

Construction Management Breadth**Introduction**

The construction management breadth is a cost analysis of the existing electrical system versus the redesigned portions of the electrical system. The cost analysis will include the following: central transformer versus distributed transformers and feeders running to each floor versus a main bus duct to the penthouse.

Cost Analysis – Distributed vs. Central Transformers

The cost analysis is part of the construction management breadth; however, it is included in the tables below. The cost analysis is based on THWN copper wire rated at 75°C, IMC conduit, a maximum of 500 kCmil Wire, and a minimum of ¾" conduit. As you can see by the tables below, the cost of the distributed transformer system is \$215,987, while the central transformer system is \$240,107.

Distributed Transformer Estimate				
Item	Quantity	Units	Cost (Inc. O&P)	Total Cost
Transformers				
150 kVA D-Type, K-13 Rated	5.0	EA	16900.00	84,500.00
Copper Feeders (THWN)				
#4 AWG, Stranded	10.3	CLF	229.00	2,347.25
Size 1/0, Stranded	5.5	CLF	450.00	2,466.00
250 kCmil, Stranded	30.8	CLF	925.00	28,443.75
500 kCmil, Stranded	27.4	CLF	1625.00	44,525.00
Conduit (IMC)				
2-1/2"	1025.0	LF	27.00	27,675.00
4"	548.0	LF	47.50	26,030.00
TOTAL				\$215,987.00
Remarks	Based on Copper Wire, 75°C, THWN insulation IMC Conduit Maximum 500kCmil Wire Minimum ¾" Conduit 100% Neutral			

Table 40: Distributed Transformer Estimate

Central Transformer Estimate				
Item	Quantity	Units	Cost (Inc. O&P)	Total Cost
Transformers				
1000 kVA D-Type Transformer	1.0	EA	43200.00	43,200.00
Copper Feeders (THWN)				
#4 AWG, Stranded	0.9	CLF	229.00	201.52
Size 1/0, Stranded	13.4	CLF	450.00	6,021.00
250 kCmil, Stranded	2.6	CLF	925.00	2,442.00
500 kCmil, Stranded	66.9	CLF	1625.00	108,712.50
Distribution Panelboards				
4-Wire, 120/208V, 3000 Amp	1.0	EA	15975.00	15,975.00
Conduit (IMC)				
2-1/2"	88.0	LF	27.00	
4"	1338.0	LF	47.50	63,555.00
TOTAL				\$240,107.02
Remarks:	Based on Copper Wire, 75°C, THWN insulation IMC Conduit Maximum 500kCmil Wire Minimum ¾" Conduit 100% Neutral			

Table 41: Central Transformer Estimate

Conclusion

Overall, the central transformer system is not recommended due to the overall cost. The central transformer is 106% the cost of the five distributed transformers. The central transformer will save on square footage for the space, but the transformer cost is higher than the five distributed transformers. The recommendation is to keep the original design with the distributed transformers.

Cost Analysis – Feeders vs. Busduct

The cost analysis is part of the construction management breadth; however, it is included in the tables below. The cost analysis is based on THWN copper wire rated at 75°C, IMC conduit, a maximum of 500 kCmil Wire, and a minimum of 3/4" conduit. As you can see by the tables below, the cost of the system with only feeders is \$59,606, while the cost of the system with the busduct is \$55,098.

Feeder Estimate				
Item	Quantity	Units	Cost (Inc. O&P)	Total Cost
Copper Feeders (THWN)				
#4 AWG, Stranded	10.5	CLF	229.00	2,393.05
250 kCmil, Stranded	31.4	CLF	925.00	28,998.75
Conduit (IMC)				
2-1/2"	1045.0	LF	27.00	28,215.00
TOTAL				\$59,606.80
Remarks	Based on Copper Wire, 75°C, THWN insulation IMC Conduit Maximum 500kCmil Wire Minimum 3/4" Conduit 100% Neutral			

Table 42: Feeder Estimate

Busway Estimate				
Item	Quantity	Units	Cost (Inc. O&P)	Total Cost
Indoor/Plug-in Busduct				
Copper Busduct - 600A	220.0	LF	210.00	46,200.00
Feeders				
#4 AWG	1.6	CLF	229.00	357.24
250 kCmil	4.7	CLF	925.00	4,329.00
Conduit (IMC)				
2-1/2"	156.00	LF	27.00	4,212.00
TOTAL				\$55,098.24
Remarks:	Based on Copper Wire, 75°C, THWN insulation IMC Conduit Maximum 500kCmil Wire Minimum 3/4" Conduit 100% Neutral			

Table 43: Central Transformer Estimate

Conclusion

Overall, the busduct is recommended due to the overall cost. The busduct is 92% the cost of the individual feeders. The feeder system used 1045' of (3) 250 kCmil & (1) #4G in 2-1/2" conduit. This equates to \$59,606 for the system. The busduct system used 220' of vertical copper 600 A busduct and 156' of (3) 250 kCmil & (1) #4G in 2-1/2" conduit. This equates to \$55,098 for the system. The recommendation is to switch to the busduct system instead of the individual feeders.