PUBLIC UTILITIES
COMMISSION

WIREMAN'S PROCEDURES FOR ELECTRICAL DESIGN SUBMISSIONS

GENERAL:

I. What is an Electrical Design Submission:

Set of drawings & calculations comprising the design of an electrical system for use in residential, commercial or industrial applications. Design must ensure practical safeguarding of persons and property from hazards arising from the use of electrical energy.

II. Why are Electrical Design Submissions Mandatory:

By law the PUC is required to regulate the consumption sector of the electrical industry. Section of the Electricity Act (Ch 221, rev 2000) that speaks to this includes:

- ***Section 6(2)(g)*** – protects the public from dangers arising from the generation, transmission or supply of electricity
- ***Section 7(1)(d)-*** the protection of electrical installations
- ***Section 7(1)(e)*** – the conditions under which fixtures and fittings may be installed
- ***Section 7(1)(f)*** – matters generally connected with the electric light and power service which are not otherwise provided for in preceding sections

An electrical system starts with a design that must be based on PUC approved installation standards. Mandating that the design of any such systems be reviewed by the PUC will ensure PUC meets its regulatory obligation under the law.

III. When must an Electrical Design Submission be made:

An electrical design submission must be made to the PUC whenever there is:

- Installation of an electrical system for a new residential/commercial/industrial application
- Alteration/modification/upgrade of an existing electrical system

IV. Who can make Electrical Design Submission:

Only a PUC licensed Wireman can make a submission. Note that any such submission must be done in accordance with the licensed category of that wireman. Also, only PUC licensed wiremen can engage in any electrical installations works at a project site.

V. Where must Electrical Design Submissions be made:

All submissions must be made to PUC. Method to use:

1. Online by emailing to submissions@puc.bz (please follow PUC online submissions procedures).

VI. Rules/Regulations/Codes governing Electrical Design Submissions:

All electrical drawing submissions must follow the code of practice adopted by the PUC, The National Electrical Code (NEC) and PUC addendums. Other relevant codes include the BEL Service Installation Manual and Standard metering Arrangements. PUC regulations and guidelines supersede all other codes in the event of any material differences.

VII. Wiremen Categories, Design & Installations Limits:

Table I outlines the design and installation limits as per wireman category.

Category	Design limits	Installation limits
Electrician	Can submit designs of electrical systems up to 24 kVA, single phase, residential.	can work alone on electrical systems up to 30 kVA, 600V <, single phase, residential; systems above must be supervised by **Electrical Technician** or above.
Electrical Technician	Can submit designs of electrical systems up to 150 kVA, 600V<; residential or commercial.	can work alone on electrical systems up to 500 kVA, 1000V<, residential or commercial; systems above must be supervised by **Engineer.**
Engineer	Can submit designs of electrical systems of any size and voltage	can work on electrical systems up to any size and voltage

SPECIFICS:

VIII. Features of Electrical Design Submissions:

- Can be emailed to submissions@puc.bz
- Formatting of Submission:
  - If hand drawn with pen and ruler; must be neat and legible.
    - Submission must be scanned and emailed to PUC.
  - If computer generated (preferred); minimum font size is Arial 11 in Microsoft Word
  - The preferred size for drawings is 11" x 17" paper. Other sizes used must ensure the contents are legible.
  - Drawings should only show outlines of structures (floor plan) overlaid with electrical details of the design.
  - Every page must bear a:
    - Title block with Project Name/description

- Project address
- Project Owner/developer,
- Wireman name/address/phone/license number/type,
- Name of the drawing of the individual sheet,
- Space with wireman signature.

IX. Components of Electrical Design Submissions:

The typical submission must have the following components:

A. COVER PAGE & SITE PLAN DRAWING

- Must include project address, GPS Coordinates, and any other details to allow for site inspection.
- Must show project structure location relative to property lines and existing structures.
- Must show location of BEL's HV (High Voltage) and/or LV (Low Voltage) lines nearby relative to project building.
- Must show location and distance of proposed meter and any existing electricity meter on property.
- Must show direction and distance of any UG (Underground) network from meter point to all points within the property.

B. SINGLE LINE DRAWING (SLD) FOR SERVICE ENTRANCE

- Must show from BEL's transformer to main breaker using standard electrical symbols and single lines labelled with conduit/cable size, voltage, current, # of phases, rating (kVA).
- Must show supply side and load side wire size(s) (line, neutral, ground);
- Must show grounding details including size/type/length of rod, size/type ground cable. Projects requiring grounding grids must show all such details.
- Must show a second drawing with the weather-head details inclusive of structural strength and minimum height clearances as per BEL's Service Installations Manual for OH (Overhead) feed; or drawing with UG (Underground) route, type/size of ducts used, depth of trench, backfill and demarcation.
- Must include a disconnecting means once there is an underground section from the BEL supply to the main breaker.
- Must show breaker panels and subpanels; specifying voltage, current, phase and location. Specify weather-proof where appropriate. Clearly indicate size of main isolating breaker in each panel.
- Must include a legend of all symbols.

C. FLOOR PLAN WITH POWER CIRCUITS

- Must show legend of symbols used in the single line drawing.
- Must have circuit reference numbers to identify components of each circuit.

- Clearly indicate location of convenience, GFCI, Dedicated and weather-proof outlets.
- Must show location of control/distribution panel (s).
- Must show dimensions.

D. FLOOR PLAN WITH LIGHTING CIRCUITS

- A separate drawing required if these circuits will result in a cluttered floor plan as per (C).
- Must show legend of symbols used in the single line drawing.
- Must have circuit reference numbers to identify components of each circuit.
- Must show control devices of each component as part of the circuitry.
- Must show dimensions.

E. BREAKER PANEL DETAILS & LOAD SHEET CALCULATION:

- Must show panel details for the main breaker panel and every sub-panel in the design.
- Panel details must include all the information as shown in the sample submission attached with this document.
- Panel details must clearly indicate the calculated imbalance as a percentage.

F. OTHER REQUIRED CALCULATIONS

- Electrical load calculations as per the applicable NEC.
- Short-circuit analysis (Basic Point-to-Point Calculation):
    - For any service above 200Amps, short-circuit calculation from utility transformer to first protection device.
    - For all generators of any capacity within any electrical system, short-circuit calculation from generator(s) to first protection device.
    - For motor loads within any electrical system, short-circuit calculation from motor to first protection device.
- Calculations related to alternative sources of energy, for example:
    - For Solar Power Systems calculations include for solar array sizing, cable sizing, energy storage details, protection devices sizing, inverter and charger sizing, day& night load calculations, etc.

G. SPECIFICATIONS, NOTES, LEGEND

- All relevant details required by the NEC but not shown in any of the above listed drawing must be noted in the specifications sheet.
- The attached specification sheet must be included in each submission; additions may be made as required by specific design.

H. Completed form Submission Data Sheet for No Objection of Design

I. **Completed form Declaration by Wireman and No Objection by PUC for Project Construction (completed by constructing wireman)**

X. SUBMISSION REQUIREMENTS BASED ON PROJECT TYPE:

Table I: Specific sheets to be included for the different project types

Service type	Required sheets for design approval	Required sheets for construction	Requirements for "fit for turn on" approval
New service	A, B, C, D, E, F, G, H	Sheet I and copy of approved design	PUC booklet and copy of approved design inclusive of any changes.
Add to existing	A, B, C, D, E, F, G, H	Sheet I and copy of approved design	PUC booklet and copy of approved design inclusive of any changes.
Social TC (events)	A, B, H, I	n/a	PUC booklet and copy of approved design inclusive of any changes.
TCC (construction)	A, B, C, D, E, F, G, H, I	n/a	PUC booklet and copy of approved design inclusive of any changes.
Upgrade/meter relocate	A, B, C, D, E, F, G, H, I	n/a	PUC booklet and copy of approved design inclusive of any changes.

LIST OF ATTACHMENTS:

- Flowchart for electrical projects from design to BEL system connection (for information only)
- Wireman checklist for submissions (must be submitted with design)
- Sample electrical drawing submission (for information only)
- Sample load calculations sheets for residential, commercial, industrial applications
- Sample legend, notes, specifications

RECOMMENDED TEXTS:

1. National Electrical Code Handbook, 2008 (or later); Mark W. Earley, Jeffrey S. Sargent.
2. Illustrated Guide to the National Electrical Code, 5th edition; Charles R. Miller.
3. UGLY'S electrical References, 2010 edition (or later); George V. Hart, Sammie Hart.