

APPENDIX

- Life Cycle Analysis
- Preliminary Design Program, dated April 1, 2011 (CD attached)
- Revised Comparative Options Value Analysis (revised April 29, 2011)
- MSBA FAS/ PDP Meeting Presentation dated May 11, 2011
- Letter and Exhibits sent to MSBA on May 18, 2011
- Exhibits sent to MSBA on June 2, 2011

**ENGINEERING ECONOMIC ANALYSIS
FOR
Concord Carlisle Regional High School**

Concord, MA

June 16, 2011

Prepared for: **Concord Carlisle Regional High School**



Prepared by:



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Consulting Engineer, Inc.

EXECUTIVE SUMMARY

Section 1.0: Executive Summary

The goal of the mechanical lifecycle engineering economic analysis is to assess the performance of various mechanical systems in comparison to a baseline mechanical system.

Each option is compared to the baseline system to determine the lowest combined savings over a 25 year cycle to determine the most advantageous system considering electrical costs, gas costs, maintenance costs, and initial construction costs.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year round temperature control and comfort at a possible marginal increase in capital cost.

As the project is currently deciding between two building orientation options (Orientation 6R2 and 14B), the mechanical system analysis is performed for both building options to demonstrate the energy consumption impacts of building orientations as well.

Section 1.1: Mechanical System Analysis

1.1.A: Baseline Mechanical System – Unit Ventilator System

- Chilled/hot water coil classroom unit ventilators serving the academic and support areas
- Exhaust fans and ductwork for classroom unit ventilator ventilation
- Hot water coil heating/direct expansion cooling roof mounted air handling units with variable air volume boxes with hot water reheat coils serving the administration areas
- Constant volume single-zone hot water coil heating/direct expansion cooling roof mounted air handling unit serving the auditorium and stage
- Hot water coil heating/direct expansion cooling roof mounted air handling unit with variable air volume boxes with hot water reheat coils serving the fitness room
- Constant volume single-zone hot water coil heating/direct expansion cooling roof mounted air handling units serving the cafeteria, CCTV studio, gymnasiums, radio studio, and music areas
- Hot water coil heating and ventilating unit serving the locker rooms
- Limited use of fin-tube radiation and unit heaters
- (2) 1,500 MBH standard-efficiency gas-fired boiler power plant located in the Gym Building mechanical room, (2) 1,500 MBH standard-efficiency gas-fired boiler power plant located in the Building A mechanical room, and (2) 2,500 MBH standard-efficiency gas-fired boiler power plant located in the New Addition Building mechanical room (Orientation 6R2)
- (4) 2,500 MBH standard-efficiency gas-fired boiler power plant serving the main building and (2) 450 MBH standard-efficiency gas-fired boiler power plant serving the renovated gymnasium (Orientation 14B)
- (2) 250 ton high-efficiency water-cooled chiller power plant

- Chilled and hot water primary pumping with variable frequency drives
- Direct digital controls throughout

1.1.B: Mechanical System Option One – Unit Ventilator System with Demand Ventilation

- Chilled/hot water coil classroom unit ventilators with demand control ventilation serving the academic and support areas
- Exhaust fans and ductwork for classroom unit ventilator ventilation
- Hot water coil heating/direct expansion cooling roof mounted air handling units with variable air volume boxes with hot water reheat coils with demand control ventilation serving the administration areas
- Constant volume single-zone hot water coil heating/direct expansion cooling roof mounted air handling unit with demand control ventilation serving the auditorium and stage
- Hot water coil heating/direct expansion cooling roof mounted air handling unit with variable air volume boxes with hot water reheat coils with demand control ventilation serving the fitness room
- Constant volume single-zone hot water coil heating/direct expansion cooling roof mounted air handling units with demand control ventilation serving the cafeteria, CCTV studio, gymnasiums, radio studio, and music areas
- Hot water coil heating and ventilating unit serving the locker rooms
- Limited use of fintube radiation and unit heaters
- (2) 1,500 MBH standard-efficiency gas-fired boiler power plant located in the Gym Building mechanical room, (2) 1,500 MBH standard-efficiency gas-fired boiler power plant located in the Building A mechanical room, and (2) 2,500 MBH standard-efficiency gas-fired boiler power plant located in the New Addition Building mechanical room (Orientation 6R2)
- (4) 2,500 MBH standard-efficiency gas-fired boiler power plant serving the main building and (2) 450 MBH standard-efficiency gas-fired boiler power plant serving the renovated gymnasium (Orientation 14B)
- (2) 250 ton high-efficiency water-cooled chiller power plant
- Chilled and hot water primary pumping with variable frequency drives
- Direct digital controls throughout

1.1.C: Mechanical System Option Two – Four-Pipe Fan Coil Unit System

- Multiple four-pipe two coil heating and cooling fan coil units, 100% recirculation air serving the academic and support areas

- Supply ductwork on discharge of fan coil units
- 100% outside air hot water coil heating/direct expansion cooling rooftop units with energy recovery wheels providing ventilation to the academic and support areas
- Primary air ducted directly to fan coil units
- Overhead fiberglass insulated ventilation distribution system feeding each fan coil unit
- Hot water coil heating/direct expansion cooling roof mounted air handling units with variable air volume boxes with hot water reheat coils with demand control ventilation serving the administration areas
- Constant volume single-zone hot water coil heating/direct expansion cooling roof mounted air handling unit with demand control ventilation serving the auditorium and stage
- Hot water coil heating/direct expansion cooling roof mounted air handling unit with variable air volume boxes with hot water reheat coils with demand control ventilation serving the fitness room
- Constant volume single-zone hot water coil heating/direct expansion cooling roof mounted air handling units with demand control ventilation serving the cafeteria, CCTV studio, gymnasiums, radio studio, and music areas
- Hot water coil heating and ventilating unit serving the locker rooms
- Limited use of fintube radiation and unit heaters
- (2) 1,500 MBH standard-efficiency gas-fired boiler power plant located in the Gym Building mechanical room, (2) 1,500 MBH standard-efficiency gas-fired boiler power plant located in the Building A mechanical room, and (2) 2,500 MBH standard-efficiency gas-fired boiler power plant located in the New Addition Building mechanical room (Orientation 6R2)
- (4) 2,500 MBH standard-efficiency gas-fired boiler power plant serving the main building and (2) 450 MBH standard-efficiency gas-fired boiler power plant serving the renovated gymnasium (Orientation 14B)
- (2) 250 ton high-efficiency water-cooled chiller power plant
- Chilled and hot water primary pumping with variable frequency drives
- Direct digital controls throughout

1.1.D: Mechanical System Option Three – Displacement Ventilation System

- Multiple low wall-mounted displacement diffusers at approximately 300-350 CFM (2 per classroom, 1 per support area) each for each academic and support area
- Dedicated overhead galvanized ventilation distribution system feeding each displacement diffuser

- 100% outside air hot water coil heating/chilled water coil cooling air handling units with energy recovery wheels with variable air volume boxes with demand control ventilation providing ventilation to the academic and support areas
- Wall-mounted fintube radiation located along exterior wall between displacement diffusers
- Hot water coil heating/chilled water coil cooling air handling units with variable air volume boxes with hot water reheat coils with demand control ventilation serving the administration areas
- Constant volume single-zone hot water coil heating/chilled water coil cooling air handling unit with demand control ventilation serving the auditorium and stage
- Hot water coil heating/chilled water coil cooling air handling unit with variable air volume boxes with hot water reheat coils with demand control ventilation serving the fitness room
- Constant volume single-zone hot water coil heating/chilled water coil cooling air handling units with demand control ventilation serving the cafeteria, CCTV studio, gymnasiums, radio studio, and music areas
- 100% outside air hot water coil heating energy recovery unit serving the locker rooms
- Limited use of fintube radiation and unit heaters
- (2) 1,500 MBH high-efficiency gas-fired condensing boiler power plant located in the Gym Building mechanical room, (2) 1,500 MBH high-efficiency gas-fired condensing boiler power plant located in the Building A mechanical room, and (2) 2,500 MBH high-efficiency gas-fired condensing boiler power plant located in the New Addition Building mechanical room (Orientation 6R2)
- (4) 2,500 MBH high-efficiency gas-fired condensing boiler power plant serving the main building and (2) 450 MBH high-efficiency gas-fired condensing boiler power plant serving the renovated gymnasium (Orientation 14B)
- (2) 250 ton high-efficiency water-cooled chiller power plant
- Chilled and hot water primary pumping with variable frequency drives
- Direct digital controls throughout

Section 1.2: Mechanical System Analysis Conclusion

The chilled/hot water coil classroom unit ventilator system is selected as the baseline system as it results in a low installed cost system and reflects code standard efficiencies. Unfortunately, the selection results in overall ownership costs that in some cases are higher as compared to the alternative systems primarily relating to the increased annual operating costs while also compromising the thermal comfort of the building. The option comparison of each alternative system to the baseline assesses the benefits of improved systems with potentially reduced combined operating costs and improved thermal comfort with the goal of selecting the system with the highest ownership savings over the 25 year study period.

Annual electrical and gas consumption is calculated thru the results of a thermal dynamic heat transfer analysis utilizing Department of Energy (DOE-2)/eQuest software with all architectural data provided by The Office of Michael Rosenfeld Architects.

Utility cost data for electricity was obtained from the town and gas rates were obtained from published data by the local gas provider.

The "Building Life-Cycle" analysis included future worth of each system option considered using standard industry discount, inflation, and interest rates.

Our observations of the Mechanical System Payback Summary suggest that option four, a displacement ventilation system, represents the most cost effective solution for both building orientations 6R2 and 14B by yielding an approximate \$1,359,497 (Orientation 6R2) / \$1,329,020 (Orientation 14B) savings over the 25 year study period with an instant payback by having the lowest installed cost.



BUILDING ORIENTATION 6R2 - MECHANICAL SYSTEM PAYBACK SUMMARY

| Baseline | System | GROSS CAPITAL INVESTMENT* | ANNUAL ELEC. CONS. (KWH) | ANNUAL GAS CONS. (MBTU) | ANNUAL ELECTRIC COST | ANNUAL GAS COST | COMBINED UTILITY COST | ANNUAL UTILITY \$/S.F. | ANNUAL MAINT. COST | COMBINED ANNUAL EXPENSE | COMBINED EXPENSE SAVINGS** | TOTAL LIFE-CYCLE SAVINGS*** | SIMPLE PAYBACK (YEARS)**** |
|----------|---|---------------------------|--------------------------|-------------------------|----------------------|-----------------|-----------------------|------------------------|--------------------|-------------------------|----------------------------|-----------------------------|----------------------------|
| - | 1. Classroom chilled/hot water coil unit ventilators 2. Hot water coil heating/dx cooling RTU's with terminal VAV's with hot water reheat coils 3. Standard efficiency cast-iron gas-fired boilers 4. Standard-efficiency water cooled chiller | \$8,691,500 | 1,735,400 | 6,539.9 | \$182,217 | \$91,185 | \$273,402 | \$0.91 | \$40,750 | \$314,152 | - | - | - |

| Option | System | GROSS CAPITAL INVESTMENT* | ANNUAL ELEC. CONS. (KWH) | ANNUAL GAS CONS. (MBTU) | ANNUAL ELECTRIC COST | ANNUAL GAS COST | COMBINED UTILITY COST | ANNUAL UTILITY \$/S.F. | ANNUAL MAINT. COST | COMBINED ANNUAL EXPENSE | COMBINED EXPENSE SAVINGS** | TOTAL LIFE-CYCLE SAVINGS*** | SIMPLE PAYBACK (YEARS)**** |
|--------|---|---------------------------|--------------------------|-------------------------|----------------------|-----------------|-----------------------|------------------------|--------------------|-------------------------|----------------------------|-----------------------------|----------------------------|
| 1 | 1. Classroom chilled/hot water coil unit ventilators with demand ventilation 2. Hot water coil heating/dx cooling RTU's with terminal VAV's with hot water reheat coils with demand ventilation 3. Standard efficiency cast-iron gas-fired boilers 4. Standard-efficiency water cooled chiller | \$8,846,300 | 1,742,900 | 5,489.3 | \$183,001 | \$76,537 | \$259,538 | \$0.86 | \$40,750 | \$300,288 | \$13,864 | \$90,174 | 11 |
| 2 | 1. Hot/chilled water fan coil units 2. Hot water coil heating/dx cooling 100% O.A. ventilating units with energy recovery 3. Hot water coil heating/dx cooling RTU with terminal VAV's with hot water reheat coils 4. Standard efficiency cast-iron gas-fired boilers 5. Standard-efficiency water cooled chiller | \$9,318,900 | 1,780,900 | 4,688.9 | \$186,995 | \$65,378 | \$252,373 | \$0.84 | \$46,750 | \$299,123 | \$15,029 | -\$357,487 | N/A***** |
| 3 | 1. Displacement ventilation diffusers with terminal VAV's and perimeter hot water radiant panels 2. Hot water coil heating/chilled water coil cooling 100% O.A. ventilating units with energy recovery 3. Hot water coil heating/chilled water coil cooling AHU's with terminal VAV's with hot water reheat coils 4. High efficiency gas-fired condensing central boilers 5. High efficiency air cooled chiller | \$8,263,400 | 1,657,000 | 3,799.9 | \$173,985 | \$52,983 | \$226,968 | \$0.75 | \$33,975 | \$260,943 | \$53,209 | \$1,359,497 | N/A***** |

* Gross capital investment based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. kitchen exhaust, sallyport HVAC systems, overhead and profit).

**Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

***Total life-cycle savings is based on a 25 year study period.

****Simple payback years is based upon BLCC5 Life Cycle Analysis.

*****Simple payback never reached within 25 year study period.

*****Simple payback never reached because system is more efficient and/or less expensive than baseline system.



BUILDING ORIENTATION 14B - MECHANICAL SYSTEM PAYBACK SUMMARY

| Baseline | System | GROSS CAPITAL INVESTMENT* | ANNUAL ELEC. CONS. (KWH) | ANNUAL GAS CONS. (MBTU) | ANNUAL ELECTRIC COST | ANNUAL GAS COST | COMBINED UTILITY COST | ANNUAL UTILITY \$/S.F. | ANNUAL MAINT. COST | COMBINED ANNUAL EXPENSE | COMBINED EXPENSE SAVINGS** | TOTAL LIFE-CYCLE SAVINGS*** | SIMPLE PAYBACK (YEARS)**** |
|----------|---|---------------------------|--------------------------|-------------------------|----------------------|-----------------|-----------------------|------------------------|--------------------|-------------------------|----------------------------|-----------------------------|----------------------------|
| - | 1. Classroom chilled/hot water coil unit ventilators 2. Hot water coil heating/dx cooling RTU's with terminal VAV's with hot water reheat coils 3. Standard efficiency cast-iron gas-fired boilers 4. Standard-efficiency water cooled chiller | \$8,430,500 | 1,658,200 | 6,696.4 | \$174,108 | \$93,367 | \$267,475 | \$0.92 | \$42,750 | \$310,225 | - | - | - |

| Option | System | GROSS CAPITAL INVESTMENT* | ANNUAL ELEC. CONS. (KWH) | ANNUAL GAS CONS. (MBTU) | ANNUAL ELECTRIC COST | ANNUAL GAS COST | COMBINED UTILITY COST | ANNUAL UTILITY \$/S.F. | ANNUAL MAINT. COST | COMBINED ANNUAL EXPENSE | COMBINED EXPENSE SAVINGS** | TOTAL LIFE-CYCLE SAVINGS*** | SIMPLE PAYBACK (YEARS)**** |
|--------|---|---------------------------|--------------------------|-------------------------|----------------------|-----------------|-----------------------|------------------------|--------------------|-------------------------|----------------------------|-----------------------------|----------------------------|
| 1 | 1. Classroom chilled/hot water coil unit ventilators with demand ventilation 2. Hot water coil heating/dx cooling RTU's with terminal VAV's with hot water reheat coils with demand ventilation 3. Standard efficiency cast-iron gas-fired boilers 4. Standard-efficiency water cooled chiller | \$8,516,300 | 1,664,400 | 5,645.9 | \$174,766 | \$78,721 | \$253,487 | \$0.87 | \$42,750 | \$296,237 | \$13,988 | \$161,473 | 7 |
| 2 | 1. Hot/chilled water fan coil units 2. Hot water coil heating/dx cooling 100% O.A. ventilating units with energy recovery 3. Hot water coil heating/dx cooling RTU with terminal VAV's with hot water reheat coils 4. Standard efficiency cast-iron gas-fired boilers 5. Standard-efficiency water cooled chiller | \$8,981,900 | 1,738,500 | 4,915.6 | \$182,539 | \$68,538 | \$251,077 | \$0.86 | \$48,750 | \$299,827 | \$10,398 | -\$360,943 | N/A***** |
| 3 | 1. Displacement ventilation diffusers with terminal VAV's and perimeter hot water radiant panels 2. Hot water coil heating/chilled water coil cooling 100% O.A. ventilating units with energy recovery 3. Hot water coil heating/chilled water coil cooling AHU's with terminal VAV's with hot water reheat coils 4. High efficiency gas-fired condensing central boilers 5. High efficiency air cooled chiller | \$8,020,120 | 1,537,700 | 4,314.2 | \$161,458 | \$60,153 | \$221,611 | \$0.76 | \$35,975 | \$257,586 | \$52,639 | \$1,329,020 | N/A***** |

* Gross capital investment based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references. Costs have been estimated for system comparison purposes only and do not incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. kitchen exhaust, sallyport HVAC systems, overhead and profit).

**Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

***Total life-cycle savings is based on a 25 year study period.

****Simple payback years is based upon BLCC5 Life Cycle Analysis.

*****Simple payback never reached within 25 year study period.

*****Simple payback never reached because system is more efficient and/or less expensive than baseline system.

LIFE CYCLE ANALYSES

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (Unit Ventilators)

Alternative: Option 1 (Unit Ventilators w/ DCV)

General Information

| | |
|--------------------------------|---|
| File Name: | C:\Program Files (x86)\BLCC5\projects\Concord Carlisle (Building 6R2).xml |
| Date of Study: | Wed Jun 15 13:09:13 GMT 2011 |
| Project Name: | Concord Carlisle (Building 6R2) |
| Project Location: | Massachusetts |
| Analysis Type: | FEMP Analysis, Energy Project |
| Analyst: | Keith Lane |
| Base Date: | January 1, 2012 |
| Service Date: | January 1, 2012 |
| Study Period: | 25 years 0 months(January 1, 2012 through December 31, 2036) |
| Discount Rate: | 4.9% |
| Discounting Convention: | End-of-Year |

Comparison of Present-Value Costs

PV Life-Cycle Cost

| | Base Case | Alternative | Savings from Alternative |
|--|-------------|-------------|--------------------------|
| Initial Investment Costs: | | | |
| Capital Requirements as of Base Date | \$8,691,500 | \$8,846,300 | -\$154,800 |
| Future Costs: | | | |
| Energy Consumption Costs | \$4,709,777 | \$4,464,803 | \$244,974 |
| Energy Demand Charges | \$0 | \$0 | \$0 |
| Energy Utility Rebates | \$0 | \$0 | \$0 |
| Water Costs | \$0 | \$0 | \$0 |
| Recurring and Non-Recurring OM&R Costs | \$706,298 | \$706,298 | \$0 |
| Capital Replacements | \$0 | \$0 | \$0 |
| Residual Value at End of Study Period | \$0 | \$0 | \$0 |

| | | | |
|---|--------------|--------------|-----------|
| | ----- | ----- | ----- |
| Subtotal (for Future Cost Items) | \$5,416,074 | \$5,171,100 | \$244,974 |
| | ----- | ----- | ----- |
| Total PV Life-Cycle Cost | \$14,107,574 | \$14,017,400 | \$90,174 |

Net Savings from Alternative Compared with Base Case

| | |
|-------------------------------------|-----------|
| PV of Non-Investment Savings | \$244,974 |
| - Increased Total Investment | \$154,800 |
| | ----- |
| Net Savings | \$90,174 |

Savings-to-Investment Ratio (SIR)

SIR = 1.58

Adjusted Internal Rate of Return

AIRR = 6.84%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

| | |
|--|----|
| Simple Payback occurs in year | 11 |
| Discounted Payback occurs in year | 15 |

Energy Savings Summary

Energy Savings Summary (in stated units)

| Energy Type | -----Average Base Case | Annual Consumption----- Alternative | Life-Cycle Savings | Life-Cycle Savings |
|--------------------|------------------------|-------------------------------------|--------------------|--------------------|
| Electricity | 1,735,400.0 kWh | 1,742,900.0 kWh | -7,500.0 kWh | -187,494.9 kWh |
| Natural Gas | 65,399.0 Therm | 54,893.0 Therm | 10,506.0 Therm | 262,642.8 Therm |

Energy Savings Summary (in MBtu)

| Energy Type | -----Average | Annual Consumption----- | Life-Cycle |
|-------------|--------------|-------------------------|------------|
|-------------|--------------|-------------------------|------------|

| Type | Base Case | Alternative | Savings | Savings |
|-------------|--------------|--------------|--------------|---------------|
| Electricity | 5,921.4 MBtu | 5,947.0 MBtu | -25.6 MBtu | -639.8 MBtu |
| Natural Gas | 6,539.9 MBtu | 5,489.3 MBtu | 1,050.6 MBtu | 26,264.4 MBtu |

Emissions Reduction Summary

| Energy Type | -----Average Base Case | Annual Alternative | Emissions----- Reduction | Life-Cycle Reduction |
|--------------------|---------------------------|-----------------------|-----------------------------|-------------------------|
| Electricity | | | | |
| CO2 | 1,318,420.86 kg | 1,324,118.78 kg | -5,697.91 kg | -142,443.90 kg |
| SO2 | 2,170.69 kg | 2,180.07 kg | -9.38 kg | -234.52 kg |
| NOx | 1,868.04 kg | 1,876.11 kg | -8.07 kg | -201.83 kg |
| Natural Gas | | | | |
| CO2 | 345,422.82 kg | 289,932.49 kg | 55,490.33 kg | 1,387,220.30 kg |
| SO2 | 2,787.67 kg | 2,339.85 kg | 447.82 kg | 11,195.31 kg |
| NOx | 48.30 kg | 40.54 kg | 7.76 kg | 193.98 kg |
| Total: | | | | |
| CO2 | 1,663,843.69 kg | 1,614,051.27 kg | 49,792.42 kg | 1,244,776.40 kg |
| SO2 | 4,958.36 kg | 4,519.92 kg | 438.44 kg | 10,960.78 kg |
| NOx | 1,916.34 kg | 1,916.65 kg | -0.31 kg | -7.85 kg |

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (Unit Ventilators)

Alternative: Option 2 (Fan Coils w/ ERV)

General Information

| | |
|--------------------------------|---|
| File Name: | C:\Program Files (x86)\BLCC5\projects\Concord Carlisle (Building 6R2).xml |
| Date of Study: | Wed Jun 15 13:06:30 GMT 2011 |
| Project Name: | Concord Carlisle (Building 6R2) |
| Project Location: | Massachusetts |
| Analysis Type: | FEMP Analysis, Energy Project |
| Analyst: | Keith Lane |
| Base Date: | January 1, 2012 |
| Service Date: | January 1, 2012 |
| Study Period: | 25 years 0 months(January 1, 2012 through December 31, 2036) |
| Discount Rate: | 4.9% |
| Discounting Convention: | End-of-Year |

Comparison of Present-Value Costs

PV Life-Cycle Cost

| | Base Case | Alternative | Savings from Alternative |
|--|-------------|-------------|--------------------------|
| Initial Investment Costs: | | | |
| Capital Requirements as of Base Date | \$8,691,500 | \$9,318,900 | -\$627,400 |
| Future Costs: | | | |
| Energy Consumption Costs | \$4,709,777 | \$4,335,869 | \$373,908 |
| Energy Demand Charges | \$0 | \$0 | \$0 |
| Energy Utility Rebates | \$0 | \$0 | \$0 |
| Water Costs | \$0 | \$0 | \$0 |
| Recurring and Non-Recurring OM&R Costs | \$706,298 | \$810,292 | -\$103,995 |
| Capital Replacements | \$0 | \$0 | \$0 |
| Residual Value at End of Study Period | \$0 | \$0 | \$0 |

| | | | |
|---|--------------|--------------|------------|
| | ----- | ----- | ----- |
| Subtotal (for Future Cost Items) | \$5,416,074 | \$5,146,161 | \$269,913 |
| | ----- | ----- | ----- |
| Total PV Life-Cycle Cost | \$14,107,574 | \$14,465,061 | -\$357,487 |

Net Savings from Alternative Compared with Base Case

| | |
|-------------------------------------|------------|
| PV of Non-Investment Savings | \$269,913 |
| - Increased Total Investment | \$627,400 |
| | ----- |
| Net Savings | -\$357,487 |

Savings-to-Investment Ratio (SIR)

$$\text{SIR} = 0.43$$

SIR is lower than 1.0; project alternative is not cost effective.

Adjusted Internal Rate of Return

$$\text{AIRR} = 1.42\%$$

AIRR is lower than your discount rate; project alternative is not cost effective.

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback never reached during study period.

Discounted Payback never reached during study period.

Energy Savings Summary

Energy Savings Summary (in stated units)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|--------------------|------------------------|--------------------|--------------------------|--------------------|
| Electricity | 1,735,400.0 kWh | 1,780,900.0 kWh | -45,500.0 kWh | -1,137,468.9 kWh |
| Natural Gas | 65,399.0 Therm | 46,889.0 Therm | 18,510.0 Therm | 462,737.3 Therm |

Energy Savings Summary (in MBtu)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|-------------|---------------------------|-----------------------|-----------------------------|-----------------------|
| Electricity | 5,921.4 MBtu | 6,076.7 MBtu | -155.3 MBtu | -3,881.2 MBtu |
| Natural Gas | 6,539.9 MBtu | 4,688.9 MBtu | 1,851.0 MBtu | 46,273.9 MBtu |

Emissions Reduction Summary

| Energy Type | -----Average Base Case | Annual Alternative | Emissions----- Reduction | Life-Cycle Reduction |
|--------------------|---------------------------|-----------------------|-----------------------------|-------------------------|
| Electricity | | | | |
| CO2 | 1,318,420.86 kg | 1,352,988.20 kg | -34,567.33 kg | -864,159.66 kg |
| SO2 | 2,170.69 kg | 2,227.60 kg | -56.91 kg | -1,422.78 kg |
| NOx | 1,868.04 kg | 1,917.01 kg | -48.98 kg | -1,224.41 kg |
| Natural Gas | | | | |
| CO2 | 345,422.82 kg | 247,657.16 kg | 97,765.66 kg | 2,444,074.61 kg |
| SO2 | 2,787.67 kg | 1,998.67 kg | 789.00 kg | 19,724.45 kg |
| NOx | 48.30 kg | 34.63 kg | 13.67 kg | 341.76 kg |
| Total: | | | | |
| CO2 | 1,663,843.69 kg | 1,600,645.36 kg | 63,198.33 kg | 1,579,914.95 kg |
| SO2 | 4,958.36 kg | 4,226.27 kg | 732.09 kg | 18,301.67 kg |
| NOx | 1,916.34 kg | 1,951.64 kg | -35.31 kg | -882.64 kg |

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (Unit Ventilators)

Alternative: Option 3 (Displacement)

General Information

| | |
|--------------------------------|---|
| File Name: | C:\Program Files (x86)\BLCC5\projects\Concord Carlisle (Building 6R2).xml |
| Date of Study: | Wed Jun 15 13:09:56 GMT 2011 |
| Project Name: | Concord Carlisle (Building 6R2) |
| Project Location: | Massachusetts |
| Analysis Type: | FEMP Analysis, Energy Project |
| Analyst: | Keith Lane |
| Base Date: | January 1, 2012 |
| Service Date: | January 1, 2012 |
| Study Period: | 25 years 0 months(January 1, 2012 through December 31, 2036) |
| Discount Rate: | 4.9% |
| Discounting Convention: | End-of-Year |

Comparison of Present-Value Costs

PV Life-Cycle Cost

| | Base Case | Alternative | Savings from Alternative |
|--|-------------|-------------|--------------------------|
| Initial Investment Costs: | | | |
| Capital Requirements as of Base Date | \$8,691,500 | \$8,263,400 | \$428,100 |
| Future Costs: | | | |
| Energy Consumption Costs | \$4,709,777 | \$3,895,808 | \$813,969 |
| Energy Demand Charges | \$0 | \$0 | \$0 |
| Energy Utility Rebates | \$0 | \$0 | \$0 |
| Water Costs | \$0 | \$0 | \$0 |
| Recurring and Non-Recurring OM&R Costs | \$706,298 | \$588,870 | \$117,427 |
| Capital Replacements | \$0 | \$0 | \$0 |
| Residual Value at End of Study Period | \$0 | \$0 | \$0 |

| | | | |
|---|--------------|--------------|-------------|
| | ----- | ----- | ----- |
| Subtotal (for Future Cost Items) | \$5,416,074 | \$4,484,678 | \$931,397 |
| | ----- | ----- | ----- |
| Total PV Life-Cycle Cost | \$14,107,574 | \$12,748,078 | \$1,359,497 |

Net Savings from Alternative Compared with Base Case

| | |
|-------------------------------------|-------------|
| PV of Non-Investment Savings | \$931,397 |
| - Increased Total Investment | -\$428,100 |
| | ----- |
| Net Savings | \$1,359,497 |

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|--------------------|-------------------------------|---------------------------|---------------------------------|---------------------------|
| Electricity | 1,735,400.0 kWh | 1,657,000.0 kWh | 78,400.0 kWh | 1,959,946.3 kWh |
| Natural Gas | 65,399.0 Therm | 37,999.0 Therm | 27,400.0 Therm | 684,981.2 Therm |

Energy Savings Summary (in MBtu)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|--------------------|-------------------------------|---------------------------|---------------------------------|---------------------------|
| Electricity | 5,921.4 MBtu | 5,653.9 MBtu | 267.5 MBtu | 6,687.6 MBtu |
| Natural Gas | 6,539.9 MBtu | 3,799.9 MBtu | 2,740.0 MBtu | 68,498.4 MBtu |

Emissions Reduction Summary

| Energy Type | -----Average Base Case | Annual Alternative | Emissions----- Reduction | Life-Cycle Reduction |
|--------------------|-------------------------------|---------------------------|---------------------------------|-----------------------------|
| Electricity | | | | |
| CO2 | 1,318,420.86 kg | 1,258,858.69 kg | 59,562.17 kg | 1,489,013.57 kg |
| SO2 | 2,170.69 kg | 2,072.62 kg | 98.07 kg | 2,451.56 kg |

| | | | | |
|------------|-------------|-------------|----------|-------------|
| NOx | 1,868.04 kg | 1,783.64 kg | 84.39 kg | 2,109.74 kg |
|------------|-------------|-------------|----------|-------------|

Natural Gas

| | | | | |
|------------|---------------|---------------|---------------|-----------------|
| CO2 | 345,422.82 kg | 200,702.18 kg | 144,720.64 kg | 3,617,917.03 kg |
|------------|---------------|---------------|---------------|-----------------|

| | | | | |
|------------|-------------|-------------|-------------|--------------|
| SO2 | 2,787.67 kg | 1,619.73 kg | 1,167.94 kg | 29,197.73 kg |
|------------|-------------|-------------|-------------|--------------|

| | | | | |
|------------|----------|----------|----------|-----------|
| NOx | 48.30 kg | 28.06 kg | 20.24 kg | 505.90 kg |
|------------|----------|----------|----------|-----------|

Total:

| | | | | |
|------------|-----------------|-----------------|---------------|-----------------|
| CO2 | 1,663,843.69 kg | 1,459,560.87 kg | 204,282.82 kg | 5,106,930.60 kg |
|------------|-----------------|-----------------|---------------|-----------------|

| | | | | |
|------------|-------------|-------------|-------------|--------------|
| SO2 | 4,958.36 kg | 3,692.35 kg | 1,266.01 kg | 31,649.29 kg |
|------------|-------------|-------------|-------------|--------------|

| | | | | |
|------------|-------------|-------------|-----------|-------------|
| NOx | 1,916.34 kg | 1,811.71 kg | 104.63 kg | 2,615.65 kg |
|------------|-------------|-------------|-----------|-------------|

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (Unit Ventilators)

Alternative: Option 1 (Unit Ventilators w/ DCV)

General Information

| | |
|--------------------------------|---|
| File Name: | C:\Program Files (x86)\BLCC5\projects\Concord Carlisle (Building 14B).xml |
| Date of Study: | Wed Jun 15 12:47:50 GMT 2011 |
| Project Name: | Concord Carlisle (Building 14B) |
| Project Location: | Massachusetts |
| Analysis Type: | FEMP Analysis, Energy Project |
| Analyst: | Keith Lane |
| Base Date: | January 1, 2012 |
| Service Date: | January 1, 2012 |
| Study Period: | 25 years 0 months(January 1, 2012 through December 31, 2036) |
| Discount Rate: | 4.9% |
| Discounting Convention: | End-of-Year |

Comparison of Present-Value Costs

PV Life-Cycle Cost

| | Base Case | Alternative | Savings from Alternative |
|---|-------------|-------------|--------------------------|
| Initial Investment Costs: | | | |
| Capital Requirements as of Base Date | \$8,430,500 | \$8,516,300 | -\$85,800 |
| Future Costs: | | | |
| Energy Consumption Costs | \$4,610,299 | \$4,363,026 | \$247,273 |
| Energy Demand Charges | \$0 | \$0 | \$0 |
| Energy Utility Rebates | \$0 | \$0 | \$0 |
| Water Costs | \$0 | \$0 | \$0 |
| Recurring and Non-Recurring OM&R Costs | \$740,962 | \$740,962 | \$0 |
| Capital Replacements | \$0 | \$0 | \$0 |
| Residual Value at End of Study Period | \$0 | \$0 | \$0 |

| | | | |
|---|--------------|--------------|-----------|
| | ----- | ----- | ----- |
| Subtotal (for Future Cost Items) | \$5,351,261 | \$5,103,988 | \$247,273 |
| | ----- | ----- | ----- |
| Total PV Life-Cycle Cost | \$13,781,761 | \$13,620,288 | \$161,473 |

Net Savings from Alternative Compared with Base Case

| | |
|-------------------------------------|-----------|
| PV of Non-Investment Savings | \$247,273 |
| - Increased Total Investment | \$85,800 |
| | ----- |
| Net Savings | \$161,473 |

Savings-to-Investment Ratio (SIR)

SIR = 2.88

Adjusted Internal Rate of Return

AIRR = 9.43%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year 7

Discounted Payback occurs in year 8

Energy Savings Summary

Energy Savings Summary (in stated units)

| Energy Type | -----Average Base Case | Annual Consumption----- Alternative | Life-Cycle Savings | Life-Cycle Savings |
|-------------|------------------------|-------------------------------------|--------------------|--------------------|
| Electricity | 1,658,200.0 kWh | 1,664,400.0 kWh | -6,200.0 kWh | -154,995.8 kWh |
| Natural Gas | 66,964.0 Therm | 56,459.0 Therm | 10,505.0 Therm | 262,617.8 Therm |

Energy Savings Summary (in MBtu)

| Energy Type | -----Average | Annual Consumption----- | Life-Cycle |
|-------------|--------------|-------------------------|------------|
|-------------|--------------|-------------------------|------------|

| Type | Base Case | Alternative | Savings | Savings |
|-------------|--------------|--------------|--------------|---------------|
| Electricity | 5,658.0 MBtu | 5,679.2 MBtu | -21.2 MBtu | -528.9 MBtu |
| Natural Gas | 6,696.4 MBtu | 5,645.9 MBtu | 1,050.5 MBtu | 26,261.9 MBtu |

Emissions Reduction Summary

| Energy Type | -----Average Base Case | Annual Alternative | Emissions----- Reduction | Life-Cycle Reduction |
|--------------------|---------------------------|-----------------------|-----------------------------|-------------------------|
| Electricity | | | | |
| CO2 | 1,259,770.36 kg | 1,264,480.63 kg | -4,710.27 kg | -117,753.62 kg |
| SO2 | 2,074.13 kg | 2,081.88 kg | -7.76 kg | -193.87 kg |
| NOx | 1,784.94 kg | 1,791.61 kg | -6.67 kg | -166.84 kg |
| Natural Gas | | | | |
| CO2 | 353,688.80 kg | 298,203.75 kg | 55,485.05 kg | 1,387,088.26 kg |
| SO2 | 2,854.38 kg | 2,406.60 kg | 447.78 kg | 11,194.24 kg |
| NOx | 49.46 kg | 41.70 kg | 7.76 kg | 193.96 kg |
| Total: | | | | |
| CO2 | 1,613,459.16 kg | 1,562,684.38 kg | 50,774.78 kg | 1,269,334.64 kg |
| SO2 | 4,928.51 kg | 4,488.48 kg | 440.03 kg | 11,000.37 kg |
| NOx | 1,834.39 kg | 1,833.31 kg | 1.08 kg | 27.12 kg |

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (Unit Ventilators)

Alternative: Option 2 (Fan Coils w/ ERV)

General Information

| | |
|--------------------------------|---|
| File Name: | C:\Program Files (x86)\BLCC5\projects\Concord Carlisle (Building 14B).xml |
| Date of Study: | Wed Jun 15 12:49:10 GMT 2011 |
| Project Name: | Concord Carlisle (Building 14B) |
| Project Location: | Massachusetts |
| Analysis Type: | FEMP Analysis, Energy Project |
| Analyst: | Keith Lane |
| Base Date: | January 1, 2012 |
| Service Date: | January 1, 2012 |
| Study Period: | 25 years 0 months(January 1, 2012 through December 31, 2036) |
| Discount Rate: | 4.9% |
| Discounting Convention: | End-of-Year |

Comparison of Present-Value Costs

PV Life-Cycle Cost

| | Base Case | Alternative | Savings from Alternative |
|--|-------------|-------------|--------------------------|
| Initial Investment Costs: | | | |
| Capital Requirements as of Base Date | \$8,430,500 | \$8,981,900 | -\$551,400 |
| Future Costs: | | | |
| Energy Consumption Costs | \$4,610,299 | \$4,315,847 | \$294,451 |
| Energy Demand Charges | \$0 | \$0 | \$0 |
| Energy Utility Rebates | \$0 | \$0 | \$0 |
| Water Costs | \$0 | \$0 | \$0 |
| Recurring and Non-Recurring OM&R Costs | \$740,962 | \$844,957 | -\$103,995 |
| Capital Replacements | \$0 | \$0 | \$0 |
| Residual Value at End of Study Period | \$0 | \$0 | \$0 |

| | | | |
|---|--------------|--------------|------------|
| | ----- | ----- | ----- |
| Subtotal (for Future Cost Items) | \$5,351,261 | \$5,160,804 | \$190,457 |
| | ----- | ----- | ----- |
| Total PV Life-Cycle Cost | \$13,781,761 | \$14,142,704 | -\$360,943 |

Net Savings from Alternative Compared with Base Case

| | |
|-------------------------------------|------------|
| PV of Non-Investment Savings | \$190,457 |
| - Increased Total Investment | \$551,400 |
| | ----- |
| Net Savings | -\$360,943 |

Savings-to-Investment Ratio (SIR)

SIR = 0.35

SIR is lower than 1.0; project alternative is not cost effective.

Adjusted Internal Rate of Return

AIRR = 0.53%

AIRR is lower than your discount rate; project alternative is not cost effective.

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback never reached during study period.

Discounted Payback never reached during study period.

Energy Savings Summary

Energy Savings Summary (in stated units)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|--------------------|------------------------|--------------------|--------------------------|--------------------|
| Electricity | 1,658,200.0 kWh | 1,738,500.0 kWh | -80,300.0 kWh | -2,007,445.0 kWh |
| Natural Gas | 66,964.0 Therm | 49,156.0 Therm | 17,808.0 Therm | 445,187.8 Therm |

Energy Savings Summary (in MBtu)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|-------------|---------------------------|-----------------------|-----------------------------|-----------------------|
| Electricity | 5,658.0 MBtu | 5,932.0 MBtu | -274.0 MBtu | -6,849.7 MBtu |
| Natural Gas | 6,696.4 MBtu | 4,915.6 MBtu | 1,780.8 MBtu | 44,518.9 MBtu |

Emissions Reduction Summary

| Energy Type | -----Average Base Case | Annual Alternative | Emissions----- Reduction | Life-Cycle Reduction |
|--------------------|---------------------------|-----------------------|-----------------------------|-------------------------|
| Electricity | | | | |
| CO2 | 1,259,770.36 kg | 1,320,776.00 kg | -61,005.64 kg | -1,525,099.36 kg |
| SO2 | 2,074.13 kg | 2,174.57 kg | -100.44 kg | -2,510.97 kg |
| NOx | 1,784.94 kg | 1,871.37 kg | -86.44 kg | -2,160.87 kg |
| Natural Gas | | | | |
| CO2 | 353,688.80 kg | 259,630.95 kg | 94,057.85 kg | 2,351,381.99 kg |
| SO2 | 2,854.38 kg | 2,095.30 kg | 759.08 kg | 18,976.39 kg |
| NOx | 49.46 kg | 36.30 kg | 13.15 kg | 328.80 kg |
| Total: | | | | |
| CO2 | 1,613,459.16 kg | 1,580,406.95 kg | 33,052.21 kg | 826,282.63 kg |
| SO2 | 4,928.51 kg | 4,269.87 kg | 658.63 kg | 16,465.42 kg |
| NOx | 1,834.39 kg | 1,907.68 kg | -73.28 kg | -1,832.07 kg |

NIST BLCC 5.3-08: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Baseline (Unit Ventilators)

Alternative: Option 3 (Displacement)

General Information

| | |
|--------------------------------|---|
| File Name: | C:\Program Files (x86)\BLCC5\projects\Concord Carlisle (Building 14B).xml |
| Date of Study: | Wed Jun 15 12:52:54 GMT 2011 |
| Project Name: | Concord Carlisle (Building 14B) |
| Project Location: | Massachusetts |
| Analysis Type: | FEMP Analysis, Energy Project |
| Analyst: | Keith Lane |
| Base Date: | January 1, 2012 |
| Service Date: | January 1, 2012 |
| Study Period: | 25 years 0 months(January 1, 2012 through December 31, 2036) |
| Discount Rate: | 4.9% |
| Discounting Convention: | End-of-Year |

Comparison of Present-Value Costs

PV Life-Cycle Cost

| | Base Case | Alternative | Savings from Alternative |
|--|-------------|-------------|--------------------------|
| Initial Investment Costs: | | | |
| Capital Requirements as of Base Date | \$8,430,500 | \$8,020,120 | \$410,380 |
| Future Costs: | | | |
| Energy Consumption Costs | \$4,610,299 | \$3,809,086 | \$801,213 |
| Energy Demand Charges | \$0 | \$0 | \$0 |
| Energy Utility Rebates | \$0 | \$0 | \$0 |
| Water Costs | \$0 | \$0 | \$0 |
| Recurring and Non-Recurring OM&R Costs | \$740,962 | \$623,535 | \$117,427 |
| Capital Replacements | \$0 | \$0 | \$0 |
| Residual Value at End of Study Period | \$0 | \$0 | \$0 |

| | | | |
|---|--------------|--------------|-------------|
| | ----- | ----- | ----- |
| Subtotal (for Future Cost Items) | \$5,351,261 | \$4,432,621 | \$918,640 |
| | ----- | ----- | ----- |
| Total PV Life-Cycle Cost | \$13,781,761 | \$12,452,741 | \$1,329,020 |

Net Savings from Alternative Compared with Base Case

| | |
|-------------------------------------|-------------|
| PV of Non-Investment Savings | \$918,640 |
| - Increased Total Investment | -\$410,380 |
| | ----- |
| Net Savings | \$1,329,020 |

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|--------------------|-------------------------------|---------------------------|---------------------------------|---------------------------|
| Electricity | 1,658,200.0 kWh | 1,537,700.0 kWh | 120,500.0 kWh | 3,012,417.5 kWh |
| Natural Gas | 66,964.0 Therm | 43,142.0 Therm | 23,822.0 Therm | 595,533.7 Therm |

Energy Savings Summary (in MBtu)

| Energy Type | -----Average Base Case | Annual Alternative | Consumption----- Savings | Life-Cycle Savings |
|--------------------|-------------------------------|---------------------------|---------------------------------|---------------------------|
| Electricity | 5,658.0 MBtu | 5,246.8 MBtu | 411.2 MBtu | 10,278.8 MBtu |
| Natural Gas | 6,696.4 MBtu | 4,314.2 MBtu | 2,382.2 MBtu | 59,553.6 MBtu |

Emissions Reduction Summary

| Energy Type | -----Average Base Case | Annual Alternative | Emissions----- Reduction | Life-Cycle Reduction |
|--------------------|-------------------------------|---------------------------|---------------------------------|-----------------------------|
| Electricity | | | | |
| CO2 | 1,259,770.36 kg | 1,168,223.90 kg | 91,546.45 kg | 2,288,598.66 kg |
| SO2 | 2,074.13 kg | 1,923.40 kg | 150.72 kg | 3,768.02 kg |

| | | | | |
|------------|-------------|-------------|-----------|-------------|
| NOx | 1,784.94 kg | 1,655.23 kg | 129.71 kg | 3,242.66 kg |
|------------|-------------|-------------|-----------|-------------|

Natural Gas

| | | | | |
|------------|---------------|---------------|---------------|-----------------|
| CO2 | 353,688.80 kg | 227,866.35 kg | 125,822.45 kg | 3,145,475.16 kg |
|------------|---------------|---------------|---------------|-----------------|

| | | | | |
|------------|-------------|-------------|-------------|--------------|
| SO2 | 2,854.38 kg | 1,838.95 kg | 1,015.43 kg | 25,384.98 kg |
|------------|-------------|-------------|-------------|--------------|

| | | | | |
|------------|----------|----------|----------|-----------|
| NOx | 49.46 kg | 31.86 kg | 17.59 kg | 439.84 kg |
|------------|----------|----------|----------|-----------|


Total:

| | | | | |
|------------|-----------------|-----------------|---------------|-----------------|
| CO2 | 1,613,459.16 kg | 1,396,090.25 kg | 217,368.90 kg | 5,434,073.82 kg |
|------------|-----------------|-----------------|---------------|-----------------|


| | | | | |
|------------|-------------|-------------|-------------|--------------|
| SO2 | 4,928.51 kg | 3,762.35 kg | 1,166.15 kg | 29,153.00 kg |
|------------|-------------|-------------|-------------|--------------|

| | | | | |
|------------|-------------|-------------|-----------|-------------|
| NOx | 1,834.39 kg | 1,687.09 kg | 147.30 kg | 3,682.49 kg |
|------------|-------------|-------------|-----------|-------------|


COST ESTIMATES

|  GARCIA • GALUSKA • DESOUSA Consulting Engineers Inc. 370 Faunce Corner Road, Dartmouth, MA 02747-1217 | | | PROJECT: Concord Carlisle High School | | |
|--|------------|-------------|--|-----------------------|-----------------|
| | | | JOB NO: 32000700 | | |
| Baseline - Unit Ventilator System (Orientation 6R2) | | | CLIENT: The Office of Michael Rosenfeld | | |
| | | | DATE: 6/15/2011 | BY: KL | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Unit Ventilators | 73 | \$6,500 | | | \$ 474,500.00 |
| VAV's w/ hot water reheat coil | 57 | \$1,500 | | | \$ 85,500.00 |
| RTU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| RTU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV RTU (Admin.) (3) @ 20,000 CFM | 60,000 CFM | \$5/CFM | | | \$ 300,000.00 |
| VAV RTU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV RTU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV RTU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| RTU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| RTU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| RTU (Gym 2) 7,500 CFM | 7,500 CFM | \$5/CFM | | | \$ 37,500.00 |
| VAV RTU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 10,800.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (4) 2,500 MBH Standard-Efficiency Gas-Fired Boilers | 2 | \$34,800 | | | \$ 69,600.00 |
| (4) 1,500 MBH Standard-Efficiency Gas-Fired Boilers | 4 | \$25,600 | | | \$ 102,400.00 |
| Pumps (CHW & HHW) including VFD's | 4 | \$5,500 | | | \$ 22,000.00 |
| HHW Piping & Insulation | | | 302,000 ft ² | \$4/ft ² | \$ 1,208,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 302,000 ft ² | \$4.5/ft ² | \$ 1,359,000.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 302,000 ft ² | \$8.5/ft ² | \$ 2,567,000.00 |
| Controls | | | 302,000 ft ² | \$6.5/ft ² | \$ 1,963,000.00 |
| Exhaust Fans (for UV ventilation) | 29,200 CFM | \$3/CFM | | | \$ 87,600.00 |
| Phasing/backfeed of existing buildings | | | | | \$ 50,000.00 |
| TOTAL | | | | | \$ 8,691,500.00 |
| TOTAL (\$/FT²) | | | | | \$ 28.78 |


Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

|  GARCIA • GALUSKA • DESOUSA Consulting Engineers Inc. 370 Faunce Corner Road, Dartmouth, MA 02747-1217 | | | PROJECT: Concord Carlisle High School | | |
|--|------------|-------------|--|-----------------------|-----------------|
| | | | JOB NO: 32000700 | | |
| Option 1 - Unit Ventilator System w/ Demand Ventilation (Orientation 6R2) | | | CLIENT: The Office of Michael Rosenfeld | | |
| | | | DATE: 6/15/2011 | BY: KL | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Unit Ventilators | 73 | \$6,500 | | | \$ 474,500.00 |
| VAV's w/ hot water reheat coil | 57 | \$1,500 | | | \$ 85,500.00 |
| RTU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| RTU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV RTU (Admin.) (3) @ 20,000 CFM | 60,000 CFM | \$5/CFM | | | \$ 300,000.00 |
| VAV RTU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV RTU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV RTU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| RTU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| RTU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| RTU (Gym 2) 7,500 CFM | 7,500 CFM | \$5/CFM | | | \$ 37,500.00 |
| VAV RTU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 10,800.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (4) 2,500 MBH Standard-Efficiency Gas-Fired Boilers | 4 | \$34,800 | | | \$ 139,200.00 |
| (4) 1,500 MBH Standard-Efficiency Gas-Fired Boilers | 4 | \$25,600 | | | \$ 102,400.00 |
| Pumps (CHW & HHW) including VFD's | 4 | \$5,500 | | | \$ 22,000.00 |
| HHW Piping & Insulation | | | 302,000 ft ² | \$4/ft ² | \$ 1,208,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 302,000 ft ² | \$4.5/ft ² | \$ 1,359,000.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 302,000 ft ² | \$8.5/ft ² | \$ 2,567,000.00 |
| Controls | | | 302,000 ft ² | \$6.5/ft ² | \$ 1,963,000.00 |
| Exhaust Fans (for UV ventilation) | 29,200 CFM | \$3/CFM | | | \$ 87,600.00 |
| Demand Ventilation Controls | 142 | \$600 | | | \$ 85,200.00 |
| Phasing/backfeed of existing buildings | | | | | \$ 50,000.00 |
| TOTAL | | | | | \$ 8,846,300.00 |
| TOTAL (\$/FT²) | | | | | \$ 29.29 |


Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

|  GARCIA • GALUSKA • DESOUSA Consulting Engineers Inc. 370 Faunce Corner Road, Dartmouth, MA 02747-1217 | | | PROJECT: Concord Carlisle High School | | |
|--|------------|-------------|--|------------------------|-----------------|
| | | | JOB NO: 32000700 | | |
| Option 2 - Fan Coil System (Orientation 6R2) | | | CLIENT: The Office of Michael Rosenfeld | | |
| | | | DATE: 6/15/2011 | BY: KL | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Fan Coils | 73 | \$6,500 | | | \$ 474,500.00 |
| DOAS w/ ERV (Classrooms) | | | | | |
| (3) @ 8,500 CFM each | 25,500 CFM | \$7/CFM | | | \$ 178,500.00 |
| VAV's w/ hot water reheat coil | 57 | \$1,500 | | | \$ 85,500.00 |
| RTU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| RTU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV RTU (Admin.) (3) @ 20,000 CFM | 60,000 CFM | \$5/CFM | | | \$ 300,000.00 |
| VAV RTU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV RTU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV RTU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| RTU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| RTU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| RTU (Gym 2) 7,500 CFM | 7,500 CFM | \$5/CFM | | | \$ 37,500.00 |
| VAV RTU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 10,800.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (4) 2,500 MBH Standard-Efficiency Gas-Fired Boilers | 4 | \$34,800 | | | \$ 139,200.00 |
| (4) 1,500 MBH Standard-Efficiency Gas-Fired Boilers | 4 | \$25,600 | | | \$ 102,400.00 |
| Pumps (CHW & HHW) including VFD's | 4 | \$5,500 | | | \$ 22,000.00 |
| HHW Piping & Insulation | | | 302,000 ft ² | \$4/ft ² | \$ 1,208,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 302,000 ft ² | \$4.5/ft ² | \$ 1,359,000.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 302,000 ft ² | \$10.5/ft ² | \$ 3,171,000.00 |
| Controls | | | 302,000 ft ² | \$6.5/ft ² | \$ 1,963,000.00 |
| Demand Ventilation Controls | 69 | \$600 | | | \$ 41,400.00 |
| Phasing/backfeed of existing buildings | | | | | \$ 50,000.00 |
| TOTAL | | | | | \$ 9,318,900.00 |
| TOTAL (\$/FT²) | | | | | \$ 31.91 |


Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

|  GARCIA • GALUSKA • DESOUSA Consulting Engineers Inc. 370 Faunce Corner Road, Dartmouth, MA 02747-1217 | | | PROJECT: Concord Carlisle High School | | |
|--|------------|-------------|--|-----------------------|-----------------|
| | | | JOB NO: 32000700 | | |
| Option 3 - Displacement Ventilation System (Orientation 6R2) | | | CLIENT: The Office of Michael Rosenfeld | | |
| | | | DATE: 6/15/2011 | BY: KL | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Displacement Diffuser Assemblies | 146 | \$600 | | | \$ 87,600.00 |
| DOAS w/ ERV (Classrooms) (3) @ 17,500 CFM each | 52,500 CFM | \$7/CFM | | | \$ 367,500.00 |
| VAV's w/ hot water reheat coil | 130 | \$1,500 | | | \$ 195,000.00 |
| AHU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| AHU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV AHU (Admin.) (3) @ 20,000 CFM | 60,000 CFM | \$5/CFM | | | \$ 300,000.00 |
| VAV AHU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV AHU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV AHU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| AHU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| AHU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| AHU (Gym 2) 7,500 CFM | 7,500 CFM | \$5/CFM | | | \$ 37,500.00 |
| VAV AHU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 10,800.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (2) 2,500 MBH High-Efficiency Gas-Fired Condensing Boilers | 2 | \$48,720 | | | \$ 97,440.00 |
| (4) 1,500 MBH High-Efficiency Gas-Fired Condensing Boilers | 4 | \$35,840 | | | \$ 143,360.00 |
| Pumps (CHW & HHW) including VFD's | 4 | \$5,500 | | | \$ 22,000.00 |
| HHW Piping & Insulation | | | 302,000 ft ² | \$4/ft ² | \$ 1,208,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 302,000 ft ² | \$2/ft ² | \$ 604,000.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 302,000 ft ² | \$9.5/ft ² | \$ 2,869,000.00 |
| Controls | | | 302,000 ft ² | \$6/ft ² | \$ 1,812,000.00 |
| Demand Ventilation Controls | 142 | \$600 | | | \$ 85,200.00 |
| Phasing/backfeed of existing buildings | | | | | \$ 50,000.00 |
| TOTAL | | | | | \$ 8,263,400.00 |
| TOTAL (\$/FT²) | | | | | \$ 27.36 |


Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

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|--|------------|-------------|---|-----------------------|-----------------|
| Baseline - Unit Ventilator System (Orientation 14B) | | | | | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Unit Ventilators | 73 | \$6,500 | | | \$ 474,500.00 |
| VAV's w/ hot water reheat coil | 57 | \$1,500 | | | \$ 85,500.00 |
| RTU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| RTU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV RTU (Admin.) (2) @ 18,000 CFM | 36,000 CFM | \$5/CFM | | | \$ 180,000.00 |
| VAV RTU (Media) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| VAV RTU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV RTU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV RTU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| RTU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| RTU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| RTU (Gym 2) (2) @ 7,500 CFM | 15,000 CFM | \$5/CFM | | | \$ 75,000.00 |
| VAV RTU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 24,000.00 |
| ERV (Lockers) 3,000 CFM | 3,000 CFM | \$6/CFM | | | \$ 18,000.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (4) 2,500 MBH Standard-Efficiency Gas-Fired Boilers (Central Heating Plant) | 4 | \$34,800 | | | \$ 139,200.00 |
| (2) 450 MBH Standard-Efficiency Gas-Fired Boilers (Gym Heating Plant) | 2 | \$10,300 | | | \$ 20,600.00 |
| Pumps (CHW & HHW) including VFD's | 6 | \$5,500 | | | \$ 33,000.00 |
| HHW Piping & Insulation | | | 291,000 ft ² | \$4/ft ² | \$ 1,164,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 291,000 ft ² | \$4.5/ft ² | \$ 1,309,500.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 291,000 ft ² | \$8.5/ft ² | \$ 2,473,500.00 |
| Controls | | | 291,000 ft ² | \$6.5/ft ² | \$ 1,891,500.00 |
| Exhaust Fans (for UV ventilation) | 29,200 CFM | \$3/CFM | | | \$ 87,600.00 |
| TOTAL | | | | | \$ 8,430,500.00 |
| TOTAL (\$/FT²) | | | | | \$ 28.87 |


Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

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|--|------------|-------------|--|-----------------------|-----------------|
| | | | JOB NO: 32000700 | | |
| Option 1 - Unit Ventilator System w/ Demand Ventilation (Orientation 1AB) | | | CLIENT: The Office of Michael Rosenfeld | | |
| | | | DATE: 6/15/2011 | BY: KL | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Unit Ventilators | 73 | \$6,500 | | | \$ 474,500.00 |
| VAV's w/ hot water reheat coil | 57 | \$1,500 | | | \$ 85,500.00 |
| RTU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| RTU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV RTU (Admin.) (2) @ 18,000 CFM | 36,000 CFM | \$5/CFM | | | \$ 180,000.00 |
| VAV RTU (Media) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| VAV RTU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV RTU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV RTU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| RTU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| RTU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| RTU (Gym 2) (2) @ 7,500 CFM | 15,000 CFM | \$5/CFM | | | \$ 75,000.00 |
| VAV RTU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 24,000.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| ERV (Lockers) 3,000 CFM | 3,000 CFM | \$6/CFM | | | \$ 18,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (4) 2,500 MBH Standard-Efficiency Gas-Fired Boilers (Central Heating Plant) | 4 | \$34,800 | | | \$ 139,200.00 |
| (2) 450 MBH Standard-Efficiency Gas-Fired Boilers (Gym Heating Plant) | 2 | \$10,300 | | | \$ 20,600.00 |
| Pumps (CHW & HHW) including VFD's | 6 | \$5,500 | | | \$ 33,000.00 |
| HHW Piping & Insulation | | | 291,000 ft ² | \$4/ft ² | \$ 1,164,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 291,000 ft ² | \$4.5/ft ² | \$ 1,309,500.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 291,000 ft ² | \$8.5/ft ² | \$ 2,473,500.00 |
| Controls | | | 291,000 ft ² | \$6.5/ft ² | \$ 1,891,500.00 |
| Exhaust Fans (for UV ventilation) | 29,200 CFM | \$3/CFM | | | \$ 87,600.00 |
| Demand Ventilation Controls | 143 | \$600 | | | \$ 85,800.00 |
| TOTAL | | | | | \$ 8,516,300.00 |
| TOTAL (\$/FT²) | | | | | \$ 29.17 |

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|--|------------|-------------|--|------------------------|-----------------|
| | | | JOB NO: 32000700 | | |
| Option 2 - Fan Coil System (Orientation 14B) | | | CLIENT: The Office of Michael Rosenfeld | | |
| | | | DATE: 6/15/2011 | BY: KL | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Fan Coils | 73 | \$6,500 | | | \$ 474,500.00 |
| DOAS w/ ERV (Classrooms) | | | | | |
| (3) @ 8,500 CFM each | 25,500 CFM | \$7/CFM | | | \$ 178,500.00 |
| VAV's w/ hot water reheat coil | 67 | \$1,500 | | | \$ 100,500.00 |
| RTU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| RTU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV RTU (Admin.) (2) @ 18,000 CFM | 36,000 CFM | \$5/CFM | | | \$ 180,000.00 |
| VAV RTU (Media) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| VAV RTU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV RTU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV RTU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| RTU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| RTU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| RTU (Gym 2) (2) @ 7,500 CFM | 15,000 CFM | \$5/CFM | | | \$ 75,000.00 |
| VAV RTU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 24,000.00 |
| ERV (Lockers) 3,000 CFM | 3,000 CFM | \$6/CFM | | | \$ 18,000.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (4) 2,500 MBH Standard-Efficiency Gas-Fired Boilers (Central Heating Plant) | 4 | \$34,800 | | | \$ 139,200.00 |
| (2) 450 MBH Standard-Efficiency Gas-Fired Boilers (Gym Heating Plant) | 2 | \$10,300 | | | \$ 20,600.00 |
| Pumps (CHW & HHW) including VFD's | 6 | \$5,500 | | | \$ 33,000.00 |
| HHW Piping & Insulation | | | 291,000 ft ² | \$4/ft ² | \$ 1,164,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 291,000 ft ² | \$4.5/ft ² | \$ 1,309,500.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 291,000 ft ² | \$10.5/ft ² | \$ 3,055,500.00 |
| Controls | | | 291,000 ft ² | \$6.5/ft ² | \$ 1,891,500.00 |
| Demand Ventilation Controls | 70 | \$600 | | | \$ 42,000.00 |
| TOTAL | | | | | \$ 8,981,900.00 |
| TOTAL (\$/FT²) | | | | | \$ 30.76 |

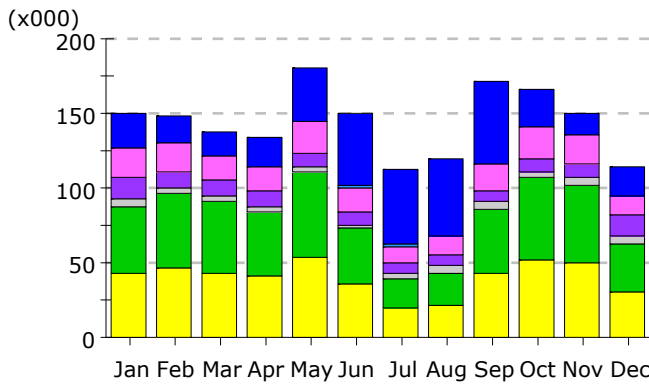
Cost estimates have been derived for system comparison purposes only. Estimates do not necessarily include HVAC systems and equipment that would typically be required for all system options studied; example: supplemental cooling systems for elevator machine rooms, tel/data rooms, etc. and radiation heating for unoccupied areas such as storage rooms, corridors, vestibules etc. Estimates do not include project general system costs; example: testing and balancing, commissioning, coordination, as built drawings etc.

|  GARCIA • GALUSKA • DESOUSA Consulting Engineers Inc. 370 Faunce Corner Road, Dartmouth, MA 02747-1217 | | | PROJECT: Concord Carlisle High School | | |
|--|------------|-------------|--|-----------------------|-----------------|
| | | | JOB NO: 32000700 | | |
| | | | CLIENT: The Office of Michael Rosenfeld | | |
| Option 3 - Displacement Ventilation System (Orientation 1AB) | | | DATE: 6/15/2011 | BY: KL | |
| ITEM OF WORK | NO. | UNIT PRICE | AREA | PRICE/S.F. | TOTAL |
| Displacement Diffuser Assemblies | 146 | \$600 | | | \$ 87,600.00 |
| DOAS w/ ERV (Classrooms) (3) @ 17,500 CFM each | 52,500 CFM | \$7/CFM | | | \$ 367,500.00 |
| VAV's w/ hot water reheat coil | 130 | \$1,500 | | | \$ 195,000.00 |
| AHU (Aud.) 14,000 CFM | 14,000 CFM | \$5/CFM | | | \$ 70,000.00 |
| AHU (Stage) 4,000 CFM | 4,000 CFM | \$5/CFM | | | \$ 20,000.00 |
| VAV RTU (Admin.) (2) @ 18,000 CFM | 36,000 CFM | \$5/CFM | | | \$ 180,000.00 |
| VAV RTU (Media) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| VAV AHU (Band/Music) 3,000 CFM | 3,000 CFM | \$5/CFM | | | \$ 15,000.00 |
| VAV AHU (CCTV) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| VAV AHU (Radio) 2,500 CFM | 2,500 CFM | \$5/CFM | | | \$ 12,500.00 |
| AHU (Cafeteria) 8,000 CFM | 8,000 CFM | \$5/CFM | | | \$ 40,000.00 |
| AHU (Gym 1) 20,000 CFM | 20,000 CFM | \$5/CFM | | | \$ 100,000.00 |
| RTU (Gym 2) (2) @ 7,500 CFM | 15,000 CFM | \$5/CFM | | | \$ 75,000.00 |
| VAV AHU (Fitness) 7,000 CFM | 7,000 CFM | \$5/CFM | | | \$ 35,000.00 |
| ERV (Lockers) 4,000 CFM | 4,000 CFM | \$6/CFM | | | \$ 24,000.00 |
| ERV (Lockers) 3,000 CFM | 3,000 CFM | \$6/CFM | | | \$ 18,000.00 |
| HV (Kitchen) 4,000 CFM | 4,000 CFM | \$4/CFM | | | \$ 16,000.00 |
| HV (Ceramics/Photo) 1,800 CFM | 1,800 CFM | \$4.5/CFM | | | \$ 8,100.00 |
| (4) 2,500 MBH High-Efficiency Gas-Fired Condensing Boilers (Central Heating Plant) | 4 | \$48,720 | | | \$ 194,880.00 |
| (2) 450 MBH High-Efficiency Gas-Fired Condensing Boilers (Gym Heating Plant) | 2 | \$14,420 | | | \$ 28,840.00 |
| Pumps (CHW & HHW) including VFD's | 6 | \$5,500 | | | \$ 33,000.00 |
| HHW Piping & Insulation | | | 291,000 ft ² | \$4/ft ² | \$ 1,164,000.00 |
| (2) 250 Ton Water-Cooled Chillers | 500 tons | \$1,000 ton | | | \$ 500,000.00 |
| CHW Piping & Insulation and Condensate | | | 291,000 ft ² | \$2/ft ² | \$ 582,000.00 |
| Ductwork including GRD's, Dampers, & General Exhaust Systems | | | 291,000 ft ² | \$9.5/ft ² | \$ 2,764,500.00 |
| Controls | | | 291,000 ft ² | \$6/ft ² | \$ 1,746,000.00 |
| Demand Ventilation Controls | 143 | \$600 | | | \$ 85,800.00 |
| TOTAL | | | | | \$ 8,020,120.00 |
| TOTAL (\$/FT²) | | | | | \$ 27.47 |

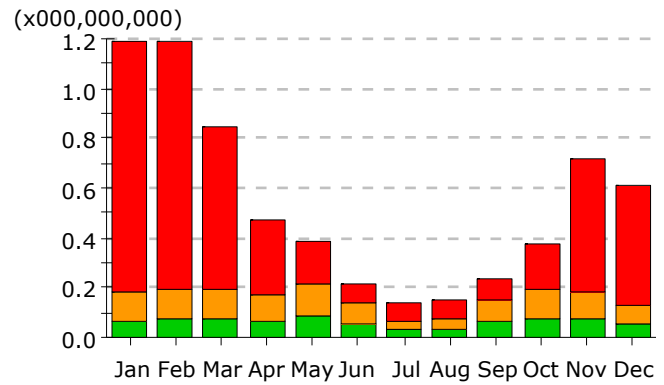
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ENERGY PROFILES
(Orientation 6R2)

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 23.1 | 18.1 | 16.8 | 18.8 | 35.6 | 49.4 | 50.5 | 50.1 | 55.7 | 25.0 | 15.2 | 19.7 | 378.0 |
| Heat Reject. | - | - | - | 0.0 | 0.3 | 0.8 | 1.3 | 1.1 | 0.9 | 0.1 | 0.0 | - | 4.6 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.6 | 0.5 | 0.4 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.3 | 2.8 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 18.2 | 18.6 | 15.7 | 15.9 | 21.7 | 16.3 | 10.5 | 11.9 | 17.4 | 20.7 | 19.2 | 12.3 | 198.3 |
| Pumps & Aux. | 15.1 | 11.1 | 10.7 | 10.6 | 9.0 | 8.3 | 8.0 | 7.9 | 7.7 | 8.5 | 9.3 | 14.1 | 120.1 |
| Ext. Usage | 4.6 | 3.6 | 3.9 | 3.8 | 2.7 | 2.6 | 2.7 | 4.4 | 4.3 | 4.4 | 4.5 | 4.6 | 46.3 |
| Misc. Equip. | 45.4 | 49.5 | 47.0 | 43.5 | 57.0 | 37.6 | 20.4 | 22.4 | 44.2 | 54.8 | 52.3 | 33.1 | 507.3 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 42.7 | 47.1 | 43.7 | 40.7 | 54.3 | 35.5 | 19.1 | 20.9 | 42.0 | 52.1 | 49.7 | 30.0 | 477.9 |
| Total | 149.7 | 148.5 | 138.2 | 133.5 | 180.8 | 150.6 | 112.6 | 118.8 | 172.3 | 165.8 | 150.5 | 114.1 | 1,735.4 |

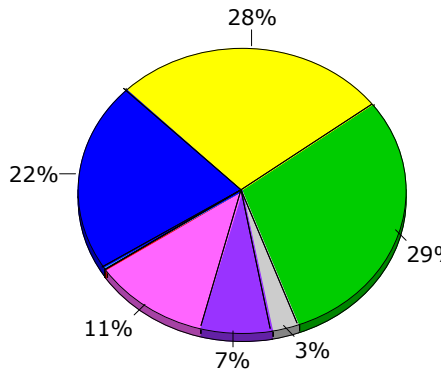
Gas Consumption (Btu x000,000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 1.01 | 0.99 | 0.66 | 0.30 | 0.17 | 0.08 | 0.08 | 0.08 | 0.08 | 0.19 | 0.53 | 0.48 | 4.66 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.11 | 0.12 | 0.12 | 0.11 | 0.13 | 0.08 | 0.04 | 0.04 | 0.08 | 0.11 | 0.11 | 0.08 | 1.13 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.07 | 0.07 | 0.07 | 0.06 | 0.08 | 0.06 | 0.03 | 0.04 | 0.06 | 0.08 | 0.08 | 0.05 | 0.75 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 1.19 | 1.19 | 0.85 | 0.47 | 0.39 | 0.22 | 0.14 | 0.15 | 0.23 | 0.38 | 0.72 | 0.61 | 6.54 |

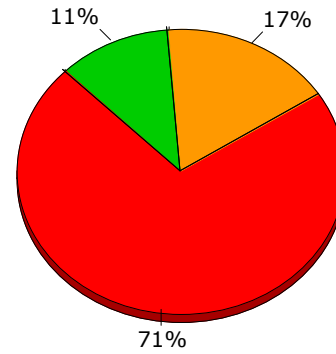
Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 378.0 | - | - | - |
| Heat Reject. | 4.6 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 2.8 | 4,660.8 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,133.5 | - | - |
| Vent. Fans | 198.3 | - | - | - |
| Pumps & Aux. | 120.1 | - | - | - |
| Ext. Usage | 46.3 | - | - | - |
| Misc. Equip. | 507.3 | 745.6 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 477.9 | - | - | - |
| Total | 1,735.4 | 6,539.9 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

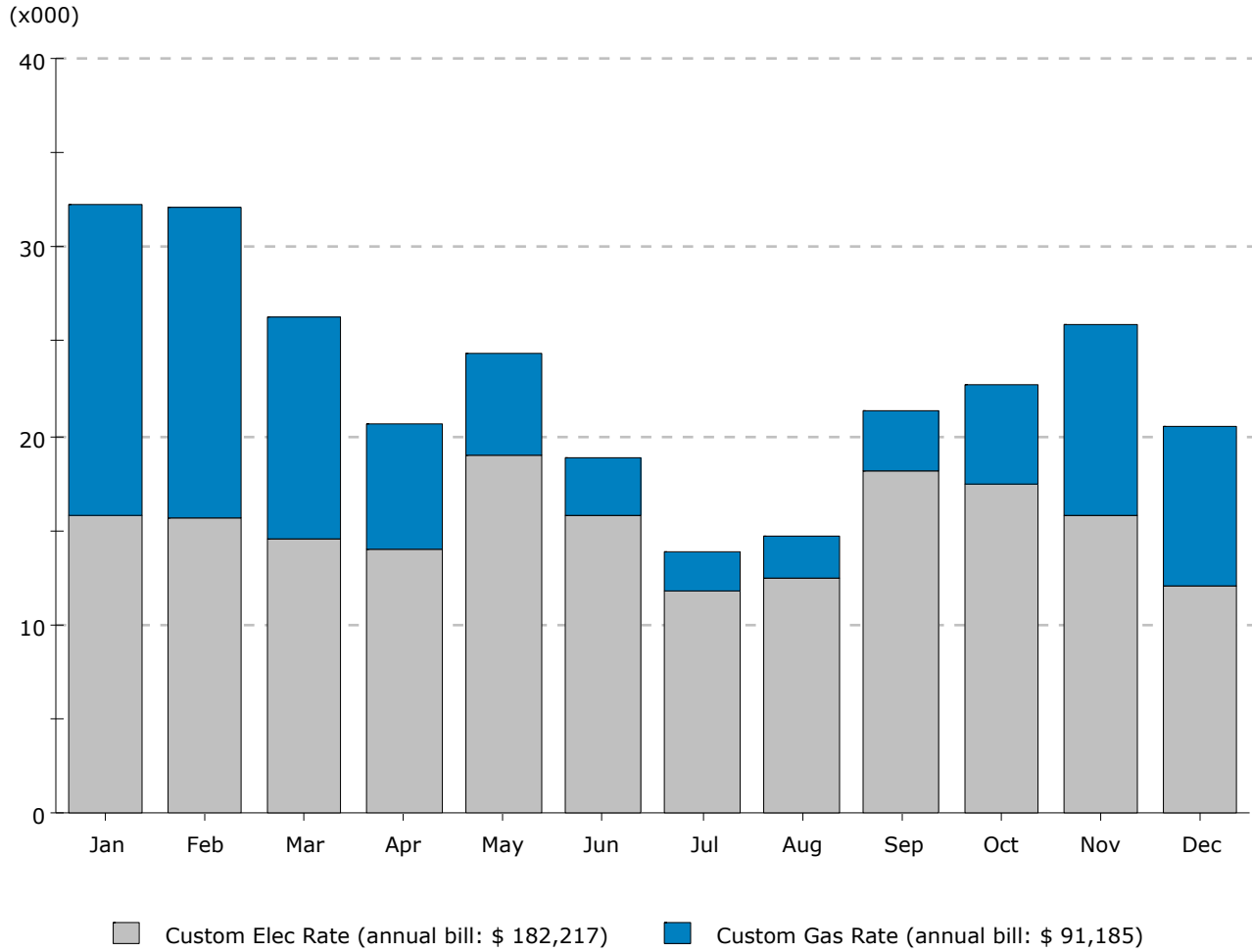


Electricity



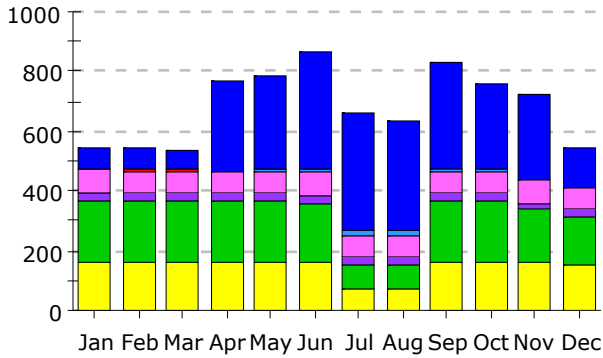
Natural Gas

Monthly Utility Bills (\$)

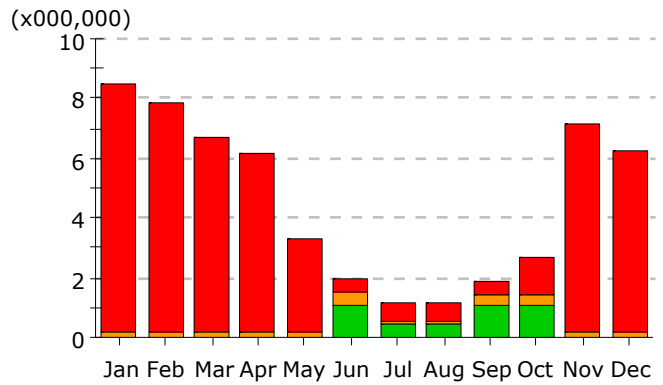


Total Annual Bill Across All Rates: \$ 273,402

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Demand (kW)

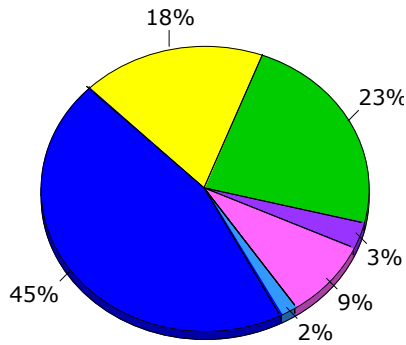
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 75.6 | 68.9 | 65.9 | 298.0 | 305.6 | 393.1 | 388.3 | 370.8 | 351.6 | 291.9 | 284.3 | 132.2 | 3,026.5 |
| Heat Reject. | - | - | - | 3.6 | 9.2 | 14.0 | 17.9 | 14.8 | 9.7 | 5.9 | 4.1 | - | 79.3 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 3.0 | 3.3 | 2.7 | 0.4 | 0.2 | 0.3 | 0.4 | 0.5 | 0.3 | 0.2 | 0.3 | 0.4 | 12.1 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 76.5 | 75.3 | 74.9 | 71.7 | 76.5 | 74.1 | 71.6 | 71.8 | 73.7 | 74.2 | 73.0 | 72.3 | 885.5 |
| Pumps & Aux. | 27.9 | 27.8 | 27.6 | 25.9 | 26.3 | 26.6 | 26.8 | 26.6 | 26.4 | 26.0 | 25.9 | 25.9 | 319.6 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 204.8 | 204.8 | 204.8 | 204.8 | 204.8 | 199.6 | 85.1 | 81.7 | 204.8 | 204.8 | 175.6 | 156.2 | 2,132.1 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 69.4 | 69.4 | 160.1 | 160.1 | 160.1 | 155.9 | 1,735.4 |
| Total | 547.9 | 540.3 | 536.1 | 764.7 | 782.7 | 867.8 | 659.5 | 635.6 | 826.6 | 763.3 | 723.3 | 542.8 | 8,190.5 |

Gas Demand (Btu/h x000,000)

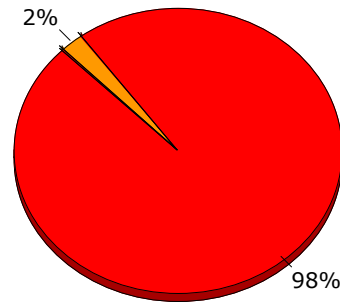
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 8.29 | 7.62 | 6.52 | 5.92 | 3.12 | 0.44 | 0.61 | 0.64 | 0.45 | 1.24 | 6.94 | 6.04 | 47.81 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.20 | 0.20 | 0.20 | 0.20 | 0.19 | 0.39 | 0.14 | 0.14 | 0.35 | 0.36 | 0.17 | 0.18 | 2.72 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 1.10 | 0.43 | 0.43 | 1.10 | 1.10 | 0.01 | 0.01 | 4.23 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 8.50 | 7.83 | 6.73 | 6.13 | 3.31 | 1.92 | 1.19 | 1.20 | 1.89 | 2.69 | 7.13 | 6.24 | 54.76 |

Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 393.14 | - | - | - |
| Heat Reject. | 14.00 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.33 | 8,287.2 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 197.2 | - | - |
| Vent. Fans | 74.08 | - | - | - |
| Pumps & Aux. | 26.61 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 199.57 | 11.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 160.09 | - | - | - |
| Total | 867.82 | 8,495.5 | - | - |

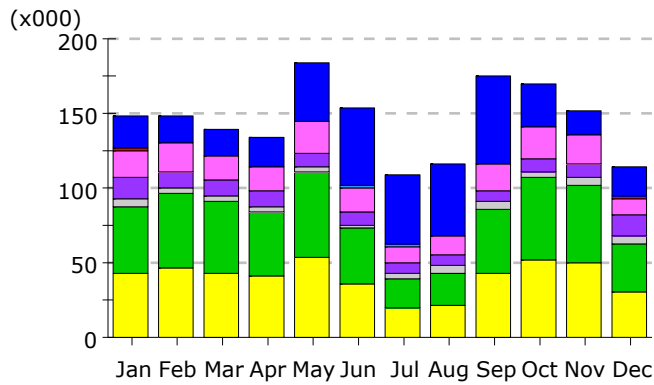


Electricity

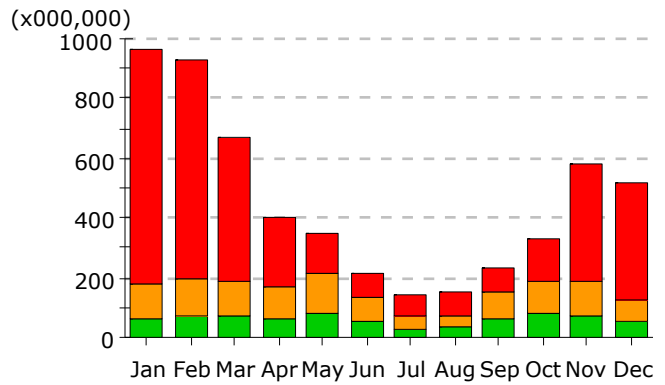


Natural Gas

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

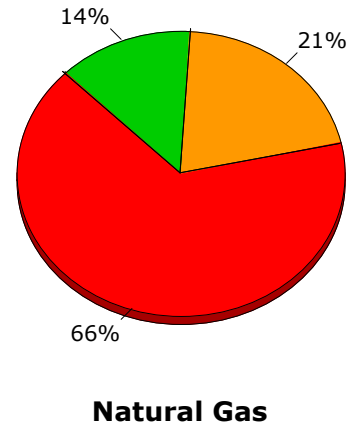
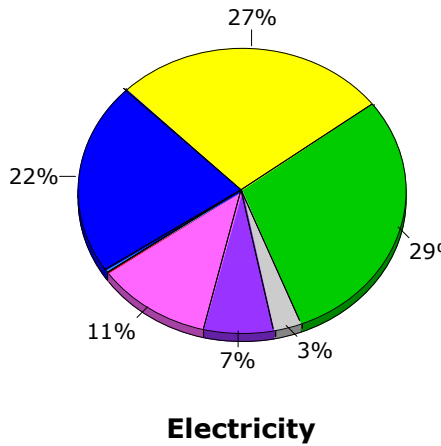
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 23.0 | 18.4 | 17.5 | 20.2 | 38.9 | 51.8 | 46.4 | 48.2 | 57.7 | 28.7 | 16.5 | 20.0 | 387.2 |
| Heat Reject. | - | - | - | 0.0 | 0.4 | 0.9 | 1.1 | 1.0 | 1.0 | 0.2 | 0.0 | - | 4.7 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.4 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 2.2 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 17.9 | 18.4 | 15.6 | 15.9 | 21.8 | 16.3 | 10.5 | 11.9 | 17.4 | 20.7 | 19.3 | 12.0 | 197.7 |
| Pumps & Aux. | 14.9 | 10.9 | 10.7 | 10.5 | 9.0 | 8.3 | 7.9 | 7.9 | 7.8 | 8.5 | 9.3 | 13.9 | 119.6 |
| Ext. Usage | 4.6 | 3.6 | 3.9 | 3.8 | 2.7 | 2.6 | 2.7 | 4.4 | 4.3 | 4.4 | 4.5 | 4.6 | 46.3 |
| Misc. Equip. | 45.4 | 49.5 | 47.0 | 43.5 | 57.0 | 37.6 | 20.4 | 22.4 | 44.2 | 54.8 | 52.3 | 33.1 | 507.3 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 42.7 | 47.1 | 43.7 | 40.7 | 54.3 | 35.5 | 19.1 | 20.9 | 42.0 | 52.1 | 49.7 | 30.0 | 477.9 |
| Total | 149.0 | 148.2 | 138.7 | 134.8 | 184.3 | 153.1 | 108.2 | 116.8 | 174.5 | 169.6 | 151.8 | 113.9 | 1,742.9 |

Gas Consumption (Btu x000,000)

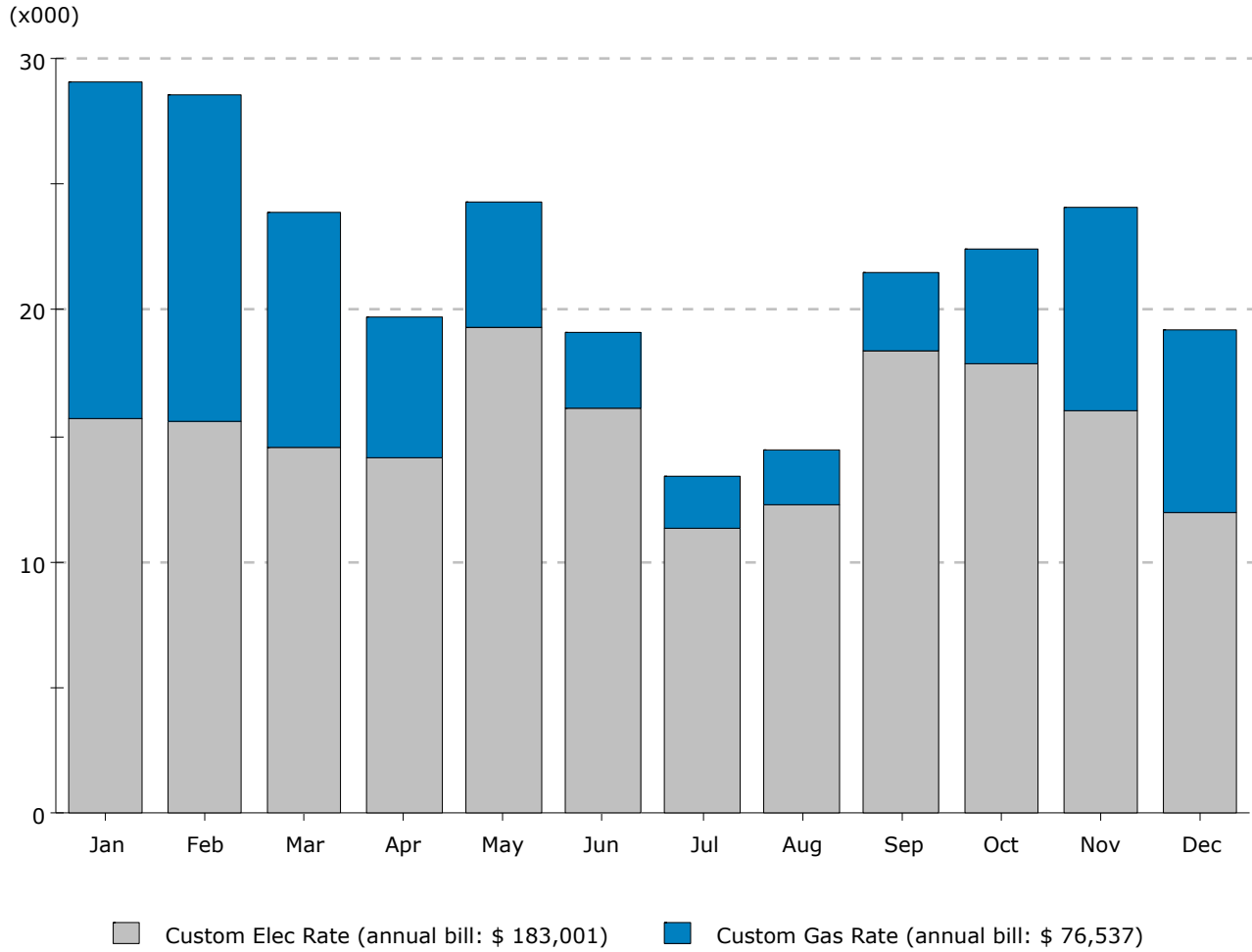
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 783.1 | 732.0 | 477.7 | 230.4 | 137.3 | 82.6 | 77.5 | 80.0 | 79.6 | 143.8 | 397.9 | 388.8 | 3,610.8 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 111.0 | 124.5 | 118.4 | 108.1 | 132.2 | 78.5 | 37.6 | 39.4 | 84.8 | 109.8 | 111.8 | 76.8 | 1,132.9 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 66.2 | 71.3 | 70.8 | 64.0 | 82.5 | 56.0 | 30.8 | 35.3 | 64.0 | 78.8 | 75.1 | 50.8 | 745.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 960.3 | 927.8 | 666.9 | 402.4 | 352.0 | 217.1 | 146.0 | 154.8 | 228.4 | 332.4 | 584.8 | 516.4 | 5,489.3 |

Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 387.2 | - | - | - |
| Heat Reject. | 4.7 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 2.2 | 3,610.8 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,132.9 | - | - |
| Vent. Fans | 197.7 | - | - | - |
| Pumps & Aux. | 119.6 | - | - | - |
| Ext. Usage | 46.3 | - | - | - |
| Misc. Equip. | 507.3 | 745.6 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 477.9 | - | - | - |
| Total | 1,742.9 | 5,489.3 | - | - |

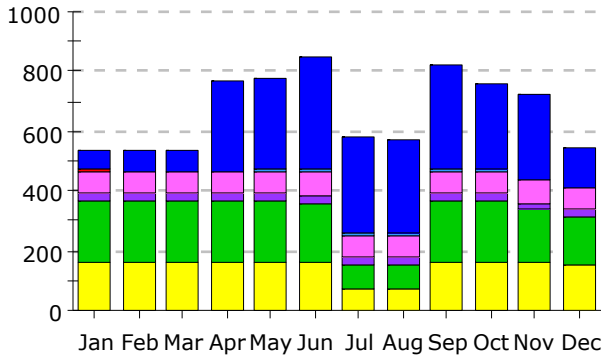


Monthly Utility Bills (\$)

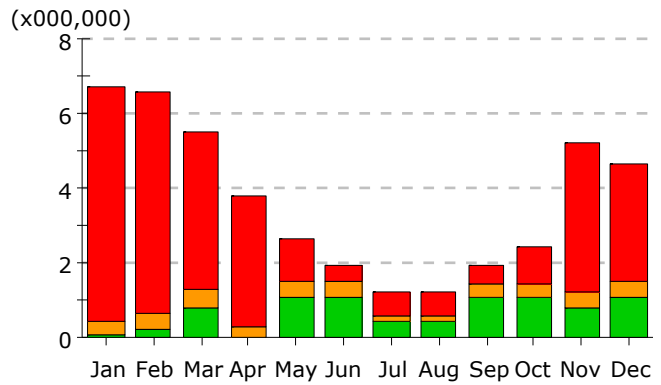


Total Annual Bill Across All Rates: \$ 259,538

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Demand (kW)

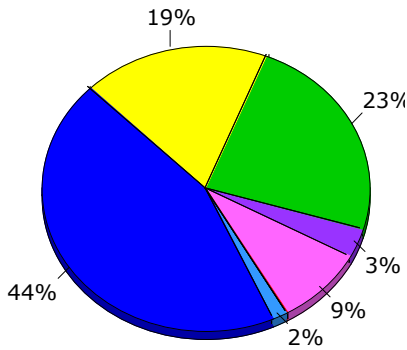
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 70.1 | 69.9 | 68.0 | 297.2 | 301.4 | 376.2 | 320.2 | 312.0 | 343.6 | 289.5 | 287.4 | 134.6 | 2,870.1 |
| Heat Reject. | - | - | - | 3.7 | 9.3 | 13.1 | 11.2 | 11.7 | 9.3 | 6.1 | 4.6 | - | 68.9 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 3.3 | 2.2 | 1.8 | 0.4 | 0.2 | 0.3 | 0.5 | 0.5 | 0.4 | 0.2 | 0.3 | 0.3 | 10.4 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 73.2 | 73.4 | 73.7 | 71.8 | 76.6 | 74.0 | 71.8 | 71.7 | 73.7 | 74.3 | 73.1 | 72.7 | 879.7 |
| Pumps & Aux. | 27.7 | 27.3 | 27.1 | 25.9 | 26.3 | 26.5 | 26.3 | 26.3 | 26.3 | 26.1 | 25.9 | 25.9 | 317.4 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 204.8 | 204.8 | 204.8 | 204.8 | 204.8 | 199.6 | 81.7 | 81.7 | 204.8 | 204.8 | 175.6 | 156.2 | 2,128.7 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 69.4 | 69.4 | 160.1 | 160.1 | 160.1 | 155.9 | 1,735.4 |
| Total | 539.2 | 537.7 | 535.5 | 764.0 | 778.7 | 849.8 | 581.0 | 573.2 | 818.1 | 761.0 | 726.9 | 545.5 | 8,010.7 |

Gas Demand (Btu/h x000,000)

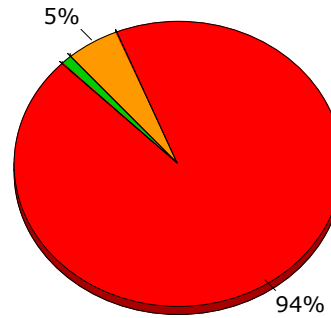
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 6.26 | 5.96 | 4.24 | 3.54 | 1.15 | 0.44 | 0.63 | 0.65 | 0.45 | 1.01 | 4.01 | 3.13 | 31.46 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.35 | 0.44 | 0.45 | 0.26 | 0.42 | 0.39 | 0.14 | 0.14 | 0.35 | 0.36 | 0.38 | 0.41 | 4.10 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.08 | 0.21 | 0.81 | 0.01 | 1.10 | 1.10 | 0.43 | 0.43 | 1.10 | 1.10 | 0.81 | 1.10 | 8.27 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 6.69 | 6.61 | 5.51 | 3.81 | 2.66 | 1.93 | 1.20 | 1.21 | 1.89 | 2.46 | 5.21 | 4.64 | 43.82 |

Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 376.20 | - | - | - |
| Heat Reject. | 13.06 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.33 | 6,260.3 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 352.5 | - | - |
| Vent. Fans | 74.00 | - | - | - |
| Pumps & Aux. | 26.51 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 199.57 | 76.8 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 160.09 | - | - | - |
| Total | 849.76 | 6,689.6 | - | - |

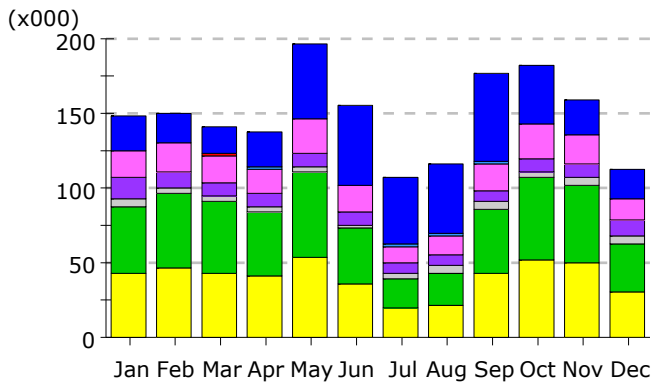


Electricity

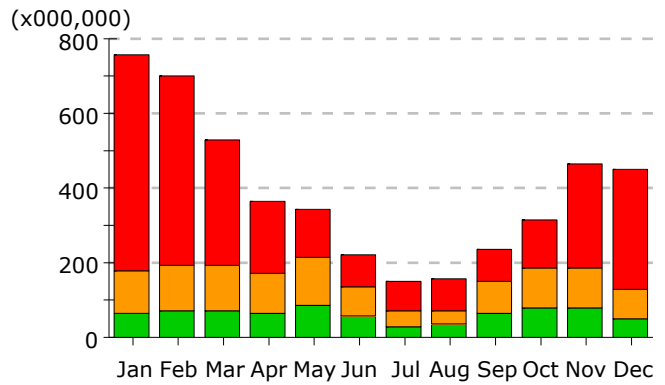


Natural Gas

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 21.9 | 19.4 | 19.2 | 23.8 | 48.5 | 52.8 | 45.5 | 47.2 | 58.3 | 39.7 | 22.4 | 19.3 | 418.0 |
| Heat Reject. | - | 0.0 | 0.0 | 0.1 | 0.7 | 1.0 | 1.0 | 0.9 | 1.0 | 0.5 | 0.1 | 0.0 | 5.3 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.3 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 1.8 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 19.1 | 19.6 | 17.9 | 17.6 | 23.3 | 17.4 | 11.2 | 12.8 | 18.6 | 22.1 | 20.6 | 13.4 | 213.5 |
| Pumps & Aux. | 13.6 | 10.6 | 9.7 | 7.7 | 9.0 | 8.1 | 7.5 | 7.5 | 7.6 | 8.6 | 9.1 | 11.6 | 110.6 |
| Ext. Usage | 4.6 | 3.6 | 3.9 | 3.8 | 2.7 | 2.6 | 2.7 | 4.4 | 4.3 | 4.4 | 4.5 | 4.6 | 46.3 |
| Misc. Equip. | 45.4 | 49.5 | 47.0 | 43.5 | 57.0 | 37.6 | 20.4 | 22.4 | 44.2 | 54.8 | 52.3 | 33.1 | 507.3 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 42.7 | 47.1 | 43.7 | 40.7 | 54.3 | 35.5 | 19.1 | 20.9 | 42.0 | 52.1 | 49.7 | 30.0 | 477.9 |
| Total | 147.7 | 150.2 | 141.6 | 137.3 | 195.6 | 155.0 | 107.6 | 116.3 | 176.2 | 182.3 | 158.8 | 112.3 | 1,780.9 |

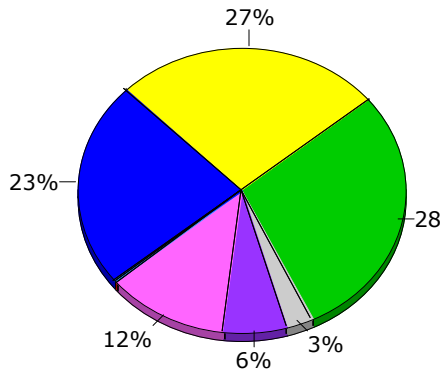
Gas Consumption (Btu x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 580.4 | 502.1 | 338.1 | 191.4 | 128.9 | 88.3 | 80.1 | 83.8 | 85.6 | 126.3 | 279.0 | 325.4 | 2,809.3 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 111.1 | 124.6 | 118.5 | 108.2 | 132.3 | 78.5 | 37.7 | 39.4 | 84.9 | 109.9 | 111.9 | 76.9 | 1,134.0 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 66.2 | 71.3 | 70.8 | 64.0 | 82.5 | 56.0 | 30.8 | 35.3 | 64.0 | 78.8 | 75.1 | 50.8 | 745.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 757.7 | 698.0 | 527.4 | 363.6 | 343.8 | 222.8 | 148.6 | 158.5 | 234.5 | 315.0 | 466.0 | 453.0 | 4,688.9 |

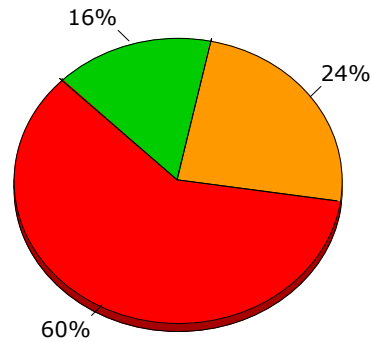
Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 418.0 | - | - | - |
| Heat Reject. | 5.3 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 1.8 | 2,809.3 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,134.0 | - | - |
| Vent. Fans | 213.5 | - | - | - |
| Pumps & Aux. | 110.6 | - | - | - |
| Ext. Usage | 46.3 | - | - | - |
| Misc. Equip. | 507.3 | 745.6 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 477.9 | - | - | - |
| Total | 1,780.9 | 4,688.9 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

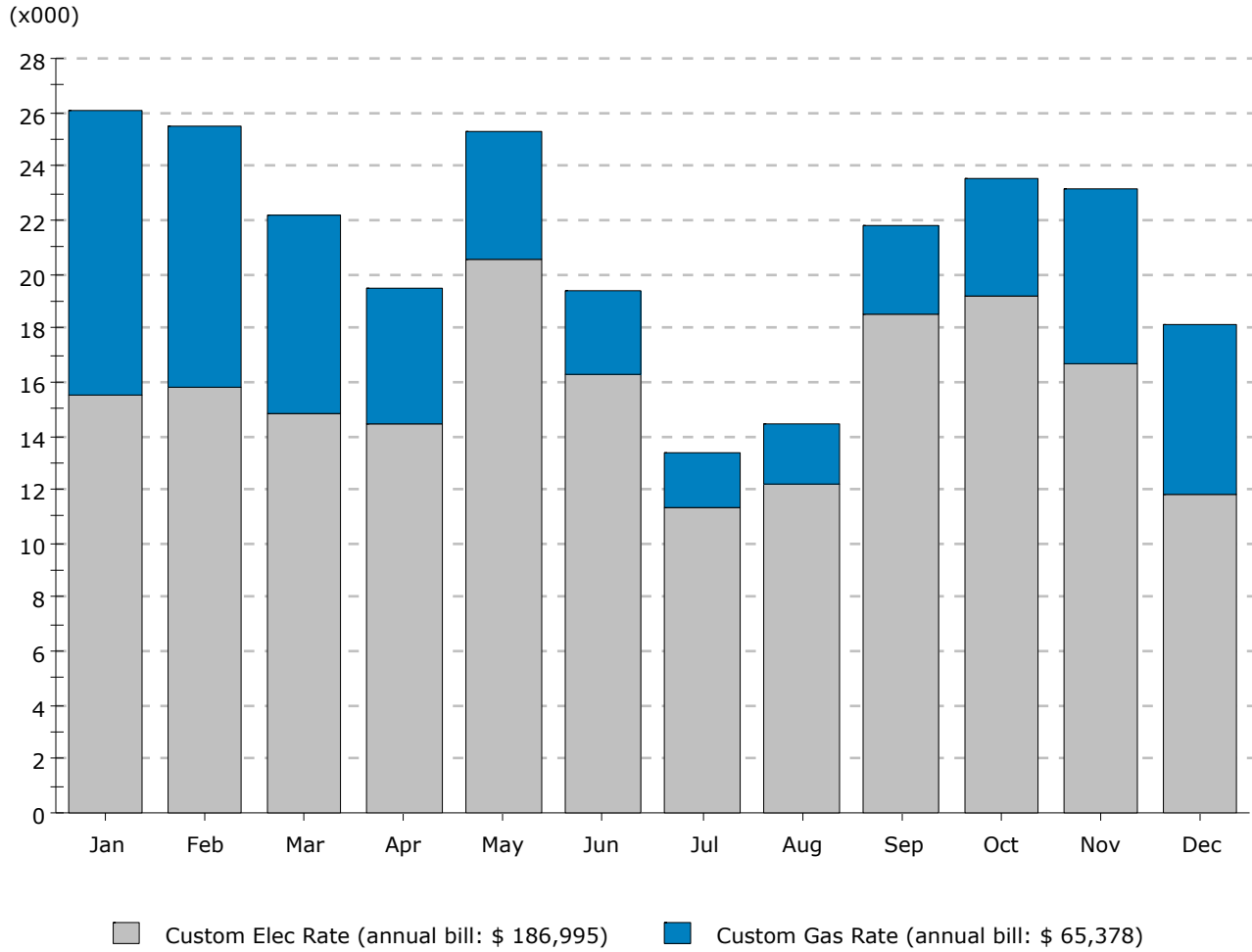


Electricity



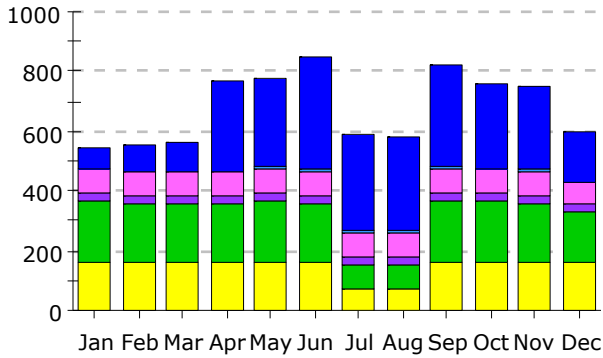
Natural Gas

Monthly Utility Bills (\$)

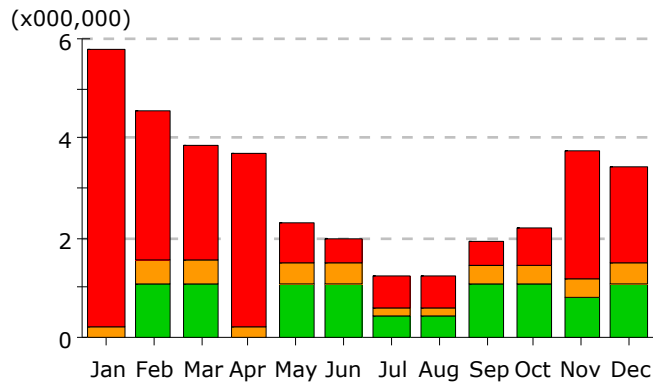


Total Annual Bill Across All Rates: \$ 252,373

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Demand (kW)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 68.6 | 87.6 | 96.0 | 297.6 | 297.0 | 372.6 | 318.8 | 311.2 | 342.4 | 285.1 | 281.9 | 168.1 | 2,926.9 |
| Heat Reject. | - | - | - | 4.2 | 8.0 | 9.7 | 9.0 | 10.2 | 7.3 | 5.7 | 4.6 | 0.7 | 59.4 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 1.0 | 0.8 | 0.8 | 0.5 | 0.3 | 0.4 | 0.5 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 5.9 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 79.3 | 78.4 | 79.3 | 77.2 | 81.8 | 79.2 | 76.8 | 76.9 | 78.9 | 79.5 | 78.2 | 78.5 | 944.1 |
| Pumps & Aux. | 27.4 | 27.1 | 27.0 | 26.7 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 | 26.8 | 26.6 | 26.6 | 322.7 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 204.8 | 199.6 | 199.6 | 199.6 | 204.8 | 199.6 | 85.1 | 81.7 | 204.8 | 204.8 | 199.6 | 166.0 | 2,150.1 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 69.4 | 69.4 | 160.1 | 160.1 | 160.1 | 160.1 | 1,739.6 |
| Total | 541.2 | 553.6 | 562.7 | 765.9 | 778.9 | 848.5 | 586.6 | 576.8 | 820.8 | 762.2 | 751.3 | 600.3 | 8,148.7 |

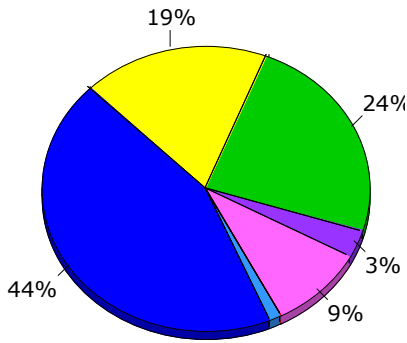
Gas Demand (Btu/h x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 5.60 | 3.01 | 2.29 | 3.50 | 0.81 | 0.47 | 0.66 | 0.68 | 0.48 | 0.73 | 2.57 | 1.94 | 22.74 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.20 | 0.45 | 0.45 | 0.20 | 0.42 | 0.39 | 0.14 | 0.14 | 0.35 | 0.36 | 0.38 | 0.41 | 3.89 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.01 | 1.10 | 1.10 | 0.01 | 1.10 | 1.10 | 0.43 | 0.43 | 1.10 | 1.10 | 0.81 | 1.10 | 9.37 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 5.80 | 4.56 | 3.84 | 3.71 | 2.32 | 1.96 | 1.24 | 1.25 | 1.93 | 2.19 | 3.76 | 3.45 | 36.01 |

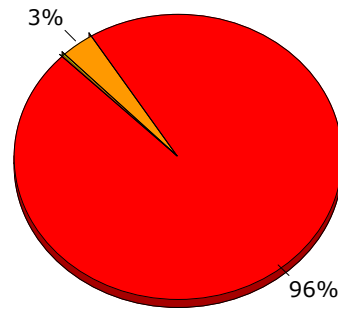
Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 372.62 | - | - | - |
| Heat Reject. | 9.68 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.35 | 5,595.9 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 197.4 | - | - |
| Vent. Fans | 79.24 | - | - | - |
| Pumps & Aux. | 26.92 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 199.57 | 11.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 160.09 | - | - | - |
| Total | 848.48 | 5,804.3 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

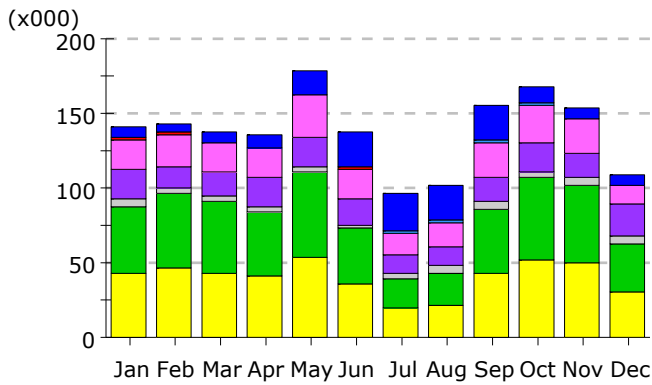


Electricity

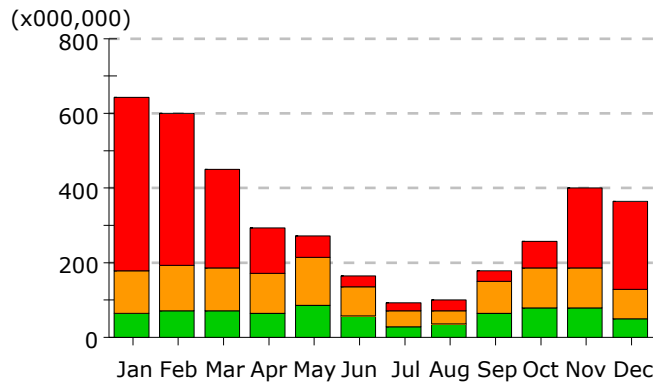


Natural Gas

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

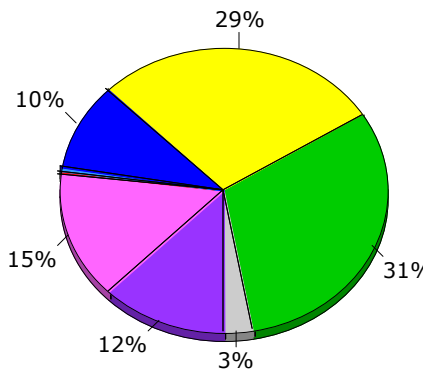
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 7.4 | 6.6 | 6.9 | 9.0 | 16.6 | 22.4 | 24.9 | 23.2 | 23.3 | 11.7 | 8.0 | 7.0 | 166.8 |
| Heat Reject. | 0.0 | 0.0 | 0.0 | 0.1 | 0.8 | 1.5 | 1.9 | 1.7 | 1.5 | 0.4 | 0.1 | 0.0 | 7.9 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.6 | 0.4 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.4 | 0.5 | 3.3 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 20.1 | 21.4 | 18.7 | 19.0 | 28.0 | 21.3 | 13.8 | 14.8 | 23.6 | 26.1 | 22.9 | 13.3 | 242.9 |
| Pumps & Aux. | 20.0 | 14.7 | 16.3 | 19.0 | 19.6 | 16.3 | 13.2 | 13.5 | 16.0 | 18.5 | 16.6 | 20.9 | 204.5 |
| Ext. Usage | 4.6 | 3.6 | 3.9 | 3.8 | 2.7 | 2.6 | 2.7 | 4.4 | 4.3 | 4.4 | 4.5 | 4.6 | 46.3 |
| Misc. Equip. | 45.4 | 49.5 | 47.0 | 43.5 | 57.0 | 37.6 | 20.4 | 22.4 | 44.2 | 54.8 | 52.3 | 33.1 | 507.3 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 42.7 | 47.1 | 43.7 | 40.7 | 54.3 | 35.5 | 19.1 | 20.9 | 42.0 | 52.1 | 49.7 | 30.0 | 477.9 |
| Total | 140.9 | 143.3 | 136.9 | 135.3 | 179.2 | 137.4 | 96.1 | 101.0 | 154.9 | 168.1 | 154.4 | 109.5 | 1,657.0 |

Gas Consumption (Btu x000,000)

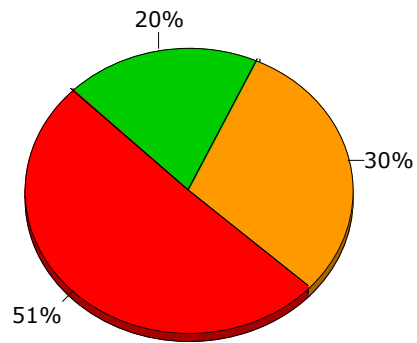
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 464.9 | 401.0 | 258.4 | 120.9 | 54.9 | 28.1 | 22.8 | 25.9 | 28.7 | 67.7 | 209.7 | 238.3 | 1,921.4 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 111.0 | 124.5 | 118.4 | 108.1 | 132.2 | 78.5 | 37.6 | 39.4 | 84.8 | 109.8 | 111.8 | 76.8 | 1,132.9 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 66.2 | 71.3 | 70.8 | 64.0 | 82.5 | 56.0 | 30.8 | 35.3 | 64.0 | 78.8 | 75.1 | 50.8 | 745.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 642.1 | 596.8 | 447.6 | 292.9 | 269.6 | 162.6 | 91.3 | 100.6 | 177.6 | 256.3 | 396.6 | 365.9 | 3,799.9 |

Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 166.8 | - | - | - |
| Heat Reject. | 7.9 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 3.3 | 1,921.4 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,132.9 | - | - |
| Vent. Fans | 242.9 | - | - | - |
| Pumps & Aux. | 204.5 | - | - | - |
| Ext. Usage | 46.3 | - | - | - |
| Misc. Equip. | 507.3 | 745.6 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 477.9 | - | - | - |
| Total | 1,657.0 | 3,799.9 | - | - |

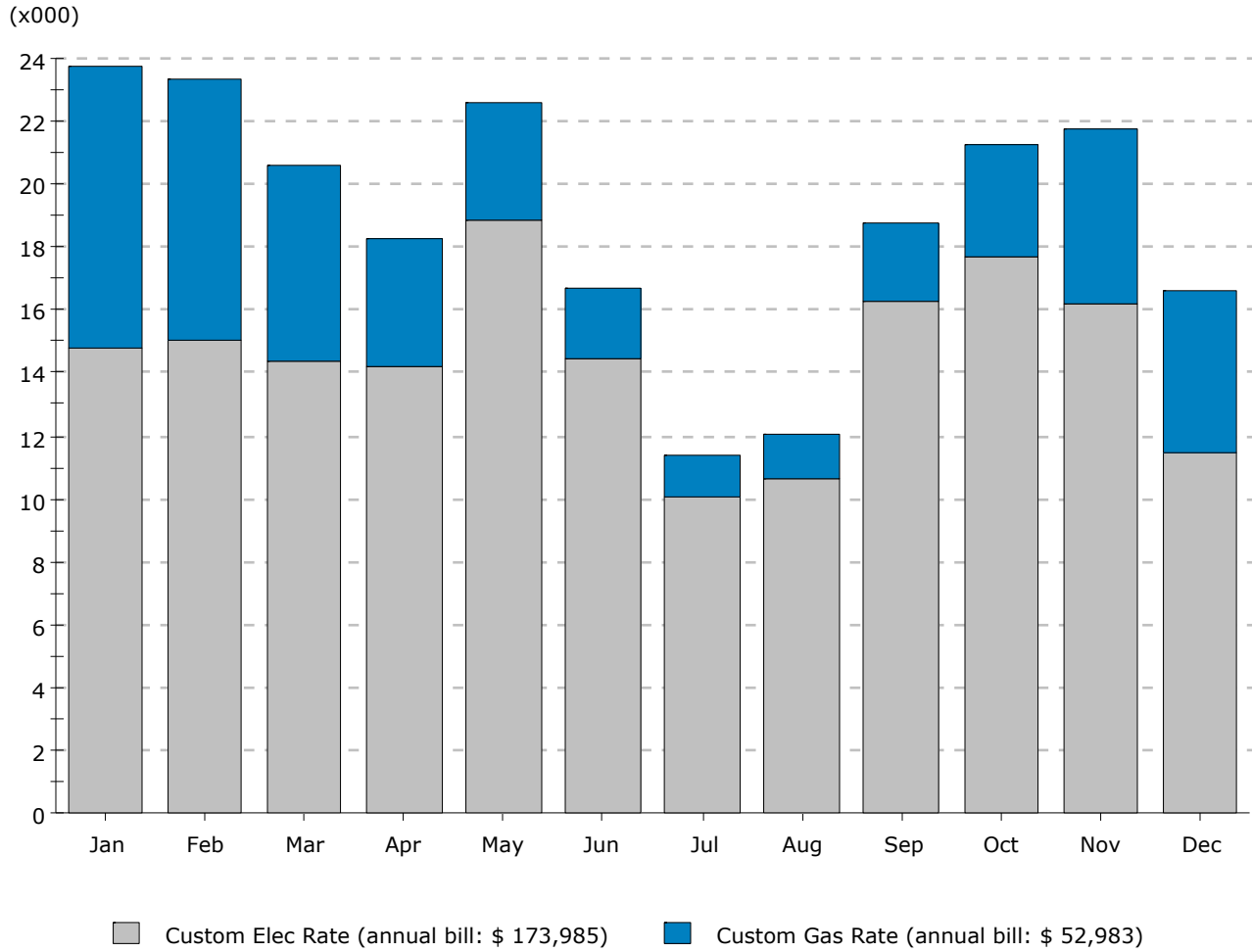


Electricity



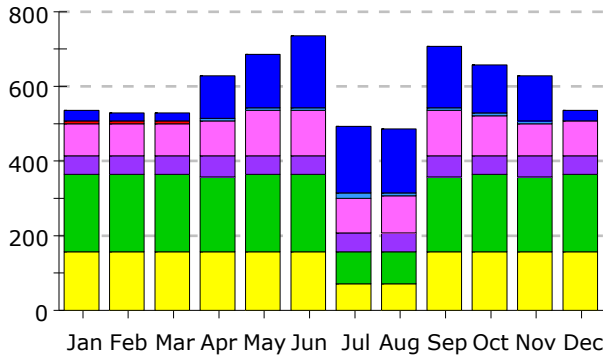
Natural Gas

Monthly Utility Bills (\$)

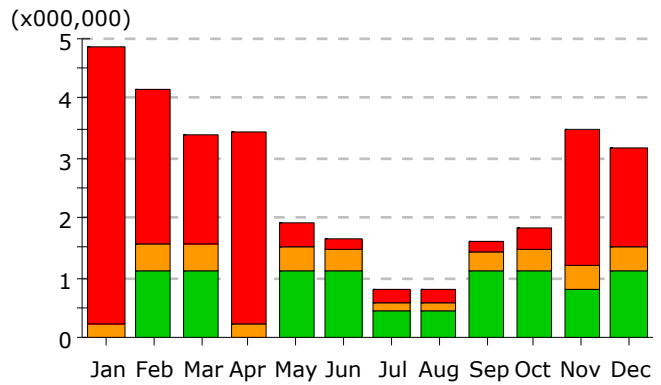


Total Annual Bill Across All Rates: \$ 226,968

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Demand (kW)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 29.2 | 27.5 | 26.9 | 112.1 | 141.7 | 188.8 | 182.9 | 167.5 | 163.7 | 124.4 | 116.8 | 28.0 | 1,309.4 |
| Heat Reject. | - | - | - | 8.5 | 8.7 | 9.4 | 8.6 | 8.6 | 9.0 | 8.5 | 8.5 | - | 69.8 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 2.2 | 1.7 | 1.6 | 0.7 | - | 0.5 | 0.7 | 0.7 | 0.5 | 0.3 | 0.5 | 1.4 | 10.8 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 87.7 | 86.7 | 86.9 | 95.2 | 116.3 | 116.2 | 96.0 | 98.1 | 122.0 | 105.0 | 88.4 | 91.2 | 1,189.7 |
| Pumps & Aux. | 50.9 | 50.5 | 50.3 | 51.1 | 51.8 | 52.5 | 51.4 | 51.3 | 52.1 | 51.4 | 51.2 | 49.9 | 614.4 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 204.8 | 204.8 | 204.8 | 199.6 | 204.8 | 204.8 | 85.1 | 86.8 | 199.6 | 204.8 | 199.6 | 204.8 | 2,204.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 160.1 | 69.4 | 69.4 | 160.1 | 160.1 | 160.1 | 160.1 | 1,739.6 |
| Total | 534.9 | 531.4 | 530.7 | 627.2 | 683.4 | 732.3 | 494.1 | 482.3 | 707.0 | 654.6 | 625.0 | 535.4 | 7,138.4 |

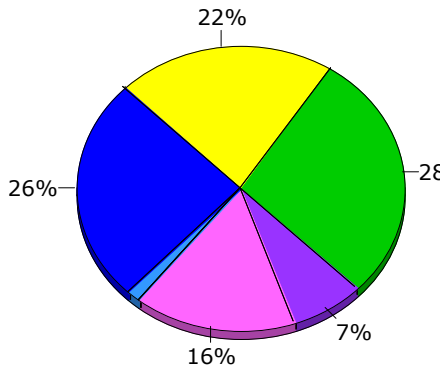
Gas Demand (Btu/h x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 4.64 | 2.59 | 1.83 | 3.20 | 0.41 | 0.17 | 0.23 | 0.24 | 0.18 | 0.36 | 2.28 | 1.67 | 17.81 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.20 | 0.45 | 0.45 | 0.20 | 0.42 | 0.39 | 0.14 | 0.14 | 0.35 | 0.36 | 0.38 | 0.41 | 3.89 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.01 | 1.10 | 1.10 | 0.01 | 1.10 | 1.10 | 0.43 | 0.43 | 1.10 | 1.10 | 0.81 | 1.10 | 9.37 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 4.85 | 4.14 | 3.38 | 3.42 | 1.93 | 1.66 | 0.80 | 0.81 | 1.62 | 1.81 | 3.48 | 3.18 | 31.07 |

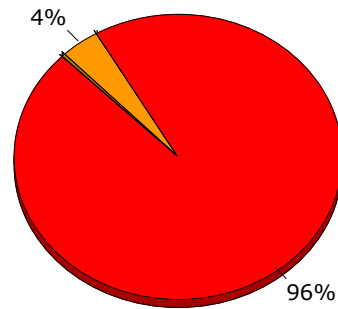
Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 188.76 | - | - | - |
| Heat Reject. | 9.44 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.45 | 4,638.5 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 197.3 | - | - |
| Vent. Fans | 116.23 | - | - | - |
| Pumps & Aux. | 52.53 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 204.85 | 11.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 160.09 | - | - | - |
| Total | 732.34 | 4,846.8 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling



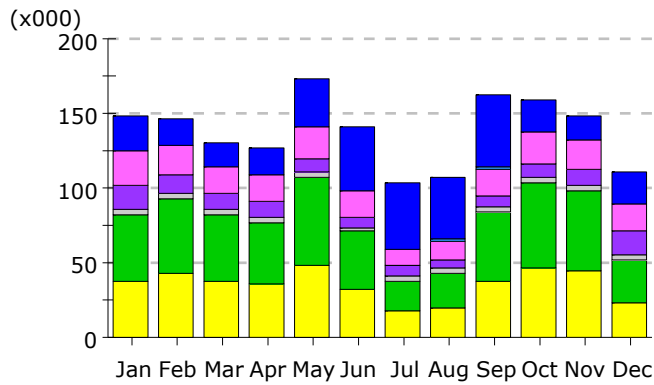
Electricity



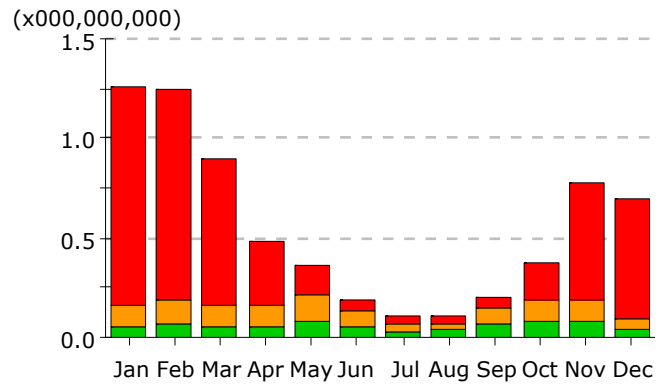
Natural Gas

ENERGY PROFILES
(Orientation 14B)

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 23.5 | 18.1 | 16.7 | 18.1 | 31.0 | 42.7 | 43.5 | 42.0 | 48.0 | 21.2 | 15.2 | 20.6 | 340.6 |
| Heat Reject. | - | - | - | 0.0 | 0.3 | 0.9 | 1.4 | 1.1 | 1.0 | 0.1 | 0.0 | - | 4.9 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.6 | 0.6 | 0.4 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 | 0.4 | 2.9 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 22.7 | 20.0 | 17.3 | 17.4 | 21.9 | 16.6 | 10.8 | 12.2 | 17.6 | 20.8 | 19.8 | 18.9 | 215.9 |
| Pumps & Aux. | 15.9 | 11.6 | 11.0 | 11.0 | 9.4 | 8.2 | 6.9 | 6.7 | 7.8 | 9.1 | 10.0 | 15.0 | 122.7 |
| Ext. Usage | 4.0 | 3.1 | 3.4 | 3.3 | 2.4 | 2.3 | 2.4 | 3.9 | 3.7 | 3.9 | 3.9 | 4.0 | 40.3 |
| Misc. Equip. | 44.7 | 51.1 | 44.7 | 42.1 | 58.8 | 38.8 | 21.0 | 23.1 | 45.6 | 56.5 | 53.9 | 28.2 | 508.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 37.2 | 42.5 | 37.2 | 35.1 | 48.9 | 32.0 | 17.2 | 18.9 | 37.9 | 46.9 | 44.8 | 23.6 | 422.2 |
| Total | 148.8 | 147.0 | 130.8 | 127.4 | 172.9 | 141.3 | 103.3 | 107.9 | 161.6 | 158.7 | 147.8 | 110.7 | 1,658.2 |

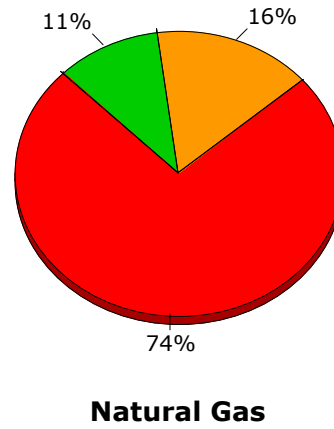
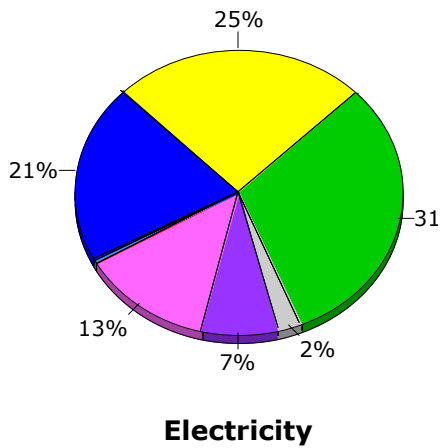
Gas Consumption (Btu x000,000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 1.10 | 1.06 | 0.73 | 0.33 | 0.15 | 0.05 | 0.04 | 0.04 | 0.05 | 0.19 | 0.59 | 0.60 | 4.93 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.10 | 0.12 | 0.11 | 0.10 | 0.13 | 0.08 | 0.04 | 0.04 | 0.08 | 0.11 | 0.11 | 0.06 | 1.06 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.06 | 0.07 | 0.06 | 0.06 | 0.08 | 0.06 | 0.03 | 0.04 | 0.06 | 0.08 | 0.08 | 0.03 | 0.71 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 1.26 | 1.25 | 0.89 | 0.48 | 0.37 | 0.18 | 0.10 | 0.11 | 0.20 | 0.38 | 0.78 | 0.69 | 6.70 |

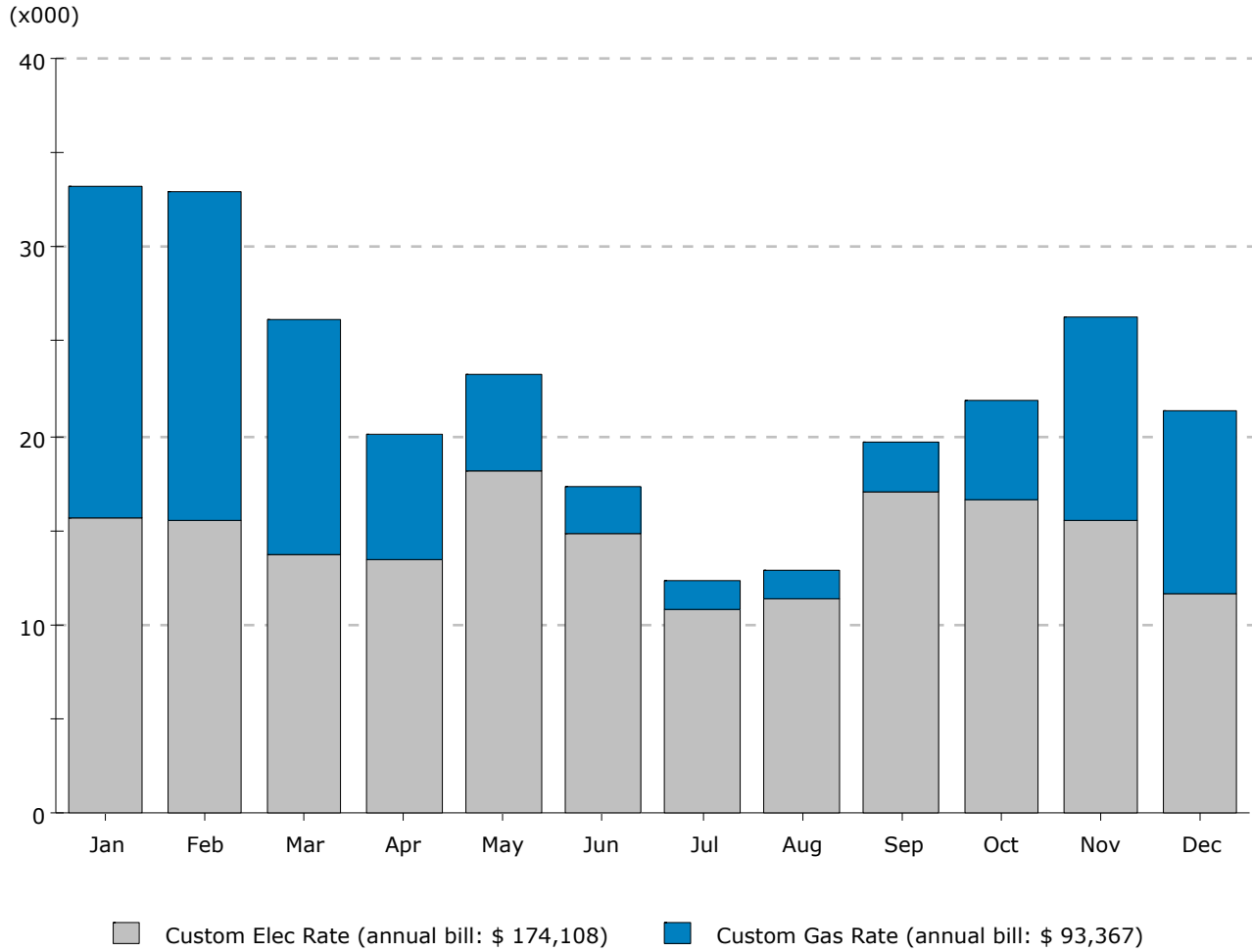
Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 340.6 | - | - | - |
| Heat Reject. | 4.9 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 2.9 | 4,928.6 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,062.7 | - | - |
| Vent. Fans | 215.9 | - | - | - |
| Pumps & Aux. | 122.7 | - | - | - |
| Ext. Usage | 40.3 | - | - | - |
| Misc. Equip. | 508.6 | 705.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 422.2 | - | - | - |
| Total | 1,658.2 | 6,696.4 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

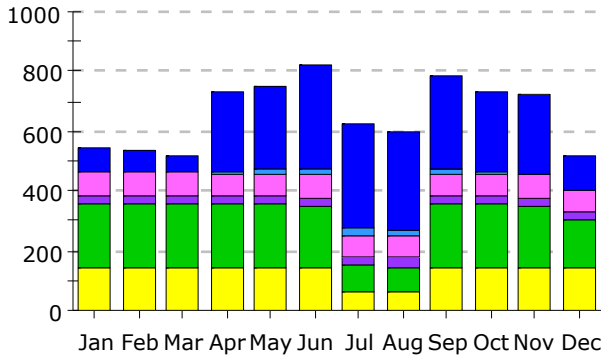


Monthly Utility Bills (\$)

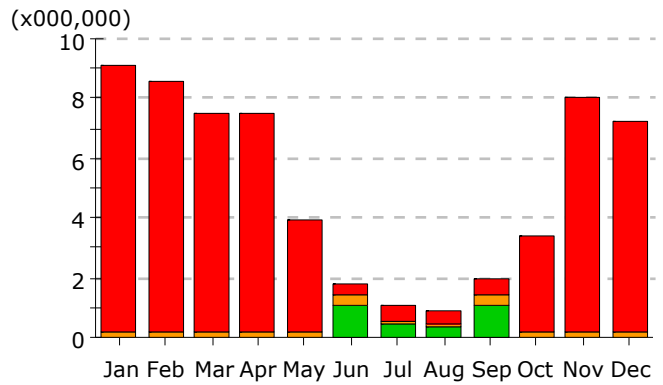


Total Annual Bill Across All Rates: \$ 267,475

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Demand (kW)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 74.2 | 66.9 | 56.3 | 268.9 | 278.8 | 351.6 | 349.2 | 333.7 | 311.9 | 264.5 | 264.4 | 112.5 | 2,733.1 |
| Heat Reject. | - | - | - | 4.3 | 10.2 | 16.3 | 19.1 | 16.2 | 11.2 | 6.9 | 4.5 | - | 88.7 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 3.0 | 3.2 | 2.6 | 0.3 | - | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.4 | 10.6 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 80.9 | 78.9 | 76.9 | 75.0 | 77.2 | 76.5 | 75.4 | 75.5 | 76.0 | 75.8 | 75.3 | 75.1 | 918.4 |
| Pumps & Aux. | 30.1 | 30.1 | 29.9 | 27.9 | 28.1 | 28.7 | 28.7 | 28.6 | 28.4 | 28.0 | 27.8 | 27.9 | 344.4 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 210.1 | 210.1 | 210.1 | 210.1 | 210.1 | 204.8 | 87.4 | 84.0 | 210.1 | 210.1 | 204.8 | 161.3 | 2,213.2 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 62.5 | 62.5 | 144.2 | 144.2 | 144.2 | 140.4 | 1,563.2 |
| Total | 542.5 | 533.5 | 520.0 | 730.8 | 748.7 | 822.3 | 622.5 | 600.8 | 782.1 | 729.6 | 721.3 | 517.7 | 7,871.6 |

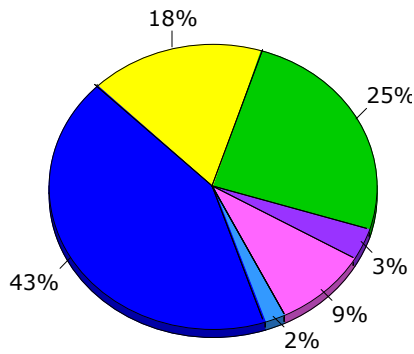
Gas Demand (Btu/h x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 8.93 | 8.40 | 7.32 | 7.32 | 3.76 | 0.31 | 0.53 | 0.48 | 0.51 | 3.21 | 7.85 | 7.03 | 55.66 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.19 | 0.20 | 0.20 | 0.19 | 0.18 | 0.38 | 0.14 | 0.13 | 0.33 | 0.16 | 0.17 | 0.18 | 2.43 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 1.10 | 0.43 | 0.31 | 1.10 | 0.01 | 0.01 | 0.01 | 3.03 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 9.13 | 8.61 | 7.53 | 7.53 | 3.95 | 1.78 | 1.10 | 0.92 | 1.94 | 3.38 | 8.03 | 7.22 | 61.12 |

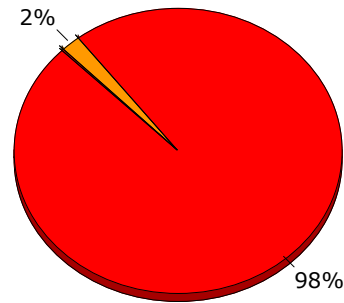
Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 351.61 | - | - | - |
| Heat Reject. | 16.28 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.17 | 8,926.8 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 189.5 | - | - |
| Vent. Fans | 76.46 | - | - | - |
| Pumps & Aux. | 28.70 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 204.84 | 11.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 144.20 | - | - | - |
| Total | 822.26 | 9,127.3 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

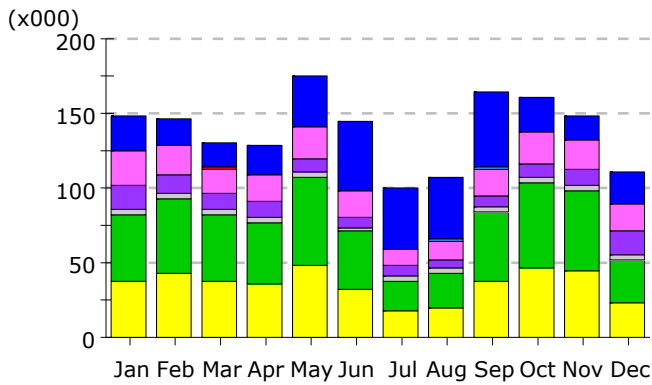


Electricity

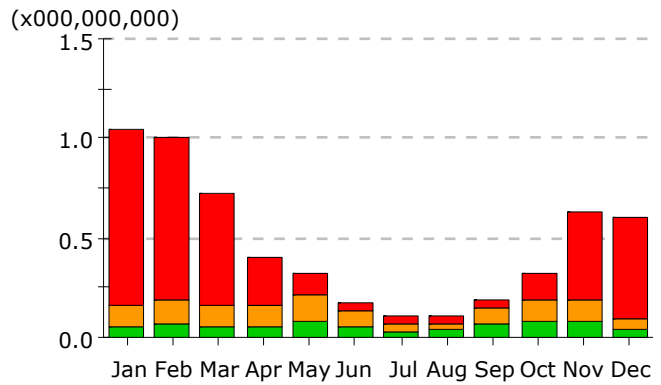


Natural Gas

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 23.6 | 18.3 | 16.9 | 18.9 | 33.5 | 45.5 | 40.7 | 41.6 | 50.0 | 23.1 | 15.7 | 20.8 | 348.7 |
| Heat Reject. | - | - | - | 0.1 | 0.4 | 1.0 | 1.2 | 1.0 | 1.1 | 0.2 | 0.0 | - | 5.0 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 | 0.3 | 2.4 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 22.5 | 19.7 | 17.1 | 17.4 | 21.9 | 16.6 | 10.8 | 12.2 | 17.6 | 20.8 | 19.7 | 18.8 | 215.0 |
| Pumps & Aux. | 15.9 | 11.5 | 10.9 | 11.1 | 9.4 | 8.2 | 6.9 | 6.7 | 7.8 | 9.1 | 9.9 | 14.9 | 122.3 |
| Ext. Usage | 4.0 | 3.1 | 3.4 | 3.3 | 2.4 | 2.3 | 2.4 | 3.9 | 3.7 | 3.9 | 3.9 | 4.0 | 40.3 |
| Misc. Equip. | 44.7 | 51.1 | 44.7 | 42.1 | 58.8 | 38.8 | 21.0 | 23.1 | 45.6 | 56.5 | 53.9 | 28.2 | 508.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 37.2 | 42.5 | 37.2 | 35.1 | 48.9 | 32.0 | 17.2 | 18.9 | 37.9 | 46.9 | 44.8 | 23.6 | 422.2 |
| Total | 148.4 | 146.5 | 130.6 | 128.2 | 175.4 | 144.3 | 100.2 | 107.4 | 163.8 | 160.6 | 148.1 | 110.8 | 1,664.4 |

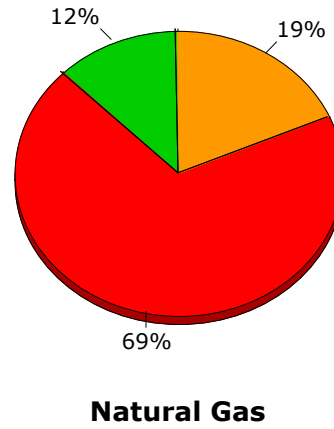
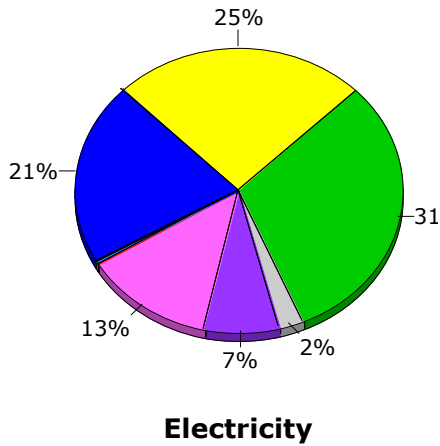
Gas Consumption (Btu x000,000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.88 | 0.81 | 0.55 | 0.25 | 0.12 | 0.05 | 0.04 | 0.04 | 0.05 | 0.14 | 0.45 | 0.51 | 3.88 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.10 | 0.12 | 0.11 | 0.10 | 0.13 | 0.08 | 0.04 | 0.04 | 0.08 | 0.11 | 0.11 | 0.06 | 1.06 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.06 | 0.07 | 0.06 | 0.06 | 0.08 | 0.06 | 0.03 | 0.04 | 0.06 | 0.08 | 0.08 | 0.03 | 0.71 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 1.05 | 1.00 | 0.72 | 0.41 | 0.33 | 0.18 | 0.10 | 0.11 | 0.19 | 0.32 | 0.63 | 0.60 | 5.65 |

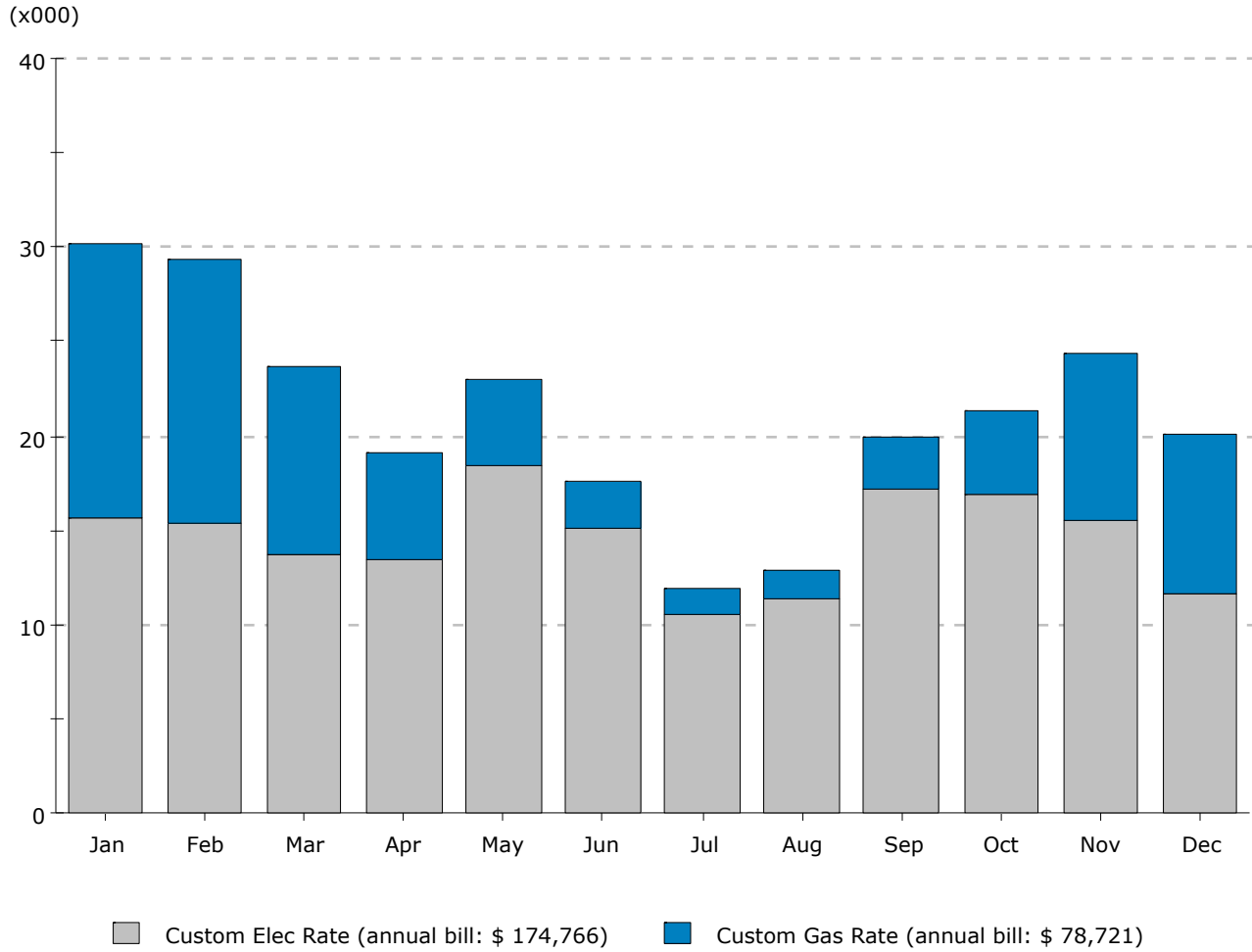
Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 348.7 | - | - | - |
| Heat Reject. | 5.0 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 2.4 | 3,878.7 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,062.2 | - | - |
| Vent. Fans | 215.0 | - | - | - |
| Pumps & Aux. | 122.3 | - | - | - |
| Ext. Usage | 40.3 | - | - | - |
| Misc. Equip. | 508.6 | 705.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 422.2 | - | - | - |
| Total | 1,664.4 | 5,645.9 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

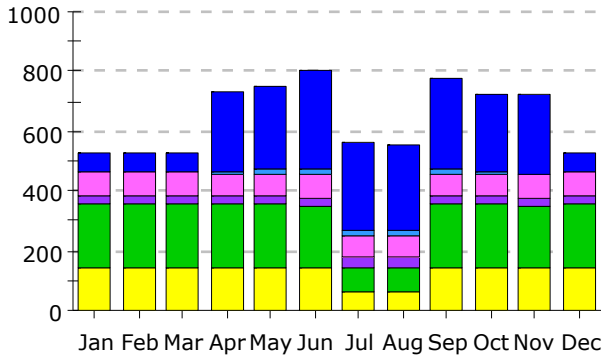


Monthly Utility Bills (\$)

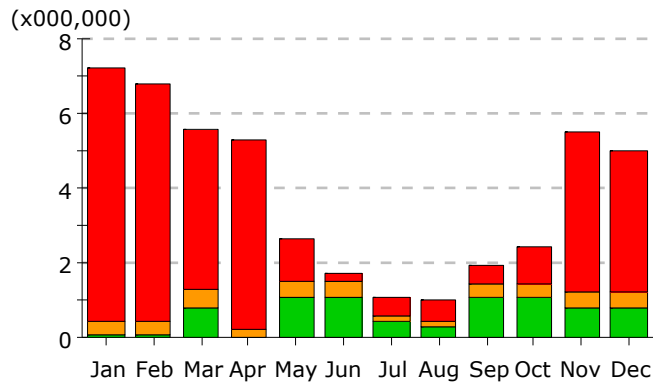


Total Annual Bill Across All Rates: \$ 253,487

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Demand (kW)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 64.4 | 63.9 | 62.0 | 267.3 | 275.4 | 336.5 | 297.7 | 286.3 | 305.1 | 261.8 | 262.5 | 62.0 | 2,545.0 |
| Heat Reject. | - | - | - | 4.5 | 10.5 | 15.5 | 12.7 | 13.1 | 10.8 | 7.3 | 5.4 | - | 79.6 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 3.2 | 2.2 | 1.9 | 0.3 | - | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 1.6 | 10.3 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 77.2 | 76.9 | 76.7 | 75.0 | 77.2 | 76.4 | 76.0 | 75.4 | 76.0 | 75.8 | 75.3 | 76.8 | 914.8 |
| Pumps & Aux. | 30.1 | 29.7 | 29.5 | 27.9 | 28.2 | 28.6 | 28.3 | 28.3 | 28.4 | 28.0 | 27.8 | 29.3 | 344.0 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 210.1 | 210.1 | 210.1 | 210.1 | 210.1 | 204.8 | 84.0 | 84.0 | 210.1 | 210.1 | 204.8 | 210.1 | 2,258.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 62.5 | 62.5 | 144.2 | 144.2 | 144.2 | 144.2 | 1,567.0 |
| Total | 529.2 | 527.0 | 524.4 | 729.4 | 745.6 | 806.2 | 561.5 | 549.7 | 774.8 | 727.3 | 720.3 | 524.0 | 7,719.3 |

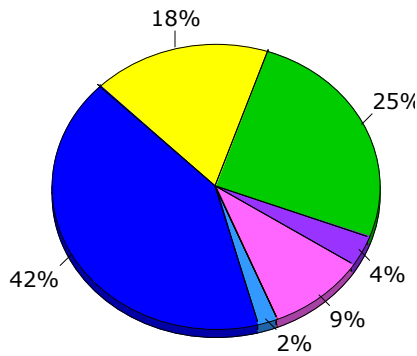
Gas Demand (Btu/h x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 6.82 | 6.34 | 4.31 | 5.09 | 1.15 | 0.27 | 0.54 | 0.53 | 0.47 | 1.02 | 4.31 | 3.78 | 34.64 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.34 | 0.35 | 0.44 | 0.19 | 0.40 | 0.38 | 0.14 | 0.13 | 0.33 | 0.35 | 0.37 | 0.40 | 3.82 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.08 | 0.08 | 0.81 | 0.01 | 1.10 | 1.10 | 0.43 | 0.31 | 1.10 | 1.10 | 0.81 | 0.81 | 7.73 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 7.24 | 6.77 | 5.56 | 5.30 | 2.65 | 1.74 | 1.10 | 0.97 | 1.90 | 2.46 | 5.50 | 4.99 | 46.19 |

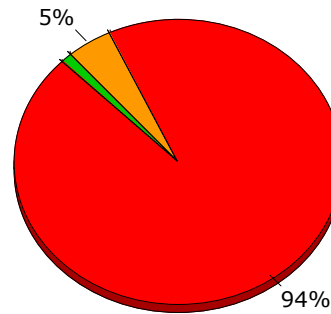
Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 336.46 | - | - | - |
| Heat Reject. | 15.47 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.17 | 6,821.5 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 340.7 | - | - |
| Vent. Fans | 76.42 | - | - | - |
| Pumps & Aux. | 28.59 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 204.84 | 76.8 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 144.20 | - | - | - |
| Total | 806.15 | 7,239.0 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

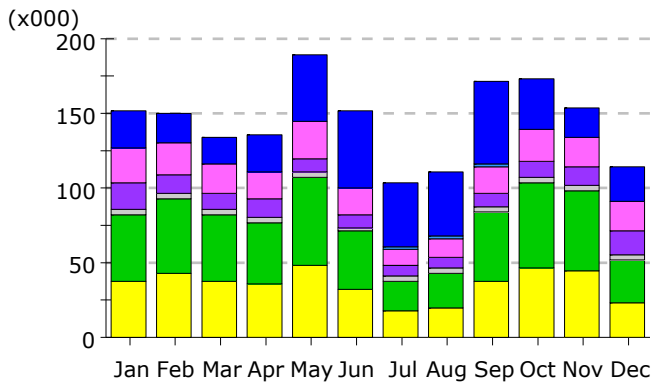


Electricity

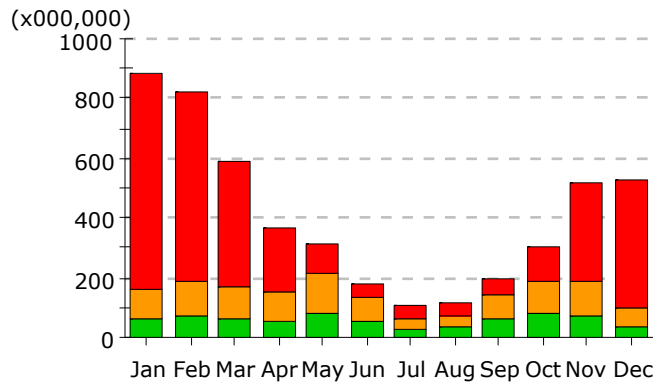


Natural Gas

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 24.9 | 19.2 | 18.3 | 24.0 | 44.9 | 50.9 | 42.1 | 43.2 | 54.8 | 33.9 | 18.7 | 22.4 | 397.4 |
| Heat Reject. | - | - | 0.0 | 0.1 | 0.6 | 1.1 | 1.3 | 1.1 | 1.2 | 0.3 | 0.0 | - | 5.8 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.4 | 0.3 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.3 | 2.0 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 23.8 | 21.1 | 18.3 | 18.5 | 23.4 | 17.7 | 11.6 | 13.1 | 18.8 | 22.2 | 21.1 | 19.8 | 229.4 |
| Pumps & Aux. | 17.2 | 12.5 | 11.8 | 11.9 | 10.4 | 8.9 | 7.3 | 7.2 | 8.6 | 10.1 | 10.8 | 16.0 | 132.8 |
| Ext. Usage | 4.0 | 3.1 | 3.4 | 3.3 | 2.4 | 2.3 | 2.4 | 3.9 | 3.7 | 3.9 | 3.9 | 4.0 | 40.3 |
| Misc. Equip. | 44.7 | 51.1 | 44.7 | 42.1 | 58.8 | 38.8 | 21.0 | 23.1 | 45.6 | 56.5 | 53.9 | 28.2 | 508.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 37.2 | 42.5 | 37.2 | 35.1 | 48.9 | 32.0 | 17.2 | 18.9 | 37.9 | 46.9 | 44.8 | 23.6 | 422.2 |
| Total | 152.3 | 149.7 | 134.0 | 135.3 | 189.6 | 151.7 | 103.0 | 110.6 | 170.6 | 173.9 | 153.4 | 114.3 | 1,738.5 |

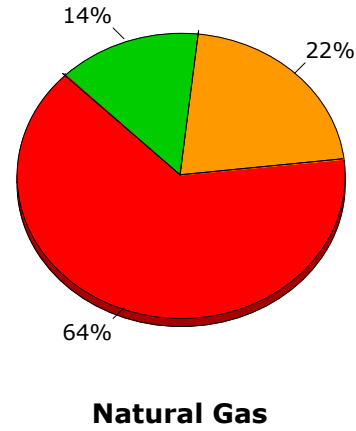
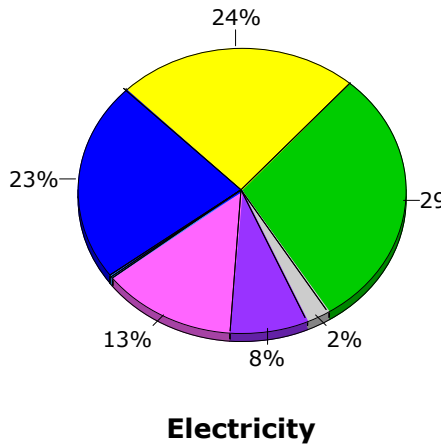
Gas Consumption (Btu x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 720.0 | 628.1 | 421.5 | 209.2 | 106.1 | 50.0 | 36.0 | 40.6 | 48.2 | 121.5 | 336.5 | 429.4 | 3,147.3 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 102.7 | 120.5 | 106.1 | 98.6 | 127.7 | 75.7 | 36.1 | 37.8 | 81.7 | 106.0 | 108.1 | 62.2 | 1,063.3 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 60.2 | 71.3 | 60.2 | 56.5 | 82.5 | 55.9 | 30.8 | 35.3 | 64.0 | 78.8 | 75.1 | 34.2 | 705.0 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 882.9 | 819.9 | 587.9 | 364.3 | 316.3 | 181.6 | 103.0 | 113.8 | 194.0 | 306.4 | 519.7 | 525.8 | 4,915.6 |

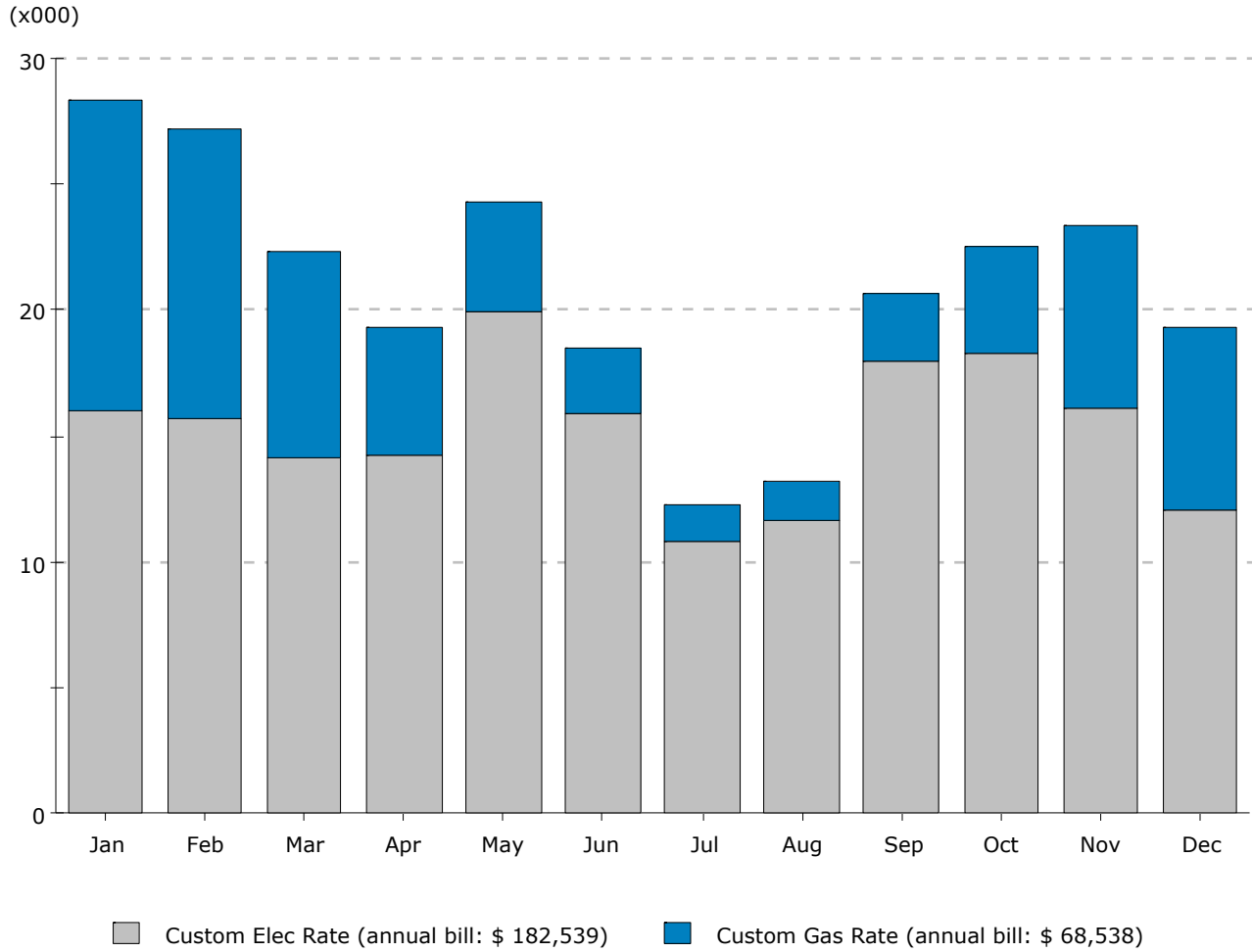
Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 397.4 | - | - | - |
| Heat Reject. | 5.8 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 2.0 | 3,147.3 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,063.3 | - | - |
| Vent. Fans | 229.4 | - | - | - |
| Pumps & Aux. | 132.8 | - | - | - |
| Ext. Usage | 40.3 | - | - | - |
| Misc. Equip. | 508.6 | 705.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 422.2 | - | - | - |
| Total | 1,738.5 | 4,915.6 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

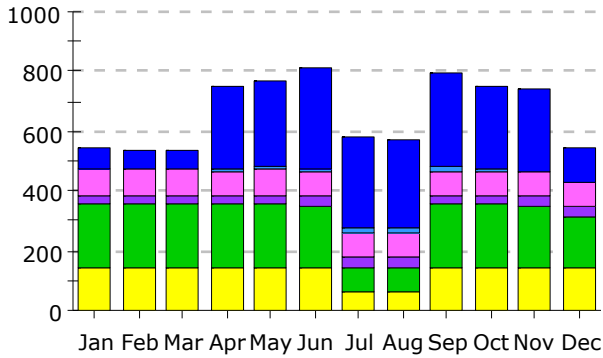


Monthly Utility Bills (\$)

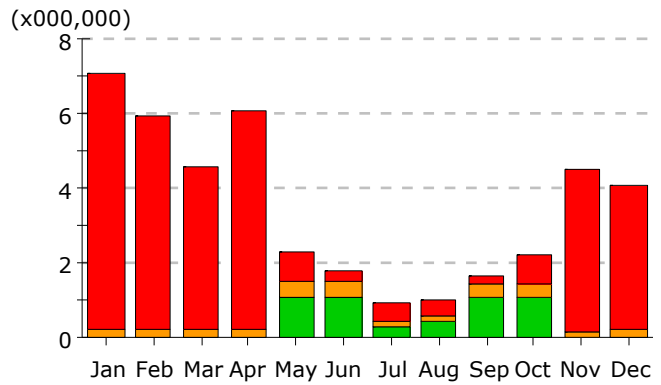


Total Annual Bill Across All Rates: \$ 251,077

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Demand (kW)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 67.6 | 67.3 | 64.9 | 276.2 | 284.1 | 338.5 | 307.0 | 294.9 | 312.0 | 270.4 | 269.9 | 119.9 | 2,672.8 |
| Heat Reject. | - | - | - | 4.9 | 10.4 | 13.9 | 12.9 | 12.7 | 10.3 | 7.6 | 6.4 | - | 79.1 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 2.2 | 1.5 | 1.3 | 0.3 | 0.1 | 0.2 | 0.2 | 0.4 | 0.2 | 0.1 | 0.2 | 0.3 | 6.8 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 82.7 | 82.3 | 82.1 | 80.5 | 82.7 | 81.9 | 81.5 | 81.0 | 81.4 | 81.2 | 80.8 | 80.9 | 978.9 |
| Pumps & Aux. | 33.6 | 33.2 | 33.1 | 32.0 | 32.2 | 32.4 | 32.4 | 32.3 | 32.3 | 32.1 | 32.0 | 31.9 | 389.7 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 210.1 | 210.1 | 210.1 | 210.1 | 210.1 | 204.8 | 84.0 | 84.0 | 210.1 | 210.1 | 204.8 | 171.2 | 2,219.7 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 62.5 | 62.5 | 144.2 | 144.2 | 144.2 | 144.2 | 1,567.0 |
| Total | 540.4 | 538.6 | 535.8 | 748.2 | 763.8 | 815.9 | 580.5 | 567.8 | 790.5 | 745.8 | 738.2 | 548.5 | 7,914.0 |

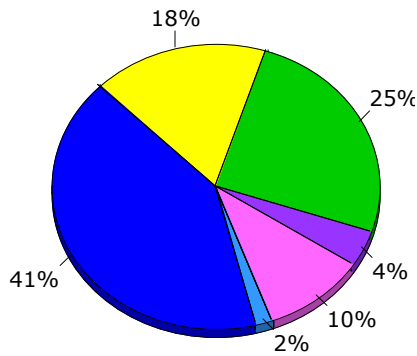
Gas Demand (Btu/h x1000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 6.84 | 5.73 | 4.38 | 5.89 | 0.82 | 0.31 | 0.49 | 0.41 | 0.22 | 0.74 | 4.34 | 3.90 | 34.07 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.19 | 0.20 | 0.20 | 0.19 | 0.40 | 0.38 | 0.13 | 0.13 | 0.33 | 0.35 | 0.17 | 0.18 | 2.85 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.01 | 0.01 | 0.01 | 0.01 | 1.10 | 1.10 | 0.31 | 0.43 | 1.10 | 1.10 | 0.01 | 0.01 | 5.20 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 7.04 | 5.94 | 4.59 | 6.09 | 2.32 | 1.78 | 0.94 | 0.97 | 1.66 | 2.18 | 4.52 | 4.09 | 42.12 |

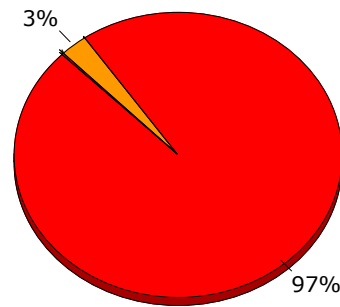
Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 338.48 | - | - | - |
| Heat Reject. | 13.89 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.16 | 6,839.8 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 190.9 | - | - |
| Vent. Fans | 81.86 | - | - | - |
| Pumps & Aux. | 32.44 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 204.84 | 11.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 144.20 | - | - | - |
| Total | 815.87 | 7,041.7 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

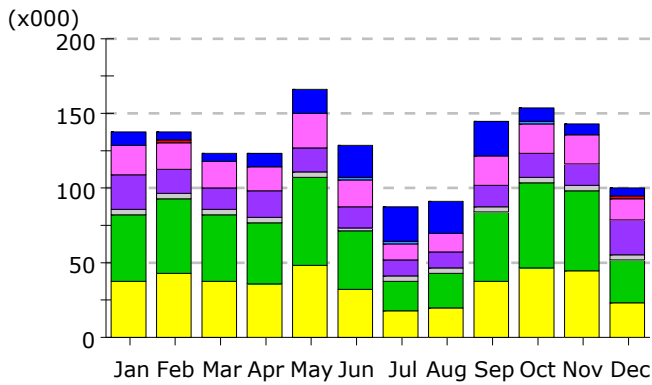


Electricity

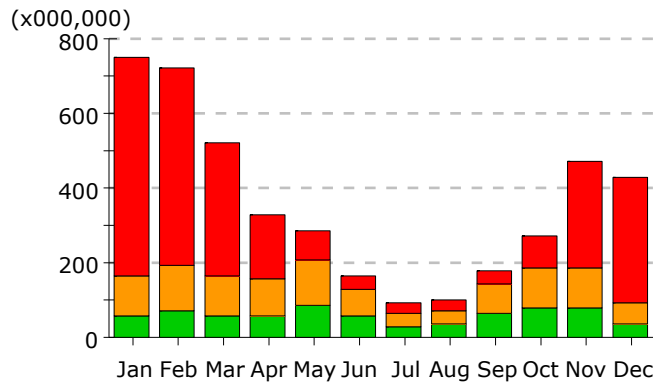


Natural Gas

Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

Electric Consumption (kWh x000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 7.6 | 6.6 | 6.1 | 7.8 | 15.4 | 21.1 | 23.5 | 20.5 | 22.9 | 10.2 | 6.7 | 6.5 | 155.1 |
| Heat Reject. | 0.0 | 0.0 | 0.0 | 0.1 | 0.6 | 1.2 | 1.5 | 1.3 | 1.3 | 0.3 | 0.1 | 0.0 | 6.6 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 0.7 | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.4 | 0.6 | 3.8 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 20.0 | 18.5 | 16.3 | 16.7 | 23.2 | 18.1 | 11.9 | 12.4 | 19.5 | 20.7 | 18.6 | 15.5 | 211.2 |
| Pumps & Aux. | 22.6 | 16.1 | 15.4 | 17.5 | 16.8 | 14.2 | 10.8 | 10.5 | 14.0 | 15.5 | 14.4 | 22.2 | 189.9 |
| Ext. Usage | 4.0 | 3.1 | 3.4 | 3.3 | 2.4 | 2.3 | 2.4 | 3.9 | 3.7 | 3.9 | 3.9 | 4.0 | 40.3 |
| Misc. Equip. | 44.7 | 51.1 | 44.7 | 42.1 | 58.8 | 38.8 | 21.0 | 23.1 | 45.6 | 56.5 | 53.9 | 28.2 | 508.6 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 37.2 | 42.5 | 37.2 | 35.1 | 48.9 | 32.0 | 17.2 | 18.9 | 37.9 | 46.9 | 44.8 | 23.6 | 422.2 |
| Total | 136.8 | 138.3 | 123.6 | 122.9 | 166.3 | 127.8 | 88.4 | 90.8 | 145.0 | 154.3 | 142.7 | 100.7 | 1,537.7 |

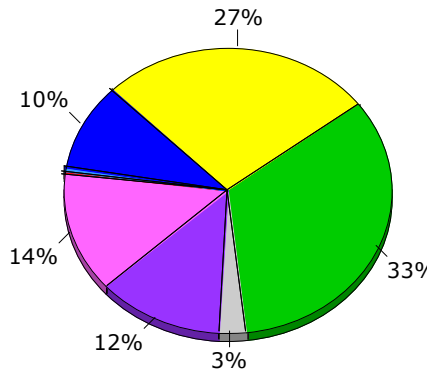
Gas Consumption (Btu x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 589.2 | 529.5 | 357.1 | 173.9 | 75.9 | 31.9 | 24.1 | 26.4 | 29.9 | 89.7 | 290.5 | 328.9 | 2,547.0 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 102.6 | 120.4 | 106.0 | 98.5 | 127.6 | 75.6 | 36.1 | 37.8 | 81.6 | 105.9 | 108.0 | 62.1 | 1,062.2 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 60.2 | 71.3 | 60.2 | 56.5 | 82.5 | 55.9 | 30.8 | 35.3 | 64.0 | 78.8 | 75.1 | 34.2 | 705.0 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 752.0 | 721.2 | 523.3 | 328.9 | 286.0 | 163.5 | 91.0 | 99.6 | 175.5 | 274.4 | 473.6 | 425.3 | 4,314.2 |

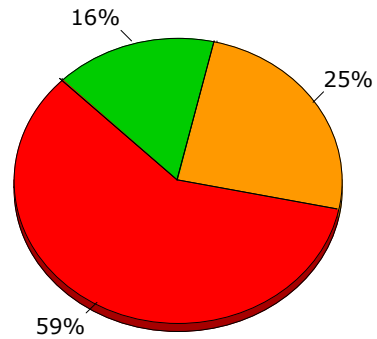
Annual Energy Consumption by Enduse

| | Electricity kWh (x000) | Natural Gas MBtu | Steam Btu | Chilled Water Btu |
|---------------|---------------------------|---------------------|--------------|----------------------|
| Space Cool | 155.1 | - | - | - |
| Heat Reject. | 6.6 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 3.8 | 2,547.0 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 1,062.2 | - | - |
| Vent. Fans | 211.2 | - | - | - |
| Pumps & Aux. | 189.9 | - | - | - |
| Ext. Usage | 40.3 | - | - | - |
| Misc. Equip. | 508.6 | 705.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 422.2 | - | - | - |
| Total | 1,537.7 | 4,314.2 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling

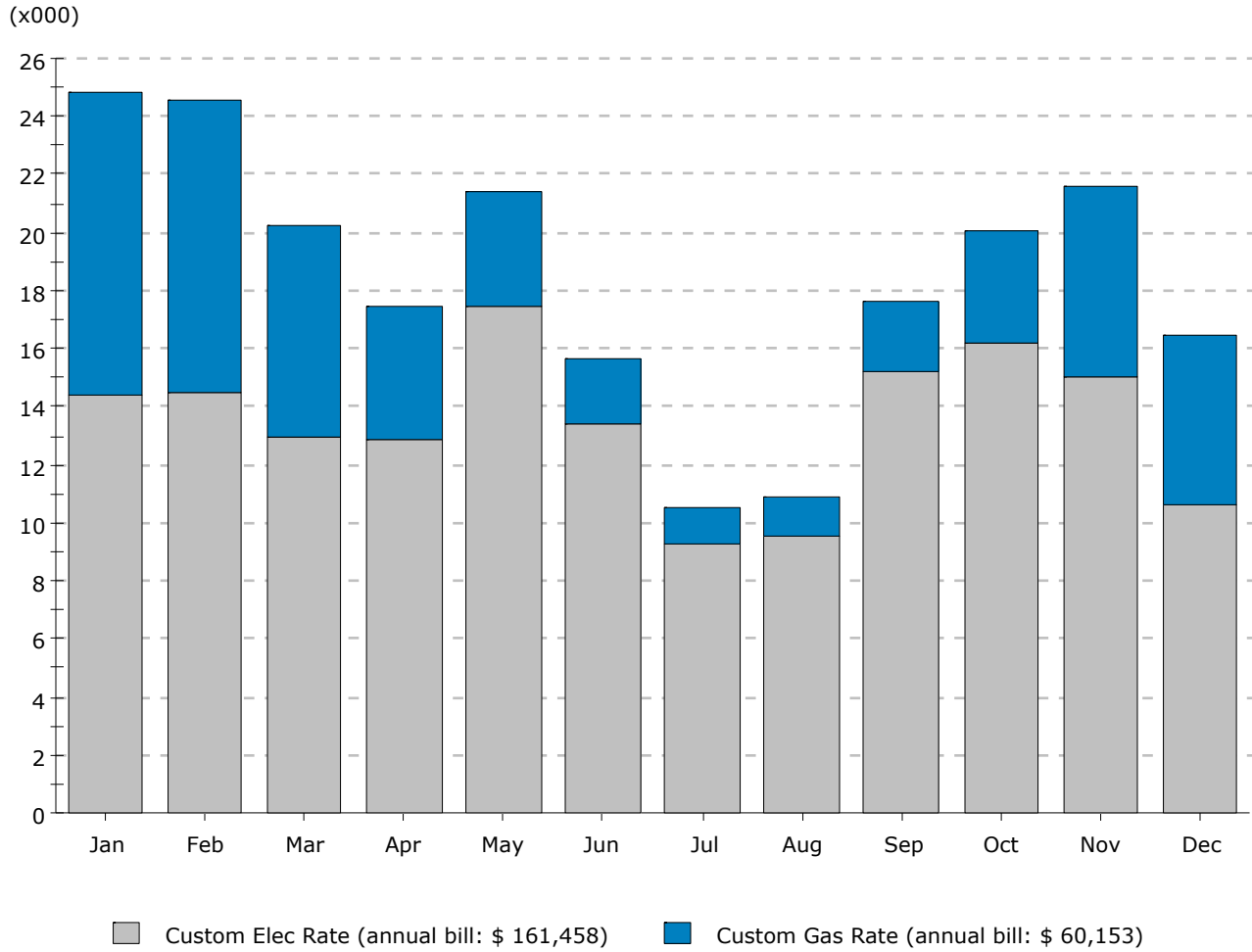


Electricity



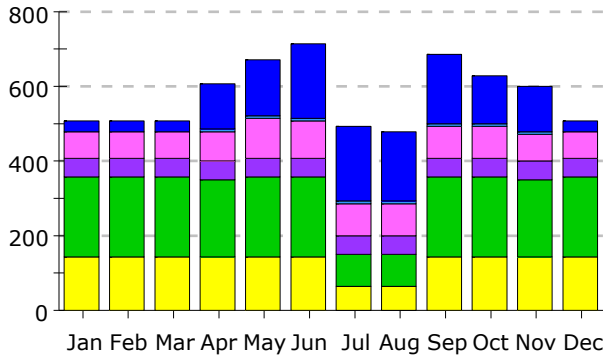
Natural Gas

Monthly Utility Bills (\$)

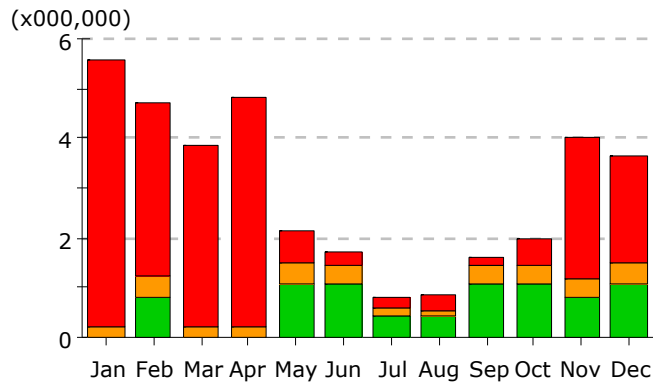


Total Annual Bill Across All Rates: \$ 221,611

Electric Demand (kW)



Gas Demand (Btu/h)



- Area Lighting
- Task Lighting
- Misc. Equipment
- Exterior Usage
- Pumps & Aux.
- Ventilation Fans
- Water Heating
- Ht Pump Supp.
- Refrigeration
- Heat Rejection
- Space Cooling

Electric Demand (kW)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| Space Cool | 27.8 | 26.7 | 27.0 | 118.4 | 152.2 | 200.0 | 195.0 | 184.3 | 184.4 | 128.1 | 121.8 | 27.1 | 1,392.8 |
| Heat Reject. | - | - | - | 8.5 | 8.7 | 9.3 | 8.6 | 8.6 | 8.9 | 8.5 | 8.5 | - | 69.7 |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 2.6 | 2.4 | 1.8 | 0.9 | - | 0.5 | 0.7 | 0.7 | - | 0.4 | 0.6 | 1.5 | 12.1 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Vent. Fans | 73.2 | 73.2 | 72.7 | 76.7 | 104.9 | 98.1 | 84.9 | 86.9 | 86.5 | 84.4 | 71.7 | 73.0 | 986.1 |
| Pumps & Aux. | 51.1 | 51.0 | 50.6 | 50.9 | 51.5 | 52.0 | 51.2 | 51.2 | 51.4 | 51.1 | 50.9 | 50.1 | 613.1 |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 210.1 | 210.1 | 210.1 | 204.8 | 210.1 | 210.1 | 87.4 | 84.0 | 210.1 | 210.1 | 204.8 | 210.1 | 2,262.0 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 144.2 | 62.5 | 62.5 | 144.2 | 144.2 | 144.2 | 144.2 | 1,567.0 |
| Total | 509.0 | 507.7 | 506.3 | 604.5 | 671.6 | 714.3 | 490.3 | 478.2 | 685.4 | 626.8 | 602.5 | 506.1 | 6,902.7 |

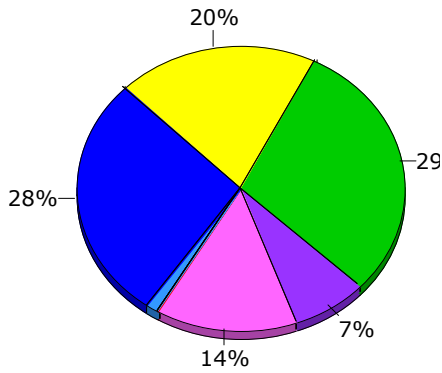
Gas Demand (Btu/h x000,000)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Space Cool | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Heat Reject. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Refrigeration | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Space Heat | 5.34 | 3.44 | 3.63 | 4.63 | 0.65 | 0.22 | 0.24 | 0.27 | 0.18 | 0.55 | 2.82 | 2.17 | 24.15 |
| HP Supp. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hot Water | 0.19 | 0.44 | 0.20 | 0.19 | 0.40 | 0.38 | 0.14 | 0.13 | 0.33 | 0.35 | 0.37 | 0.40 | 3.52 |
| Vent. Fans | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pumps & Aux. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ext. Usage | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Misc. Equip. | 0.01 | 0.81 | 0.01 | 0.01 | 1.10 | 1.10 | 0.43 | 0.43 | 1.10 | 1.10 | 0.81 | 1.10 | 8.00 |
| Task Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Area Lights | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | 5.55 | 4.69 | 3.83 | 4.84 | 2.15 | 1.69 | 0.81 | 0.83 | 1.61 | 2.00 | 4.00 | 3.67 | 35.66 |

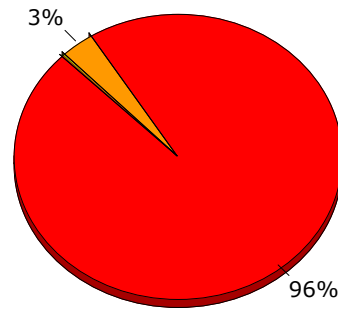
Annual Peak Demand by Enduse

| | Electricity kW | Natural Gas Btu/h (x000) | Steam Btu/h | Chilled Water Btu/h |
|---------------|-------------------|-----------------------------|----------------|------------------------|
| Space Cool | 200.02 | - | - | - |
| Heat Reject. | 9.31 | - | - | - |
| Refrigeration | - | - | - | - |
| Space Heat | 0.51 | 5,343.4 | - | - |
| HP Supp. | - | - | - | - |
| Hot Water | - | 190.7 | - | - |
| Vent. Fans | 98.11 | - | - | - |
| Pumps & Aux. | 52.00 | - | - | - |
| Ext. Usage | - | - | - | - |
| Misc. Equip. | 210.12 | 11.0 | - | - |
| Task Lights | - | - | - | - |
| Area Lights | 144.20 | - | - | - |
| Total | 714.27 | 5,545.1 | - | - |

- Area Lighting
- Exterior Usage
- Water Heating
- Refrigeration
- Task Lighting
- Pumps & Aux.
- Ht Pump Supp.
- Heat Rejection
- Misc. Equipment
- Ventilation Fans
- Space Heating
- Space Cooling



Electricity



Natural Gas

Concord-Carlisle High School Revitalization - Comparative Options Value Analysis

April 2011

April 29, 2011 (revised - after further consideration regarding schedule, option 3 was updated to indicate a estimated schedule of 42 months.)

| | No-Build | Renovation/Addition Options | | | | | | New Construction Options | | | | |
|--|-----------------------------------|-------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-------------------------------|--------------------------------|-----------------------------|--|
| | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 | Option 6 | Option 7 | Option 8 | Option 9A | Option 9B | Option 10 | |
| | Code upgrade Multi phase Proj | Full Renovation Multi phase Proj | Ren/Addition Multi phase Proj | Ren/Addition Multi phase Proj | Ren/Addition Multi phase Proj | Ren/Addition Multi phase Proj | Multiple Bldgs Multiple Phases | Multiple Bldgs Multiple Phases | Single Bldg Dbl Ph w/ mods | Single Bldg Dbl Ph w/o mods | Single Bldg Single Phase | |
| | Anticipated construction duration | | | | | | | | | | | |
| | 38 | 42 | 42 | 46 | 41 | 44 | 48 | 48 | 34 | 48 | 32 | |
| | 233,800 | 248,000 | 248,000 | 248,000 | 248,000 | 248,000 | 248,000 | 248,000 | 248,000 | 248,000 | 248,000 | |
| | \$147 | \$203 | \$208 | \$220 | \$217 | \$220 | \$222 | \$222 | \$218 | \$218 | \$218 | |
| | \$299 | \$369 | \$377 | \$396 | \$384 | \$394 | \$399 | \$402 | \$373 | \$391 | \$367 | |
| 1 Hard Costs | | | | | | | | | | | | |
| 2 Building construction (a) | \$34,297,500 | \$50,303,100 | \$51,583,550 | \$54,485,900 | \$53,754,000 | \$54,494,000 | \$55,111,600 | \$54,991,400 | \$53,947,440 | \$53,947,440 | \$54,073,860 | |
| 3 CM/GC PR/GC - mgmt during constr (b) | \$7,980,000 | \$8,820,000 | \$8,820,000 | \$9,660,000 | \$8,610,000 | \$9,240,000 | \$10,080,000 | \$10,080,000 | \$7,140,000 | \$10,080,000 | \$6,720,000 | |
| 4 CM/GC Fee (2%) | \$845,550 | \$1,182,462 | \$1,208,071 | \$1,282,918 | \$1,247,280 | \$1,274,680 | \$1,303,832 | \$1,301,428 | \$1,221,749 | \$1,280,549 | \$1,215,877 | |
| 4 Asbestos abatement | \$1,300,000 (c) | \$1,300,000 (c) | \$1,300,000 (c) | \$1,200,000 (c) | \$1,200,000 (c) | \$1,200,000 (c) | \$1,200,000 (c) | \$1,200,000 (c) | \$1,000,000 | \$1,000,000 | \$1,000,000 | |
| 5 Building take downs | - | - | \$377,300 \$7/sf | \$1,058,400 \$7/sf | \$1,124,200 \$7/sf | \$1,302,700 \$7/sf | \$1,636,600 \$7/sf | \$1,636,600 \$7/sf | \$1,402,800 \$6/sf | \$1,402,800 \$6/sf | \$1,402,800 \$6/sf | |
| 6 Site improvements (a) (d) | \$2,000,000 | \$2,000,000 | \$2,000,000 | \$2,500,000 | \$2,500,000 | \$2,500,000 | \$4,000,000 | \$4,000,000 | \$5,000,000 | \$5,000,000 | \$5,000,000 | |
| 7 Escalation | \$1,856,922 4% | \$2,862,250 4.5% | \$2,611,557 4% | \$3,509,361 5% | \$3,079,597 4.5% | \$3,500,569 5% | \$2,933,281 4% | \$3,660,471 5% | \$2,788,480 4% | \$3,635,539 5% | \$2,776,501 4% | |
| 8 Hard contingency (e) | \$4,827,997 10% | \$6,646,781 10% | \$6,790,048 10% | \$5,527,243 7.5% | \$5,363,631 7.5% | \$5,513,396 7.5% | \$3,813,266 5% | \$3,843,495 5% | \$3,625,023 5% | \$3,817,316 5% | \$3,609,452 5% | |
| 9 Soft Costs | | | | | | | | | | | | |
| 10 Design costs (f) | \$4,186,478 | \$5,386,876 | \$5,481,432 | \$5,753,429 | \$5,612,722 | \$5,741,521 | \$5,804,715 | \$5,842,804 | \$5,567,530 | \$5,809,819 | \$5,547,909 | |
| 11 A/E CA mgmt (g) | \$2,280,000 60k/m | \$2,100,000 50k/m | \$2,520,000 60k/m | \$2,300,000 50k/m | \$2,050,000 50k/m | \$2,200,000 50k/m | \$2,400,000 50k/m | \$2,400,000 50k/m | \$2,040,000 60k/m | \$2,400,000 50k/m | \$1,920,000 60k/m | |
| 12 OPM CA mgmt (h) | \$1,900,000 | \$2,100,000 | \$2,100,000 | \$2,300,000 | \$2,050,000 | \$2,200,000 | \$2,400,000 | \$2,400,000 | \$1,700,000 | \$2,400,000 | \$1,600,000 | |
| 13 FFE / technology (\$3,200/student) | \$4,120,000 (c) | \$4,120,000 (c) | \$4,120,000 (c) | \$4,120,000 (c) | \$4,120,000 (c) | \$4,120,000 (c) | \$4,120,000 (c) | \$4,120,000 (c) | \$3,920,000 | \$3,920,000 | \$3,920,000 | |
| 14 Temp parking / road access logistics | \$100,000 | \$200,000 | \$200,000 | \$200,000 | \$200,000 | \$250,000 | \$400,000 | \$400,000 | \$400,000 | \$400,000 | \$400,000 | |
| 15 Temp modulars / storage | \$2,219,500 | \$2,319,500 | \$2,169,500 | \$2,219,500 | \$2,119,500 | \$2,069,500 | \$1,668,700 | \$1,668,700 | \$930,700 | - | - | |
| 16 Relocation / moving expenses | \$500,000 | \$500,000 | \$400,000 | \$350,000 | \$350,000 | \$350,000 | \$300,000 | \$300,000 | \$250,000 | \$250,000 | \$250,000 | |
| 17 Misc expenses (testing, legal, utility B/C, other) | \$700,000 | \$900,000 | \$900,000 | \$900,000 | \$900,000 | \$900,000 | \$900,000 | \$900,000 | \$900,000 | \$900,000 | \$900,000 | |
| 18 Soft contingency (5%) | \$800,299 5% | \$881,319 5% | \$894,547 5% | \$907,146 5% | \$870,111 5% | \$891,551 5% | \$899,671 5% | \$901,575 5% | \$785,411 5% | \$803,991 5% | \$726,895 5% | |
| 19 Comparative Values | \$69,914,246 | \$91,622,288 | \$93,476,004 | \$98,273,898 | \$95,151,041 | \$97,747,917 | \$98,971,664 | \$99,646,473 | \$92,619,133 | \$97,047,454 | \$91,063,296 | |
| 20 % above(below) new construction - option 10 | -23% | 1% | 3% | 8% | 4% | 7% | 9% | 9% | 2% | 7% | | |
| 21 % of total project value compared to total hard costs value | 76% | 80% | 80% | 81% | 81% | 81% | 81% | 81% | 82% | 83% | 83% | |
| 22 % of total project value compared to total soft costs value | 24% | 20% | 20% | 19% | 19% | 19% | 19% | 19% | 18% | 17% | 17% | |

Notes:

- (a) Disposal of contaminated soil is EXCLUDED. Unknown at this time.
- (b) Value of \$210,000 carried per month. Length of schedule is the cost driver.
- (c) Premium for multiple mobilizations.
- (d) In depth cost analysis has not been performed.
- (e) 10% carried for renovation, 5% for new, 7.5% for hybrids.
- (f) 6% is carried based on total hard construction costs + 1,000,000 for feasibility and schematic. Excludes CA costs, carried in line 11.
- (g) Based on \$60,000 or \$50,000 per month. Length of schedule is the cost driver.
- (h) Based on \$50,000 per month. Length of schedule is the cost driver.

Disclaimer

These values are not to be considered as a project budget. This analysis was utilized to compare various options to one another to determine which options would further be developed and studied. These values are subject to change as the option are further developed.



Concord-Carlisle Regional High School



MSBA Facilities Assessment
Subcommittee Meeting

May 11, 2011

omr architects

Agenda

- Process Overview
- Site and Building Conditions
 - Space Program
- Development of Alternatives
- Recommended Alternatives

CCHS Proposed Project Schedule

| | | |
|---|---|---------------------------------|
| | CCHS receives Approval to Proceed into Feasibility Study | September 29, 2010 |
| | CCHS procures OPM | November 2010 |
| | CCHS procures Designer | Mid- February 2011 |
| | PDP issued (costs in addenda) | April 1- April 7, 2011 |
|  | FAS / PDP meeting | May 11, 2011 |
| | PSR issued (early submission vs. alternate submission) | May 26 vs. June 16, 2011 |
| | FAS / PSR meeting | June 22, 2011 |
| | CCHS/ OMR possibly commences Schematic Design with risk | June 23, 2011 |
| | MSBA BOD scheduled to approve CCHS to proceed into SD | July 27, 2011 |
| | Schematic Design Submittal issued | August 19, 2011 |
| | FAS / Schematic meeting | September 14, 2011 |
| | PSBA (Project Scope and Budget Agreement) | September 2011 |
| | MSBA BOD scheduled to approve SD Submission | September 28, 2011 |
| | Execute PSBA | October 2011 |
| | Concord & Carlisle November Annual Town Meeting 2011 | November |
| | Execute PFA | December 2011 |

CCHS Feasibility Study Work Plan

- | | | |
|-------------------|--|--|
| Groundwork | <ul style="list-style-type: none"> ○ Prepare contract ○ Obtain and review all available/ pertinent documents ○ Prepare schedule and work plan | <ul style="list-style-type: none"> ○ Review existing conditions information ○ Attend Site Based Committee Meeting ○ Conduct User Group meetings and Prepare Space Summary |
|-------------------|--|--|

Meeting # 1 **Goals, Values and Space Summary**

3/09/11

Objectives

- Review schedule and process
- Review goals, values
- Review proposed space summary

Follow-up

- Site walk thru with Engineers and Facilities Manager
- Submit draft space summary to MSBA for initial review
- Meet with MSBA for kickoff meeting
- Prepare Preliminary Alternative concepts

Meeting # 2 **Vision, Space Summary and Preliminary Alternatives Concepts**

3/23/11

Objectives

- Review Educational Vision, goals and values
- Review Preliminary Alternative Concepts
- Approve Initial Space Summary and PDP

Follow-up

- Complete Preliminary Design Program Submittal for MSBA
- Meet with MSBA
- Develop Preliminary Alternatives

Meeting # 3 **Sustainability Goals**

4/06/11

Objectives

- Discuss sustainability goals and net zero options with team

Follow-up

- Develop Preliminary Evaluation of Proposed Alternatives

Meeting # 4 **Preliminary Evaluation of Proposed Alternatives**

4/13/11

Objectives

- Review Preliminary Evaluation of Proposed Alternatives

Follow-up

- Submit Preliminary Alternatives to MSBA for initial review
- Meet with MSBA
- Develop Final Evaluation of Selected Alternatives

Meeting # 5 **Finalize Preliminary Alternatives**

5/04/11

Objectives

- Review and Approve Preliminary Alternative(s)

Follow-up

- Prepare Final Evaluation of Alternatives

Meeting # 6 **Final Evaluation of Alternatives**

5/18/11

Objectives

- Review Final Evaluation of Alternatives
- Confirm Preferred Solution

Follow-up

- Prepare Preferred Schematic Report

Meeting # 7 **Preferred Schematic Report to MSBA on or about 5/26/11**

5/25/11

Objectives

- Review and Approve Preferred Schematic Report

Follow-up

- Submit Preferred Schematic Report to MSBA
- MSBA Facilities Assessment Subcommittee and BOD Vote



GOALS: Process

- Partnering with the MSBA, **proactively manage the process** with foresight and insight in an integrated manner.
- **Communicate clearly, convincingly, strategically and sensitively** regarding the issues and challenges intrinsic to building momentum for this project at this time
- **Model and reflect our Communities' values** with a design that fosters civic pride and environmental stewardship, and garners social, financial and political support
- **Explore financial options** with public/private partnerships and develop innovative ways to generate project funding and sustainable income

As approved by CCHS SBC on 3/09/11

11 May 2011

GOALS: Project

- Develop a project which is **fiscally, academically, environmentally and socially responsible**
- Design a facility which is **flexible, adaptable, affordable and achievable**
- Create a facility that is **fully accessible, highly functional, cost effective, high performing, durable, and easy to maintain**
- Plan for a fully integrated campus that **promotes 21st century learning, educational excellence, high performance and shared intergenerational community and recreational use**
- **Actively engage our communities** in this ongoing and exciting opportunity for teaching and learning
- **Holistically integrate all campus elements** into a practical and inspiring new and transformed CCHS

As approved by CCHS SBC on 3/09/11

11 May 2011

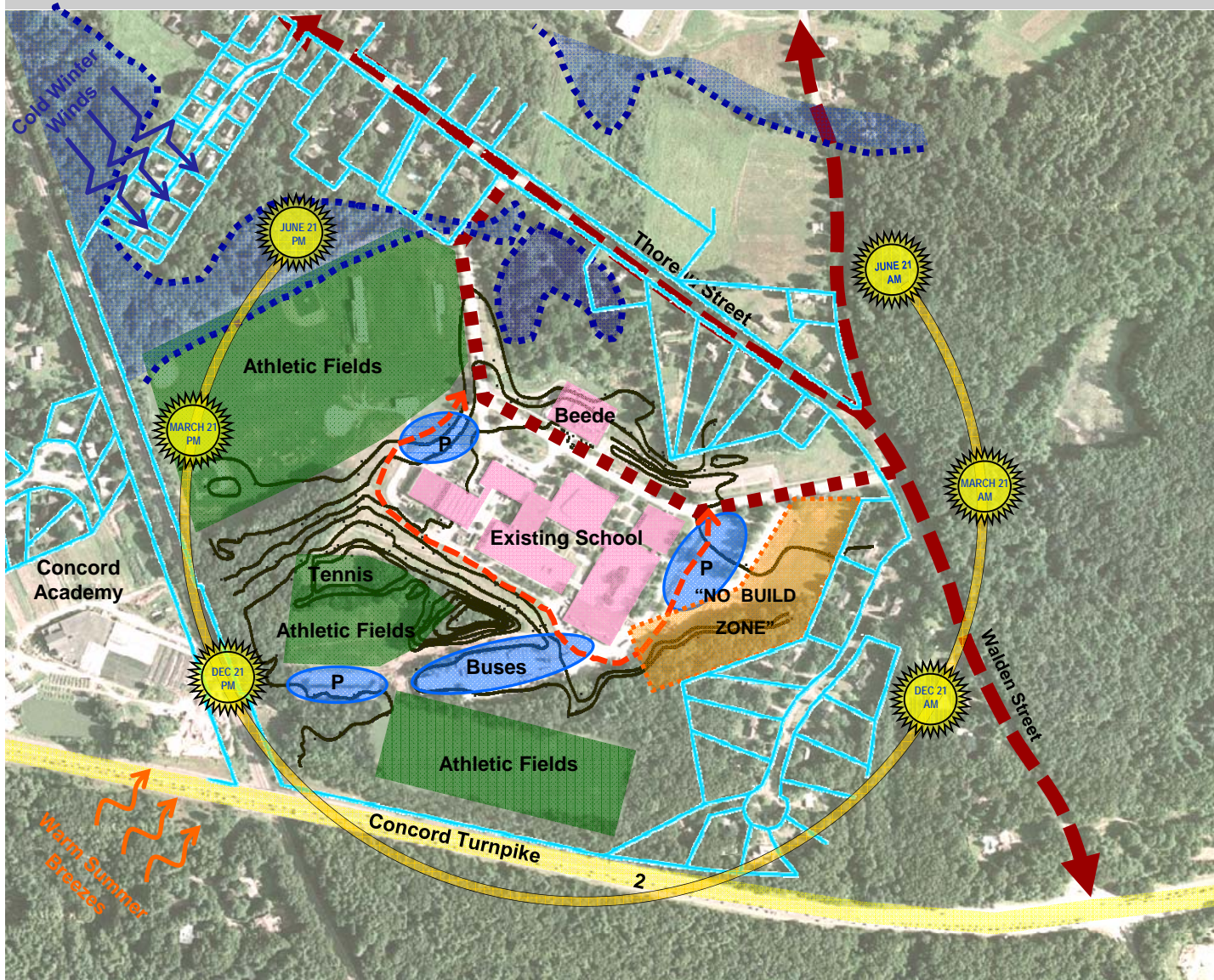
GOALS: Product

- Create a campus which is **safe and secure**
- Provide **state-of-the-art facilities** with the full and appropriate array of **formal and informal learning, gathering, and performance spaces**
- Provide **state-of-the-art building systems** in an environment with an abundance of **natural light, clean healthy air, and practical, sustainable and high performance** design strategies
- Integrate and maximize the current and future use of **effective, cutting-edge technologies**
- Develop intuitively clear, **logical and efficient organizational and circulation patterns**
- Build an inspiring and engaging center for **“24/7” community use**
- **Minimize the impact of the design and construction** on the students, teachers, parents, neighbors and the greater community

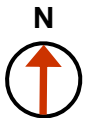
As approved by CCHS SBC on 3/09/11

11 May 2011

Site Conditions Overview



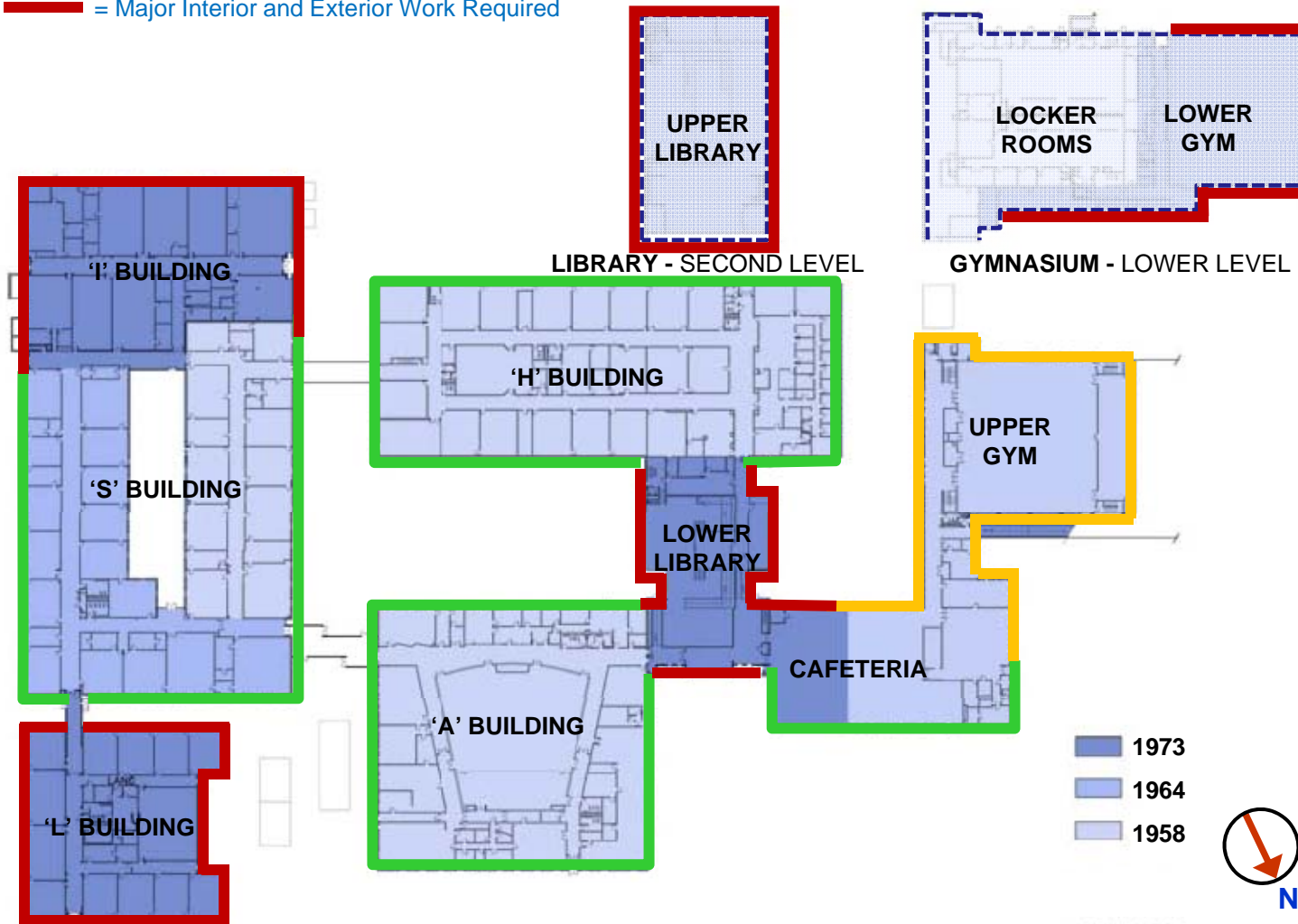
- Solar Orientation and Winds for Sustainable Design
- Topography of hills surrounding
- Access to the Site
- Security and Egress around the Building
- Parking Insufficient
- Proximity to Neighbors and “no build” quadrant
- Wetlands
- Need to retain Athletic Fields



11 May 2011

Existing Building Conditions Summary

- █ = 1990 Envelope in the Best Current Physical Condition
- █ = Exterior Building Envelope System Replacement Req'd
- █ = Major Interior and Exterior Work Required

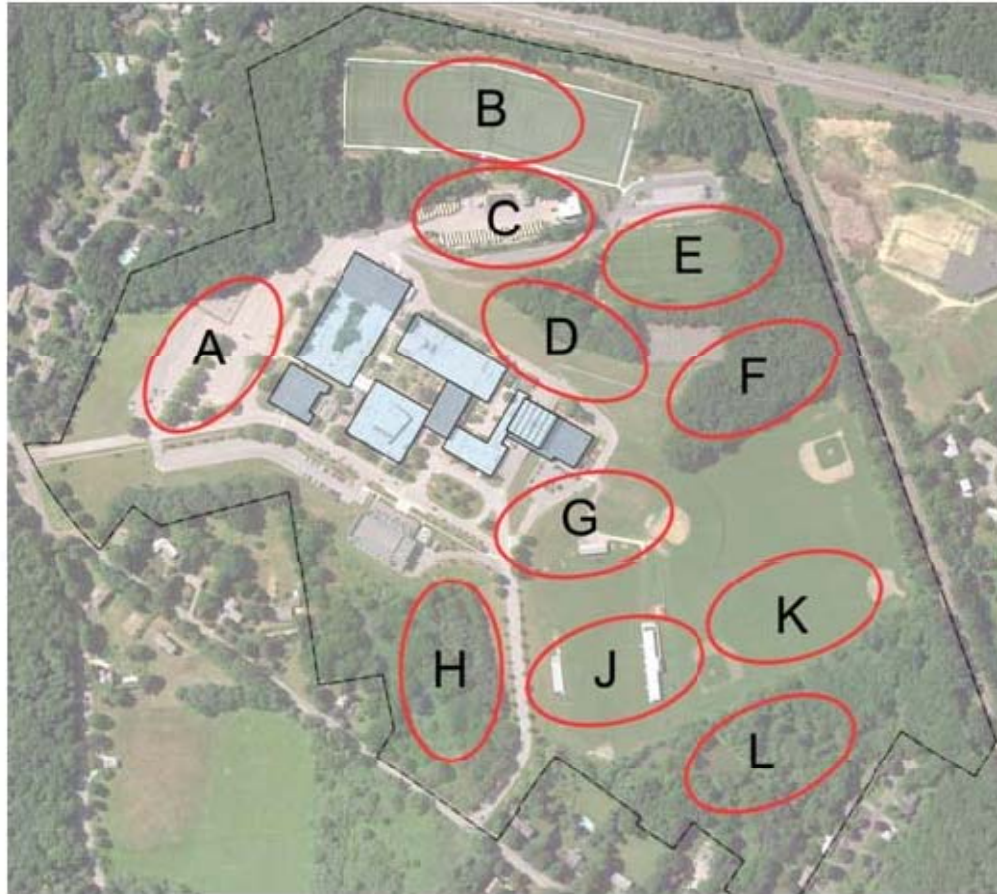


- Does not meet Energy, Building, Plumbing or MAAB codes
- Extensive Seismic and Roof structure upgrade required
- Requires all new MEP, FP, Tech, & Security systems
- Unsuitable Mechanical Tunnels throughout. Insufficient ceiling ht. for new systems
- Requires all new Envelope for Energy Efficiency (roof, windows, insulation, etc.)
- Hazardous Materials
- Lack of natural light in core
- Not organized for 21st c Team Teaching or Collaboration
- Requires substantial interior reconfiguration for educational needs

Existing Building Space Utilization



Site Locations Considered



Location A:

- + Site is flat
- Close proximity to neighbors
- Requires relocation of existing parking
- Poor solar orientation
- Remote from existing fields

Location B:

- Located on newly constructed turf fields
- Close proximity to neighbors
- Close proximity to Route 2
- On top of hill; remote from rest of campus

Location C:

- Sloping topography
- Located on existing district bus parking
- Site is tight between turf fields and existing roadway
- Poor solar exposure, south faces into the hill

Location D:

- + Adjacent to existing school and access
- + Connects multiple grade levels
- Sloping topography
- Poor solar exposure, south faces into the hill

Location E:

- + Distant from neighbors
- + Good solar exposure
- On top of hill; remote from rest of campus
- Close proximity to MBTA
- Close proximity to Route 2

Location F:

- + Distant from neighbors
- Sloping topography
- Poor solar exposure, south faces into the hill
- Close proximity to MBTA

Location G:

- + Good solar exposure
- + Manageable topography, terraced slopes
- + Close to existing infrastructure and access
- + Connects lower fields area with main campus

Location H:

- Close proximity to neighbors
- Encroaches on wetlands
- Sloping topography
- Poor solar exposure

Location J:

- + Good solar exposure
- + Flat site
- Close proximity to neighbors
- Close proximity to wetlands
- Remote from rest of campus

Location K:

- + Good solar exposure
- + Flat site
- Close proximity to neighbors
- Close proximity to MBTA
- Close proximity to wetlands
- Remote from rest of campus

Location L:

- Located in existing woods
- Close proximity to neighbors
- Encroaches on wetlands
- Remote from rest of campus

REVISED Space Program Summary

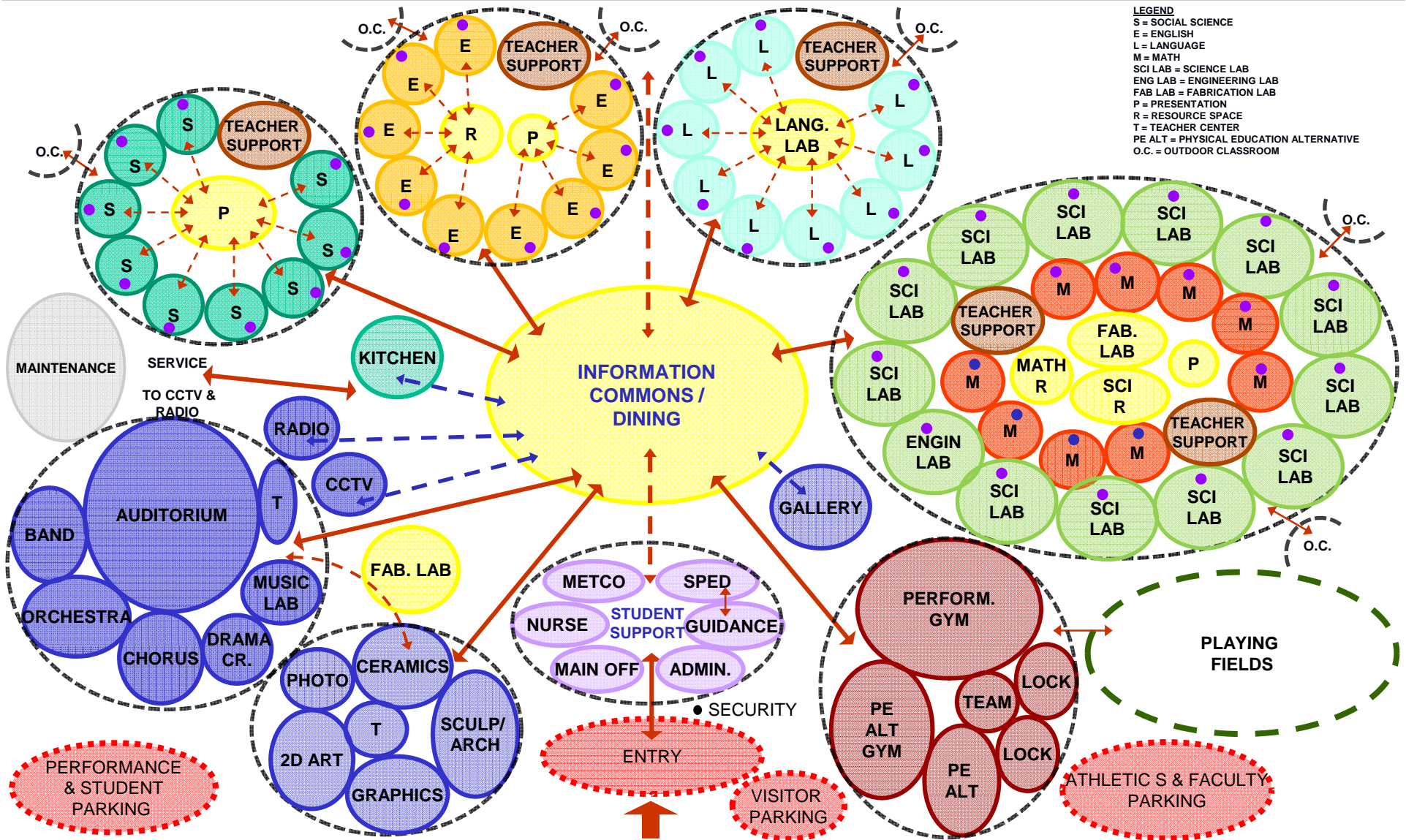
| <u>Existing</u> | <u>Proposed</u> | <u>MSBA</u> |
|-----------------|-----------------|----------------------------|
| 170,390 NSF | 167,086 NSF | 152,692 NSF |
| 1.37 net/gross | 1.45 net/gross | 1.45 net/gross |
| 233,800 GSF | 242,275 GSF | 221,725 GSF (△ 20,550 GSF) |

Variations:

- **Core Acad. and SPED combined** = (-)2,390 NSF due to inclusion model.
- **Art/ Music and Voc/ Tech combined** = (-)75 NSF while maintaining strong program in art and music.
- **PE** = (+)9,600 NSF due to the need for 5 Teaching Stations.
- **Media Center** = (+)1,044 NSF due to the high level of use for student group projects and team research.
- **Admin & Guidance** = (+)1,776 NSF due to high level of student support & attention at CCHS.
- **Other** = (+)4,440 NSF for Art Gallery, Adult Ed, CCTV and Radio Station.

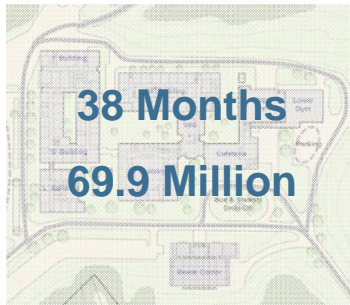
| Description | Existing Program | Proposed Program - 2011 1225 Enrollment | MSBA Guidelines - 2010 1225 Enrollment |
|--|------------------|--|---|
| CORE ACADEMIC SPACES | 57,476 | 63,420 | 58,690 |
| SPED | 7,145 | 5,970 | 13,090 |
| ART & MUSIC (Visual and Performing Arts) | 11,059 | 12,575 | 8,200 |
| VOCATIONS & TECHNOLOGY | 8,035 | 8,350 | 12,800 |
| HEALTH AND PHYSICAL EDUCATION | 33,675 | 32,660 | 23,060 |
| MEDIA-LIBRARY (Learning Commons) | 13,480 | 8,600 | 7,556 |
| AUDITORIUM / DRAMA | 9,667 | 10,400 | 10,400 |
| DINING & FOOD SERVICE | 13,068 | 10,262 | 10,262 |
| MEDICAL / NURSE | 690 | 1,110 | 1,110 |
| ADM. & GUIDANCE (Student Support) | 8,462 | 6,755 | 4,979 |
| CUSTODIAL & MAINTENANCE | 2,779 | 2,544 | 2,544 |
| SUB-TOTAL Net Area | 165,536 | 162,646 | 152,692 |
| OTHER | 4,854 | 4,440 | 0 |
| GRAND TOTAL Net Area | 170,390 | 167,086 | 152,692 |
| Net:Gross Ratio (Net Area / Gross Area) | 1.37 | 1.45 | 1.45 |
| Gross Area | 233,800 | 242,275 | 221,725 |

Space Adjacency Diagram



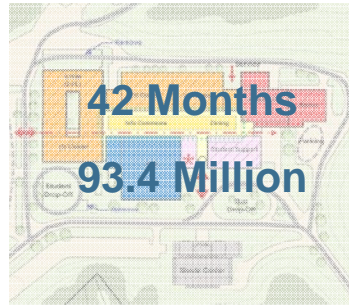
Preliminary Alternatives Summary

Existing Building



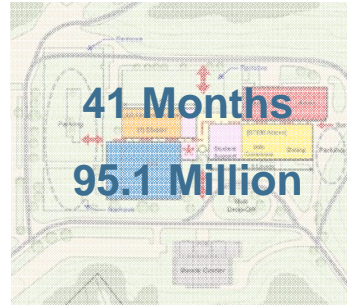
Option 1 – No Build
(repairs)

Renovation/Minor Additions



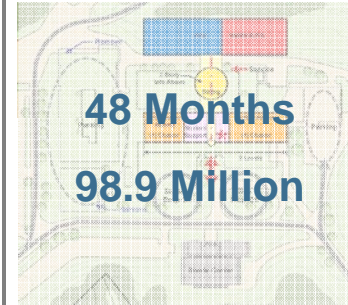
Option 3 – Full
Renovation w/ Additions
(Infill Courtyards, Remove 'L' & 'I')

Minor Renovation/
Major Additions



Option 5 – Minor
Renovation /Major
Additions
(Keeps 'A' and Gyms)

New Building
3 Phases

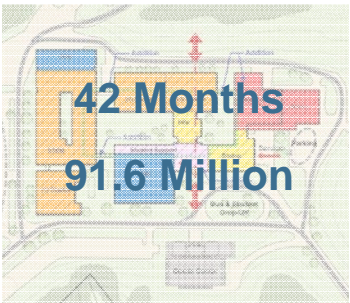


Option 7 – Phased New
Building 3 Steps

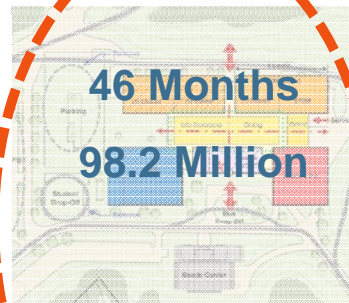
New Building
1 or 2 Phases



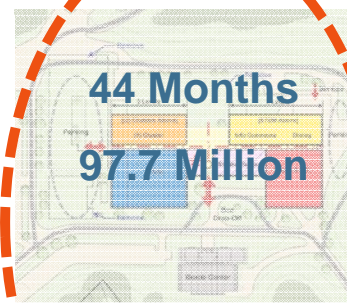
Option 9 – Phased New
Building 2 Steps



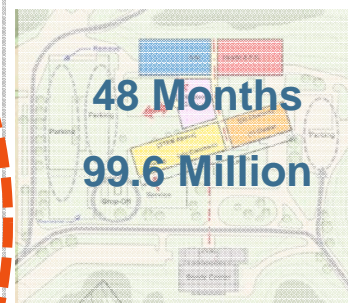
Option 2 – Full Renovation
w/ Minor Additions
(Keep All Buildings)



Option 4 – Major
Renovation/Major
Additions
(Keep 'A', 'H', & Cafe)



Option 6 – Minor
Renovation /Major
Additions
(Keeps 'A' and Cafe)



Option 8 – Phased New
Building 3 Steps



Option 10 – New Building
1 Step

Preliminary Evaluation Summary



Option 4R
Major Addition / Major Renovation



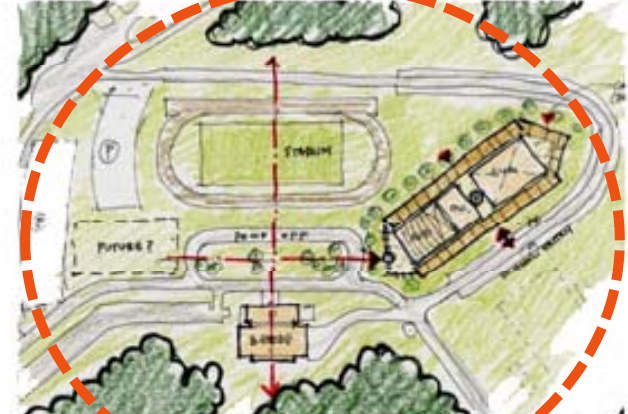
Option 6R
Major Addition / Minor Renovation



Option 9/10
New Building



Option 11
New Building



Option 12
New Building

Option 4R – Major Addition / Major Renovation



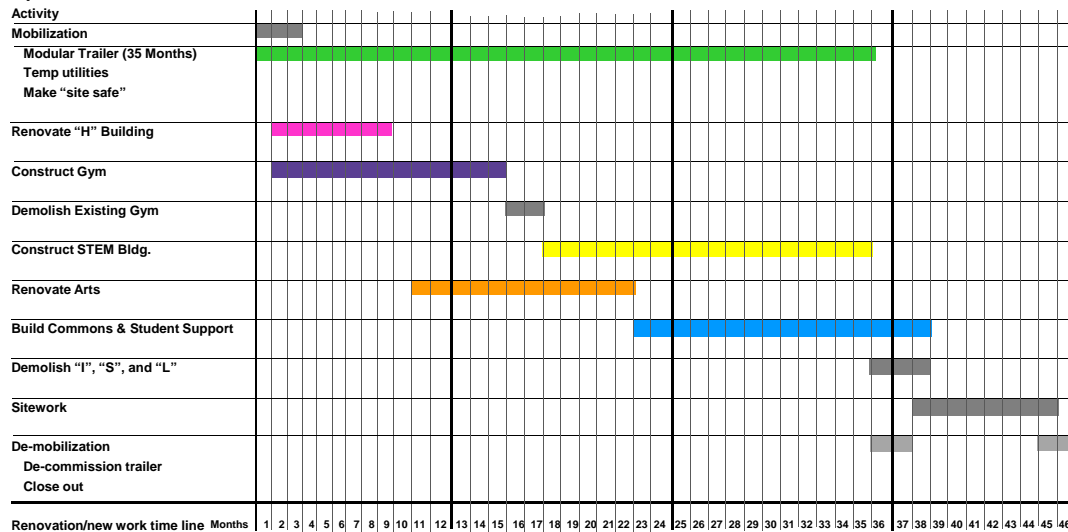
- + Core academics clustered on east-west axis
- + Safe / secure campus
- + Logical organization
- + Improved site circulation
- + Improved building orientation (day lighting)

- +/- Maintains buildings “A”, “H” and Cafeteria
- +/- Building is less sprawling
- +/- Promotes Community use

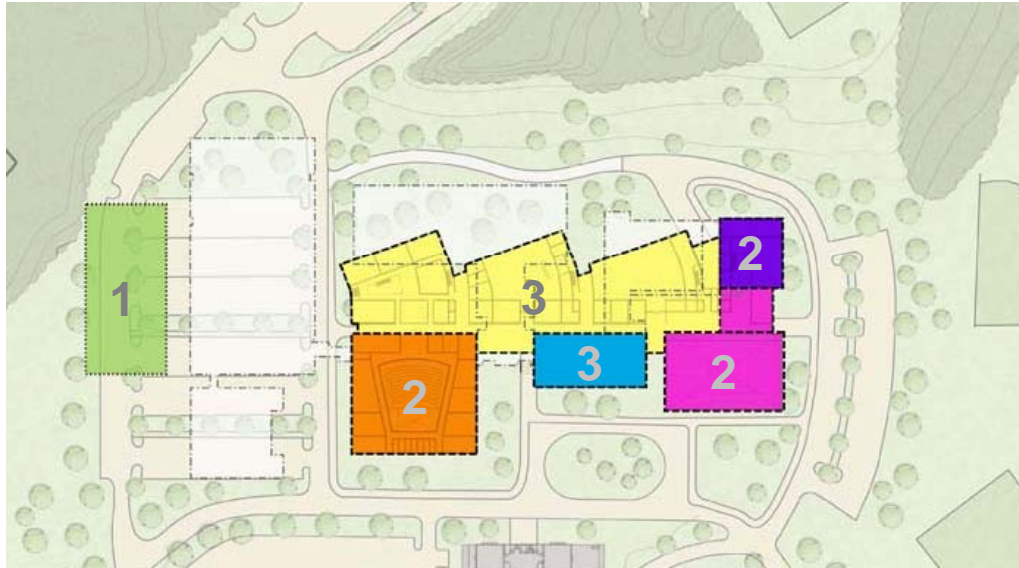
- Does not promote 21st century learning
- Limited flexibility / adaptability
- Existing Building envelope requires repair
- Limits sustainability strategies
- Phasing is disruptive to students
- Cost / Value

\$98.2M (46 months)

Option 4 Renovation/New Work



Option 6R1 – Major Addition / Major Renovation



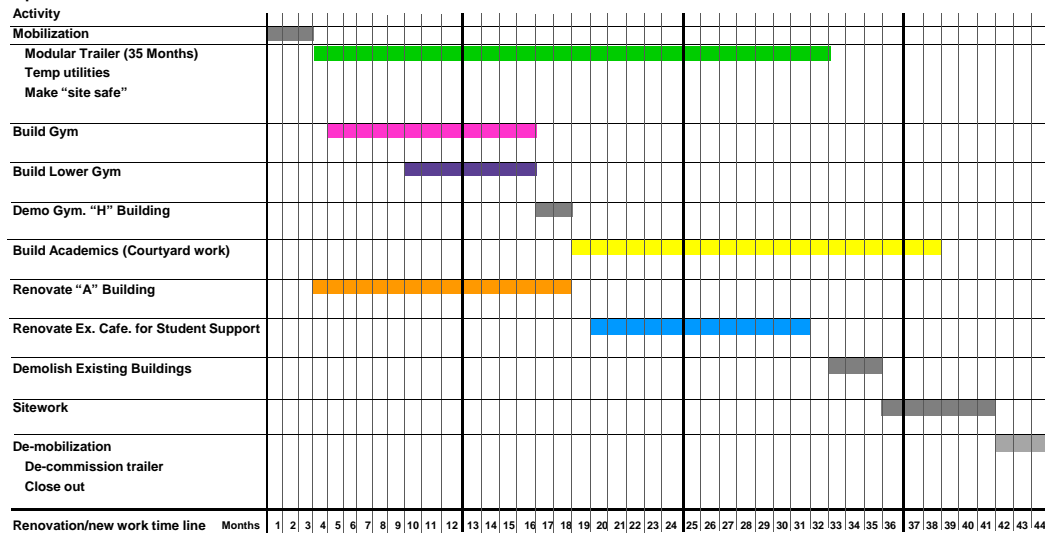
- + Fulfills Educational Program
- + Promotes 21st century learning
- + Flexibility / Adaptability
- + Safe / Secure campus
- + Logical and efficient organization
- + Good building orientation (day lighting)
- + Improved site circulation
- + Promotes Community use
- + Integrates campus

- +/- Maintains buildings "A", Cafeteria, L. Gym
- +/- Building envelope / perimeter
- +/- Cost / Value
- +/- Sustainability

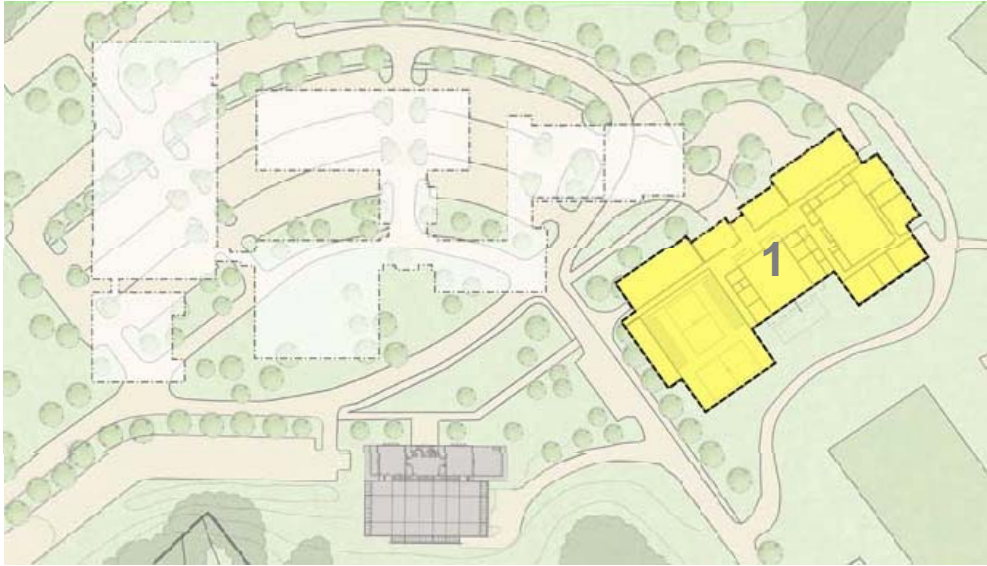
- Phasing is disruptive to students

\$97.7M (44 months)

Option 6 Renovation/New Work



Option 12R – New Building

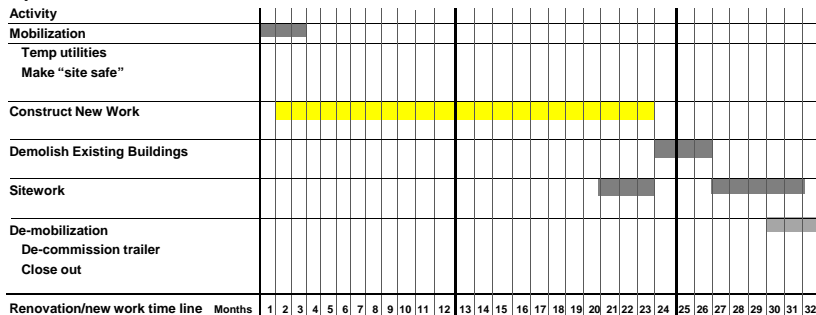


- + Fulfills Educational Program
- + Promotes 21st century learning
- + Flexibility / Adaptability
- + Safe / Secure campus
- + Logical and efficient organization
- + Optimizes building orientation (day lighting)
- + Improved site circulation
- + Promotes Community use
- + Integrates campus
- + Reduces building envelope / perimeter
- + Sustainability
- + Minimizes phasing disruption to students
- + Cost / Value

- +/- Does not maintain existing buildings
- +/- **Unknown soil conditions??**

\$91.0M (32 months)

Option 12 New Work



Integrated Design Team Highlights

- Study active vs. passive energy strategies
- Optimize daylighting and views throughout
- Include north facing classrooms
- Integrate clustering with vertical ventilation / light shafts
- Integrate tight building envelope
- Consider integrated hybrid approach for building systems
- Balance sustainability ideas with maintenance and operations
- Use quantifiable data to determine feasibility / value
- Consider solar wall system
- Consider PV array at grade
- Use LED lighting at exterior and as an alternate on the interior
- Sustainable subcommittee to develop 3rd party PV financing & CMLP



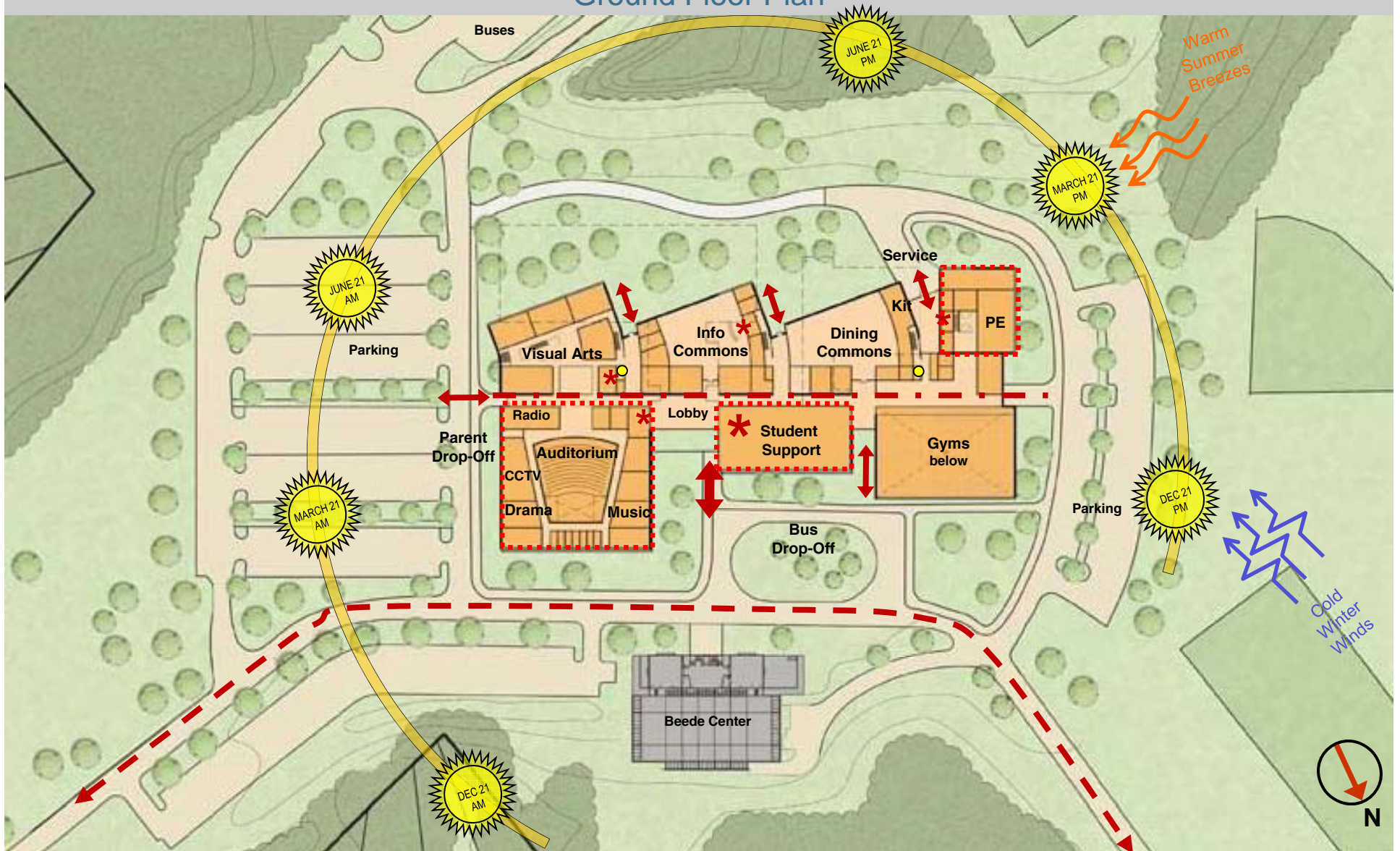
Option 6R1
Major Renovation/ Major Addition



Option 12R
New One Phase Building

Option 6R1 – Major Addition / Major Renovation

Ground Floor Plan



Option 6R1 – Major Addition / Major Renovation

Second Floor Plan



Option 6R1 – Major Addition / Major Renovation

Third Floor Plan

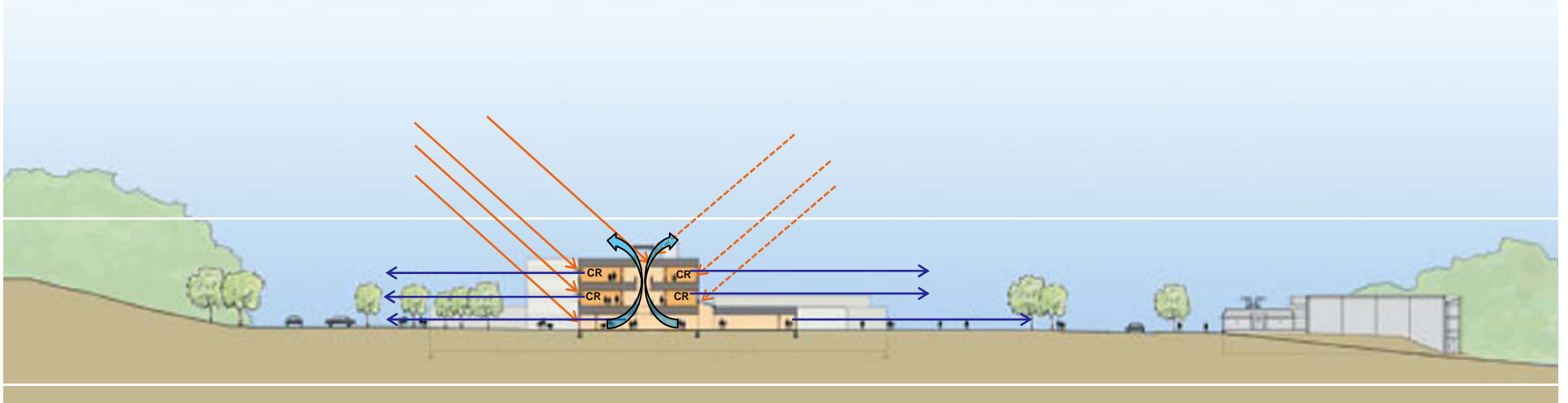


Option 6R1 – Major Addition / Major Renovation

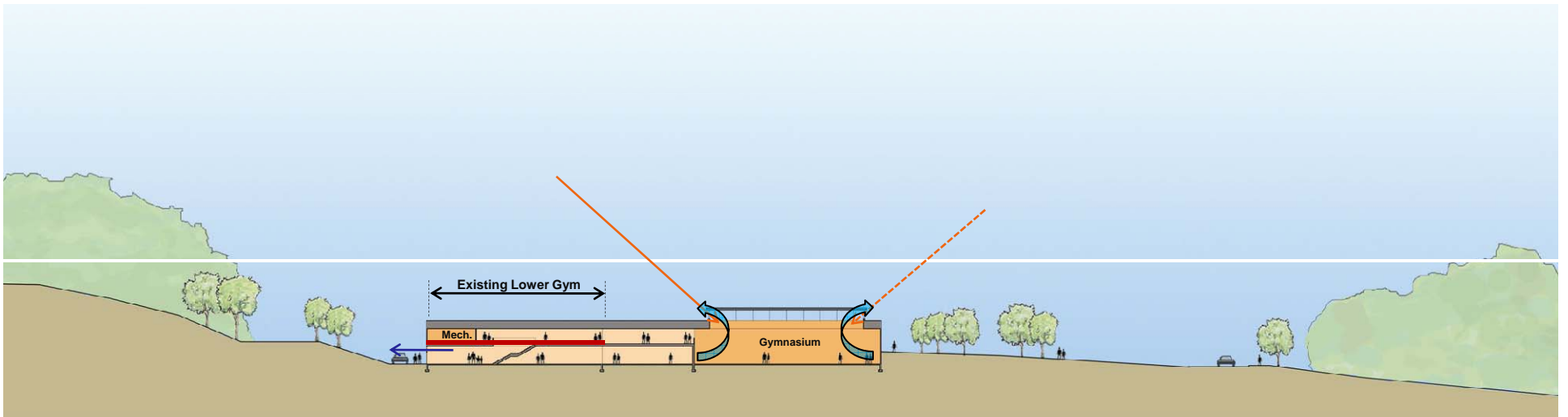
Lower Floor Plan



Option 6R1 - Conceptual Sections



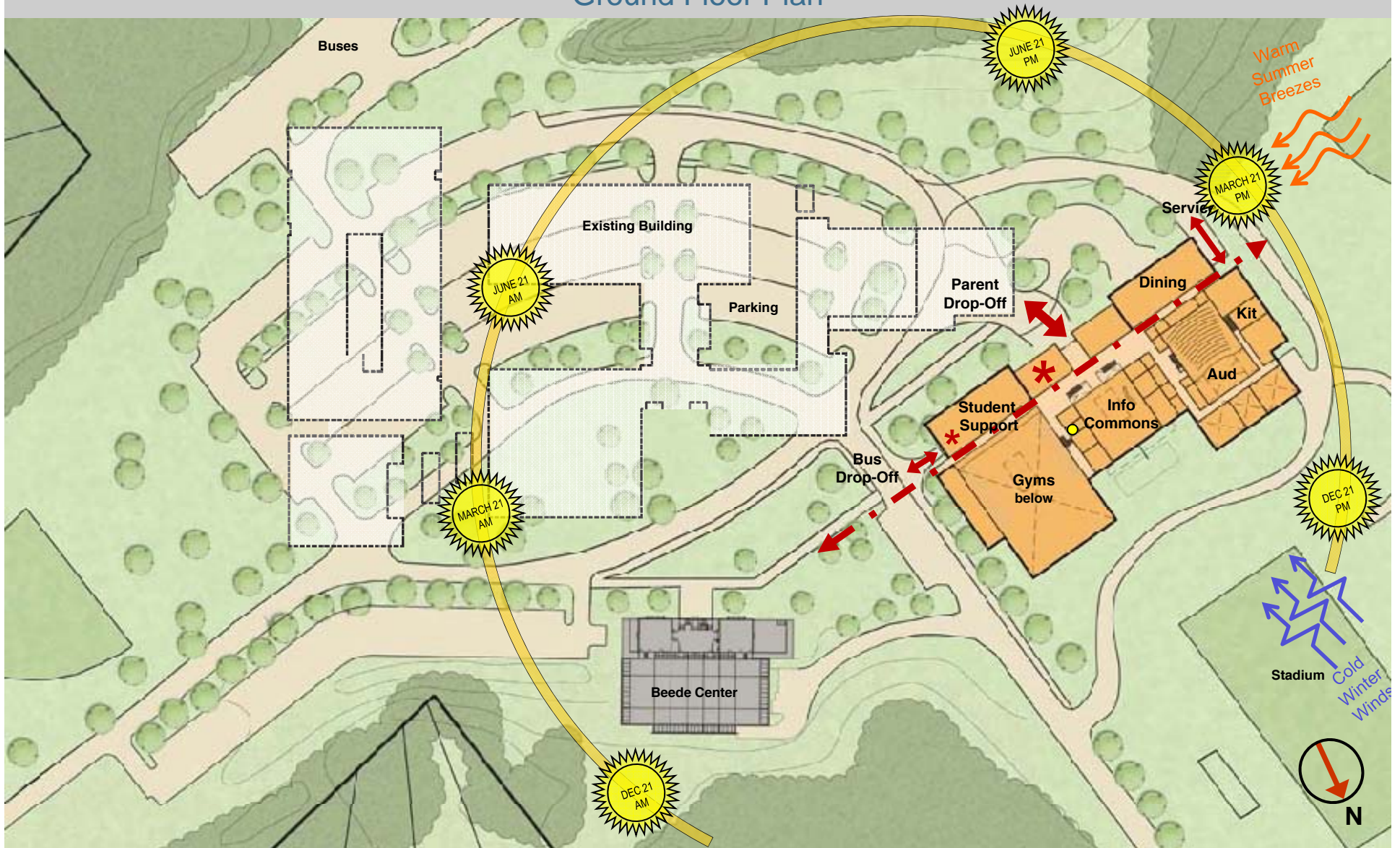
Section at Entry



Section at Gymnasium

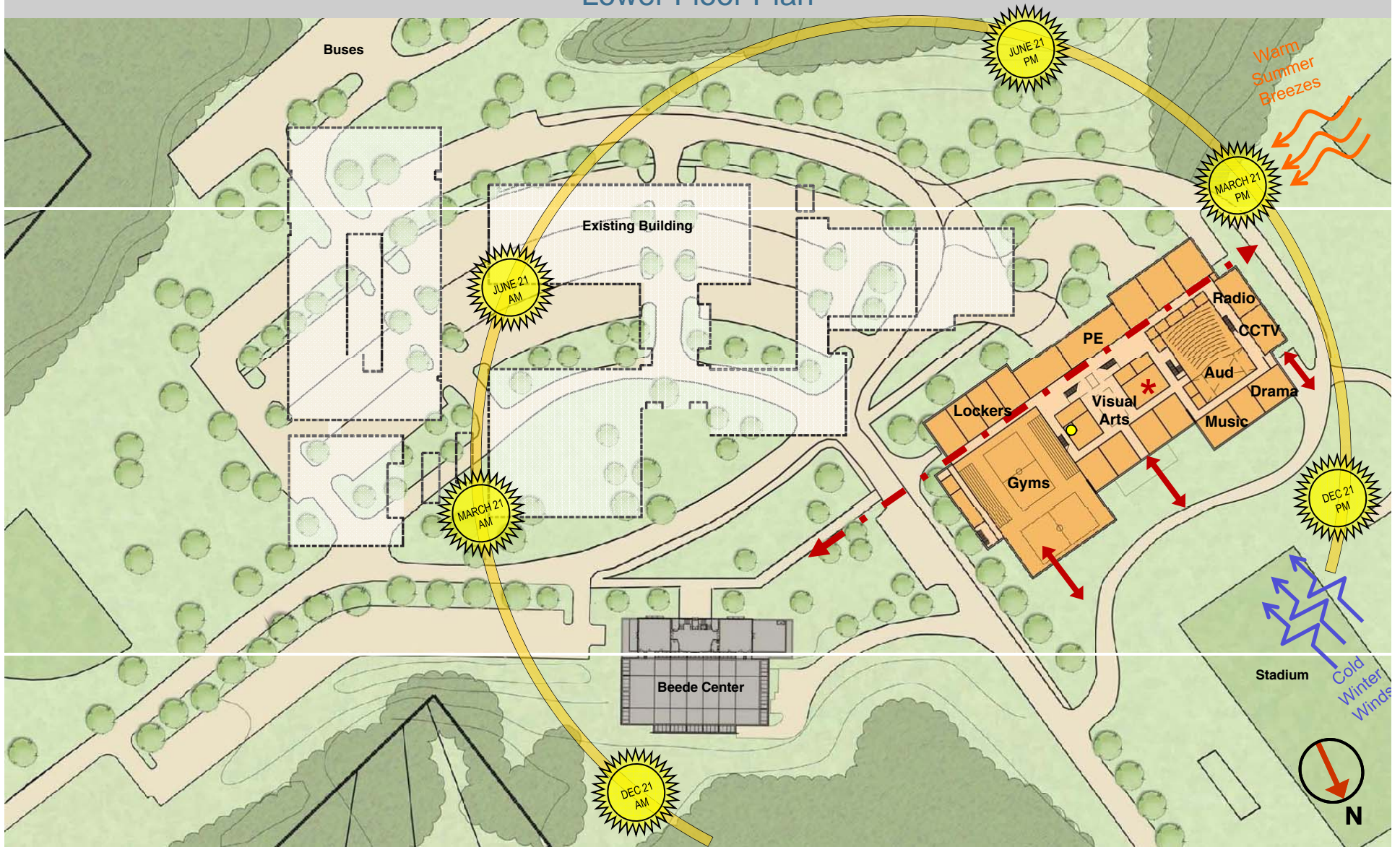
Option 12R – New Building

Ground Floor Plan



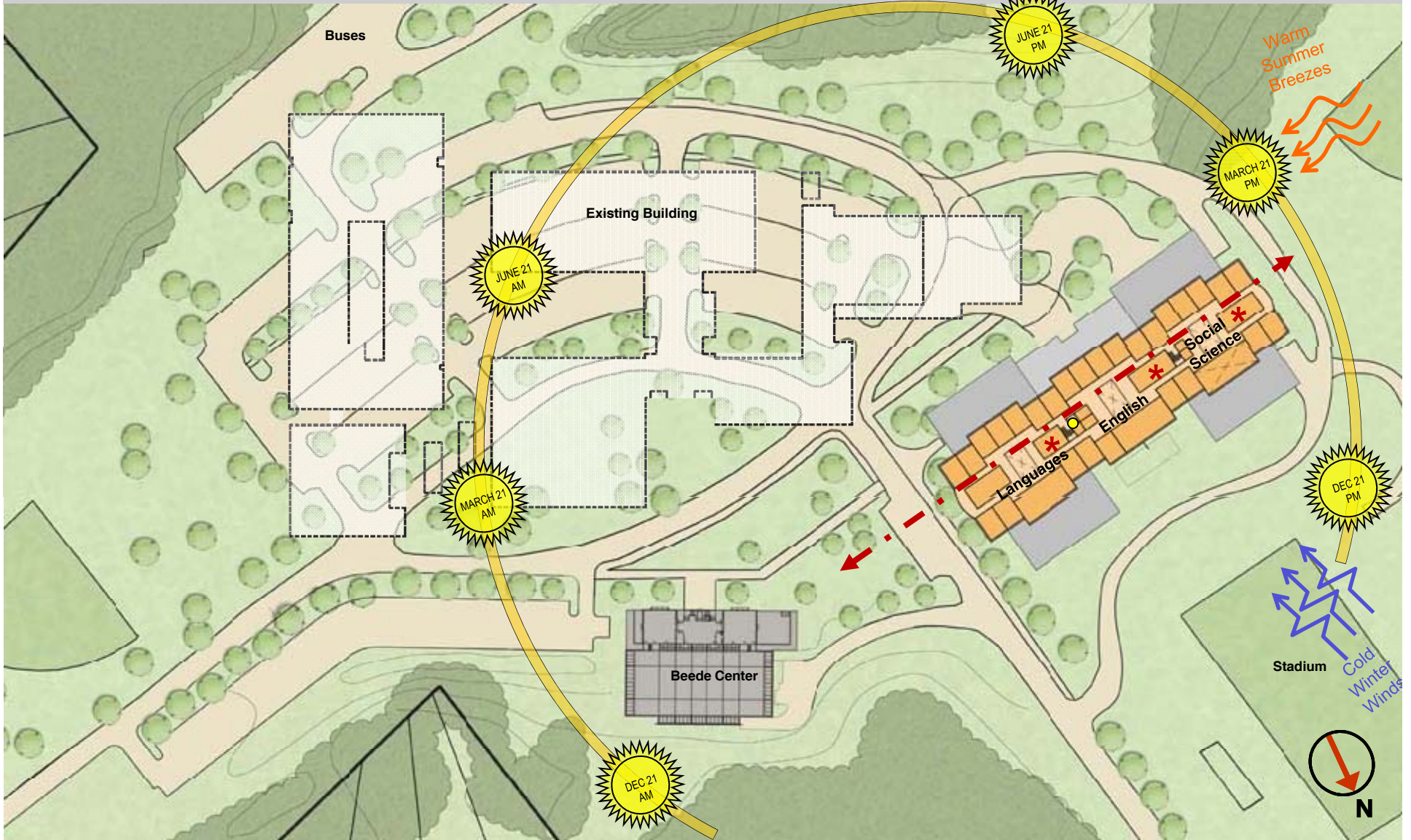
Option 12R – New Building

Lower Floor Plan



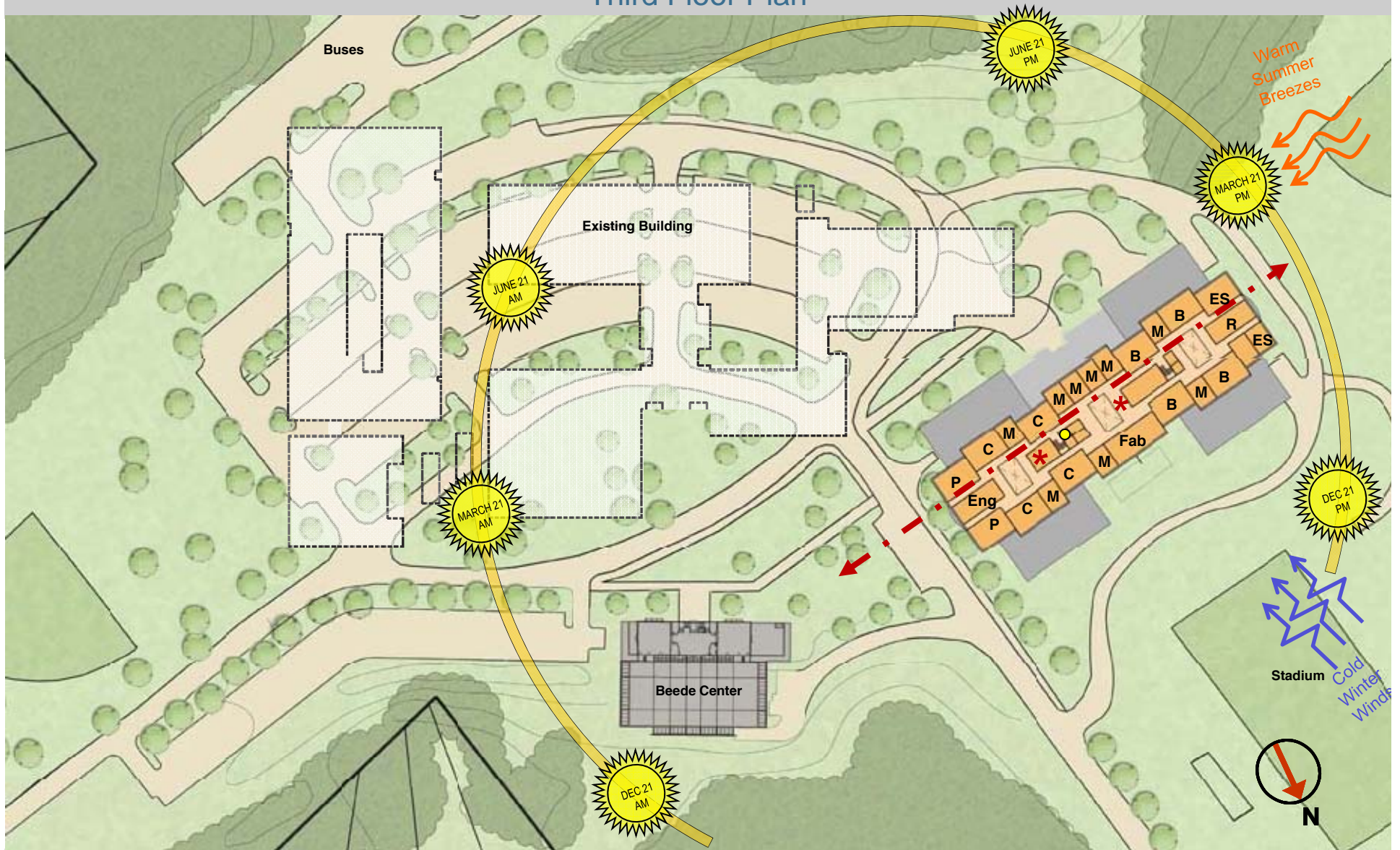
Option 12R – New Building

Second Floor Plan

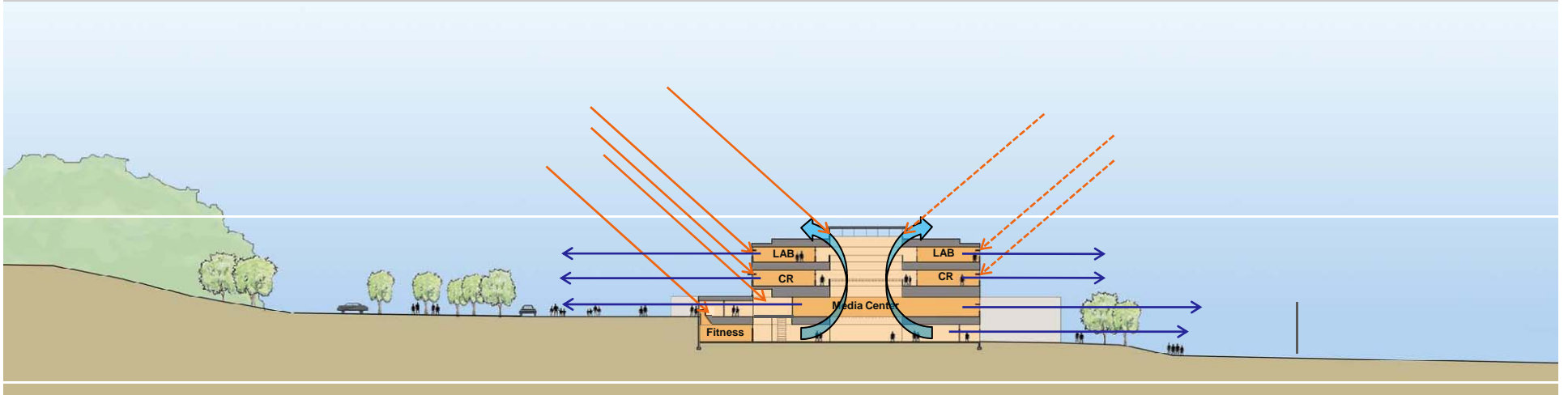


Option 12R – New Building

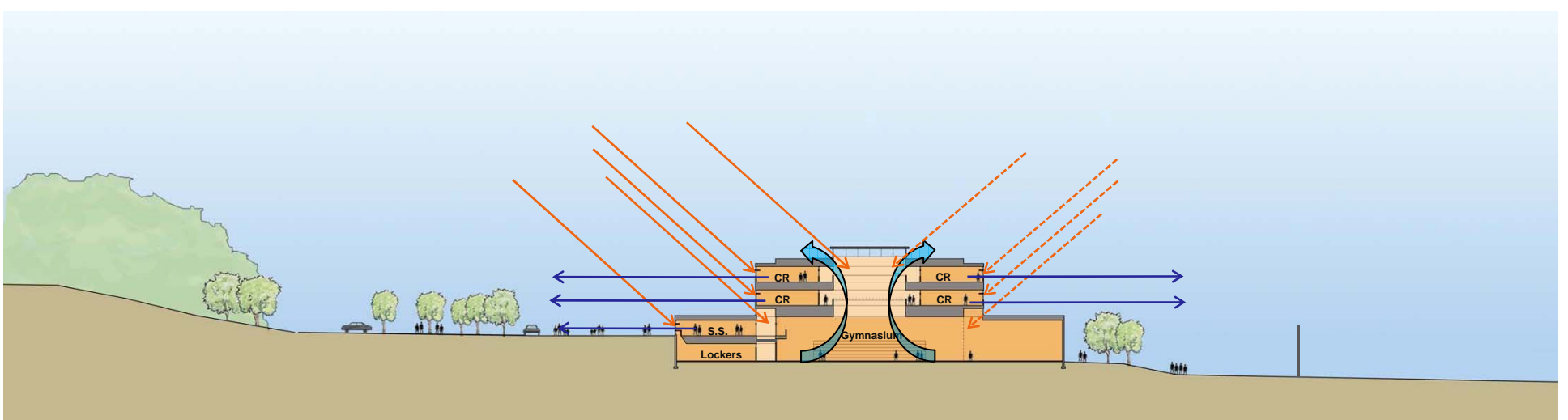
Third Floor Plan



Option 12R - Conceptual Sections



Section at Ground & Lower Entries



Section at Gymnasium

Recommended Alternatives

Option 6R1 \$97.7M

Major Renovation /Major Addition (44 months)



- **Fulfills Educational Program**
- **Promotes 21st century learning**
- **Flexibility / Adaptability**
- **Safe / Secure campus**
- **Logical and efficient organization**
- **Good building orientation (day lighting)**
- **Improved site circulation**
- **Promotes Community use**
- **Integrates campus**
- **Compact and efficient**
- **Good *Sustainability***
- **Phasing is disruptive to students**
- **Maintains buildings "A", Cafeteria, L. Gym**

Option 12R \$91.0M

1 Phase New Building (32 months)



- **Fulfills Educational Program**
- **Promotes 21st century learning**
- **Flexibility / Adaptability**
- **Safe / Secure campus**
- **Logical and efficient organization**
- **Optimizes building orientation (day lighting)**
- **Improved site circulation**
- **Promotes Community use**
- **Integrates campus**
- **More compact & efficient**
- **Better *Sustainability***
- **Minimizes phasing disruption to students**
- **Does not maintain existing buildings**
- **Unknown soil conditions??**



THANK YOU

omr architects

Concord- Carlisle High School

Preferred Schematic Report

Letter and Exhibits sent to MSBA on May 18, 2011

**CONCORD PUBLIC SCHOOLS
CONCORD-CARLISLE REGIONAL SCHOOL DISTRICT**

120 MERIAM ROAD CONCORD, MA 01742 PHONE: 978.318.1500 FAX: 978.318.1537
www.concordpublicschools.net

May 18, 2011

Ms. Mary Pichetti, Director of Capital Planning
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

RE: Concord-Carlisle Regional High School

Dear Ms. Pichetti,

We have reviewed your comments on the Space Summary submission for Concord-Carlisle Regional High School project and we are proposing the following changes to better achieve compliance with the MSBA guidelines in the new program and strive to meet the MSBA gross square footage and space standards. Please see the attached [Exhibit #1](#)- Proposed Space Summary and Comparison Worksheet revised and dated 16 May 2011 for more information.

1. CORE ACADEMIC SPACE

- **Teacher planning space 7,400 nsf** - Currently 74 FTE share 41 classrooms and use their planning space to conference with individual and small groups of students in Math, Science, Social Studies, English, and Foreign Language. CCHS teachers teach in classrooms 4/7 periods daily and work with students in their planning space 3/7 periods daily, as they do not have dedicated classrooms from which to work. We have allocated 100 SF per FTE as per the MSBA guidelines.
- **Resource Centers 2,075 nsf.** - Special education students receive individualized and small group tutoring/instruction in the Resource Centers. Additionally, regular education students receive tutoring support in Math, English/Social Studies, and Science.
- **Large Group Seminar 1,700 nsf** – Currently, the existing large group presentation room is used on a daily basis for 2 or more classes to gather for student demonstrations of their project – based learning assignments.
- **Physics and Earth Science classrooms 1200 nsf each**- These classrooms do not need wet labs or gas, and the science teachers confirmed that 1200 sq ft will support their classroom design and the delivery of the curriculum.
- **Foreign Language Laboratory** – We understand that MSBA accepts this variation to the guidelines and no additional action is required.
- **Health Classroom** – We understand that MSBA accepts this variation to the guidelines and no additional action is required.

2. SPECIAL EDUCATION

One hundred eighty five (185) special education students are included in the general education classrooms for core curriculum classes. They receive study skills and tutorial support from special education teachers and tutors in the Math, English/Social Studies and Science Resource Centers and the Special Education Resource Room. Math Strategies and Integrated English courses are provided for those special education students who need intensive specialized instruction. The Pathways program services approximately twelve (12) developmentally delayed students. These special education students receive related services, social/prevocational training, specialized tutorial support, and individualized program coordination in the self-contained classroom. The Pathways program is staffed with a full time head special education teacher who coordinates all students' progress and classroom modifications, a full time social worker, and an additional special education teacher, and several special education tutors. The Alternative Program serves approximately twelve to fifteen (12-15) special education students with severe social emotional issues in a self-contained classroom. A full time special education teacher and tutor are assigned to the program as well as a part time school psychologist. Special education students are mainstreamed according to their individual needs and IEPs. The lead special education teacher works closely with outside therapists and related service providers in order to create the most comprehensive support system for the individual special education students. The Lighthouse program serves approximately twelve to fifteen (12-15) special education students who are returning to CCHS from hospitalization for therapeutic intervention. A full time social worker, school psychologist and special education teacher/tutor serve these special education students in a self-contained classroom. Special education related services such as speech/language therapy, occupational therapy, physical therapy, vocational rehabilitation, and counseling are provided to special education students based on their IEPs.

This educational program has been reviewed with our Special Education department at CCHS, and we understand that at a later date we are required to submit a letter and drawings to the MSBA, which in turn will be submitted to the DESE for their approval during the Schematic Design phase of this project, prior to the Project Scope and Budget agreement.

3. ART & MUSIC/VOC-TECH

- To clarify, the proposed Art Gallery at 750 nsf was counted twice in the MSBA letter dated 5/13/11. There is only one Art Gallery @750 nsf. As suggested, we will move the Art Gallery back into the Art and Music category, but we plan to reduce it to 525 nsf in the program and carry 225 nsf in gross.
- To clarify, the storage and workroom space in the space summary referred to in the MSBA letter was only 450 nsf over MSBA guidelines. As suggested, we will reduce Art Workroom with Storage and Kiln from five spaces that total 900 nsf to three spaces that total 450 nsf. Additional storage space will be provided in gross.
- Based on the new Space Summary, the total space for Art/Music is 12,650 nsf and the total for Voc/Tech is 8,350 nsf. The total area for Art/Music

and Voc/Tech is now 21,000 nsf and within the amount included in MSBA guidelines.

4. HEALTH AND PHYSICAL EDUCATION

- **Reduce the Health and Physical Education area to comply with MSBA guidelines** - The existing Health and PE program space is 31,075 nsf for five teaching stations including 2 gyms, fitness center, and 2 temporary classrooms used for Health instruction and yoga. More than 76% of students participate in the athletic program, and both Concord and Carlisle communities expect the current program to continue in the new building project. We propose to move the additional PE spaces: Multipurpose PE space for yoga, dance, aerobics, fencing, wrestling - 2,175 nsf; Gym - 5,000 nsf; PE equipment storage - 500 nsf; 3 team rooms - 1,675 nsf; and athletic trainer space - 500 nsf; to the "Other" or community space category. These PE Other spaces total 9,850 nsf and are needed for some PE classes but are required for the athletic program. Please see #11, Other, below.
- The MSBA PE alternative was revised to 2,750 nsf. Note that there is still the need for two (2) health instructor's offices/showers/toilets in the MSBA program, as these are meant to be adult supervising control spaces located in the girls and boys locker rooms and are required to be single gender with a glass wall into the locker rooms. The Health and PE area now complies with the MSBA guideline of 23,060 nsf.
- **Health Classroom** – This is within the core academic category and we understand that MSBA accepts this variation to the guidelines and no additional action is required.

5. MEDIA CENTER

- We understand that MSBA accepts this variation to the guidelines and no additional action is required.

6. AUDITORIUM/DRAMA

- No additional action is required per MSBA.

7. DINING & FOOD SERVICE

- No additional action is required per MSBA.

8. MEDICAL

- To clarify, the MSBA refers to 1,100 nsf of Medical space in their May 13 2011 letter, but the MSBA guidelines state 1,110 nsf and the Proposed Space Summary remains at 1,110 nsf. The District assumes this was a typo, and would like the 1,110 nsf maintained for the record.

9. ADMINISTRATION AND GUIDANCE

- **Reduce the Administration and Guidance area by 451 nsf to meet MSBA guidelines plus accepted variations** – We propose to delete 456 nsf for Career Center. Currently the career center space is used for counselors to meet with small groups of students and to store college catalogs. The print catalog information has been replaced by web-based

resources, and students use computers to access college/career information. Counselors will use their office space and the conference room to meet with students.

- **Additional 300 nsf for METCO** – We understand that MSBA accepts this variation to the guidelines and no additional action is required.
- **Additional 200 nsf for two additional guidance counselors**- We understand that MSBA accepts this variation to the guidelines.
- **Additional 825 nsf for the “Challenge program and Planning Room”** - This space serves potential student drop-outs and students with in school suspension. We understand that MSBA accepts this variation to the guidelines.

10. CUSTODIAL AND MAINTENANCE

- No additional action is required per MSBA.

11. OTHER

- Per MSBA, we have moved the 750 nsf Art Gallery to the Art & Music category.
- We have also moved the additional PE spaces that are ineligible for reimbursement by the MSBA to Other. PE Alternative – Multipurpose 2,175 nsf, PE Alternative Gym 5,000 nsf, PE storage 500 nsf, 3 Team Rooms 1,675 nsf, and Athletic trainer, 500 nsf is necessary to replace current athletic space. All costs would be ineligible for reimbursement by MSBA, but we propose to include the program space within the project as it is vital to the functioning of the high school. Please see Exhibits #1, #2, #3, and #4 for quantitative and graphic representations of the Community (Other) spaces.
- **Radio Station 1,840 nsf, Cable/TV 1,600 nsf, Adult and Community Education 250 nsf** - We understand that this space and all costs associated with fitting out this space are considered ineligible for reimbursement by MSBA, but may be included within the project.

Additional comments re: OTHER -

Exhibit #2 is a graphic representation of the Proposed Space Summary relative to MSBA guidelines indicating the categories, “Health and Physical Education” shaded in orange and “Other” shaded in blue.

Exhibit #3 shows a Sample Winter Week Practice Schedule used for scheduling the spaces after school to accommodate all of the athletic programs at CCHS. The impact of having only one athletic space (gymnasium) would be extremely detrimental to the athletic and PE programs at the high school.

The scheduling of athletics begins at 2:30 and ends at 8:00pm on most days. Currently, CCHS has 6 basketball teams, 2 track teams, 2 fencing teams, and the wrestling team which utilizes the cafeteria for daily practice. The High School plays Freshman and JV games at the same 4:00 PM time slot on Tuesdays to allow the Varsity games to begin at 5:30 and end at 7:00 on school nights. Many days multiple teams are sharing space -- the track teams with nearly 100

students use half of the lower gym for practice on most days. On Wednesdays, the athletic department buses the fencing team to Billerica to practice at the fencing school. This opens up time to allow for Wednesday evening wrestling meets to be held in the main gym, rather than the cafeteria. In the fall, CCHS uses two gyms daily for volleyball with 60+ students practicing and has simultaneous matches at home so that they end by 6:30 PM. If the school had to have three matches in a row it would be closer to 8:00 PM, with the younger kids at the end of the evening. At the conclusion of volleyball practice, the cheer team then practices from 6:00-8:00 PM. CCHS also uses the lower gym as a visiting team locker room during home football games since no other space exists for this function.

Additionally, if only one gymnasium were to be located at the proposed high school, then when a contest is added to the schedule, it would eliminate the opportunity for all other teams to practice on that day. And it would eliminate most if not all community use of the high school gymnasiums. The Proposed Health, PE and Other program spaces are vital to the Towns of Concord and Carlisle and the students at Concord-Carlisle Regional High School.

The district respectfully requests that the MSBA accepts the square footage of the "Other" category as integral to the Project and allows the district to proceed with this square footage under one umbrella of a total project. The project team will design the additional SF (OTHER) as a separately defined quadrant or quadrants within the building. Exhibit #4 includes potential design ideas which articulate how a proposed New Building of 221,725 GSF (shaded in orange) might include an area of 19,272 GSF (shaded in blue) within the Project. The area in blue would house the community and after school spaces indicated in the "Other" category of the Space Summary. Each option has been developed to meet the educational program and to holistically join the buildings so that the amount of perimeter wall can be reduced thereby making the project as a whole, a more economical solution. We will continue to work with the users and the building committee to develop these design ideas through Schematic Design.

We understand that the MSBA has many ways of handling accounting for these ineligible costs, which are included within the Project. We would be happy to discuss and consider any accounting system that the MSBA would like to pursue to track and separate these costs.

12. TOTAL NET BUILDING FLOOR AREA – The District is now proposing to provide a total of 166,205 nsf which exceeds the MSBA guidelines by 13,513 nsf, but 13,540 nsf of this is in Other.

13. TOTAL BUILDING GROSS FLOOR AREA – The District is now proposing to provide a total of 240,997 gsf which exceeds the MSBA guidelines by 19,272 gsf. This overage is in Other and we understand it to be ineligible, but propose it to be included within the project.

Concord-Carlisle Regional High School District Space Summary Response
18 May 2011

We look forward to our scheduled conference call on Friday, May 20th at 3:30PM to discuss the space summary and to reach agreement that is mutually acceptable to MSBA and our communities.

Thank you for your assistance.

Sincerely,

Diana F. Rigby, Superintendent
Concord/Concord-Carlisle Regional School District

Enclosures:

Exhibit #1 - Proposed Space Summary revised and dated 16 May 2011

Exhibit #2 - Graphic Analysis of comparison of MSBA PE spaces to Proposed PE and "Other" spaces as requested by MSBA.

Exhibit #3 – Sample weekly winter athletic practice schedule

Exhibit #4 – Four design ideas to graphically represent the possible relationship of the MSBA eligible building to the "Other" part of the building.

cc: Mr. John Jumpe, MSBA Project Manager
Ms. Katie DeCristofaro, MSBA Field Coordinator
CCHS School Committee
CCHS Building Committee
David Saindon, KVA
Jeanne Roberts, OMR

Concord-Carlisle Regional High School Space Summary Comparison

01 April 2011, Rev 04 May 2011, Rev 13 May 2011, Rev 16 May 2011

| Description | Existing Program | Proposed Program - 2011 1225 Enrollment | MSBA Guidelines - 2010 1225 Enrollment | Delta: Prop - MSBA |
|--|----------------------------|--|---|--------------------------|
| CORE ACADEMIC SPACES | 57,476 | 63,420 | 58,690 | 4,730 |
| SPED | 7,145 | 5,970 | 13,090 | (7,120) |
| ART & MUSIC (Visual and Performing Arts) | 11,779 | 12,650 | 8,200 | 4,450 |
| VOCATIONS & TECHNOLOGY | 8,035 | 8,350 | 12,800 | (4,450) |
| HEALTH AND PHYSICAL EDUCATION | 31,075 | 23,060 | 23,060 | 0 |
| MEDIA-LIBRARY (Learning Commons) | 13,480 | 8,600 | 7,556 | 1,044 |
| AUDITORIUM / DRAMA | 9,667 | 10,400 | 10,400 | 0 |
| DINING & FOOD SERVICE | 13,068 | 10,262 | 10,262 | 0 |
| MEDICAL / NURSE | 690 | 1,110 | 1,110 | 0 |
| ADM. & GUIDANCE (Student Support) | 8,462 | 6,299 | 4,979 | 1,320 |
| CUSTODIAL & MAINTENANCE | 2,779 | 2,544 | 2,544 | 0 |
| SUB-TOTAL Net Area | 163,656 | 152,665 | 152,692 | (26) |
| OTHER | 6,734 | 13,540 | 0 | 13,540 |
| GRAND TOTAL Net Area Net:Gross Ratio (Net Area / Gross Area) Gross Area | 170,390 1.37 233,800 | 166,205 1.45 240,997 | 152,692 1.45 221,725 | 13,513 1.45 19,272 |

"Other" includes:

- Radio Station
- Cable TV Station
- Adult Education
- School Store
- Year Book Room

"Other" includes:

- Radio Station
- Cable TV Station
- Adult Education
- PE spaces addtl to MSBA

Legend lines revised 04 May 2011
 lines revised 16 May 2011

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | Existing Conditions | | |
|---|-----------------------|----------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| CORE ACADEMIC SPACES <i>(List classrooms of different sizes separately)</i> | | | 57,476 |
| Classroom - General | | 41 | 32,771 |
| <i>English (15 FTE)</i> | | 10 | 7,616 |
| Ex CR - English | 800 | 1 | 800 |
| Ex CR - English | 790 | 1 | 790 |
| Ex CR - English | 800 | 1 | 800 |
| Ex CR - English | 795 | 1 | 795 |
| Ex CR - English (shared w/Social Sci.) | 795 | 1 | 795 |
| Ex CR - English (shared w/Social Sci.) | 820 | 1 | 820 |
| Ex CR - English | 656 | 1 | 656 |
| Ex CR - English (small) | 310 | 1 | 310 |
| Ex CR - English (shared w/F. Language) | 1,010 | 1 | 1,010 |
| English (separate Resource Ctr; Writing Lab) | | | |
| English/Social Sciences (SSERC) Resource Ctr. | 840 | 1 | 840 |
| <i>Social Science (14 FTE)</i> | | 9 | 6,750 |
| Ex CR - Social Science | 795 | 1 | 795 |
| Ex CR - Social Science | 795 | 1 | 795 |
| Ex CR - Social Science | 800 | 1 | 800 |
| Ex CR - Social Science | 800 | 1 | 800 |
| Ex CR - Social Science | 795 | 1 | 795 |
| Ex CR - Social Science | 785 | 1 | 785 |
| Ex CR - Social Science | 780 | 1 | 780 |
| Ex CR - Social Science | 600 | 2 | 1,200 |
| SS Resource Ctr. (none existing) | | | |

| Proposed | | |
|-----------------------|----------|-------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | 63,420 |
| | 40 | 34,175 |
| | 10 | 8,250 |
| 825 | 9 | 7,425 |
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| 825 | 1 | 825 |
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| | 9 | 7,425 |
| 825 | 9 | 7,425 |
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| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|-------------|-------------------------|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | 58,690 | |
| | | | |
| | | | |
| 850 | 41 | 34,850 | 825 SF min - 950 SF max |
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Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | Existing Conditions | | |
|--|--------------------------|----------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| <i>Math (16 FTE)</i> | | 10 | 8,355 |
| Ex CR-Math | 810 | 1 | 810 |
| Ex CR-Math | 800 | 1 | 800 |
| Ex CR-Math | 795 | 1 | 795 |
| Ex CR-Math | 815 | 1 | 815 |
| Ex CR-Math | 1,080 | 1 | 1,080 |
| Ex CR-Math | 815 | 1 | 815 |
| Ex CR-Math | 815 | 1 | 815 |
| Ex CR-Math | 815 | 1 | 815 |
| Ex CR-Math | 810 | 1 | 810 |
| | | | |
| Ex. Math (MARC) Resource Ctr. | 800 | 1 | 800 |
| | | | |
| <i>Foreign Language (13 FTE)</i> | | 10 | 8,700 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex CR-Foreign Language | 750 | 1 | 750 |
| Ex Foreign Language Lab / Resource Ctr. | 1,950 | 1 | 1,950 |
| | | | |
| <i>Health</i> | | 2 | 1,350 |
| Health Classroom (1 Ex. TS) | 750 | 1 | 750 |
| Health Classroom (1 Ex. TS- portable) | 600 | 1 | 600 |
| | | | |
| Teacher Planning (was Misc. Support. Spaces) | | 6 | 7,560 |
| Ex. English (separate) | 1,400 | 1 | 1,400 |
| Ex. English/Social Sciences (shared) | 910 | 1 | 910 |
| Ex. Social Sciences (separate) | 1,290 | 1 | 1,290 |
| Ex. Math | 1,270 | 1 | 1,270 |
| Ex. Foreign Language (separate) | 1,595 | 1 | 1,595 |
| Ex. Science (separate) | 1,095 | 1 | 1,095 |

| Proposed | | |
|--------------------------|----------|-------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | 10 | 8,250 |
| 825 | 9 | 7,425 |
| | | |
| | | |
| | | |
| | | |
| | | |
| 825 | 1 | 825 |
| | | |
| | | |
| 825 | 9 | 7,425 |
| | | |
| | | |
| | | |
| | | |
| | | |
| 2,000 | 1 | 2,000 |
| | | |
| | | |
| | | |
| | 1 | 825 |
| 825 | 1 | 825 |
| 0 | 0 | 0 |
| | | |
| | 5 | 7,400 |
| 1,500 | 1 | 1,500 |
| | | |
| 1,400 | 1 | 1,400 |
| 1,300 | 1 | 1,300 |
| 1,600 | 1 | 1,600 |
| 1,600 | 1 | 1,600 |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|-------------|----------|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | | |
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| | | | |
| 100 | 41 | 4,100 | |
| | | | |
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Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | Existing Conditions | | |
|--|--------------------------|----------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| Chemical Storage Prep Room | | | |
| Foreign Language Recording&Storage Foreign Language Lab Storage | 160 | 1 | 160 |
| Central Chemical Storage Rm | | | |
| | | | |
| SPECIAL EDUCATION <i>(List classrooms of different sizes separately)</i> | | 21 | 7,145 |
| Self-Contained SPED | 765 | 1 | 765 |
| "Alt Pro" (Alternative Program) | 850 | 1 | 850 |
| "Lighthouse" (Post-Hospitalization, Self-Contained SPED Toilet | | | |
| OT / PT Therapy and SPED Classroom | 780 | 1 | 780 |
| "Pathways" SPED | 615 | 1 | 615 |
| Resource Room | 580 | 1 | 580 |
| Small Group Room | | | |
| Resource Rooms / Seminar Rooms | 104 | 9 | 935 |
| SPED Offices | | | |
| SPED Psychologist Offices | | | |
| Small Group / Conference Room | 230 | 1 | 230 |
| | | | |
| SPED Support | | | |
| SPED Secretary | 260 | 1 | 260 |
| SPED Waiting | 175 | 1 | 175 |
| SPED Workroom | 155 | 1 | 155 |
| SPED Kitchenette | 45 | 1 | 45 |
| | | | |
| "Compass" (ex. program) | 940 | 1 | 940 |
| ELL / SPED (shared classroom) | 815 | 1 | 815 |

| Proposed | | |
|--------------------------|----------|-------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| 200 | 1 | 200 |
| | | |
| | | |
| 200 | 1 | 200 |
| | | |
| | | |
| | 17 | 5,970 |
| | | |
| | | |
| 825 | 1 | 825 |
| 825 | 1 | 825 |
| | | |
| 1,010 | 1 | 1,010 |
| 1,010 | 1 | 1,010 |
| 500 | 1 | 500 |
| | | |
| | | |
| 100 | 4 | 400 |
| 100 | 2 | 200 |
| 250 | 2 | 500 |
| | | |
| | | |
| 250 | 1 | 250 |
| 150 | 1 | 150 |
| 150 | 1 | 150 |
| 150 | 1 | 150 |
| | | |
| | | |
| | | |
| | | |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|-------------|---|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | | |
| | | | |
| 200 | 1 | 200 | |
| | | | |
| | | 13,090 | |
| | | | |
| | | | |
| 950 | 9 | 8,550 | assumed 8% of pop. in self-contained SPED |
| | | | |
| 60 | 9 | 540 | |
| | | | |
| 500 | 4 | 2,000 | 1/2 size Genl. Clrm. |
| 500 | 4 | 2,000 | 1/2 size Genl. Clrm. |
| | | | |
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Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | | Existing Conditions | |
|---------------------------------------|-----------------------|---------------------|---------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| ART & MUSIC | | | 11,779 |
| Art Classroom - 25 seats | | 3 | 3,515 |
| Art Workroom w/ Storage & kiln | | 5 | 565 |
| 2D Art CR (1-TS) | 1,465 | 1 | 1,465 |
| 2D Art Storage | 120 | 1 | 120 |
| Ceramics (1-TS) | 1,290 | 1 | 1,290 |
| Ceramics Storage | 100 | 1 | 100 |
| Ceramics Storage | 90 | 1 | 90 |
| Kiln Room (none existing) | | | |
| Photography CR (1-TS) | 760 | 1 | 760 |
| Dark Room | 210 | 1 | 210 |
| Photography Storage | 45 | 1 | 45 |
| Art Teacher's Center (5 FTE) | 330 | 1 | 330 |
| Art Gallery | | 1 | 720 |
| Student Gallery | 720 | 1 | 720 |
| Art Storage - General | 150 | 1 | 150 |
| Performance and Music | | 3 | 4,110 |
| Band - 50-100 seats | 1,600 | 1 | 1,600 |
| Chorus - 50-100 seats | 1,420 | 1 | 1,420 |
| Ensemble (Chamber Orchestra) | 1,090 | 1 | 1,090 |
| Drama Classroom | | | |
| Music Practice | | 3 | 215 |
| Practice | 70 | 1 | 70 |
| Practice | 70 | 1 | 70 |
| Practice | 75 | 1 | 75 |
| Music Support | | 4 | 769 |
| Perf. Arts Teacher's Center | | | |
| Orch. Office | 240 | 1 | 240 |
| Band Office | 169 | 1 | 169 |
| Chorus Office | 200 | 1 | 200 |
| Theater Office | 160 | 1 | 160 |
| Music Storage | | 3 | 305 |
| Band Storage | 120 | 1 | 120 |
| Music Library (Sheet Music) | 75 | 1 | 75 |
| Drama Costume Storage | 110 | 1 | 110 |

| Proposed | | |
|-----------------------|----------|---------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | 12,650 |
| | 3 | 3,225 |
| | 3 | 450 |
| 1,200 | 1 | 1,200 |
| 150 | 0 | 0 |
| 1,200 | 1 | 1,200 |
| 300 | 0 | 0 |
| 100 | 1 | 100 |
| 825 | 1 | 825 |
| 300 | 1 | 300 |
| 50 | 1 | 50 |
| 500 | 1 | 500 |
| 525 | 1 | 525 |
| 525 | 1 | 525 |
| 300 | 0 | 0 |
| | 4 | 5,500 |
| 2,000 | 1 | 2,000 |
| 1,400 | 1 | 1,400 |
| 500 | 1 | 500 |
| 1,600 | 1 | 1,600 |
| | 5 | 450 |
| 75 | 4 | 300 |
| 150 | 1 | 150 |
| | 1 | 400 |
| 400 | 1 | 400 |
| | | |
| | | |
| | | |
| | | |
| | 1 | 500 |
| 500 | 1 | 500 |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|--------------|---|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | 8,200 | |
| 1,200 | 3 | 3,600 | Assumed use - 25% Population - 5 times/week |
| 150 | 3 | 450 | |
| | | | now in gross |
| | | | now in gross |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | JKR note: this is a subtotal line |
| | | | there is now 525 in net and 225 sf in gross |
| | | | |
| | | | now in gross |
| | | | |
| | | | |
| 1,500 | 1 | 1,500 | Assumed use - 25% Population - 5 times/week |
| 1,500 | 1 | 1,500 | |
| 200 | 1 | 200 | |
| | | | |
| 75 | 6 | 450 | |
| | | | |
| | | | |
| 500 | 1 | 500 | |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | | Existing Conditions | |
|--|--------------------------|---------------------|--------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| Electronic Music Lab (MIDI) | | 5 | 1,100 |
| Digital Music Classroom | 600 | 1 | 600 |
| Electronic Music Lab Control Room | 225 | 1 | 225 |
| Recording Booth | 100 | 1 | 100 |
| Recording Booth | 130 | 1 | 130 |
| Recording Booth | 45 | 1 | 45 |
| VOCATIONS & TECHNOLOGY | | | 8,035 |
| Tech Clrm. - (E.G. Drafting, Business) | | | 4,475 |
| Mac Lab Video (currently in Art) | 1,175 | 1 | 1,175 |
| Architecture/Sculpture (1-TS) | 1,500 | 1 | 1,500 |
| Architecture/Sculpture Storage | 150 | 1 | 150 |
| IT Instruction (3 staff + 4 students) | | | |
| IT Office / Instruction (In ex. Mac Lab) | 190 | 1 | 190 |
| IT Office / Instruction (In ex. Mac Lab) | 100 | 1 | 100 |
| Digital Imaging (1-TS) [ex PC Lab] | 1,360 | 1 | 1,360 |
| Tech Shop - (E.G. Consumer, Wood) | | | 3,560 |
| Woodworking / Maint., / Set Const. | 1,780 | 1 | 1,780 |
| Woodworking /- Spray Booth | 140 | 1 | 140 |
| Woodworking Storage | 140 | 1 | 140 |
| Fabrication Lab | | | |
| Engineering/Robotics | 1,500 | 1 | 1,500 |

| Proposed | | |
|--------------------------|----------|--------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | 5 | 1,100 |
| 600 | 1 | 600 |
| 225 | 1 | 225 |
| 100 | 1 | 100 |
| 130 | 1 | 130 |
| 45 | 1 | 45 |
| | | 8,350 |
| | | 3,150 |
| 1,200 | 1 | 1,200 |
| 150 | 1 | 150 |
| 600 | 1 | 600 |
| | | |
| | | 5,200 |
| | | |
| 2,000 | 2 | 4,000 |
| 1,200 | 1 | 1,200 |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|---------------|---|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | 12,800 | |
| 1,200 | 4 | 4,800 | Assumed use - 50% Population - 5 times/week |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 2,000 | 4 | 8,000 | Assumed use - 50% Population - 5 times/week |
| | | | |
| | | | |
| | | | |
| | | | |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | | Existing Conditions | |
|---|--------------------------|---------------------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| HEALTH & PHYSICAL EDUCATION | | | |
| [6 ex. teaching stations (TS) incl. 2- Health in core acad] | | 3 | 21,415 |
| Gymnasium (1 Ex. TS - Performance) | 9,775 | 1 | 9,775 |
| PE Alternatives (MSBA) (1 Ex. TS) | 2,100 | 1 | 2,100 |
| PE Alternative (ex. Lower Gym) | 9,540 | 1 | 9,540 |
| Gym Storeroom (MSBA) | | 3 | 510 |
| Ex. Upper Gym Storage | 130 | 1 | 260 |
| Ex. Upper Gym Storage | 120 | 1 | 120 |
| Ex. Weight Room Storage | 65 | 1 | 130 |
| Locker Rooms - Boys/Girls w/Toilets | | 2 | 8,305 |
| Girls | 4,405 | 1 | 4,405 |
| Boys | 3,900 | 1 | 3,900 |
| Phys. Ed. Storage (MSBA) | | 3 | 500 |
| Phys. Ed. Storage | 260 | 1 | 260 |
| Phys. Ed. Storage | 170 | 1 | 170 |
| Phys. Ed. Storage | 70 | 1 | 70 |
| Athletic Director's Office | | 1 | 145 |
| Ex. Athletic Director's Office | 120 | 1 | 120 |
| Ex. Athletic Director's Office Storage | 25 | 1 | 25 |
| Health Instructor Office w/Shower & Toilet | | 1 | 200 |
| Teacher's Center (5-FTE) | | | |
| Girls P.E. Office Locker Room | 200 | 1 | 200 |

| Proposed | | |
|--------------------------|----------|---------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | 23,060 |
| | 2 | 14,750 |
| 12,000 | 1 | 12,000 |
| 2,750 | 1 | 2,750 |
| 0 | 0 | 0 |
| 300 | 1 | 300 |
| 1,715 | 4 | 6,860 |
| 500 | 1 | 500 |
| 150 | 1 | 150 |
| | 2 | 500 |
| 250 | 2 | 500 |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|---------------|--------------------------------|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | 23,060 | |
| 12,000 | 1 | 12,000 | |
| 3,000 | 1 | 3,000 | |
| 300 | 1 | 300 | |
| 6,860 | 1 | 6,860 | 5.6 sf/student total |
| 500 | 1 | 500 | |
| 150 | 1 | 150 | |
| 250 | 1 | 250 | |
| | | | separate male and female req'd |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | | Existing Conditions | |
|--|-----------------------|---------------------|---------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| MEDIA CENTER | | | 13,480 |
| Media Center/Reading Room Commons/Media Center (4-staff / FTE) (Ex. area less Mac Lab) | | | 13,480 |
| Lower Library (inc. Lower level ramps) | 5,640 | 1 | 5,640 |
| Upper Library (stacks) | 6,850 | 1 | 6,850 |
| Library Office | 640 | 1 | 640 |
| Project Room / Conference | 350 | 1 | 350 |
| Faculty/Staff Workroom | | | |
| Faculty/Staff Break room | | | |
| Circulation Desk | | | |
| Silent Area/study carrels | | | |
| Group workstations | | | |
| Stacks area (11,800 vols) | | | |
| Conference/Project Rooms Large | | | |
| Medium (sim. to SPED / Guidance) | | | |
| Small (independent Study) | | | |
| Student Presentation area (Multi-purpose) | | | |
| AUDITORIUM / DRAMA | | | 9,667 |
| Auditorium (ex. 604 seats) | 6,090 | 1 | 6,090 |
| Stage Wings 2 @ (15'x40') | 1,770 | 1 | 1,770 |
| Auditorium Storage Theater Storage | 190 | 1 | 190 |
| Make-up / Dressing Rooms Ex. outside portable units | 504 | 3 | 1,512 |
| Controls / Lighting / Projection | 105 | 1 | 105 |

| Proposed | | |
|-----------------------|----------|---------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | 8,600 |
| | | 8,600 |
| | | |
| 400 | 1 | 400 |
| 400 | 1 | 400 |
| 850 | 1 | 850 |
| 3,400 | 1 | 3,400 |
| 2,000 | 1 | 2,000 |
| | | |
| 400 | 1 | 400 |
| 250 | 1 | 250 |
| 100 | 3 | 300 |
| 600 | 1 | 600 |
| | | |
| | | 10,400 |
| 6,000 | 1 | 6,000 |
| 1,600 | 1 | 1,600 |
| 600 | 2 | 1,200 |
| | | |
| 400 | 2 | 800 |
| | | |
| 300 | 2 | 600 |
| | | |
| 200 | 1 | 200 |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|---------------|---|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | 7,556 | |
| 7,556 | 1 | 7,556 | |
| | | | |
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| | | | |
| | | | |
| | | | |
| | | | |
| | | 10,400 | |
| 7,500 | 1 | 7,500 | 2/3 Enrollment @ 10 SF/Seat - 750 seats MAX |
| 1,600 | 1 | 1,600 | |
| | | | |
| 500 | 1 | 500 | |
| | | | |
| 300 | 2 | 600 | |
| | | | |
| 200 | 1 | 200 | |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | | Existing Conditions | |
|--|--------------------------|---------------------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| DINING & FOOD SERVICE | | | |
| Cafeteria / Student Lounge/ Break-out | 8,880 | 1 | 8,880 |
| Chair / Table Storage | | | |
| Scramble Serving Area | | | |
| Kitchen | 2,245 | 1 | 2,245 |
| Dishwashing | 330 | 1 | 330 |
| Kitchen Office | 165 | 1 | 165 |
| Food Storage | 260 | 1 | 260 |
| Walk-in Cooler | 95 | 1 | 95 |
| Walk-in Freezer | 55 | 1 | 55 |
| Walk-in Freezer | 80 | 1 | 80 |
| Staff Lunch Room | 860 | 1 | 860 |
| Staff Lockers | 60 | 1 | 60 |
| Kitchen Staff Toilet | 38 | 1 | 38 |
| MEDICAL | | | |
| Medical Suite Toilet | 45 | 1 | 45 |
| Nurses' Office/Waiting Room | 500 | 1 | 500 |
| Interview Room | | | |
| Examination Room / Resting | 145 | 1 | 145 |
| STUDENT SUPPORT (Adm. & Guidance) | | | |
| Administrative Suite | | | 3,545 |
| General Office / Waiting Room | 510 | 1 | 510 |
| Teachers' Mail and Copy Room | 190 | 1 | 190 |
| Duplicating Room | | | |
| Records Room | 55 | 1 | 55 |
| Principal's Office w/ Conference Area | 220 | 1 | 220 |
| Principal's Secretary / Waiting | 290 | 1 | 290 |
| Assistant Principal's Office - AP1 | 145 | 1 | 145 |
| Assistant Principal's Office - AP2 | 140 | 1 | 140 |
| Registrar's Office | 205 | 1 | 205 |
| Conference Room | 450 | 1 | 450 |
| Ex Administrative Office / Work Room | 125 | 1 | 125 |
| Ex. kitchenette | 85 | 1 | 85 |
| Ex. Meeting / Work Room | 1,130 | 1 | 1,130 |

| Proposed | | |
|--------------------------|----------|--------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| 10,262 | | |
| 6,125 | 1 | 6,125 |
| 456 | 1 | 456 |
| 600 | 1 | 600 |
| 2,525 | 1 | 2,525 |
| | | |
| | | |
| | | |
| | | |
| | | |
| 556 | 1 | 556 |
| | | |
| | | |
| | | |
| 1,110 | | |
| 60 | 1 | 60 |
| 250 | 1 | 250 |
| 100 | 3 | 300 |
| 100 | 5 | 500 |
| | | |
| | | 6,299 |
| | | 2,470 |
| 500 | 1 | 500 |
| 300 | 1 | 300 |
| | | |
| | | |
| 220 | 1 | 220 |
| 290 | 1 | 290 |
| 150 | 1 | 150 |
| 150 | 1 | 150 |
| 200 | 1 | 200 |
| 450 | 1 | 450 |
| 210 | 1 | 210 |
| | | |
| | | |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|--------------|--|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| 10,262 | | | |
| 6,125 | 1 | 6,125 | 3 seatings - 15SF per seat |
| 456 | 1 | 456 | |
| 600 | 1 | 600 | |
| 2,525 | 1 | 2,525 | 1600 SF for first 300 + 1 SF/student Add'l |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 556 | 1 | 556 | 20 SF/Occupant |
| | | | |
| | | | |
| 1,110 | | | |
| 60 | 1 | 60 | |
| 250 | 1 | 250 | |
| 100 | 3 | 300 | |
| 100 | 5 | 500 | |
| | | | |
| | | 4,979 | |
| 613 | 1 | 613 | |
| 100 | 1 | 100 | |
| 200 | 1 | 200 | |
| 200 | 1 | 200 | |
| 375 | 1 | 375 | |
| 125 | 1 | 125 | |
| 150 | 1 | 150 | |
| 150 | 1 | 150 | |
| 120 | 1 | 120 | |
| 450 | 1 | 450 | |
| | | | |
| | | | |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | Existing Conditions | | |
|---|--------------------------|----------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| METCO | | | 515 |
| METCO Director - Ex. | 115 | 1 | 115 |
| METCO Secretary - Ex. | 100 | 1 | 100 |
| METCO Tutoring - Ex. | 300 | 1 | 300 |
| Guidance Suite | | | 2,452 |
| Guidance Office | 95 | 4 | 380 |
| Guidance Office | 112 | 1 | 112 |
| Guidance Office | 140 | 1 | 140 |
| Guidance Office | 90 | 1 | 90 |
| | 110 | 1 | 110 |
| Social Adjustment Office | 60 | 2 | 120 |
| School Psychologist | 60 | 1 | 60 |
| Conference Room (share w/ SPED) | 200 | 1 | 200 |
| Guidance Waiting Room | | | |
| Guidance Storeroom | | | |
| Career Center | 945 | 1 | 945 |
| Records Room | 70 | 1 | 70 |
| Copy Room | 65 | 1 | 65 |
| Interns | 40 | 4 | 160 |
| Teachers' Work Room [Adult Support] | | | |
| Program Capacity (MSBA) | | | |
| Adult Support (Planning/Break/Kit) | | | |
| Student Service Programs | | | 1,950 |
| "Challenge" - Ex. Prog. | 1,050 | 1 | 1,050 |
| "Planning" (in-house susp./Social worker) Ex. | 680 | 1 | 680 |
| Planning - Storage | 220 | 1 | 220 |
| "Network" (At-risk - Freshman level) | | | |

| Proposed | | |
|--------------------------|----------|-------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | 300 |
| 200 | 1 | 200 |
| 100 | 1 | 100 |
| | 14 | 2,091 |
| 100 | 9 | 900 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| 200 | 1 | 200 |
| 100 | 1 | 100 |
| 100 | 1 | 100 |
| 456 | 0 | 0 |
| 178 | 1 | 178 |
| | | |
| | | |
| 613 | 1 | 613 |
| | | |
| | | |
| | | |
| | | |
| | | 825 |
| 825 | 1 | 825 |
| | | |
| | | |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|-------------|------------------------------------|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | | |
| 150 | 7 | 1,050 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 100 | 1 | 100 | |
| 100 | 1 | 100 | |
| 456 | 1 | 456 | this is not needed in cchs program |
| 178 | 1 | 178 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 613 | 1 | 613 | |
| | | | |
| | | | |
| | | | |
| | | | |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | | Existing Conditions | |
|--|--------------------------|---------------------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| CUSTODIAL & MAINTENANCE | | 7 | 2,779 |
| Custodian's Office | | | |
| Ex. Custodian's Office | 450 | 1 | 450 |
| Ex. Custodian's Office | 75 | 1 | 75 |
| Custodian's Workshop | | | |
| Ex. Maintenance Department | 1,250 | 1 | 1,250 |
| Custodian's Storage | | | |
| Ex. Custodian's Storage | 80 | 1 | 80 |
| Ex. Custodian's Storage | 165 | 1 | 165 |
| Ex. Custodian's Storage | 255 | 1 | 255 |
| | | | |
| Recycling Room / Trash | | | |
| Receiving and General Supply | | | |
| Storeroom | | | |
| Ex. trailer | 504 | 1 | 504 |
| Network/Telecom Room | | | |
| Existing included in gsf | | | |
| | | | |
| Ex. Grounds Equip.(incl. in gsf) | | | |
| Ex. Custodial Clos. (incl. in gsf) | | | |
| Ex. Telecom. Switch Clos. (incl. in gsf) | | | |

| Proposed | | |
|--------------------------|----------|-------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | 2,544 |
| 150 | 1 | 150 |
| | | |
| 250 | 1 | 250 |
| | | |
| 375 | 1 | 375 |
| | | |
| | | |
| 400 | 1 | 400 |
| 456 | 1 | 456 |
| 713 | 1 | 713 |
| | | |
| 200 | 1 | 200 |
| | | |
| | | |
| | | |
| | | |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|-------------|----------|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | 2,544 | |
| 150 | 1 | 150 | |
| | | | |
| 250 | 1 | 250 | |
| | | | |
| 375 | 1 | 375 | |
| | | | |
| | | | |
| 400 | 1 | 400 | |
| 456 | 1 | 456 | |
| 713 | 1 | 713 | |
| | | | |
| 200 | 1 | 200 | |
| | | | |
| | | | |
| | | | |
| | | | |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | | Existing Conditions | |
|---|-----------------------|---------------------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| OTHER | | | 6,734 |
| <i>Other (specify)</i> | | | |
| Alternative Health & Physical Education | | 1 | 330 |
| PE Alternative - Multipurpose | | | |
| PE Alternative | | | |
| PE Alternative Storage | 330 | 1 | 330 |
| Team Rooms | | 3 | 1,540 |
| Team Room | 675 | 1 | 675 |
| Team Room | 605 | 1 | 605 |
| Team Room | 260 | 1 | 260 |
| Visitor's Team Room | | | |
| PE Support | | 2 | 730 |
| Officials & Coaches Lockers w/ showers | 420 | 1 | 420 |
| Athletic Trainer | 310 | 1 | 310 |
| Radio Station | | 5 | 1,839 |
| Radio Station General | 980 | 1 | 980 |
| Radio Studio | 145 | 1 | 145 |
| Radio Studio | 120 | 1 | 120 |
| Tran. Storage | 150 | 1 | 150 |
| Technology Storage | 444 | 1 | 444 |
| Cable / TV | | 5 | 1,600 |
| Cable / TV General | 1,200 | 1 | 1,200 |
| Cable / TV Projection Room | 60 | 1 | 60 |
| Cable / TV Projection Room | 110 | 1 | 110 |
| Cable / TV Storage | 105 | 1 | 105 |
| Cable / TV Storage | 125 | 1 | 125 |
| Adult Education | | 2 | 385 |
| AE Directors Office | 225 | 1 | 225 |
| AE Education Office | 160 | 1 | 160 |
| School Store | | 1 | 100 |
| | 100 | 1 | 100 |
| Year Book | | 1 | 210 |
| | 210 | 1 | 210 |

| Proposed | | |
|-----------------------|----------|-------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | 13,540 |
| | 4 | 7,675 |
| 2,175 | 1 | 2,175 |
| 5,000 | 1 | 5,000 |
| 250 | 2 | 500 |
| | 3 | 1,675 |
| 675 | 1 | 675 |
| 500 | 2 | 1,000 |
| 150 | 0 | 0 |
| | 1 | 500 |
| 225 | 0 | 0 |
| 500 | 1 | 500 |
| | 5 | 1,840 |
| 980 | 1 | 980 |
| 145 | 1 | 145 |
| 120 | 1 | 120 |
| 150 | 1 | 150 |
| 445 | 1 | 445 |
| | 5 | 1,600 |
| 1,200 | 1 | 1,200 |
| 60 | 1 | 60 |
| 110 | 1 | 110 |
| 105 | 1 | 105 |
| 125 | 1 | 125 |
| | 2 | 250 |
| 150 | 1 | 150 |
| 100 | 1 | 100 |
| | 0 | 0 |
| | | |
| | 0 | 0 |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|-------------|----------|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | 0 | |

Preliminary Proposed Space Summary - Concord-Carlisle Regional High School

01 April 2011, Revised 04 May 2011, Revised 13 May 2011, Revised 16 May 2011

| Concord-Carlisle Regional High School | Existing Conditions | | |
|--|--------------------------|----------|-------------|
| ROOM TYPE | ROOM NFA ¹ | # OF RMS | area totals |
| | | | |
| | | | |
| Total Building Net Floor Area (NFA) <i>(Program does not include a Field House)</i> | | | 170,390 |
| Proposed Student Capacity/Enrollment | | | |
| | | | |
| Total Building Gross Floor Area (GFA) ² | | | 233,800 |
| Ex. Permanent Building | 230,050 | | |
| Ex. Temporary Buildings | 3,750 | | |
| | | | |
| Grossing factor (GFA/NFA) | | | 1.37 |

| Proposed | | |
|--------------------------|----------|-------------|
| Total | | |
| ROOM NFA ¹ | # OF RMS | area totals |
| | | |
| | | 166,205 |
| | | 1,225 |
| | | 240,997 |
| | | |
| | | 1.45 |

| MSBA 2010 Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|----------|-------------|----------|
| ROOM NFA ¹ | # OF RMS | area totals | Comments |
| | | | |
| | | 152,692 | |
| | | 1,225 | 181 |
| | | 221,725 | |
| | | | |
| | | 1.45 | |

¹ Individual Room Net Floor Area (NFA)

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

² Total Building Gross Floor Area (GFA)

Includes the entire building gross square footage measured from the outside face of exterior walls

Architect Certification

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulation

Name of Architect Firm: OMR Architects

Name of Principal Architect: Jeanne Kuespert Roberts, AIA

Signature of Principal Architect: _____

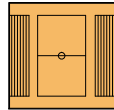
Date:

Exhibit #2

Graphic Analysis of comparison of MSBA PE spaces to Proposed PE spaces as requested by MSBA.

HEALTH & PE

MSBA
(23,060 NSF)



PERFORMANCE
GYM (12,000 S.F.)



PE ALTERNATIVES
(3,000 S.F.)



GYM STORAGE ROOM
(300 S.F.)



LOCKER ROOMS
(6,860 S.F.)



PE STORAGE
(500 S.F.)

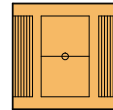


AD OFFICE
(150 S.F.)



HEALTH
INSTRUCTOR
(250 S.F.)

PROPOSED
(23,060 NSF)



PERFORMANCE
GYM (12,000 S.F.)



PE ALTERNATIVES
(2,750 S.F.)



GYM STORAGE ROOM
(300 S.F.)



LOCKER ROOMS
(6,860 S.F.)



PE STORAGE
(500 S.F.)



AD OFFICE
(150 S.F.)



HEALTH
INSTRUCTOR
(500 S.F.)

OTHER

PROPOSED
(13,540 NSF)



PE ALTERNATIVE
(2,175 S.F.)



PE ALT-MULTIPURPOSE
(5,000 S.F.)



PE ALT. STORAGE
(500 S.F.)



TEAM ROOMS
(1,675 S.F.)



ATHLETIC TRAINER
(500 S.F.)



RADIO STATION
(1,840 S.F.)



CABLE/TV
(1,600 S.F.)

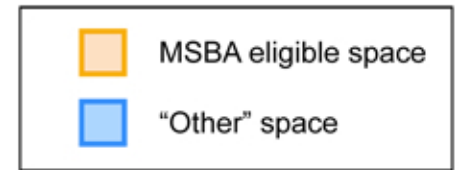


ADULT EDUCATION
(250 S.F.)

Sample Week
CCHS Winter Practice Schedule

| Day | Date | B Varsity Basketball | B JV Basketball | G Varsity Basketball | G JV Basketball | B FRBasketball | G Fr Basketball | V Wrestling | Fencing | Indoor track | Cheer |
|-----------|--------|----------------------|------------------|----------------------|-----------------|----------------|-----------------|-------------------|-------------------|-----------------|---------|
| Sunday | 5-Dec | 4:00MG | 2:00 MG | | | XXXXXXXXXXXX | XXXXXXXXXXXX | | | | |
| Monday | 6-Dec | off | off | 6:00MG | 2:30-3:45 MG | 2:30- LG | 2:30-3:45MG | Practice 2:30cafe | Meet B 5:00 | Practice 2:30LG | |
| Tuesday | 7-Dec | Scrim @ Hudson | Scrim @ Hudson | 3:45 MG | 2:30-3:45 MG | 2:30 LG | 2:30-3:45 MG | Practice 2:30cafe | Practice LG 4:15 | Practice 2:30LG | |
| Wednesday | 8-Dec | 5:45 MG | 3:45 MG | 6:00 LG | 3:45MG | 2:30-3:45MG | 2:30-3:45MG | Practice 2:30cafe | Practice @ Prisd. | Practice 2:30LG | XXXX |
| Thursday | 9-Dec | New Mission 6:30 | Practice 2:30 LG | 4:00 MG | 2:30-3:45MG | 2:30-4:00LG | 2:30-4:00MG | Lower 6:00 | Practice LG 4:30 | Meet @ RLC | 6:30 LG |
| Friday | 10-Dec | Practice 4:00 LG | Practice 4:00 LG | Practice 3:30 MG | 2:30 LG | 2:30-3:30MG | 2:30-3:30MG | Practice 2:30cafe | XXXXXXXXXXXX | | 6:30 LG |
| Saturday | 11-Dec | 10:00MG | | Scrimage 3:00 | Scrim LG 3:00 | XXXXXXXXXXXX | XXXXXXXXXXXX | @ Waltham | | LG 8:00 | |

EXHIBIT #4 - Alternative ideas representing possible building relationships



Idea A: Two distinct "Other" spaces; one at North, one at East

- Corridor separates "Other" space from eligible space
- North Portion - "Other" PE space on multiple floors
- East Addition - Radio, CCTV & Adult Education spaces on one floor

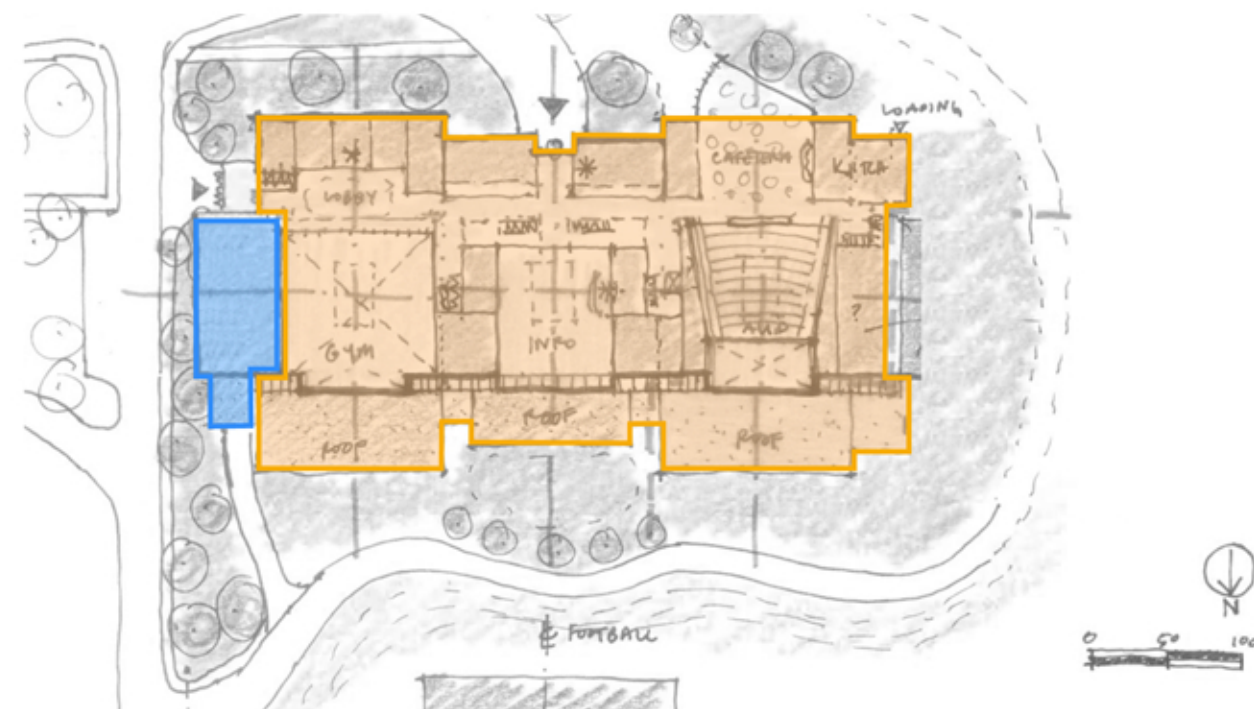
Idea B: "Other" Space on North side

- Corridor separates "Other" space from eligible space
- "Other" PE space on multiple floors
- Radio, CCTV & Adult Education spaces on one floor



Idea C: "Other" Space on North & West sides

- Corridor separates "Other" space from eligible space
- All "Other" space on one floor



Idea D: "Other" Space on East side, partially below eligible space

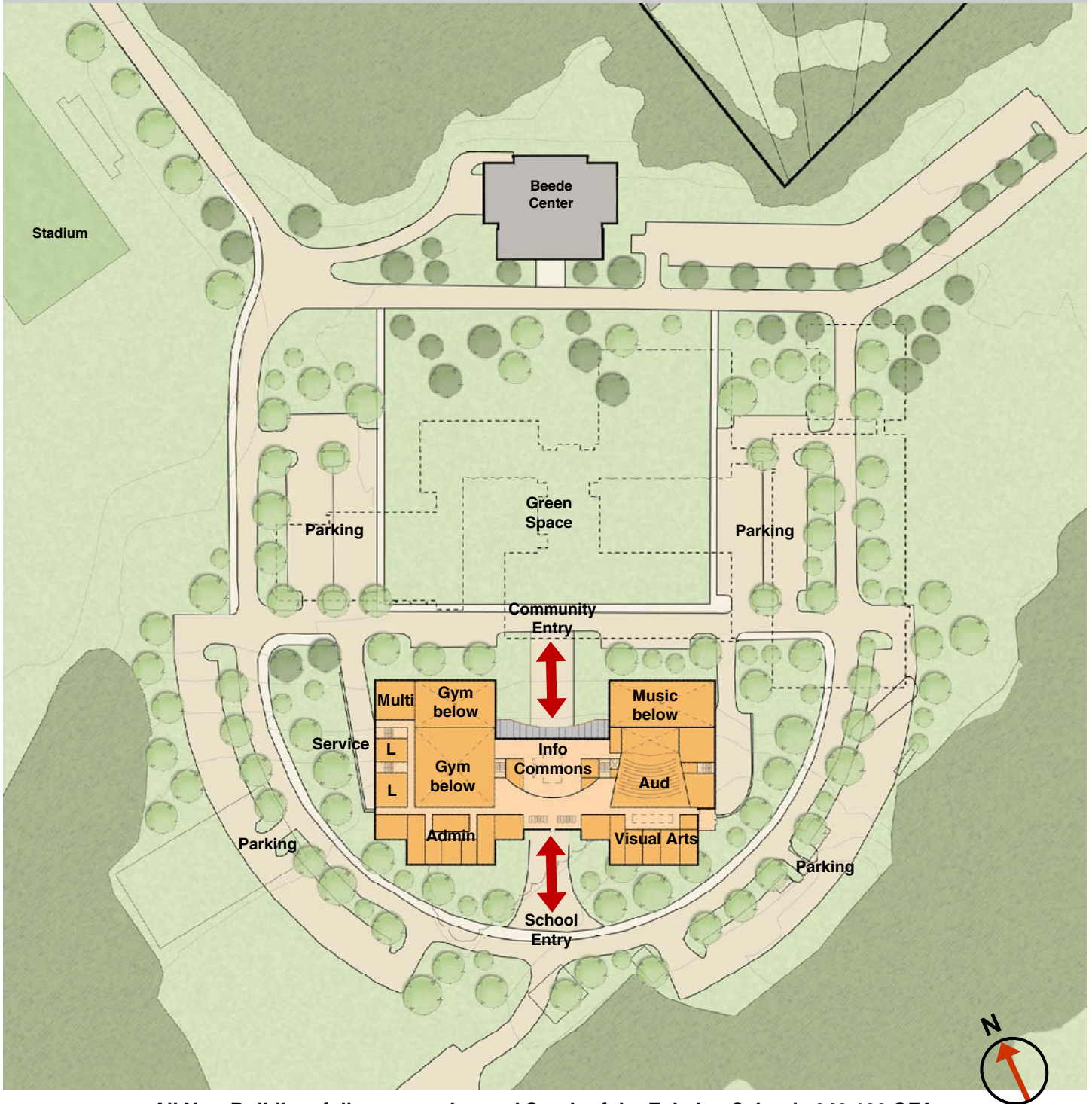
- Corridor separates "Other" space from eligible space
- "Other" PE space on multiple floors
- Radio, CCTV & Adult Education spaces on one floor

Concord- Carlisle High School

Preferred Schematic Report

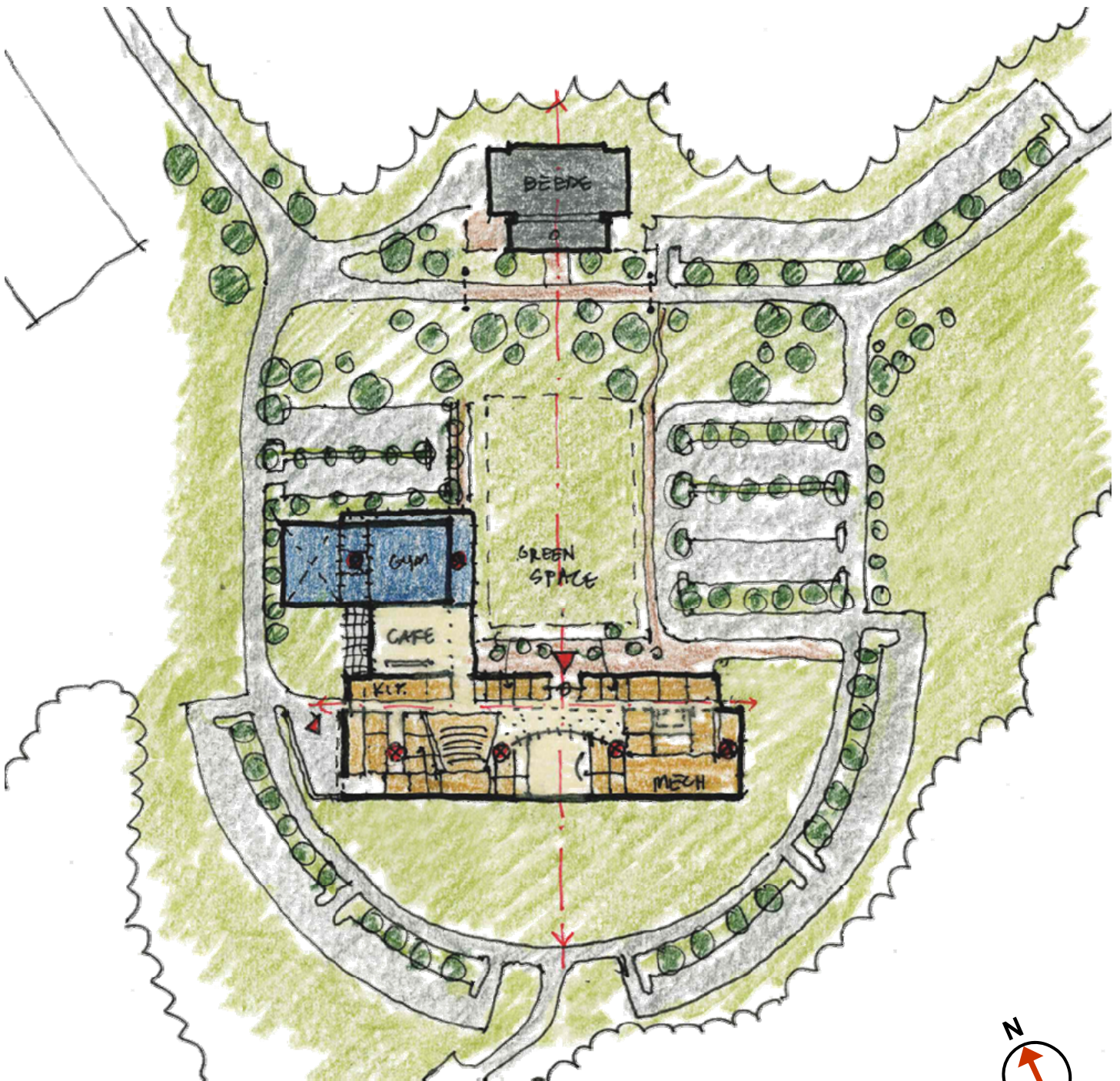
Exhibits sent to MSBA on June 2, 2011

Option 13



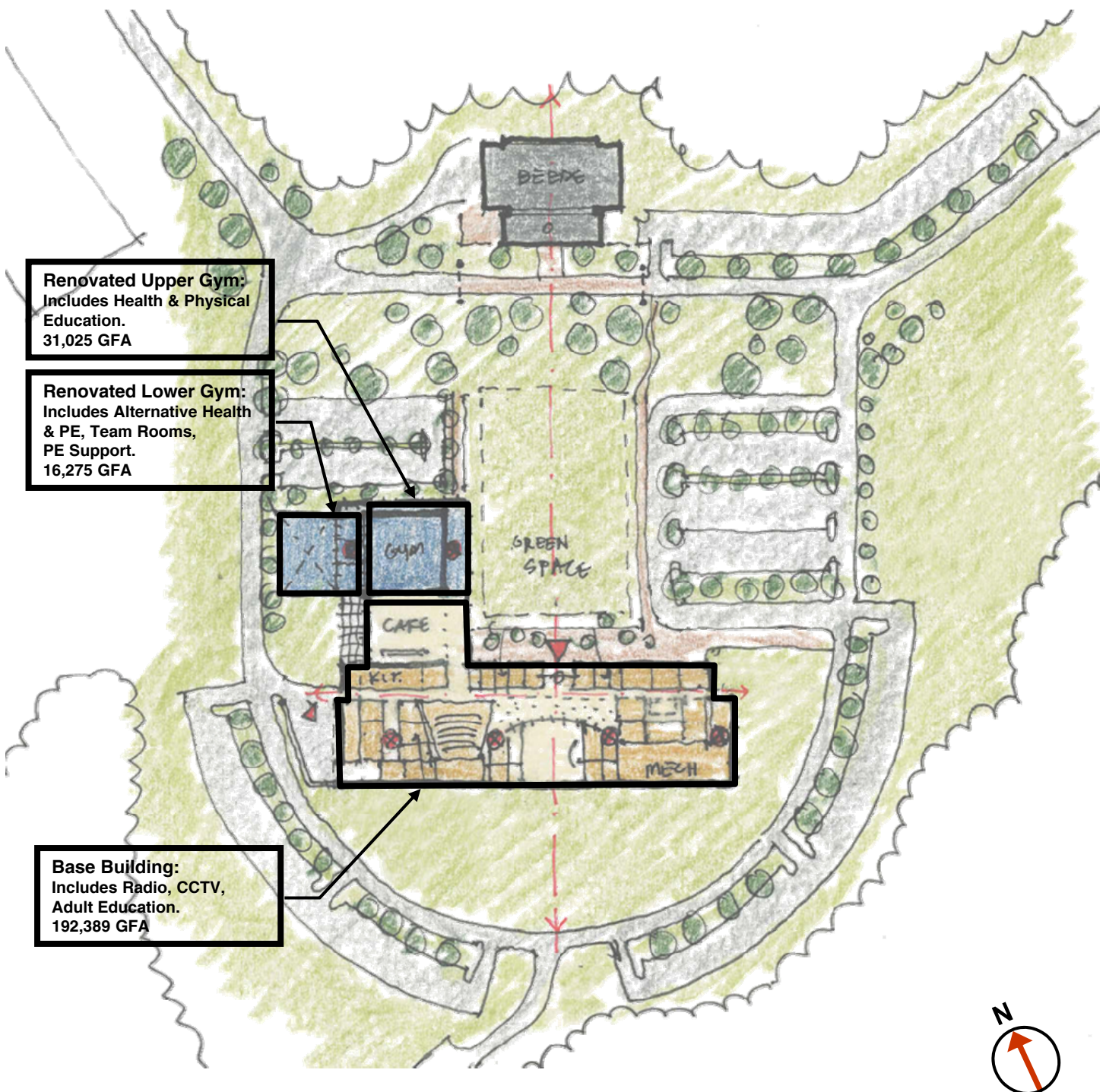
All New Building, full program, located South of the Existing School. 240,108 GFA

Option 14a



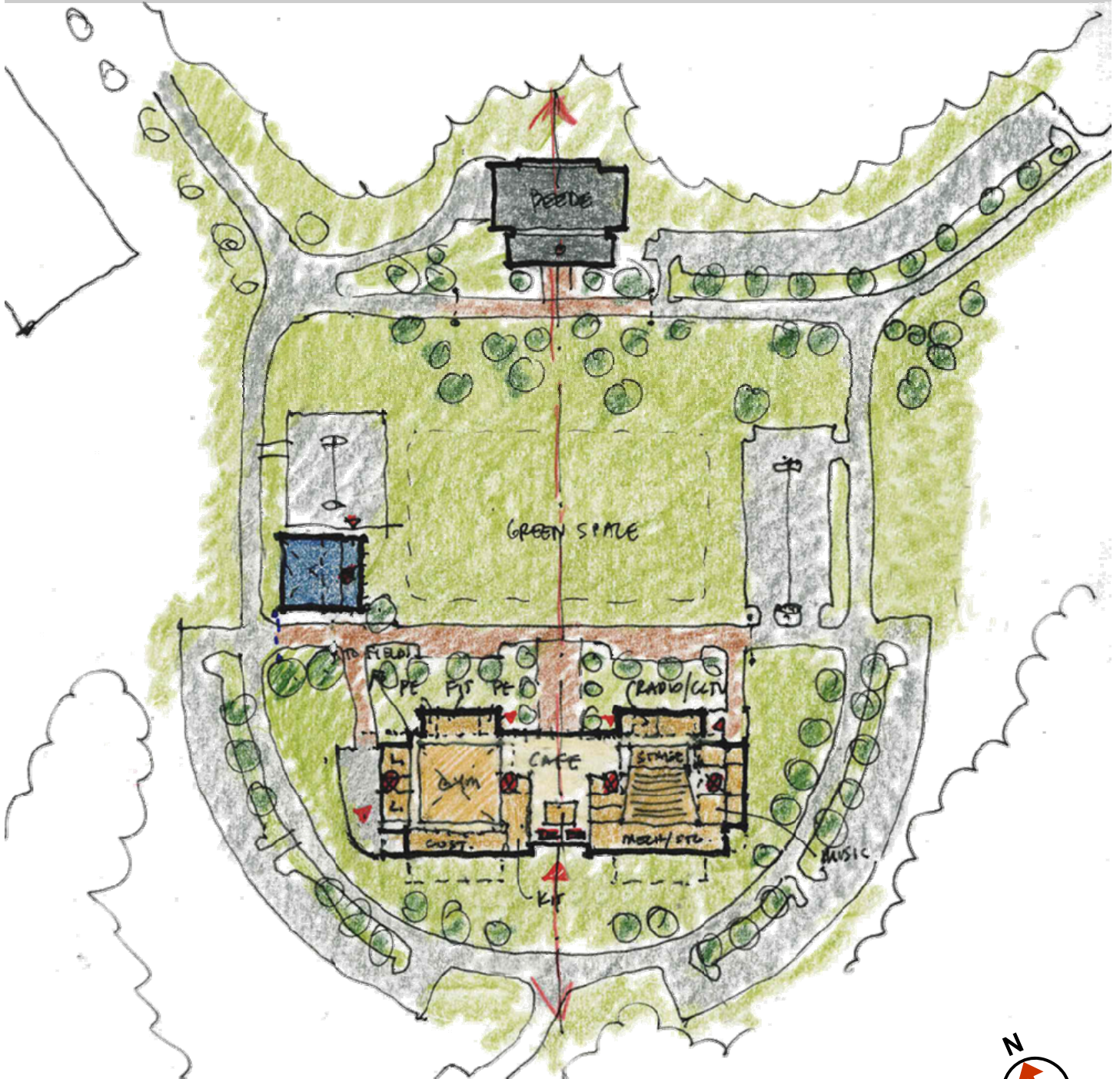
New Base Building connected to renovated Upper and Lower Gym Buildings which will house the entire Health and PE Department for the School. 239,689 GFA

Option 14a



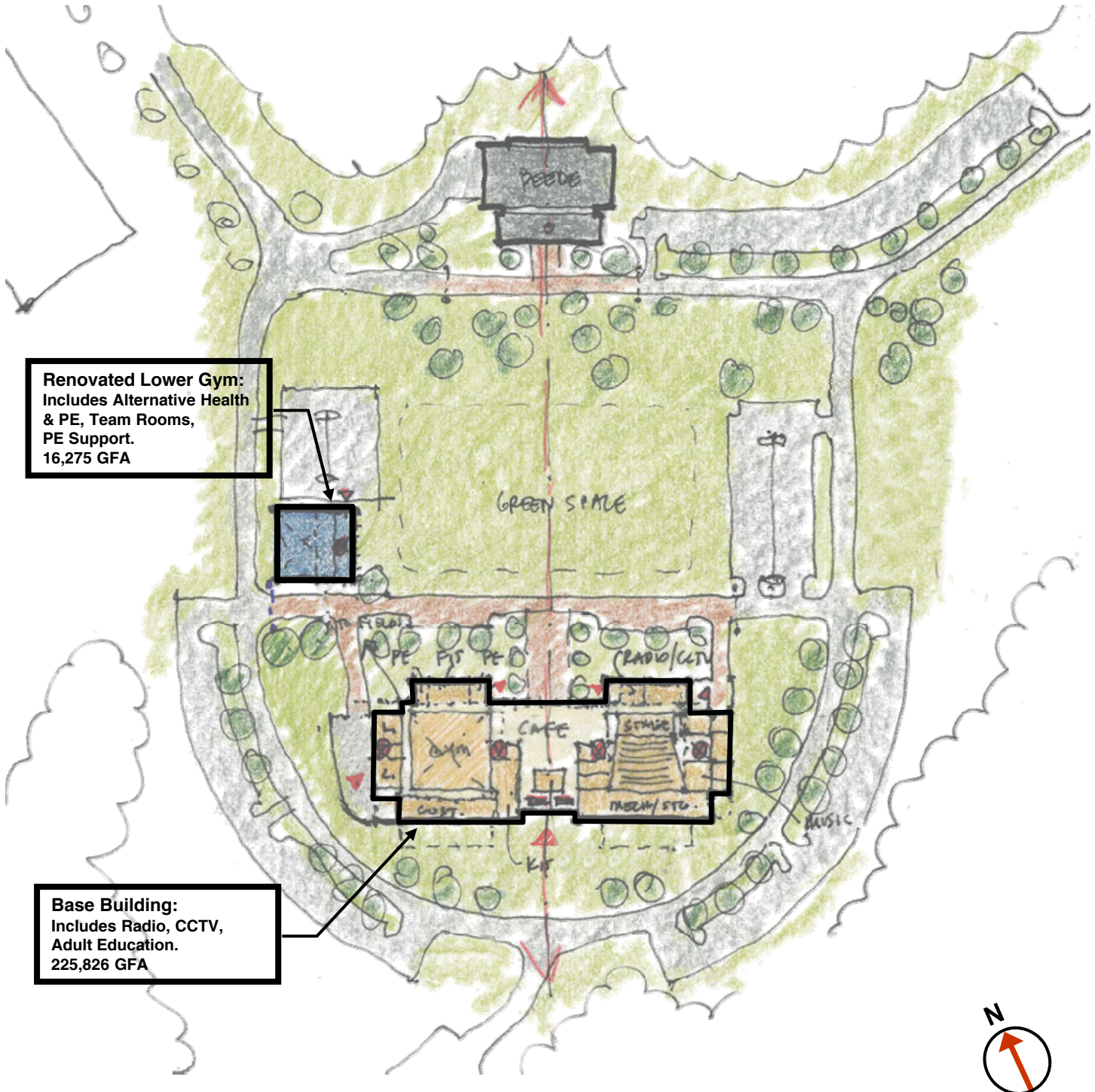
New Base Building connected to renovated Upper and Lower Gym Buildings which will house the entire Health and PE Department for the School. 239,689 GFA

Option 14b



New Base Building with stand alone renovated Lower Gym building which will house the Alternative Health & PE, Team Rooms & PE Support. 242,101 GFA

Option 14b

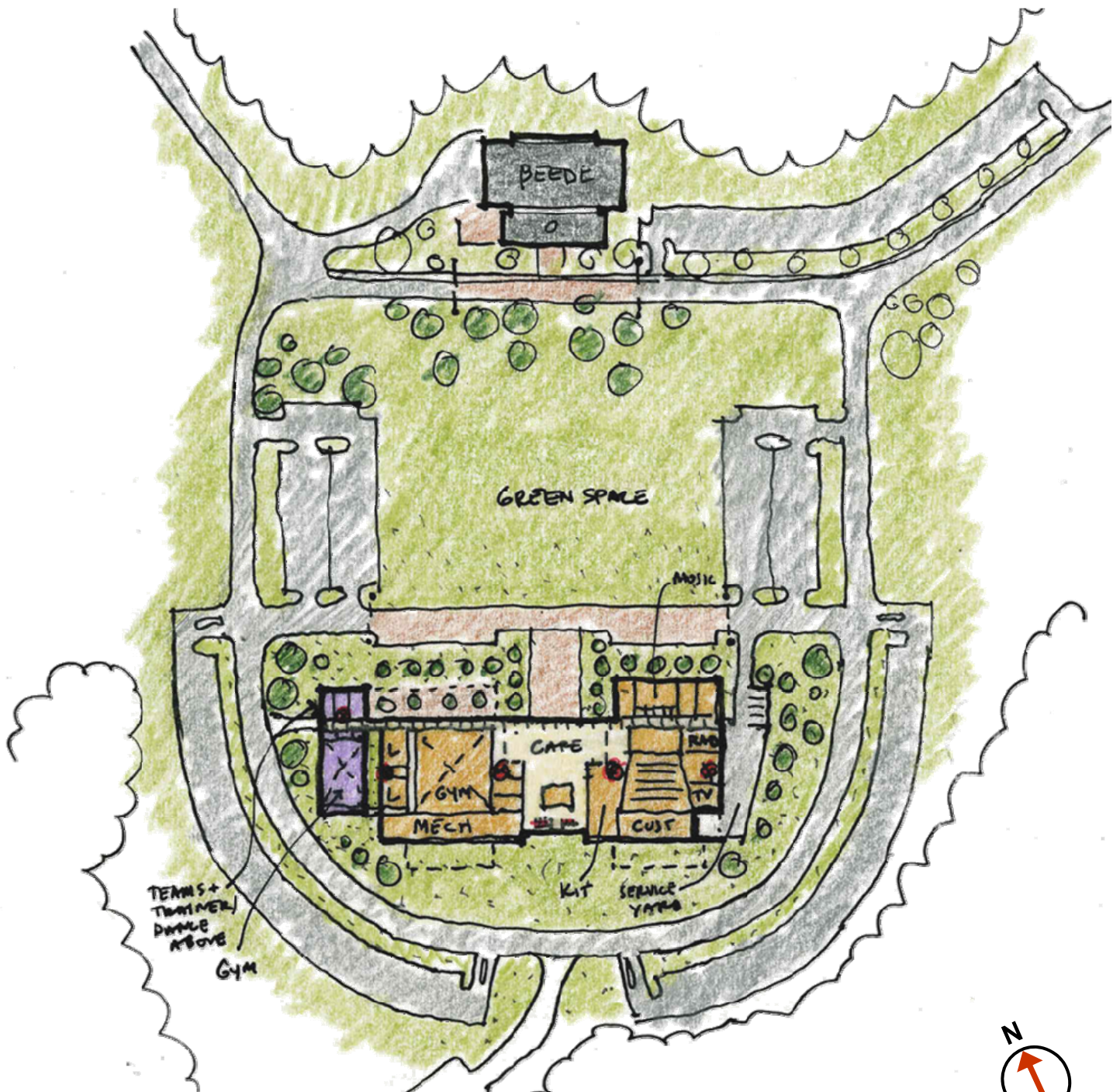


Renovated Lower Gym:
Includes Alternative Health & PE, Team Rooms, PE Support.
16,275 GFA

Base Building:
Includes Radio, CCTV, Adult Education.
225,826 GFA

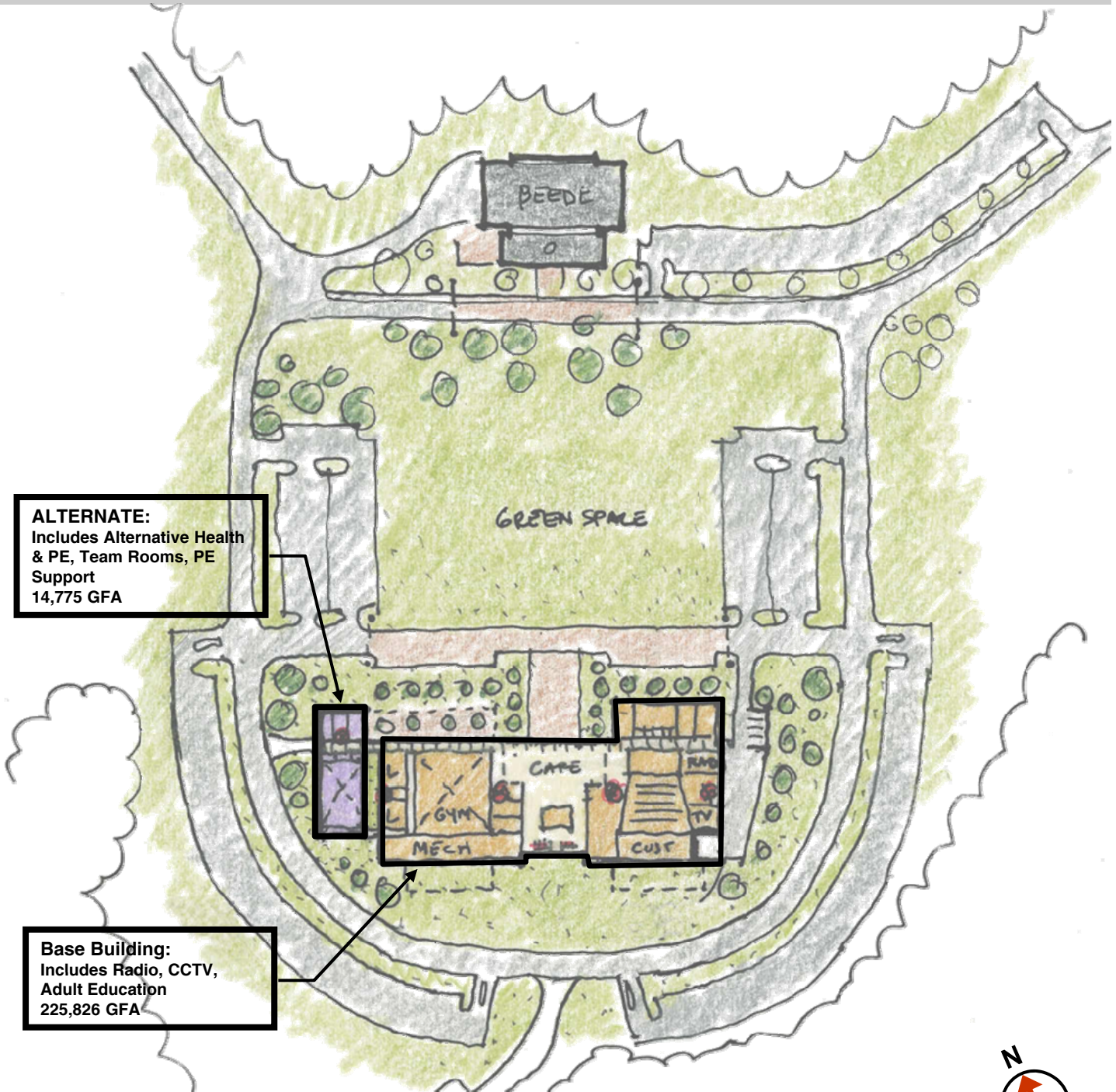
New Base Building with stand alone renovated Lower Gym building which will house the Alternative Health & PE, Team Rooms & PE Support. 242,101 GFA

Option 14c



New Base Building with separate building including separate systems. 240,601 GFA

Option 14c



New Base Building with separate building including separate systems. 240,601 GFA