

Fort Valley State University: Miller Hall



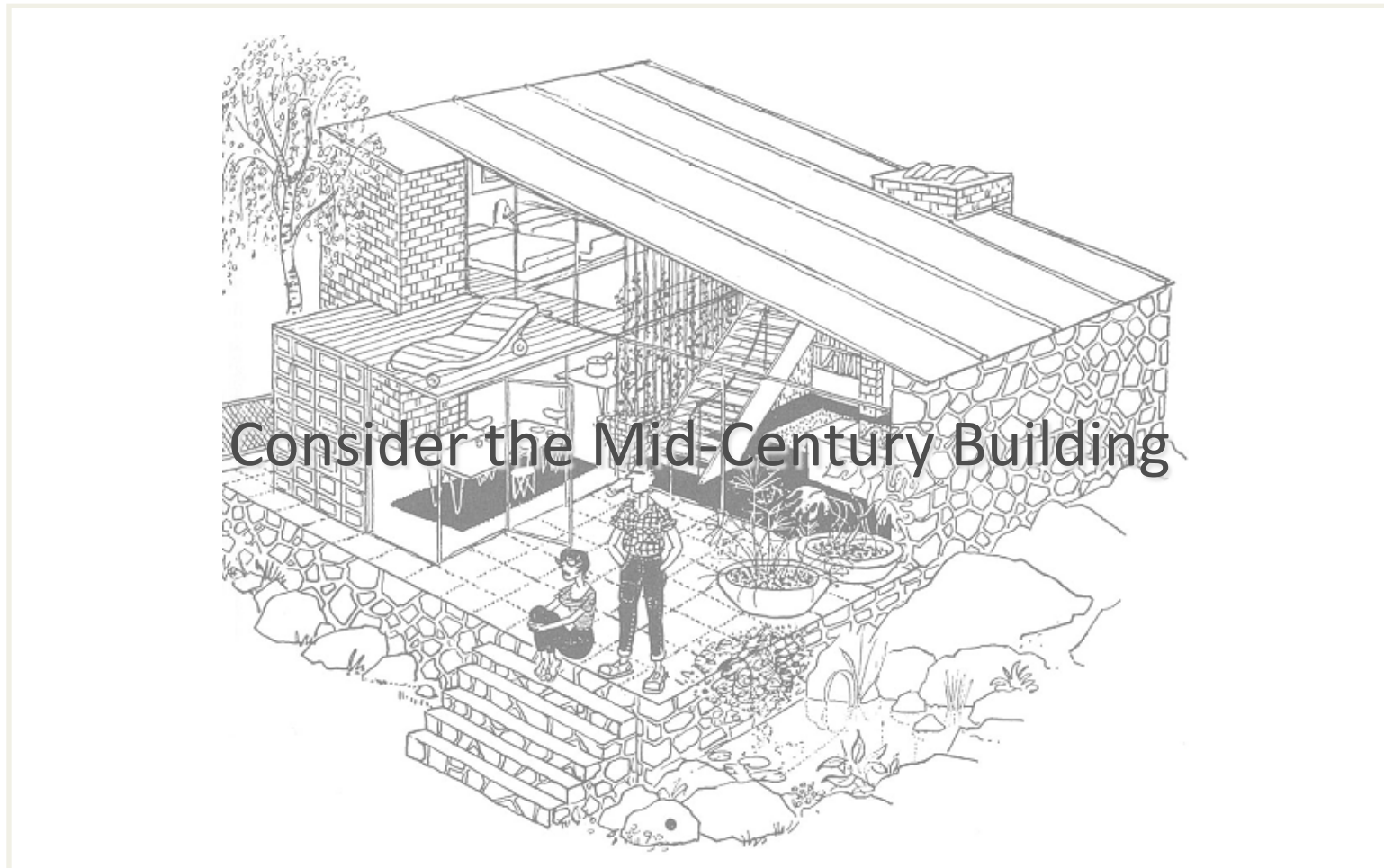
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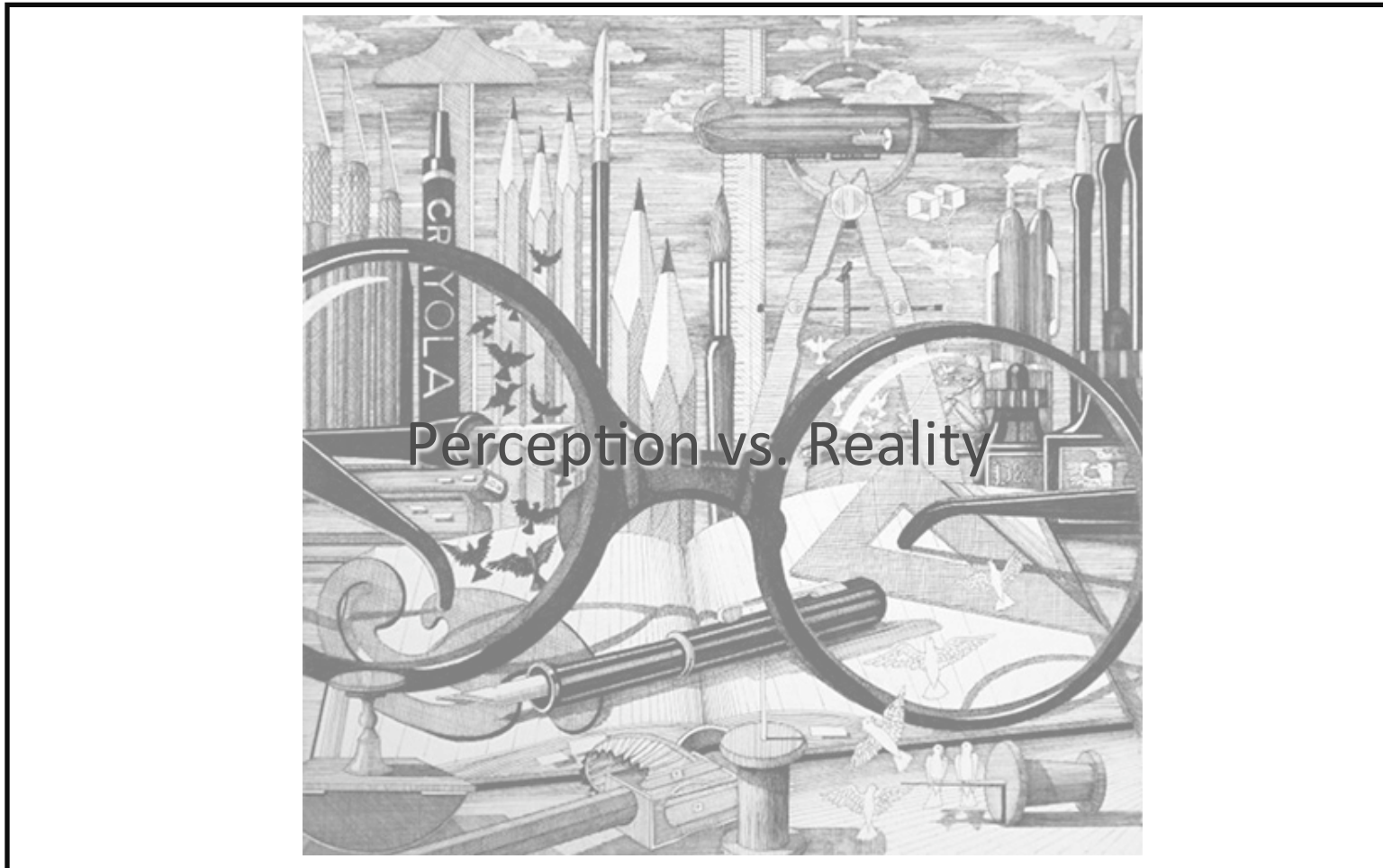
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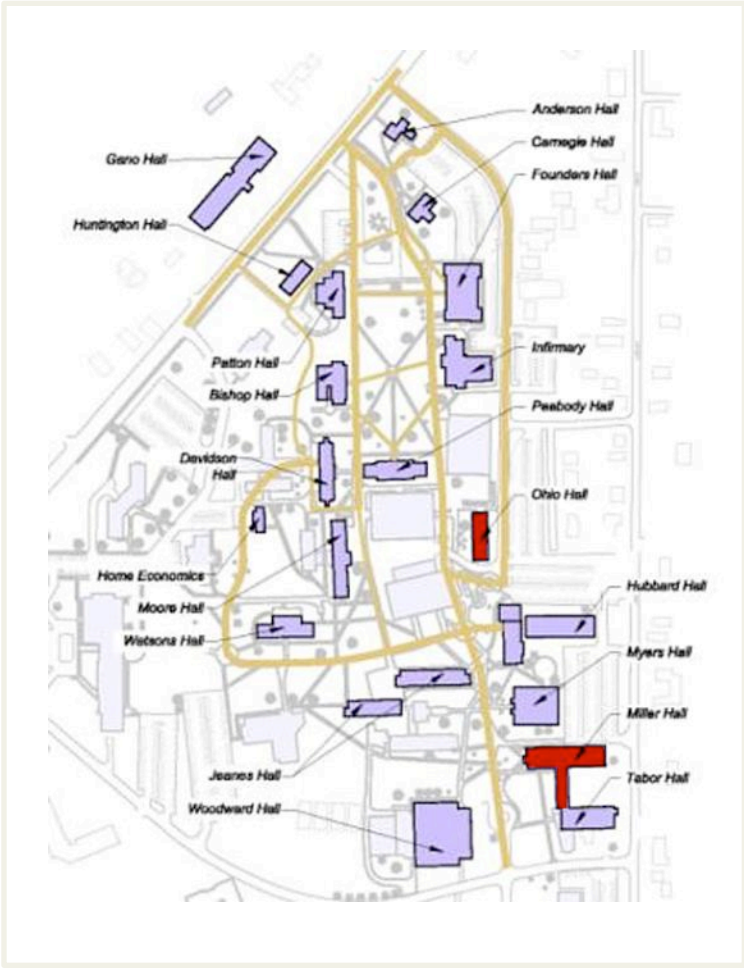
Campus Map



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Site Plan



Miller Hall



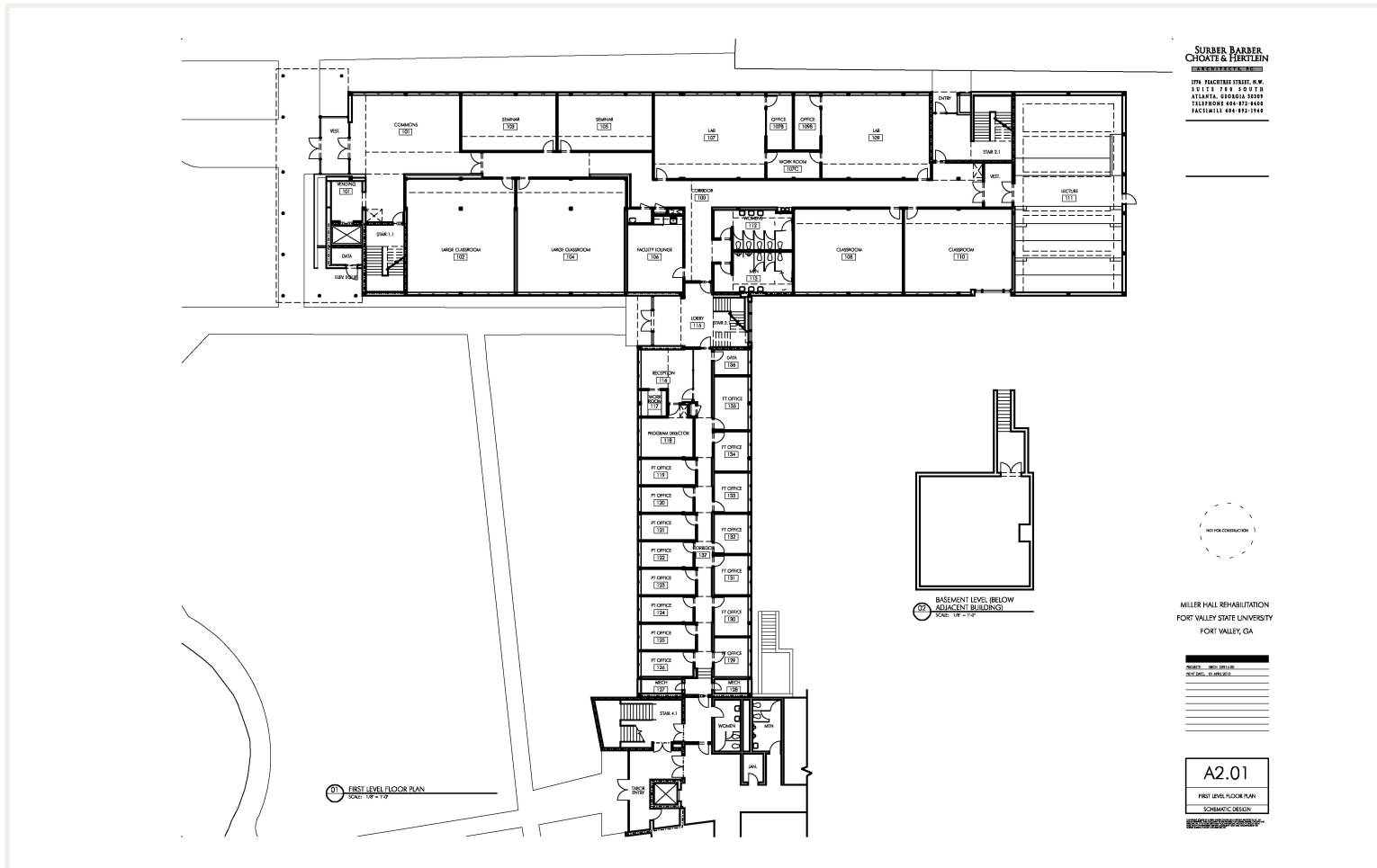
Ohio Hall



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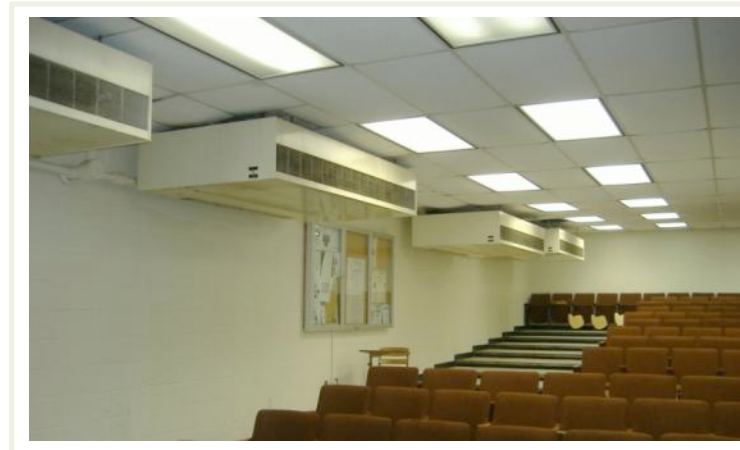
Main Floor Plan



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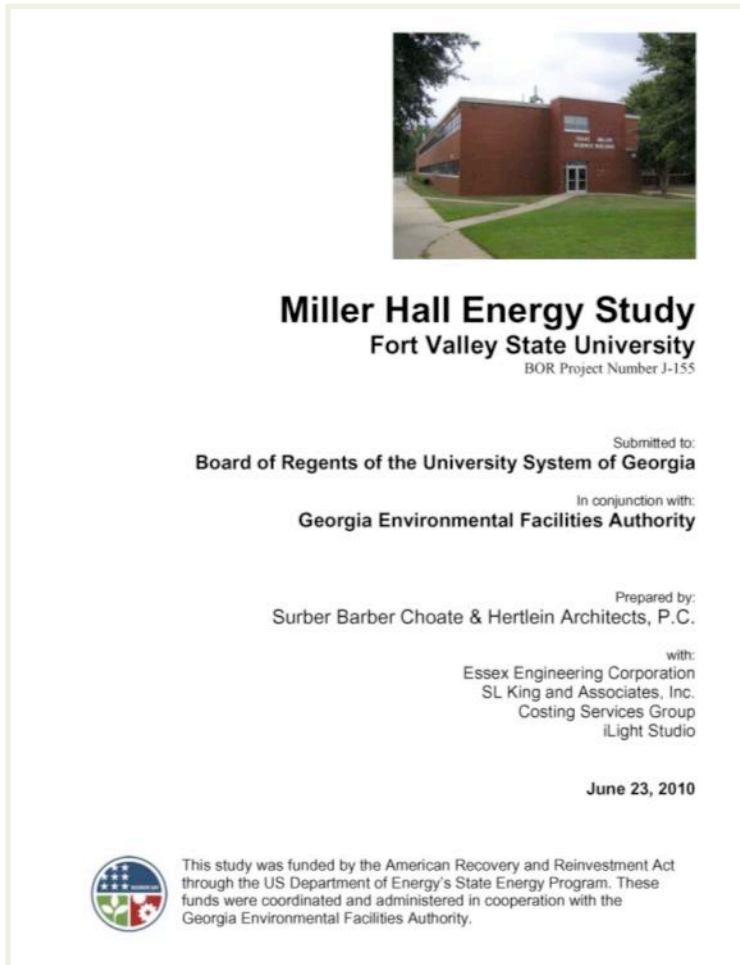
Miller Hall Energy Study




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Miller Hall Energy Study
Fort Valley State University
BOR Project Number J-155


Submitted to:
Board of Regents of the University System of Georgia

In conjunction with:
Georgia Environmental Facilities Authority

Prepared by:
Surber Barber Choate & Hertlein Architects, P.C.

with:
Essex Engineering Corporation
SL King and Associates, Inc.
Costing Services Group
iLight Studio

June 23, 2010

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Miller Hall Energy Study

TABLE OF CONTENTS

- Acknowledgements
- Executive Summary
- Miller Hall Background and The Impetus for the Energy Study
- Miller Hall Photos
- Miller Hall Floor Plans
- Methodology
- Energy Modeling Scenarios
- Recommendations

- Appendix:
 - Table 1 Comparison of Current Building, Proposed Building and Further Energy Conservation Opportunities
 - Table 2 Payback and Energy saved per investment for Each Energy Conservation Opportunity
 - Thermography Photographs
 - Cost Estimates
 - Resources

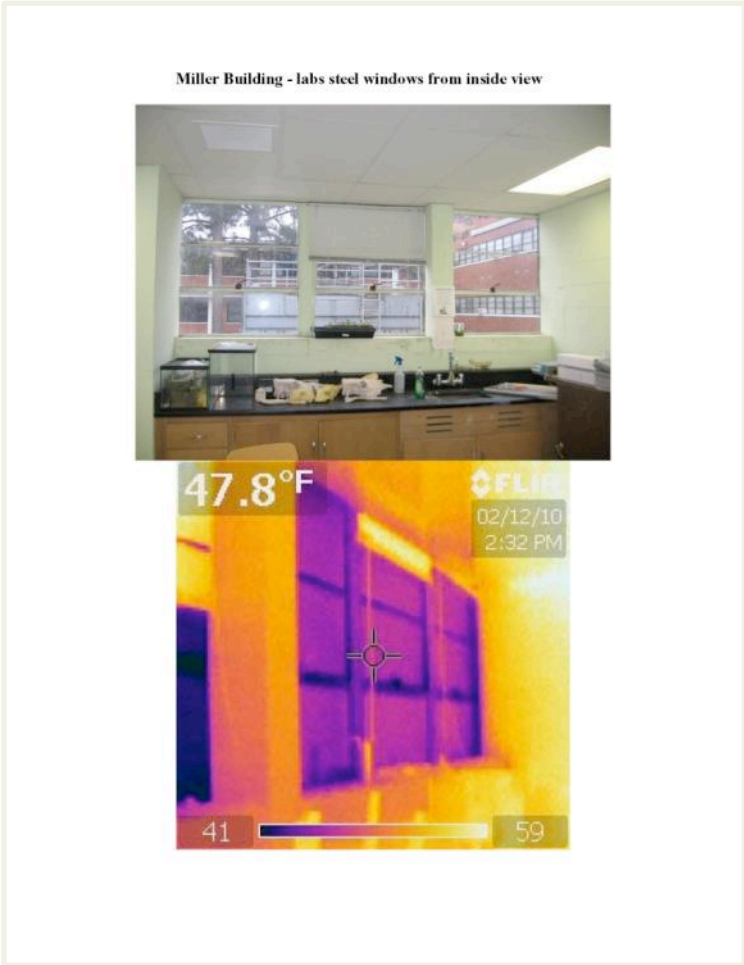
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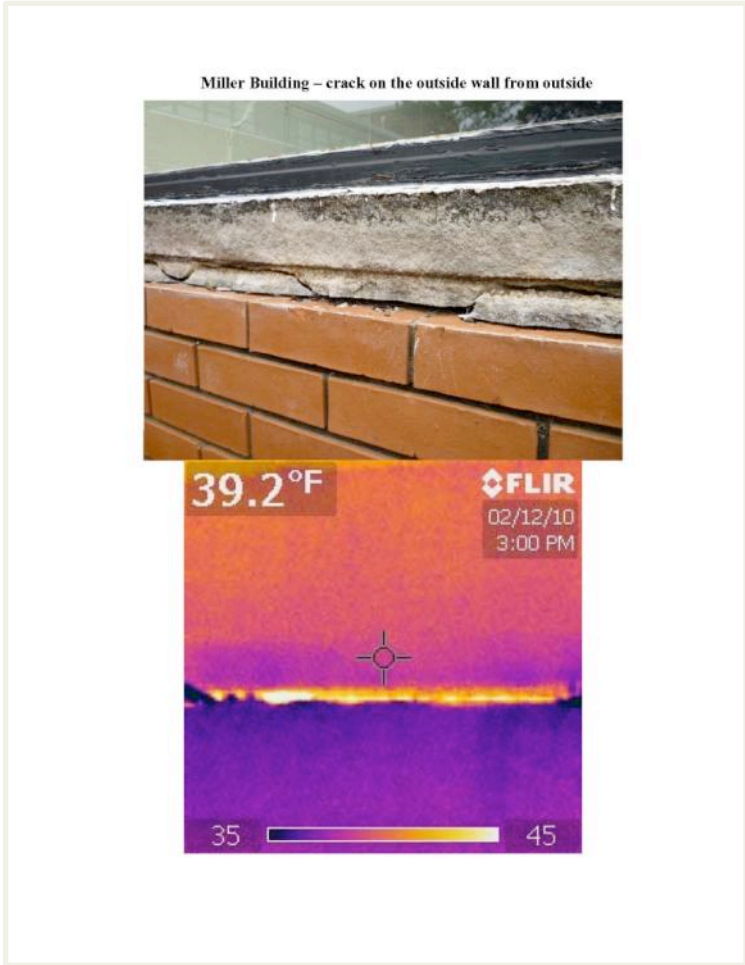
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Typical Window



Window Sill



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Table 1. Comparison of Current Building, Proposed building and Further Energy Conservation Opportunities.

| Project Run | ECO Description | Electricity | | Natural Gas | | Total Energy | | Total Yearly Cost | |
|------------------|--|--------------------|---------|------------------------|---------|------------------------|---------|-------------------|---------|
| | | Usage (x1,000) kWh | Savings | Usage (x1,000,000) Btu | Savings | Usage (x1,000,000) Btu | Savings | Cost (\$) | Savings |
| Current Building | | 515.3 | | 648.1 | | 2406.8 | | \$66,781 | |
| Baseline | renovation baseline | 401.9 | | 928.46 | | 2300.1 | 4.4% | \$54,210 | 18.8% |
| Reduced Lighting | F28T8 vs F32T8 | 385.5 | 4.1% | 933.5 | -0.5% | 2249.2 | 2.2% | \$52,233 | 3.6% |
| R30 Roof | R30 roof insulation | 402.7 | -0.2% | 925.09 | 0.4% | 2297.4 | 0.1% | \$54,222 | 0.0% |
| PVC Roof | PVC membrane on 2-inch It wt concrete | 399.36 | 0.6% | 966.66 | -4.1% | 2330 | -1.3% | \$54,014 | 0.4% |
| Operable Windows | Keep operable windows | 400.61 | 0.3% | 971.83 | -4.7% | 2339.1 | -1.7% | \$54,183 | 0.0% |
| Insulating Glass | insul glass in current window frame | 402.18 | -0.1% | 897.41 | 3.3% | 2270 | 1.3% | \$54,154 | 0.1% |
| Aluminum Frame | New alu frame window | 401.5 | 0.1% | 886.99 | 4.5% | 2257 | 1.9% | \$54,042 | 0.3% |
| Vinyl Frame | New vinyl frame window | 401.52 | 0.1% | 882.99 | 4.9% | 2253.4 | 2.0% | \$54,033 | 0.3% |
| Daylighting | Daylighting Controls | 385.69 | 4.0% | 932.66 | -0.5% | 2249 | 2.2% | \$52,253 | 3.6% |
| VAV | VAV HVAC System | 526.04 | -30.9% | 68.77 | 92.6% | 1864.1 | 19.0% | \$66,708 | -23.1% |
| DCV* | DCV estimate | | | | | 2242.6 | 2.5% | | |
| VRFZ* | Estimate of VRFZ system instead of 4-pipe HVAC system. | | | | | 2019.12 | 12.2% | | |

*savings for these ECO are estimates only, as they could not be accurately modeled in eQUEST

Comparison of Existing Building to Proposed Work



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Table 2. Payback and Energy Saved per Investment for each Energy Conservation Opportunity

| Project Run | ECO Description | Total Energy | | Total Yearly Cost | | Installation Cost | Payback (years) | Energy Saved per Investment (MBtu/ 1,000 dollars) |
|------------------|--|------------------------|---------|-------------------|---------|-------------------|-----------------|---|
| | | Usage (x1,000,000) Btu | Savings | Cost (\$) | Savings | | | |
| Current Building | | 2406.8 | | \$66,781 | | | | |
| Baseline | renovation baseline | 2300.1 | 4.4% | \$54,210 | 18.8% | | | |
| Reduced Lighting | F28T8 vs F32T8 | 2249.2 | 2.2% | \$52,233 | 3.6% | \$20,499 | 10.5 | 2.5 |
| R30 Roof | R30 roof insulation | 2297.4 | 0.1% | \$54,222 | 0.0% | \$31,706 | none | 0.1 |
| PVC Roof | PVC membrane on 2-inch lt wt concrete | 2330 | -1.3% | \$54,014 | 0.4% | Not Price | | |
| Operable Windows | Keep operable windows | 2339.1 | -1.7% | \$54,183 | 0.0% | \$0 | 0.0 | |
| Insulating Glass | insul glass in current window frame | 2270 | 1.3% | \$54,154 | 0.1% | \$131,381 | none | 0.2 |
| Aluminum Frame | New alu frame window | 2257 | 1.9% | \$54,042 | 0.3% | \$164,226 | none | 0.3 |
| Vinyl Frame | New vinyl frame window | 2253.4 | 2.0% | \$54,033 | 0.3% | \$65,690 | none | 0.7 |
| Daylighting | Daylighting Controls | 2249 | 2.2% | \$52,253 | 3.6% | \$40,998 | 21.0 | 1.2 |
| VAV | VAV HVAC System | 1864.1 | 19.0% | \$66,708 | -23.1% | \$25,184 | none | 17.3 |
| DCV* | DCV estimate* | 2242.6 | 2.5% | | | \$12,885 | | 4.5 |
| VRFZ* | Estimate of VRFZ system instead of 4-pipe HVAC system. | 2019.12 | 12.2% | | | \$126,748 | | 2.2 |

*savings for these ECO are estimates only, as they could not be accurately modeled in eQUEST

Payback and Energy Saved



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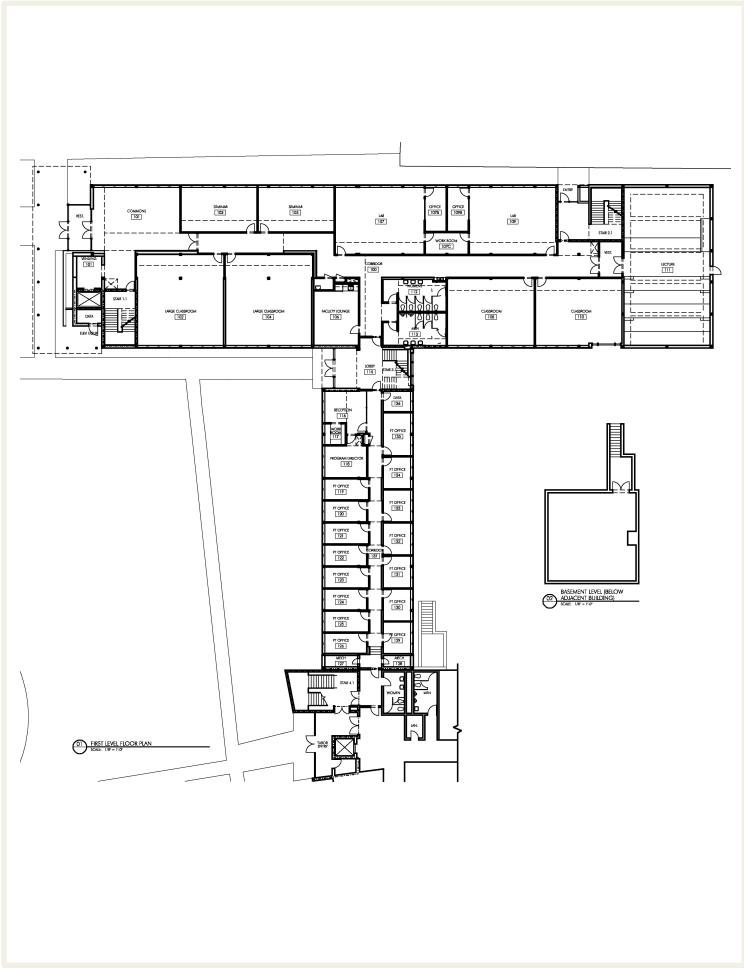
Miller Hall: Programmatic Issues



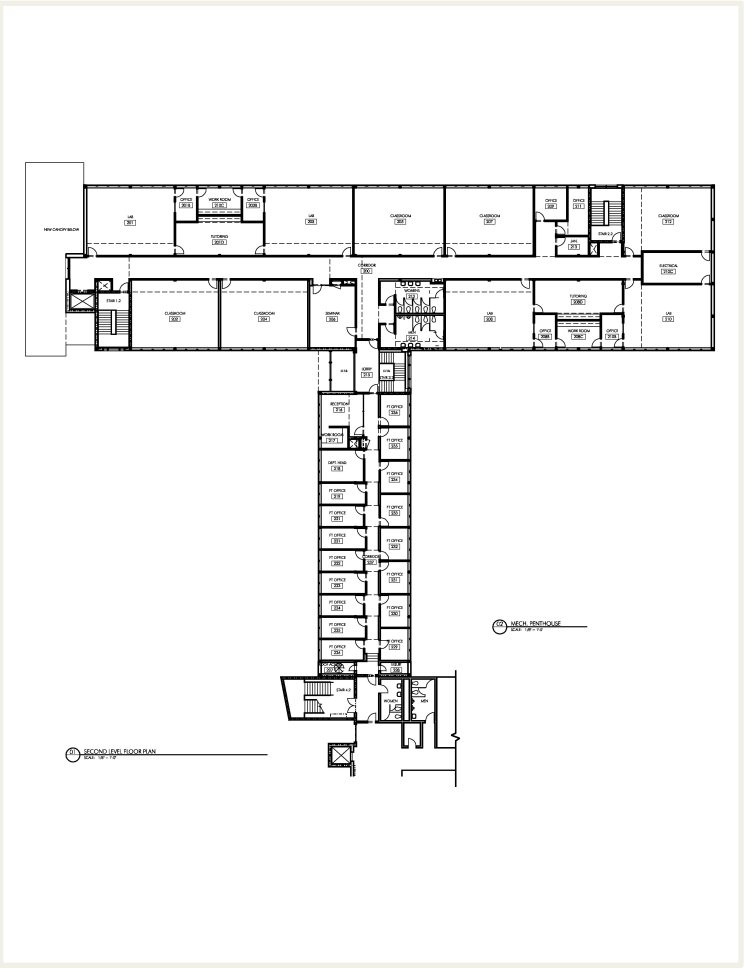
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Main Floor



Upper Floor



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Classrooms



Offices



Public Spaces



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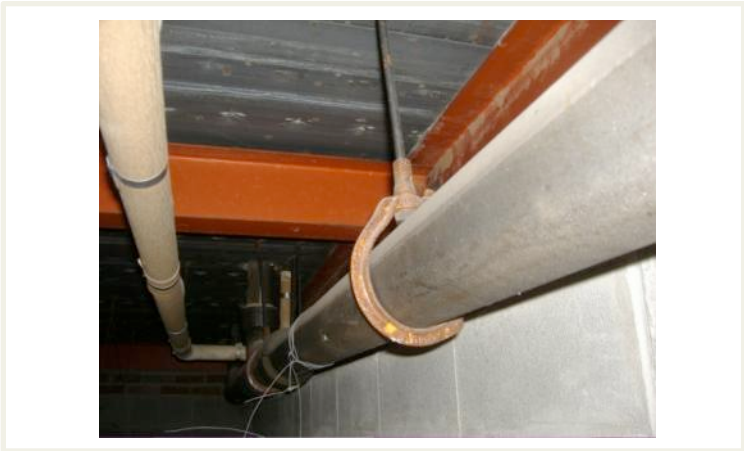
Miller Hall: Technical Challenges



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Steel Structure with CMU Shear Walls; Low ceiling heights



Systems shared with adjacent buildings

Window and masonry rehabilitation



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Implementation



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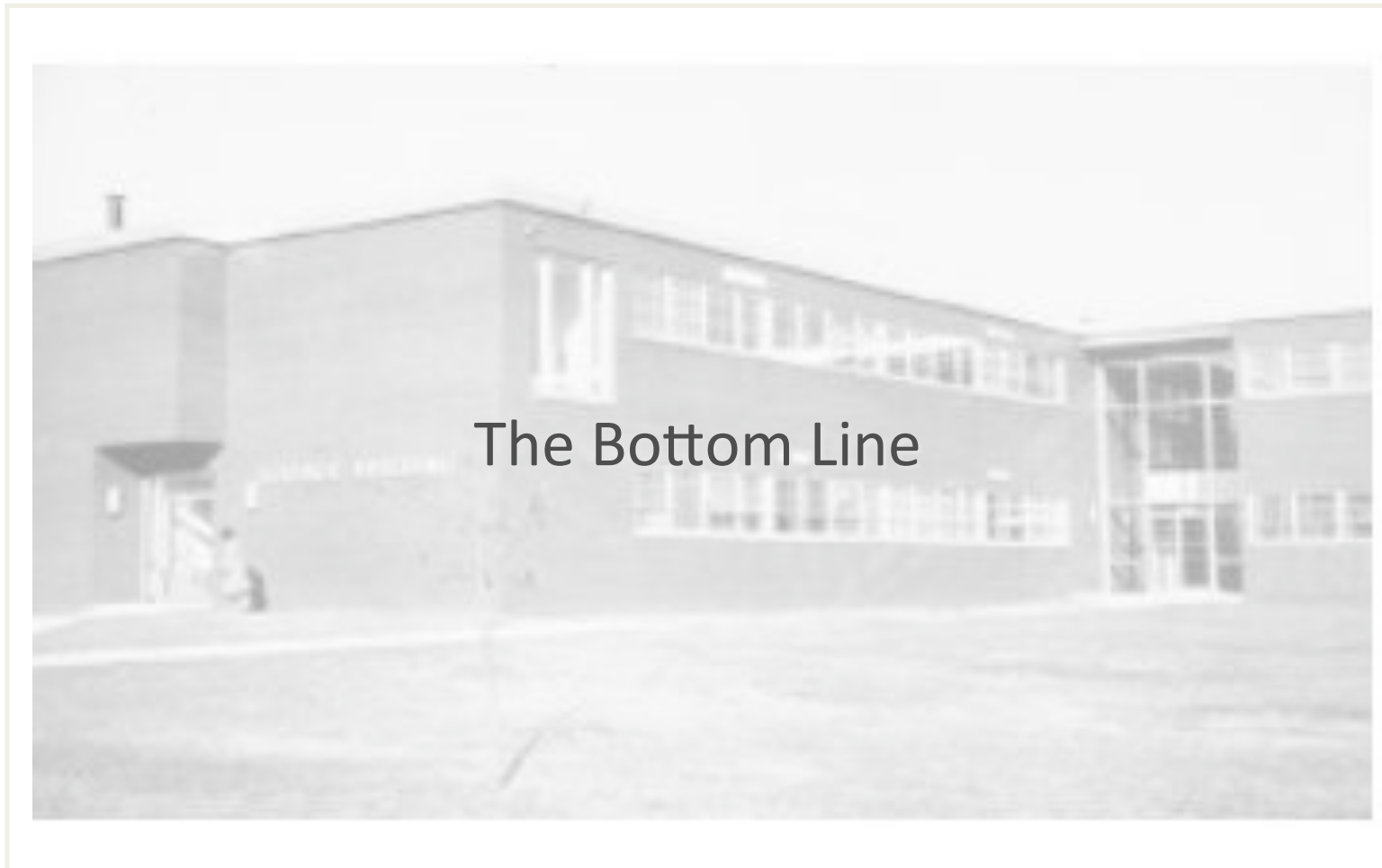
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Miller Hall \$150/square foot (estimated)
vs.
New Construction @ \$180-\$240/square foot



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