Designing A Better Tomorrow

Electrical Feasibility Study For

UVic – SUB Sustainability Initiatives

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1.0 INTRODUCTION

This feasibility study consists of performing a site assessment of the existing mechanical systems to be modified at the Student Union Building (SUB) at the University of Victoria as originally suggested in the 2012 Energy Study performed by Avalon Mechanical Engineers. The report will also review the proposed replacement systems from the perspective of their associated electrical connections at the.

The purpose of this study is to provide a high-level view of the required electrical work required to facilitate the proposed mechanical system modifications and additions.

2.0 METHODOLOGY

Creation of this report is based on information gathered on site, review of existing documentation and proposed new equipment information provided by AME Consultants.

The existing systems were reviewed on October 8, 2020 by Jeff Halpenny of AES Engineering with the assistance of Dale from the UVic mechanical shop and Louise and Zach from AME Consultants. During this review, all applicable information was gathered, and the necessary facilities staff and consultants were available for questions as they came up.

3.0 APPLICABLE CODES AND STANDARDS

All electrical work required to support these equipment modifications and additions would need to be performed such that remaining work is in compliance with the Canadian Electrical Code 2018 (CEC).

In all cases, the University shall have first right of refusal of any demolished equipment. Anything not accepted by the University is to be discarded by the contractor.

4.0 AIR HANDLING UNIT AHU-1 DX COOLING UNIT

4.1 EXISTING EQUIPMENT

The existing AHU-1 appears to have two (2) feeds: one is for the supply and return fan and one is for the current DX cooling coil. The fans are fed from a combined feed from the MCC#1 in Level 0 South Electrical Room. The feed to the DX cooling coil was not located; however, based on the nameplate on the unit, it is fed with a service rated for 80-amp, 208V, 3Ph.

The existing connection to the unit is to be disconnected (at the equipment end) along with removal of the existing, rusted, equipment mounted disconnect. The feed to be retained for reuse.

4.2 REQUIRED MODIFICATIONS AND ADDITIONS

The new cooling coil and heat pump requires a 70-amp, 208V, 3Ph service. As such, the existing 80-amp feed can be reused but will need to be fused down at the equipment. A new outdoor 100A fused disconnect will be provided with 3x70A fuses to make connection to the new unit.

It should be noted that the existing feed comes through the roof so ideally, the new equipment can work within the same footprint; otherwise, the existing feed may need to be relocated or extended and would require additional roof rework.

5.0 DOMESTIC WATER HEATER WITH HEAT RECOVERY

5.1 EXISTING EQUIPMENT

There are two (2) existing 30KW, 208V, 3Ph electric domestic water heaters located in the Level 0 South Mechanical Room. Each tank is connected to a 100-amp, 3pole circuit breaker in Panel 'DPD' located in the neighbouring Level 0 South Electrical Room.

Both tanks are to be removed to allow for replacement. This will include removal of the connection at the unit as well as removal each feeder back to its source panel. Existing breakers should be switched off and noted as spare.

As an alternative, one of the 100A, 3ph feeds could be retained and used to connect to new equipment as noted below.

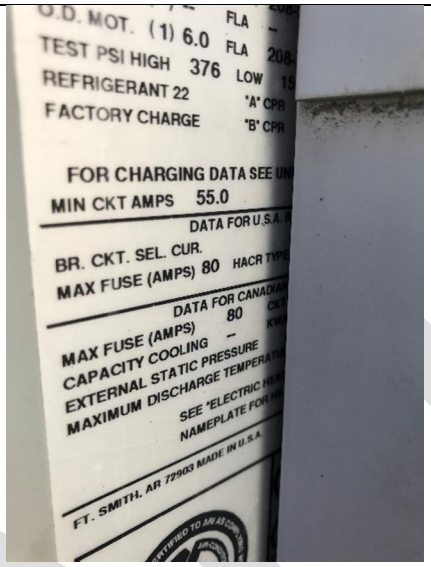
5.2 REQUIRED MODIFICATIONS AND ADDITIONS

It is understood that replacement tanks will be provided in quantity as budget allows (between one and three). Replacement tanks each have electrical requirements of 24-amp, 208V, 1Ph. Each tank can be connected to a new 30-amp, 2-pole breaker in Panel DPD and connected with 2#10 in 21mm EMT conduit.

As an alternative, as mentioned above, one of the 100-amp, 208V, 3Ph, 3W feeds into the mechanical room could be retained and connected to a new 100A, 120/208V, 3Ph, 3W panel in the mechanical room. It should be noted that it is not believed that there is a neutral conductor in the existing feeder so this would be a 208V, 3Ph panel only (no 120V available). Under this scenario, the panel would have 12 circuit capacity and be provided with a 30A, 2-pole breaker for connection with 2#10 in 21mm EMT conduit to each water heater. This would be the recommended option so long as the 100A sub panel can be located in proximity to the existing heaters and utilize an existing feeder.

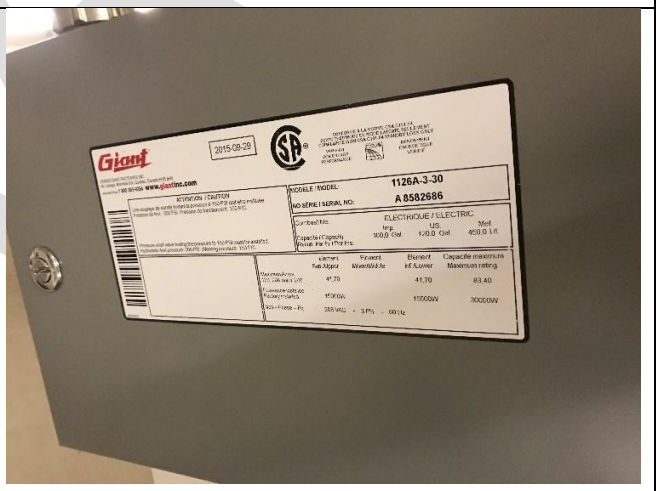
6.0 PHOTOS

Existing disconnect for AHU-1 DX cooling coil



DX cooling coil nameplate data

Breaker in Panel DPD for existing domestic water heater



Existing domestic water heater nameplate data