2.3 | Utility Infrastructure

All Low Temperature (Condensing Boiler) Heating Hot Water Plant

Load Type	Capacity (CFM - GPM)	EAT / EWT	LAT / LWT	BTU / hour	Annual hours	BTU / yr	Nat. gas / yr (1)	$ / yr (2)
AHU Preheat Energy	79,175	57	58	85509	1332	113,897,988	126,553,320	$1,734
	79,175	52	58	513054	1415	725,971,410	806,634,900	$11,051
	79,175	47	58	940599	1573	1,479,562,227	1,643,958,030	$22,522
	79,175	42	58	1368144	1258	1,721,125,152	1,912,361,280	$26,199
	79,175	37	58	1795689	687	1,233,638,343	1,370,709,270	$18,779
	79,175	32	58	2223234	214	475,772,076	528,635,640	$7,242
	79,175	27	58	2650779	57	151,094,403	167,882,670	$2,300
	79,175	22	58	3078324	25	76,958,100	85,509,000	$1,171
	79,175	17	58	3505869	15	52,588,035	58,431,150	$801
	79,175	12	58	3933414	3	11,800,242	13,111,380	$180
Reheat Energy	79,175	58	62	342036	8760	2,996,235,360	3,329,150,400	$45,609
Domestic Hot water	30.4	40	120	1216000	350.4	426,086,400	532,608,000	$7,297
Lab Hot Water	91.2	40	120	3648000	350.4	1,278,259,200	1,597,824,000	$21,890
Subtotal						**10,742,988,936**	**12,173,369,040**	**$166,775**

Notes

1. Assuming a Hot Water System efficiency of 90%.
2. Based on $1.37 / Therm.

2.3.5 Electrical Systems

General

During the week of October 6 & 7, 2008 team members from HDR Architecture performed a brief engineering survey of the existing electrical system supporting the Washington State Public Health Laboratory, in Shoreline, Washington. The site survey provided a brief inspection of the Normal Utility Power and Emergency Generator Power Systems.

Normal Utility Power

Based on the record information provided by the State Public Health Lab, the existing utility service transformer is rated at 1500 KVA which is feeding a 2500A, 480/277V 3 Phase, 4W main switchboard. The Lab building service is being fed from two main 4.16 KV utility service feeders (N2A and N5) via a pad mounted 200A selector switch. Feeder N2A (3#2/0 & 1#2N) is originated from the East Service Substation located at the Steam Plant Building 28. Feeder N5 (3#4/0 & 1#1/0) is connected to the North Utility Unit Substation which located at the north-west end of the campus adjacent to 15th Ave. The North Utility Unit Substation is owned by the Fircrest Utility (Seattle City Light).

East Service Power Substation & Feeder N2A:
As discussed during the site visit meeting, feeder N2A from the East Service Power Substation will be disconnected and the pad mounted selector switch will be demolished and removed. The construction will began by the end of January 2009 and the electrical service power for the Lab building will be only supplied by the existing feeder N5 from the North Utility Substation.

North Utility Substation & Feeder N5:
Based on the Public Health Lab project information, feeder N5 from the North Utility Substation will be re-routed to avoid a future project construction conflict. New underground conduits and manholes will be provided. The construction will begin by the end of January 2009 and feeder N5 will be connected directly to the existing 1500 KVA service transformer.

Emergency Generator Power
The existing emergency generator is rated at 1250 KW to provide back up dedicated power for the Lab building. The generator is visually in excellent condition.

Electrical System Observations
Observations with the facility power systems include the following;

Normal Utility Power
Based on discussions during the site visit and the information provided by the Washington State Public Health Lab, (WSPHL), the highest recorded demand in 2007 at the main switchboard was approximately 700 KW which is within the installed 1500 kVA service transformer capacity.

From the discussion with Mr. Ian Cooper of Seattle City Light (206-386 9734), the North Utility Substation is owned and maintained by WSPHL. Seattle City Light does maintain the 26 kV to 5 kV transformer, the primary voltage feeder and the metering. Everything beyond the metering section is the responsibility of WSPHL. This system was designed and installed to feed the Fircrest School Campus as the facility was known at that time.

Seattle City Light has a policy of one service to one site and standardizing the service at 26 kV system. A separate feed to the State Public Health Lab at 26KV would not be possible unless a plan was developed by WSPHL to convert all the existing Fircrest buildings to the new 26KV system. As this is not feasible, the PHL will need to establish a plan to obtain a separate high voltage service to the WSPHL designated site.

The existing facility peak load is approximately 12W/sf, based on the 700 KW peak recorded load of 2007 from WSPHL. The estimated required power service for the new Public Health Lab project will be about 2000 kVA after demolition of existing spaces with the new expansion,

2.3 | Utility Infrastructure

Assuming that a separate service can be obtained, it is anticipated that two pad mounted transformers would be utilized to serve the proposed Public Health Laboratory expansion project. A new 1500 KVA transformer would serve the Lab Building, while a 500 KVA transformer would serve the new Office Building. Primary service would be obtained from the local electric utility company at a voltage of 26 KV. Secondary voltage supply to each building would be at 480 volts. A graphic representation of the proposed distribution is included at the end of this section. The existing 1500 KVA transformer, fed from the existing 4160 volt primary service, will need to remain in service until the new high voltage system is energized. Associated construction costs for this system have been estimated assuming that WSPHL would be required to fund on-site distribution and would own both transformers. d Further engineering study, detailed analysis and coordination with the electric utility company will be required to determine the best option to supply the facility from the existing electric utility power distribution system off-site.

Emergency Generator Power

The existing 1250 KW emergency generator is connected directly to the Lab building main switchboard to provide 100% dedicated back up service capacity. However, a further system analysis will be required in order to determine the back up power system adequacy for the future facility modification / addition project.

2.3.6 Telecommunications System

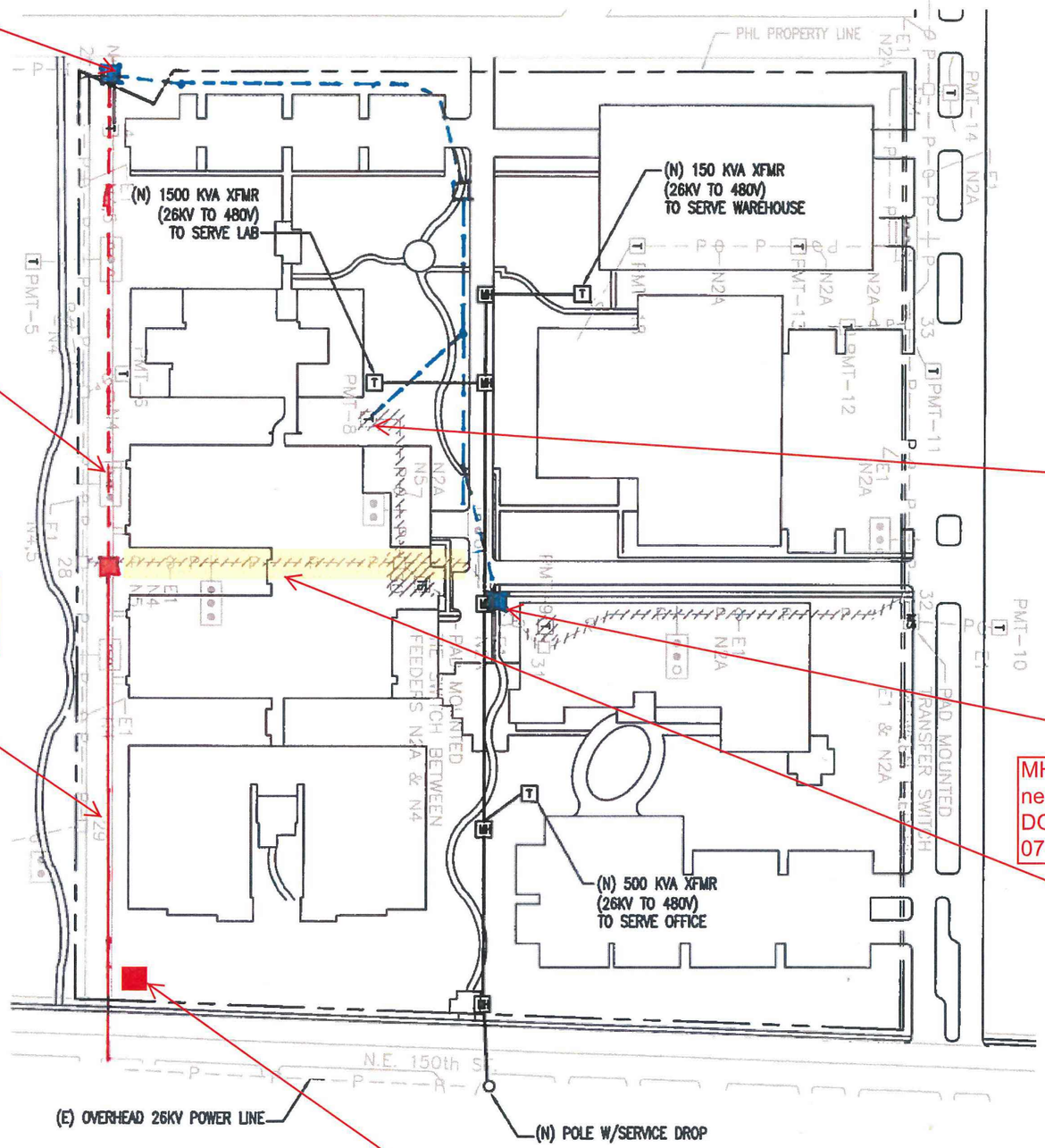
General

Telephone service is managed independently from Fircrest and no change is anticipated or recommended.

MH 26 - Start of new existing E1 and N5 feeders around DOH site. Installed in 07-09

New feeder in existing ductbank. To be installed 15-17.

New feeder in new ductbank. To be installed in 15-17



PMT8 - Termination of N5 feeder around DOH site. New Transformer to be installed in 15-17

MH 31 - Termination of new E1 Feeder around DOH site. Installed in 07-09.

E1 & N5 cable removed and rerouted around north and east side of existing DOH site. Removed in 07-09

New Utility Substation - connect to service drop. To be installed in 15-17.

LEGEND

———	PROPOSED EELCTRICAL SERVICE DUCT (BY PSE) SEATTLE CITY
– – –	EX ELECTRICAL SERVICE LIGHT
//////	EX ELECTRICAL SERVICE TO BE REMOVED
MH	NEW MANHOLE
T	TRANSFORMER (XFMR)
(N)	NEW
(E)	EXISTING

NOTES

1. ELECTRICAL SERVICE PLAN TO BE CONFIRMED WITH SEATTLE CITY LIGHT.

HDR

HDR Architecture, Inc.

STATE OF WASHINGTON
PUBLIC HEALTH
LABORATORIES

SHORELINE, WASHINGTON

MARK	DATE	DESCRIPTION

PROJECT NUMBER	93950
PROJECT MANAGER	–
PROJECT ARCHITECT	–
DESIGN	–
CIVIL	–
STRUCTURAL	–
MECHANICAL	B. JOHNSON
ELECTRICAL	V. LAU
INTERIORS	–
EQUIPMENT	–
DRAWN BY	R. MENESES

N

100 0 100

SCALE: 1" = 100'

PHL MASTER PLAN CONCEPTUAL ELECTRICAL IMPROVEMENT

SCALE 1" = 100'-0"

FIGURE 1.1

April 2010