IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.1. SYSTEM DESCRIPTIONS

Project:	**Date:**
Location:	

By: (Engineer's Name and Title)

Base System:

Alternate #1:

Alternate #2:

Alternate #3:

Alternate #4:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.2. UTILITY COST DATA

ENERGY TYPE	COST	ESCALATION RATE
Electric Energy Charge	$ Per KWH (Winter) $ Per KWH (Summer)	
Electric Demand Charge	$ Per KWH (Winter) $ Per KWH (Summer)	
Steam Energy Charge	$ Per MLB (Winter) $ Per MLB (Summer)	
Steam Demand Charge	$ Per MLB (Winter) $ Per MLB (Summer)	
Gas	$ Per MCF or Therm	
Fuel Oil	$ Per Gallon	
Others	$ Per Unit	
Electric Energy Charge		

Utility Summer Rate Months: (from) (to)
Utility Winter Rate Months: (from) (to)
LCCA Term (Typically 30 Years):
Discount Rate:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.3. INITAL COST ESTIMATE – BASE SYSTEM

a. HVAC MAJOR EQUIPMENT

ITEM	QTY UNITS	CAPACITY	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Chillers		Tons				
2. Cooling Towers		Tons				
3. HT. Exchangers		GPM MBH				
4. Pumps		GPM TH HP				
5. A.H.U.		CFM CMBH HMBH HP				
6. Supply Fans		CFM HP				
8. Return Fans		CFM HP				
9. Exhaust Fans		CFM HP				
10. Other Fans		CFM HP				
11. Terminal Units		CFM				
12. Misc Equip.		MBH CFM HP				
13. Fuel Oil w/ Leak Detection.		Gal.				
14. ATC						

Base System HVAC Major Equipment Sub Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

b. HVAC MATERIAL

ITEM	QTY	UNITS OF MEASURE	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Supply / Return Ductwork, complete including diffusers, grilles, dampers, insulation etc						
2. General Exhaust Ductwork, complete including diffusers, grilles, dampers, insulation etc						
3. Special Exhaust Systems						
4. Heating Piping (HS, HR)		FEET				
5. Chilled Piping (CHS, CHR)		FEET				
6. Condenser Water Piping (CWS, CWR)		FEET				
8. Steam Piping (MP, LP)		FEET				
9. Steam Condensate Piping (MP, LP)		FEET				

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

b. HVAC MATERIAL (Continued)

ITEM	QTY	UNITS OF MEASURE	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
10. Natural Gas Piping (Non - Lab)		FEET				
11. Pipe Insulation						

Base System HVAC Material Sub Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

c. PLUMBING MAJOR EQUIPMENT

ITEM	QTY UNITS	CAPACITY	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Domestic Water Heaters and Storage Tank		Storage in Gal. Recovery GPH MBH				
2. Circulating Pumps		GPM TH HP				
3. Sump Pumps		GPM TH HP				
4. Sewage Ejectors		GPM TH HP				
3. RO/DI Water Equipment						

Base System Plumbing Major Equipment Sub Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

d. PLUMBING MATERIAL

ITEM	QTY	UNITS OF MEASURE	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Domestic Water Piping with Insulation (CW, HW, HWR)		FEET				
2. Sanitary & Vent (Non – Lab Above Grade)						
3. Sanitary & Vent (Lab – Acid Waste Above Grade)						
4. Storm Water (Above Grade)						
5. Lab Support Piping – Air, Vac, Natural Gas						
6. RO / DI Piping System						
7. Sprinkler System, Complete						

Base System Plumbing Material Sub Total:

Base System Mechanical Installation Initial Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.4. INITAL COST ESTIMATE – ALTERNATE SYSTEM

a. HVAC MAJOR EQUIPMENT

ITEM	QTY UNITS	CAPACITY	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Chillers		Tons				
2. Cooling Towers		Tons				
3. HT. Exchangers		GPM MBH				
4. Pumps		GPM TH HP				
5. A.H.U.		CFM CMBH HMBH HP				
6. Supply Fans		CFM HP				
8. Return Fans		CFM HP				
9. Exhaust Fans		CFM HP				
10. Other Fans		CFM HP				
11. Terminal Units		CFM				
12. Misc Equip.		MBH CFM HP				
13. Fuel Oil w/ Leak Detection.		Gal.				
14. ATC						

Alternate System HVAC Major Equipment Sub Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

b. HVAC MATERIAL

ITEM	QTY	UNITS OF MEASURE	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Supply / Return Ductwork, complete including diffusers, grilles, dampers, insulation etc						
2. General Exhaust Ductwork, complete including diffusers, grilles, dampers, insulation etc						
3. Special Exhaust Systems						
4. Heating Piping (HS, HR)		FEET				
5. Chilled Piping (CHS, CHR)		FEET				
6. Condenser Water Piping (CWS, CWR)		FEET				
8. Steam Piping (MP, LP)		FEET				
9. Steam Condensate Piping (MP, LP)		FEET				

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

b. HVAC MATERIAL (Continued)

ITEM	QTY	UNITS OF MEASURE	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
10. Natural Gas Piping (Non - Lab)		FEET				
11. Pipe Insulation						

Alternate System HVAC Material Sub Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

c. PLUMBING MAJOR EQUIPMENT

ITEM	QTY UNITS	CAPACITY	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Domestic Water Heaters and Storage Tank		Storage in Gal. Recovery GPH MBH				
2. Circulating Pumps		GPM TH HP				
3. Sump Pumps		GPM TH HP				
4. Sewage Ejectors		GPM TH HP				
3. RO/DI Water Equipment						

Alternate System Plumbing Major Equipment Sub Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

d. PLUMBING MATERIAL

ITEM	QTY	UNITS OF MEASURE	UNIT PRICE MATERIAL	UNIT PRICE LABOR	TOTAL PRICE MATERIAL	TOTAL PRICE LABOR
1. Domestic Water Piping with Insulation (CW, HW, HWR)		FEET				
2. Sanitary & Vent (Non – Lab Above Grade)						
3. Sanitary & Vent (Lab – Acid Waste Above Grade)						
4. Storm Water (Above Grade)						
5. Lab Support Piping – Air, Vac, Natural Gas						
6. RO / DI Piping System						
7. Sprinkler System, Complete						

Alternate System Plumbing Material Sub Total:

Alternate System Mechanical Installation Initial Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.5. ANNUAL COST – BASE SYSTEM

a. ENERGY (Excluding Lights & Receptacles)

ENERGY SOURCE	UNITS OF MEASURE	ANNUAL ENERGY CONSUMPTION	ENERGY COST	DEMAND CHARGE	TOTAL ANNUAL ENERGY COST
1. Electric (Winter)					
2. Electric (Summer)					
3. Gas (Winter)					
4. Gas (Summer)					
5. Steam (Winter)					
6. Steam (Summer)					
7. Fuel Oil					
8. Others					

Base System Annual Energy Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

b. SERVICE AND MAINTENANCE COST

MAJOR EQUIPMENT	ANNUAL SERVICE COST	ANNUAL MAINTENANCE COST	TOTAL SERVICE & MAINTENANCE COST
1. Chillers			
2. Cooling Towers			
3. Heat Exchangers			
4. Pumps			
5. Air Handling Units			
6. Supply Fans			
7. Return Fans			
8. Exhaust Fans			
9. Terminal Units			
10. Domestic Water Heaters			
11. RO / DI Equipment			
12. Exhaust Fans			
13. ATC			
14. Misc. Equipment			

Base System Service and Maintenance Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.6. SYSTEM REPLACEMENT COST – BASE SYSTEM

PRESENT VALUE OF EQUIPMENT REPLACEMENT COST				
Major Equipment	**Useful Life**	**Replacement Cost In Current Dollars (RC)**	**Present Worth Factor (PWF)**	**Present Value (PV) of Replacement Cost PWF x RC**

Base System Present Value of Equipment Replacement Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.7. ANNUAL COST – ALTERNATE

a. ENERGY (Excluding Lights & Receptacles)

ENERGY SOURCE	UNITS OF MEASURE	ANNUAL ENERGY CONSUMPTION	ENERGY COST	DEMAND CHARGE	TOTAL ANNUAL ENERGY COST
1. Electric (Winter)					
2. Electric (Summer)					
3. Gas (Winter)					
4. Gas (Summer)					
5. Steam (Winter)					
6. Steam (Summer)					
7. Fuel Oil					
8. Others					

Alternate System Annual Energy Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

b. SERVICE AND MAINTENANCE COST

MAJOR EQUIPMENT	ANNUAL SERVICE COST	ANNUAL MAINTENANCE COST	TOTAL SERVICE & MAINTENANCE COST
1. Chillers			
2. Cooling Towers			
3. Heat Exchangers			
4. Pumps			
5. Air Handling Units			
6. Supply Fans			
7. Return Fans			
8. Exhaust Fans			
9. Terminal Units			
10. Domestic Water Heaters			
11. RO / DI Equipment			
12. Exhaust Fans			
13. ATC			
14. Misc. Equipment			

Alternate System Service and Maintenance Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.8. SYSTEM REPLACEMENT COST – ALTERNATE

PRESENT VALUE OF EQUIPMENT REPLACEMENT COST				
Major Equipment	**Useful Life**	**Replacement Cost In Current Dollars (RC)**	**Present Worth Factor (PWF)**	**Present Value (PV) of Replacement Cost PWF x RC**

Alternate System Present Value of Equipment Replacement Cost Total:

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.9. SUMMARY - LCCA

PROJECT: **DATE:**

COSTS	**BASE SYSTEM**	**ALTERNATIVE #1**	**ALTERNATIVE #2**
1. Mechanical Installation Initial Cost Total			
2. Incremental Cost For Architectural Components (+ / - over base system)	N / A		
3. Incremental Cost For Structural Components (+ / - over base system)	N / A		
4. Incremental Cost For Electrical Components (+ / - over base system)	N / A		
Total Initial Cost			
Annual Energy Cost			
Annual Service Cost			
Annual Routine Maintenance Cost			
Total Annual Cost			
Present Value (PV) of Total Annual Cost (Total Annual Cost x PW Factor)			
Present Value of Equipment Replacement Cost			
Total Life Cycle Cost (Total Initial Cost + PV of Total Annual Cost + PV of Equipment Replacement Cost)			

IMPLEMENTATION OF LIFE CYCLE COST ANALYSIS

1.10. SUMMARY - LCCA (Continued)

PROJECT: **DATE:**

COSTS	BASE SYSTEM	ALTERNATIVE #3	ALTERNATIVE #4
1. Mechanical Installation Initial Cost Total			
2. Incremental Cost For Architectural Components (+ / - over base system)	N / A		
3. Incremental Cost For Structural Components (+ / - over base system)	N / A		
4. Incremental Cost For Electrical Components (+ / - over base system)	N / A		
Total Initial Cost			
Annual Energy Cost			
Annual Service Cost			
Annual Routine Maintenance Cost			
Total Annual Cost			
Present Value (PV) of Total Annual Cost (Total Annual Cost x PW Factor)			
Present Value of Equipment Replacement Cost			
Total Life Cycle Cost (Total Initial Cost + PV of Total Annual Cost + PV of Equipment Replacement Cost)			

Recommended System: