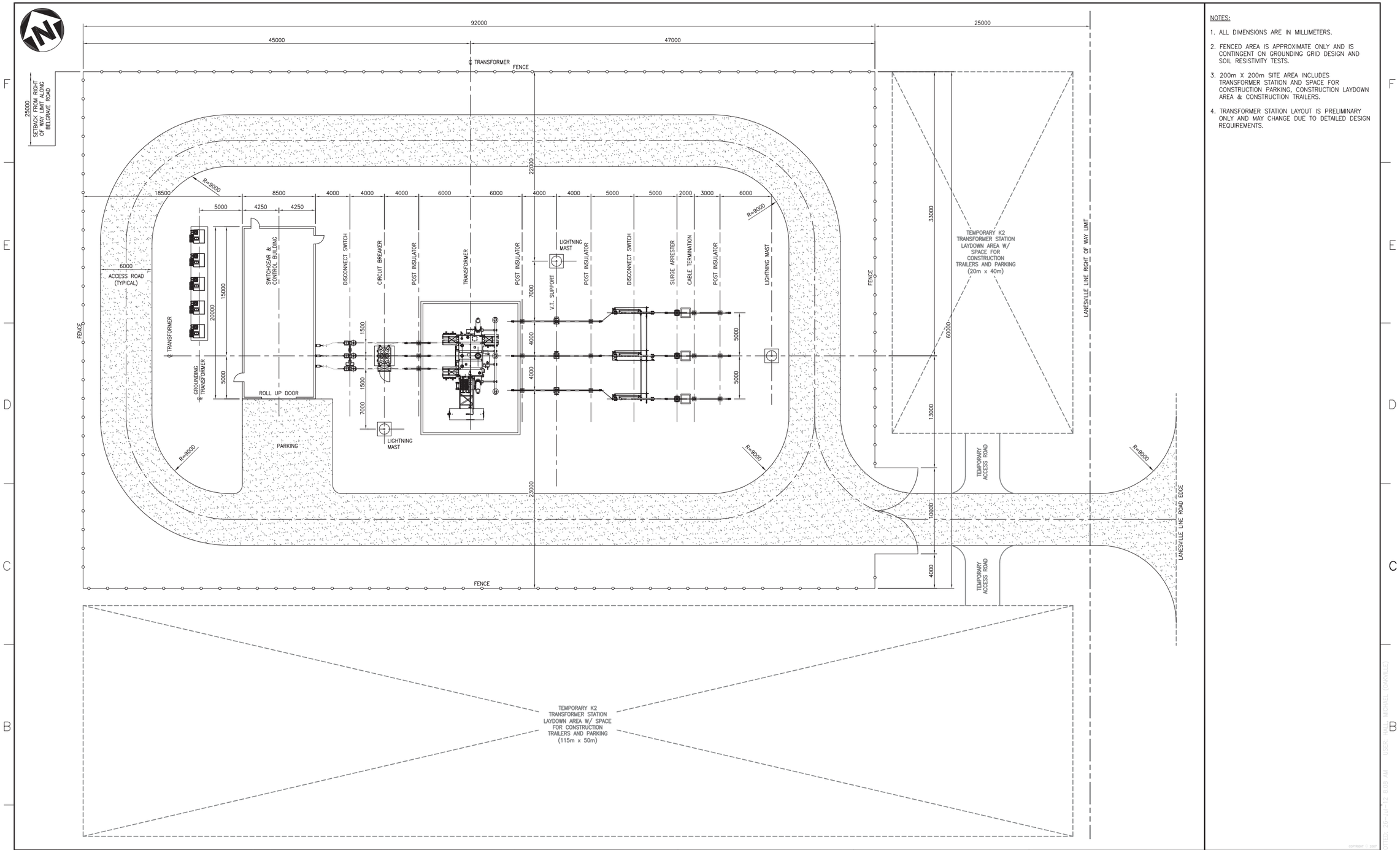
TRANSFORMER STATION
MAIN TRANSFORMER
PLAN & ELEVATIONS

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0906

REV. B

PLOTTED: 26-JUL-12 10:55 AM BY: MICHEL (ORVILLE)
SAVED: 26-JUL-12 10:55 AM BY: MICHEL (ORVILLE)
CAD FILE: T:\CAD\ELE\SKETCHES\A1-161973-00-141-0906.DWG



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. FENCED AREA IS APPROXIMATE ONLY AND IS CONTINGENT ON GROUNDING GRID DESIGN AND SOIL RESISTIVITY TESTS.
3. 200m X 200m SITE AREA INCLUDES TRANSFORMER STATION AND SPACE FOR CONSTRUCTION PARKING, CONSTRUCTION LAYDOWN AREA & CONSTRUCTION TRAILERS.
4. TRANSFORMER STATION LAYOUT IS PRELIMINARY ONLY AND MAY CHANGE DUE TO DETAILED DESIGN REQUIREMENTS.

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
I	26JUL12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
H	18JUL12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
G	17JUL12	GROUNDING TRANSFORMERS ADDED	M.HALL	BJN	JHM			
F	28JUN12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
E	22JUN12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
D	09MAR12	REVISED & ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
C	15DEC11	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
B	13DEC11	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
A	12SEP11	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE

REFERENCES

STAMP/SEAL

PRELIMINARY

APPROVED FOR _____

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

PROJECT NO.	ACTIVITY NO.
161973	
SCALE	PACKAGE CODE
1:200	

	BY	DDMMYY
DSN	BJN	SEP.'11
DRN	M.HALL	SEP.'11
CHK	BJN	SEP.'11
APP	JHM	SEP.'11

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00 — K2 WIND PROJECT

SUBJECT: TRANSFORMER STATION LAYOUT —PLAN—

amec

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0055 — REV. I

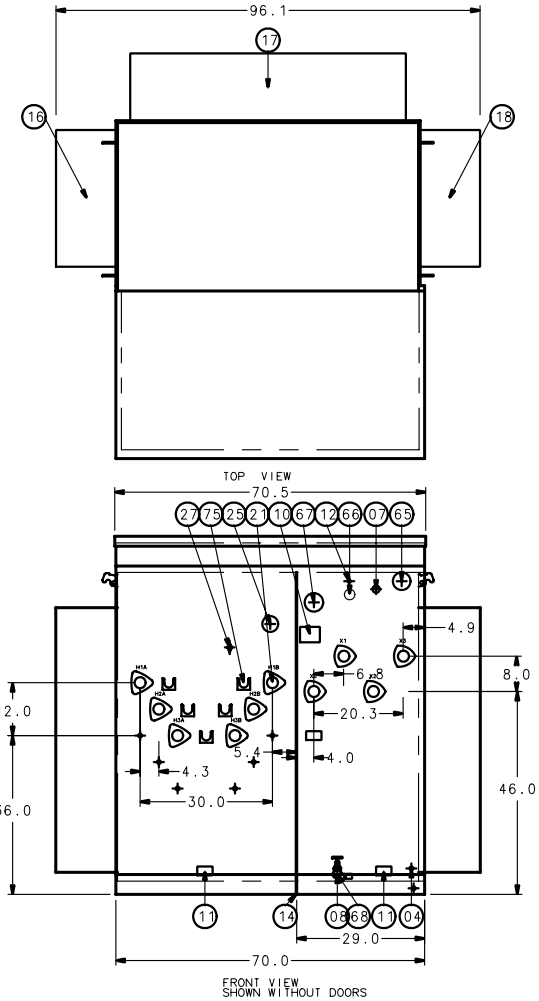
CAD FILE: P:\CAD\ELE\MF\A1-161973-00-141-0055.DWG

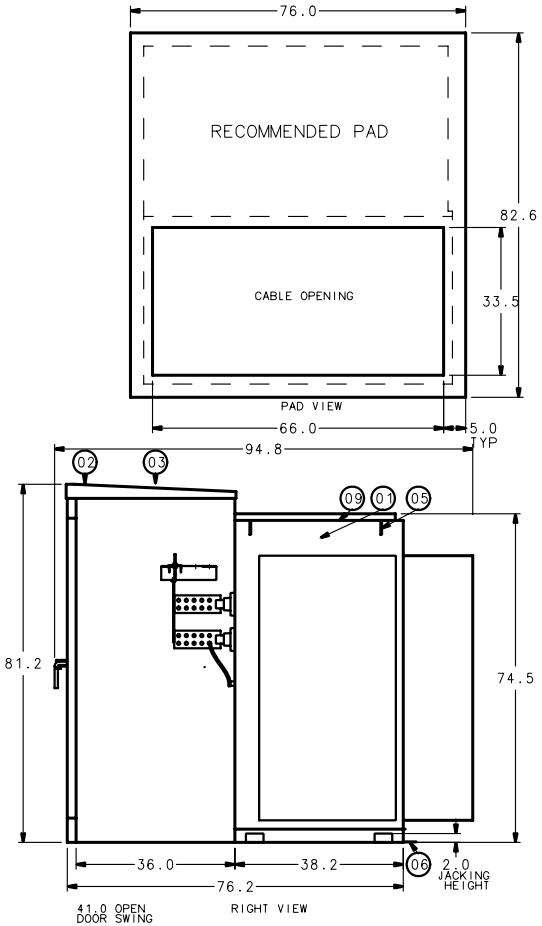
PLOTTED: 26 JUL 12 8:08 AM — USER: MICHAEL (MICHAEL.DANIELS)

DOWNLOAD INSTRUCTION BOOKS AT WWW.ABB.COM/TRANSFORMERS
DESCARGAR LIBRO DE INSTRUCCIONES EN WWW.ABB.COM/TRANSFORMERS

THIS OUTLINE IS FOR ERECTION OR MOUNTING PURPOSES. IT IS NOT TO SCALE AND SHOULD NOT BE REGARDED AS INDICATING THE EXACT DETAILS OF CONSTRUCTION.

01 TANK
02 CABINET BOLTED-ON, REMOVABLE SILLS, OPEN BOTTOM 1.25 INCH FLANGE, HINGED LIFT-OFF DOOR, PROVISION FOR PADLOCK, STOP IN OPEN POSITION.
03 WEATHER COVER, REMOVABLE OR HINGED
04 PROVISIONS FOR TANK TO CABINET GROUND
05 LIFTING HOOKS, 4 TOTAL
06 SHIPPING BRACKETS
07 1 INCH FILL PLUG
08 1 INCH DRAIN PLUG
09 HANDHOLE, 9.5 INCH X 17.5 INCH, BOLTED-ON COVER
10 NAMEPLATE MOUNTED ON TANK WALL
11 GROUND PAD .50-13-TAP, HV AND LV COMPARTMENT
12 PRESSURE RELIEF DEVICE
13 LV NEUTRAL GROUND PAD .50-13-TAP WITH GROUND STRAP
14 HV/LV BARRIER (STEEL)
16 LEFT SIDE COOLER
17 REAR COOLER
18 RIGHT SIDE COOLER
21 HIGH VOLTAGE BUSHING
25 TAP CHANGER
27 LBOR
35 LOW VOLTAGE BUSHING, ANSI SPADES, WITH 10 HOLES.
65 PRESSURE VACUUM GAUGE
66 OIL LEVEL GAUGE
67 THERMOMETER
68 DRAIN VALVE WITH SAMPLER
75 PARKING STAND





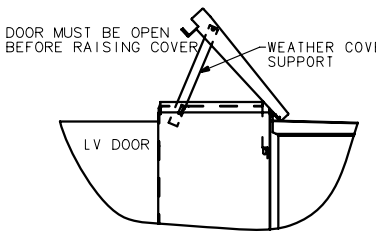


ABB INC.						REV NO 01
TITLE OL3PPADMNT	DEF XXX	FIN XX	U/M XX	NOTE XX		
DES 3PH OUTLINE					USER HEMKEI	
DIMENSIONS IN INCHES-SCALE.1	CADAM 20904051INNMNBVYB01,1					
DFTM K,HEMEYER	00411	APPD XXXXX	MMDDYY			
D SPEC XXXXXX		APPD			J801BVYB	
ENG. REF XXXXXX		LAYOUT MODEL ID	,			
ENGINEERING DEPT.	JEFFERSON CITY, MO.	USA				

REV DATA

MADE IN USA AT
JEFFERSON CITY, MO

CLASS ONAN 60 HERTZ
THREE PHASE DISTRIBUTION TRANSFORMER

1LUJ

KVA	AT CONTINUOUS RISE °C	STYLE	SERIAL	MFG DATE
2500.0	65	FN1X267NFW	99J999999	MMM-YY

HIGH VOLTAGE	HV BIL KV	HV MTL	% IMPEDANCE
34500	150	AL	5.77

LOW VOLTAGE	LV BIL KV	LV MTL	GALLONS OIL
690Y/398	30	AL	660

APPROXIMATE WEIGHTS IN POUNDS	
CORE & COILS	6300
OIL	4950
CASE	3785
TOTAL	15035

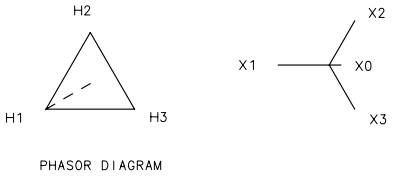
TAP CHANGER RATINGS		
TAP	VOLTAGE	CURRENT
1	36220	39.85
2	35360	40.82
3	34500	41.84
4	33640	42.91
5	32780	44.03

INSULATING LIQUID: CONTAINS MINERAL OIL WITH NO DETECTABLE LEVEL OF PCB, LESS THAN 1PPM, AT THE TIME OF MANUFACTURE

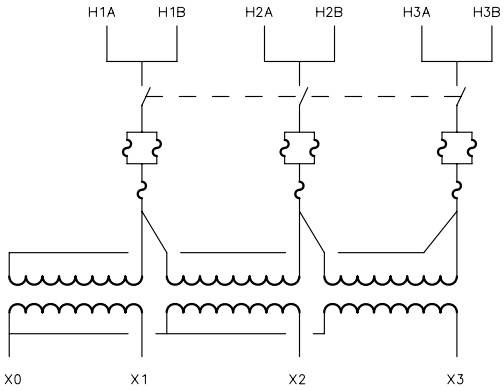
CAUTION: 1. BEFORE OPERATING READ INSTRUCTION BOOK 46-060-1 AT WWW.ABBDTD.COM.
2. TANK MUST BE SOLIDLY GROUNDED.

ID .

c UL us
LISTED
LIQUID-IMMERSED
DISTRIBUTION TRANSFORMER
16ER



PHASOR DIAGRAM



SPS2 Circuit Breaker (15kV-245kV)

Longer Operating Life - Lower Maintenance Costs

Power Transmission & Distribution

SIEMENS

SPS2 Dead Tank Breakers

A new generation of Circuit Breakers

The new SPS2 is not just another circuit breaker, it's a better circuit breaker. With the ability to handle 63kA at 145kV and 50kA at 245kV without capacitors, three-cycle interruption, -40°C/F without tank heaters at 69kV and no adjustments—SPS2 is the result of combined global engineering and major product improvements.

A family of circuit breakers designed to your specifications

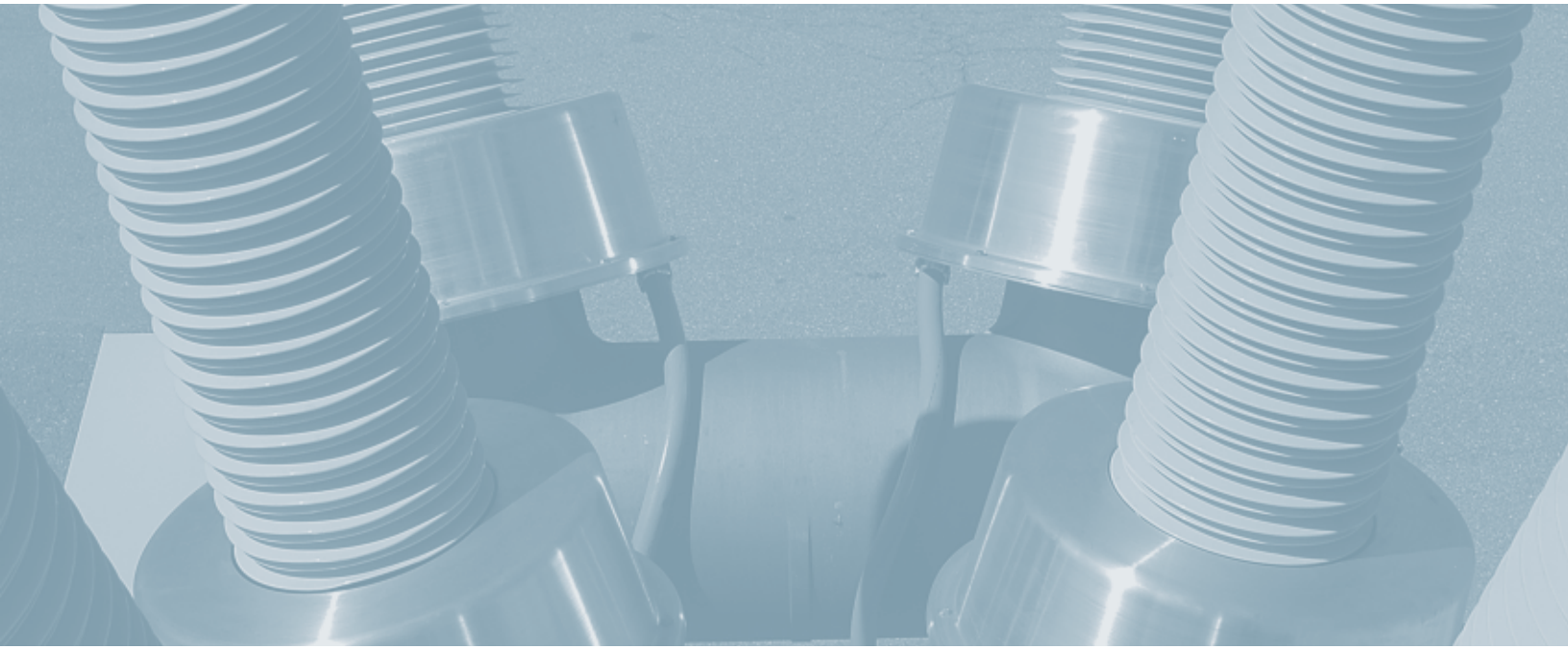
Siemens took the best of what breaker technology has to offer and brought them together into one circuit breaker to offer reliable performance for a wide range of voltage requirements. From 15kV right up through 245kV. The SPS2 can meet your requirements.

Each component of the SPS2 is made in our state-of-the-art manufacturing facility, which is quality certified to ISO 9001-2000 standards. This precision manufacturing allows Siemens to make quality products, which are used in thousands of installations worldwide.

Siemens combines the latest in circuit breaker technology with the economies of a streamlined, closely monitored production process at the Siemens Power Transmission & Distribution plant in Jackson, Mississippi, to ensure both measurable quality improvements and cost containment. And to ensure product performance and customer satisfaction, the SPS2 is tested to ANSI and IEC standards in the world's largest laboratory.

SPS2 Dead Tank Breakers

A new generation of Circuit Breakers



Siemens quality inside and out
The durable dead-tank construction of the SPS2 circuit breaker means reliable, long-lasting performance in demanding operating conditions. Seismically qualified with a leak rate of less than 1% annually, the SPS2 has been tested to 6,000 mechanical operations and 3,000 operations at 6kA. Global components include:

- the FA2/4 mechanism
- 3AP arc-assist interrupter
- rupture disks for each interrupter
- porcelain or composite bushings with standard provision for two CTs per bushing

All of these components are factory assembled and tested with no field adjustments necessary.

Why SPS2 outperforms the rest
The SPS2 circuit breaker uses arc-assist interrupter technology–the second generation of this latest technology developed as a result of the successful arc-assist interrupters used in Siemens circuit breakers worldwide. Instead of the standard puffer mechanism that utilizes compression only, arc-assist also uses temperature build-up to quench the arc. With fewer moving parts, your maintenance costs are reduced while increasing the operational life of your circuit breaker.

The SPS2 – Circuit breaker technology to see you through the future
Siemens is investing in research and development in order to manufacture the products you need now and will want in years to come. The SPS2 is more than just a better breaker. It's designed to perform more reliably under the most demanding specifications–yours; and to see you through the future needs of system growth and expansion.

Ratings and Specifications

SPS2 15-72kV

Identification	Ratings								Related Capabilities		
		Voltage		Insulation		Current			Current Values — Amperes		
Type	Nominal kV Class	Rated Max kV	Rated Voltage Range Factor	Rated Withstand Test Voltage		Rated Continuous Current (Amps, rms)	Rated Short Circuit Current at Rated Max kV	Interrupting Time (Cycles)	Maximum Symmetrical Interrupting Capability	3-Sec. Short Time Current Carrying Capability	Closing and Latching Capability
				Low Freq. (kV, rms)	Impulse (kV, Crest)						
SPS2 – 15.5-31.5	14.4	15.5	1.0	50	110	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 15.5-40	14.4	15.5	1.0	50	110	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 25.8-20	23.0	25.8	1.0	60	150	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 25.8-31.5	23.0	25.8	1.0	60	150	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 25.8-40	23.0	25.8	1.0	60	150	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 38-20	34.5	38.0	1.0	80	200	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 38-31.5	34.5	38.0	1.0	80	200	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 38-40	34.5	38.0	1.0	80	200	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 48.3-20	46.0	48.3	1.0	105	250	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 48.3-31.5	46.0	48.3	1.0	105	250	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 48.3-40	46.0	48.3	1.0	105	250	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 72.5-20	69.0	72.5	1.0	160	350	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 72.5-31.5	69.0	72.5	1.0	160	350	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 72.5-40	69.0	72.5	1.0	160	350	1200/4000	40,000	3	40,000	40,000	108,000

Supplementary Specifications

Voltage

DESCRIPTION	UNIT	SPS2 15.5	SPS2 25.8	SPS2 38	SPS2 48.3	SPS2 72.5
Lightning Impulse Withstand Voltage						
Chopped Wave 2µs	kV	142	194	258	322	452
Chopped Wave 3µs	kV	126	172	230	288	402
Rated Normal Current (10^2)	A	12/20/31.5/40	12/20/31.5/40	12/20/31.5/40	12/20/31.5/40	12/20/31.5/40
Normal Frequency	Hz	60	60	60	60	60
Optional Frequency	Hz	50	50	50	50	50
Rated Permissible Tripping Delay (Y)	s	2	2	2	2	2
Auxiliary Voltage	Vac	115/230				
Operating Mechanism	—	Spring ("OCO")				
Trip Coils		Single (standard) – Dual (optional)				
Trip and Close Coil Rating	Vdc	48/125/250				
Breaks Per Phase	—	1				
Contact Gap	in	3.5				
Phase Spacing	in	37.0				
Seismic Withstand Standard Optional	 g g	 0.3 Dynamic 0.5 Dynamic				
Rated Voltage Range Factor	(k)	1.0				
RIV at 1000 kHz	µV	<<500				

Supplementary Specifications

Current

DESCRIPTION	UNIT	20kA	31.5kA	40kA
Rated Short Circuit Current	kA	20	31.5	40
Rated Making Current	kA	20	31.5	40
Closing and Latching Capability rms peak	 kA kA	 32 54	 50 85	 64 108
Capacitance Switching General Purpose Overhead Line Isolated Current Definite Purpose Overhead Line Isolated Current	 A A A A	 100 250 100 630		
Asymmetrical Int. Capability Ratio (S)	—	1.2		
Normal Operating Temperature Range Standard Special	 °C °C	 -40°C to 55°C -50°C to 55°C		
Closing Time (total)	ms	100		
Rated Reclosing Time	Cycles	12		
Rated Duty Cycle	—	OCO-10S-CO (No derating)		
External Creep Standard Special	 in in	 73 114	 73 114	 73 114
External Strike To Ground Standard Special	 in in	 23 27	 23 27	 23 27
Qty. SF_6	lbs	33		
SF_6 Pressure	psig	65 @ 68° F/20°C		

Ratings and Specifications

SPS2 123-145-170kV

Identification	Ratings								Related Capabilities		
		Voltage		Insulation		Current			Current Values — Amperes		
Type	Nominal kV Class	Rated Max kV	Rated Voltage Range Factor	Rated Withstand Test Voltage		Rated Continuous Current (Amps, rms)	Rated Short Circuit Current at Rated Max. kV	Interrupting Time (Cycles)	Maximum Symmetrical Interrupting Capability	3-Sec. Short Time Current Carrying Capability	Closing and Latching Capability
				Low Freq. (kV, rms)	Impulse (kV, Crest)						
SPS2 – 123-20	115	123	1.0	260	550	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 123-31.5	115	123	1.0	260	550	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 123-40	115	123	1.0	260	550	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 123-50	115	123	1.0	260	550	1200/4000	50,000	3	50,000	50,000	135,000
SPS2 – 123-63	115	123	1.0	260	550	1200/4000	63,000	3	63,000	63,000	170,000
SPS2 – 145-20	138	145	1.0	310	650	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 145-31.5	138	145	1.0	310	650	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 145-40	138	145	1.0	310	650	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 145-50	138	145	1.0	310	650	1200/4000	50,000	3	50,000	50,000	135,000
SPS2 – 145-63	138	145	1.0	310	650	1200/4000	63,000	3	63,000	63,000	170,000
SPS2 – 170-20	161	170	1.0	365	750	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 170-31.5	161	170	1.0	365	750	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 170-40	161	170	1.0	365	750	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 170-50	161	170	1.0	365	750	1200/4000	50,000	3	50,000	50,000	135,000
SPS2 – 170-63	161	170	1.0	365	750	1200/4000	63,000	3	63,000	63,000	170,000

Supplementary Specifications

Voltage

DESCRIPTION	UNIT	SPS2 123	SPS2 145	SPS2 170
Lightning Impulse Withstand Voltage				
Chopped Wave 2µs	kV	710	838	968
Chopped Wave 3µs	kV	632	748	862
Rated Normal Current (10^2)	A	12/20/31.5/40	12/20/31.5/40	12/20/31.5/40
Normal Frequency	Hz	60	60	60
Optional Frequency	Hz	50	50	50
Rated Permissible Tripping Delay (Y)	s	1	1	1
Auxiliary Voltage	Vac	115/230		
Operating Mechanism	—	Spring ("OCO")		
Trip Coils		Single (standard) – Dual (optional)		
Trip and Close Coil Rating	Vdc	48/125/250		
Breaks Per Phase	—	1		
Contact Gap	in	3.5/4.5		
Phase Spacing	in	69.9		
Seismic Withstand Standard Optional	g g	0.3 Dynamic 0.5 Dynamic		
Rated Voltage Range Factor	(k)	1.0		
RIV at 1000 kHz	µV	<<500		

Supplementary Specifications

Current

DESCRIPTION	UNIT	20kA	31.5kA	40kA	50kA	63kA
Rated Short Circuit Current	kA	20	31.5	40	50	63
Rated Making Current	kA	20	31.5	40	50	63
Closing and Latching Capability rms peak	 kA kA	 32 54	 50 85	 64 108	 80 135	 101 170
Capacitance Switching General Purpose Overhead Line Isolated Current Definite Purpose Overhead Line Isolated Current	 A A A A	 100 250 100 315				
Asymmetrical Int. Capability Ratio (S)	—	1.2				
Normal Operating Temperature Range Standard Special	 °C °C	 -30°C to 55°C -40°C/-50°C to 55°C				
Closing Time (total)	ms	100				
Rated Reclosing Time	Cycles	12				
Rated Duty Cycle	—	OCO-10S-CO (No derating)				
External Creep Standard Special	 in in	 131 144	 131 144	 131 144	 131 144	 131 144
External Strike To Ground Standard Special	 in in	 46 53	 46 53	 46 53	 46 53	 46 53
Qty. SF_6	lbs	58	58	58	128	128
SF_6 Pressure	psig	87 @ 68° F/20°C				

Ratings and Specifications

SPS2 245kV

Identification	Ratings								Related Capabilities		
		Voltage		Insulation		Current			Current Values — Amperes		
Type	Nominal kV Class	Rated Max kV	Rated Voltage Range Factor	Rated Withstand Test Voltage		Rated Continuous Current (Amps, rms)	Rated Short Circuit Current at Rated Max. kV	Interrupting Time (Cycles)	Maximum Symmetrical Interrupting Capability	3-Sec. Short Time Current Carrying Capability	Closing and Latching Capability
				Low Freq. (kV, rms)	Impulse (kV, Crest)						
SPS2 – 245-20	230	245	1.0	425	900	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 245-31.5	230	245	1.0	425	900	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 245-40	230	245	1.0	425	900	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 245-50	230	245	1.0	425	900	1200/4000	50,000	3	50,000	50,000	135,000
SPS2 – 245-63	230	245	1.0	425	900	1200/4000	63,000	3	63,000	63,000	170,000
SPS2 – 245-20	230	245	1.0	460	1050	1200/4000	20,000	3	20,000	20,000	54,000
SPS2 – 245-31.5	230	245	1.0	460	1050	1200/4000	31,500	3	31,500	31,500	85,000
SPS2 – 245-40	230	245	1.0	460	1050	1200/4000	40,000	3	40,000	40,000	108,000
SPS2 – 245-50	230	245	1.0	460	1050	1200/4000	50,000	3	50,000	50,000	135,000
SPS2 – 245-63	230	245	1.0	460	1050	1200/4000	63,000	3	63,000	63,000	170,000

Supplementary Specifications

Voltage

DESCRIPTION	UNIT	SPS2 900 kV	SPS2 1050 kV
Lightning Impulse Withstand Voltage			
Chopped Wave 2µs	kV	1160	1160
Chopped Wave 3µs	kV	1040	1040
Rated Normal Current (10^2)	A	12/20/31.5/40	12/20/31.5/40
Normal Frequency	Hz	60	60
Optional Frequency	Hz	50	50
Rated Permissible Tripping Delay (Y)	s	1	1
Auxiliary Voltage	Vac	115/230	
Operating Mechanism	—	Spring ("OCO")	
Trip Coils		Single (standard) – Dual (optional)	
Trip and Close Coil Rating	Vdc	48/125/250	
Breaks Per Phase	—	1	
Contact Gap	in	4.5	
Phase Spacing	in	85.3	
Seismic Withstand Standard Optional	 g g	 0.3 Dynamic 0.5 Dynamic	
Rated Voltage Range Factor	(k)	1.0	
RIV at 1000 kHz	µV	<<500	

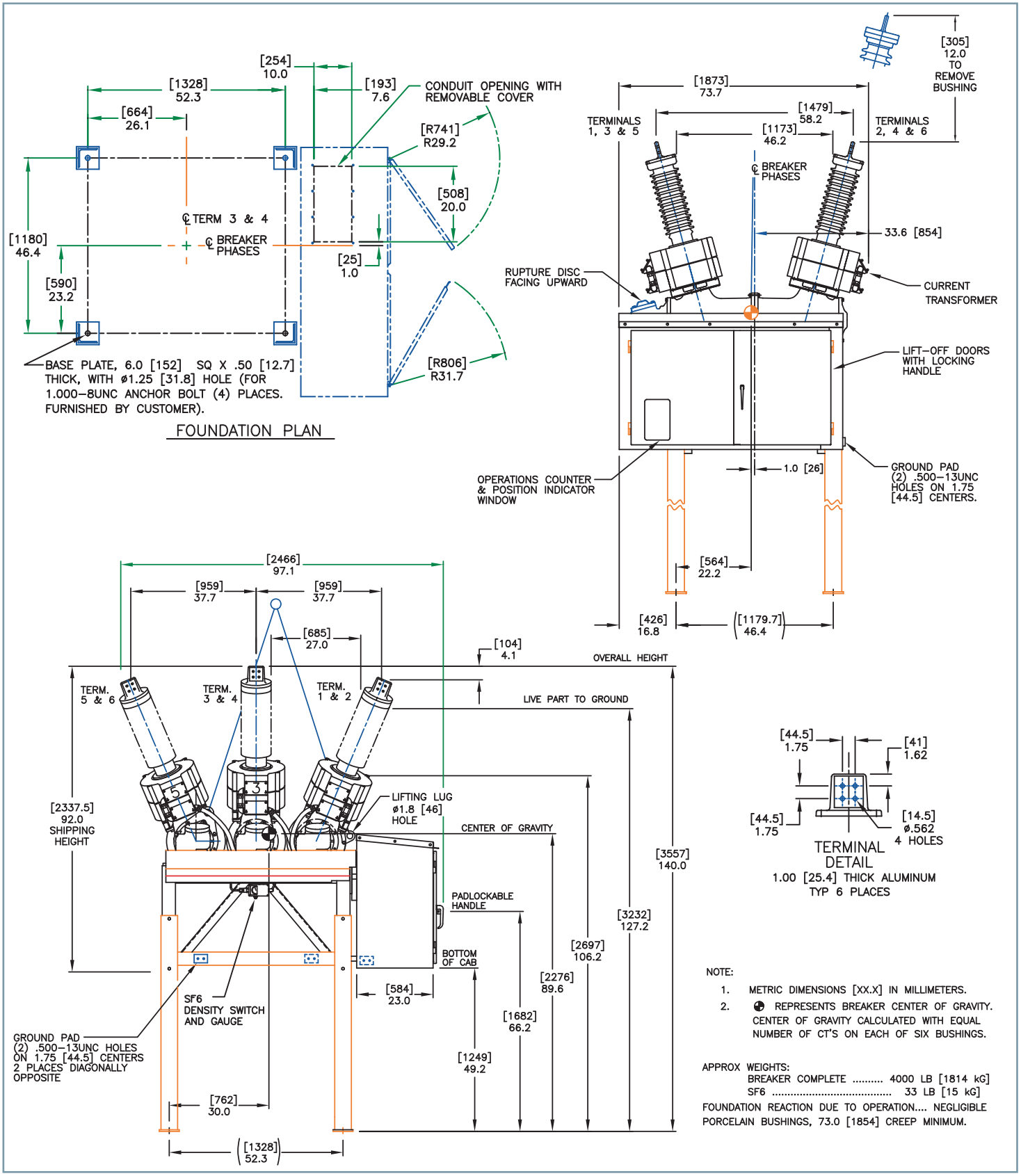
Supplementary Specifications

Current

DESCRIPTION	UNIT	20kA	31.5kA	40kA	50kA	63kA
Rated Short Circuit Current	kA	20	31.5	40	50	63
Rated Making Current	kA	20	31.5	40	50	63
Closing and Latching Capability rms peak	 kA kA	 32 54	 50 85	 64 108	 80 135	 101 170
Capacitance Switching General Purpose Overhead Line Isolated Current Definite Purpose Overhead Line Isolated Current	 A A A A	 160 160 200 400				
Asymmetrical Int. Capability Ratio (S)	—	1.2				
Normal Operating Temperature Range Standard Special	 °C °C	 -30°C to 55°C -40°C/-50°C to 55°C				
Closing Time (total)	ms	100				
Rated Reclosing Time	Cycles	12				
Rated Duty Cycle	—	OCO-15S-CO (No derating)				
External Creep Standard Special	 in in	 140 205	 140 205	 140 205	 140 205	 140 205
External Strike To Ground Standard Special	 in in	 60 62	 60 62	 60 62	 60 62	 60 62
Qty. SF_6	lbs	161				
SF_6 Pressure	psig	87 @ 68° F/20°C				

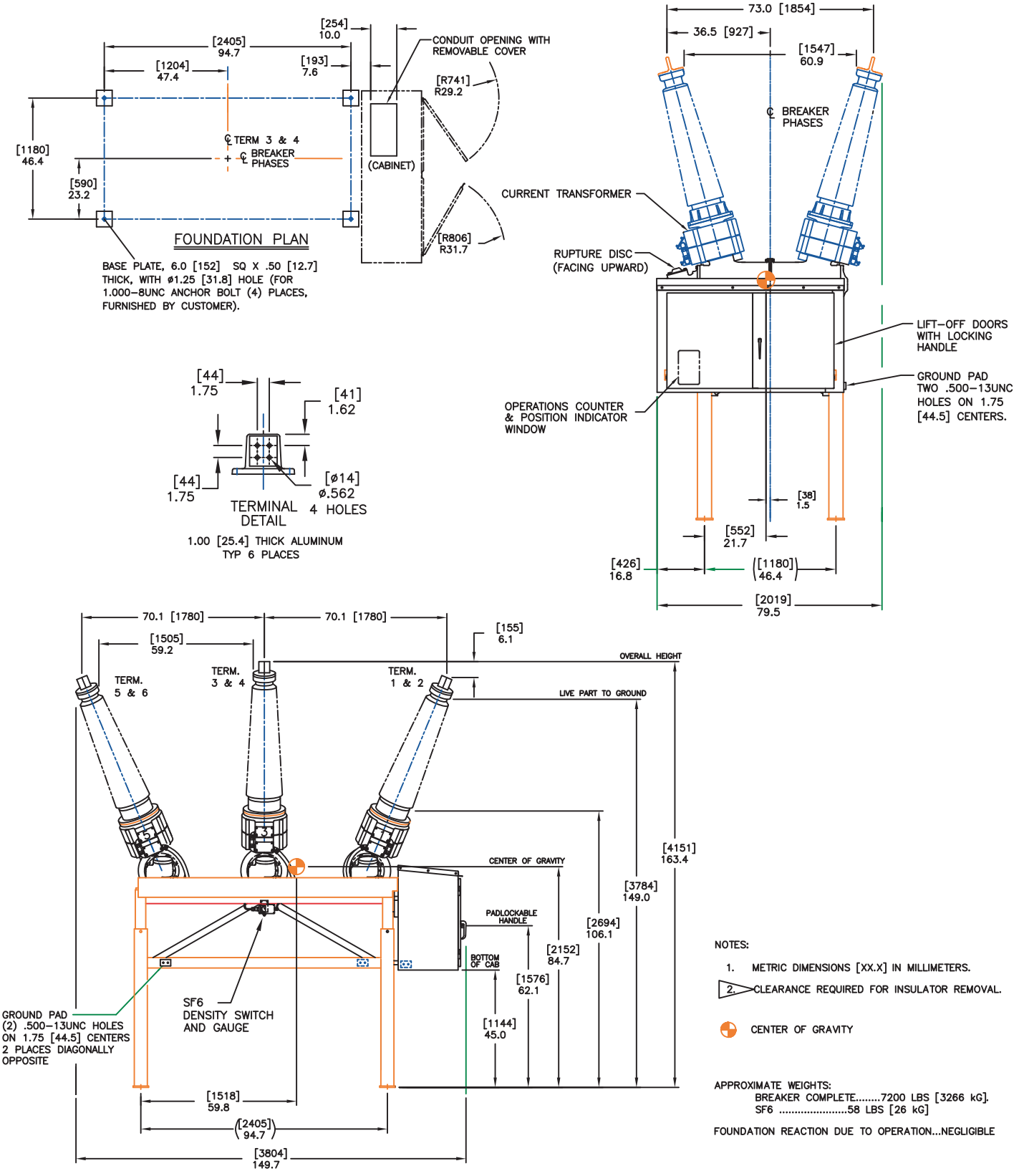
Dimension Data

SPS2 15-72kV



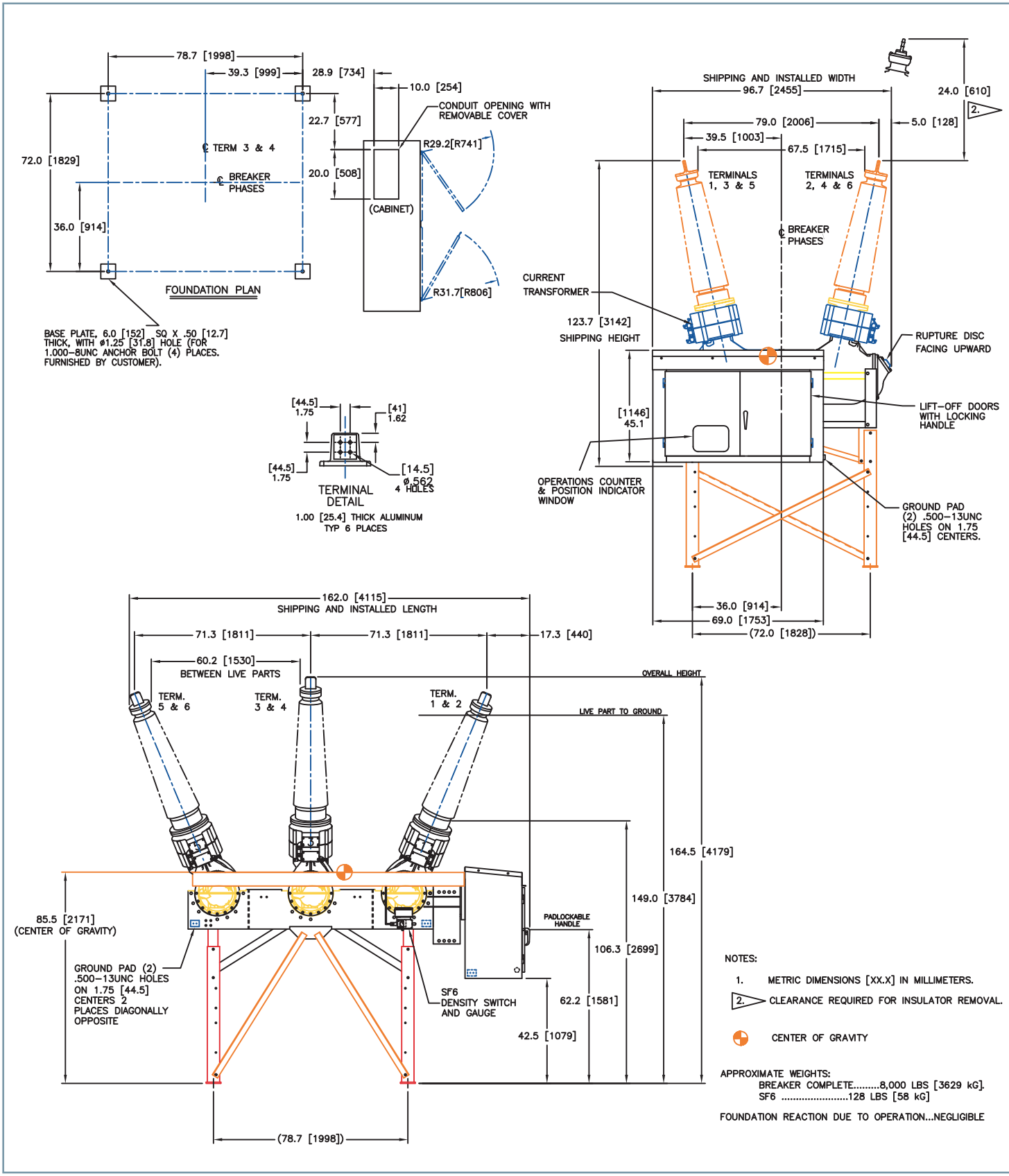
Dimension Data

SPS2 123, 145, 170kV-40kA



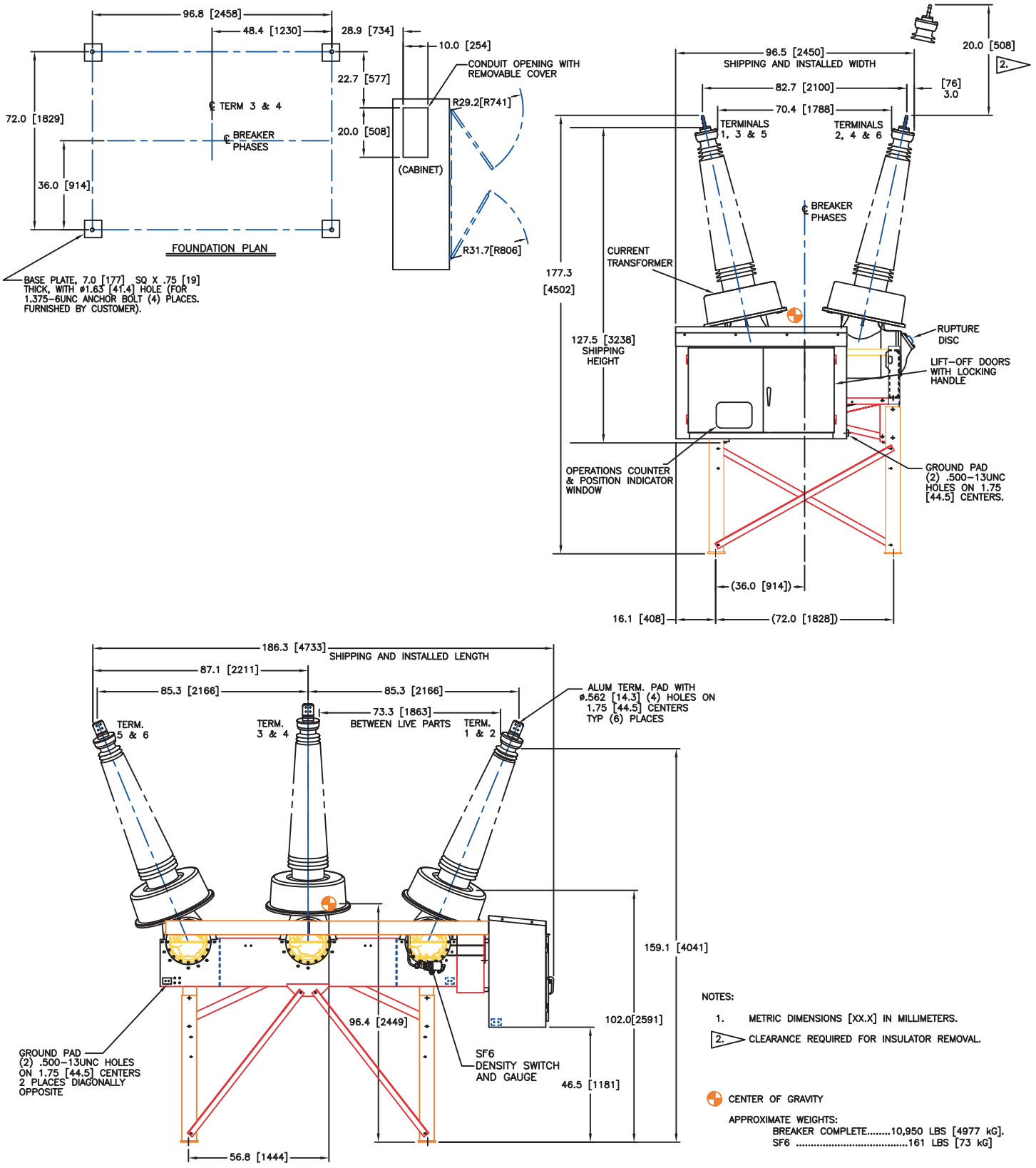
Dimension Data

SPS2 123, 145, 170kV-50/63kA



Dimension Data

SPS2 245kV-40/50/63kA

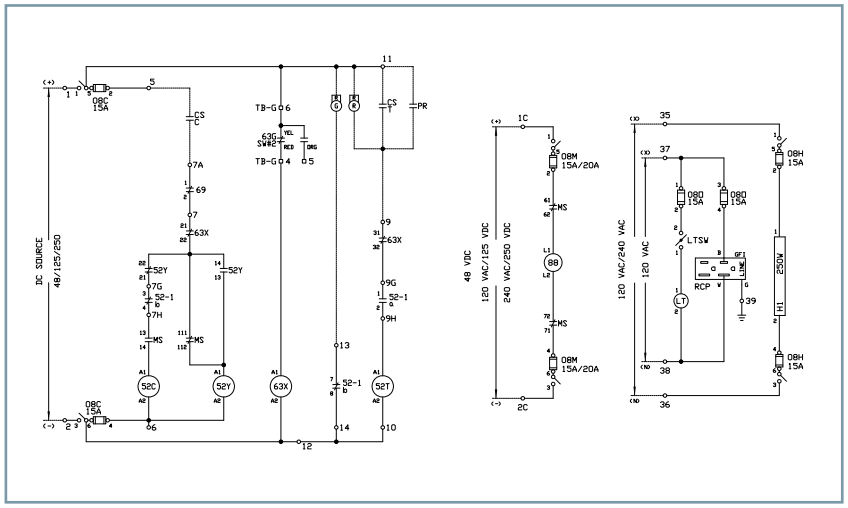


Spring Charged Operating Mechanism

More than 20,000 worldwide installations are up and running testimonies to the reliability of the spring-stored energy FA2/4 mechanism. This mechanism is fully equipped with a closing and opening spring fitted inside a common housing.

The operating mechanism incorporates roller bearings that allow wear-free transmission of forces and thus ensures a long service life. The charging gear, with its long-wearing spur wheels and its principle of no-load decoupling, is another component that ensures maintenance-free operation. Low operating mechanism force assures that the transmission elements are subjected to less stress resulting in optimal operating reliability.

The SPS2 is the product of tried and proven performance in the field. Our reputation for quality and extensive global expensive are captured in the design principles of this circuit breaker.

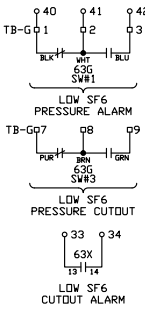


LEGEND

DEVICE	DESCRIPTION
01	BREAKER CONTROL SWITCH
08C	CLOSE POWER DISCONNECT
08H	HEATER POWER DISCONNECT
08M	MOTOR POWER DISCONNECT
08O	RECEPTACLE & LIGHT POWER DISCONNECT
08T	TRIP POWER DISCONNECT
23	CONTROL HOUSING THERMOSTAT
52-a, b	BREAKER AUXILIARY SWITCHES (a=OPEN/BKR OPEN b=CLOSED/BKR OPEN)
52C	BREAKER CLOSE COIL
52T	BREAKER TRIP COIL
52Y	BREAKER CLOSING CUTOFF RELAY (ANTI-PUMP)
63G	GAS PRESSURE SWITCH (SF6) SW#1 LOW PRESSURE ALARM SW#2 LOW PRESSURE CUTOUT SW#3 LOW PRESSURE CUTOUT
63X	INTERRUPTER SF6 LOW PRESSURE CUTOUT AUXILIARY RELAY
88	MOTOR (MECHANISM)

DEVICE	DESCRIPTION
G	GREEN INDICATOR LIGHT
H1	CABINET HEATER
H2	CABINET HEATER
LT	HOUSING LIGHT
LTSW	HOUSING LIGHT TOGGLE SWITCH
MS	SPRING CHARGE MOTOR SWITCH
PR	REMOTE PROTECTIVE RELAYS
R	RED INDICATOR LIGHT
RCP	DUPLEX RECEPTACLE (GFCI)

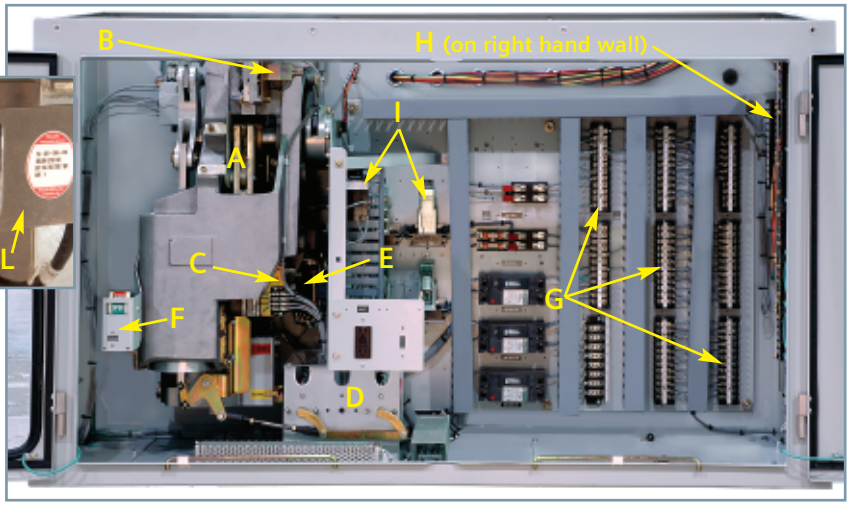
NOTES:
1. ALL EQUIPMENT SHOWN WITH: CIRCUIT BREAKER OPEN, CONTROL VOLTAGE OFF, SF6 PRESSURE LOW, SPRING DISCHARGED, TEMPERATURE LOW.



Control Power Requirements					
Rated Voltage	48 VDC	125 VDC	250 VDC	115 VAC	230 VAC
Trip Coil Current (amps)	16	12.0	6.7	12.0	6.7
Close Coil Current (amps)	4.6	1.9	6.7	2.5	6.7
Motor Run Current (amps)					
FA2	17.4	9.8	4.6	12.3	6.3
FA4	29.0	16.0	8.0	23.0	11.0

Spring charged operating mechanism

- **A.** Spring Operating Mechanisim (FA2)
- **B.** Close Coil
- **C.** Trip Coil
- **D.** Auxiliary Switches
- **E.** Motor (125VDC/120VAC)
- **F.** Open/Close Indicator
- **G.** Control Terminal Blocks
- **H.** Bushing Current Transformer Terminal Blocks (on right hand wall)
- **I.** Control Relay (on back panel)
- **J.** SF_6 Fill Connection (outside left side)
- **K.** SF_6 Pressure Gauge (outside left side)
- **L.** SF_6 Density Switch (outside left side)



Live-tank and Dead-tank SF6 Circuit Breakers

Same technology for every application in two designs. Both designs possess their own special features, and each design has its own particular advantages.

Special technical features of live-tank design

On live-tank circuit breakers, the interrupter chamber is arranged in the insulator, which can be either porcelain or of a composite material, and is at high potential with the voltage level determining the length of the insulators for the interrupter chamber and the insulator column.

For higher voltage levels, several interrupter chambers series-connected on live-tank circuit breakers and installed on the insulator column. The current transformers are arranged separately either in front of or behind the live-tank circuit breakers. As in live-tank circuit breakers, no fault currents can occur between the interrupter unit and the housing; only one current transformer per pole assembly is necessary.

A further feature of live-tank circuit breakers are the comparatively small gas compartments. The advantage of the low gas volume is that there is a reduction in the amount of gas maintenance work.

To ensure the safe operation of live-tank circuit breakers in seismic regions, the breakers can be mounted on anti-seismic dampers, a solution that has been tested up to 800kV and has proved its worth many times.

Special technical features of dead-tank design

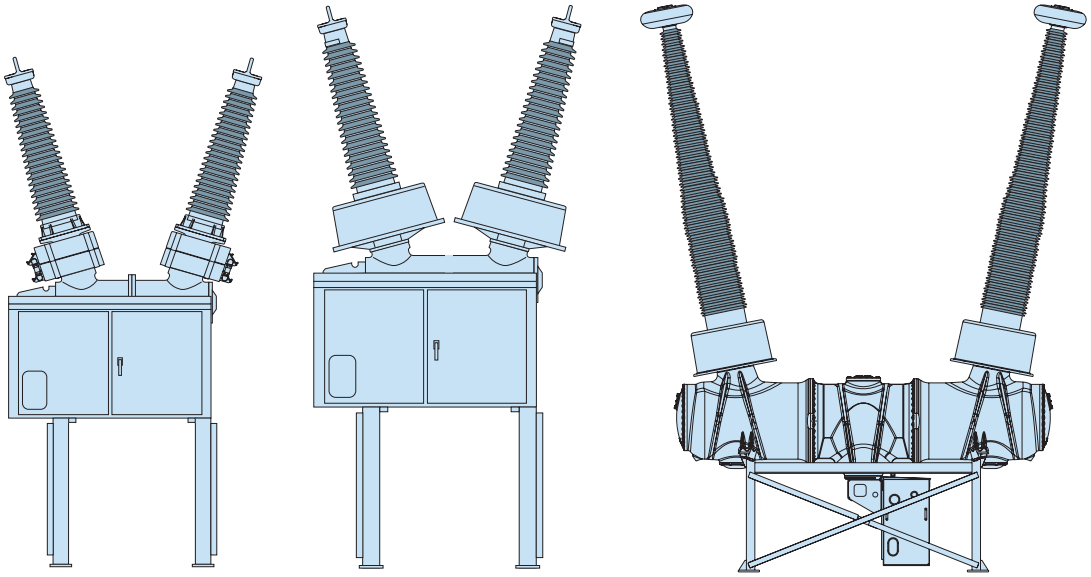
The distinguishing feature of dead-tank technology is that the interrupter chamber is accommodated in an earthed metal housing. With this arrangement, the SF_6 gas filling insulates the high voltage live parts of the contact assembly from the housing. The connection to the high voltage is via a SF_6 outdoor bushing.

The current transformers are mounted directly on the bushing, which eliminates the fastening devices and cabling required in the case of exterior mounting.

Dead-tank circuit breakers offer particular advantages if the protection design requires the use of several current transformers per pole assembly, such as for a typical American system. The possibility of being able to arrange current transformers in front of and behind the circuit breaker enables protection schemes to be met in a particularly cost-saving manner. Furthermore, it is relatively simple to retrofit the current transformers in the field.

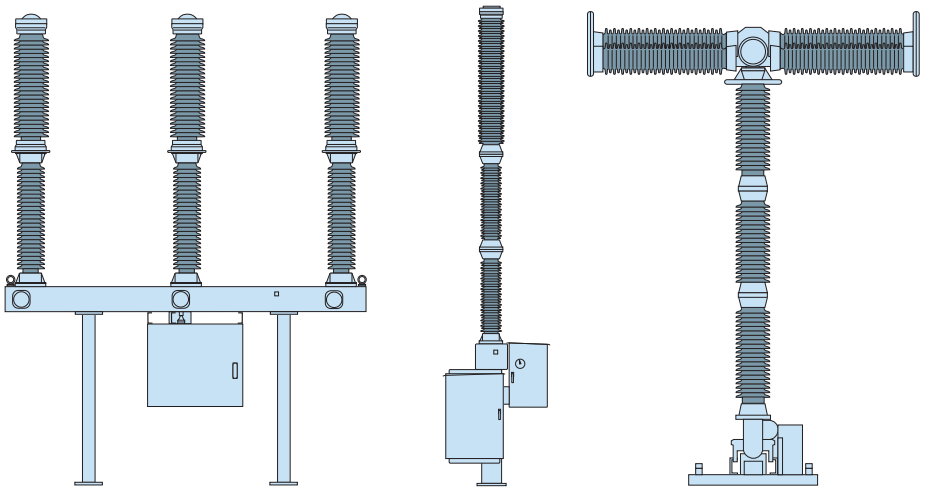
As an additional advantage, dead-tank circuit breakers are particularly resistant to earthquakes due to their compact design and low center of gravity.

Dead-Tank



Type		SPS2							
Electrical data		3 cycle							2 cycle
Rated voltage	kV	38	48.3	72.5	123	145	170	245	**550**
Rated power-frequency withstand voltage	kV	80	105	160	260	310	365	425/460	**860**
Rated lighting impulse withstand voltage	kV	200	250	350	550	650	750	900/1050	**1800**
Rated nominal current up to	A	4000	4000	4000	4000	4000	4000	4000	**4000**
Rated breaking current up to	kA	40	40	40	63	63	63	63	**63**

Live-Tank



Type		3AP1					3AT2/3			
Electrical data		3 cycle					2 cycle			
Rated voltage	kV	72.5	123	145	170	245/300	145	245	362	550
Rated power-frequency withstand voltage	kV	160	260	310	365	460	310	460	555	860
Rated lighting impulse withstand voltage	kV	325	550	650	750	1050	650	1050	1300	1800
Rated nominal current up to	A	4000	4000	4000	4000	4000	4000	4000	4000	4000
Rated breaking current up to	kA	40	40	40	40	50	80	80	63	63

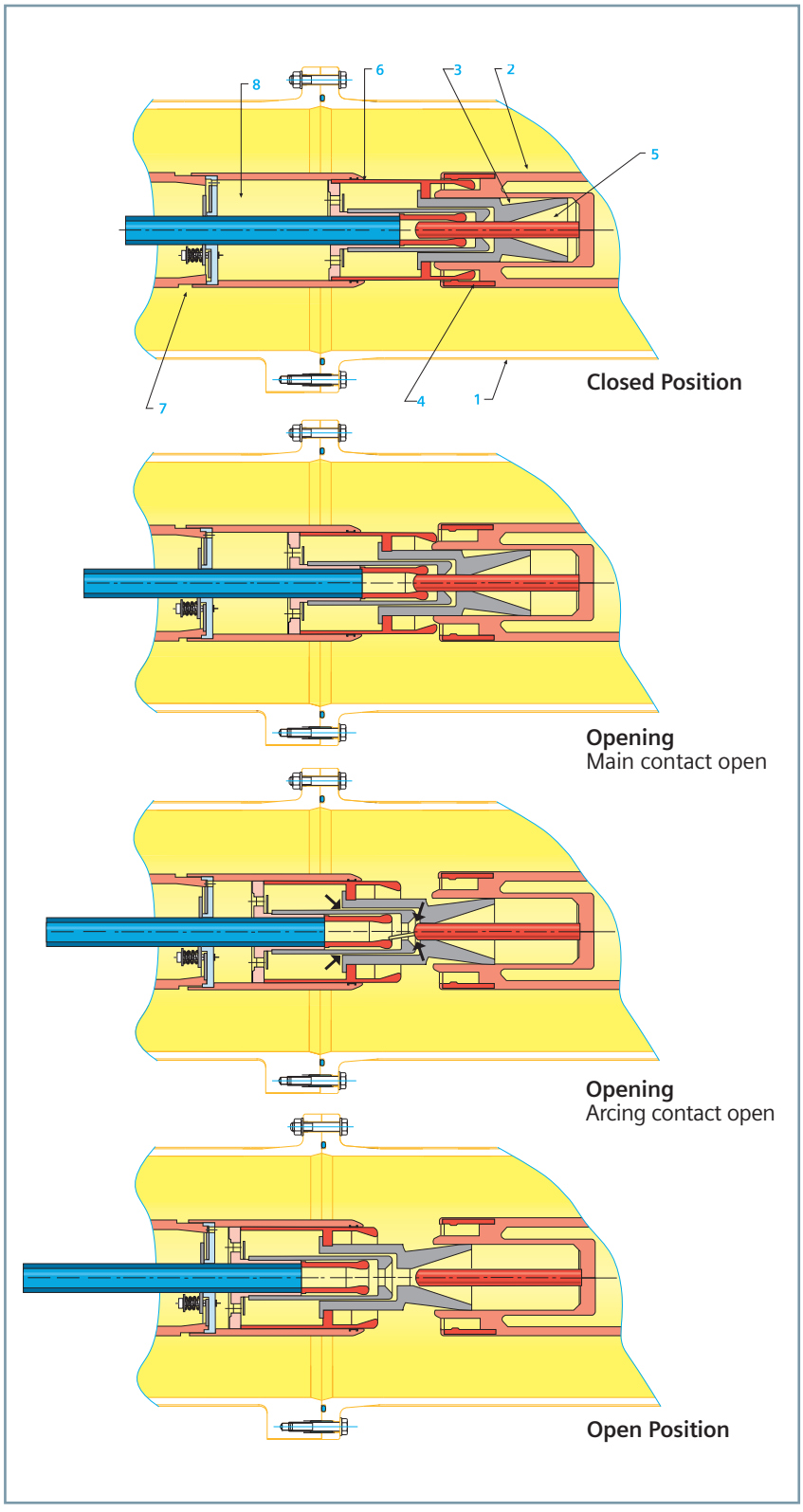
Interrupter Unit

Arc-assist interrupter

The durable construction of the SPS2 circuit breaker includes the field proven 3AP arc-assist interrupter. Each interrupter consists of a stationary contact assembly and a moving contact assembly mounted inside a pole unit housing.

During the opening operation, the puffer action in the compression cylinder of the 3AP interrupter is sufficient for low current faults and switching operations. During high current interruptions, heat from the arc causes the pressure to rise in the heating volume chamber. The resulting high pressure gas from the heating volume extinguishes the arc.

This arc-assist technology, coupled with our FA family of spring mechanisms used from 72.5kV up to 55kV, assures that the components are subjected to less stress which results in optimal operating reliability.



KEY:

1. Aluminum Housing
2. Stationary Contact Support
3. Nozzle
4. Main Contact
5. Arcing Contact
6. Heating Volume
7. Moving Contact Support Base
8. Compression Cylinder

SPS2 Specification

Longer operating life – Lower maintenance costs

In considering any circuit breaker, today's utilities must be concerned not only with initial price and installation, but also with the ongoing costs of ownership. The Siemens SPS2 wins in every category. Its relatively low price tag, simple installation and easy maintenance will continue to pay dividends decades into the future.

In addition to the reliable performance you can expect from your SPS2 breaker, you'll also find it can handle a number of special requirements, such as:

- Switching capacitors, cables and reactors
- Environmentally restricted sites requiring oil sumps
- System stability problems requiring three-cycle interrupting
- Reclosing duty without derating interrupting capability
- High contamination zones that require extra creep and low contamination weather shields
- High altitude application up to 10,000 feet without derating

Getting the Best Breaker for your Needs

How to Order

When ordering a Type SPS2 breaker, specify the following:

1. Breaker type and rating
2. Trip voltage (see Ratings Section)
3. Close voltage (see Ratings Section)
4. Motor voltage: 120VAC/125VDC, 240VAC/250VDC, 48VDC
5. Heater voltage: 115, 230 VAC
6. BCTs: type, ratio, number, location
7. Terminals: specify in detail if desired
8. Include customer specifications covering special equipment, accessories, test, etc.

Basic Breaker

The Standard basic breaker includes:

1. Three-pole SF_6-filled outdoor power circuit breaker with three SF_6 interrupters
2. Galvanized frame with four galvanized steel legs
3. Light gray standard color
4. Six light gray SF_6-filled bushings
5. Six relaying accuracy bushing current transformers
6. Trip-free spring operating mechanism
7. Instrumentation to monitor SF_6 gas pressure and provide low pressure alarm
8. Twelve stage auxiliary switch; Eight stages for customer use
9. Trip coil and close coil
10. Cabinet heater to prevent condensation
11. Necessary terminal blocks and wiring
12. Operations counter
13. Fused knife switches (3)
14. Grounding pads (3)
15. Mechanical position indicator
16. Provision for travel recorder attachment
17. SF_6 gas for initial filling
18. Set of tools required for installation

Operational modifications

1. Extra BCTs
2. Metering accuracy BCTs
3. Extra creepage bushings
4. Capacitor trip
5. Relays for reclosing or non-reclosing breaker application
6. External pull to trip handle
7. Cabinet light and convenience outlet
8. Special heaters and cabinet insulation for operation down to -50°C
9. Two additional 12-pole auxiliary switches
10. Dual trip coils
11. Control switch
12. Local/remote switch
13. Thermostat for cabinet heater
14. Composite bushings

Bushing current transformers

External bushing current transformers are mounted in weatherproof housings on both sides of the breaker. Their leads terminate in the control cabinet at short circulating type terminal blocks. Space is available for mounting two current transformers per bushing. Up to three CTs can be supplied if required.

Ratio ①,③	Accuracy ②	
	ANSI	IEC
600:5 MR	C-200	5P10@15VA
600:5 MR	C-400	10P20@50VA
1200:5 MR	C-400	CLASS0.5@30VA
1200:5 MR	C-800	CLASSX
2000:5 MR	C-400	10P20@50VA
2000:5 MR	C-800	CLASS0.5@30VA
3000:5 MR	C-800	CLASS0.5@30VA
300:5 SR	0.6B-0.5	CLASS0.25@20VA
600:5 SR	0.3B-0.5	5P20@20VA
600/1200:5 DR	0.3B-0.5/0.3B-1.0	10P20@50VA
1200:5 SR	0.3B-1.0	CLASS0.2@15VA
2000:5 SR	0.3B-1.8	CLASS0.2@15VA

1 Ratio
MR = Multiple Ratio
SR = Single Ratio
DR = Dual Ratio

2 Accuracy
C = Relay Accuracy
B = Meter Accuracy

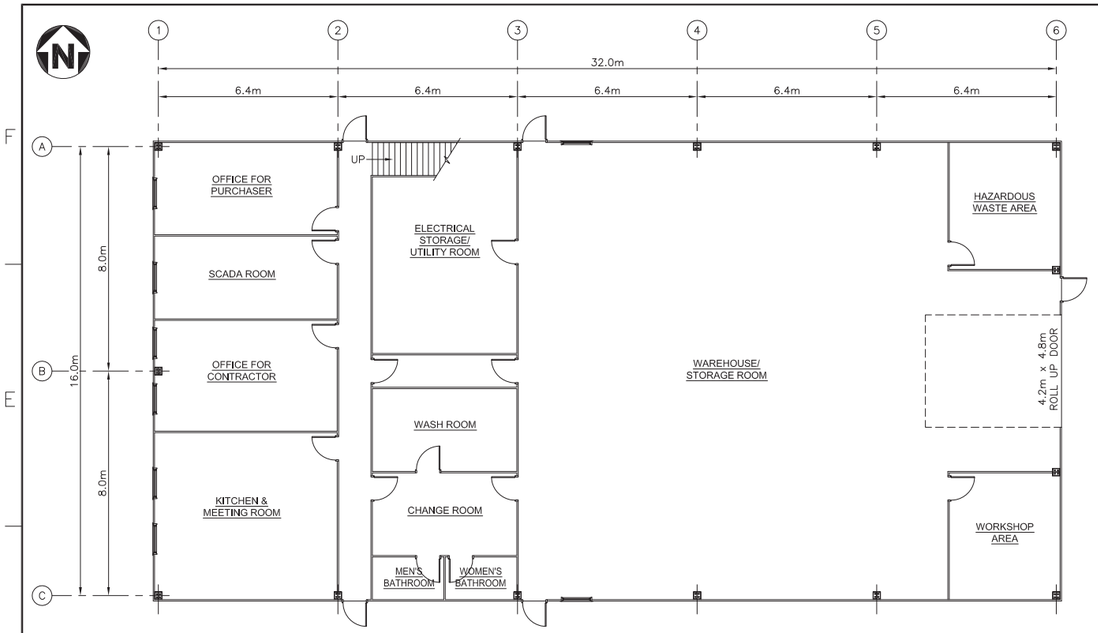
3 Typical Ratios
Special Ratios Available Upon Request

All statements, technical information and recommendations contained herein are based on information and tests we believe to be reliable. The accuracy or completeness hereof is not guaranteed. Since conditions of use are outside our control, the user should determine the suitability of the product for its intended use and assumes all risk and liability whatsoever in connection herewith.

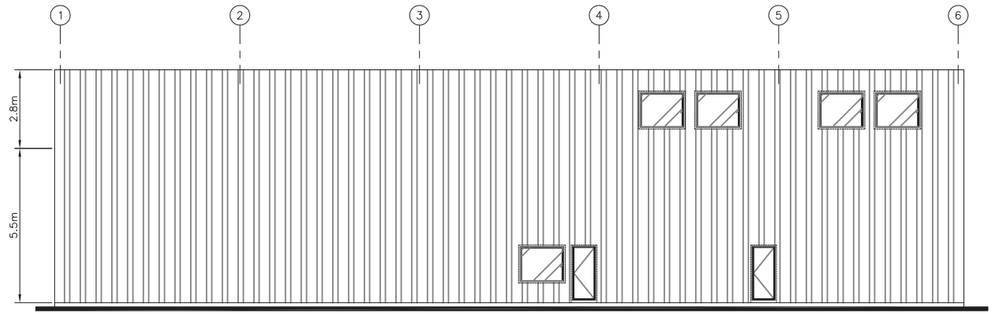
Siemens Power Transmission and Distribution
444 Hwy. 49 S
Richland, MS 39218 USA
tel: 601.939.0550
fax: 601.932.9911

PBBR-1000F

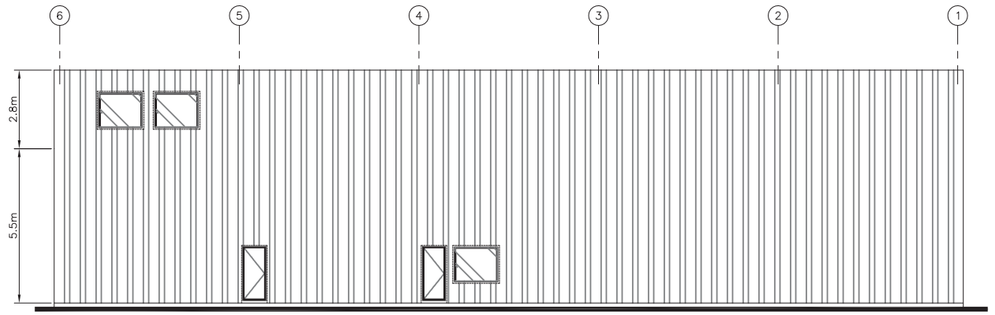
www.usa.siemens.com/energy



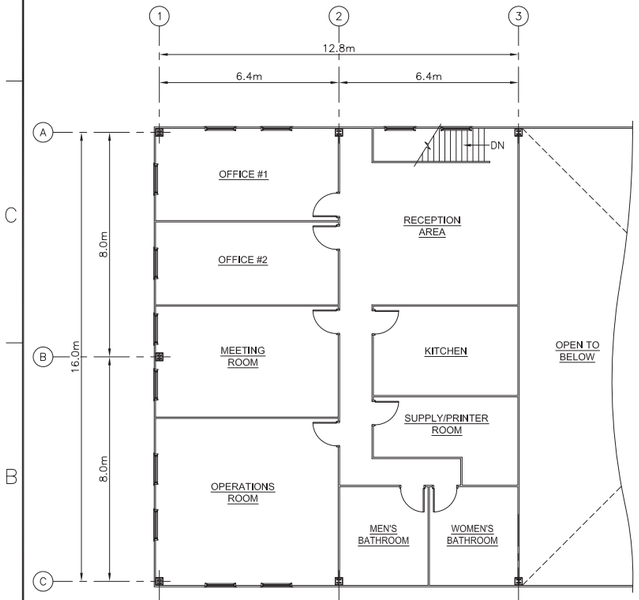
MAIN FLOOR PLAN
SCALE 1:100



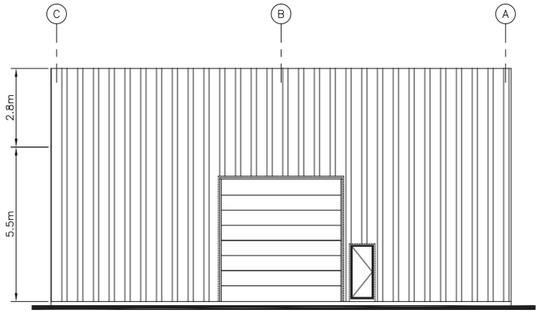
NORTH ELEVATION
SCALE 1:100



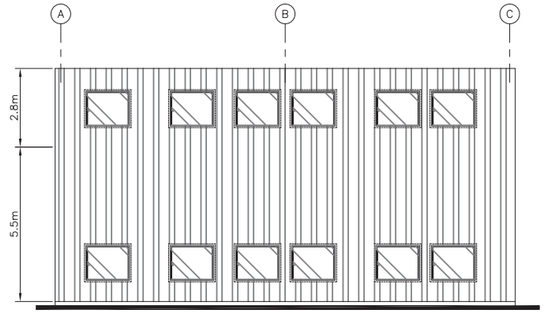
SOUTH ELEVATION
SCALE 1:100



SECOND FLOOR PLAN
SCALE 1:100



EAST ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100

NOTES

1. DIMENSIONS AND DATA SHOWN ARE AS PER SIEMENS' REQUIREMENTS AND MAY CHANGE DUE TO ACTUAL O&M BUILDING DESIGNED FOR PROJECT.

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
B	11JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
A	10JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE

REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00

K2 WIND POWER PROJECT

PROJECT NO. 161973

ACTIVITY NO.

SCALE NTS

PACKAGE CODE

	BY	DDMMMYY
DSN	BJN	JUL.'12
DRN	M.HALL	JUL.'12
CHK	BJN	JUL.'12
APP	JHM	JUL.'12

SUBJECT

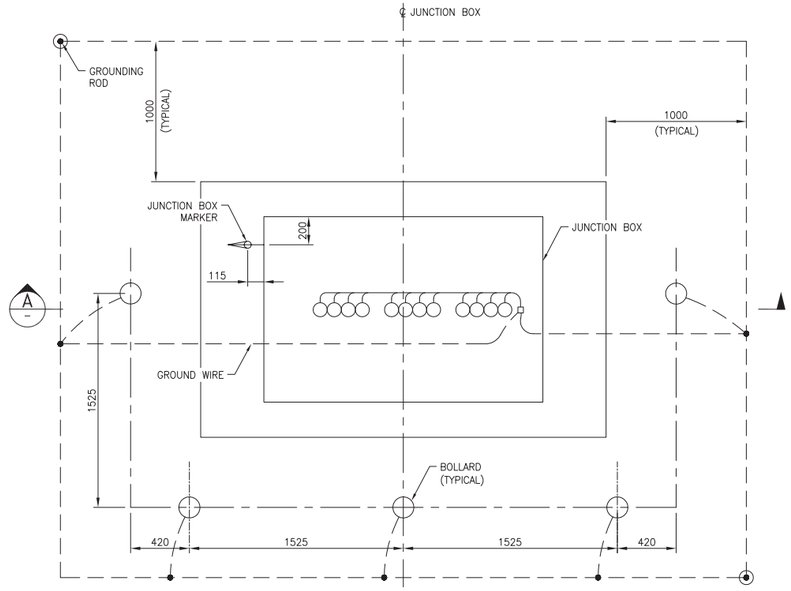
PROPOSED OPERATIONS & MAINTENANCE BUILDING PLANS & ELEVATIONS

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-123-0100

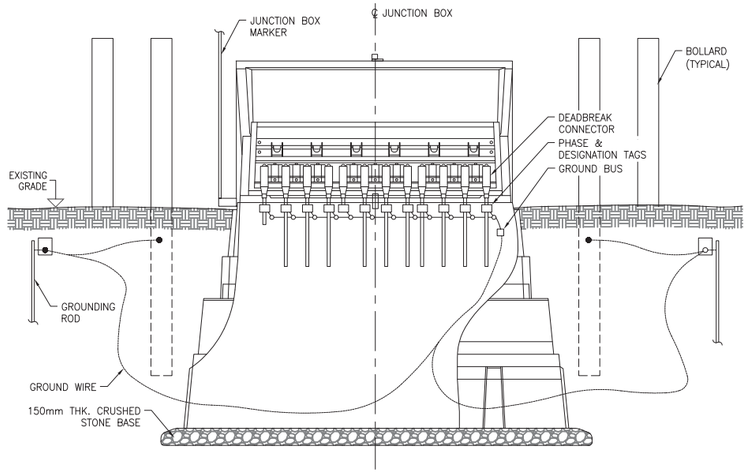
REV. B

CAD FILE: P:\CAD\CIV\MP\A1-161973-00-123-0100.DWG



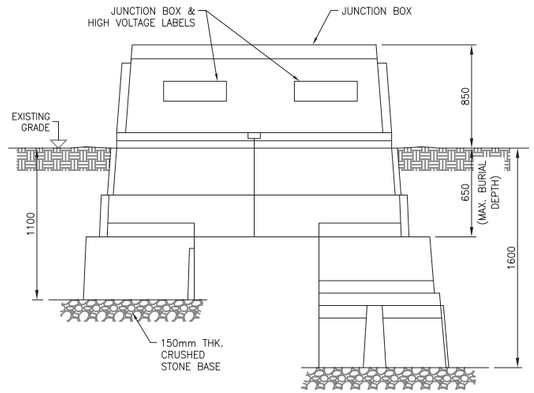
TYPICAL JUNCTION BOX & GROUNDING PLAN

NOT TO SCALE



SECTION A

NOT TO SCALE



TYPICAL JUNCTION BOX BURIAL DETAIL

NOT TO SCALE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS AND DATA SHOWN ARE TYPICAL ONLY AND MAY CHANGE DUE TO ACTUAL JUNCTION BOX ORDERED FOR PROJECT.

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP
A	10JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM		

REF	NUMBER	TITLE
		REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00

K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.		BY	DDMMMYY
161973		DSN	BJN	JUL.'12
		DRN	M.HALL	JUL.'12
SCALE	PACKAGE CODE	CHK	BJN	JUL.'12
NTS		APP	JHM	JUL.'12

SUBJECT: TYPICAL JUNCTION BOX DETAIL PLAN & SECTIONS

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0908

REV. A

CAD FILE: T:\CAD\ELE\SKETCHES\A1-161973-00-141-0908.DWG

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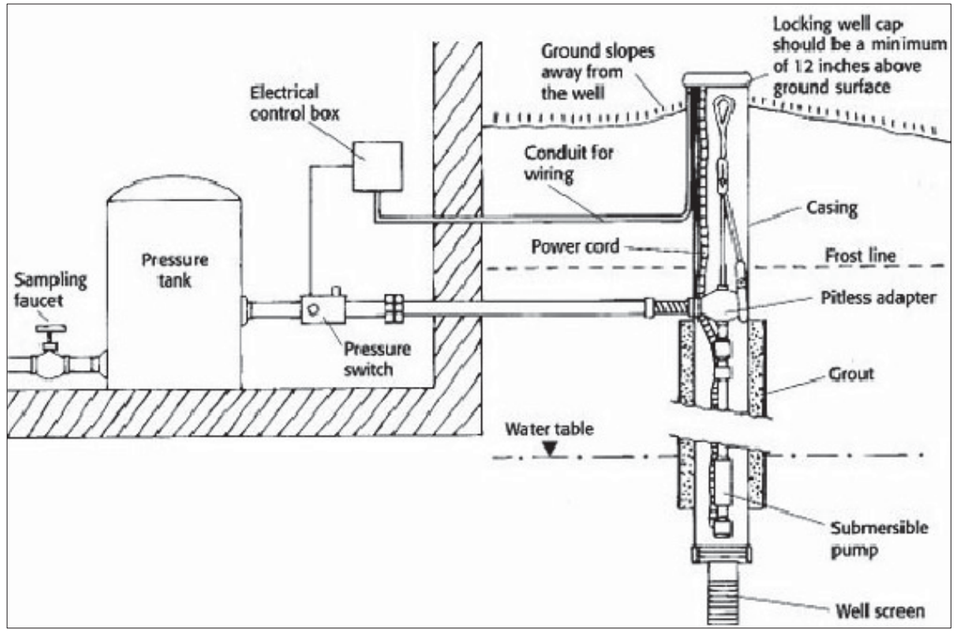
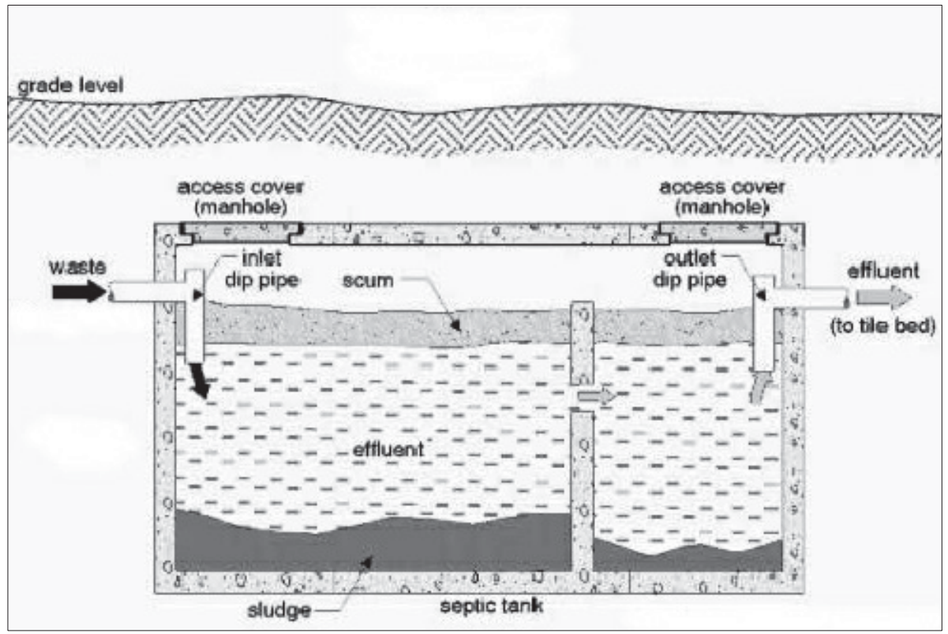
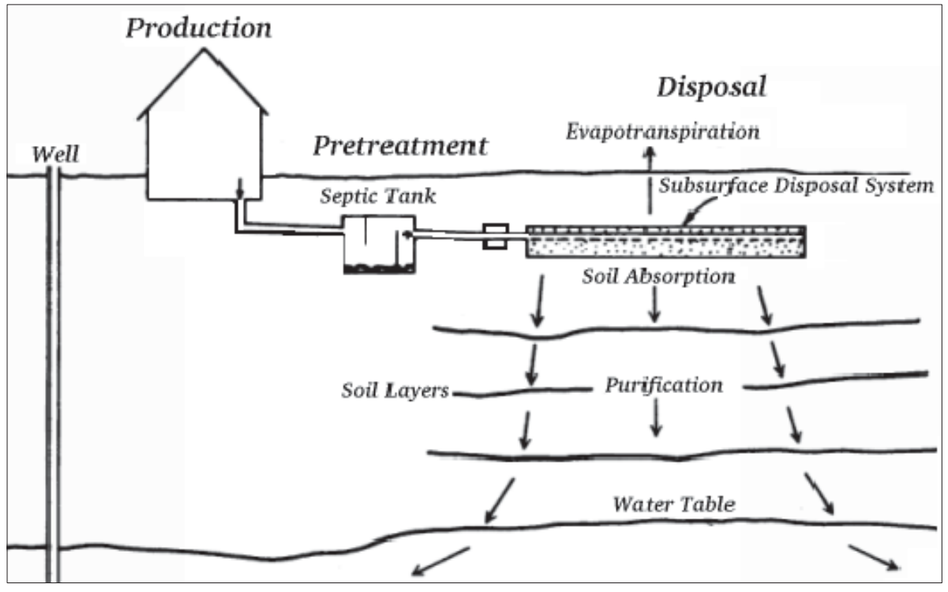
SAVED: 10-Jul-12 11:22 AM



WATER WELL DETAIL



SEPTIC TANK DETAIL



SEPTIC SYSTEM DETAIL

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
A	06JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE
REFERENCES		

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

PROJECT NO. 161973

ACTIVITY NO.

SCALE NTS

PACKAGE CODE

	BY	DDMMMYY
DSN	BJN	JUL.'12
DRN	M.HALL	JUL.'12
CHK	BJN	JUL.'12
APP	JHM	JUL.'12

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00

K2 WIND POWER PROJECT

SUBJECT

TYPICAL WATER WELL, SEPTIC SYSTEM & TANK DETAIL

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0907

REV. A

PLOTTED: 06-JUL-12 8:23 PM BY: MICHEL (DRAYVILLE)
SAVED: 06-JUL-12 8:22 PM BY: MICHEL (DRAYVILLE)
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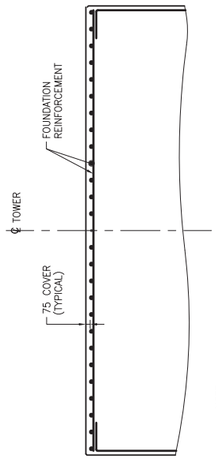


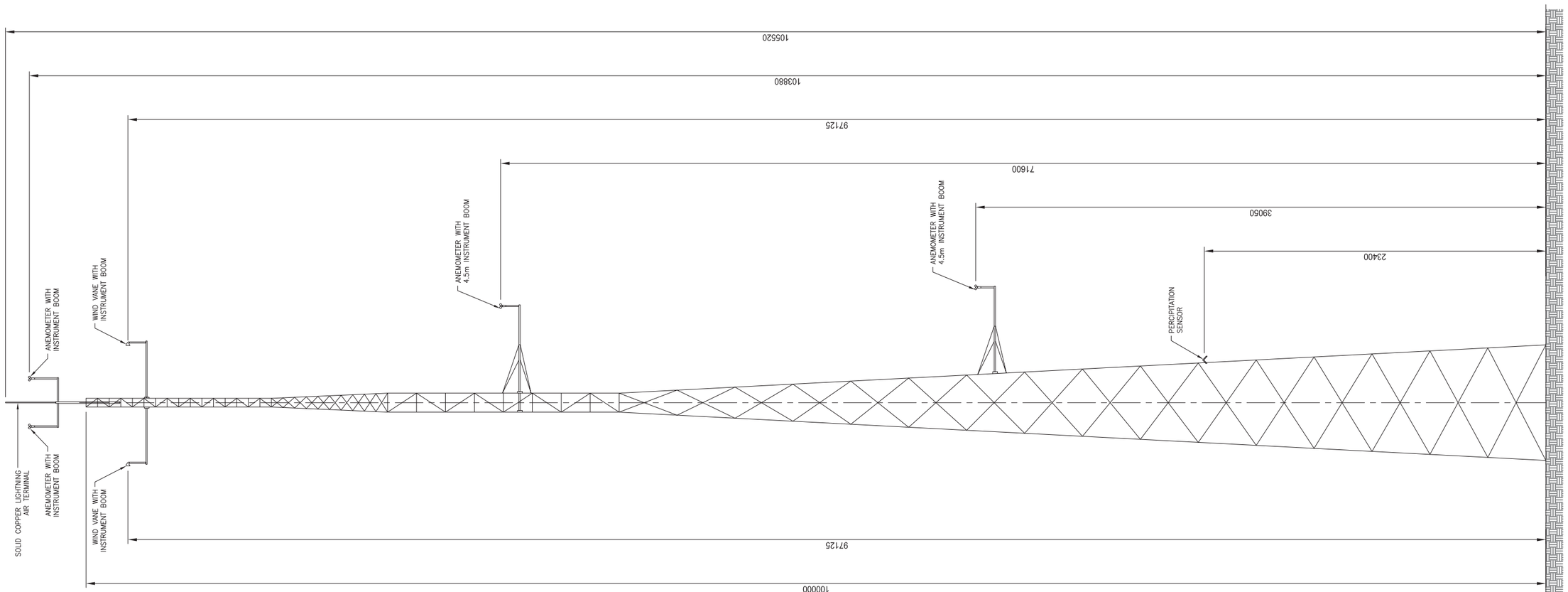
NOTE:
FOUNDATION SIZE AND DEPTH DEPENDANT ON GEOTECHNICAL INVESTIGATION.

TYPICAL METEOROLOGICAL TOWER FOUNDATION

NOT TO SCALE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS AND MET TOWER INSTRUMENTS SHOWN ARE TYPICAL ONLY AND MAY CHANGE DUE TO ACTUAL METEOROLOGICAL TOWER ORDERED FOR THE PROJECT.



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A	10JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE
REFERENCES		

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

	BY	DDMMMYY
DSN	BJN	JUL.'12
DRN	M.HALL	JUL.'12
CHK	BJN	JUL.'12
APP	JHM	JUL.'12

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00 — K2 WIND POWER PROJECT

PROJECT NO. 161973 | ACTIVITY NO. | SCALE NTS | PACKAGE CODE

SUBJECT: TYPICAL 100m HIGH METEOROLOGICAL TOWER PLAN & SECTIONS

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-141-0909 | REV. A

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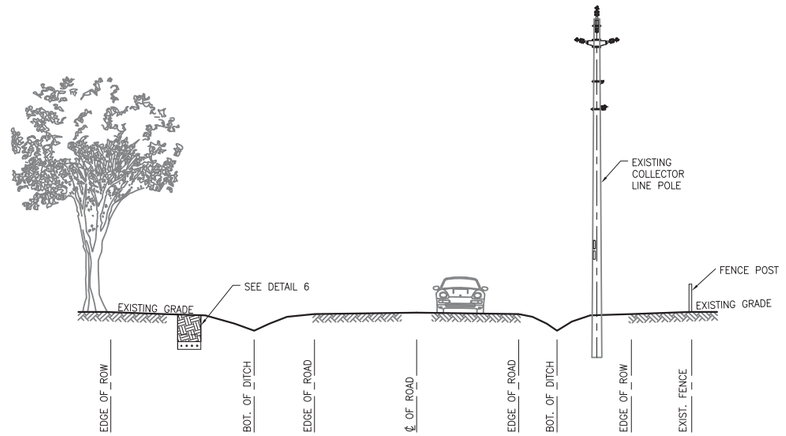
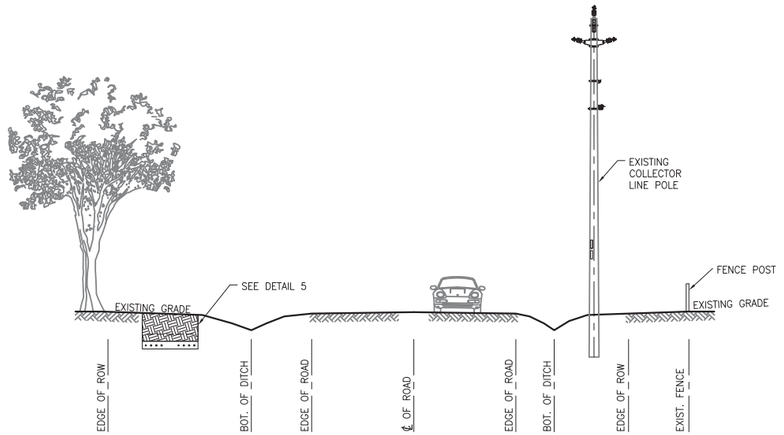
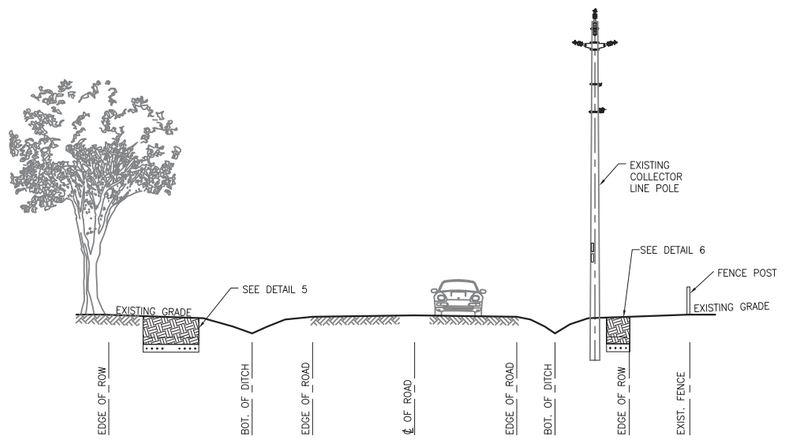
PLOTTED: 27-Jul-12 10:57 AM by MICHAEL GRAVELLE



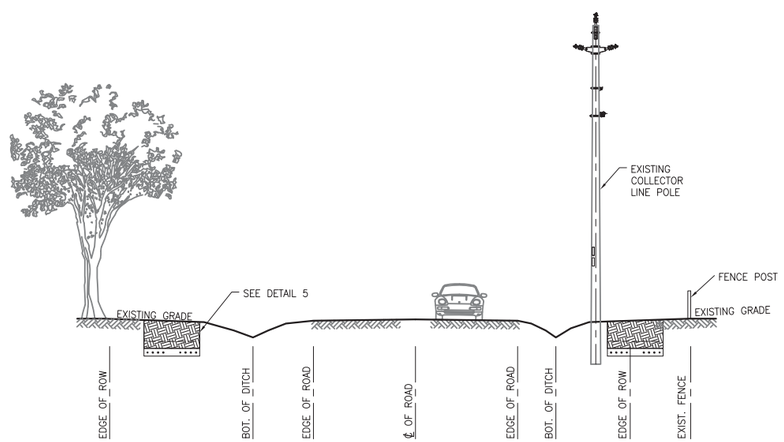
DETAIL 1: TYPICAL 1–CIRCUIT UNDERGROUND COLLECTOR
SCALE 1:100



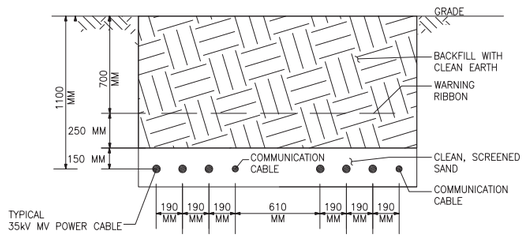
DETAIL 2: TYPICAL 2–CIRCUIT UNDERGROUND COLLECTOR
SCALE 1:100



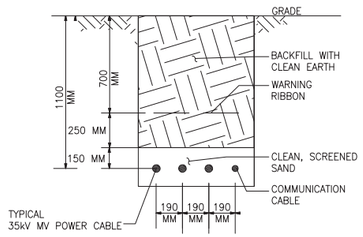
DETAIL 3: TYPICAL 3–CIRCUIT UNDERGROUND COLLECTOR
SCALE 1:100



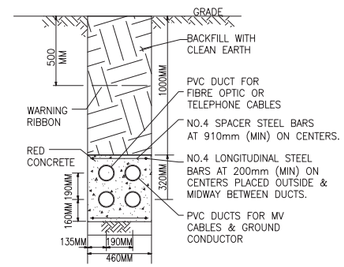
DETAIL 4: TYPICAL 4–CIRCUIT UNDERGROUND COLLECTOR
SCALE 1:100



DETAIL 5: TYPICAL TRENCH FOR 2 CIRCUIT UNDERGROUND COLLECTOR
SCALE 1:20



DETAIL 6: TYPICAL TRENCH FOR 1 CIRCUIT UNDERGROUND COLLECTOR
SCALE 1:20



DETAIL 7: TYPICAL TRENCH FOR ROAD CROSSING
SCALE 1:20

NOTES:

1. CABLE ROUTE MARKERS SHALL BE PROVIDED AS PER CODE.
2. CROSS SECTIONAL VIEWS ARE NOT BASED ON ACTUAL SURVEY ALONG MUNICIPAL ROAD AND ARE SUBJECT TO CHANGE.
3. UNDERGROUND TRENCH FOR COLLECTOR CIRCUITS MAY EXCEED ACTUAL ROAD ROW AND ENCROACH UPON LANDOWNER LOTS DEPENDING ON ACTUAL ROAD SURVEY CONDITIONS.
4. TREELINES, FENCING AND EXISTING OVERHEAD POLES MAY BE ON EITHER SIDE OF ROW DEPENDING ON ACTUAL ROAD CONDITIONS.
5. A TYPICAL ROW OF 18.75M (60') IS SHOWN.

0m 0.2 0.4 0.6 0.8 1
1:20

0m 1 2 3 4 5
1:100

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP
E	27SEP11	ISSUED FOR REA APPLICATION – FIGURE #	CK	CK	JHM		
D	06SEP11	ISSUED FOR REA APPLICATION	M.HALL	CK	JHM		
C	31AUG10	ISSUED FOR INFORMATION	JL	CK	JHM		
B	25AUG10	ISSUED FOR INFORMATION	JL	CK	JHM		
A	20AUG10	ISSUED FOR INFORMATION	JL	CK	JHM		

REF	NUMBER	TITLE
		REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

K2 WIND ONTARIO LIMITED PARTNERSHIP

PROJECT PHASE

AREA 00

K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.
161973	

SCALE	PACKAGE CODE
AS SHOWN	

	BY	DDMMMYY
DSN	CK	AUG.'10
DRN	J.LOH	AUG.'10
CHK	CK	AUG.'10
APP	JHM	AUG.'10

SUBJECT: TYPICAL BURIED CABLE

CLIENT DWG. NO.

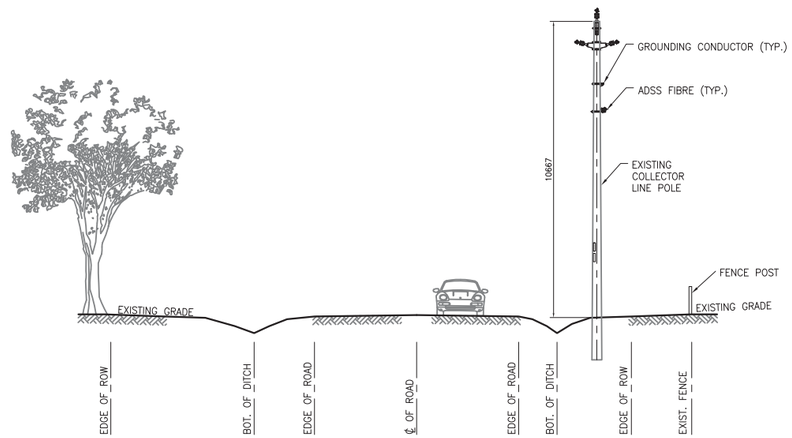
DRAWING NO. A1–161973–00–121–0904

REV. E

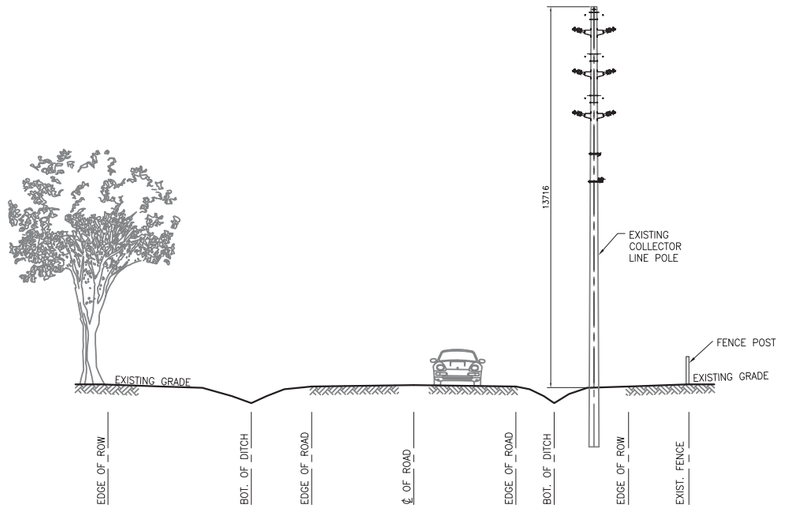
CAD FILE: K:\CAD\CIV\MF\A1–161973–00–121–0904.DWG

PLOTTED: 26–Sep–11 5:37 PM USER: KENT, CATHY N

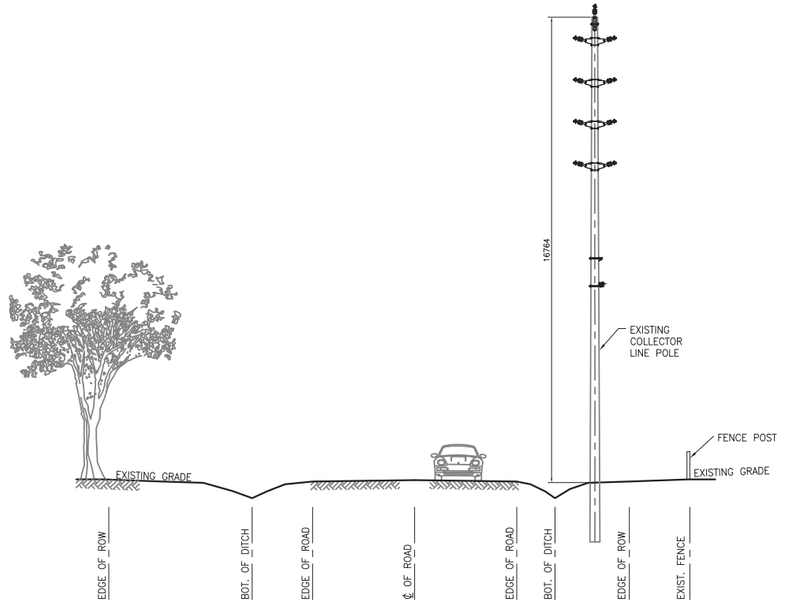
SAVED: 26–Sep–11 5:37 PM



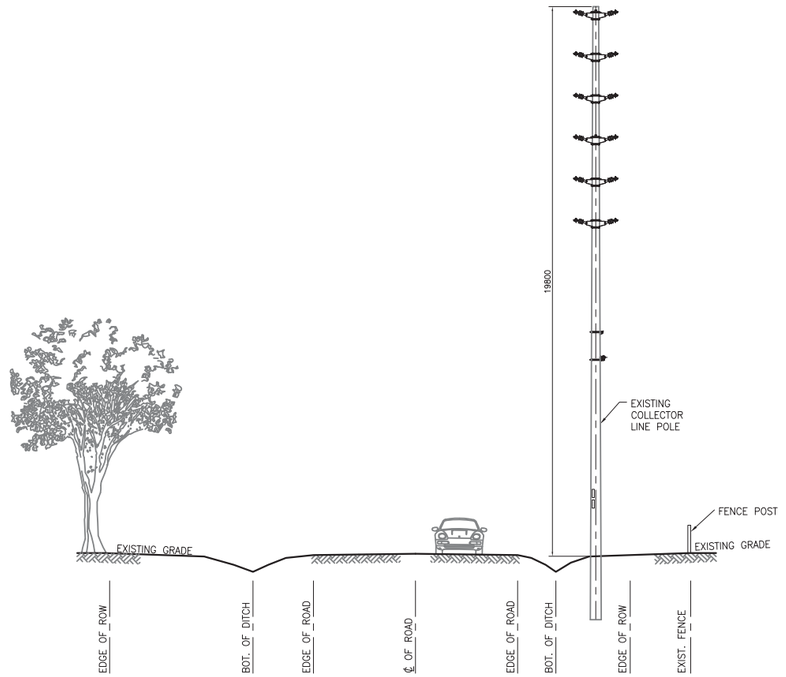
DETAIL 1: TYPICAL 1–CIRCUIT OVERHEAD COLLECTOR



DETAIL 2: TYPICAL 2–CIRCUIT OVERHEAD COLLECTOR



DETAIL 3: TYPICAL 3–CIRCUIT OVERHEAD COLLECTOR



DETAIL 4: TYPICAL 4–CIRCUIT OVERHEAD COLLECTOR

NOTES:

1. CROSS SECTIONAL VIEWS ARE NOT BASED ON ACTUAL BOUNDARY ALONG MUNICIPAL ROAD AND ARE SUBJECT TO CHANGE.
2. TREELINES, FENCING AND EXISTING OVERHEAD POLES MAY BE ON EITHER SIDE OF ROW DEPENDING ON ACTUAL ROAD CONDITIONS.
3. POLE HEIGHTS SHOWN ARE APPROXIMATE & SUBJECT TO CHANGE.
4. A TYPICAL ROW OF 18.75 (60') IS SHOWN.

0m 1 2 3 4 5
1:100

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
D	27SEP11	ISSUED FOR REA APPLICATION – FIGURE #	CK	CK	JHM			
C	08SEP11	ISSUED FOR REA APPLICATION	M.HALL	CK	JHM			
B	21SEP10	ISSUED FOR INFORMATION	JL	CK	JHM			
A	20AUG10	ISSUED FOR INFORMATION	JL	CK	JHM			

REF	NUMBER	TITLE

REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00

K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.
161973	
SCALE	PACKAGE CODE
1:100	

	BY	DDMMMYY
DSN	CK	AUG.'10
DRN	M.HALL	AUG.'10
CHK	CK	AUG.'10
APP	JHM	AUG.'10

SUBJECT

TYPICAL OVERHEAD COLLECTOR SYSTEM CROSS–SECTION

CLIENT DWG. NO.

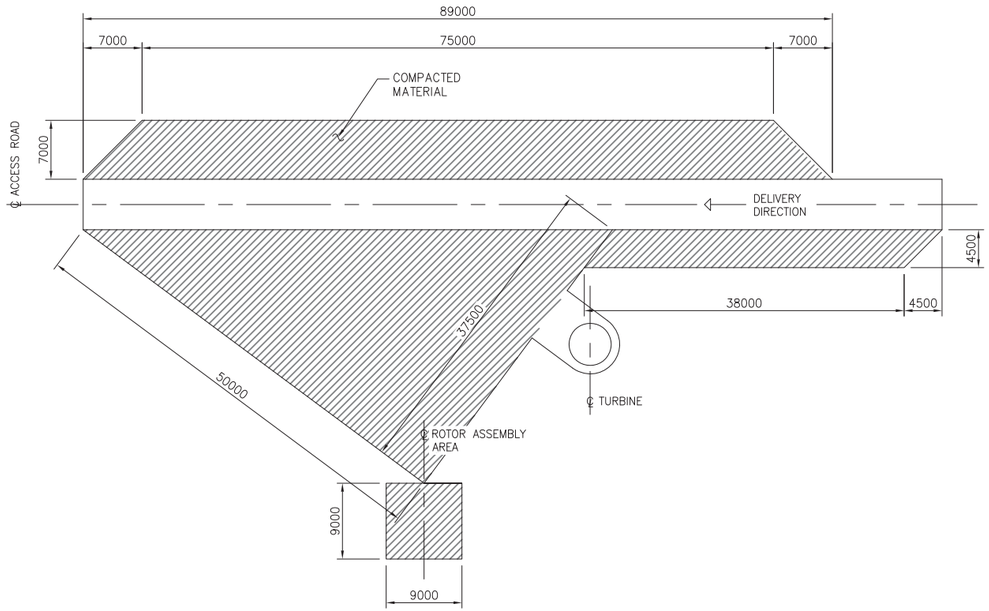
DRAWING NO. A1–161973–00–121–0903

REV. D

CAD FILE: X:\CAD\CIV\MF\A1–161973–00–121–0903.DWG

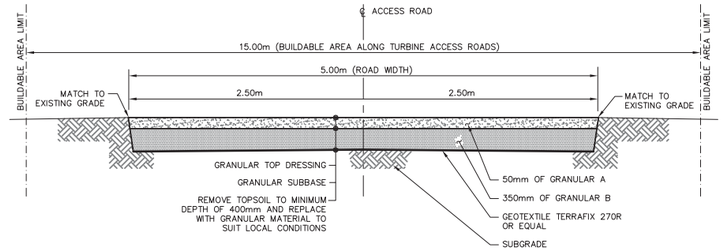
PLOTTED: 26–Sep–11 5:40 PM USER: KENT, CATHY N

SAVED: 26–Sep–11 5:40 PM



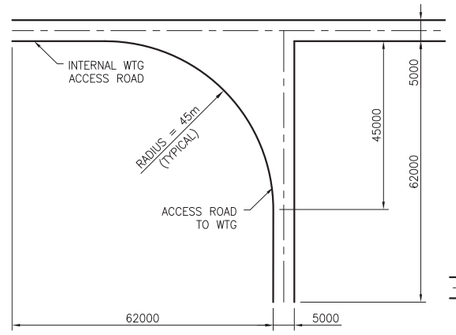
TYPICAL SIEMENS LAYDOWN AREA & CRANE PAD LAYOUT

NOT TO SCALE



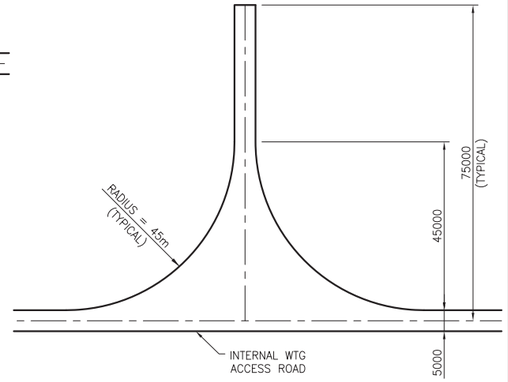
TYPICAL ACCESS ROAD CROSS SECTION

NTS (FIT FOR PURPOSE)



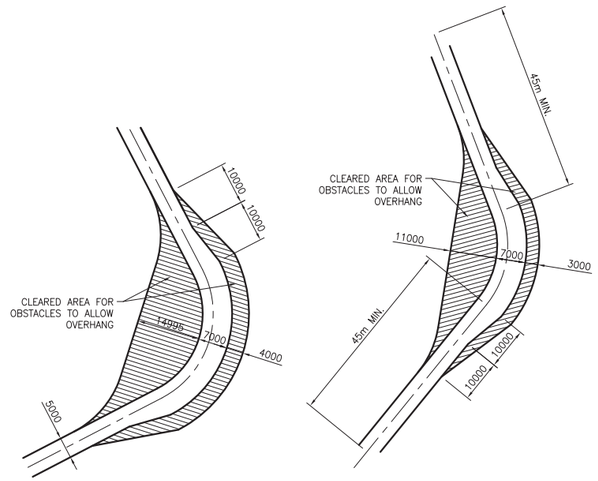
TURNING AREA DETAIL

NTS



TYPICAL DELIVERY TRUCK "HAMMERHEAD" TURNAROUND

NTS

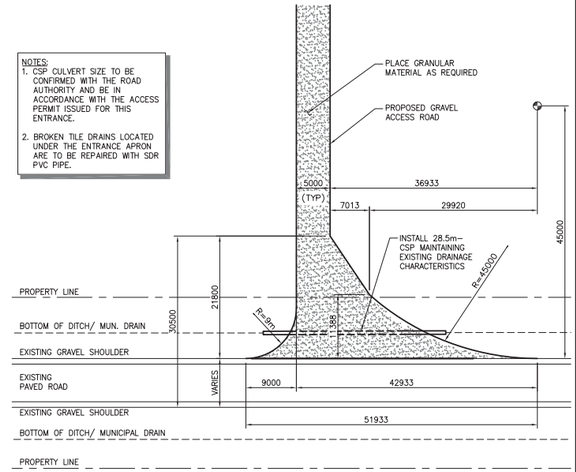


PLAN - CURVES <90° DETAIL

NTS

PLAN - CURVES <60° DETAIL

NTS



TYPICAL ACCESS ROAD / PAVED MUNICIPAL CONCESSION ROAD INTERSECTION DETAIL

NOT TO SCALE

NOTES:

1. FOR WTG ACCESS ROAD LAYOUT SEE DRAWING A1-161973-00-121-0100.
2. FOR CRANE PAD, LAYDOWN AREA & ACCESS ROADS SEE SIEMENS DOCUMENT "GENERAL SITE REQUIREMENTS, 5 SECTION TOWER, SWT-2.3MW- 101 -99.5m HH US REV. 00".

CRANE PAD NOTES:

P1. CRANE PAD STRUCTURE (TEMPORARY): GRANULAR 'B' SUBBASE TO BE INSPECTED BY GEOTECHNICAL CONSULTANT.

P2. DRAINAGE TILES INTERCEPTED IN WORK ZONE SHALL BE REROUTED AROUND FOUNDATION (MINIMUM SEPARATION 3m FROM EXCAVATION AND 'DEAD' DRAINS SHALL BE GROUTED/SEALED PRIOR TO BACKFILLING.

P3. PERIMETER GRADING SHALL BLEND TO EXISTING. CRANE PAD AREAS SHALL BE GRADED TO SHED SURFACE WATER DRAINAGE DIRECTIONS INDICATED ON THIS PLAN ARE NOT SPECIFIC TO ANY DIRECTION AND EROSION CONTROLS SHALL BE IMPLEMENTED (AS NECESSARY) TO SUIT LOCAL CONDITIONS.

P4. WINDROW/STOCKPILING OF NATIVE SOILS TO BE LOCATED 10m (MIN.) FROM ANY WATERCOURSE.

P5. TEMPORARY SEDIMENT TRAPS (PER OPSD 219.22, 219.24) SHALL BE CONSTRUCTED WITHIN THE WORK ZONE AT THE POINT OF CONVERGENCE OF SURFACE RUNOFF. CONTRACTOR SHALL MONITOR TRAPS FOR SILT ACCUMULATIONS (AS NECESSARY).

P6. EXCESS SUBSOIL, FROM FOUNDATION AND CRANE PAD EXCAVATION TO BE REMOVED FROM SITE BY CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

ACCESS ROAD NOTES:

1. INSTEAD OF CROWN, ROAD SURFACE MAY SLOPE AT 2% LATERALLY IN ONE DIRECTION OR BE SLOPED TO MATCH EXISTING TOPOGRAPHY.
2. ROAD WILL FOLLOW EXISTING CONTOURS TO MAINTAIN LOCAL DRAINAGE PATTERNS TO THE SATISFACTION OF THE LANDOWNER.
3. USE OF GEOTEXTILE SUBGRADE REINFORCEMENT AND GRANULAR DRESSING DEPTH TO BE CONFIRMED SUBJECT TO GEOTECHNICAL REVIEW.
4. A FULLY ENGINEERED ROADWAY (ie. ALL WEATHER ROAD) WOULD INCLUDE STRIPPING OF TOPSOIL AND A DESIGN BASE COURSE THICKNESS, LIKELY SIZED ACCORDING TO THE WEAKEST SUBGRADE SOIL TYPE.
5. CHECK COMPACTION OF NATIVE SOIL AND REMOVE ALL "SOFT AREAS" UNTIL REQUIRED COMPACTION IS ACHIEVED

NOT TO BE USED FOR CONSTRUCTION

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
E	27SEPT11	ISSUED FOR REA APPLICATION - TITLE	CK	CK	JHM			
D	27SEPT11	ISSUED FOR REA APPLICATION - FIGURE #	CK	SL	JHM			
C	06SEPT11	ISSUED FOR REA APPLICATION	M.HALL	SL	JHM			
B	24AUG11	ISSUED FOR REA APPLICATION	M.HALL	SL	JHM			
A	31AUG10	ISSUED FOR INFORMATION	M.HALL	SL	JHM			

REF	NUMBER	TITLE

REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00

K2 WIND POWER PROJECT

PROJECT NO.	ACTIVITY NO.
161973	

SCALE	PACKAGE CODE
AS SHOWN	

	BY	DDMMMYY
DSN	SL	AUG.'10
DRN	M.HALL	AUG.'10
CHK	SL	AUG.'10
APP	JHM	AUG.'10

SUBJECT: TYPICAL ACCESS ROAD CROSS-SECTION, CRANE PAD LAYOUT AND LAYDOWN AREA

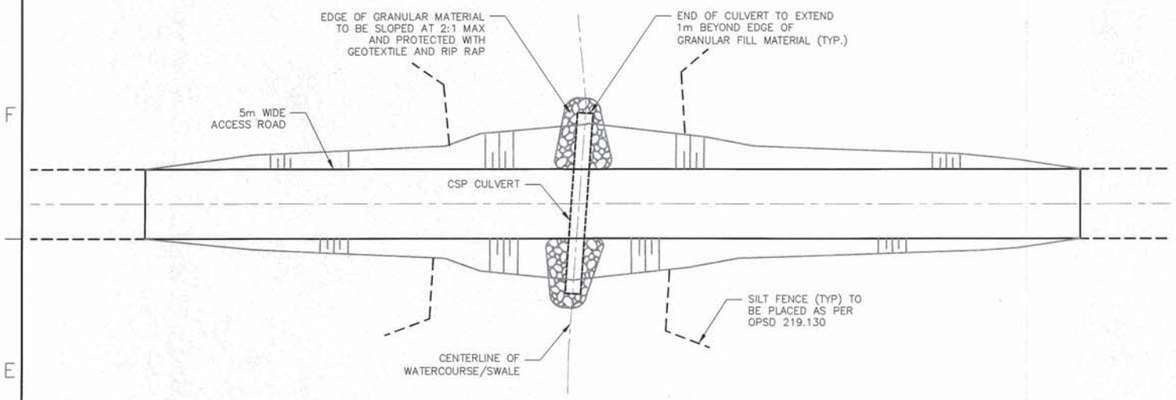
CLIENT DWG. NO.

DRAWING NO. A1-161973-00-121-0150

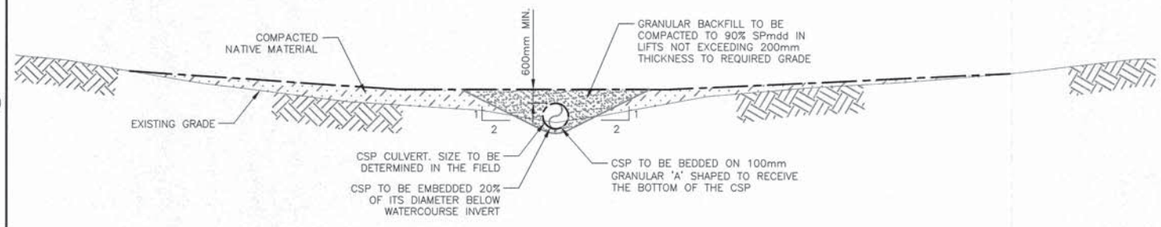
REV. E

CAD FILE: K:\CAD\CIVIL\MF\A1-161973-00-121-0150.DWG

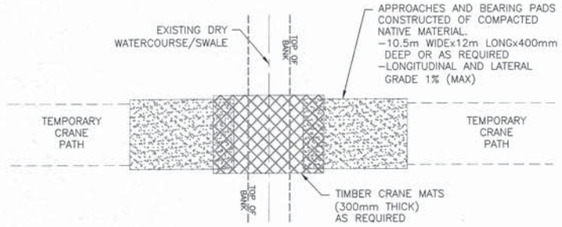
PLOTTED: 27-Sep-11 10:19 AM USER: KENT, CATHY N SAVED: 27-Sep-11 10:19 AM



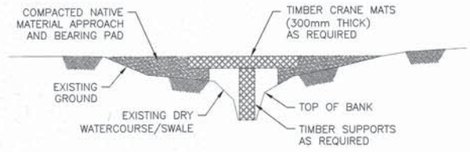
TYPICAL ACCESS ROAD CROSSING OF A WATERCOURSE/ SWALE (PLAN VIEW)
NTS



TYPICAL ACCESS ROAD CROSSING OF A WATERCOURSE/ SWALE (PROFILE VIEW)
NTS



TYPICAL TEMPORARY CRANE CROSSING OF WATERCOURSE USING TIMBER CRANE MATS (PLAN VIEW)
NTS



TYPICAL TEMPORARY CRANE CROSSING OF WATERCOURSE USING TIMBER CRANE MATS (PROFILE VIEW)
NTS

TEMPORARY APPROACHES AND BEARING PADS CONSTRUCTION

1. PLACE COMPACTED NATIVE MATERIAL TO GRADES AS REQUIRED.
2. AFTER COMPLETION OF THE CONSTRUCTION PROJECT ALL APPROACHES AND BEARING PADS TO BE REMOVED AND AREA RESTORED TO ORIGINAL CONDITION WITH TOPSOIL AND GRASS SEED WHERE REQUIRED.

NOTES

1. ALL MEASUREMENTS SHOWN ARE IN METRES UNLESS OTHERWISE SHOWN.
2. ALL EFFORTS SHALL BE MADE TO MINIMIZE DISTURBANCE OR SEDIMENT RELEASE TO ANY WATERCOURSE.
3. FLOWS TO BE MAINTAINED AROUND CONSTRUCTION SITES AT ALL TIMES.
4. TEMPORARY CROSSINGS USING CRANE MATS ARE TO BE USED WHERE PRACTICAL DURING DRY OR LOW-FLOW CONDITIONS AND SHALL BE CONSTRUCTED AS SHOWN ON TYPICAL TEMPORARY CROSSING USING CRANE MATS.
5. CULVERT INSTALLATION IF REQUIRED IS TO TAKE PLACE IF POSSIBLE DURING NO-FLOW CONDITIONS. IF FLOW IS PRESENT CULVERT IS TO BE INSTALLED USING A TEMPORARY WATER PASSAGE SYSTEM AS SHOWN ON OPSD 221.020.
6. RIP-RAP SHALL CONSIST OF 100-250mm ANGULAR CRUSHED LIMESTONE (OR APPROVED EQUIVALENT) PLACED 300mm THICK ON GEOTEXTILE UNDERLAY (TERRAFIX 270R OR EQUIVALENT) WITH 300mm OVERLAP.
7. ALL CULVERTS, GRANULAR MATERIALS AND COMPACTED NATIVE MATERIALS TO BE REMOVED FROM SITE AFTER COMPLETION OF CONSTRUCTION. RESTORATION OF ANY DISTURBED AREAS SHALL BE TO PRE-CONSTRUCTION CONDITION OR BETTER. TOPSOIL DRESSING AND SEEDING OF ANY GRASSED AREAS TO TAKE PLACE AS SOON AS POSSIBLE AFTER CONSTRUCTION.
8. 19mm WASHED CLEAR STONE MAY BE SUBSTITUTED FOR 100mm GRANULAR 'A' BEDDING UNDER ALL CULVERTS.
9. HDPE CULVERTS (BOSS 1000 OR EQUIVALENT) MAY BE SUBSTITUTED FOR CSP IN ALL LOCATIONS WHERE MAXIMUM LOAD REQUIREMENTS CAN BE ACHIEVED.

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
E	01NOV12	ISSUED FOR REA APPLICATION	M.HALL	BJN	JHM			
D	13MAR12	ISSUED FOR REA APPLICATION	M.HALL	BJN	JHM			
C	27SEPT11	ISSUED FOR REA APPLICATION - FIGURE #	CK	CK	JHM			
B	27SEPT11	ISSUED FOR REA APPLICATION	CK	CK	JHM			
A	31AUG10	ISSUED FOR INFORMATION	M.HALL	JJ	JHM			

REF	NUMBER	TITLE
REFERENCES		

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

PROJECT NO.	ACTIVITY NO.
161973	

SCALE	PACKAGE CODE
NTS	

	BY	DDMMMYY
DSN	M.HALL	AUG.'10
DRN	M.HALL	AUG.'10
CHK	CK	AUG.'10
APP	JHM	AUG.'10

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00 | K2 WIND POWER PROJECT

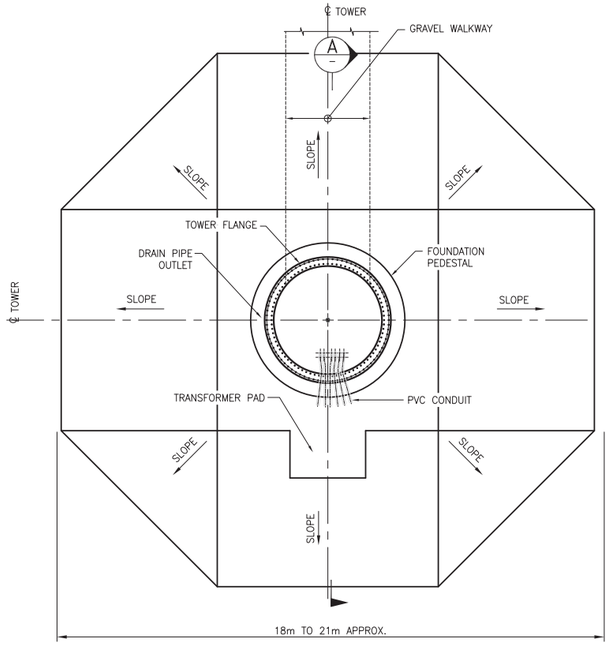
SUBJECT: TYPICAL WATERCOURSE CROSSING PLAN

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-121-0905 | REV. E

amec

PLOTTED: 08-Nov-12 9:29 AM USER: SHAHBAZIAN, RAZMIK
SAVED: 07-Nov-12 9:46 AM



FOUNDATION – PLAN
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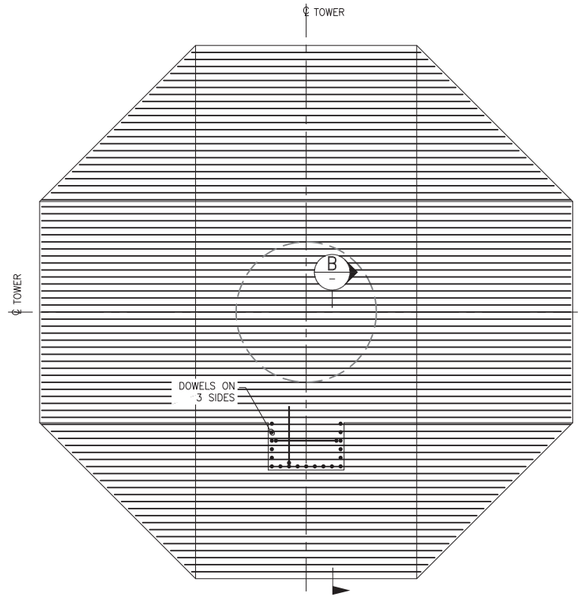

TOP MAT REINFORCING PLAN
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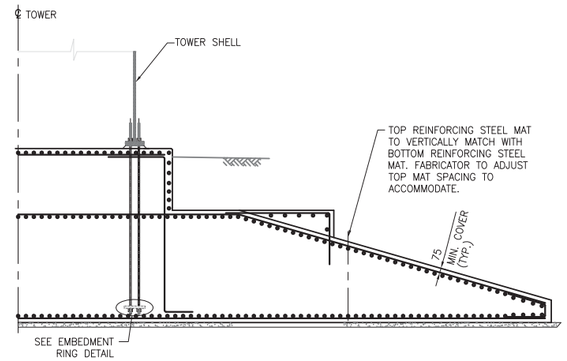
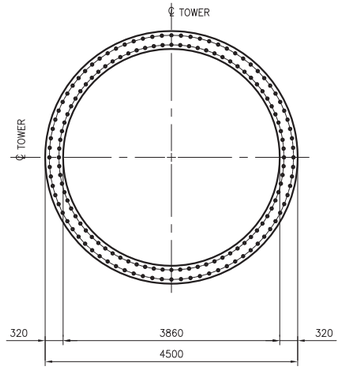


SECTION B
1:50



EMBEDMENT RING DETAIL
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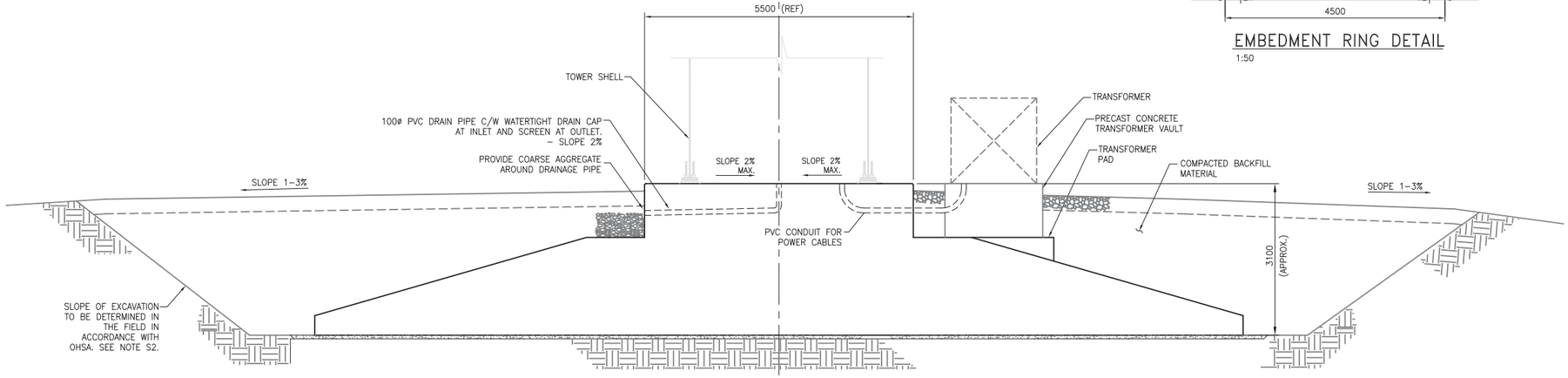

SECTION A
1:50

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. INFORMATION AND DIMENSIONS SHOWN ON THIS DRAWING ARE TYPICAL ONLY AND MAY CHANGE DUE TO DURING DETAILED DESIGN PHASE OF THE PROJECT.

REV	DDMMMYY	REVISION / ISSUE DESCRIPTION	DRN	CHK	APP	APP	APP	APP
B	02AUG12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			
A	27JUL12	ISSUED FOR INFORMATION	M.HALL	BJN	JHM			

REF	NUMBER	TITLE

REFERENCES

STAMP/SEAL

PRELIMINARY

CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

PROJECT NO.	ACTIVITY NO.
161973	

SCALE	PACKAGE CODE
AS SHOWN	

	BY	DDMMMYY
DSN	BJN	JUL.'12
DRN	M.HALL	JUL.'12
CHK	BJN	JUL.'12
APP	JHM	JUL.'12

K2 WIND ONTARIO LIMITED PARTNERSHIP

AREA 00 — K2 WIND POWER PROJECT

SUBJECT
TYPICAL SPREAD FOOTING FOUNDATION FOR SIEMENS 2.3MW WTG PLANS, SECTION & DETAIL

CLIENT DWG. NO.

DRAWING NO. A1-161973-00-121-0153

REV. B

CAD FILE: P:\CAD\CIV\MF\A1-161973-00-121-0153.DWG


08/13/2010