

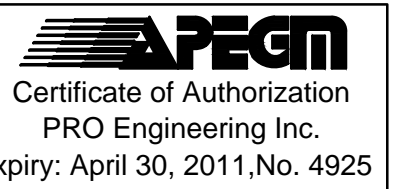
10-02-14-ET
FILE NAME:
DATE: 2010.12.09
DESCRIPTION: E7
PROJECT No.: 2008-095-02
ADDRESS: 185 KING STREET

- 1.21 SOLID STATE UNINTERRUPTIBLE POWER SUPPLY
- .1 SCOPE: PROVIDE DESIGN AND ENGINEERING, LABOR, MATERIAL, EQUIPMENT, RELATED SERVICES, AND SUPERVISION REQUIRED, INCLUDING, BUT NOT LIMITED TO, MANUFACTURING, FABRICATION, ERECTION, AND INSTALLATION FOR A SOLID STATE UNINTERRUPTIBLE POWER SUPPLY (UPS) AS REQUIRED FOR THE COMPLETE PERFORMANCE OF THE WORK AND AS SHOWN ON THE DRAWINGS AND AS HEREIN SPECIFIED.
- .2 SECTION INCLUDES: THE WORK SPECIFIED IN THIS SECTION INCLUDES, BUT SHALL NOT BE LIMITED TO, A THREE-PHASE, ON-LINE, DOUBLE CONVERSION, SOLID STATE UPS. THE UPS SHALL OPERATE IN CONJUNCTION WITH THE EXISTING BUILDING ELECTRICAL SYSTEM TO PROVIDE HIGH QUALITY POWER CONDITIONING, BACK-UP POWER PROTECTION, AND DISTRIBUTION FOR ELECTRONIC EQUIPMENT LOADS. THE SYSTEM SHALL CONSIST OF A SOLID STATE INVERTER, A 100 PERCENT RATED FOR CONTINUOUS DUTY STATIC SWITCH, BATTERY PLANT, GRAPHICAL STATUS/CONTROL PANEL, AND SYNCHRONIZING CIRCUITRY AS DESCRIBED HEREIN.
- .3 UPS DESIGN REQUIREMENTS:
- .1 OUTPUT POWER CONTINUOUS RATING: THE CONTINUOUS OUTPUT POWER RATING OF THE UPS SHALL BE 65 KVA AT A 0.8 LAGGING POWER FACTOR. UNIT TO BE RATED FOR 50 KW OUTPUT.
- .2 INPUT VOLTAGE: 208 VOLTS AC, -20 PERCENT +15 PERCENT, THREE-PHASE, 4 WIRES PLUS GROUND.
- .3 OUTPUT VOLTAGE: 208 VOLTS AC, THREE-PHASE, 4 WIRES PLUS GROUND.
- .4 BATTERY AUTONOMY: UPS SHALL BE CAPABLE OF OPERATING AT FULL LOAD FOR 45 MINS AT 0.8 PF OUTPUT AT A TEMPERATURE OF 77°F (25°C) ON BATTERY POWER.
- .5 BATTERY TYPE: VALVE REGULATED SEALED LEAD ACID (VRLA).
- .4 AC INPUT CHARACTERISTICS:
- .1 VOLTAGE: 208 VOLTS AC, -20 PERCENT, +15 PERCENT, THREE-PHASE, 3 WIRES PLUS NEUTRAL GROUND.
- .2 FREQUENCY: 60 HERTZ, ±5 PERCENT.
- .3 POWER FACTOR: GREATER THAN 0.98 LAGGING.
- .4 TOTAL HARMONIC DISTORTION: LESS THAN 3 PERCENT AT FULL LOAD.
- .5 COLD START TIME: 0 PERCENT TO 100 PERCENT OVER A 10 SECOND PERIOD.
- .6 INRUSH CURRENT: LESS THAN NOMINAL INPUT CURRENT FOR LESS THAN ONE CYCLE.
- .7 INPUT SURGE PROTECTION: UPS SHALL BE EQUIPPED WITH INPUT MOVES TO WITHSTAND SURGES PER ANSI/IEEE C62.41.
- .5 AC OUTPUT CHARACTERISTICS:
- .1 VOLTAGE: 208 VOLTS AC, -20 PERCENT, +15 PERCENT, THREE-PHASE, 3 WIRES PLUS NEUTRAL GROUND.
- .2 FREQUENCY: 60 HERTZ, ± 1.0 PERCENT (OR SELECTABLE UP TO 4 PERCENT); 60 HERTZ, ± 0.1 PERCENT WHEN FREE RUNNING.
- .3 VOLTAGE REGULATION: ± 1.0 PERCENT FOR BALANCED LOAD, ± 1.75 PERCENT FOR 50 PERCENT UNBALANCED LOAD, ± 2.5 PERCENT FOR 100 PERCENT UNBALANCED LOAD.
- .4 VOLTAGE DISTORTION: MAXIMUM 2 PERCENT TOTAL (THD) AND 1 PERCENT ANY SINGLE HARMONIC ON 100 PERCENT LINEAR LOADS.
- .5 VOLTAGE TRANSIENT (STEP LOAD) RESPONSE: ± PERCENT FOR 50 PERCENT STEP LOAD CHANGE, ±5 PERCENT FOR 100 PERCENT STEP LOAD CHANGE, ± 1 PERCENT FOR LOSS OR RETURN OF AC INPUT POWER OR MANUAL TRANSFER AT FULL LOAD.
- .6 VOLTAGE RECOVERY TIME: RETURN TO WITHIN 1 PERCENT OF NOMINAL VALUE WITHIN 16.67 MILLISECOND (ONE CYCLE).
- .7 PHASE ANGLE DISPLACEMENT: 120 DEGREES, ± DEGREE FOR BALANCED LOAD; 120 DEGREES, ± 3 DEGREES FOR 100 PERCENT UNBALANCED LOAD.
- .8 NON-LINEAR LOAD CAPABILITY: OUTPUT VOLTAGE TOTAL HARMONIC DISTORTION SHALL BE LESS THAN 3 PERCENT WHEN CONNECTED TO A 100 PERCENT NON-LINEAR LOAD WITH A CREST FACTOR NOT TO EXCEED 3 PERCENT.
- .9 SLEW RATE: 1.0 HERTZ/ SECOND MAXIMUM 9 OR SELECTABLE UP TO 2.0 HERTZ/SECOND).
- .10 POWER FACTOR: 0.8 AT THE RATED VOLT AMPERES (VA).
- .11 INVERTER OVERLOAD CAPABILITY: 120 PERCENT OF RATED LOAD FOR 100 SECONDS, 130 PERCENT OF RATED LOAD FOR 60 SECONDS, 145 PERCENT OF RATED LOAD FOR 30 SECONDS.
- .12 BYPASS OVERLOAD CAPABILITY: GREATER THAN 212 PERCENT FOR ONE CYCLE; GREATER THAN 150 PERCENT FOR 30 SECONDS.
- .6 BATTERY:
1. BATTERY VOLTAGE: 198 VOLTS DC MINIMUM BEFORE CUTOFF; 240 VOLTS DC NOMINAL; 277 VOLTS DC MAXIMUM MAINTENANCE CHARGE VOLTAGE; 286 VOLTS DC EQUALIZATION VOLTAGE.
- .7 REGULATORY REQUIREMENTS: COMPLY WITH APPLICABLE REQUIREMENTS OF THE LAWS, CODES, ORDINANCES, AND REGULATIONS OF FEDERAL, STATE, AND LOCAL AUTHORITIES HAVING JURISDICTION. OBTAIN NECESSARY APPROVALS FROM SUCH AUTHORITIES.
- .1 THE UPS SHALL MEET REQUIREMENTS OF THE FOLLOWING STANDARDS:
- A. UL- LISTED UNDER UL 1778.
- B. UL CANADA (CUL).
- C. FCC RULES AND REGULATIONS OF PART 15, SUBPART J, CLASS A.
- D. IEC 1000-4, LEVEL 4.
- .2 THE UPS SHALL BE DESIGNED IN ACCORDANCE WITH THE APPLIANCE SECTIONS OF THE DOCUMENTS PUBLISHED BY:
- THE NFPA, NEMA AND OSHA
- .8 FACTORY TESTING: PRIOR TO SHIPMENT THE MANUFACTURER SHALL COMPLETE A DOCUMENTED TEST PROCEDURE TO TEST FUNCTIONS OF THE UPS MODULE AND BATTERIES (VIA A DISCHARGE TEST) WHEN SUPPLIED BY THE UPS MANUFACTURER, AND WARRANT COMPLIANCE WITH THIS SECTION. THE FACTORY TEST SHALL BE PERFORMED IN THE PRESENCE OF THE OWNER PROVIDING THE MANUFACTURER RECEIVES ADEQUATE PRIOR NOTICE. THE MANUFACTURER SHALL PROVIDE A COPY OF THE REPORT UPON REQUEST.
- .9 ENVIRONMENTAL REQUIREMENTS: DO NOT INSTALL SOLID STATE UPS UNTIL SPACE IS ENCLOSED AND WEATHERPROOF, WET WORK IN SPACE IS COMPLETED AND NOMINALLY DRY, WORK ABOVE CEILINGS IS COMPLETE, AND AMBIENT TEMPERATURE AND HUMIDITY CONDITIONS ARE WILL BE CONTINUOUSLY MAINTAINED AT VALUES NEAR THOSE INDICATED FOR FINAL OCCUPANCY.
- .1 THE UPS SHALL OPERATE UNDER THE FOLLOWING ENVIRONMENTAL CONDITIONS:
- A. TEMPERATURE:
- .1 UPS MODULE OPERATING: 32° F (0°C) TO 104° F (40°C).
- .2 NON-OPERATING: -4° F (-20° C) TO 113° F (45°C).
- B. RELATIVE HUMIDITY (OPERATING AND STORAGE): 0 PERCENT TO 95 PERCENT NON-CONDENSING.
- C. BAROMETRIC PRESSURE: UP TO 3281 FEET (1000 METERS) ABOVE SEA LEVEL (UP TO 6562 FEET [2000 METERS] WITH AMBIENT TEMPERATURE LESS THAN 82°F [28°C])/ UP TO 39,370 FEET (12,000 METERS) ABOVE SEA LEVEL NON-OPERATING.
- D. AUDIBLE NOISE: 69 DBA AT 3 FEET (914MM).
- .10 BASIS OF DESIGN: PRODUCT SPECIFIED IS " MGE GALAXY 4000" AS MANUFACTURED BY SCHNEIDER ELECTRIC. ITEMS SPECIFIED ARE TO ESTABLISH A STANDARD OF QUALITY
- .11 MODES OF OPERATION
- .1 UPS MODULE SHALL BE DESIGNED TO OPERATE AS A DOUBLE CONVERSION, ON-LINE REVERSE TRANSFER SYSTEM IN THE FOLLOWING MODES:
- .1 NORMAL: THE INVERTER SHALL CONTINUOUSLY SUPPLY POWER TO THE CRITICAL LOAD. THE PFC RECTIFIER SHALL DERIVE POWER FROM THE UTILITY AC SOURCE AND SUPPLY
- .2 EMERGENCY UPON FAILURE OF THE UTILITY AC POWER SOURCE, THE CRITICAL LOAD SHALL BE SUPPLIED BY THE INVERTER, WHICH, WITHOUT ANY INTERRUPTION, SHALL OBTAIN ITS POWER FROM THE BATTERY.
- .3 RECHARGE: UPON RESTORATION OF THE UTILITY OF THE UTILITY AC POWER SOURCE (PRIOR TO COMPLETE BATTERY DISCHARGE), THE PFC RECTIFIER SHALL POWER THE INVERTER AND SIMULTANEOUSLY RECHARGE THE BATTERY.
- .4 BYPASS MODE: THE STATIC BYPASS TRANSFER SWITCH SHALL BE USED TO TRANSFER THE LOAD TO THE BYPASS WITHOUT INTERRUPTION TO THE CRITICAL POWER LOAD. THIS SHALL BE ACCOMPLISHED BY TURNING THE INVERTER OFF. AUTOMATIC RE-TRANSFER OR FORWARD TRANSFER OF THE LOAD SHALL BE ACCOMPLISHED BY TURNING THE INVERTER ON.
- .2 INVERTER: THE UPS OUTPUT SHALL BE DERIVED FROM A VARIABLE FREQUENCY PULSE WIDTH MODULATED (PWM) IGBT INVERTER DESIGN. THE INVERTER SHALL BE CAPABLE OF PROVIDING THE SPECIFIED PRECISE OUTPUT POWER CHARACTERISTICS WHILE OPERATING OVER THE BATTERY VOLTAGE RANGE. THE INVERTER ASSEMBLY SHALL BE CONSTRUCTED AS A MODULAR ASSEMBLY TO FACILITATE RAPID MAINTENANCE.
- .3 STATIC BYPASS- 100 PERCENT RATED, CONTINUOUS DUTY: THE STATIC BYPASS TRANSFER SWITCH SHALL BE SOLID STATE, RATED FOR 100 PERCENT CONTINUOUS DUTY WITHOUT MECHANICAL CONTRACTOR DEVICE IN PARALLEL FOR HIGHER RELIABILITY AND CONSISTENT RESPONSE TIME.
- .4 OUTPUT STATIC SWITCH-100 PERCENT RATED, CONTINUOUS DUTY: UPS OUTPUT SHALL BE EQUIPPED WITH A 100 PERCENT RATED OUTPUT STATIC SWITCH WITHOUT MECHANICAL CONTRACTOR DEVICE IN PARALLEL FOR HIGHER RELIABILITY AND CONSISTANT RESPONSE TIME OF 16.66 MILLISECOND.
- .5 MICROPROCESSOR-CONTROLLED LOGIC: THE FULL UPS OPERATION SHALL BE PROVIDED THROUGH THE USE OF MICROPROCESSOR-CONTROLLED LOGIC. OPERATION AND PARAMETERS SHALL BE FIRMWARE-CONTROLLED THUS ELIMINATING THE NEED FOR MANUAL ADJUSTMENTS OR POTENTIOMETERS. THE LOGIC SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, A SELF-TEST AND DIAGNOSTIC CIRCUITRY SUCH THAT A FAULT SHALL BE ISOLATED DOWN TO THE PRINTED CIRCUIT ASSEMBLY OR PLUG-IN POWER ASSEMBLY LEVEL. EVERY PRINTED CIRCUIT ASSEMBLY OR PLUG-IN POWER ASSEMBLY SHALL BE MONITORED. DIAGNOSTICS SHALL BE PERFORMED VIA A PC THROUGH THE LOCAL DIAGNOSTICS PORT ON THE UPS.
- .6 STANDARD DISPLAY, CONTROL AND INDICATOR PANEL: THE UPS SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, A STANDARD EASY-TO-USE CONTROL AND INDICATOR PANEL. INCLUDED SHALL BE A BACKLIT, COLOR GRAPHIC ANIMATED LCD DISPLAY AND LED INDICATORS. THE UPS PANEL SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, UPS ON AND UPS OFF PUSHBUTTONS THAT SHALL PERMIT THE OWNER TO SAFELY COMMAND THE UPS ON OR OFF WITHOUT RISK OF LOAD LOSS.
- .12 BATTERY
- .1 GENERAL: THE UPS MODULE SHALL USE A VALVE REGULATED SEALED LEAD ACID DUTY INDUSTRIAL BATTERY, DESIGNED FOR AUXILIARY POWER SERVICE IN AN UPS APPLICATION. THE PRIMARY BATTERY SHALL BE FURNISHED WITH IMPACT-RESISTANT PLASTIC CASES AND HOUSED IN A MATCHING CABINETS(S) NEXT TO THE UPS MODULE
- .2 PROTECTION AGAINST DEEP DISCHARGE AND SELF-DISCHARGE: THE UPS SHALL BE EQUIPPED WITH A DEVICE DESIGNED TO PROTECT THE BATTERY AGAINST DEEP DISCHARGE, DEPENDING ON DISCHARGE CONDITIONS, WITH ISOLATION OF THE BATTERY BY A CIRCUIT BREAKER. IN PARTICULAR, A MONITORING DEVICE SHALL ADJUST THE BATTERY SHUTDOWN VOLTAGE AS A FUNTION OF A DISCHARGE COEFFICIENT TO AVOID EXCESSIVE DISCHARGE AT LESS THAN THE RATED OUTPUT. A SECOND DEVICE SHALL AVOID SELF-DISCHARGE OF THE BATTERY INTO THE UPS CONTROL CIRCUITS DURING AN EXTENDED SHUTDOWN OF THE UPS(OVER TWO HOURS).
- .3 BATTERY SELF-TESTS:
- .1 THE BATTERY MONITORING SYSTEM SHALL BE ABLE TO PERFORM THE FOLLOWING AUTOMATIC FUNCTIONS:
- .A BATTERY CIRCUIT CHECKS EVERY 12 HOURS.
- .B OPEN CIRCUIT BATTERY TEST ONCE A MONTH.
- .C PARTIAL DISCHARGE TEST EVERY THREE MONTHS.
- .2 THIS SELF-TEST SYSTEM SHALL SIGNAL FAULTS VIA LEDS ON THE FRONT PANEL OR A MESSAGE TO REMOTE SUPERVISION SYSTEMS.

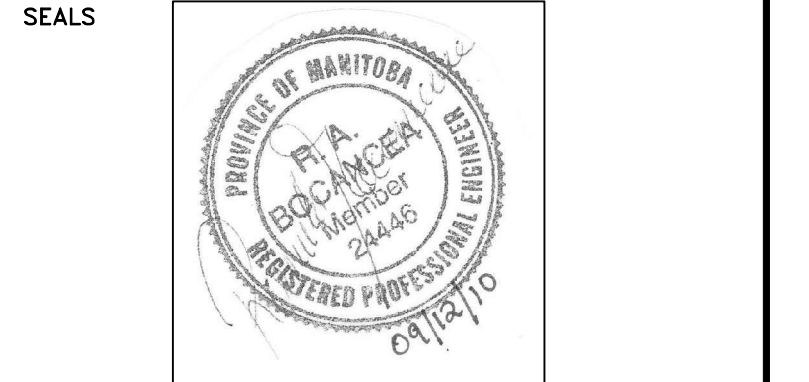
13 ACCESSORIES

- .1 BATTERY CABINETS: CABINETS SHALL BE PROVIDED AND MATCH THE SIZE OF THE UPS MODULES. POWER WIRING AND CONTROL CABLES ARE TO BE INCLUDED TO ADJACENT UNITS.
- .2 EXTERNAL CONTROL AND COMMUNICATIONS DEVICES: UP TO THREE OF THE FOLLOWING CONTROL AND COMMUNICATIONS DEVICES MAY BE INSTALLED IN THE UPS MODULE:
- .1 RS- 232/U-TALK OR DRY CONTACTS CARD (66060); THE U-TALK PROTOCOL SHALL BE USED WITH SOLUTION-PAC 2 FOR REMOTE MONITORING OR GRACEFUL SHUTDOWN FOR MOST POPULAR FILE SERVERS. THE DRY CONTACTS SHALL CLOSE ON PREDEFINED CONDITIONS TO MONITOR UPS OPERATIONS. THIS SHALL REQUIRE ONE COMMUNICATION SLOT AND OPTIONAL CABLES.
- .A THE DRY CONTACTS SHALL CLOSE ON THE CONDITIONS LISTED BELOW, BUT SHALL BE OWNER-PROGRAMMABLE TO CLOSE ON PRESET THRESHOLDS OF OTHER OWNER UPS PARAMETERS:
- .1 UPS ON-LINE.
- .2 LOAD ON BYPASS.
- .3 UPS ON BATTERY.
- .4 LOW BATTERY WARNING.
- .5 BATTERY FAULT.
- .6 GENERAL ALARM.
- .B TWO DRY CONTACT INPUTS SHALL ALSO BE PROVIDED TO TURN THE UPS INVERTER ON AND OFF REMOTELY UPON CLOSURE OF THE CONTACTS. THIS FEATURE MAY ALSO BE DISABLED IF REQUIRED.
- .3 HIGH VOLTAGE 6 ALARM RELAYS CARD (66069): A SECOND SET (ONE SET SHALL BE PROVIDED STANDARD WITH THE UPS MODULE) OF SIX NORMALLY OPEN DRY CONTACT OUTPUTS RATED AT 2.0 AMPERES (250 VOLTS DC/30 VOLTS DC) SHALL BE AVAILABLE TO MONITOR UPS OPERATION.
- .1 THE DRY CONTACTS SHALL CLOSE ON THE CONDITIONS LISTED BELOW, BUT SHALL BE OWNER-PROGRAMMABLE TO CLOSE ON PRESET THRESHHOLDS OF OTHER OWNER UPS PARAMETERS:
- .1 UPS ON-LINE.
- .2 LOAD ON BYPASS.
- .3 UPS ON BATTERY.
- .4 LOW BATTERY WARNING.
- .5 BATTERY FAULT.
- .6 GENERAL ALARM.
- .2 TWO DRY CONTACT INPUTS SHALL ALSO BE PROVIDED TO TURN THE UPS INVERTER ON AND OFF REMOTELY UPON CLOSURE OF THE CONTACTS. THIS FEATURE MAY ALSO BE DISABLED IF REQUIRED.
- .4 NETWORK MANAGEMENT CARD (66074): THE NETWORK MANAGEMENT CARD (NMC) SHALL PROVIDE A WEB INTERFACE, SWMP (SIMPLE NETWORK MANAGEMENT PROTOCOL), LOGGING, AND EMAIL CAPABILITIES. THE NMC SHALL BE USED FOR REMOTE MONITORING OR GRACEFUL SHUTDOWN FOR MOST POPULAR FILE SERVERS.
- .5 TWO OR THREE CIRCUIT BREAKER EXTERNAL MAINTENANCE BYPASS-WALL MOUNT: THE MAINTENANCE BYPASS OPTION SHALL PROVIDE FOR TWO OR THREE CIRCUIT BREAKERS MOUNTED INSIDE A WALL-MOUNTED ENCLOSURE TO PROVIDE A WRAP-AROUND BYPASS CONFIGURATION FOR TOTAL UPS ISOLATION DURING MAINTENANCE. MAINTENANCE BYPASS TRANSFERS SHALL BE WITHOUT INTERRUPTION AND SHALL HAVE MECHANICAL KEYED INTERLOCKS TO PROTECT THE UPS FROM DAMAGE IN THE EVENT OF OUT OF SEQUENCE TRANSFERS. AN OPTIONAL ELECTRICALLY BASED SOLENOID ACTIVATED KEY RELEASE SHALL BE AVAILABLE TO CONTROL THE REMOVAL OF THE KEYS FROM THE KEY INTERLOCKS.
- .6 SEISMIC ANCHORS: SEISMIC ZONE 4 ANCHORS SHALL BE AVAILABLE FOR SYSTEM CABINETS.
- .7 DUAL INPUT: A SECOND INPUT TERMINAL BLOCK SHALL BE PROVIDED TO ACCOMMODATE A SEPERATE INPUT SOURCE.
- .8 INTERNAL MAINTENANCE BYPASS: AN INTERNAL MANUAL MAINTENANCE BYPASS SWITCH SHALL BE OPTIONALLY PROVIDED TO ISOLATE THE UPS INVERTER OUTPUT AND STATIC BYPASS TRANSFER SWITCH FOR MAINTENANCE. THIS SHALL ALLOW THE UPS TO BE TESTED OR REPAIRED WITHOUT AFFECTING LOAD OPERATION.
- .9 BYPASS INPUT FUSES: BYPASS INPUT FUSES SHALL BE OPTIONALLY PROVIDED ON THE BYPASS FOR CURRENT LIMITING.
- .14 DEMONSTRATION
- .1 PROVIDE THE SERVICES OF A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE OF THE MANUFACTURER TO PROVIDE START-UP SERVICE AND TO DEMONSTRATE AND TRAIN THE CITY'S PERSONNEL.
- .1 TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED OR MALFUNCTIONING CONTROLS AND EQUIPMENT.
- .2 TRAIN THE CITY'S MAINTENANCE PERSONNEL ON PROCEDURES AND SCHEDULES RELATED TO START-UP AND SHUTDOWN, TROUBLESHOOTING, SERVICING, AND PREV. MAINTENANCE.
- .3 REVIEW DATA IN OPERATION AND MAINTENANCE MANUALS WITH THE CITY'S PERSONNEL.
- .4 SCHEDULE TRAINING WITH THE OWNER, THROUGH THE ARCHITECT/ CONTRACT ADMINISTRATOR, WITH AT LEAST SEVEN DAY'S ADVANCED NOTICE.

NOTES :



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NO.	REVISION/DESCRIPTION	BY	DATE



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KOLO		
DATE	USER APPROVAL	
2010.12.09		

CITY OF WINNIPEG
PLANNING, PROPERTY AND
DEVELOPMENT DEPARTMENT
CIVIC ACCOMMODATIONS DIVISION
300 - 65 GARRY ST. R3C 4K4

PROJECT
MANDARIN BUILDING
ALTERNATE EMERGENCY
COMMUNICATION CENTRE-DESIGN
185 KING STREET

SHEET TITLE
ELECTRICAL
SPECIFICATION

SCALE	PROJECT NO.	SHEET NO.
AS SHOWN	2008-095-02	E-7