LCLS Room Data Sheet #	1.9-1038	Far Experimental Hall (FEH) - Hutch # 1	Revision 2

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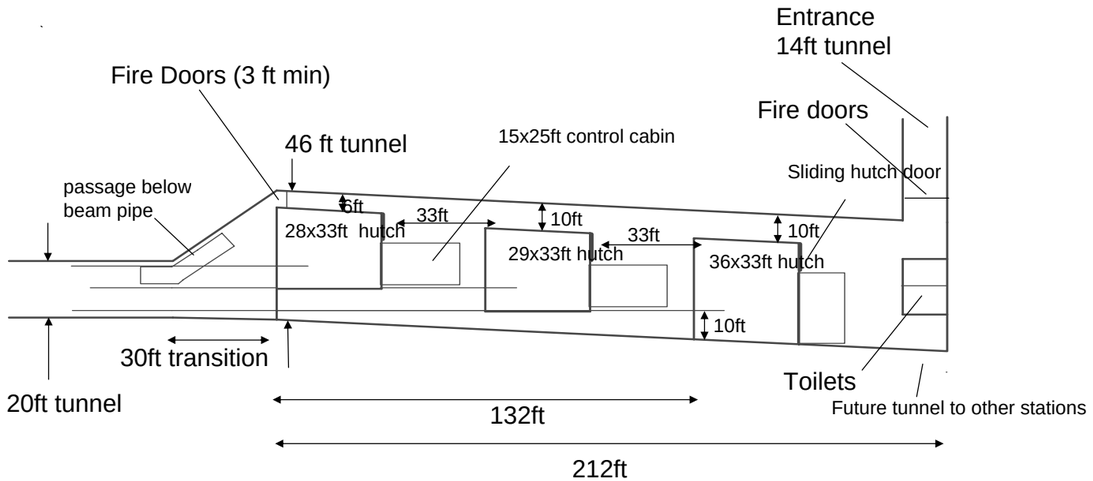
REVISION INFORMATION

Rev 2. Deleted N2 central gas system, delete wrong layout fig #2, added wall penetration fig #3. Added Figure No. 4
Changed amperage, 110 volts, 20 amps outlets. Updated Code and Standards
Added hutch and control area layout. Added power diversity factor. Clarifications to cable trays requirements
Added LCLS ESD 1.9-103 and 1.9-104 . General changes and corrections

FACILITY COMPONENT	HUTCH# 1 (3 each in FEH includes control area) - ROOM DATA SHEET			
	Name of Building	Hutch #1 in FEH		
	Organization or Department	SLAC, Stanford University		
	Net area	95.0	sq. meters	1023sf
	Critical dimensions	**H:**	4.5 m	15'-0"
		W:	9.5 m	31'-2"
		L:	10.0 m	32'-9"
	Hours of operation	24/7/365		
	Users/Occupancy	5		
	Building orientation	Located along the beam line on the FEH level.		
FUNCTIONAL OBJECTIVE	To conduct a variety of experiments with the high energy X-ray beam. One of the hutches in the NEH also houses special optical devices, that help split the X-ray beam into the +/- 3/4 degree beams. For hutch layout see figure 2.			
PLANNING CONSIDERATIONS & CRITICAL FACTORS	Floor level is to remain constant throughout the entire length of the BTH at 1.4m below the beam axis. Y = - 0.895305m in LCLS coordinate system (refer to LCLS-TN-03-8). Each hutch should have it's longer side parallel to the direction of beam travel. The hutches should be capable of independent operations. Provide modular hutch design flexible for future expansions and modifications. Refer to LCLS ESD 1.9-103 General Concrete Guideline			
FINISHES	Wall	Gypsum board walls, painted surface and 1/8in.of Lead for all hutch walls. Provide modular hutch design flexible for future expansions and modifications. Penetrations 6" diameter, every 4ft, can not allow line of sight to beam lines. (see figure 3)		
	Ceiling	Gypsum board, painted surface, painted surface and 1/8in of lead. 15'-0"high. Ceiling structure with suspended Unistrut framing grid capable of supporting experiment specific diagnostic equipment on suspended shelf below the ceiling above each laser table. Each shelf estimated weight is 500 lbs each. Bottom of unistrut framing grid: 12'-0"AFF		
	Floor	Sealed concrete with epoxy coating- Refer to LCLS ESD 1.9-103 General Concrete Guideline		
	Base	None allowed.		
	Doors	Sliding Hutch doors should contain 1/8" lead. Door runs in groove. No cracks. Door height 8"-0'. Width to allowed 5 ft entry space. Door must interface with special Personal Protection System(PPS). PPS provided by SLAC. Example of doors are similar to SSRL X-Ray hutch doors.		
	Fenestrations	None		
	Acoustical	None		

APPLICABLE STANDARDS	29 CFR Part 1910 Occupational Safety and Health Standards Dept of Labor, 29 CFR Part 1926 Safety and Health Regulations for Constructions Dept of Labor, Uniform Building Code (UBC) 1997 including appendixes, National Electric Code (NEC) 2002, Uniform Mechanical Code (UMC) 2003 including appendixes, Uniform Plumbing Code (UPC) 2003 including appendixes, Uniform Fire Code (UFC) 1997 including appendixes, California Code of Regulations Title 8 Industrial Safety, Title 19 Public Safety, NFPA 70 National Fire Codes, National electrical Safety Code ANSI C2, Occupational Safety and Health Act (OSHA), General Services Administration 41 CFR part 101-19, Environmental Protection Agency 40 CFR Parts 264 and 265, SLAC Environmental Safety & Health Manual, General Industrial Activities Storm Water Permit (SLAC Permit), NFPA 101 life Safety Code, Title 24, DOE standard 10 CFR Part 435, ASHRAE/IES Standards 90.1, NFPA Standard 13 and SLAC Fire Marshal requirements, LCLS Cabling Standard, SLAC LOTO
VIEWS & SCHEMATICS (N. T. S.)	**Figure 1 FEH Schematic Layout-Overall**



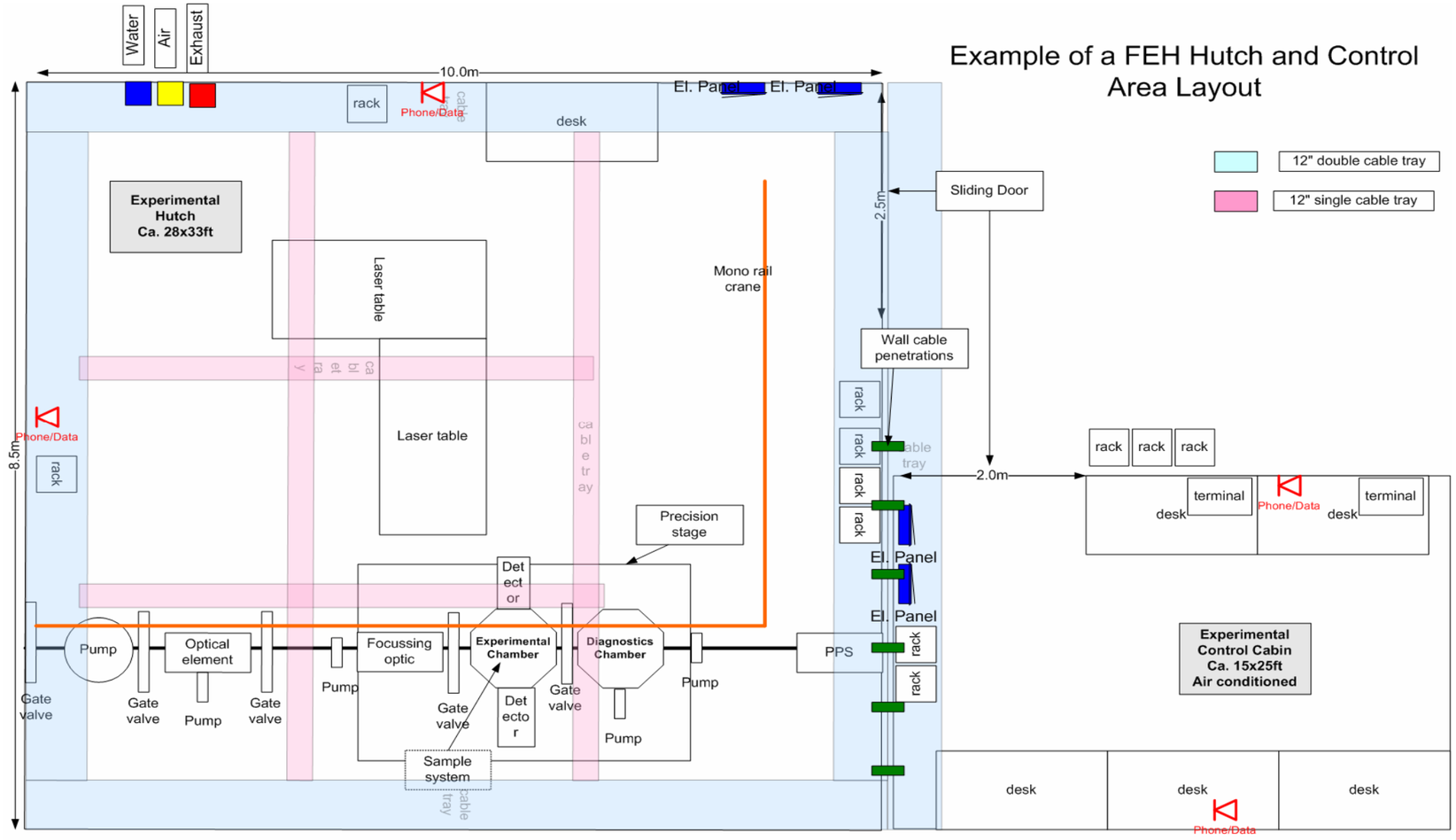
MECHANICAL REQUIREMENTS	**HVAC**	☒	Heating system	Temp:	☐	Mechanical humidification	
	Provide filtered clean air using pre-filters, high efficiency filters and HEPA filters in the air handling unit. 6 FPM average room velocity	☒	Air conditioning	Temp: 72 degrees F± 1 degree F	☒	Direct exhaust system	
		☐	Direct supply		☐	Positive pressure system	
		☐	Indirect supply		☐	Negative pressure system	
		☐	Smoke control system		☐	Standard registers	
		☒	Temperature sensors connected to SLAC's DDC system		☒	Requirement for gases	
		List of Gases - No centralized N2 gas system in FEH, local use of bottles only. **Centralized Mechanical Utilities:** Clean dry oil-free compressed air 20 SCFM, 100 psig. Provide one location (along wall) with shut off valve and pressure gauge per hutch.			1) Noise criteria for HVAC system design: NC=35 2)Temperature fluctuation to be maximum of +/- 1 deg F for stability. 3)Relative Humidity (RH)- shall be controlled to 45% +/- 10% 4) Exhaust: 200 CFM exhaust ducts (6") for process exhaust at 1.5"W.C. static pressure for each hutch on separate fan for each hutch.		
	Communications	☒	Telephone- 2 phone lines/location		☐	PA speakers	
		☒	Data port- 2 jacks/location		☐	PA station	
		☐	Payphone		☐	CCTV camera	
		☒	Fire alarm station		☐	CCTV monitor	
		☐	Intercom				
		Comments: 1) Provide two locations (data and voice) per wall 2) Cable trays: Double 12 inch to be installed along the inside walls of each hutch and along side hutch wall in control area and single 12 in grid in each hutch . Provide cable trays at 8'-6" ft AFF (see figure 2 for layout). Cable trays should be made from galvanized steel. Provide each cable tray with 1-4#0 bare copper wire for grounding. Provide 6" deep cable tray for I&C cables and control cables for DC racks, and 4" deep for cables for DC racks.					
	Plumbing/Fire Protection	☐	Hot water system		☐	Electric water cooler	
		☒	Process cooling water		☐	Drinking fountain	
		☐	Tempered water		☒	Smoke detection systems with devices suitable for radiation environment	
		☐	Waste drain		☒	Wet Spirnkler System	
		☐	Floor drain		☐	Eye wash	
		☐	Trench drain				
		Comments: Process Cooling water **(PCW):** 10GPM, 25 PSI at 68 F supply in each hutch. Refer to LCLS Water Cooling Specification. Terminate with shut off valve and pressure gauge. Locate piping on wall					

ELECTRICAL REQUIREMENTS	**Power supply**	☐	208V outlets-1 phase- 30 amps	☐	Uninterrupted power supply	
		☒	110V, 1ph Double duplex outlets, 20 amps locate at 10ft apart on all walls.	☒	Special electric-See below	Type:
		☐	Emergency power		a) Provide two panels, 120-208 volts, 3 ph, (one "clean" and one "dirty" power) in each hutch. Each panel shall have a main breaker. All panels should have 20% spare capacity and additional breaker space. Capacity: 42 circuits/panel. b) Capacity of each panel: **100** amps. Diversity factor: 60% **Panel location:** On walls next to door (see figure 2).	
		Comments: 1. Electrical distribution system in ceiling with vertical drops. 2. Cable trays: To be installed along the inside walls of each hutch (see figure 2 for layout) and alongside hutch wall in control area. 3. The two panels will provide power to future experimental equipment.				
	Lighting	☒	Light fixtures	☐	Remote lighting control	
		☒	Fixture type I: Down light	☒	Light switches	
		☐	Fixture type II: Bollard (exterior)	☒	Lighting level	FC: 75
		☒	Emergency lighting			
		Comments: 1- All conduits are surface mounted. Low profile fixtures preferred. 2- No night lighting desired. 3- Must have the ability to completely darken the room when required by the particular experiment. 4- Lighting level should be higher than normal standard office environment due to the dark laser protective goggles worn by the lab personnel. **(75 FC)**. 5- Light fixtures could be located at the lower unistrut level, placing the fixtures as close to the work surface as possible. 6- Refer to LCLS ESD 1.9-104 Emergency Lighting Specification				
RADIATION/SEISMIC/VIBRATIONS ISSUES	**Comments:** 1- All equipment (HVAC, cable trays, panels, etc) and systems are to be seismically braced and restrained per SLAC Seismic Standards and per Code. 2- Vibration criteria in the hutches: Refer to document: LCLS Vibration Specification B. (100 micro inch/sec.) 3- For cable penetration details, refer to figure 3. Allow for two 6 inch penetrations between hutches (one on each end)					
SPECIAL REQUIREMENTS FOR EQUIPMENT	**Comments:** **1-** Each hutch is equipped with a "L" shaped mono rail electric crane (capacity 1 ton, hook height 12ft) which runs above the beam line and has a loading area adjacent to it (see figure 2). **2**- Provide cable trays at 8'-6" ft AFF					

CHEMICALS / GASES	CHEMICALS			SPECIALTY GASES		
	#	Chemical Type	Quantity	#	Gas Type	Quantity

ENVIRONMENTAL NEEDS	

Figure 2- SCHEMATIC PLAN VIEW OF HUTCH ROOM AND CONTROL AREA



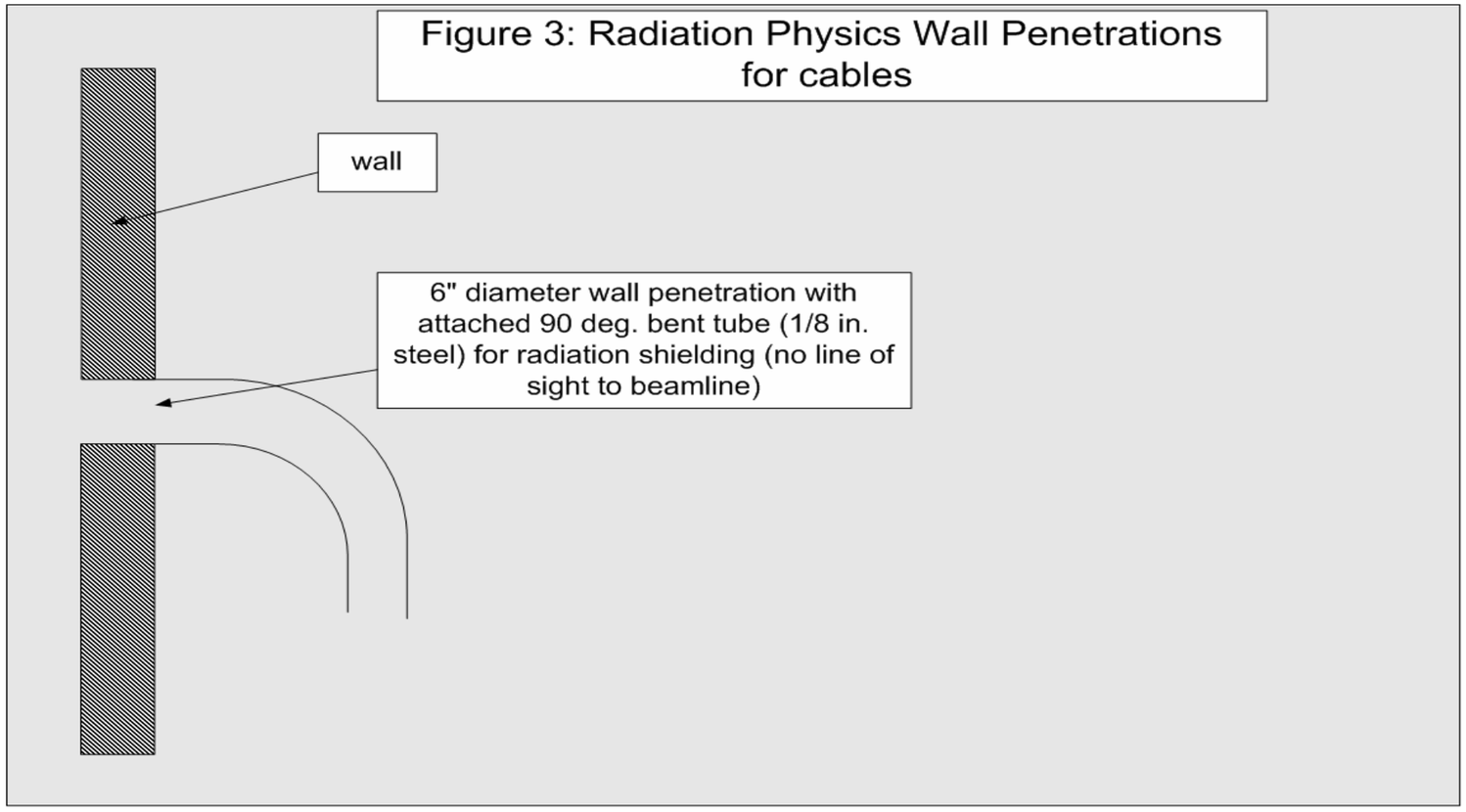
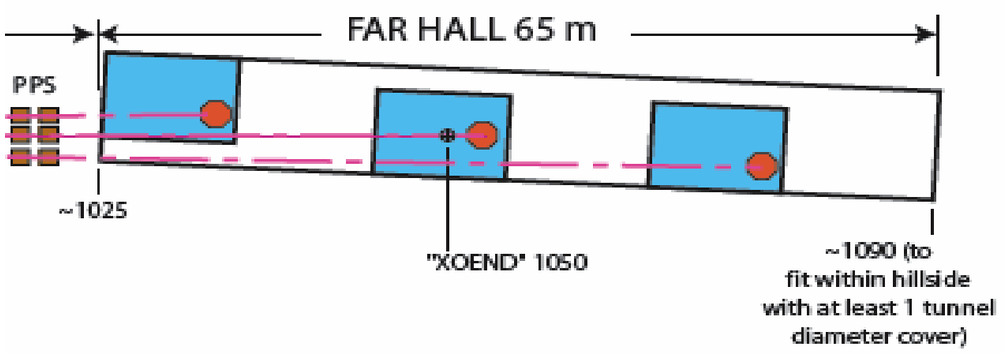


Figure 3: Radiation Physics Wall Penetrations for cables
wall
6" diameter wall penetration with attached 90 deg. bent tube (1/8 in. steel) for radiation shielding (no line of sight to beamline)

FIGURE No. 4


FAR HALL 65 m
PPS
~1025
"XOEND" 1050
~1090 (to fit within hillside with at least 1 tunnel diameter cover)