

W. EDWARD BALMER SCHOOL

NORTHBRIDGE, MA
SCHEMATIC DESIGN

SCHOOL BUILDING
COMMITTEE MEETING

APRIL 3, 2018



Massachusetts School Building Authority
Funding Affordable, Sustainable, and Efficient Schools in Partnership with Local Communities



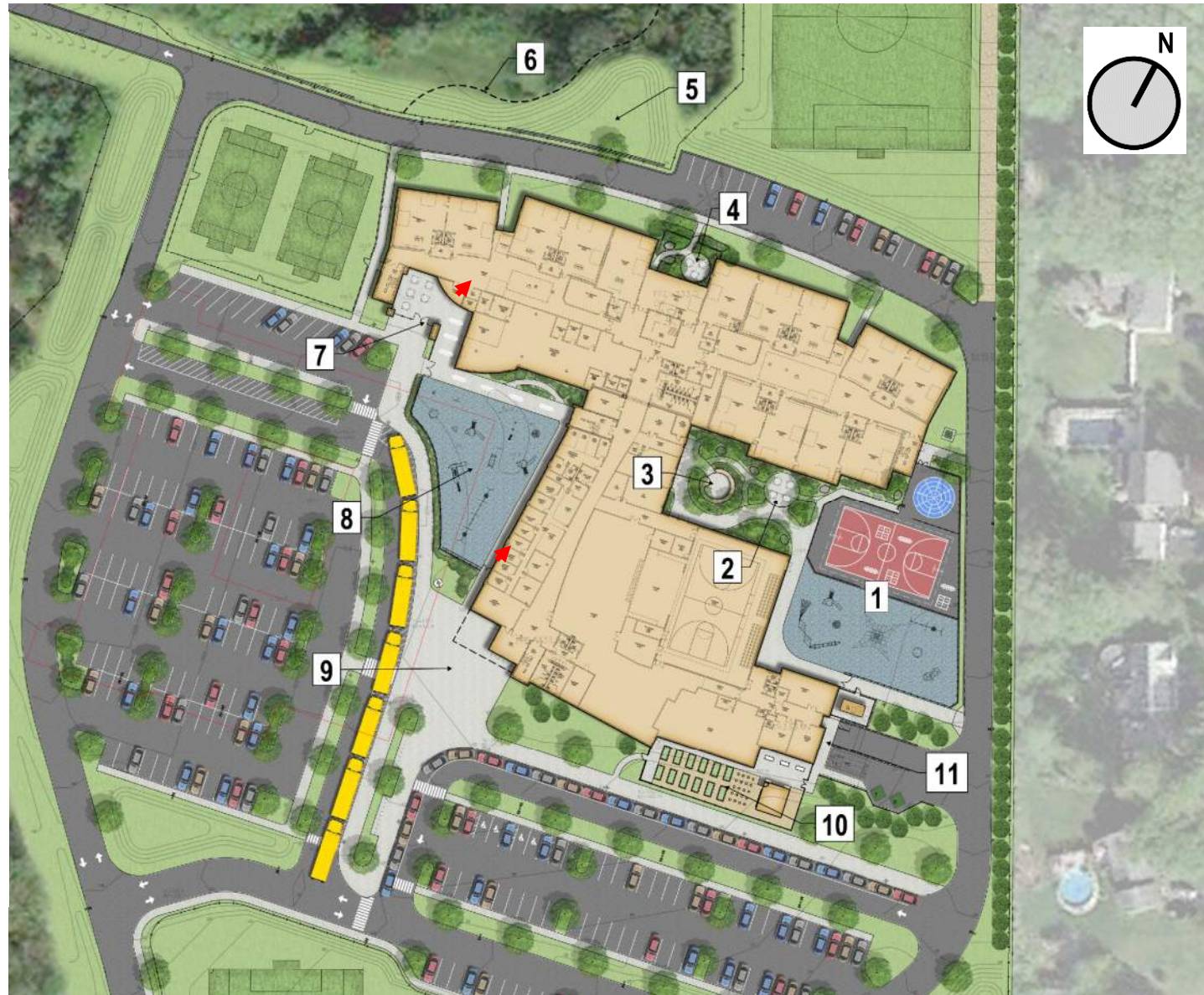
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- 1. SITE PLANNING UPDATE**
 - 2. BUILDING DESIGN UPDATE**
 - 3. PRELIMINARY SD ENERGY MODEL AND OPERATING COSTS**
 - 4. SUSTAINABLE DESIGN FEATURES**
 - 5. QUESTIONS, COMMENTS, FEEDBACK**

1.

SITE PLANNING UPDATE

SITE FEATURES

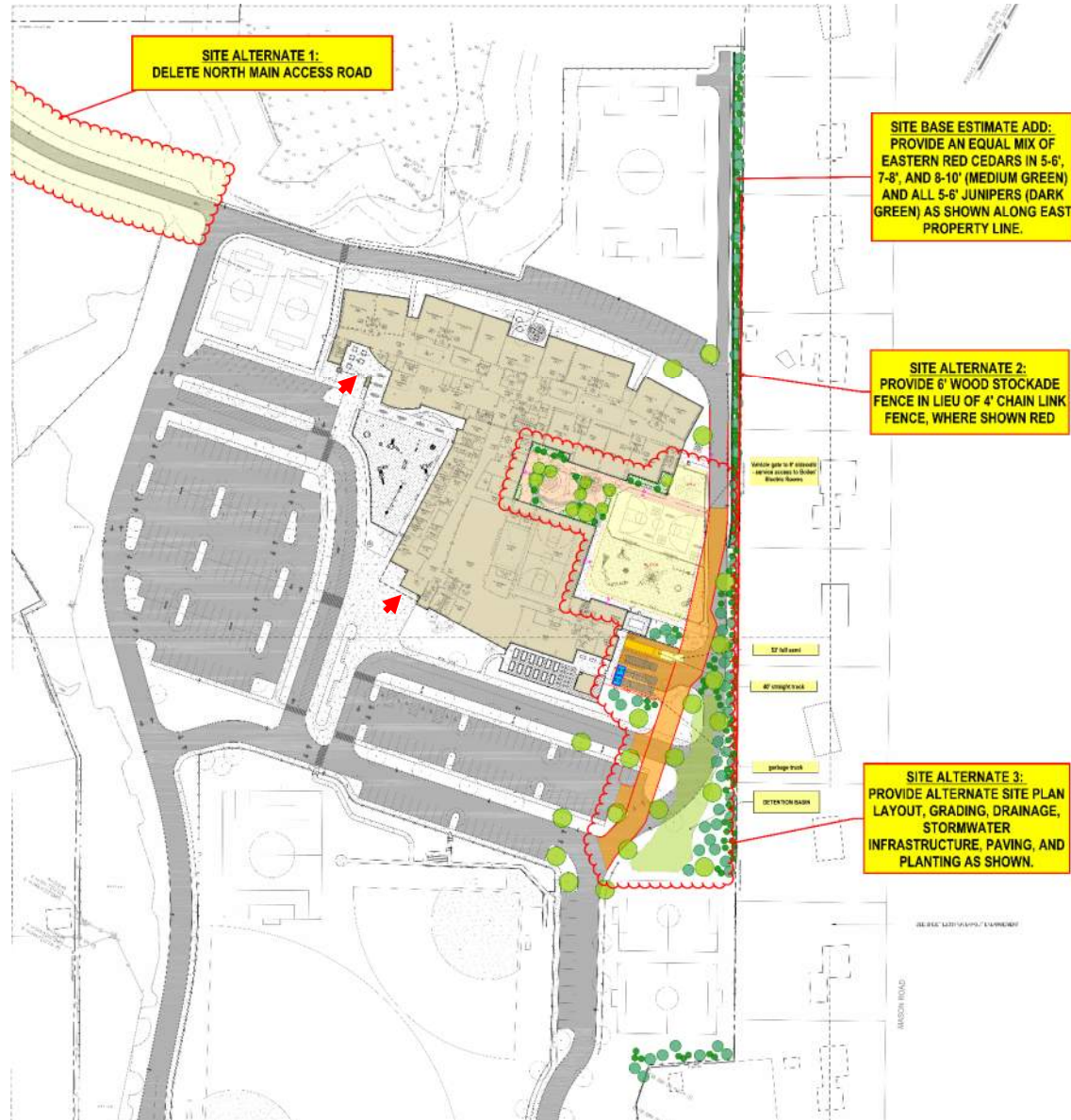
1. Grade 3-5 playground
2. Informal garden
3. Outdoor Classroom
4. Outdoor learning space
5. Stormwater retention
6. Nature Trail (future)
7. Covered portico
8. PK-2 Playground
9. Entry Plaza
10. Children's Gardens
11. Service Yard



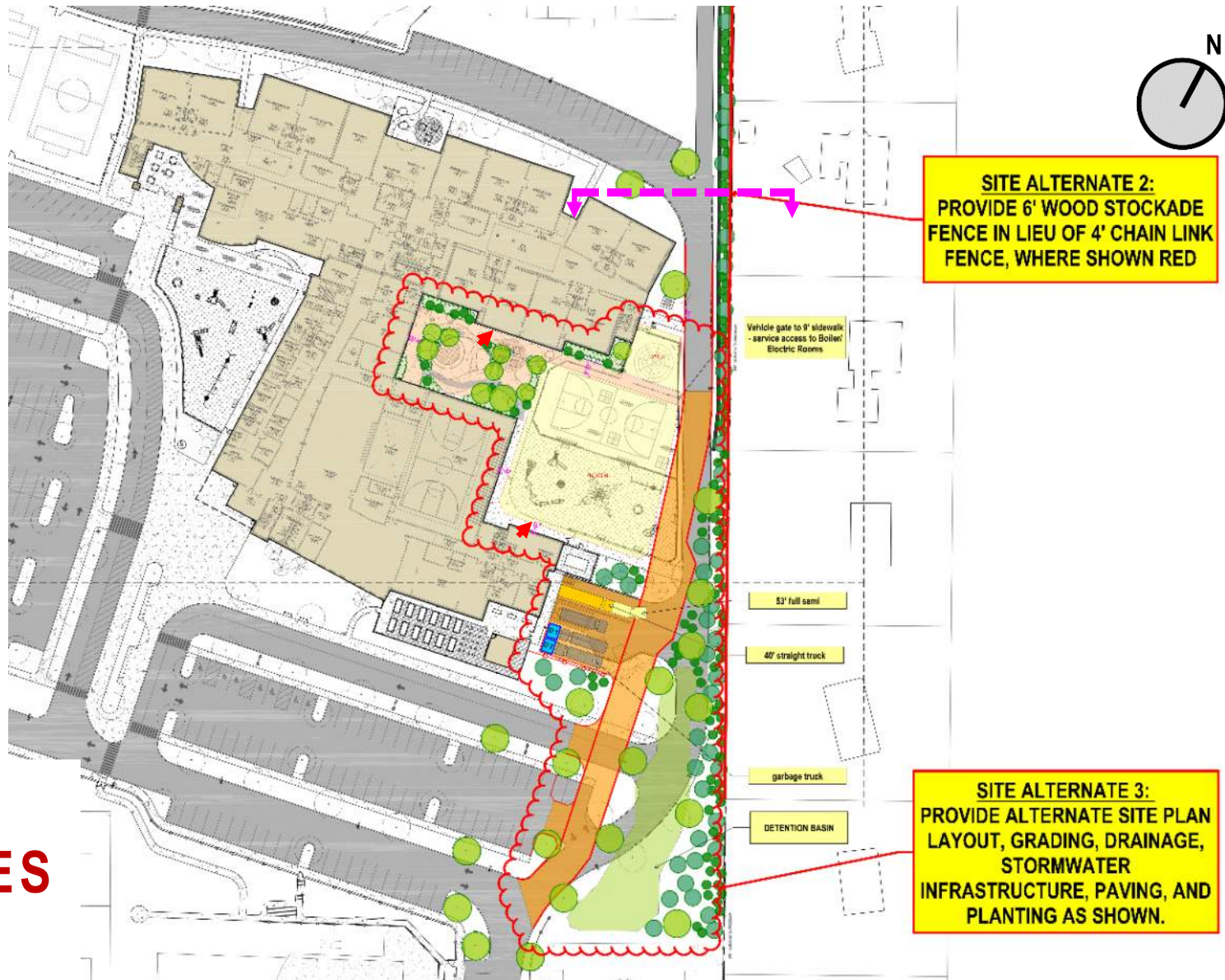
SITE ALTERNATES

1. Delete north main access road
2. Provide 6' wood stockade fence in lieu of 4' black chain link fence.
3. Provide alternate site plan road layout as shown.

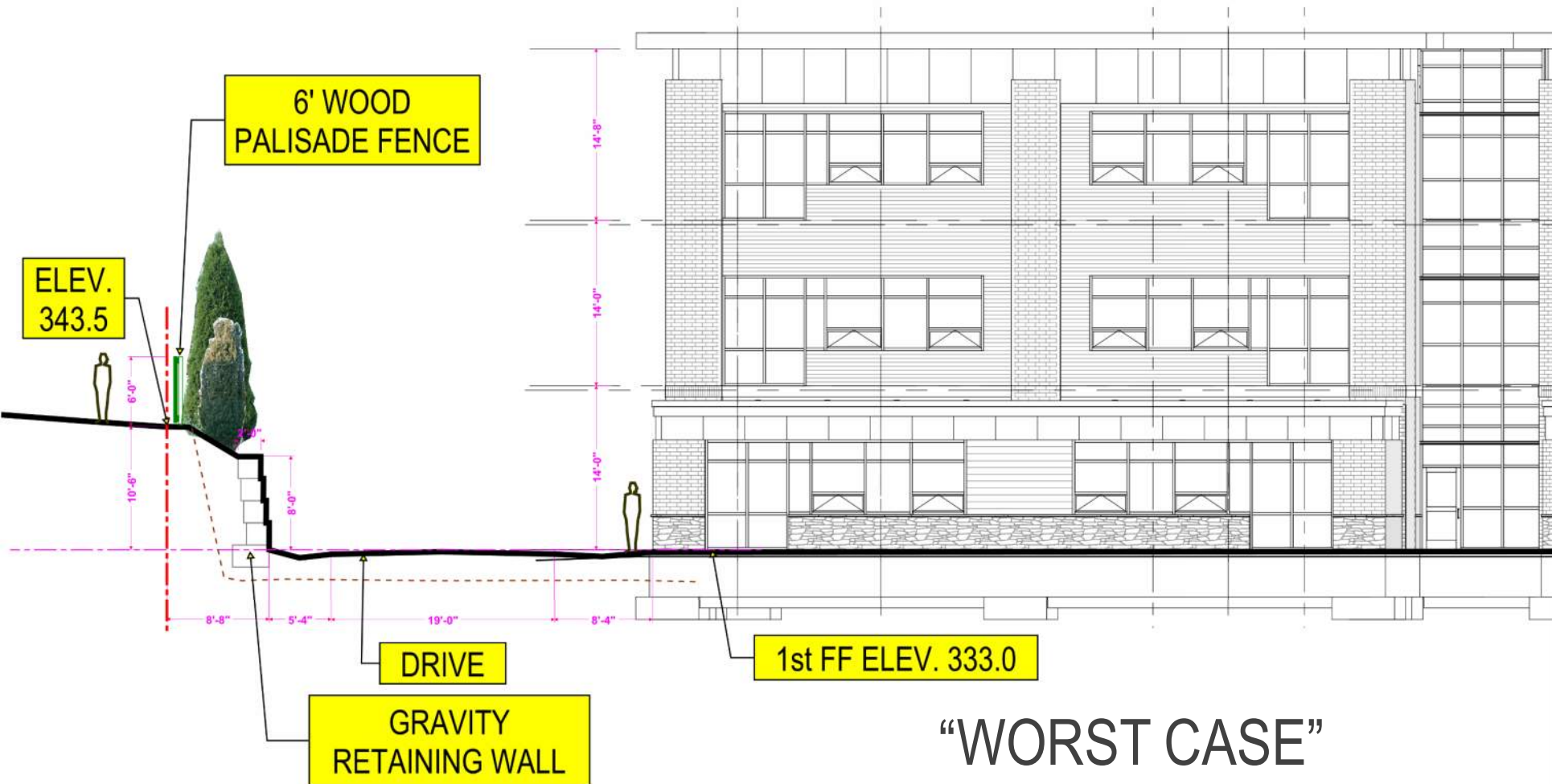
Base estimate clarification – include dense plantings along east property line



SITE ALTERNATES (Detail)



EAST PROPERTY LINE – SITE SECTION



SITE PLANNING



2.1

**BUILDING DESIGN:
EXTERIOR IMAGERY**

DESIGN THEMES:

- Historical references to larger-scale Northbridge buildings
- “WOVEN”
- Spirit of 21st Century Arts and Technology emerging from the structure of the old: Heavy Structure with Lightweight Infill



VIEW FROM SOUTHWEST SITE ENTRANCE



AERIAL VIEW FROM SOUTHWEST



ENTRY VIEW FROM SOUTHWEST



ENTRY VIEW FROM WEST PARKING LOT



VIEW OF EARLY EDUCATION ENTRANCE



VIEW OF MAKER SPACE – NORTH FACADE



VIEW OF NORTH FACADE



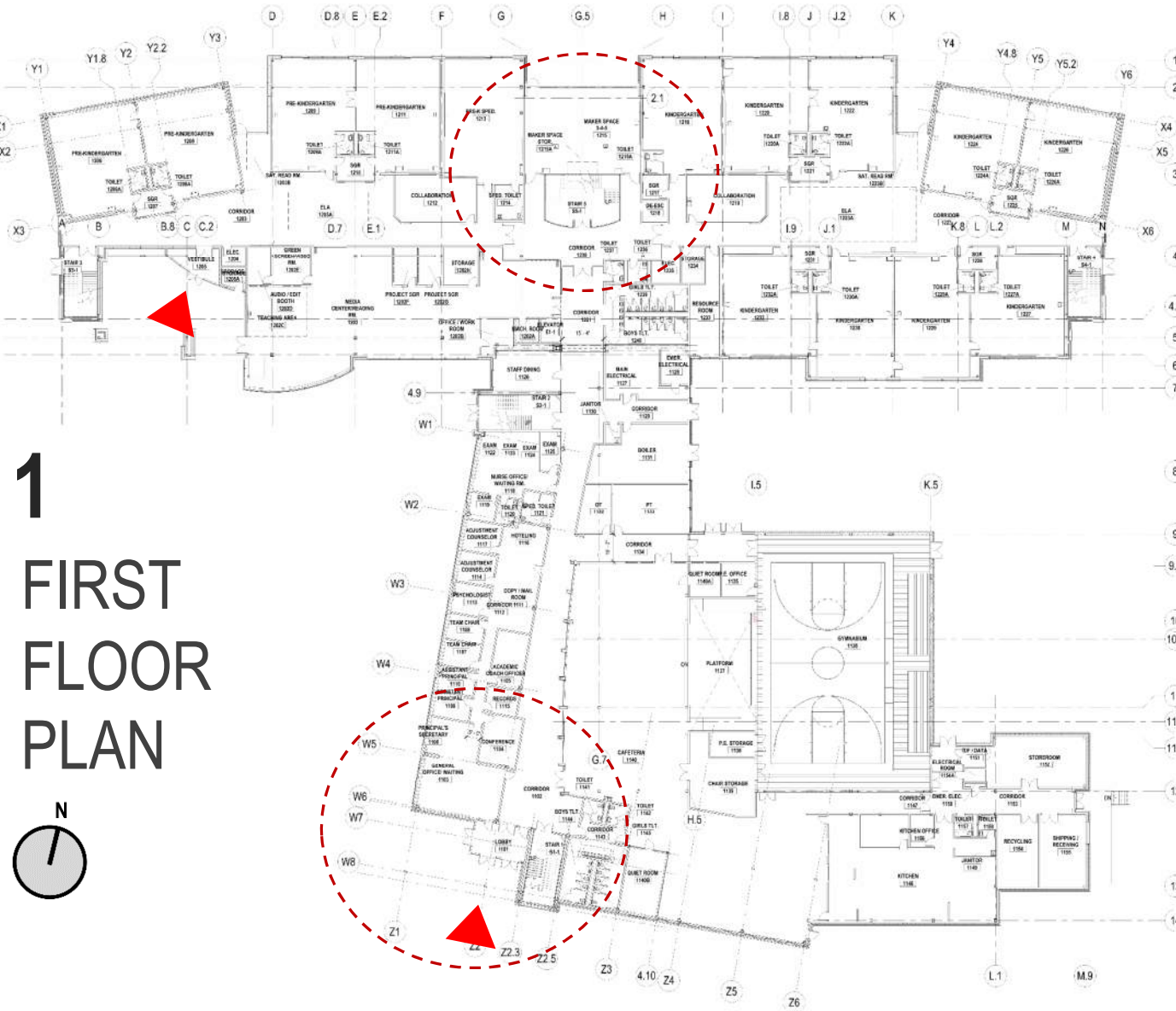
AERIAL VIEW OF COURTYARD - EAST



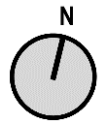
AERIAL VIEW FROM SOUTHEAST

2.2

**BUILDING DESIGN:
PLAN UPDATES**

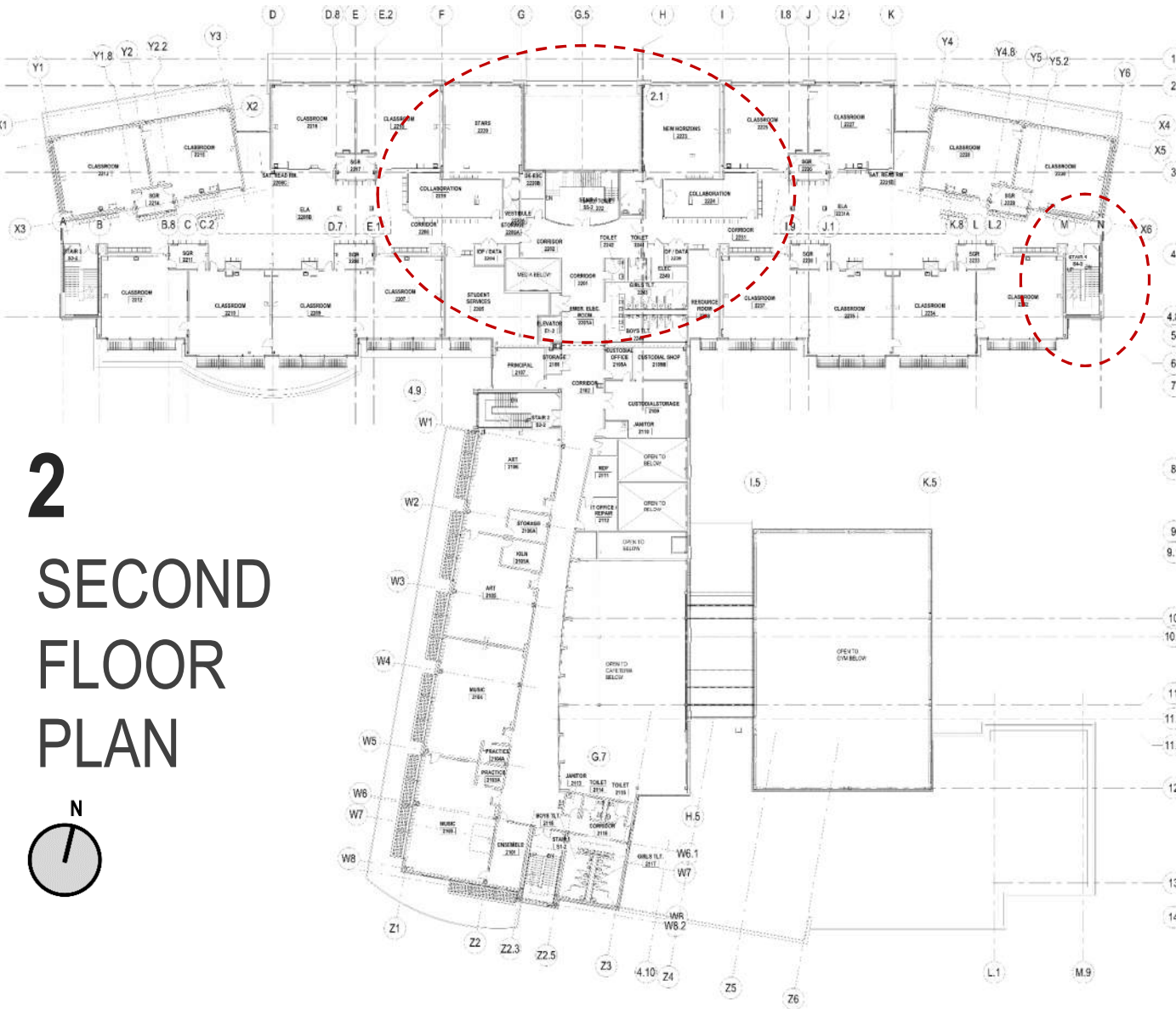
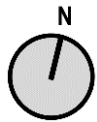


1 FIRST FLOOR PLAN

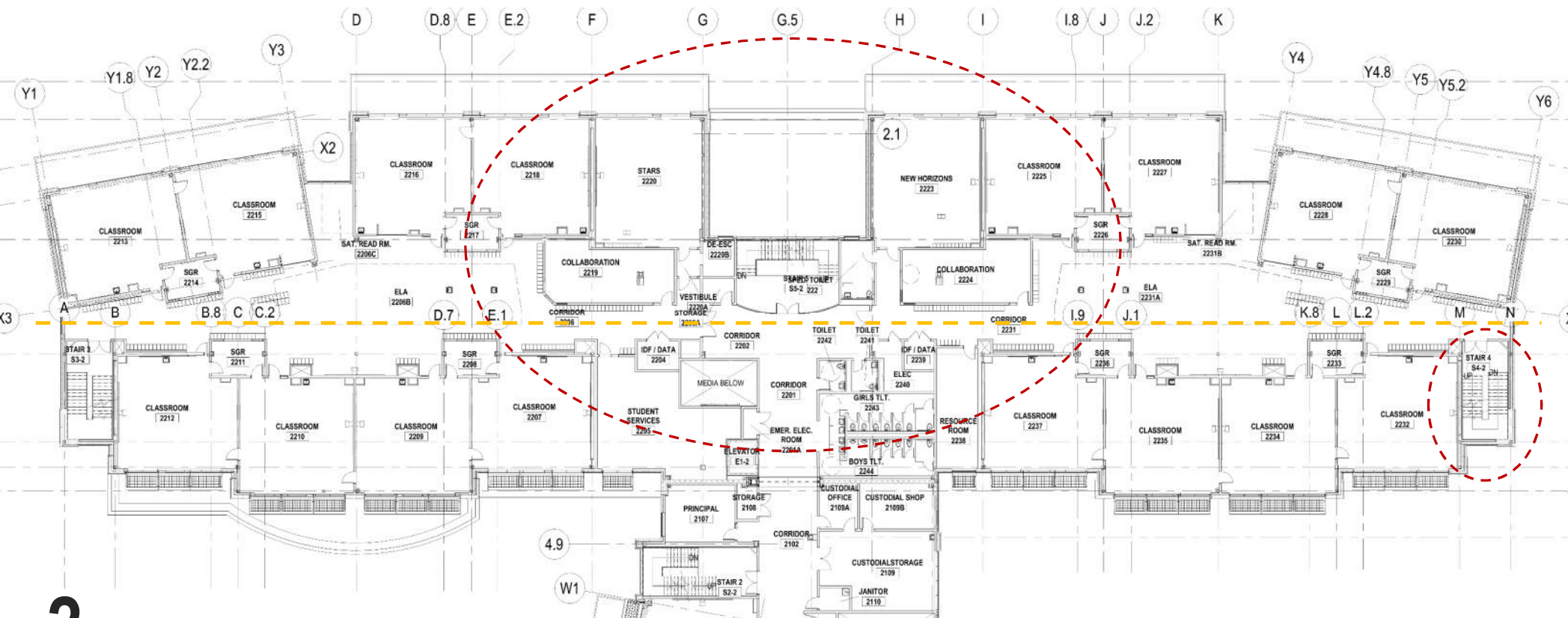


- Central Stair 5 adjustments
- Entry vestibule right-sized
- Entry canopy columns placed
- Continued nip and tuck to conform to program GSF

2 SECOND FLOOR PLAN



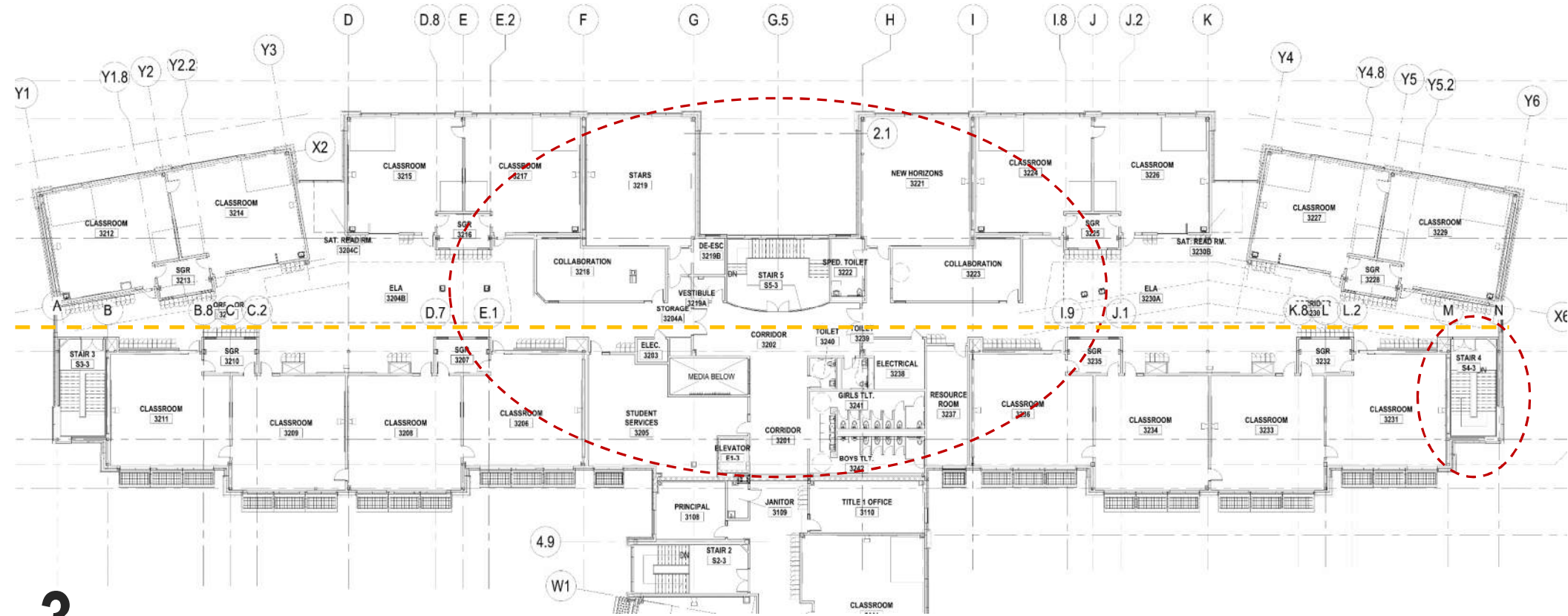
- Central Stair 5 adjustments
- Flipped circulation for STARS and New Horizons spaces – now within grade-level communities
- Continued nip and tuck to conform to program GSF – 8” slice out of north wing
- Stairs 3 and 4 grew by inches



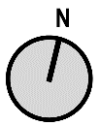
2

SECOND FLOOR PLAN - DETAIL





3 THIRD FLOOR PLAN - DETAIL

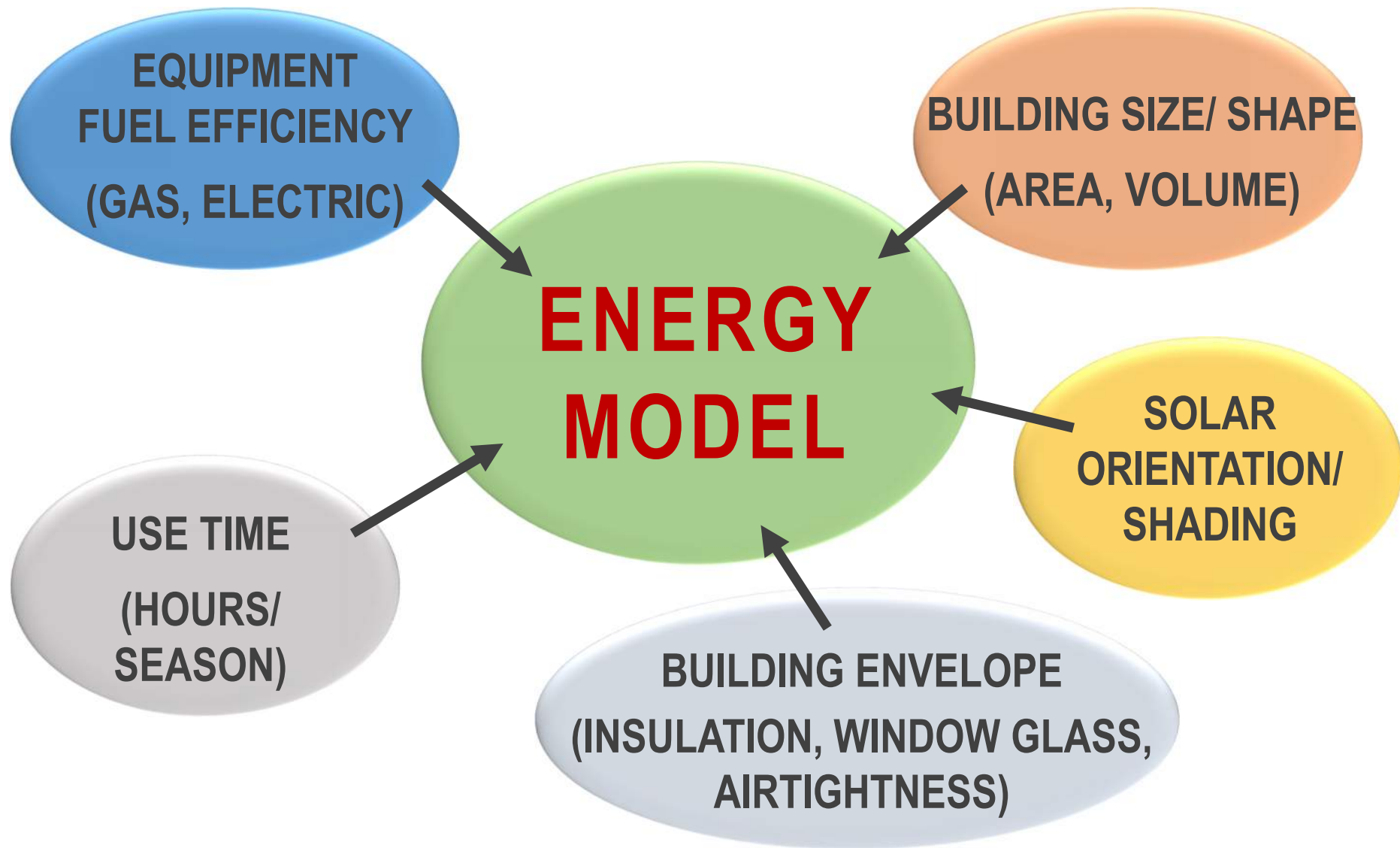


3 PRELIMINARY SD ENERGY MODEL AND OPERATING COSTS



GARCIA • GALUSKA • DESOUSA
Consulting Engineers Inc.

370 Faunce Comer Road, Dartmouth, MA 02747-1217



EUI \approx MPG

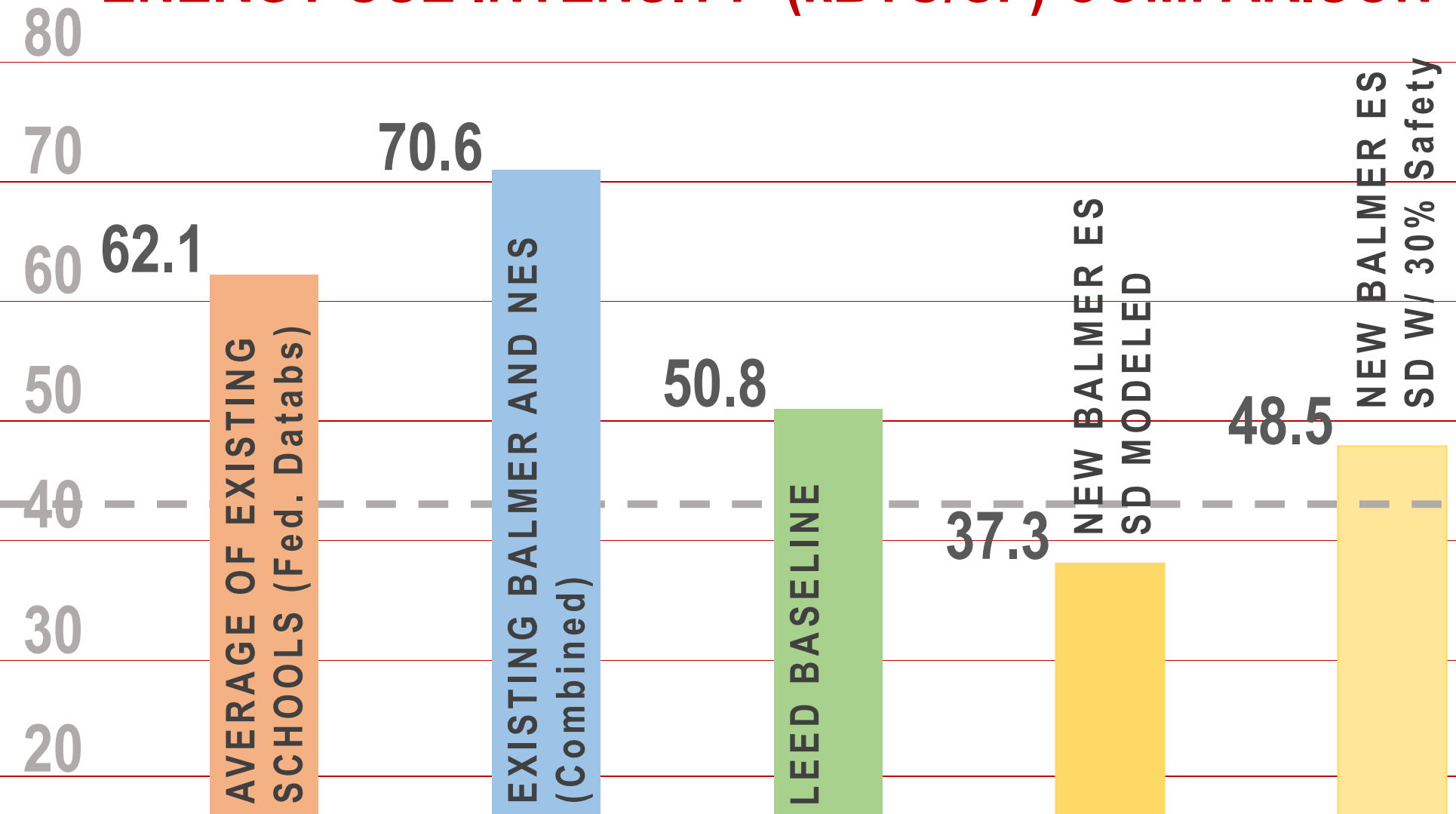
ENERGY USE INTENSITY

(kBTU/ square foot)

- Total Energy Used / Building Area
- An approximate way to compare building efficiency or performance



ENERGY USE INTENSITY (kBTU/SF) COMPARISON



LCCA

LIFE CYCLE COST ANALYSIS

30-Year Study Duration/Payback Horizon

Looks at:

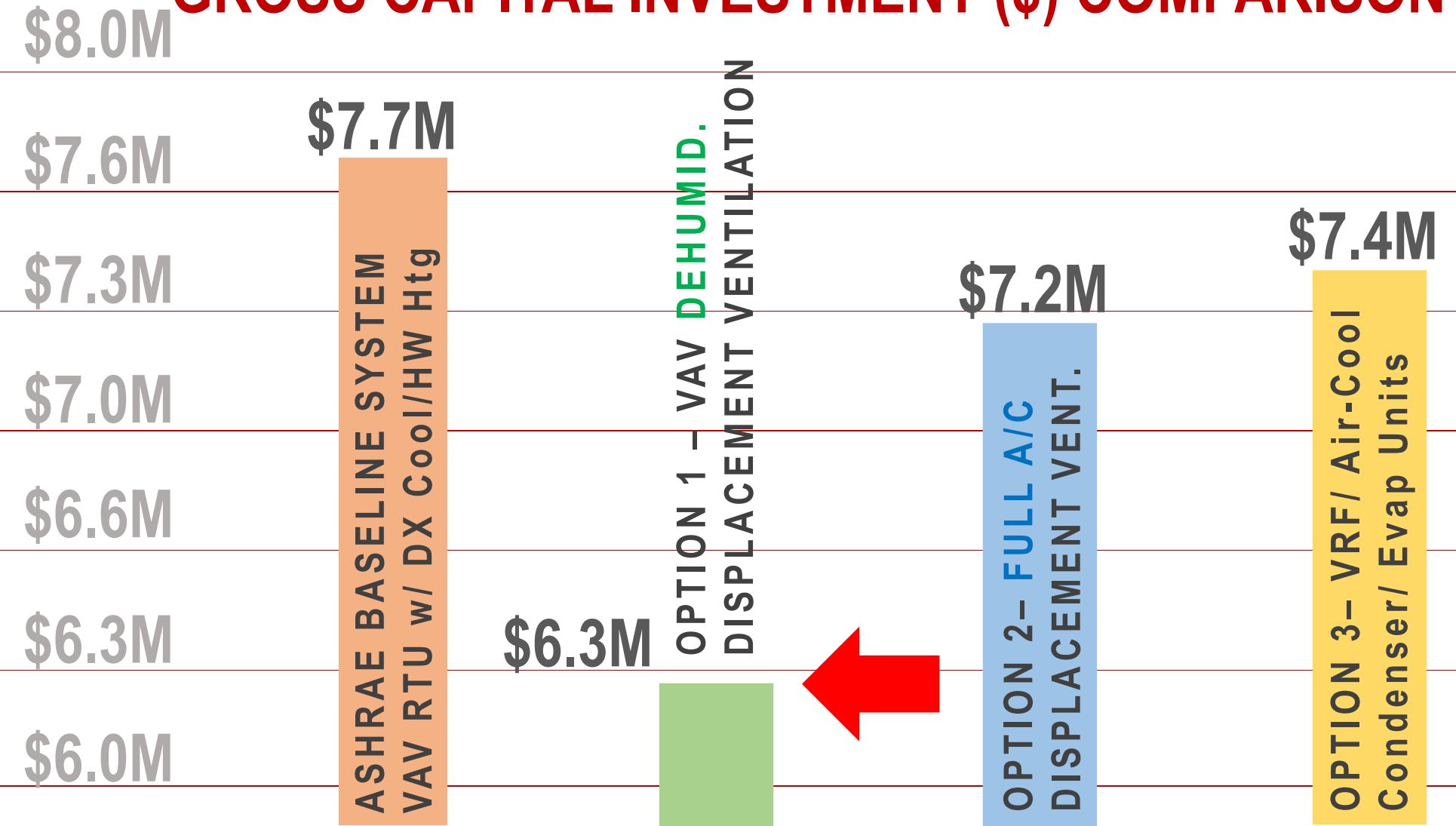
- Initial Capital Investment
- Annual Fuel Costs (Gas & Electric)
- Annual Maintenance Costs

To determine:

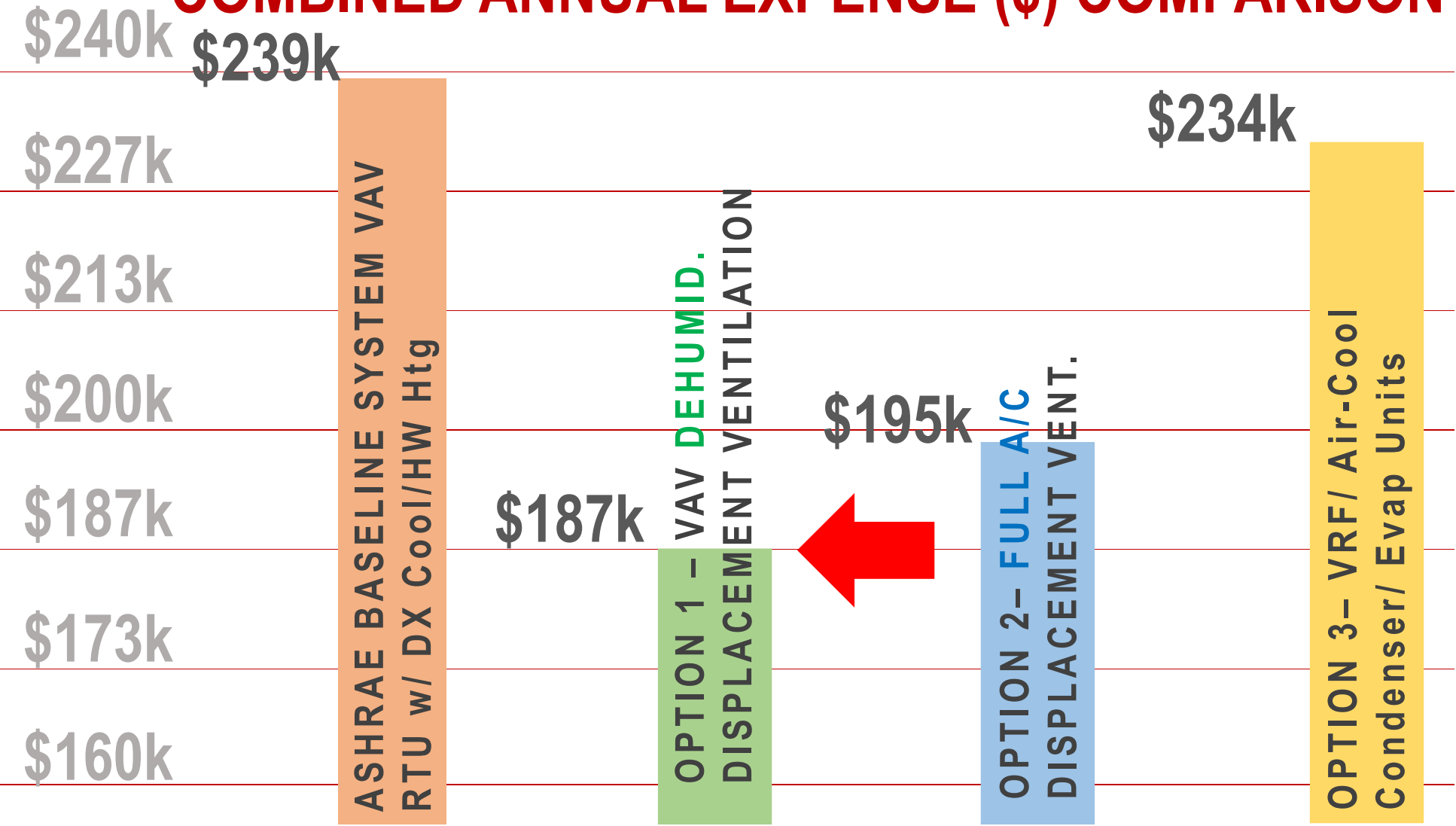
- Total Life-Cycle Savings (or Cost)
- Payback Period (Years)



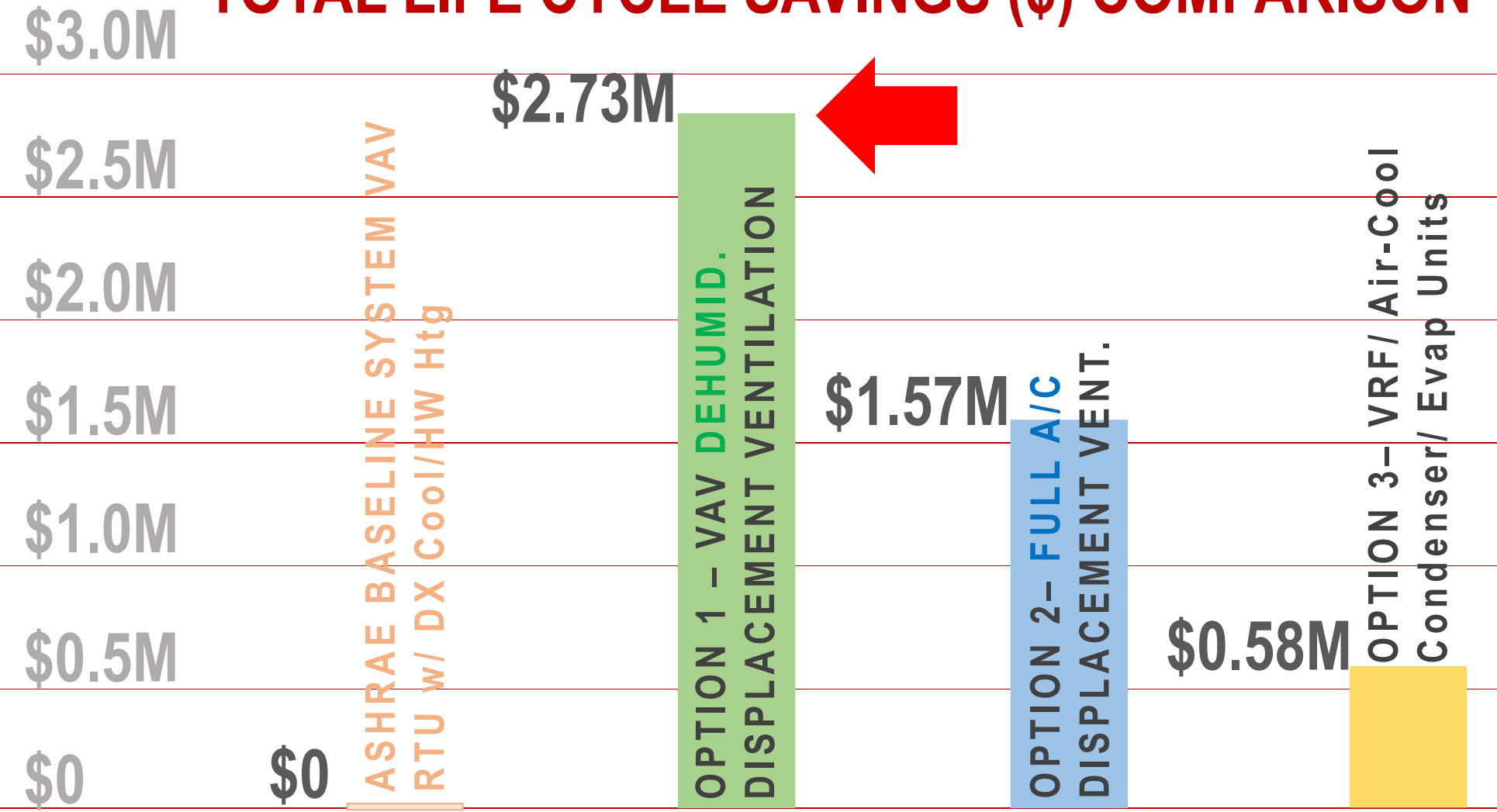
GROSS CAPITAL INVESTMENT (\$) COMPARISON



COMBINED ANNUAL EXPENSE (\$) COMPARISON



TOTAL LIFE CYCLE SAVINGS (\$) COMPARISON



BEST VALUE

DISPLACEMENT VENTILATION w/ VAV, DEHUMIDIFICATION OPTION 1

- Lowest Initial Capital Investment
- Lowest Annual Fuel Costs
- Tied for Lowest Annual Maintenance Cost
- Highest Life-Cycle Savings
- “Instant” Payback on Investment
- Low environmental footprint
- Better Indoor Air Quality
- Superior Thermal Comfort
- Good Controllability
- Advanced system without being needlessly complex



MODELED ENVELOPE OPTIONS

1. BETTER GLAZING - ADD \$212,780

- SHGC 0.27 IN LIEU OF 0.39


2. MORE ROOF INSULATION - ADD \$100,360

- R-40 IN LIEU OF R-34
- Neither option costed out (potential savings exceeded 30-year payback period)
- Neither option changed sizing of mechanical equipment
- Shows that base envelope design is already quite robust
- Point of diminishing returns



A large, dark gray, stylized letter 'Q' with a thick stroke and a short tail.

Asked at Forum #3

A small, solid dark gray square.

Q.: What is the [modeled] energy cost to operate the new building as compared to the energy cost to operate the existing buildings, Balmer and NES combined?

A.: See below....

EXISTING VERSUS NEW BUILDING: ANNUAL OPERATING COST COMPARISON

BUILDING	AREA (GSF)	COMBINED UTILITY COST (GAS + ELECTRIC)	ESTIMATED EXPENSE INCREASE (Delta)	ESTIMATED ANNUAL MAINT. COST
EXISTING BALMER + NES	128,431 GSF	\$130,870	-	\$31,100
PROPOSED (DESIGN) BUILDING	167,352 GSF	\$197,323	\$66,453	\$37,000



4

**SUSTAINABLE
DESIGN
FEATURES
UPDATE**

LEED EAc3 – OPTIMIZE ENERGY PERFORMANCE

- Modeled Building shows a 33.2% energy savings, compared with Baseline Building
- MSBA minimum is 16% savings
- Translates to 13 points – we were targeting 11
- Conservative Approach – keep 11 in YES column, 2 in Maybe column



CURRENT LEED STATUS

Yes	No
45	33
	32

Project Totals (Certification Estimates) 110

Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+ points

Project Goal(s)	LEED v4 BD+C NC Silver minimum
Activity Over the 2 Last Months	Reviewed MSBA Preferred Schematic Report. Participated in SD Phase Consultants Kickoff Meeting on January 17, 2018. Updated LEED-S v4 Scorecard based on additional project data and after meeting.
Planned Activity Over the Next Month	Work with team to identify LEED credit documentation responsibilities. Facilitate team to complete LEED Integrative Process and Site Assessment worksheets and OPR document.

SUSTAINABLE DESIGN FEATURES

				Yes	No		
				1	0	0	Integrative Process
D		1					IPc1 Integrative Process
				Yes	No		
				0	3	12	Location & Transportation
D							LTc1 LEED for Neighborhood Development Location
D						1	LTc2 Sensitive Land Protection
D						2	LTc3 <u>High Priority Site</u>
D						5	LTc4 <u>Surrounding Density and Diverse Uses (RP@4)</u>
D						4	LTc5 Access to Quality Transit
D							
D		1					LTc6 Bicycle Facilities
D		1					LTc7 Reduced Parking Footprint
D		1					LTc8 Green Vehicles



SUSTAINABLE DESIGN FEATURES

		Yes	No		
		4	4	4	Sustainable Sites
C	Y				SSp1 Construction Activity Pollution Prevention
D	Y				SSp2 Environmental Site Assessment
D	1				SSc1 Site Assessment
D		2			SSc2 Site Development - Protect or Restore Habitat
D	1				SSc3 Open Space
D				3	SSc4 <u>Rainwater Management</u>
D		2			SSc5 Heat Island Reduction
D	1				SSc6 Light Pollution Reduction
D				1	SSc7 Site Master Plan
D	1				SSc8 Joint Use of Facilities





SUSTAINABLE DESIGN



SUSTAINABLE DESIGN FEATURES

		Yes	No		
		16	9	6	Energy & Atmosphere
C	Y				EAp1 Fundamental Commissioning and Verification
D	Y				EAp2 Minimum Energy Performance
D	Y				EAp3 Building-level Energy Metering
D	Y				EAp4 Fundamental Refrigerant Management
C	5	1			EAc1 Enhanced Commissioning
D	11	3	2		EAc2 <u>Optimize Energy Performance (RP@8)</u>
				Y	10% Improvement in Energy Performance
				Y	<u>20% Improvement in Energy Performance</u>
				Y	24% Improvement in Energy Performance
				Y	26% Improvement in Energy Performance



SUSTAINABLE DESIGN FEATURES

				Yes	No		
				16	9	6	Energy & Atmosphere
D		1		EAc3	Advanced Energy Metering		
C			2	EAc4	Demand Response		
D		3		EAc5	<u>Renewable Energy Production</u> 1 (1%), <u>2 (5%)</u> , 3 (10%)		
D		1		EAc6	Enhanced Refrigerant Management		
C		2		EAc7	Green Power and Carbon Offsets		
				M+	50% Total Energy by RECs &/or Offsets		
				M+	100% Total Energy by RECs &/or Offsets		



SUSTAINABLE DESIGN FEATURES

	Yes 4	No 5		Materials & Resources
D	Y		MRp1	Storage & Collection of Recyclables
C	Y		MRp2	Construction and Demolition Waste Management Planning
C		3	2	MRc1 <u>Building Life-Cycle Impact Reduction (RP@2)</u>
C	1		1	MRc2 Building Product Disclosure & Optimization - Environmental Product Declarations
C	1		1	MRc3 Building Product Disclosure & Optimization - Sourcing of Raw Materials
C	1		1	MRc4 Building Product Disclosure and Optimization - Material Ingredients
C	1	1		MRc5 Construction and Demolition Waste Management



SUSTAINABLE DESIGN FEATURES

		Yes	No		
		8	7	1	
					Indoor Environmental Quality
D	Y				IEQp1 Minimum IAQ Performance
D	Y				IEQp2 Environmental Tobacco Smoke (ETS) Control
D	Y				IEQp3 Minimum Acoustical Performance
D	2				IEQc1 Enhanced IAQ Strategies
C	1	2			IEQc2 Low-Emitting Materials
					Y Three of seven categories (or 4 w/ furniture)
					M Five of seven categories (or 6 w/ furniture)
					M Six of seven categories (or 7 w/ furniture)
C	1				IEQc3 Construction IAQ Management Plan
C	2				IEQc4 IAQ Assessment
D		1			IEQc5 Thermal Comfort
D	1	1			IEQc6 Interior Lighting
D		3			IEQc7 Daylight
D	1				IEQc8 Quality Views
D				1	IEQc9 Acoustic Performance



SUSTAINABLE DESIGN FEATURES

	5	1	0		Innovation
D	1			IDc1	Innovation in Design: To be determined (EB:O&M Starter Kit?)
D	1			IDc2	Innovation in Design: TBD (Green Building Education?)
D	1			IDc3	Innovation in Design: TBD
C		1		IDc4	Innovation in Design: TBD
C	1			IDc5	Innovation in Design: TBD (Pilot Credit)
C	1			IDc6	LEED Accredited Professional

Yes	No			
<u>2</u>	<u>2</u>	<u>0</u>		Regional Priority for 01588 (credits have been underlined)
<u>1</u>			RPc1	LTc3, LTc4, WEc1 , EAc2, EAc5, MRc1
<u>1</u>			RPc2	LTc3, LTc4, WEc1, EAc2 , EAc5, MRc1
	<u>1</u>		RPc3	LTc3, LTc4, WEc1, EAc2, EAc5 , MRc1
	<u>1</u>		RPc4	LTc3, LTc4, WEc1, EAc2, EAc5, MRc1





***Thank you
for your
attention!***

***Questions?
Comments?***