

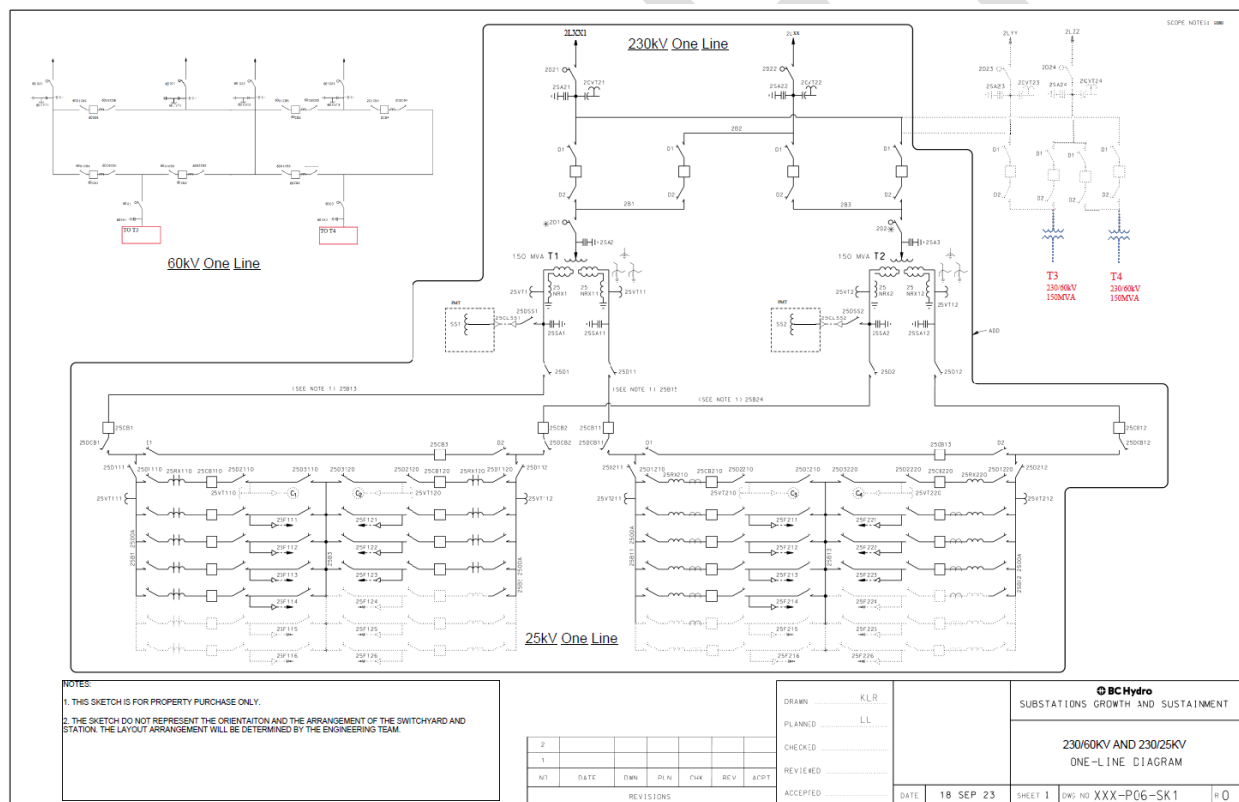
Campbell Heights (CBS) & Willoughby(WIB) Substations

Electrical Design Considerations for Conceptual Options

Assumptions

The layouts were designed with the following assumptions:

- All electrical conceptual layout design serves for property purchase only.
- All related transmission line entrance supports the current electrical design layouts and will coordinate with Transmission Lines when carry on further design stages.
- The electrical conceptual design for both Campbell Heights and Willoughby substations are based on the following attached Planning One-Line for Campbell Heights substation provided on March 06, 2024 by PE, David Chwackinski.



Options

Two layout options were explored, option 1 is based on air insulated switchyard (AIS) design and option 2 is conducted upon indoor gas insulated switchgear (GIS) for 230kV/60kV/25kV and leave transformers to be installed in the outdoor switchyard.

Both options comprise of 230kV/60kV/25kV switchyards, a control building, and outdoor power and station service transformers. The station service equipment, batteries, P&C panels and Telecomm equipment will be located in the control building. The control building will also include a washroom and a mechanical room. Key features include:

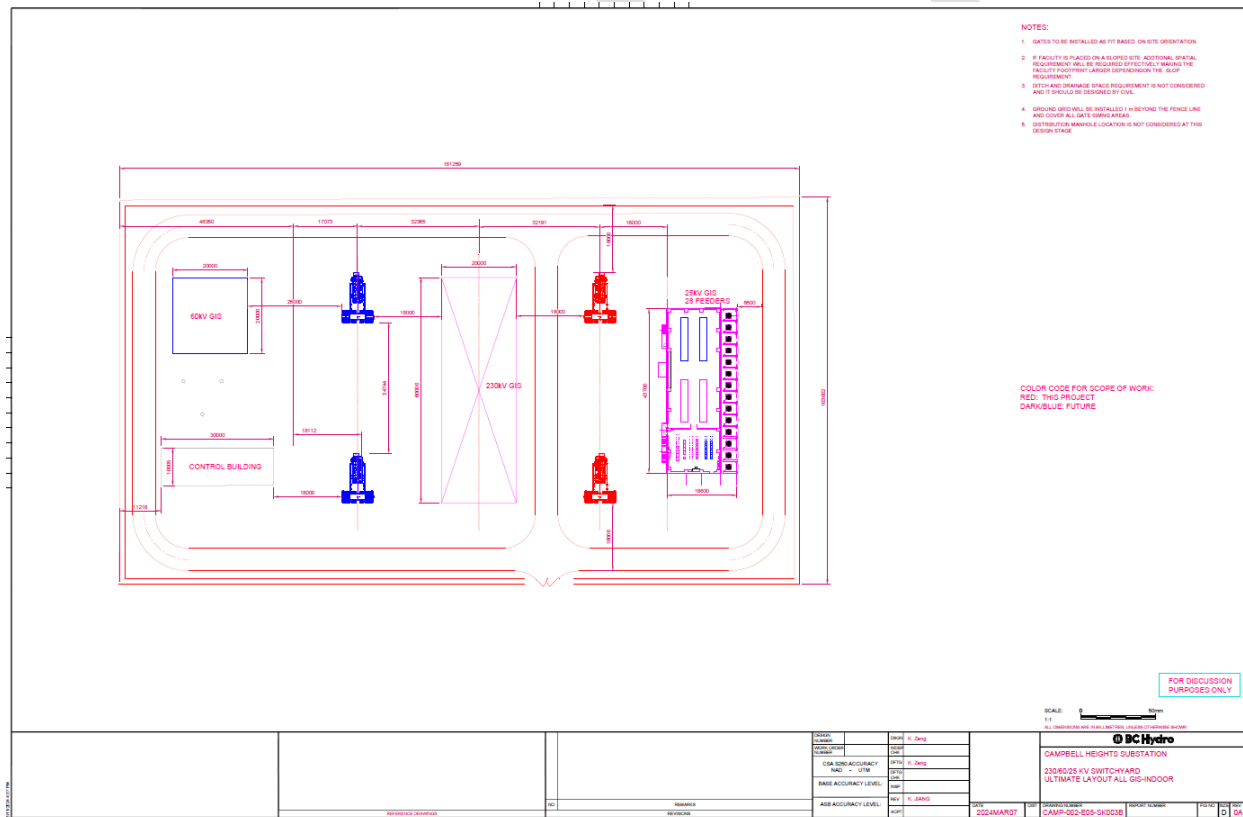
- Latest applicable standards are conformed for design
- 20m separation between transformer edges
- 18m separation from transformer edges to all buildings and property lines.
- 6m separation from station service transformer to Control Building
- 15m separation between 230kV GIS and 60 kV GIS and Control buildings
- Minimum 2.5m between edges of the road and 230kV bus
- Minimum 1.5m between edges of the road and 60kV/25kv bus
- Minimum 6m wide access roads
- Minimum 10m turning radius within substation
- 27m turning radius for main access roads into substation for transformer transportation

Option 2: GIS Layout Design.

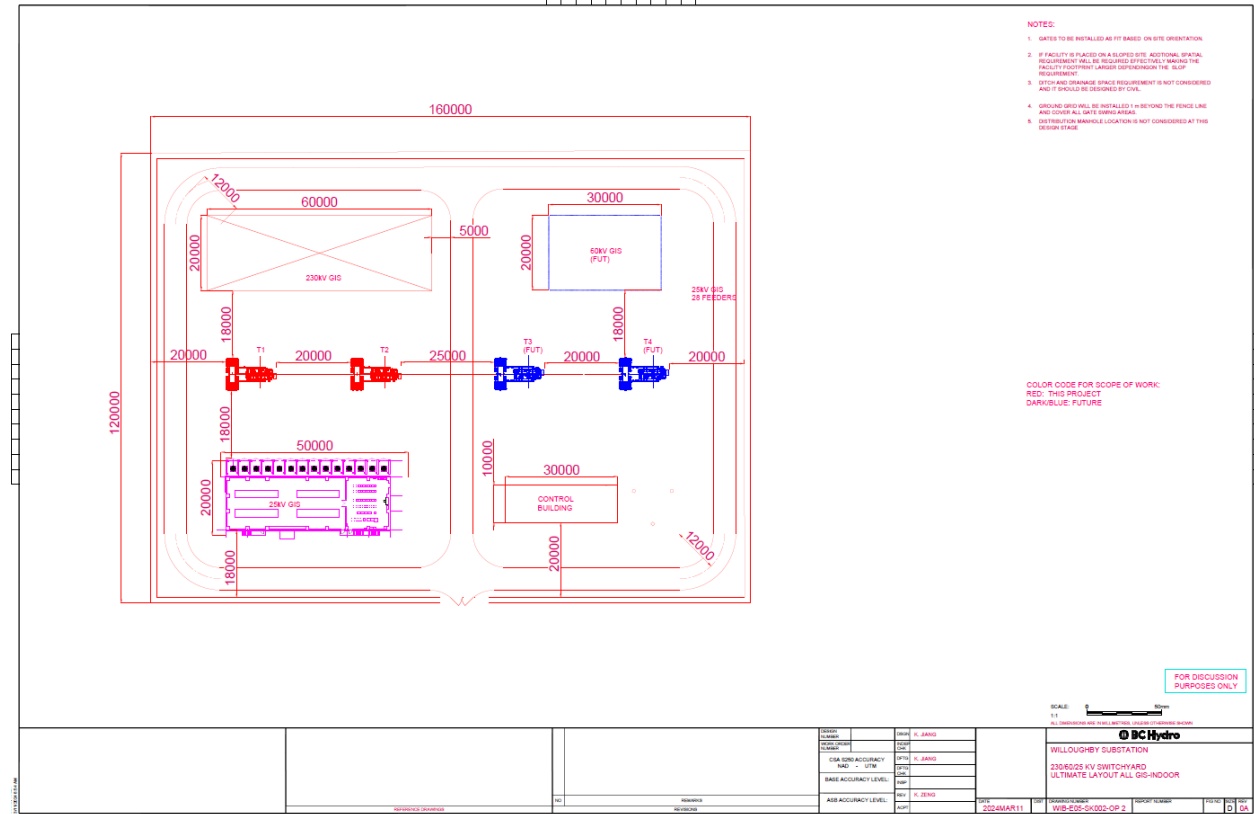
The 230kV and 60kV indoor GIS buildings consist of two floors, with the basement floor designated for cable entry and terminations while the main ground floor is designated for the GIS equipment and local station service panels.

The 25kV indoor GIS feeder building will consist of three floors, with the basement floor designated for cable entry and terminations while the main ground / second floors are designated for the GIS equipment for the 28 feeders / local station service panels.

The option 2 has been explored with 3 sketches as shown below for CBS and WIB.



Option 2-1-GIS Layout Design



Option 2-2-GIS Layout Design

