Engineering Specifications for X-Ray Tunnel Utility Fill Out

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Brief Summary:

This document describes the electrical and mechanical utilities needed to support beamline and experiment hardware in the X-Ray Tunnel (XRT).

Change History Log

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1. Overview

The computer servers to support NEH and FEH experiment operations for LCLS beams will require 
external cooling. The current PCW system in the NEH cannot support the cooling requirements of the 
computer servers along with the demands from the experiment hutchs, FEE, existing laser hall, and the 
ew equipment assembly area and laser research lab. Table 4.1 provides estimated cooling needs by area 
in the NEH. The computer server farm to be installed in a re-purposed room adjacent to the basement 
level mechanical room will require up to 50 kilowatts of cooling. Using a Process Cooling Water (PCW) 
system at 68 degrees Fahrenheit, this translates to approximately 33 gallons per minute of PCW flow. 
The current PCW system in NEH provides approximately 73 gpm of capacity. Expected usage for FEE, 
Hutch 1-3, Assembly Area, Laser Hall, Laser Research Lab, and network servers is estimated at about 60 
gpm. To support the computer servers, additional PCW capacity is needed. Also, as experiments become 
better defined and future additions are planned, it is reasonable to expect the demand on the PCW system 
to increase by an additional 30 gpm (45 kilowatts of cooling). To support these additional PCW loads, a 
PCW system currently installed at BaBar can be moved to the Mechanical Room in NEH. This system 
will provide, with a minor upgrade to the equipment, 50 gpm of additional cooling capacity (75 kW). 
This should be sufficient to satisfy the needs of the computer servers and additional experiment demand.

2. Electrical

2.1. Racks

• Install four SLAC provided racks at specified locations in the XRT (see Figure 4.1)
• For each rack, install two 208VAC 3-phase 20 Amp circuits, terminate each 3-phase 
circuit in the provided Furman power distribution boxes in the rack.

2.2. Welding outlets

• Three 208 VAC 1-phase 30 Amp outlets at locations shown in Figure 4.1 for the tube 
welder.
• One 208 VAC 3-phase 30 Amp outlet at the HED Mirror location as shown in Figure 
4.1 for vacuum bake-out connection.

2.3. PPS

PPS power outlets at east and west ends of the XRT.
3. Mechanical

3.1. PCW

- Install copper supply and return lines for future hook up on the utility wall that will run from the FEH to the most upstream rack. Size for 10 gpm flow. Drops installed at every rack location with ball valves suitable for up to 6 gpm maximum flow. Provide a full flow bypass valve on the upstream end between manifolds.

4. Figures

Figure 4.1: Schematic XRT: SLAC Drawing ID-391-030-12