

11.0 ELECTRICAL BREADTH: POWER REQUIREMENTS FOR MECHANICAL REDESIGN

The replacement of many electric driven pieces of mechanical equipment with direct fired equipment changes the power requirements for the Milton Hershey School New Supply Center. The air handling units that are replaced with DOAS units also are removed from the electrical panels.

The main distribution panel (MDP) and four other distribution panels are affected by the mechanical work, and the motor control center, which included the electrical requirements for the boilers and chillers is also affected. Added to the distribution panels are the fans for the DOAS units as well as a new panel board that includes the water source heat pumps. The new water source heat pump panel is a 3 phase 480/277V panels that is branched off of one of the 480/277V distribution panels.

The changes of the electrical requirements result in more initial cost savings. Main feeder sizes are reduced from a lesser load on the distribution panels which saves in cost. The circuit breakers for the distribution panels also are smaller in certain cases. Appendix C illustrates all original distribution panels with the loads being removed highlighted. The appendix then shows the adjusted panels with the new calculated loads, wire sizes, and circuit breaker sizes. A side note on the MDP, the total KVA shown appears too high for its wire and circuit breaker size. This is because part of the MDP's load is handled by a diesel generator with its own circuit breaker.

Table 11-1 illustrates the cost of adding the new equipment (WSHPs and DOAS units) and table 11-2 indicates the cost savings created from removing the existing electric driven mechanical equipment.

Table 11-1 Additional Electrical Wiring Cost

ADD ON	Cost per 100 LF	Length (ft)	Total Cost \$
(3) #10 & 1#10 GD	229	20	45
(4) # 350 kcmil	2650	65	1722
(3) #6 1#8 GD	379	60	227
(4) #400 kcmil	3000	65	1950
(3) #10 1#10	229	20	45
3 sets of (4) #300 kcmil	9000	15	1350
3#10 & 1#10 GRD	229	30	68
3#12 & 1#12 GRD	137	30	41
3#12 & 1#12 GRD	137	30	41
3#12 & 1#12 GRD	137	30	41
		Total	\$5,534

Table 11-2 Electrical Wiring Cost Savings

TAKE OFF	Cost per 100 LF	Length (ft)	Total Cost
(3) #8 & 1#10 GD	318	20	\$64
(3) #8 1#10 GD	318	20	\$64
(3) #10 1#10 GD	229	20	\$46
(3) #10 1#10 GD	229	20	\$46
(3) #12 1#12 GD	137	20	\$27
(3) #10 1#10 GD	229	20	\$46
(3) #10 1#10 GD	229	20	\$46
(3) #8 1#8 GD	385	20	\$77
(3) #10 1#10 GD	229	20	\$46
(3) #8 & 1#10 GD	318	20	\$64
(4) #500 kcmil	3625	65	\$2,356
(4) #500 kcmil	3625	65	\$2,356
(3) #12 1#12 GD	137	20	\$27
(3) #12 1#12 GD	137	20	\$27
(3) #8 1#10	318	20	\$64
(3) #10 1#10	229	20	\$46
3 sets of (4) #500 kcmil	10875	15	\$1,631
3#10 & 1#10 GRD	229	30	\$69
3#12 & 1#12 GRD	137	30	\$41
3#10 & 1#10 GRD	229	30	\$69
3#12 & 1#12 GRD	137	30	\$41
3#10 & 1#10 GRD	229	30	\$69
3#12 & 1#12 GRD	137	30	\$41
3 # 400kCMIL & 1#3 GRD	2400	30	\$720
3 # 400kCMIL & 1#3 GRD	2400	30	\$720
3 #2 & 1 #6 GRD	647	30	\$194
3 #2 & 1 #6 GRD	647	30	\$194
		Total	\$9,189

The total cost savings on the electrical side of the project from the mechanical system redesign is approximately \$3,600. The mechanical system redesign proves to integrate and affect most building systems at the supply center. However, after analyzing the structural system, electrical system, the construction process, and all forms of the mechanical system, the overall project sees cost savings in all categories.