

# A Roadmap to the Ultra-Efficient Laboratory: Science applications, benchmarks, and pitfalls to avoid

Framingham State University First Capital Cost	Quantity	Unit	Rate	Total
Ducted Fume Hoods (VAV controls)	(49)	Each	\$12,000	(\$588,000)
Filtering Fume Hoods	49	Each	\$25,000	\$1,225,000
<b>Total filtering fume hood premium</b>				<b>\$637,000</b>
AHU Reductions	(18,000)	CFM	\$13	(\$234,000)
Exhaust Fan Reductions	(18,000)	CFM	\$2	(\$36,000)
Fume Hood Valve Reductions	(49)	EA	\$2,300	(\$112,700)
Fume Hood SS Exhaust (100#per location)	(4,900)	Lbs	\$18	(\$88,200)
ATC reductions per fume hood	49	EA	\$800	(\$39,200)
ATC reductions for fume hood exhaust valves	(49)	EA	\$1,200	(\$58,800)
Building ductwork and Insulation reductions	(36,000) / (6,900)	Lbs / SF	\$9 / \$3.5	(\$348,150)
<b>Total HVAC Infrastructure reductions</b>				<b>(\$917,050)</b>
<b>Total adjusted net cost</b>				<b>(\$280,050)</b>
<b>Total gross savings (w/ cont., GC OH&amp;P)</b>				<b>(\$330,000)</b>

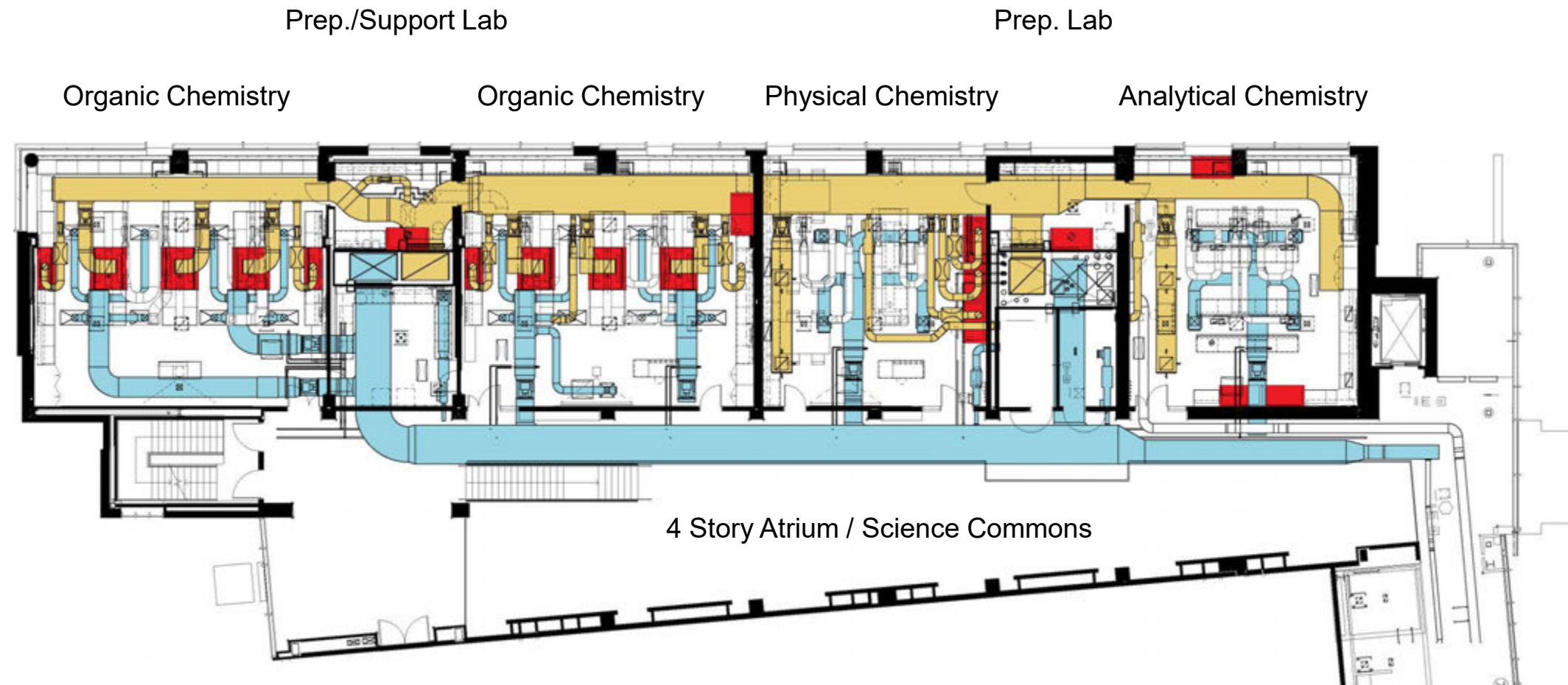
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## Framingham State University Science Building

Level 4 HVAC Distribution:

### VAV Ducted Chemical Fume Hoods

- Before Value Engineering



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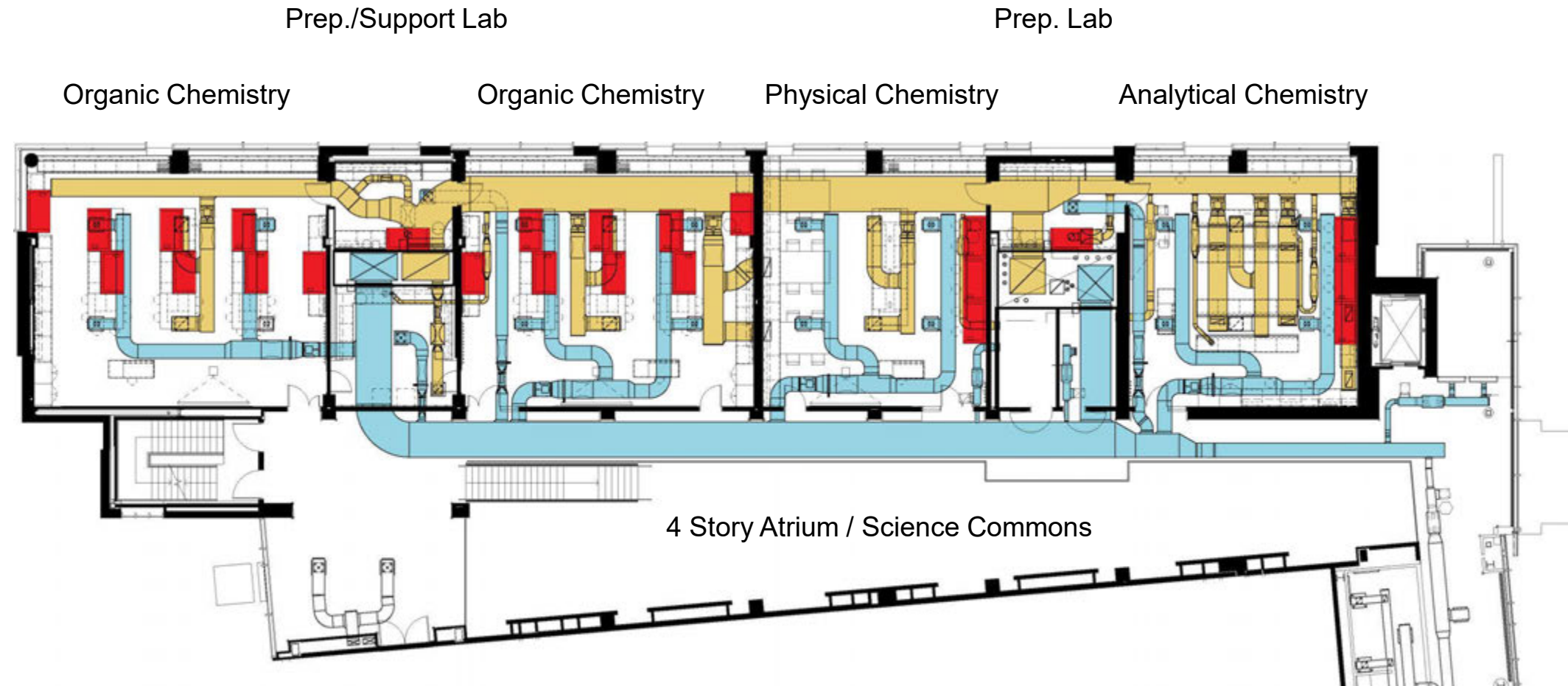
Level 4 HVAC Distribution:

### Filtering Chemical Fume Hoods

After Value Engineering

### 25% reduction in the HVAC mechanical infrastructure

- Supply AHU capacity
- Exhaust AHU capacity
- Reduction in chiller capacity
- Reduction in exhaust valves, ductwork and controls





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