

**DIV.26 - SPECIFICATIONS****1.0 GENERAL PROVISIONS**

01 THE DRAWINGS, GENERAL CONDITIONS AND GENERAL PROVISIONS OF THE CONTRACT SHALL FORM AN INTEGRAL PART OF THE SPECIFICATIONS. WHERE CONFLICTS ARISE BETWEEN THESE DOCUMENTS, THE MORE STRINGENT PROVISION WILL BE APPLICABLE. SUBJECT TO THE INTERPRETATION OF THE CONTRACT ADMINISTRATOR, THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE WHERE THE CONTRACT DOCUMENTS EXCEED CODE, UTILITY OR RECOGNIZED STANDARDS REQUIREMENTS.

02 THE CONTRACT SHALL INCLUDE FURNISHING ALL LABOUR, MATERIAL, SERVICES, AND SKILLED SUPERVISION NECESSARY FOR THE CONSTRUCTION, ERECTION, INSTALLATION, CONNECTIONS, TESTING, AND ADJUSTMENT OF ALL MATERIALS AND ELECTRICAL EQUIPMENT NECESSARY FOR A COMPLETE AND OPERATING SYSTEM AS INDICATED ON THE DRAWINGS OR SPECIFIED HEREIN, AND ITS DELIVERY TO THE CITY, COMPLETE IN ALL RESPECTS AND READY FOR USE.

03 ALL ELECTRICAL WORK AND MATERIAL SHALL CONFORM WITH THE CURRENT RELEVANT NBC, CEC, LOCAL BY-LAWS AND TO THE SATISFACTION OF THE AHJ AND CONTRACT ADMINISTRATOR.

04 EXAMINE THE SITE, BUILDING AND LOCAL CONDITIONS AFFECTING WORK OF THIS CONTRACT. EXAMINE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL CONDITIONS TO ENSURE WORK CAN BE PERFORMED WITHOUT CHANGES, AS SHOWN ON CONTRACT DRAWINGS. NO ALLOWANCE WILL BE MADE LATER FOR NECESSARY CHANGES, UNLESS IT HAS BEEN BROUGHT TO CONTRACT ADMINISTRATOR'S ATTENTION IN WRITING, PRIOR TO CLOSING OF BIDS. BY SIGNING THE CONTRACT, THE EC ACKNOWLEDGES A SITE VISIT HAS BEEN MADE AND HAS BEEN COMPLETED AND THE EXISTING CONDITIONS WERE ACCEPTED.

05 APPLY FOR AND INCLUDE THE ASSOCIATED COSTS FOR ALL PERMITS, SERVICES, FEES AND INSPECTIONS IN THE BID QUOTE.

06 OBTAIN APPROVALS FROM THE AHJ AND NOTIFY THE CONTRACT ADMINISTRATOR OF ANY CHANGES REQUESTED BY THE AHJ PRIOR TO THE EXECUTION OF THE REQUEST.

07 COMPLY WITH ALL DEPARTMENT OF LABOUR, WORKPLACE AND HEALTH REQUIREMENTS AT ALL TIMES.

08 WHERE DOUBT EXISTS AS TO THE MEANING OF THE DRAWINGS OR SPECIFICATIONS, IT IS THE RESPONSIBILITY OF THE EC TO OBTAIN CLARIFICATION PRIOR TO BID.

09 ALL MATERIALS USED SHALL BE NEW, OF THE TYPE SPECIFIED, AND APPROVED BY CERTIFICATION AGENCY RECOGNIZED BY THE AHJ, AND FREE FROM DEFECTS.

10 EXECUTE WORK IN A FIRST-CLASS AND WORKMANLIKE MANNER, TO PRESENT A NEAT APPEARANCE.

11 ALL PACKAGING BARCODE LABELS SHALL BE REMOVED PRIOR TO INSTALLATION.

12 CLEAN ALL EQUIPMENT DURING CONSTRUCTION AND AGAIN ON COMPLETION OF THE CONTRACT. ALL SURPLUS MATERIALS, CUTTINGS, PACKAGING AND DEBRIS SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED.

13 ALL ELECTRICAL EQUIPMENT (INCLUDING PANELBOARDS, DISCONNECT SWITCHES, MOTOR STARTERS, SERVICE ENTRANCE, AND MCC) SHALL HAVE A LIGHT GREY (ASA-61) FACTORY ENAMEL FINISH UNLESS SPECIFIED OTHERWISE IN THE OTHER SECTIONS.

14 BUILDING ENVELOPE PENETRATIONS FOR ANY ELECTRICAL COMPONENTS (I.E. CONDUIT, BOXES, CABLES, ETC.) SHALL BE EXECUTED SO INTEGRITY OF ASSEMBLY IS NOT COMPROMISED. PROVIDE ADEQUATE SEALING, COVERS, GASKETS, CAPS, ETC. COORDINATE WORK AND REQUIREMENTS WITH ALL OTHER RELEVANT CONTRACTORS, ARCHITECT, ENVELOPE CONTRACT ADMINISTRATOR AND OTHER RELEVANT CONTRACT ADMINISTRATOR AND CONTRACTORS.

15 THE ELECTRICAL SERIES DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS PERTAIN TO THE ELECTRICAL SCOPE OF WORK ONLY. TASKS WHICH ARE NOT PART OF THE ELECTRICAL SCOPE OF WORK, EVEN IF MENTIONED IN THESE DOCUMENTS, ARE INDICATED PURELY FOR REFERENCE AND COORDINATION PURPOSES ONLY.

16 THE DRAWINGS ARE DIAGRAMMATIC ONLY, AND DO NOT SHOW ALL DETAILS. INFORMATION INVOLVING ACCURATE MEASUREMENTS OF THE BUILDING, STRUCTURAL STEEL, EXISTING WALLS, ETC. IS TO BE TAKEN IN THE FIELD. THE EC SHALL MAKE, WITHOUT ADDITIONAL EXPENSE TO CITY NECESSARY CHANGES OR ADDITIONS TO RUNS TO ACCOMMODATE STRUCTURAL CONDITIONS.

17 LOCATION OF DEVICES MAY BE ALTERED BY THE CONTRACT ADMINISTRATOR WITHOUT CHARGE TO CITY, PROVIDED THE CHANGE IS MADE BEFORE FINAL INSTALLATION AND DOES NOT NECESSITATE ADDITIONAL MATERIALS. RECORD CHANGES ON RECORD DRAWINGS.

18 DRAWINGS SHOW GENERAL LOCATIONS FOR EQUIPMENT AND CIRCUITS; INSTALL THEM IN SUCH A WAY AS TO CONSERVE HEADROOM AND TO INTERFERE AS LITTLE AS POSSIBLE WITH THE SPACE THROUGH WHICH THEY PASS.

19 ALL PAINTING AND PATCHING SHALL BE DONE BY QUALIFIED LABOURERS.

20 MAINTAIN 40" (1m) CLEARANCE IN FRONT OF ALL SERVICEABLE ELECTRICAL EQUIPMENT (I.E. PANELBOARDS) AS PER CEC REQUIREMENTS.

21 INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE AHJ, CEC AND MANUFACTURER'S INSTRUCTIONS. EC SHALL COORDINATE WITH OTHER TRADES TO ENSURE PROPER INSTALLATION.

22 THE EC SHALL KEEP A SET OF FULL SIZED RECORD DRAWINGS ON WHICH THE EC SHALL RECORD ALL ADDITIONS OR DEVIATIONS FROM THE CONTRACT DOCUMENTS INCLUDING ALL CHANGES COVERED BY ADDENDA, CHANGE ORDERS, FIELD CHANGES, SITE CONDITIONS, ETC. A SET OF DRAWINGS SHALL BE UTILIZED FOR EACH SYSTEM AND THE EC SHALL OBTAIN PRINTS AS REQUIRED. DRAWINGS TO INCLUDE LOCATIONS OF ALL JUNCTION AND PULL BOXES, ROUTING OF FEEDERS AND CONDUITS, AND CHANGES TO CIRCUIT NUMBERS. ALL PRINCIPLE BELOW GRADE OR INACCESSIBLE CONDUITS, SYSTEMS, ETC. SHALL BE DIMENSIONED AT EACH CHANGE IN DIRECTION. ALL CONDUIT ROUTES NOT SHOWN BY THE CONTRACT ADMINISTRATOR ON ORIGINAL DRAWING SHALL BE SHOWN INCLUDING CIRCUIT WIRING, JUNCTION BOXES, ZONED CONDUIT RUNS, ETC.

23 ALL EQUIPMENT HEIGHTS SHALL MEET THE CITY OF WINNIPEG BARRIER FREE STANDARDS. THE EC SHALL INSTALL ELECTRICAL COMPONENTS AT THE FOLLOWING HEIGHTS UNLESS INDICATED OR DIRECTED OTHERWISE.

- GENERAL PURPOSE OUTLETS: 18" (450mm) TO CENTER, VERTICAL ORIENTATION.
- OUTLETS ABOVE COUNTERS: 6" (150mm) TO BOTTOM, VERTICAL ORIENTATION.
- MILLWORK / MICROWAVE RECEPTACLES: REFER TO MILLWORK SHOP DRAWINGS AND ARCHITECTURAL ELEVATIONS.
- CONTROL DEVICES (SWITCHES, THERMOSTATS, ETC.): 48" (1200mm) TO TOP, VERTICAL ORIENTATION.

24 TEST SYSTEM AND RECORD SAME FOR THE CONTRACT ADMINISTRATOR'S APPROVAL.

- PHASE BALANCE
- INSULATION RESISTANCE
- GROUND RESISTANCE
- VOLTAGE DROP
- SUBMIT VOLTAGE DROP RESULTS FOR ALL LARGE MECHANICAL EQUIPMENT AND PANEL BOARDS WHERE UPSTREAM AMPACITY EXCEEDS 100A.

25 ALL PCN COSTING SHALL BE REVIEWED BY THE CONTRACT ADMINISTRATOR USING PRICING STANDARDS BASED ON THE CURRENT EDITION OF RSMEANS "ELECTRICAL CHANGE ORDER COST DATA" PRICING GUIDE. THIS GUIDE SHALL BE THE MAXIMUM COST ALLOWED.

26 FINAL ACCEPTANCE AS KGS GROUP IS REQUIRED TO GIVE PROFESSIONAL ASSURANCE THAT ALL ELECTRICAL SYSTEMS HAVE BEEN INSTALLED, TESTED AND VERIFIED IN ACCORDANCE WITH THE NBC AND THE CEC. KGS REQUIRES THE FOLLOWING ITEMS FROM THE EC PRIOR TO ISSUANCE OF "LETTER OF PROFESSIONAL ASSURANCE" FOR BUILDING OCCUPANCY:

- FINAL ELECTRICAL INSPECTION CERTIFICATE SIGNED BY THE ELECTRICAL INSPECTOR FOR THE PROJECT. A DECLARATION FORM SIGNED BY THE EC IS NOT ACCEPTABLE.

**2.0 DEFINITIONS**

01 THE FOLLOWING ARE DEFINITIONS OF TERMS AND EXPRESSIONS USED IN THE ELECTRICAL SPECIFICATION AND DRAWINGS:

- AHJ - AUTHORITY HAVING JURISDICTION
  - EC - ELECTRICAL SUB-CONTRACTOR
  - GC - GENERAL CONTRACTOR
- INSPECTION AUTHORITY - MEANS AGENT OF ANY AUTHORITY HAVING JURISDICTION OVER CONSTRUCTION STANDARDS ASSOCIATED WITH ANY PART OF ELECTRICAL WORK ON SITE.
- SUPPLY AUTHORITY - MEANS THE ELECTRICAL POWER UTILITY COMPANY RESPONSIBLE FOR DELIVERY OF ELECTRICAL POWER TO PROJECT (MANITOBA HYDRO).
- CEC - MEANS CANADIAN ELECTRICAL CODE OR LOCAL CODE IN FORCE AT PROJECT LOCATION.
- NBC - MEANS NATIONAL BUILDING CODE OR LOCAL CODE IN FORCE AT PROJECT LOCATION.
- CODE - MEANS ALL CODES, REGULATIONS AND REQUIREMENTS INCLUDING BUT NOT LIMITED TO THE CURRENT RELEVANT NBC, CEC AND LOCAL BY-LAWS.
- PROVIDE - MEANS TO SUPPLY, INSTALL AND LEAVE IN WORKING ORDER ALL MATERIALS AND NECESSARY WIRING, SUPPORTS, ACCESS PANELS, ETC., AS NECESSARY FOR EQUIPMENT INDICATED.
- CONCEALED - MEANS HIDDEN FROM NORMAL SIGHT IN FURRED SPACES, SHAFTS, CEILING SPACES, WALLS AND PARTITIONS;
- EXPOSED - MEANS WORK NORMALLY VISIBLE, INCLUDING WORK IN EQUIPMENT ROOMS, TUNNELS, AND SIMILAR SPACES;
- FINISHED - MEANS WHEN IN DESCRIPTION OF ANY AREA OR PART OF AN AREA OR A PRODUCT WHICH RECEIVES A FINISH SUCH AS PAINT OR IN CASE OF A PRODUCT MAY BE FACTORY FINISHED;
- INSTALL (AND TENSES OF "INSTALL") - MEANS SECURE IN POSITION, CONNECT COMPLETE, TEST, ADJUST AND VERIFY.
- CONNECT - TO BRING SERVICE TO THE EQUIPMENT AND MAKE FINAL ATTACHMENT INCLUDING NECESSARY SWITCHES, OUTLETS, BOXES, TERMINATIONS, ETC.;
- SUPPLY - MEANS TO PROCURE, ARRANGE FOR DELIVERY TO SITE, DISTRIBUTE TO FLOORS, INSPECT, ACCEPT DELIVERY AND ADMINISTER SUPPLY OF MANUFACTURER'S PRODUCTS AND/OR SYSTEMS, AND INCLUDES MANUFACTURER'S SUPPLY OF ANY SPECIAL CABLES, STANDARD ON SITE TESTING, INITIAL START-UP, PROGRAMMING, BASIC COMMISSIONING, WARRANTIES AND ASSISTANCE TO CONTRACTOR.
- DELETE OR REMOVE (AND TENSES OF "DELETE" OR "REMOVE") - MEANS TO DISCONNECT, MAKE SAFE, REMOVE INCLUDING ANY BACK BOX AND EXPOSED CONDUITS, PATCH AND REPAIR/FINISH SURFACES TO MATCH ADJOINING SIMILAR CONSTRUCTION. INCLUDE FOR ASSOCIATED RE-PROGRAMMING OF SYSTEMS AND/OR CHANGE OF DOCUMENTATION IDENTIFICATIONS TO SUIT DELETIONS, AND LEGALLY DISPOSE OF DELETED PRODUCTS OFF-SITE UNLESS OTHERWISE INSTRUCTED BY THE CONTRACT ADMINISTRATOR OR CITY, HOWEVER THE CITY RESERVES FIRST RIGHTS TO SALVAGE.
- ELECTRICAL DIVISIONS - REFERS TO DIVISIONS 26, 27, 28 AND OTHER DIVISIONS AS SPECIFICALLY NOTED, AND WHICH WORK AS DEFINED IN SPECIFICATIONS AND /OR ON DRAWINGS IS RESPONSIBILITY OF EC, UNLESS OTHERWISE NOTED.
  - BOH - BACK OF HOUSE

**3.0 SUBMITTALS**

01 SUBMIT PRODUCT DATA FOR ALL EQUIPMENT. ACCEPTABLE MATERIALS SHALL BE AS SPECIFIED, CODE APPROVED OR CITY APPROVED. ALL MATERIAL SHALL BE NEW, UNLESS SPECIFIED OTHERWISE.

02 SHOP DRAWINGS SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR FOR REVIEW AND APPROVAL BEFORE MANUFACTURING OR CONSTRUCTION CAN PROCEED.

03 LAMACOID LABEL WORDING SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR FOR REVIEW AND APPROVAL BEFORE MANUFACTURING AND INSTALLATION CAN PROCEED.

04 SUBMIT THE FOLLOWING CLOSE-OUT SUBMITTALS TO THE CONTRACT ADMINISTRATOR UPON COMPLETION OF THE CONTRACT:

- AS-BUILTS
- ONE (1) O&M MANUAL, HARD COPY AND ONE (1) DIGITAL COPY IN DVD FORMAT. O&M MANUALS SHALL CONTAIN COPIES OF ALL FINAL SHOP DRAWINGS, WARRANTY LETTER, AS-BUILTS, TEST RESULTS AND THE CLOSED ELECTRICAL PERMIT. THE HARD COPY SHALL BE SUBMITTED IN A D-RING BINDER C/W COVERAGE, TABLE OF CONTENTS, DVD SLEEVE AND LABELED TABBED DIVIDERS FOR ALL SECTIONS INCLUDING POWER, LIGHTING, DATA, FIRE ALARM, ETC. THE DIGITAL COPY SHALL BE LABELED AND ORGANIZED TO MATCH THE HARD COPY. THE FILES IN THE DIGITAL COPY SHALL BE ORGANIZED WITHIN SUBFOLDERS SIMILAR TO THE HARD COPY.
- A COPY OF THE 1 YEAR GUARANTEE LETTER.

**4.0 COORDINATION**

01 THE EC IS RESPONSIBLE TO DETERMINE THE SCOPE OF THE WORK REQUIRED FOR EACH TRADE. ALL TRADES MUST COORDINATE WORK TO ENSURE THAT THE ENTIRE SCOPE OF THE PROJECT IS COVERED. THERE SHALL BE NO ALLOWANCES GIVEN FOR ITEMS WHICH RESULT AS A FAILURE TO COORDINATE. THE EC WILL REVIEW THE DRAWINGS WITH ALL TRADES PRIOR TO BID TO RESOLVE ALL COORDINATION ISSUES.

02 COORDINATE WITH ALL TRADES AND ARRANGE EQUIPMENT IN PROPER RELATION WITH OTHER APPARATUS INCLUDING BUT NOT LIMITED TO ARCHITECTURAL FINISHES, DUCTS, PIPES, AND BUILDING CONSTRUCTION.

03 THE EC IS RESPONSIBLE TO DETERMINE WHICH DIVISION OR SECTION PROVIDES VARIOUS PRODUCTS AND WORK. ADDITIONAL COMPENSATION WILL NOT BE CONSIDERED BECAUSE OF DIFFERENCES IN INTERPRETATION OF TECHNICAL PROVISIONS.

04 COORDINATE AS REQUIRED WITH THE CITY DURING THE DEMOLITION AND CONSTRUCTION PHASES OF THE WORK. THIS INCLUDES ANY TEMPORARY ELECTRICAL CONNECTIONS, REMOVAL OF EXISTING POWER SERVICES AND INSTALLATION OF NEW SERVICES. THE EC SHALL COMPLETE ALL PRELIMINARY WORK PRIOR TO ANY POWER OUTAGES IN ORDER TO MINIMIZE DOWNTIME.

05 COORDINATE, NOTIFY AND ARRANGE WITH THE CITY, GC AND CONTRACT ADMINISTRATOR ALL STAGING REQUIREMENTS TO MINIMIZE THE DURATION AND NUMBER OF POWER OUTAGES NECESSARY TO COMPLETE THE WORK AT NO ADDITIONAL COST.

06 THE ELECTRICAL DRAWINGS AND SPECIFICATIONS SHALL BE READ IN CONJUNCTION WITH THE DRAWINGS AND SPECIFICATION OF ALL OTHER DISCIPLINES. THE EC SHALL BE RESPONSIBLE FOR THE INCLUSION OF ALL ELECTRICAL WORK ASSOCIATED WITH OTHER DISCIPLINES.

**5.0 IDENTIFICATION**

01 UNLESS OTHERWISE NOTED ALL ELECTRICAL EQUIPMENT INSTALLED OR CONNECTED SHALL BE IDENTIFIED BY MEANS OF ENGRAVED LAMACOID LABELS C/W MINIMUM 3/8" LETTERING. AS A MINIMUM THE LABEL SHALL INDICATE THE EQUIPMENT TAG AND SOURCE. THIS INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING: SWITCHBOARDS, PANEL BOARDS, DISCONNECT SWITCHES, TRANSFORMERS, STARTERS/WFD'S, MECHANICAL EQUIPMENT (INDICATE EQUIPMENT TAG), ETC. WHERE THE CITY'S LABELING STANDARDS EXCEED THIS SPECIFICATION THE EC SHALL FOLLOW THE CITY'S STANDARDS. THE EC SHALL ALLOW FOR A MINIMUM OF 25-CHARACTERS PER LABEL AND SUBMIT THE PROPOSED LABELS TO THE CONTRACT ADMINISTRATOR FOR APPROVAL PRIOR TO ORDERING.

- NORMAL POWER SYSTEMS: WHITE WITH BLACK LETTERING

02 ELECTRICAL EQUIPMENT:

- RECEPTACLES (PNL "X" - CCT#);

03 SWITCHBOARD AND PANELS:

- UPDATE EXISTING PANEL SCHEDULES.

04 THE EC SHALL UPDATE ALL ELECTRICAL LABELING AFFECTED BY THE SCOPE OF WORK AND THE REVISED LABELING SHALL MEET THE REQUIREMENTS OF THIS SPECIFICATION.

**6.0 ELECTRICAL WORK IN EXISTING BUILDINGS**

- GENERAL
  - NO CORING OR DRILLING IN CONCRETE FLOORS OR WALLS SHALL TAKE PLACE UNLESS THE CONCRETE HAS BEEN SCANNED (OR X-RAYED) FOR ELECTRICAL, MECHANICAL, AND STRUCTURAL ELEMENTS. THE EC SHALL NOTIFY THE CITY BEFORE DRILLING. THE EC ASSUMES COMPLETE RESPONSIBILITY FOR ANY AND ALL DAMAGES OR WORK STOPPAGES OCCURRING FROM UNFORESEEN PROBLEMS.
  - ALLOW FOR AFTER HOURS WORK AS REQUIRED.
  - CONFIRM WITH CITY OF WINNIPEG CONTRACT ADMINISTRATOR FOR "AFTER HOURS" WORKING HOURS.
  - DRAWINGS INDICATE MAJOR ITEMS TO BE DELETED OR RELOCATED BUT MAY

NOT INDICATE EVERY ITEM, IT IS THE EC RESPONSIBILITY TO DETERMINE WHICH EXISTING EQUIPMENT IS TO BE DELETED OR RELOCATED BY EXAMINING ALL SITE CONDITIONS AND ALL CONSTRUCTION DOCUMENTS PRIOR TO BIDDING.

- CONDUIT, WIRING, AND EQUIPMENT SERVICING SPACES OUTSIDE OF THE DEMOLITION AREA SHALL BE MAINTAINED. THE EC SHALL RELOCATE AND EXTEND EXISTING CONDUIT AND WIRING AS REQUIRED TO MAINTAIN THE EXISTING SYSTEM AND SUIT THE NEW LAYOUT.
- DISCONNECT AND REMOVE EXISTING ELECTRICAL EQUIPMENT MADE OBSOLETE DUE TO RENOVATIONS C/W ASSOCIATED WIRING AND CONDUITS BACK TO SOURCE PANEL.
- ANY DAMAGES CAUSED BY THE EC SHALL BE THE RESPONSIBILITY OF THE EC TO TAKE ALL ACTIONS REQUIRED AND AS MAY BE DEEMED NECESSARY BY THE CITY TO CORRECT ANY DAMAGE.
- PATCH AND MAKE GOOD EXISTING WALLS WHICH ARE TO REMAIN WHERE EXISTING ELECTRICAL DEVICES OR CONDUITS HAVE BEEN REMOVED.
- THE EC SHALL UPDATE ALL PANEL SCHEDULES AFFECTED BY DEMOLITION WORK. REMAINING UNUSED BREAKERS SHALL BE LEFT IN PANELBOARDS AND BE LABELED "SPARE".

**7.0 CONDUIT, WIRE, AND CONNECTIONS**

- SHUT-DOWNS
  - COORDINATE ALL SHUT-DOWNS OF EXISTING SERVICES OR SYSTEMS WITH THE CITY AND CARRY OUT THE WORK AT A TIME AND IN A MANNER ACCEPTABLE TO THE CITY. ALL DISRUPTIONS AND/OR SHUT-DOWNS SHALL BE SCHEDULED TO ENSURE THE DURATION OF OF THE SHUT-DOWN IS KEPT TO THE ABSOLUTE MINIMUM. NOTIFY AND APPROVAL. A WRITTEN CONCISE SCHEDULE OF EACH DISRUPTION AT LEAST TWO WEEKS IN ADVANCE OF PERFORMING WORK AND OBTAIN WRITTEN CONSENT PRIOR TO IMPLEMENTING.
  - PROVIDE TEMPORARY ELECTRICAL CONNECTIONS AS REQUIRED TO MAINTAIN EXISTING ELECTRICAL DEVICES OR CONDUITS UNLESS OTHERWISE SPECIFIED. MATERIAL AND EQUIPMENT, AND PROVIDE ALL LABOUR AT NO EXTRA COST.
- EXISTING DEVICES IN NEW CONSTRUCTION
  - ALL EXISTING JUNCTION BOXES IN WALLS AND CEILING SPACES REQUIRED TO MAINTAIN EXISTING CIRCUITS SHALL REMAIN ACCEPTABLE.

04 MATERIALS

- PROVIDE NEW WIRING AS REQUIRED TO INTERCONNECT NEW DEVICES TO EXISTING SYSTEMS TO SUIT THE MANUFACTURER REQUIREMENTS AND INSTRUCTIONS. THE INTENT OF THESE SPECIFICATIONS IS NOT TO RE-USE ANY EXISTING WIRING.
- MATERIAL QUALITY FOR NEW SYSTEM DEVICES SHALL MATCH OR EXCEED EXISTING.

**7.0 CONDUIT, WIRE, AND CONNECTIONS**

- PROVIDE ALL CONDUIT, WIRING AND CONNECTIONS FOR A CODE COMPLIANT, COMPLETE AND OPERATIONAL SYSTEM.
- GENERAL CONDUIT REQUIREMENTS:
  - ALL WIRING SHALL BE INSTALLED IN CONDUIT UNLESS OTHERWISE NOTED.
  - ALL CONDUIT SHALL BE MIN. 3/4" (21mm)Ø.
  - CONDUIT TYPES:
    - INTERIOR CONDUIT: EMT C/W SET-SCREW
  - CONDUITS SHALL NOT HAVE MORE THAN ONE VOLTAGE LEVEL OF WIRING RUNNING WITHIN THEM.
  - CONDUIT RUNS WITHIN WALLS TO BE VERTICAL. HORIZONTAL RUNS IN WALLS ARE NOT ACCEPTABLE.
  - PROVIDE A SEPARATE RACEWAY FOR EACH ELECTRICAL SYSTEM.

02 GENERAL DEVICE BOX REQUIREMENTS:

- PROVIDE OUTLET BOXES FOR CONNECTING TO DEVICES AND EQUIPMENT AS REQUIRED OR AS INDICATED ON DRAWINGS. LOCATIONS OF OUTLETS MAY BE CHANGED UP TO 15" (457mm) WITHOUT EXTRA CHARGE PROVIDED THAT INSTRUCTIONS FOR CHANGE ARE ISSUED PRIOR TO INSTALLATION OF OUTLET.
- WIRING DEVICES IN FINISHED AREAS SHALL BE RECESSED MOUNTED AND FOR ALL UNFINISHED AREAS MAY BE SURFACE MOUNTED. EXPOSED CONDUITS SHALL NOT BE ACCEPTED UNLESS OTHERWISE NOTED ON THE DRAWINGS. WHERE CONDUITS RUN EXPOSED ON EXISTING SURFACES PAINT TO MATCH WALL FINISH.
- RECESSED WALL BOX: STEEL RECESSED BOX C/W NYLON THROATED FITTINGS.
- INTERIOR SURFACE MOUNT: STEEL SURFACE MOUNT C/W NYLON THROATED FITTINGS

03 GENERAL BUILDING WIRING REQUIREMENTS:

- UNLESS OTHERWISE NOTED ALL WIRING SHALL BE COPPER, 98% CONDUCTIVITY, COLOUR CODED, NEW AND MARKED AS PER CEC REQUIREMENTS.
- UNLESS OTHERWISE NOTED ALL BUILDING WIRING SHALL BE RW90 TYPE RATED MINIMUM 600V, RW90/90 SHALL BE USED FOR UNDERGROUND RACEWAY INSTALLATIONS.
  - ALL CABLES AND WIRES, ETC., TO BE RATED FT4 FOR NON-COMBUSTIBLE BUILDINGS AND FT6 FOR PLENUM AND AS REQUIRED BY THE CODE.
  - MAXIMUM VOLTAGE DROP SHALL BE AS PER CODE REQUIREMENTS, WHERE REQUIRED THE EC SHALL UPSIZE THE FEEDER WIRING FOR EQUIPMENT AT NO ADDITIONAL COST TO THE CITY IN ORDER TO MEET MINIMUM VOLTAGE DROP REQUIREMENTS; AS THE FINAL FEEDER ROUTING IS DETERMINED BY THE EC. NO ALLOWANCE WILL BE GIVEN FOR A FAILURE TO ACCOUNT FOR VOLTAGE DROP PRIOR TO BIDDING.

04 BRANCH CIRCUIT WIRING REQUIREMENTS:

- ALL WIRING SHALL BE SIZED AS PER CODE. MINIMUM ALLOWABLE WIRE SIZE IS #12 AWG. CONDUCTORS #8 AND LARGER SHALL BE STRANDED. PROVIDE MINIMUM #10 AWG CU WIRING FOR OUTSIDE LIGHTING, 15A RECEPTACLES CIRCUIT LENGTHS >100' AND 20A RECEPTACLES CIRCUIT LENGTHS >60'.

05 GENERAL INSTALLATION NOTES

- DRAWINGS ARE SCHEMATIC ONLY. CONDUIT RUNS SHOWN INDICATE POINTS TO BE JOINED. RUNS MAY BE ALTERED BY THE EC TO SUIT FIELD CONDITIONS. ELECTRICAL DRAWINGS ONLY GIVE INDICATION OF OTHER TRADES EQUIPMENT.
- ALL CONDUITS SHALL BE SECURELY FASTENED WITH APPROVED CLIPS. SCREWS IN PARTITIONS AND CADDY CLIPS IN CEILING. NAILS ARE NOT ACCEPTED.
- ALL CONDUIT, CONDUCTORS, WIRES, ETC. TO BE LABELED IN INDELEIBLE INK AT PANEL AND JUNCTION BOXES INDICATING DEVICE FED, PANEL NAME AND CIRCUIT NUMBER.
- ALL FASTENERS, HANGERS AND SUPPORTS SHALL BE HOT DIPPED GALVANIZED.

**8.0 BONDING AND GROUNDING**

01 BONDING AND GROUND SYSTEM AS REQUIRED BY CODE.

**9.0 WIRING DEVICES**

- PROVIDE RECEPTACLES AND LINE VOLTAGE CONTROLS C/W SUITABLE DEVICE BOXES AND COVER PLATES WHERE INDICATED ON THE PLANS.
- RECEPTACLES SHALL MEET THE FOLLOWING REQUIREMENTS UNLESS NOTED OTHERWISE ON THE DRAWINGS. SINGLE / DUPLEX RECEPTACLES
  - CSA TYPE 5-15 R, 125V, 15A
  - SUITABLE FOR NO. 10 AWG FOR BACK AND SIDE WIRING
  - ACCEPTABLE MANUFACTURERS: HUBBELL, LEVITON, LEGRAND
  - DECORA FORM FACTOR - WHITE FINISH
  - TAMPER RESISTANT
  - ACCEPTABLE MANUFACTURERS: HUBBELL, LEVITON, LEGRAND

03 COVER PLATES SHALL MEET THE FOLLOWING REQUIREMENTS:

- FLUSH MOUNTED COVER PLATES SHALL BE VERTICALLY BRUSHED STAINLESS STEEL
- COVER PLATES FOR SURFACE MOUNTED DEVICES IN UTILITY ROOMS SHALL BE METAL.

**10.0 FIRE STOPPING**

- ALL ELECTRICAL WIRES, CABLES, RACEWAYS, OUTLET BOXES AND OTHER SIMILAR SERVICES THAT PENETRATE FIRE WALL, FIRE SEPARATION OR ASSEMBLY REQUIRED TO HAVE A FIRE RESISTANCE RATING OR FIRE SEPARATION, SHALL BE SEALED BY FIRE STOP SYSTEM WHICH HAS AN "F" AND/OR "FT" RATING NOT LESS THAN REQUIRED FIRE PROTECTION RATINGS OF FIRE SEPARATION.
- FIRE STOPPING REQUIRING RATINGS OF 2HRS OR MORE IN UNOCCUPIED SPACES (I.E. CEILING SPACES, STORAGE ROOMS, ELECTRICAL ROOMS, ETC.) SHALL BE LABELED AND INSTALLED BY A CERTIFIED INSTALLER.
- ONLY LISTED MATERIALS AND METHODS SHALL BE UTILIZED.

04 SERVICE PENETRATION AND FIRE STOPPING OF SERVICE PENETRATION IN FIRE SEPARATION AND FIRE RATED ASSEMBLIES SHALL COMPLY WITH CODE.

- ALL FIRE RESISTANCE RATED ASSEMBLIES (I.E. WALLS, CEILINGS, ETC.) WHICH CONTAIN PANELBOARDS, BACK BOXES, RECESSED LIGHTING FIXTURES, ETC. SHALL BE C/W FIRE RATED BACKING TO MAINTAIN THE INTEGRITY OF THE FIRE RESISTANCE.
  - ELECTRICAL EQUIPMENT BACK BOARDS SHALL BE 3/4" (19mm) THICK PLYWOOD PAINTED WITH FIRE RETARDANT PAINT (GREY) ON ALL SIX FACES.
  - OPENINGS FOR STEEL ELECTRICAL BOXES NOT EXCEEDING 16 SQUARE INCHES ARE PERMITTED PROVIDED OPENINGS DO NOT AGGREGATE MORE THAN 100 SQUARE INCHES FOR ANY 100 SQUARE FEET OF WALL OR PARTITION
  - OUTLET BOXES ON OPPOSITE SIDES OF WALLS OR PARTITIONS MUST BE SEPARATED BY A HORIZONTAL DISTANCE OF 24" (610mm).

**DIV 27 - SPECIFICATIONS:****1.0 STRUCTURED CABLING**

01 THE CONTRACTOR SHALL SUPPLY AND INSTALL A COMPLETE CATEGORY 6 STRUCTURED CABLING SYSTEM AS SHOWN ON DRAWINGS AND AS SPECIFIED HEREIN. ALL COMPONENTS OF THE STRUCTURED CABLING SYSTEM SHALL BE OF THE SAME MANUFACTURER UNLESS OTHERWISE SHOWN OR STATED.

02 THE SYSTEM SHALL BE USED FOR THE FOLLOWING SYSTEMS:

- DATA NETWORK
- TELEPHONE
- SYSTEM EQUIPMENT SHALL BE SUPPLIED BY OTHERS UNLESS OTHERWISE SPECIFIED.

**03 DEFINITIONS**

THE FOLLOWING ARE DEFINITIONS OF TERMS AND EXPRESSIONS USED IN THE SPECIFICATION AND DRAWINGS:

- AWG - AMERICAN WIRE GAUGE
- BICSI - BUILDING INDUSTRY CONSULTING SERVICE INTERNATIONAL
- CAT - CATEGORY
- CER - COMMUNICATIONS EQUIPMENT ROOM
- EIA - ELECTRONICS INDUSTRIES ASSOCIATION
- GIS - GOOD ONE SIDE
- IDC - INSULATION DISPLACEMENT CONNECTOR
- IP - INTERNET PROTOCOL
- OSP - OUTSIDE PLANT
- PoE - POWER OVER ETHERNET
- RU - RACK UNIT
- TDDM - TELECOMMUNICATIONS DISTRIBUTION METHODS MANUAL
- TIA - TELECOMMUNICATIONS INDUSTRY ASSOCIATION
- TC - TELECOMMUNICATIONS CLOSURE
- TE - TELECOMMUNICATIONS ENCLOSURE
- TR - TELECOMMUNICATIONS ROOM
- UTP - UNSHIELDED TWISTED PAIR
- WAP - WIRELESS ACCESS POINT

**04 REFERENCE STANDARDS:**

- TIA-568-x.0 GENERIC TELECOMMUNICATIONS CABLING FOR CUSTOMER PREMISES
- TIA-568-x.1 COMMERCIAL BUILDING TELECOMMUNICATIONS CABLING STANDARD
- TIA-568-x.2 BALANCED TWISTED-PAIR TELECOMMUNICATIONS CABLING AND COMPONENTS STANDARDS
- TIA-568-x.3 OPTICAL FIBRE CABLING COMPONENTS STANDARD
- TIA-569 TELECOMMUNICATIONS PATHWAYS AND SPACES
- TIA-606X ADMINISTRATION STANDARD FOR TELECOMMUNICATIONS INFRASTRUCTURE
- TIA-607X GENERIC TELECOMMUNICATIONS BONDING AND GROUNDING (EARTHING) FOR CUSTOMER PREMISES

X - DENOTES LATEST REVISION

**05 UTP HORIZONTAL CABLING:**

- CAT6 UTP, 24AWG, SOLID CONDUCTORS CMP PVC BLUE JACKET
- ALL UTP HORIZONTAL CABLES SHALL EXTEND FROM THE TELECOMMUNICATIONS OUTLET AT THE WORKSPACE BACK TO THE LOCAL TELECOMMUNICATIONS ROOM/CLOSET LOCATION. LENGTH OF CABLE SHALL NOT EXCEED 295' (90m) METERS AND CONTAIN NO SPLICES.

**06 TELECOMMUNICATIONS OUTLET:**

- SHALL CONSIST OF A MINIMUM OF THREE (3) CAT6 UTP HORIZONTAL CABLES 2 DATA, 1 SPARE UNLESS OTHERWISE SHOWN.
- HORIZONTAL CABLES SHALL BE TERMINATED USING KEYSTONE TYPE CAT6 R45 FEMALE MODULAR CONNECTORS WHICH SNAP INTO THE OUTLET FACEPLATES.

**07 TELECOMMUNICATIONS OUTLET ROUGH-INS:**

- MINIMUM 4" (100mm) SQ. DEEP BACK BOX C/W SINGLE GANG MUD RING
- MINIMUM 1" (27mm) CO. C/W APPROVED BUSHINGS AND PULL STRING UP TO ACCESSIBLE CEILING OR CABLE TRAY SYSTEM FOR EACH TELECOMMUNICATIONS OUTLET.

**08 TELECOMMUNICATIONS OUTLET COVER PLATES:**

- SHALL HAVE MIN. 3 MODULAR TYPE PORTS OR
- SHALL BE DECORA STYLE WITH DECORA ADAPTER STRAPS C/W MIN. 3 MODULAR TYPE PORTS
- BLANKS SHALL BE PROVIDED FOR ANY UNUSED PORTS.
- WHERE TELECOMMUNICATIONS OUTLETS ARE INSTALLED IN MILLWORK, FURNITURE RACEWAY SYSTEMS OR FLOOR BOXES, PROVIDE COMPATIBLE ADAPTERS AND COVER PLATE.
- COVER PLATE COLOURS SHALL MATCH RECEPTACLES AND BE BRUSHED STAINLESS STEEL

**09 COMMUNICATIONS ROOM TERMINATION HARDWARE:**

- KEYSTONE TYPE CAT6 R45 FEMALE MODULAR CONNECTORS FOR TERMINATION AT THE PATCH PANELS
- RACK MOUNTED PATCH PANEL(S) ARE EXISTING IN ELECTRICAL ROOM 1:64.
- EC TO PERFORM ALL TERMINATIONS.

**10 CABLE MANAGEMENT**

- CABLES SHALL BE BUNDLED AND STRAPPED USING VELCRO TIE STRAPS ONLY. PLASTIC OR NYLON TIE STRAPS SHALL NOT BE USED.

**11 RACKS AND CABINETS**

- UTILIZE EXISTING.

**12 CONDUITS AND RACEWAYS**

- ALL CABLING SHALL BE INSTALLED IN CONDUIT. THE MANUFACTURER'S MINIMUM RECOMMENDED BEND RADIUS OF EACH CABLE SHALL BE MAINTAINED AND NOT EXCEEDED.

**13 LABELING AND IDENTIFICATION**

- ALL LABELING SHALL COMPLY WITH CITY'S STANDARD
- WHERE THE CITY'S STANDARD IS NOT APPLICABLE OR AVAILABLE, TIA-606 ADMINISTRATION STANDARD FOR TELECOMMUNICATIONS INFRASTRUCTURE (LATEST REVISION) SHALL BE USED.
- MACHINE PRINTED LABELING SHALL BE USED ONLY, (I.E. BROTHER P-TOUCH).

**14 CONTRACTOR REQUIREMENTS**

- ALL CONTRACTOR STAFF PERFORMING THE INSTALLATION SHALL BE CERTIFIED BY THE MANUFACTURER TO INSTALL THE STRUCTURED CABLING SYSTEM. THE SYSTEM SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH THE LATEST BICSI TDDM AND TIA STANDARDS.

**15 TESTING**

- PERFORM TIA/EIA-568 PERMANENT LINK AND WIRE MAP TESTING FOR ALL UTP CABLING.
- ONLY "PASS" OR "FAIL" TEST RESULTS SHALL BE ACCEPTED. PAYMENT FOR THE STRUCTURED CABLING PORTION OF THE CONTRACT MAY BE WITHHELD UNTIL THE CONTRACT ADMINISTRATOR IS SATISFIED WITH THE INSTALLATION OF THE STRUCTURED CABLING SYSTEM.
- ALL UTP CABLE TESTING SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR IN PDF FORMAT FOR REVIEW.

**16 SUBMITTALS**

- REFER TO SECTION 2.0 SUBMITTALS FOR ADDITIONAL INFORMATION.
- SUBMIT SIGNED CERTIFICATE VERIFYING THAT THE STRUCTURED CABLING SYSTEM HAS PASSED THE MINIMUM TIA PERFORMANCE TESTING COMPLETE WITH COPIES OF ALL CABLE TESTS REQUEST UNDER THE TESTING SECTION.

- ACCEPTABLE PRODUCTS:
  - ACCEPTABLE MANUFACTURERS: BELDON, PANDIUT, LEVITON, AND COMSCOPE / SYSTEMAX
  - EQUIPMENT GRADE: TIER 2

**2.0 SUBMITTALS****01 GENERAL**

- SUBMIT PRODUCT DATA FOR ALL EQUIPMENT. ACCEPTABLE MATERIALS SHALL BE AS SPECIFIED, CODE APPROVED OR CITY APPROVED. ALL MATERIAL SHALL BE NEW, UNLESS SPECIFIED OTHERWISE.
- SHOP DRAWINGS FOR EQUIPMENT/MATERIALS SHALL BE SUBMITTED FOR REVIEW BY THE CONTRACT ADMINISTRATOR BEFORE INSTALLATION CAN PROCEED. ALL INTENDED OPTIONS SHALL BE CLEARLY MARKED AND IDENTIFIED. PRODUCT BROCHURES AND/OR ADVERTISEMENTS ARE UNACCEPTABLE AND SHALL BE REJECTED.</