SUMNER-BONNEY LAKE SCHOOL DISTRICT
SUMNER HIGH SCHOOL ADDITION - PHASE 2
VALUE ENGINEERING REPORT
SEPTEMBER 12, 2025

Revised 10/13/2025 with updated Implementation Data

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I. EXECUTIVE SUMMARY

INTRODUCTION

This value engineering (VE) report is presented to Sumner-Bonney Lake School District and the design team to support decision making at the design development phase for the Sumner High School Addition - Phase 2 project.

The goals for this study were to review the current design concepts and identify potential opportunities for design cost effectiveness and efficiency. The VE team sought to identify site development, planning, and building system alternatives that may offer first cost or life cycle cost benefits and/or improve project quality and reduce construction risks.

The following criteria were described by stakeholders as important project requirements:

- Aesthetics
- Construction Budget
- District Standards
- Durable Materials
- Energy Efficiency
- Long-life Systems
- O&M Impacts
- Safety and Security
- Sustainability
- Total Cost of Ownership

Value Engineering Team and Process

The multidisciplinary team was led by a certified value management facilitator and included: licensed architectural, civil, structural, mechanical, electrical, cost estimating and construction management team members.

At the initial kickoff meeting, Sumner-Bonney Lake School District and the design team presented their project requirements and basis of planning and design. The VE study team worked together using the formal value methodology. The essential and secondary functions of the project components were identified along with their associated costs, design alternatives were generated, and the most viable alternatives were further developed.

SUMMARY

VALIDATION OF PROGRAM AND DESIGN ELEMENTS:

Value Methodology is not a cost-cutting exercise but is about finding opportunities to improve overall value. It is also useful for Districts and design teams in validating decisions that have been made by the District and Design Team. In the process of

comparing alternative concepts with the current design, the VE team noted the following planning and design components, as well as owner project requirements merit strong continued support:

- Educational programs beyond general classrooms, preparing students for future real-world experiences:
    - Specific CTE programs and the thoughtful grouping of CTE offerings, including Aerospace, Robotics, Horticultural Science, Agricultural Science, Culinary Arts, Graphic Design, and Visual Arts.
    - Thoughtful inclusion of Developmental Learning and Life Skills, Child Development and Early Learning.
- Adherence to the Master Plan.
- Matching the vernacular expression of the Phase 1 building (look and feel) to build a unified campus.
- Thoughtful continuity of systems established in Phase 1 to maintain experiences for students, instructional staff, and maintenance staff.
- Utilization of Active Beam technology for comfort, energy efficiency, heating cooling, and ventilation.
- A three-story plan to reduce the building footprint and establish appropriate massing.
- Efficient use of limited site area.
- Highly efficient, double loaded floor plan configuration with breakout Learning Commons in classroom pods.
- Incorporation of outdoor spaces with courtyards.
- Drop off and vehicular circulation flow.
- Logical, direct, and efficient circulation connections to Phase 1 building.
- Inclusion of rooftop photovoltaic (PV) systems.
- Appropriately engineered solutions to site condition challenges (e.g., high water table, poor soils).
- Minimal impact on surrounding neighborhood.
- Overall Aesthetics.
- Considerations for the success of future campus phase development.

Value Engineering Proposals

Key proposals include:

- Enhancing storm drainage and pavement systems
- Structural alternatives and reducing upper floor polished concrete cracking risks
- Walkway alternatives and providing covered play for Child Development
- Opportunities to enhance Mechanical, Plumbing, and Electrical efficiencies

Success of the formal VE process is not merely measured in terms of the value of cost reductions, but rather in the accepted implementation of all VE proposals and their contributions toward performance improvements in the project as a whole. In recognition of such additional benefits and to assist Washington State in representing the results of its VE program to the state legislature, performance measures have been developed and standardized by the Cascadia Chapter of SAVE International. The following table summarizes the VE team's proposals relative to these performance measures:

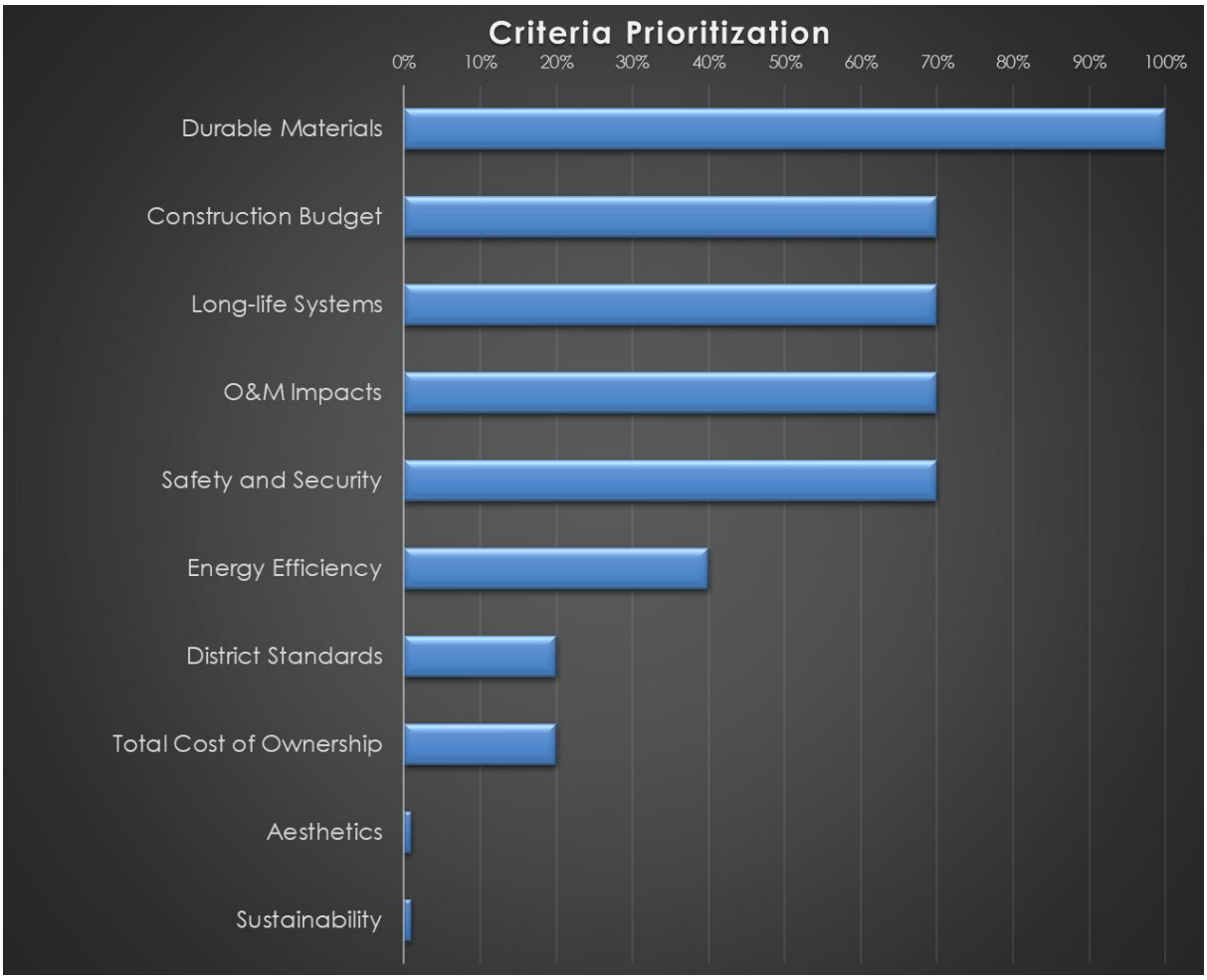
Performance Measures	Number of Proposals
Program	**1**
Aesthetics	**5**
Facility Preservation	**4**
Total Cost of Ownership / LCCA	**11**
Environmental Sustainability	**8**
Schedule	**3**
Constructability	**7**
Occupant Comfort, Safety & Performance	**2**

CRITERIA PRIORITIZATION

At the VE kickoff meeting, Sumner-Bonney Lake School District stakeholders were led through a criteria prioritization exercise. This exercise identified criteria that are important to measure the success of the project and allowed stakeholders to vote on which criteria are most important or of lower priority to them.

Aesthetics	General appearance, expression to match Phase I, or other specific features.
Construction Budget	First cost (including development and construction costs).
District Standards	Adherence to prescribed standards and Owner Project Requirements (OPR).
Durable Materials	Long-life materials that will withstand the test of time.
Energy Efficiency	Improves energy performance of the facility.
Long-life Systems	Systems that will last a long time (but may come at a first-cost premium).
O&M Impacts	Support of ongoing operations and maintenance, including maintenance cost.
Safety and Security	Design for a safe and secure environment. CEPTED
Sustainability	General environmental responsibility.
Total Cost of Ownership	The total long-term / life cycle cost.

The following criteria prioritization graph shows how the various project criteria were weighted by the stakeholders. The VE team uses this graph when evaluating and developing proposals, and to gauge the performance of proposals with project goals.


Criteria Prioritization
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Durable Materials
Construction Budget
Long-life Systems
O&M Impacts
Safety and Security
Energy Efficiency
District Standards
Total Cost of Ownership
Aesthetics
Sustainability

II. PROJECT DESCRIPTION

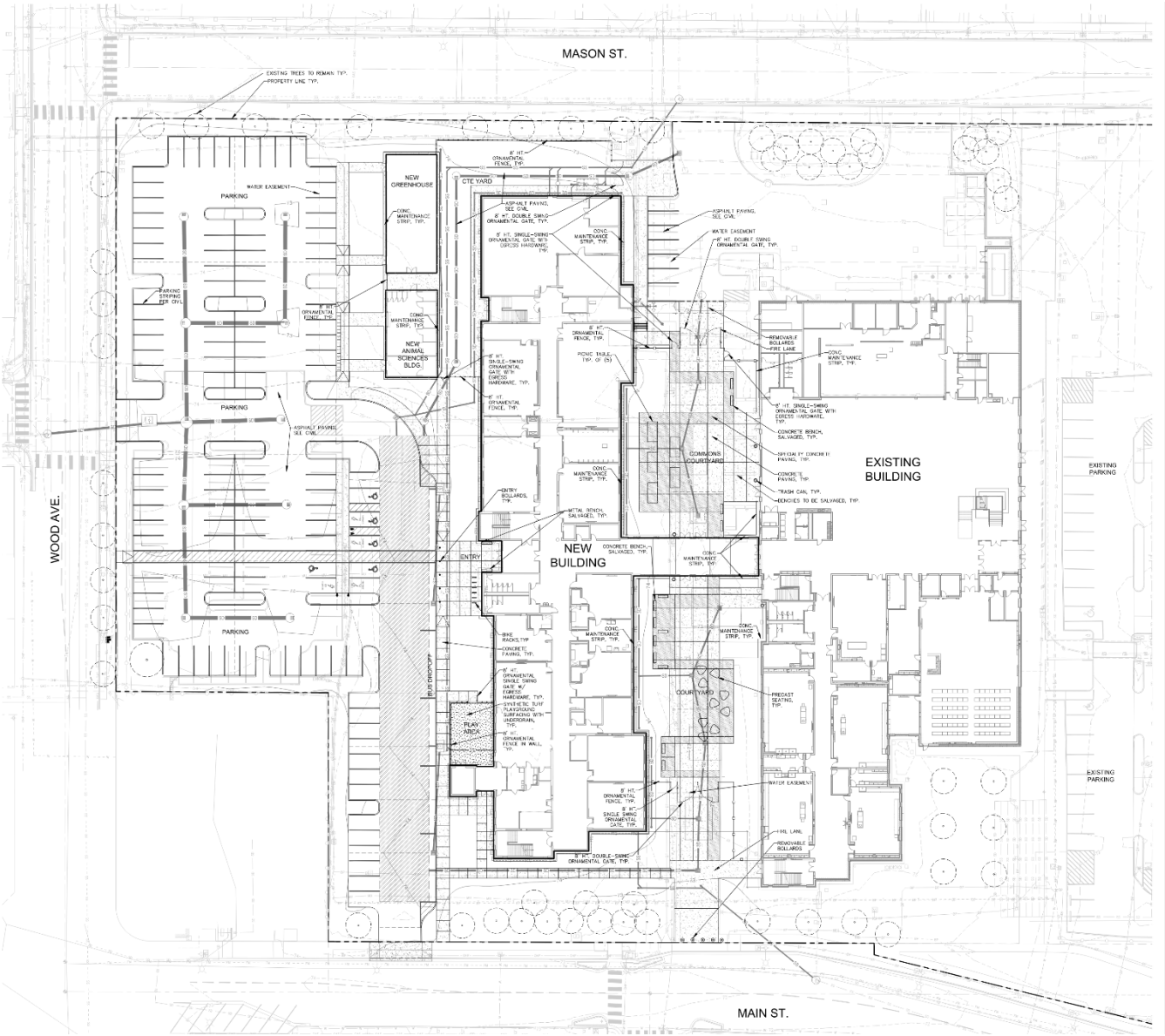
PROJECT INFORMATION

Cost:	Building	$63,579,529	$671.01/SF
	On-Site Development	$7,176,342	
	Off-Site Allowance	$250,000	
	Total	**$71,005,871**	
Size:	New	94,752 SF	
Location:	1707 Main St. Sumner, WA 98390		
Schedule:	Construction	20 months	
Delivery Method:	Design-Bid-Build		
Building Construction Type:		II-B	
Occupancy:	Educational	Students:	1,830

Description (excerpted from the Educational Specifications, dated July 2025)

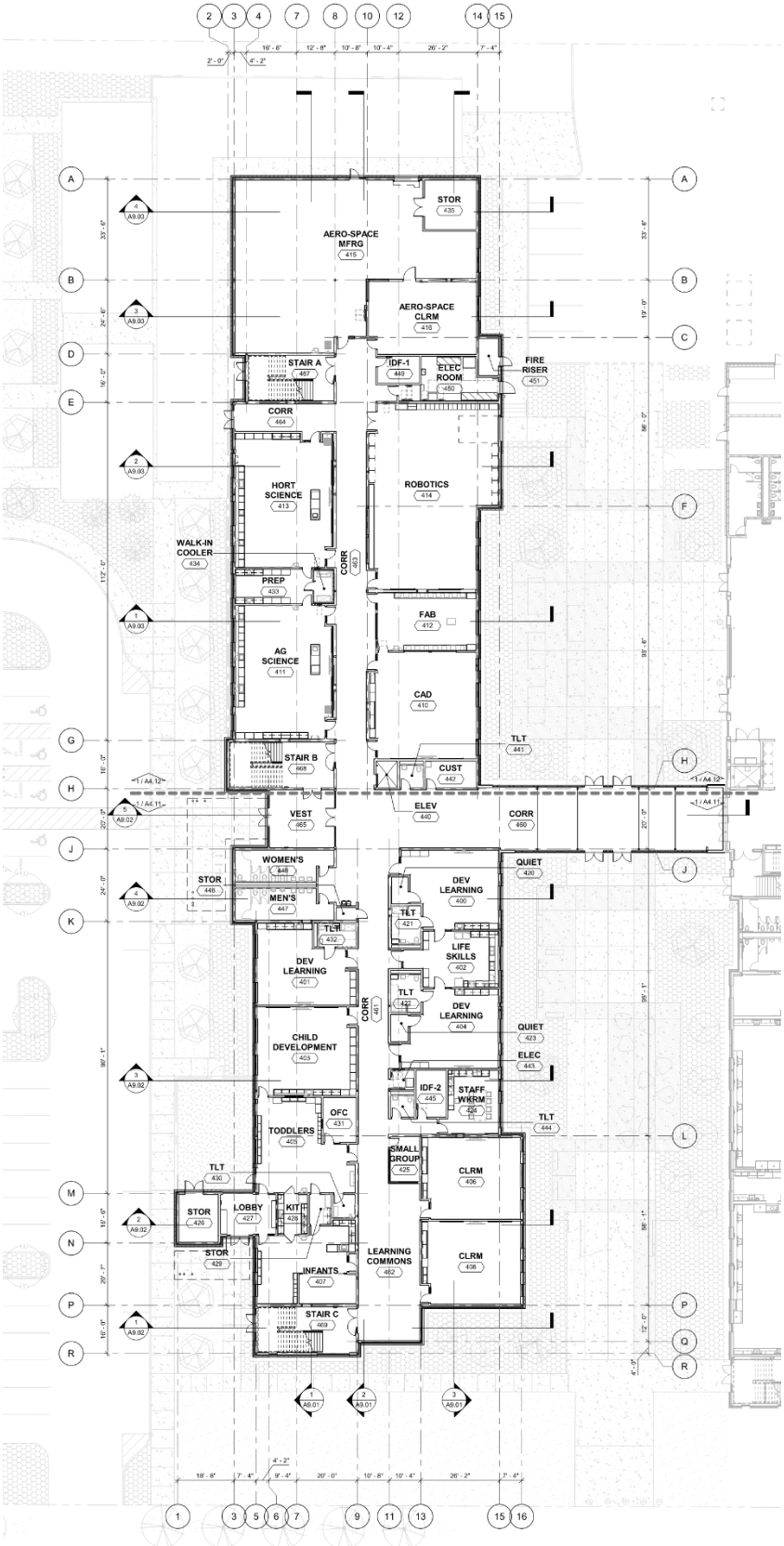
The Sumner High School Addition – Phase 2 is a transformative project that reflects the district's commitment to creating innovative, student-centered learning environments. Developed through extensive collaboration with staff, students, and community members, the design prioritizes flexibility, inclusivity, and future-ready spaces that will serve the school for decades. The expansion introduces modern, adaptable classrooms and dedicated areas for special education, while also greatly enhancing Career and Technical Education offerings with specialized labs for robotics, culinary arts, aerospace manufacturing, digital media, and more. A unique feature of this project is its focus on child development, with classrooms and daycare facilities designed to support both instructional needs and hands-on learning opportunities for students exploring careers in early childhood education. Complementing these specialized spaces are collaborative learning commons, faculty support areas, and updated building systems that improve safety, efficiency, and accessibility across the campus. With the capacity to serve 1,830 students in grades 9–12, the new facility will not only strengthen academic and career pathways but also stand as a source of pride and connection for the Sumner community.

SITE PLAN

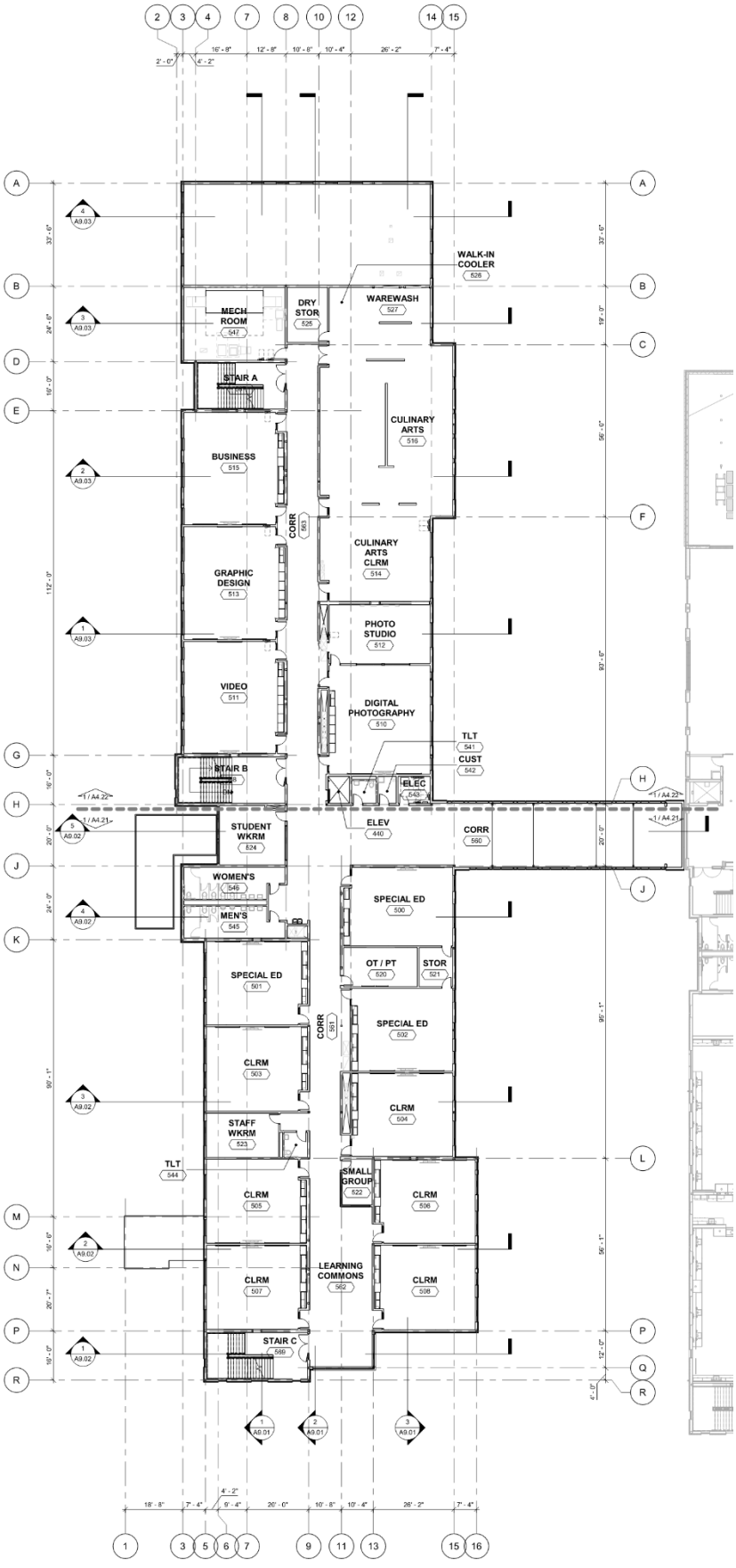

MASON ST.
WOOD AVE.
MAIN ST.
PARKING
NEW GREENHOUSE
NEW ANIMAL SCIENCES BLDG.
CTE YARD
NEW BUILDING
ENTRY
COMMONS COURTYARD
COURTYARD
EXISTING BUILDING
EXISTING PARKING
PLAY AREA
BUS DROPOFF

FLOOR PLANS

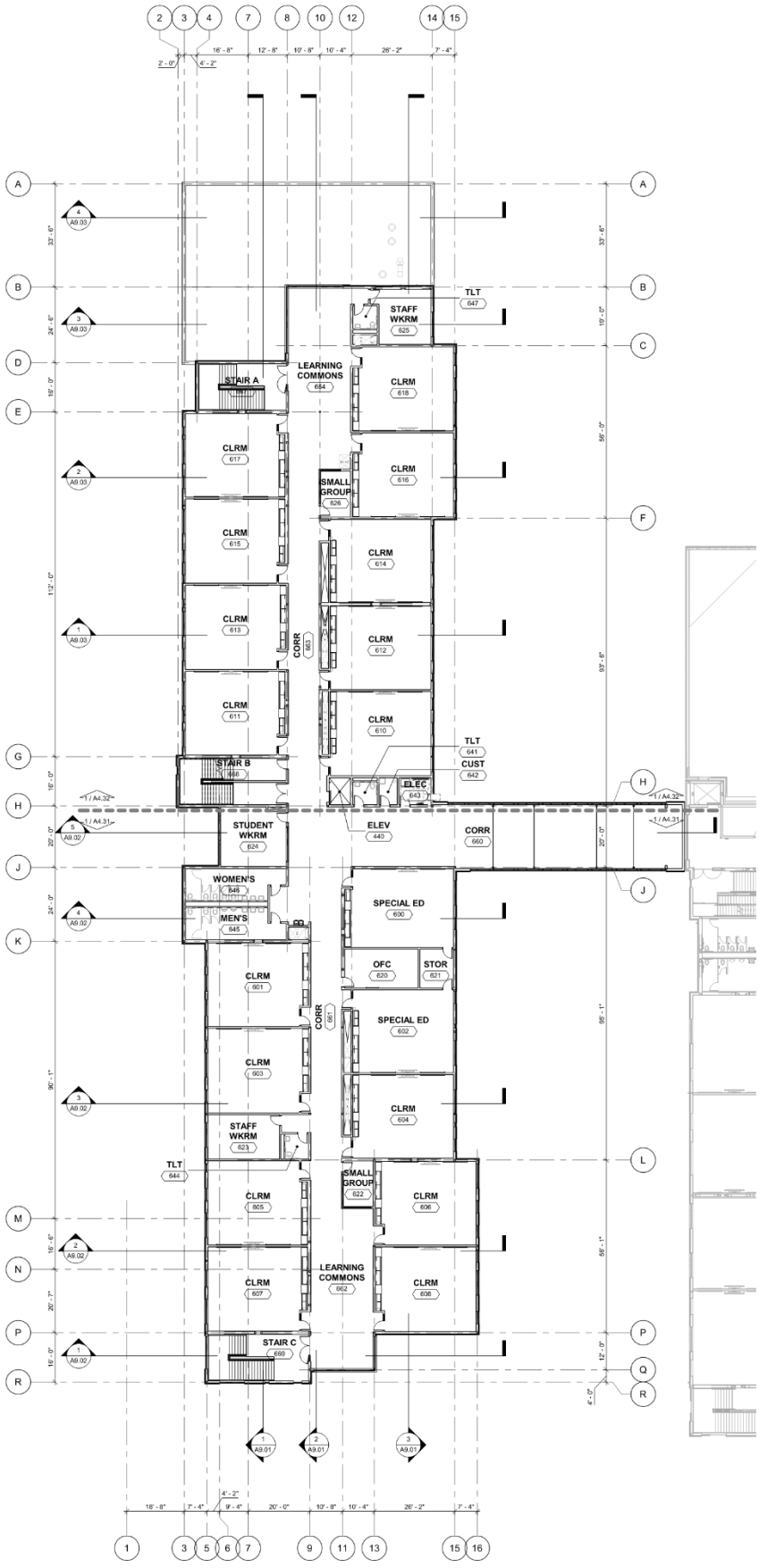
First Floor



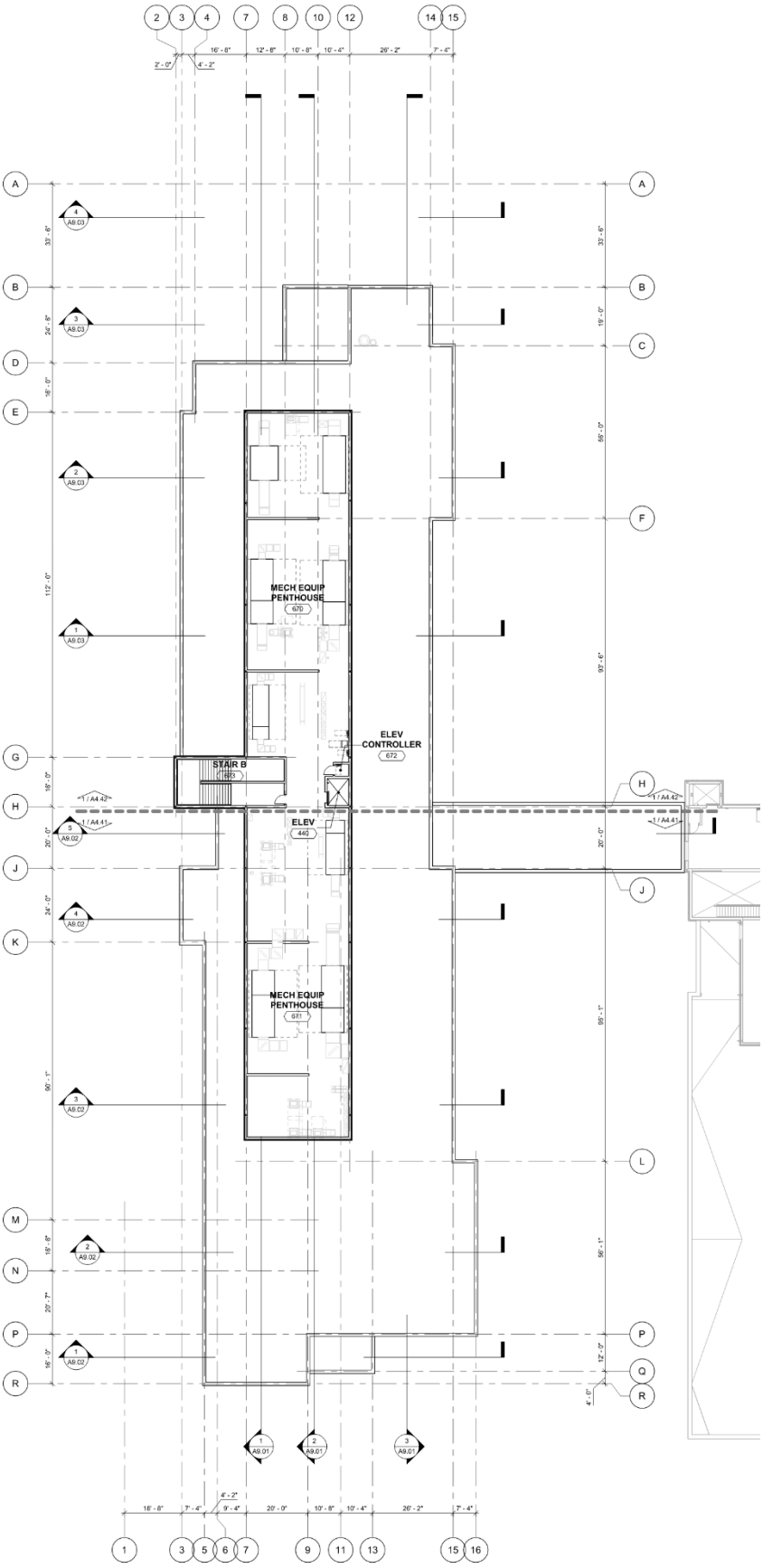
Second Floor



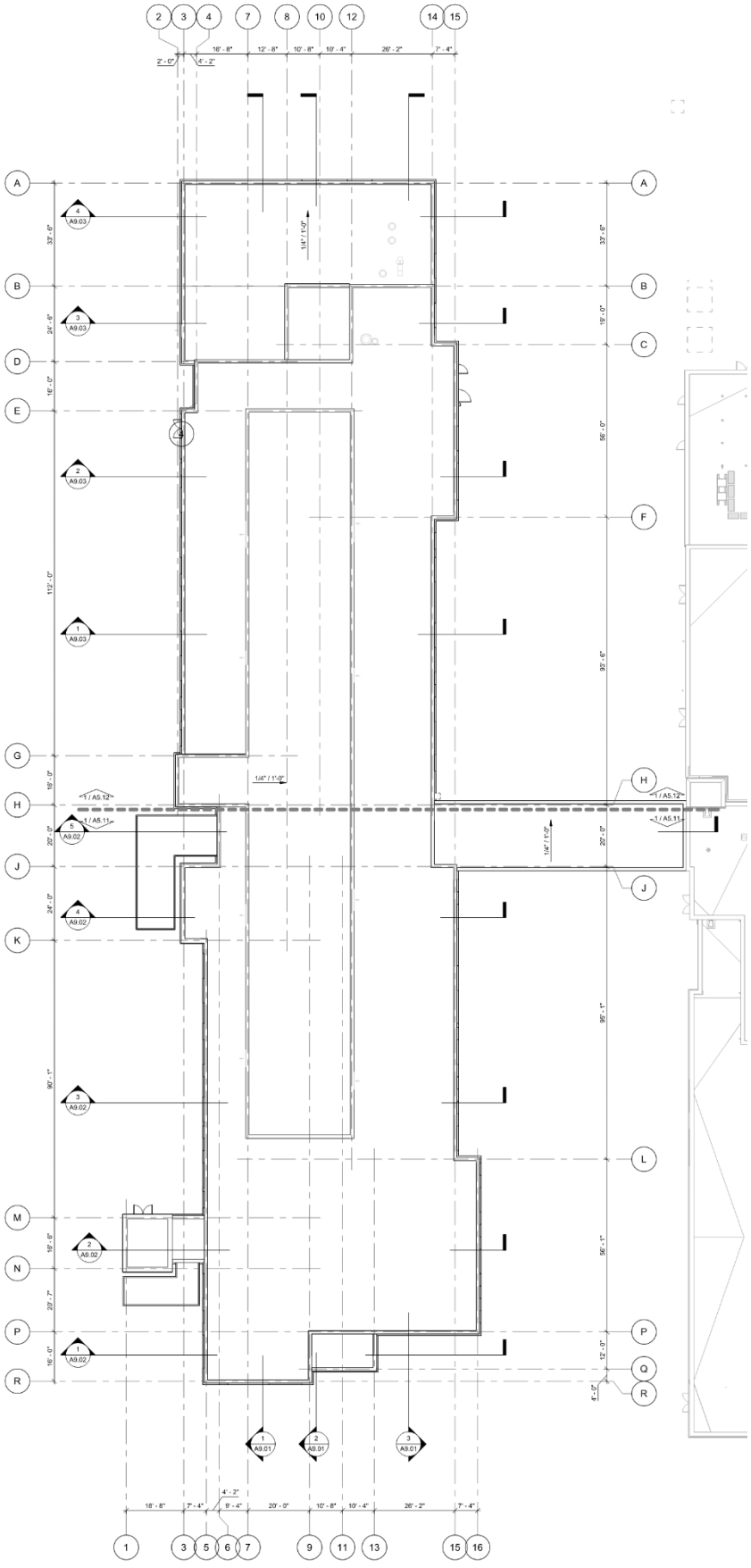
Third Floor


LEARNING COMMONS 664
STAFF WKRM 625
TLT 647
STAIR A
CLRM 618
CLRM 617
SMALL GROUP 626
CLRM 616
CLRM 615
CLRM 614
CLRM 613
CORR 663
CLRM 612
CLRM 611
CLRM 610
TLT 641
CUST 642
STAIR B 666
ELEC 643
STUDENT WKRM 624
ELEV 440
CORR 660
WOMEN'S 646
MEN'S 645
SPECIAL ED 630
OFC 620
STOR 621
CLRM 601
CORR 661
SPECIAL ED 602
CLRM 603
CLRM 604
STAFF WKRM 623
TLT 644
SMALL GROUP 622
CLRM 605
CLRM 606
LEARNING COMMONS 662
CLRM 607
CLRM 608
STAIR C 669

Mechanical Equipment Penthouse



ROOF PLAN



RENDERING

III. VALUE ENGINEERING PROPOSALS

The following section presents the developed VE proposals. Each proposal describes the current concept, then compares it to the VE concept. Order of magnitude cost estimates are included for each alternative, comparing the current design to the estimated VE concepts.

To evaluate proposals beyond just budget considerations, the VE team ranked each proposal based on how well it addresses Sumner-Bonney Lake School District's ten identified priorities. Proposals were also evaluated for functional performance (how well the proposal meets its intended function) and implementation practicality (the relative difficulty of implementation).

In addition to formal VE proposals (with expanded summary, backup and cost estimates), the value team has also included a number of line-item "Revision Proposals" indicating various additional opportunities to improve value.

Not all proposals are first cost savings "Quantitative" ideas, but some are "Qualitative," that may add first cost, but add value to the project with potential life Cycle Cost savings over time or address other quality and functional improvements.

[The Criteria Scored rankings in the table below are based on limited responses received from the District. Additional feedback is anticipated, and the final draft will be updated to incorporate any further responses, resulting in a more accurate reflection of the District's priorities].

VE PROPOSAL SUMMARY:

No.	Name	Current Cost	VE Proposal Cost	Difference	Criteria Scored Ranking	Note*	LCCA Difference
C1	Courtyard Drainage	$58,000	$28,000	**$30,000**	2		
C2	Pavement Sections	$359,000	$347,000	**$12,000**	13		
L1	Courtyard Pavement	$317,000	$270,000	**$47,000**	12	NIC	
S1	Slab-On-Grade	$3,532,000	$2,856,000	**$676,000**	5		
S2	Floor Structure	$865,000	$1,121,000	**($256,000)**	11		
A1	Walkway Glazing	$1,123,000	$812,000	**$311,000**	6	NIC	
A2	Walkway Structure	$2,450,000	$1,266,000	**$1,184,000**	8		
A3	Covered Play	$0	$99,000	**($99,000)**	3		
M1	Integrated Design	$21,453,000	$21,163,000	**$290,000**	1	LCCA	$516,000
M2	Hydronic Distribution	$5,117,000	$4,677,000	**$440,000**	7		
M3	Water Distribution	$944,000	$850,000	**$94,000**	4		
E1	Panel Boards	$71,000	$0	**$71,000**	9		
E2	Lighting Density	$2,302,000	$2,151,000	**$151,000**	10		

SUBTOTAL VE PROPOSALS	**$2,646,000**
SUBTOTAL QUANTITATIVE VE PROPOSALS*	*$3,001,000*

** Quantitative Savings Per US Army Corps of Engineers VE Standard (tally excludes Qualitative - cost add proposals)*

NIC – Indicates Not Included in totals (cost or portions are included in a different idea)
LCCA – Indicates Life Cycle Cost Analysis savings potential

REVISION PROPOSALS:

No.	Description	ROM Difference	Note*
R1	Use pavers ILO concrete in courtyards (assume 50%)	($280,460)	NIC
R2	Raise concrete crosswalks to slow traffic and improve safety	($17,100)	
R3	Provide 1,000 SF covered walkway between entrances of main building and animal science-green house buildings	($210,240)	
R4	Add Silva cells at parking lot planter islands for storm water treatment, detention, and promoting tree health.	($49,259)	
R5	Add covered bike parking (assume 8'w x 15'L)	($25,229)	
R6	Extend sidewalk in parking lot (in front of greenhouse) to connect with sidewalk in Mason Street	($2,523)	
R7	Hydromechanical grease interceptor ILO vault-type	$2,803	
R8	Spade out existing trees and re-plant (ILO remove at (E) parking islands, etc...)	$1,402	
R9	Add sculpture or artforms to enhance aesthetics (FF&E budget)	($30,000)	
R10	Add moveable planted pots to courtyard areas (add in FFE budget)	($10,000)	
R11	Provide smart irrigation controls with weather sensors	($5,000)	
R12	Add umbrellas and tables in courtyards (add via FF&E)	($12,500)	
R13	Install vehicular gate at Main Street drive entrance to thwart bypassing intersection and cutting through site.	($21,024)	
R14	Retain existing 6' fence at existing parking property lines (ILO Demo)	$545	
R15	Steel bar joist framing ILO WF steel at penthouse roof	$48,637	
R16	Storefront ILO curtainwall (add aluminum panel clad exterior wall to reduce height to 12')	$441,924	NIC
R17	Increase OH access door for large equipment through parking lot to east of Aero-Space MFRG. to 10'x12' with vision glass.	($1,402)	
R18	Rigid insulation with thermal clip ILO structural insulated panel	$258,881	
R19	TPO in lieu of modified bituminous roofing system	$47,607	
R20	True brick Wainscott at base to protect wall from impacts and splash back staining.	$18,949	
R21	Reduce aluminum window and storefront glazing by 10%	$23,453	NIC
R22	Reduce vinyl wall coverings and replace with paint 50% of the area.	$361,043	
R23	Stained Concrete (no grind) ILO polished concrete.	$183,686	
R24	Solid surface counters ILO Plam (in science and mfrg labs)	($34,577)	
R25	Add 500 SF of Unistrut grid to Robotics ceiling	($10,512)	

R26	Include glass casework in hallways outside robotics/digital media classrooms to showcase students work	($20,000)	
R27	Select more economical vinyl wall covering product (reduce from $15.56 / SF to $10 / SF)	$258,023	NIC
R28	Mobile aisle high-density storage system for Aero-space manufacturing & Robotics (add in FFE budget)	($75,000)	
R29	Expand a restroom to also accommodate nursing mothers (including casework)	($10,000)	
R30	Provide ceiling active beam filter access device for Maintenance Staff (rolling step ladder/platform or lift) coordinated with the furniture plan.	($2,500)	
R31	Integrate "Sesame Exposed Grid Ceiling Hatches" into ACT ceiling systems (50 ea) to facilitate maintenance of the hydronic and plumbing distribution piping, valves and controls.	($59,568)	
R32	Covered drive drop off area at childcare (15' long by 10'w).	($31,536)	
R33	Provide 30% more outside air capacity than code minimum for improved health, well-being and economizer (free) cooling.	($300,000)	
R34	Non-metallic ILO metallic hydronic heating & cooling water distribution.	$180,000	
R35	Semi ILO fully ducted DOAS return air. (simplifies and reduces ducting, saves energy, loss of WSSP credit).	$100,000	
R36	Open-source control system ILO sole-source.	$680,000	
R37	Fixed-core DOAS heat recovery ILO heat wheels to eliminate cross-contamination and airborne contagion risk.	($150,000)	
R38	Wild-fire and airborne contagion HVAC control modes.	($25,500)	
R39	Reduce pre-heating and pre-cooling at DOAS units; heat recovery pre-heats and pre-cools, with final heating and cooling by the active beams.	$140,000	
R40	Premium efficiency air handling equipment fans and motors ILO code minimum.	($50,000)	NIC, LCCA
R41	Ceiling fans for high-bay space and classrooms	($120,000)	
R42	DDC monitoring of Walk-in Cooler Temperature Alarms	($1,700)	
R43	Non-metallic (PEX) ILO metallic piping	$100,000	
R44	Sleeve grade-beams for gravity waste piping ILO multiple sewer connections	$42,500	
R45	Heat pump domestic water heater ILO gas-fired	($150,000)	LCCA
R46	Water Isolation Valves per room for maintenance.	($30,000)	
R47	Monitoring wells below each end of building	($15,000)	
R48	Change to non-plenum cabling where not installed in plenum spaces.	$14,507	NIC

R49	Option for set screw instead of compression fittings, connectors and couplings for conduit.	$92,556	
R50	Include Power monitoring display near CTE wing for real time display of power use and generation learning (Corridor 460?)	($11,914)	
R51	Add equipment status panels at each lab space	($13,315)	
R52	Coordinate with gear manufacturer to incorporate demand power metering ILO separate field install metering.	$9,110	
R53	Tunable Lighting for Child Development, Dev. Learning, Life Skills, Toddlers, Infants Areas	($16,819)	
R54	Additional interior motion sensors and door position switches for intrusion alarm at spaces with expensive equipment and tools (Robotics, Fabrication, Aerospace Labs).	($21,024)	
R55	Provide enhanced fire alarm detection, including specialty labs, shops and culinary arts; maybe child development and Developmental Learning spaces.	($24,528)	
R56	Overhead festoon lighting at courtyards	($6,307)	

SUBTOTAL REVISION PROPOSAL	**$1,161,092**
SUBTOTAL QUANTITATIVE REVISION PROPOSALS*	*$2,67,721*

** Quantitative Savings Per US Army Corps of Engineers VE Standard (tally excludes Qualitative - cost add proposals)*

NIC – Indicates Not Included in totals (cost or portions are included in a different idea)
LCCA – Indicates Life Cycle Cost Analysis savings potential

TOTAL PROPOSAL SUMMARY

GRAND TOTAL OF ALL PROPOSALS	**$3,807,092**
GRAND TOTAL OF ALL QUANTITATIVE PROPOSALS	*$5,268,721*

	PROPOSAL	C1
COMPONENT: Courtyard Drainage	**AUTHOR**	MSV

BASELINE CONCEPT:

The north courtyard is graded to drain to several low spots with catch basins. The seven catch basins are all linked to convey stormwater north to an existing catch basin.

VALUE PROPOSAL SYNOPSIS:

Grade the courtyard to surface drain to the north. Install an edge drain down the mid-section of the courtyard to facilitate drainage to the existing catch basin.

SCHEDULE SAVINGS: Maintained

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Improved	Improved	Improved

FUNCTIONS:

Convey Fluid	Collect Fluid	Control Fluid

ADVANTAGES:

- Reduces flooding risk
- Improves aesthetics
- More uniform pavement surface

DISADVANTAGES:

- May require more skill to construct
- May be more difficult to design grading

DISCUSSION AND JUSTIFICATION

One of the greatest challenges with courtyards is draining a semi-enclosed area adjacent to buildings. Providing an overland flood route provides a way for storm water to drain the courtyard, away from buildings. Otherwise, if an underground storm pipe becomes blocked, stormwater could back up and flood adjacent buildings. An edge drain along with courtyard grading can provide drainage to the existing catch basin located at the north end of the courtyard and an effective flood route system.

SCHEDULE SAVINGS:

Maintained. Constructing an edge drain system should have no impact on the construction schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Improved compared to the baseline. The proposal reduces the risk of flooding the courtyard and adjacent buildings.

Maintenance & Operations:

Improved compared to the baseline. Maintenance is simplified because the system is more accessible from above ground.

Functionality:

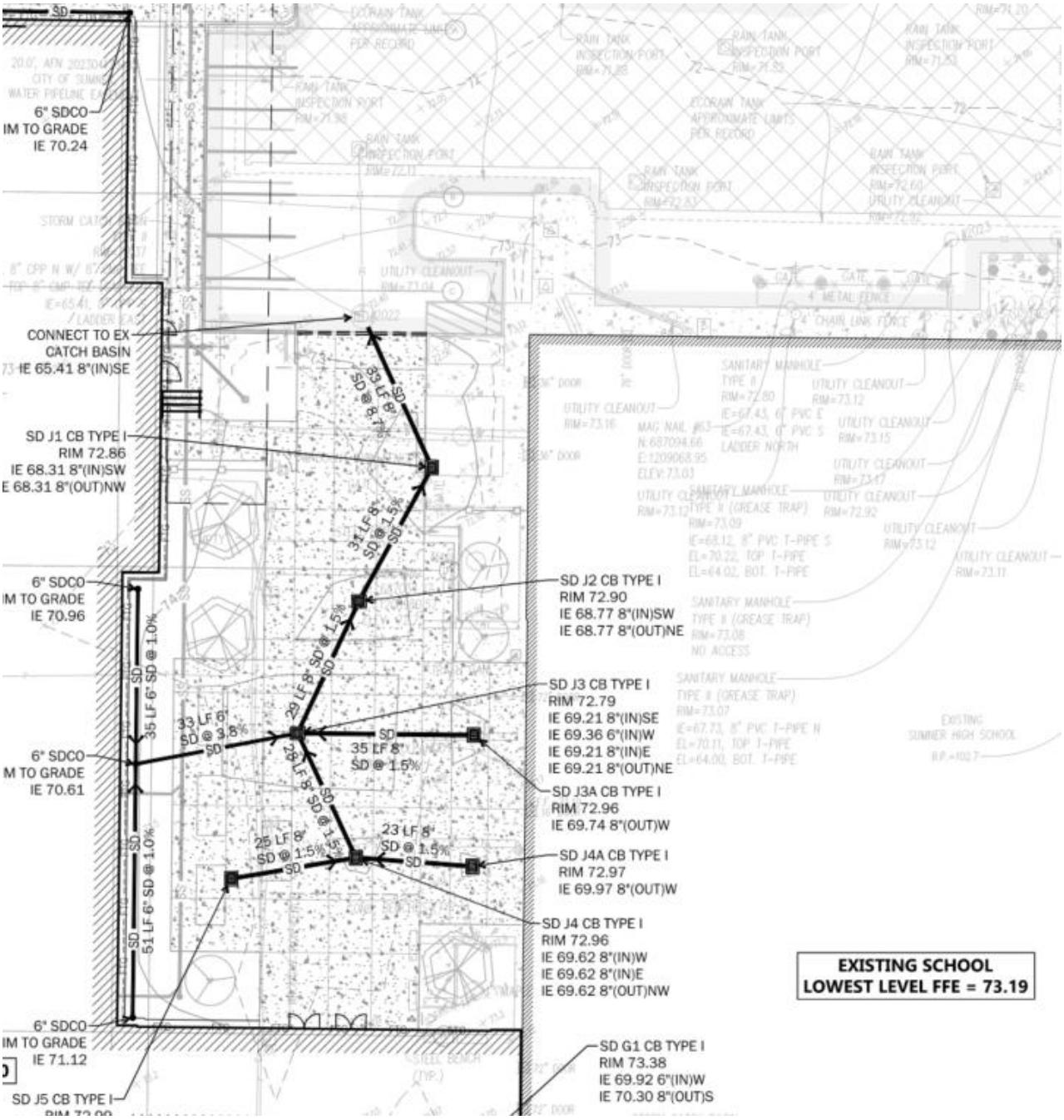
Improved compared to the baseline. Storm water drains out of the courtyard by the edge drain and surface drainage, reducing the risk of a blocked pipe causing flooding.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

Stakeholders were interested in exploring this VE concept.

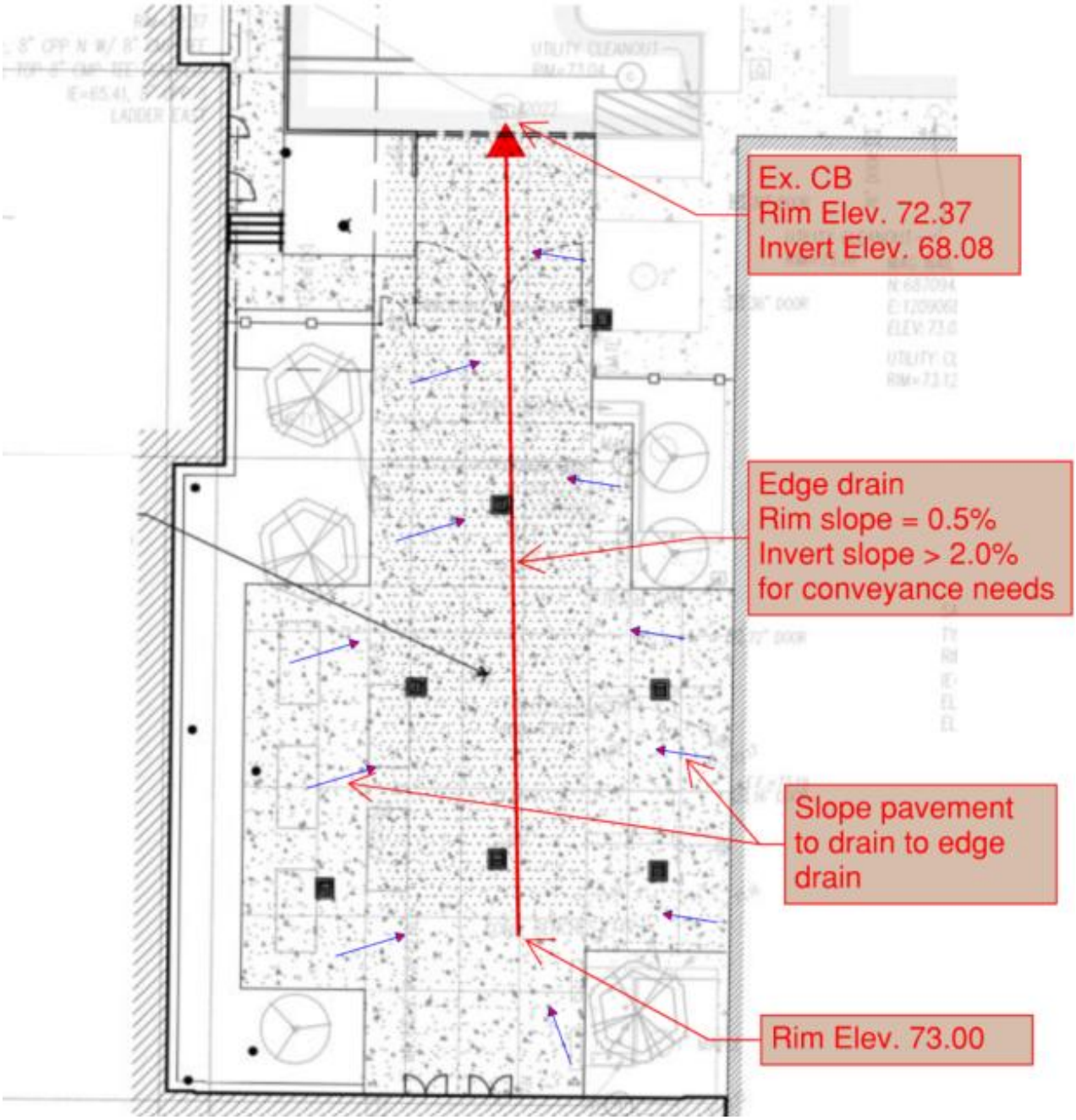
SKETCHES/DIAGRAMS:

BASELINE CONCEPT



North courtyard with planned drainage system

VALUE PROPOSAL CONCEPT



Edge drain centrally located in north courtyard drains to existing catch basin to the north

Edge drain grate options

Edge drain during construction and at completion

ASSUMPTIONS AND CALCULATIONS:

Edge drain materials are available and come with heavy duty ratings.

COST ESTIMATE FORM

C1

COMPONENT: Courtyard Drainage

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
8" Storm drain line	203	LF	118	23,950	Trench drain, decorative	100	LF	200	20,000
Catch basin, type 1	7	EA	2500	17,500					
Subtotal				41,450	Subtotal				20,000
General Contractor Markup	40.16	%		16,646	General Contractor Markup	40.16	%		8,032
Total to nearest $1000				58,000	Total to nearest $1000				28,000
					Difference				30,000

MENG Analysis

C1 Proposal

	PROPOSAL	C2
COMPONENT: Pavement Sections	**AUTHOR**	MSV

BASELINE CONCEPT:

All drive lanes throughout the parking lot are designed to be heavy-duty pavement.

VALUE PROPOSAL SYNOPSIS:

Provide heavy duty pavement only in the through lanes that the buses and emergency vehicles use.

SCHEDULE SAVINGS: Improved

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Maintained	Maintained	Maintained

FUNCTIONS:

Support Vehicles	Circulate Vehicles	Resist rutting

ADVANTAGES:

- Reduces cost
- Easier to pave
- Requires less pavement materials
- Reduces carbon footprint

DISADVANTAGES:

- Heavy vehicles could weaken pavement
- May require more signage to direct traffic
- More restrictive parking lot

DISCUSSION AND JUSTIFICATION

Heavy-duty pavement is only needed where heavy vehicles such as emergency vehicles or delivery trucks will travel. The main through route to and from the bus drop-off appears to be the only route that heavy vehicles will travel. The tighter geometry of the drive lanes in the rest of the parking lot will restrict access to larger vehicles. A reduction of heavy-duty pavement will save money.

SCHEDULE SAVINGS:

Improved compared to baseline. The reduction in pavement thickness will reduce the amount of material that is needed, simplify paving operations, and should reduce construction time.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Maintained compared to baseline. The reliability of the pavement should be maintained because heavy-duty pavement is used where heavy vehicles will circulate.

Maintenance & Operations:

Maintained compared to baseline. The maintenance and operations of the pavement should be maintained because heavy-duty pavement is used where heavy vehicles will circulate.

Functionality:

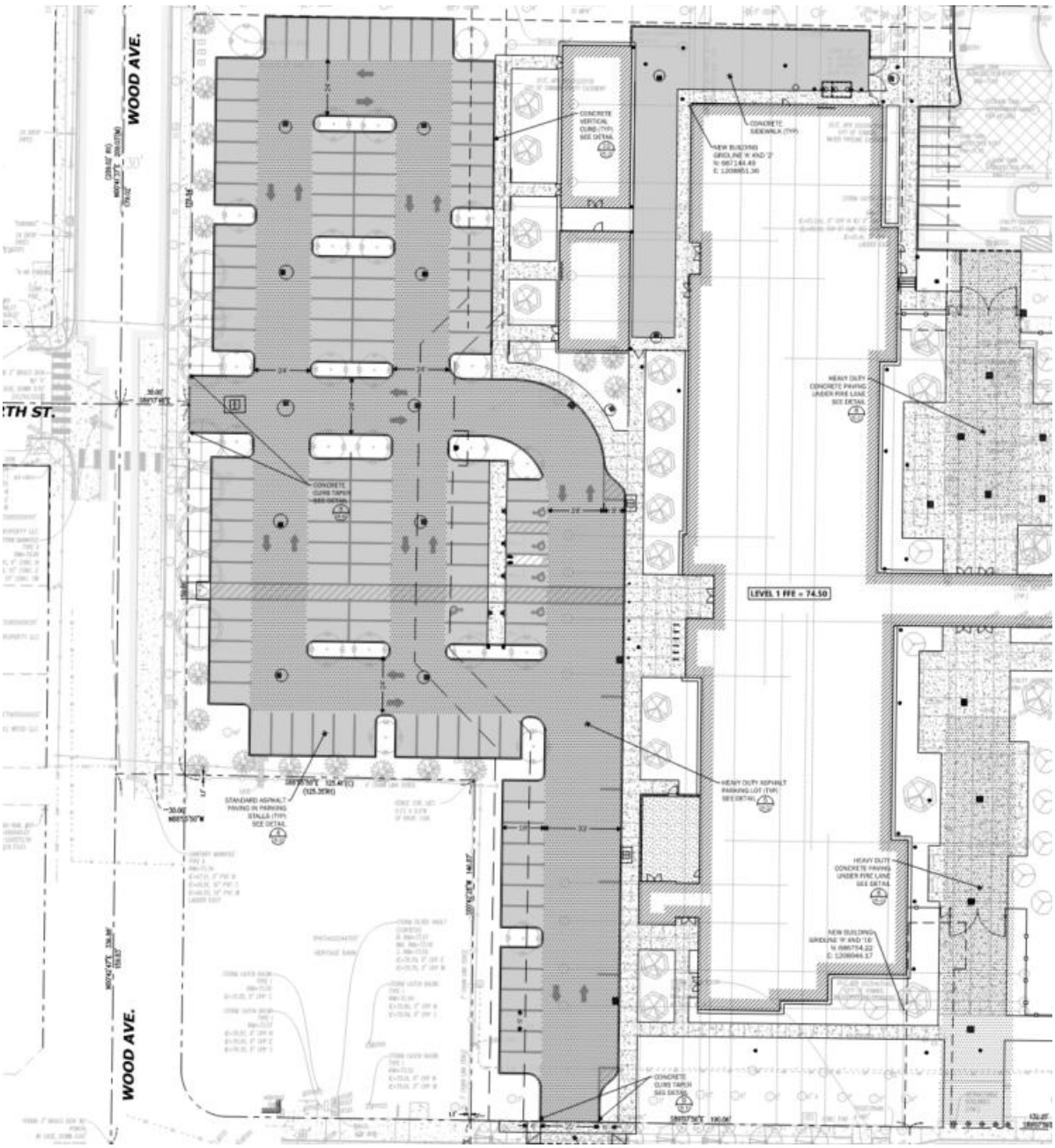
Improved compared to baseline. The functionality is improved because heavy-duty pavement is used only where it is needed.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

Stakeholders were interested in exploring this VE concept.

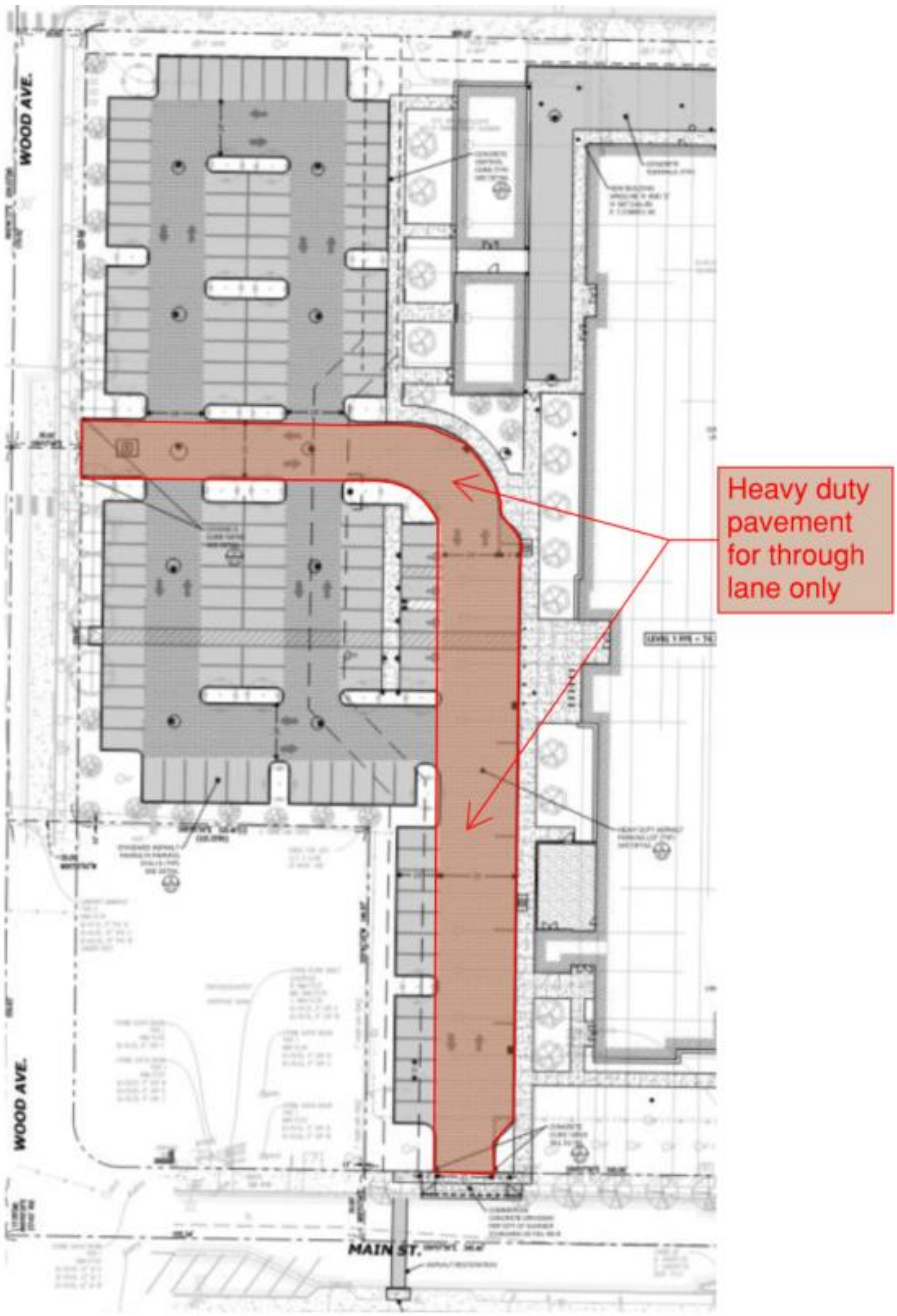
SKETCHES/DIAGRAMS:

BASELINE CONCEPT



West parking lot with reduced heavy-duty pavement throughout drive lanes

VALUE PROPOSAL CONCEPT



West parking lot with reduced heavy-duty pavement locations

ASSUMPTIONS AND CALCULATIONS:

The proposed concept assumes that parking lot configuration and use do not change.

COST ESTIMATE FORM

C2

COMPONENT: Pavement Sections

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
3" HMA over ATB (Standard Asphalt)	2,316	SY	43.5	100,736	3" HMA over ATB (Standard Asphalt)	3,992	SY	43.5	173,670
4" HMA over ATB (Heavy Duty)	3,190	SY	48.75	155,524	4" HMA over ATB (Heavy Duty)	1,514	SY	48.75	73,790
Subtotal				256,260	Subtotal				247,460
General Contractor Markup	40.16	%		102,914	General Contractor Markup	40.16	%		99,380
Total to nearest $1000				359,000	Total to nearest $1000				347,000
					Difference				12,000

MENG Analysis

Proposal **C2**

	PROPOSAL	L1
COMPONENT: Courtyard Pavement	**AUTHOR**	MSV

BASELINE CONCEPT:

The north and south courtyards are designed to be paved with continuous concrete pavement. The pavement is sloped to drain to several catch basins. Stormwater is then conveyed by pipe.

VALUE PROPOSAL SYNOPSIS:

Install concrete panels with colored drain rock and eliminate the stormwater catch basin pipe system. Stormwater will drain through the drain rock between the concrete panels into the ground.

SCHEDULE SAVINGS: Maintained

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Maintained	Maintained	Improved

FUNCTIONS:

Support Pedestrians	Convey Fluid	Infiltrate Storm

ADVANTAGES:

- Reduces stormwater detention
- Enhances aesthetics
- No storm facilities maintenance
- Simplifies grading

DISADVANTAGES:

- Increases surface maintenance
- Rocks could be displaced
- Weeds could grow
- Drain rock could clog

DISCUSSION AND JUSTIFICATION

A concrete panel with drain rock system in the courtyard will enable stormwater to drain into the ground. Catch basins and pipes will not be needed to capture and convey stormwater. Larger stones between the concrete panels will be more stable and less susceptible to being kicked out of place, though additional maintenance may be required to replace dislodged stones. However, catch basin and storm pipe maintenance will be eliminated. The concrete panel and drain-rock system can be designed to accommodate the occasional heavy loads of emergency vehicles and still be suitable for ADA accessibility. Surface grading to provide an overland flood route will still be required.

SCHEDULE SAVINGS:

Degraded compared to baseline. Construction time to install the panel drain rock system will likely take longer to complete than concrete pavement.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Maintained compared to baseline. The concrete panel drain rock system should be as reliable as concrete pavement. Though the concrete panel drain rock system is designed for heavy loads, emergency vehicle access should be infrequent.

Maintenance & Operations:

Maintained compared to baseline. The concrete panel drain rock system may require more surface maintenance to replace drain rock between the panels that has been displaced. However, catch basin and storm pipe maintenance will be eliminated from the courtyards.

Functionality:

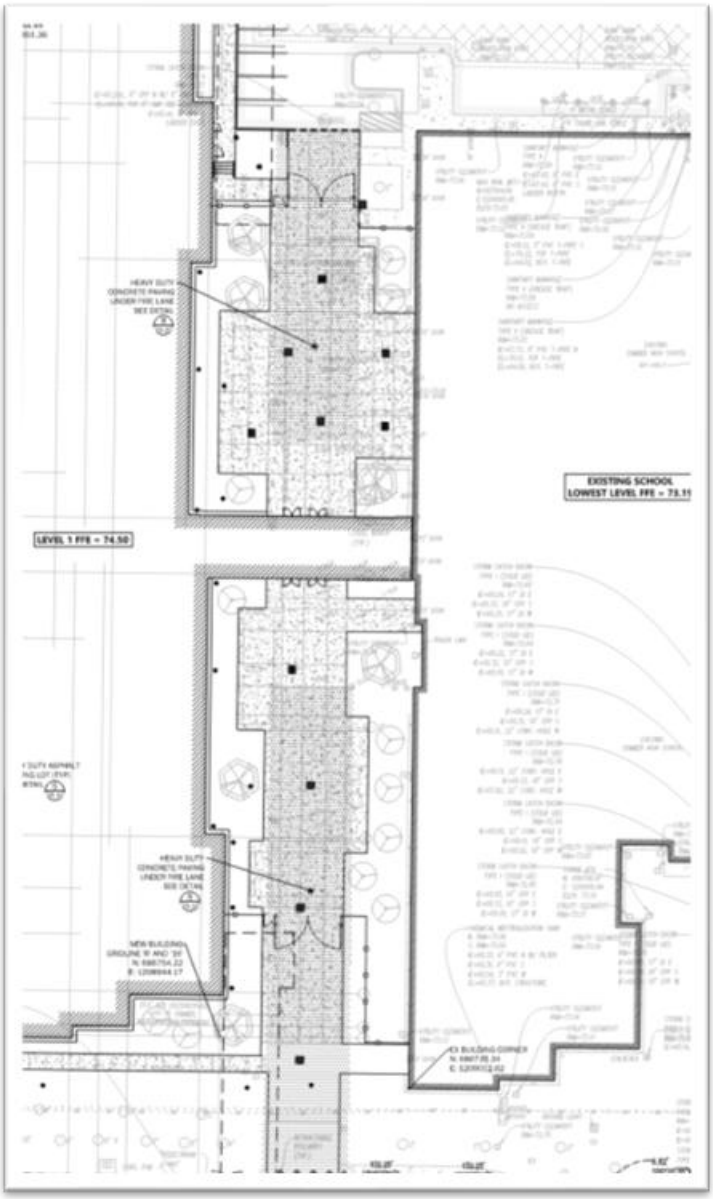
Maintained compared to baseline. The concrete panel drain rock system will provide a more evenly graded courtyard. Drainage will be simplified and reduce stormwater detention. The surface transitions between concrete panels and drain rock will still be manageable for ADA accessibility.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

Stakeholders were not in favor of using concrete pavers for the courtyard. However, they were interested in the idea of concrete panels with drain rock.

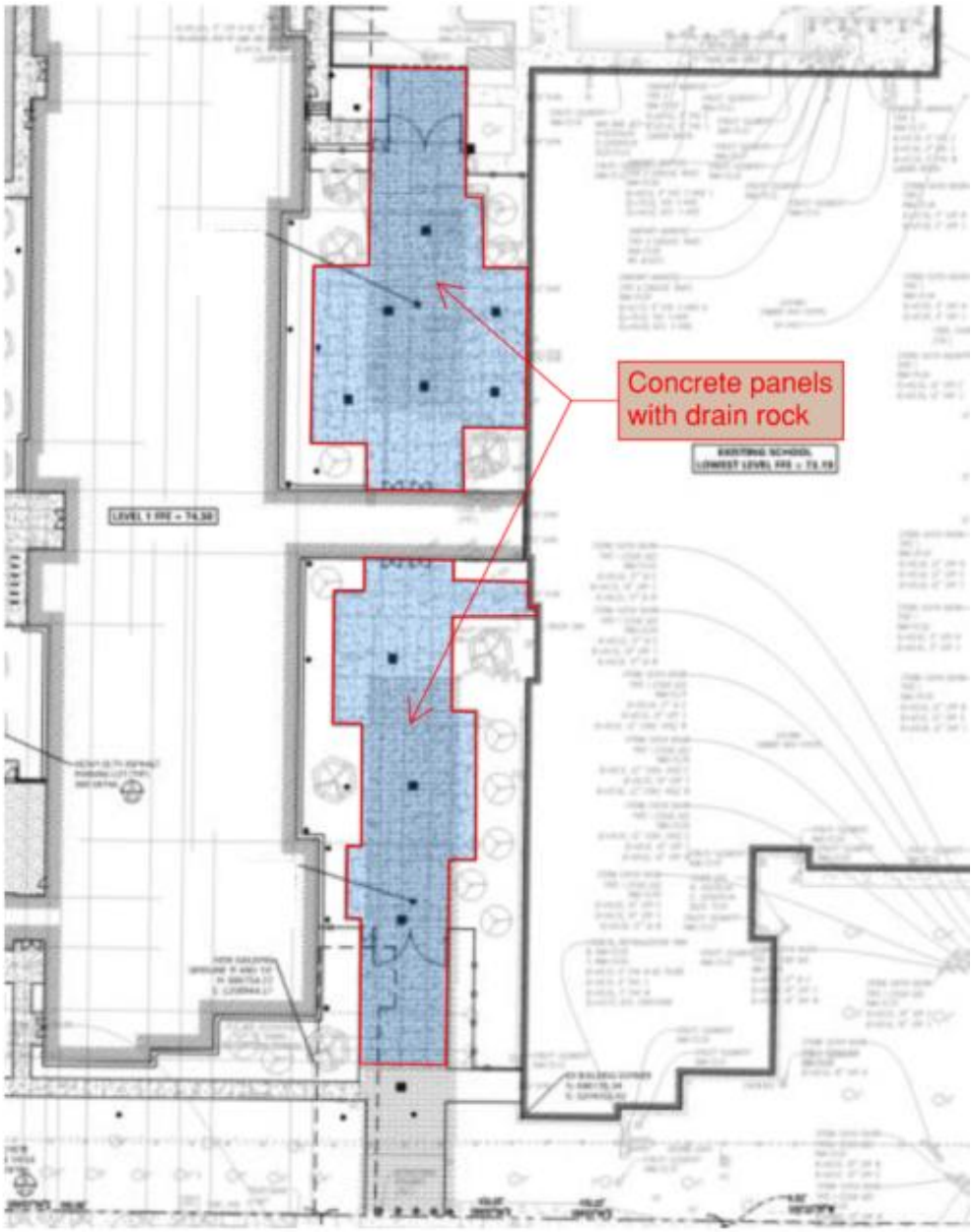
SKETCHES/DIAGRAMS:

BASELINE CONCEPT



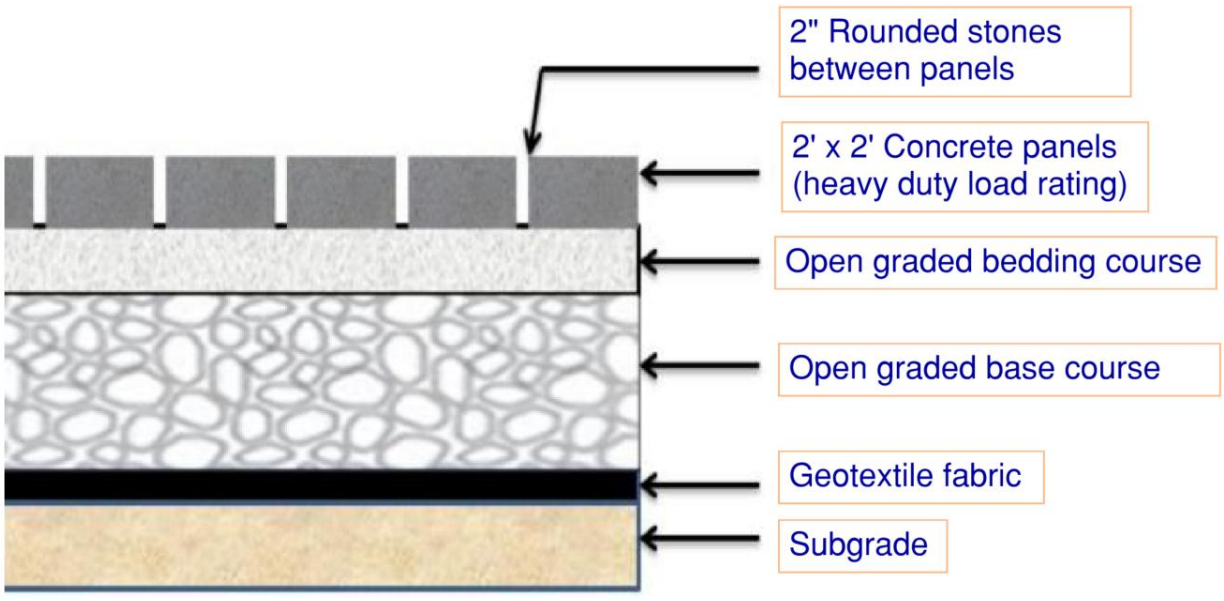
Existing north and south courtyards with concrete pavement

VALUE PROPOSAL CONCEPT



North and South courtyards highlighted for permeable concrete pavers with drain rock

Example of concrete panels with drain rock



Section view concept

ASSUMPTIONS AND CALCULATIONS:

This concept assumes that the courtyard is graded to allow for overland flow in the event of a heavy storm with high ground water.

COST ESTIMATE FORM

L1

COMPONENT: Courtyard Pavement

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Pedestrian concrete paving	10,860	SF	12	130,320	Precast concrete panels w/ drain rock	12,860	SF	15	192,900
Predestrian accent paving	2,000	SF	15.00	30,000					
Catch Basin	10	EA	2500.00	25,000					
8" Storm Drain	344	LF	118	40,592					
Subtotal				225,912	Subtotal				192,900
General Contractor Markup	40.16	%		90,726	General Contractor Markup	40.16	%		77,469
Total to nearest $1000				317,000	Total to nearest $1000				270,000
					Difference				47,000

MENG Analysis

Proposal L1

	PROPOSAL	S1
COMPONENT: Slab on Grade	**AUTHOR**	DH

BASELINE CONCEPT:

The ground floor slab is 12-inch, mild reinforced, two-way concrete structural slab spanning between large (3' to 4' wide and deep) concrete grade beams supported on auger cast piles.

VALUE PROPOSAL SYNOPSIS:

Replace the mild slab with a two way post tensioned (PT) flat slab with column drops spanning between piles. Replace the tie action provided by the grade beams in the current design with reinforcement embedded in the PT slab and drop caps.

SCHEDULE SAVINGS: Improved

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Maintained	Improved	Improved

FUNCTIONS:

Support Loads	Stabilize Structure	Control Moisture

ADVANTAGES:

- Improves Schedule
- Reduced Excavation
- Reduced interference with utilities
- Improved subgrade drainage
- Reduced structural depth

DISADVANTAGES:

- More Complex Implementation
- Reduced flexibility for changes
- Fewer subcontractors qualified for work

DISCUSSION AND JUSTIFICATION

The baseline concept uses a mild reinforced flat slab that spans between a network of deep, wide grade beams connecting the columns. The mild reinforced slab was identified to be 12 inches thick during the presentation, however later conversations with the design team indicate that the flat slab may actually have to be between 14 and 16 inches to meet deflection requirements. This seems appropriate for a mild reinforced slab spanning over 40 feet in some locations. The grade beams also seem to be very large, although dimensions have not been presented at this time. We understand the size has been dictated by development lengths required to develop uplift forces from the brace frames and code required tie forces between the piles. Although this solution seems more than adequate for the design requirements, it requires large amounts of excavation, reinforcement, and concrete, all of which will impact schedule and construction costs. The continuous network of deep grade beams also will cause problems with underground utilities which will have to cross the pile lines at varying elevations.

The value proposal concept uses a post tensioned (PT) slab in lieu of a mild reinforced slab. PT slabs can span longer distances than similar depth mild slabs due to the catenary effects of the draped tensioned cables and reduction of tension in the slab and are typically not as thick. This will help reduce excavation and concrete costs. It should be noted that using a PT in conjunction with the current grade beam design could be done and would also reduce costs and schedule. It should be feasible to place the PT on a shaped subgrade without interior formwork.

Using a PT slab with square drop caps at the columns, or continuous “wide-shallow” beams on the column line may make it possible to reduce the depth of the concrete at the column lines or even eliminate the thickened concrete away from the columns. The PT slab can be designed as a two-way slab with thickened drop cap sections sized to carry the shear forces at the piles. A continuous wide-shallow beam could also be used to provide additional slab stiffness and strength and ease possible congestion of reinforcement and post tensions along column lines. The wide shallow beams could also be used under the braced frames for uplift anchorage and to distribute lateral forces to adjacent piles. Compression and tension tie forces between columns can be carried by reinforced column sections in the PT slab or wide shallow beams.

An additional benefit of reducing the depth of the grade beams would be simplifying the installation of below grade utilities in the building.

SCHEDULE SAVINGS:

Reduced excavation and forming of grade beams will reduce the schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Similar general reliability

Maintenance & Operations:

Reduced cracking and deflection

Functionality:

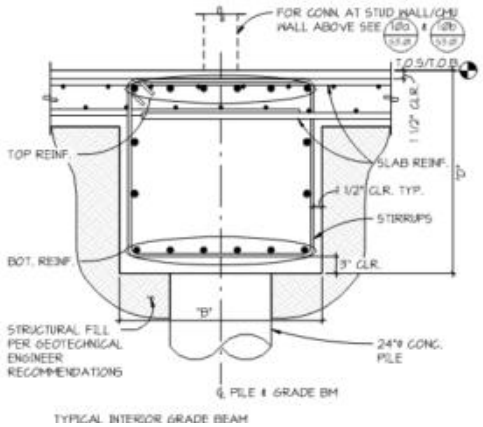
Reduced cracking and deflections may improve functionality.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

The design team indicated they liked the reduced depth of grade beams due to requirements for sleeving for underground utilities.

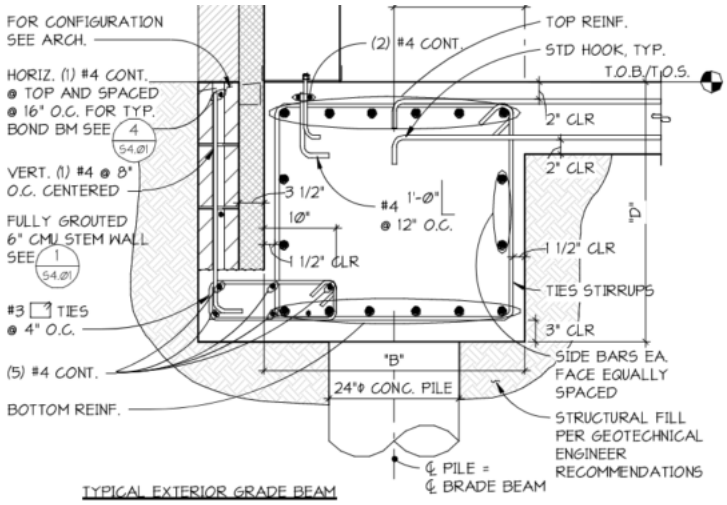
SKETCHES/DIAGRAMS:

BASELINE CONCEPT

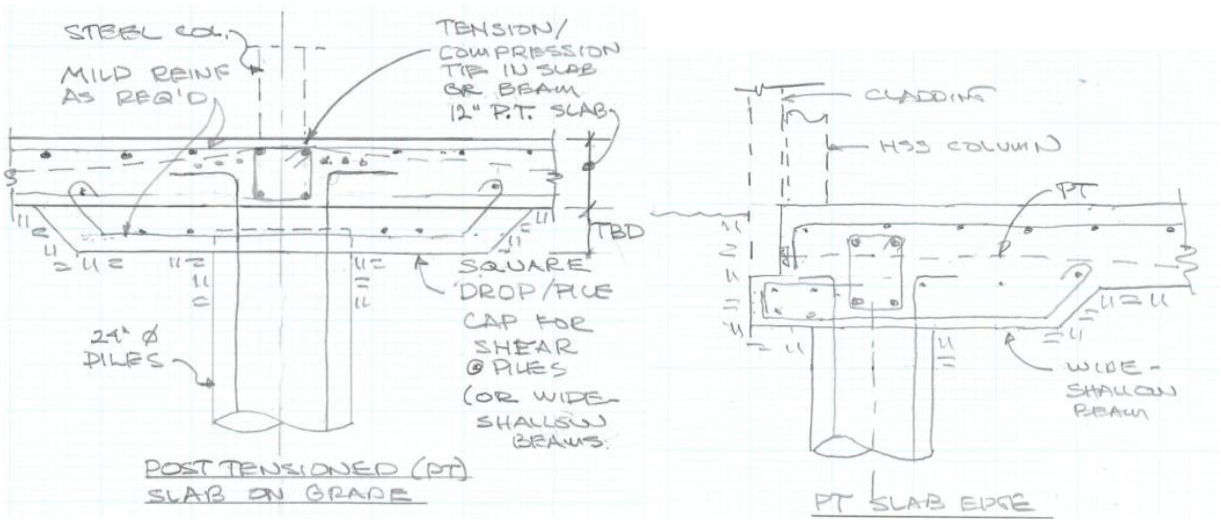


TYPICAL INTERIOR GRADE BEAM

BASELINE CONCEPT



VALUE PROPOSAL CONCEPT



ASSUMPTIONS AND CALCULATIONS:

The Value Proposal concept presented is based on our experience with similar post tensioned and mild slabs used in pile other pile supported buildings. The actual configuration, feasibility, and design of a PT slab option will have to be verified by the design team based on a more detailed analysis than possible within our review time frame.

COST ESTIMATE FORM

S1

COMPONENT: Slab-On-Grade

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
14" structural slab on grade	33,966	sf	31.1	1,056,343	12" post tensioned slab on grade	33,966	SF	60	2,037,960
w/ 2 mats of #6 bar @ 12" o.c.					w/ thickened edges and pile caps				
CIP concrete grade beam system	33,966	sf	43.09	1,463,715					
Subtotal				2,520,058	Subtotal				2,037,960
General Contractor Markup	40.16	%		1,012,055	General Contractor Markup	40.16	%		818,445
Total to nearest $1000				3,532,000	Total to nearest $1000				2,856,000
					Difference				676,000

MENG Analysis

Proposal **S1**

	PROPOSAL	S2
COMPONENT: Floor Structure	**AUTHOR**	DH

BASELINE CONCEPT:

Elevated floors are 3½ inches of normal weight concrete on 2-inch metal deck supported on wide flange steel beams and girders designed for composite action by using headed shear studs.

VALUE PROPOSAL SYNOPSIS:

To avoid excess cracking in the elevated floor slabs, include measures such as concrete shrinkage control, more control joints, and thickening concrete fill to allow for use of deformed bar reinforcement for crack control.

SCHEDULE SAVINGS: Limited - increased construction time depending on methods used.

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Improved	Improved	Improved

FUNCTIONS:

Support Loads	Improved Aesthetics	Ease Circulation

ADVANTAGES:

- Improves quality
- Reduced cracking
- Improved Maintenance
- Life Cycle Cost Savings
- Improved Aesthetics

DISADVANTAGES:

- Research and Re-design
- Increased construction costs
- Increased inspection requirements
- Potential Schedule Impacts
- More Embodied Carbon

DISCUSSION AND JUSTIFICATION

We understand that excess cracking in the elevated floor slabs was experienced in Phase 1. Some cracking of concrete floors is a normal occurrence, mainly due to shrinkage of concrete as it cures, but the cracking is typically not a problem when floor coverings such as vinyl or carpet are used. However, when exposed concrete is used, especially polished concrete floors, cracking is much more noticeable and may affect the aesthetics of the floor if excessive. The installation of control joints in non-structural concrete such as non-reinforced slab on grade can make cracking acceptable by limiting it to straight lines in an acceptable pattern.

For elevated concrete slabs on metal deck, crack control is more complicated. The decks are corrugated, and the thickness of the concrete topping is not constant over flutes. The topping typically has welded wire fabric embedded for fire ratings which provides limited crack control versus deformed steel structural reinforcing used in structural concrete. The installation of control joints in concrete on metal deck slabs is complicated by the typical use of composite construction where concrete is attached to the steel beams with headed steel studs and the concrete fill provides compression strength to the “composite” beam section. Because of this the installation of control joints the concrete fill is limited to areas where it will not affect the composite action. Cracking can also be caused by deflections of the supporting steel beams, especially at the connection of steel beams to girders, where rotation of the beam at the connections can cause cracking over the girder lines where the concrete fill is put in tension and installation of crack control joints may impact the integrity of the composite section. These factors result in a complicated design challenge where concrete will be exposed and uncontrolled cracking is not acceptable.

We would recommend additional research and consulting with metal deck suppliers to identify measures that may limit cracking for this phase, especially where exposed concrete is specified. Additional resources may be concrete subcontractors who may have successful experience with controlling cracking in similar projects, or industry groups like the Steel Deck Institute. Consider measures like increased concrete mix shrinkage control, more control joints where feasible, or thickening the concrete fill to allow for use of deformed bar reinforcement for more effective crack control. Alternatively, deformed bars can be added to weld wire reinforcement at critical locations such as over girders and at corners or openings.

Alternatively, eliminating the use of polished or exposed concrete in level 2 and 3 slabs in this phase would reduce the likelihood of the cracking being a problem. The cost impacts of this are shown in Item R57.

SCHEDULE SAVINGS:

Additional measures to reduce elevated slab cracking may negatively impact schedule due to additional time for items such as additional placement time for deformed reinforcement. However, the increase in time should be incremental.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Less chance of uncontrolled cracking

Maintenance & Operations:

Additional control joists may degrade maintenance due to recaulking or filling of joints, however uncontrolled cracking may be more difficult to mitigate if it occurs

Functionality:

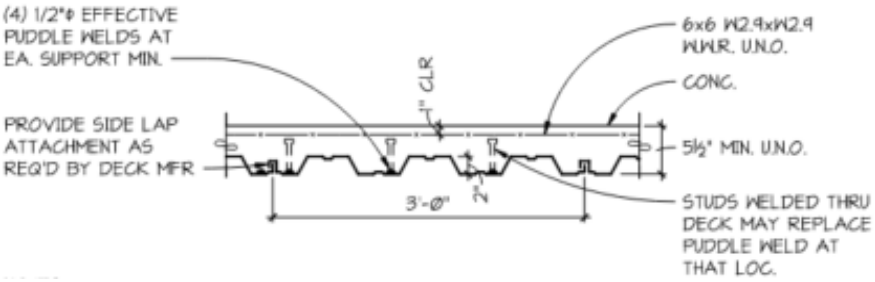
Less chance of uncontrolled cracking affecting aesthetics.

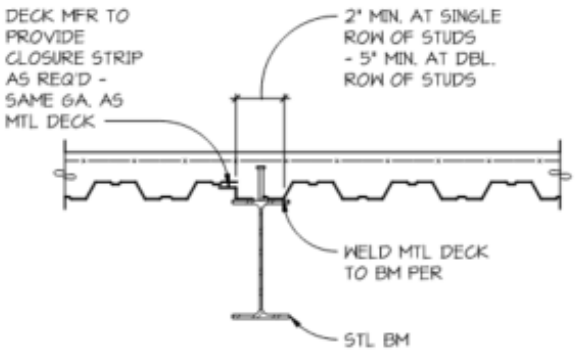
REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

The elimination of polished concrete floors was not accepted as a potential change by stakeholders; however the potential cost impact is presented in R57 for informational purposes.

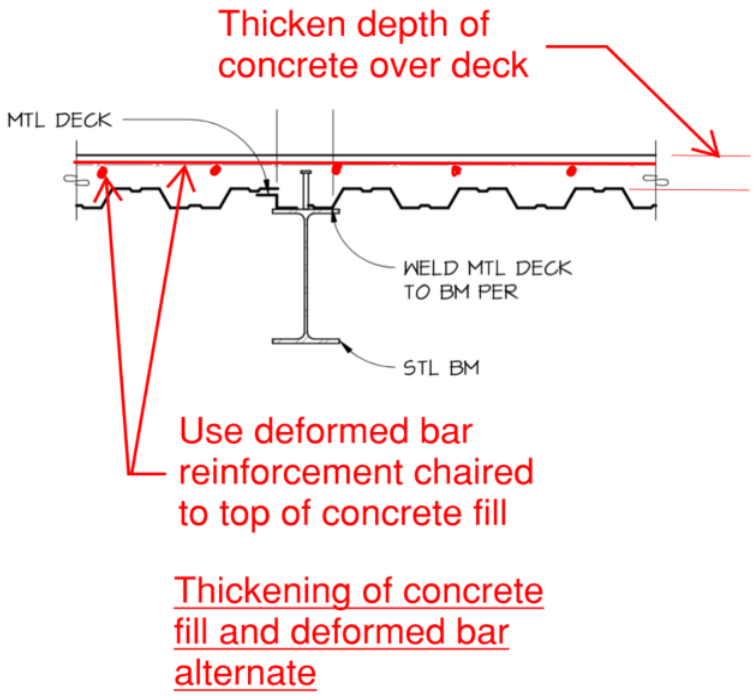
SKETCHES/DIAGRAMS:

BASELINE CONCEPT





VALUE PROPOSAL CONCEPT



ASSUMPTIONS AND CALCULATIONS:

The issues of cracking exposed concrete slabs on metal deck were discussed with Herb Ahten (hahten@vercodeck.com),the local representative and engineer for Verco, a leading national deck manufacturer and supplier. Herb concurred with our initial ideas on crack control and exposed slabs and had additional suggestions that are included in the above alternatives. Herb indicated he would be happy to provide input to the design team if asked. Actual alternatives used to control cracking to be determined by the Design Team.

COST ESTIMATE FORM

S2

COMPONENT: Floor Structure

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Topping slab - 3.5" over 2" deck w/	69,539	SF	8.87	616,811	Topping slab - 4.5" over 2" deck w/	69,539	SF	11.5	799,699
WWF					rebar reinforcing & addt'l conotrl joints				
Subtotal				616,811	Subtotal				799,699
General Contractor Markup	40.16	%		247,711	General Contractor Markup	40.16	%		321,159
Total to nearest $1000				865,000	Total to nearest $1000				1,121,000
					Difference				-256,000

MENG Analysis

Proposal **S2**

	PROPOSAL	A1
COMPONENT: Walkway Glazing	**AUTHOR**	BC

BASELINE CONCEPT:

The design includes a 3-story tall curtain wall cladding system on each side of the connector corridors spanning from the Phase 1 building to the Phase 2 building.

VALUE PROPOSAL SYNOPSIS:

Replace the proposed curtainwall system with ribbon windows and typical cladding.

SCHEDULE SAVINGS: Maintained

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Maintained	Improved	Maintained

FUNCTIONS:

Transmit Light	Define Aesthetics	Insulate Space

ADVANTAGES:

- Improved Maintenance
- Improved Energy Efficiency
- Decreased Construction Costs

DISADVANTAGES:

- Re-design required
- Changes Aesthetic
- Reduces Transparency

DISCUSSION AND JUSTIFICATION

The current design proposal includes a large expanse of curtain-wall glazing on the 3-story walkway between the Phase 1 building and the Phase 2 building. This provides a very open and transparent look to both sides of the walkway. This alternate design proposal includes an uninterrupted expanse of ribbon glazing to maintain as much openness as possible while simplifying the construction considerably and reducing cost.

SCHEDULE SAVINGS:

Maintained. No impact anticipated to the schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Maintained.

Maintenance & Operations:

Improved. A smaller percentage of glazing will reduce the solar gain within the walkway spaces which will reduce the amount of cooling required. In addition, the reduced area of glazing should be easier to maintain and keep clean.

Functionality:

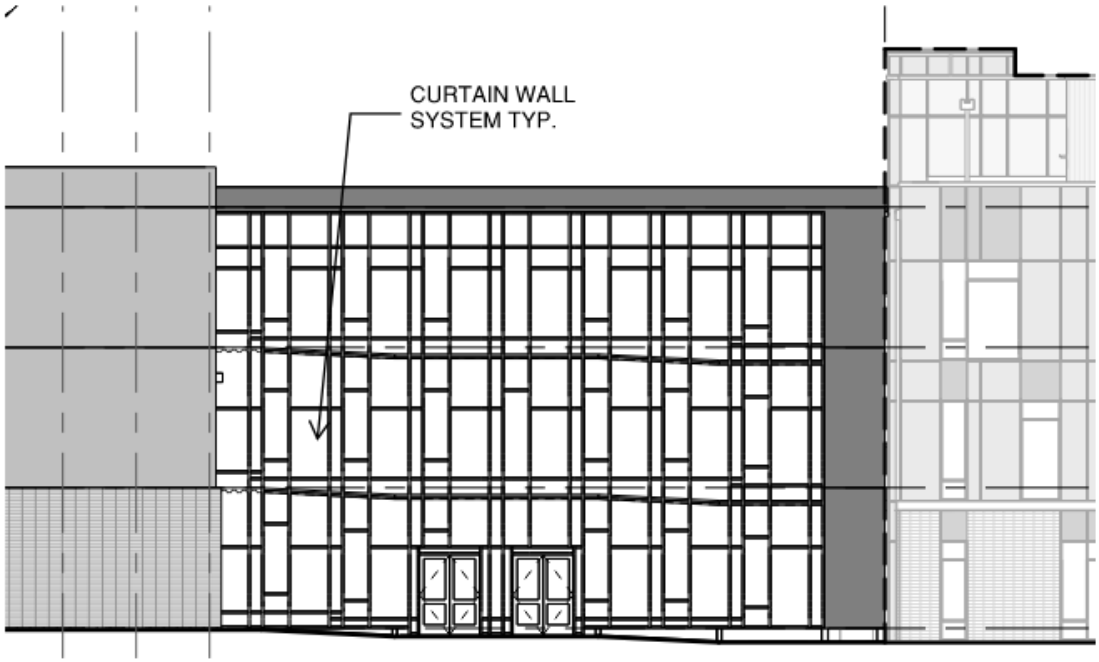
Maintained.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

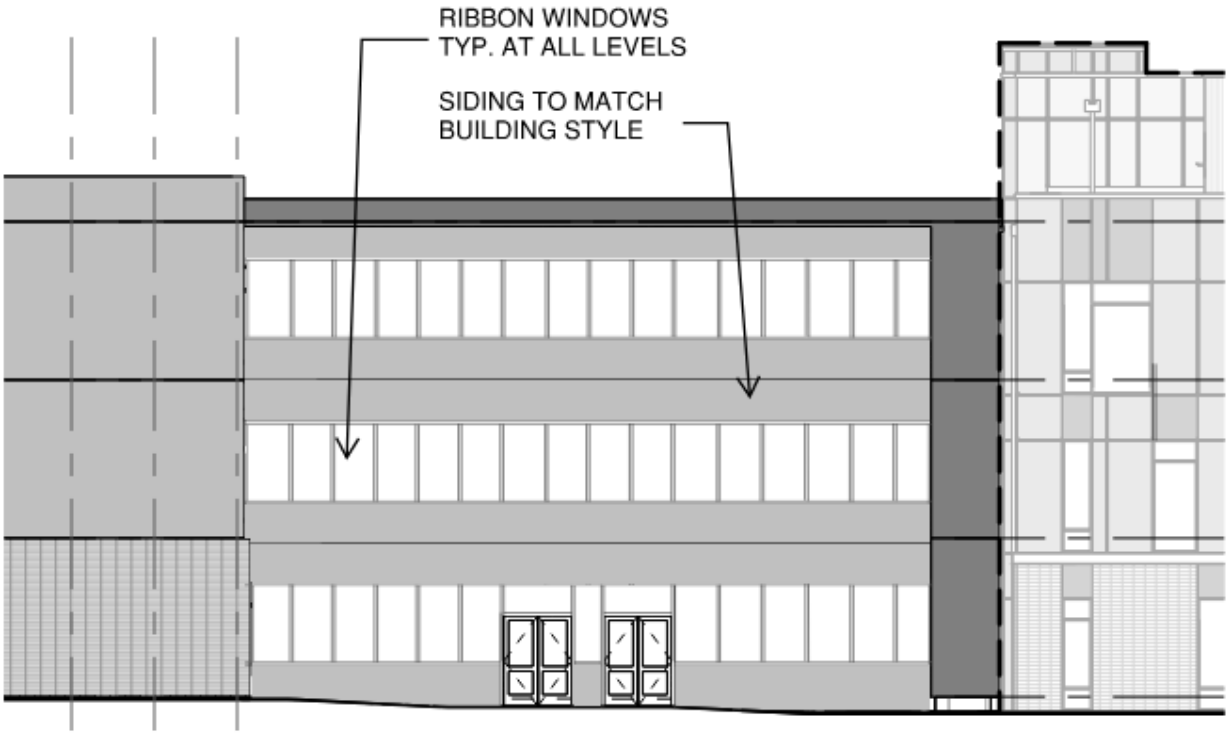
A primary concern was brought up during the review relative to transparency. A major driver of the curtain-wall system in the original design proposal is to provide as much openness and transparency as possible. This alternate proposal includes less glazing however it attempts to maintain as much openness and transparency as possible by keeping an uninterrupted linear expanse of glass.

SKETCHES/DIAGRAMS:

BASELINE CONCEPT



VALUE PROPOSAL CONCEPT



COST ESTIMATE FORM

A1

COMPONENT: Walkway Glazing

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Curtain wall glazing system	5,342	SF	150	801,300	Sintered surface wall panels	4,069	SF	59.53	242,230
					Ext. wall framing system	4,069	SF	46.99	191,200
					Sheet metal flashings at ext. walls	4,069	SF	5.5	22,380
					Storefront glazing system	1,273	SF	96.9	123,350
Subtotal				801,300	Subtotal				579,160
General Contractor Markup	40.16	%		321,802	General Contractor Markup	40.16	%		232,591
Total to nearest $1000				1,123,000	Total to nearest $1000				812,000
					Difference				311,000

MENG Analysis

Proposal **A1**

	PROPOSAL	A2
COMPONENT: Walkway Structure	**AUTHOR**	BC

BASELINE CONCEPT:

The current design includes a walkway connection from the Phase 1 building to the Phase 1 building. The connection includes 3 enclosed stories.

VALUE PROPOSAL SYNOPSIS:

This proposal utilizes an enclosed walkway on the second floor only supported from posts to the ground. The walkway will allow for covered and unenclosed access on the 1st floor level, fully enclosed access on the 2nd floor, and open and uncovered access on the 3rd floor.

SCHEDULE SAVINGS: Maintained

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Maintained	Improved	Maintained

FUNCTIONS:

Access Building	Define Aesthetics	Transmit Light

ADVANTAGES:

- Reduced Labor & Materials
- Improved Maintenance
- Reduced Cost
- Allows more daylight into the north courtyard.

DISADVANTAGES:

- Re-design required
- Changes Aesthetic
- 1st level open to air
- 3rd level open to air and rain

DISCUSSION AND JUSTIFICATION

The current design includes a 3-story walkway linking the Phase 1 building to the Phase 2 building. It is fully enclosed from the weather on all three levels. This proposal includes a fully enclosed corridor at the 2nd level only. On the 1st floor level access will be below the 2nd floor walkway and will be protected from rain. The 3rd level access will be via the roof of the 2nd floor corridor. Railings and an 8' high ornamental mesh screen will be included for safety.

SCHEDULE SAVINGS:

Maintained. This concept will not cause any extension to the current schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Maintained. No negative impacts to the reliability of the system.

Maintenance & Operations:

Improved. Some added cleaning may be required for the rooftop level. Significantly less time will need to be spent cleaning the 3-story curtain wall system in the original design.

Functionality:

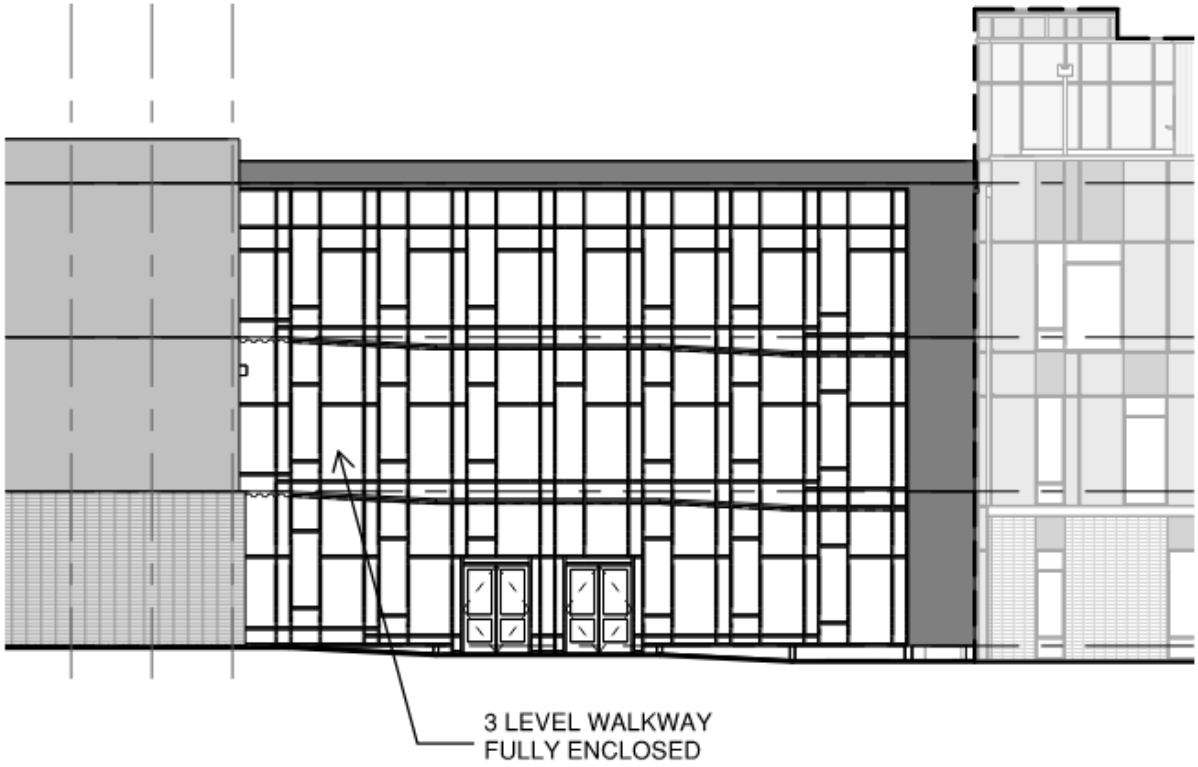
Maintained. The ability to access both buildings from utilizing the shortest distance will still be possible.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

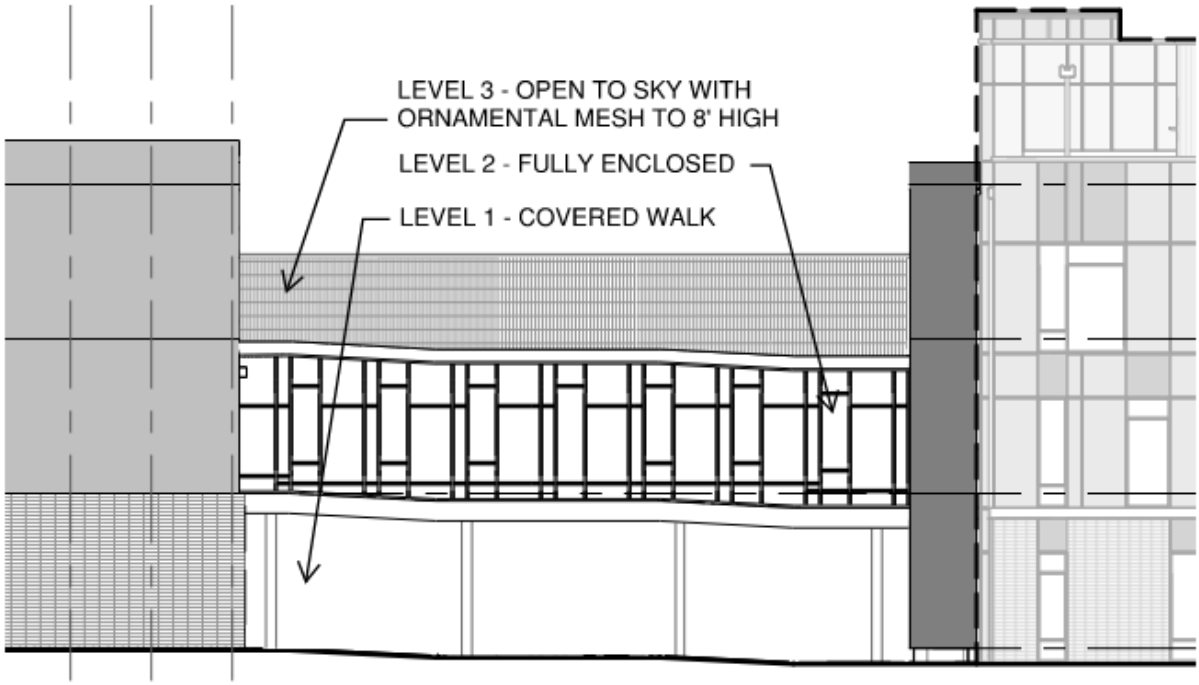
There was some discussion relative to the potential for student safety and possibility of hanging unapproved banners etc. over the edge of the 3rd floor open walkway. An 8' tall metal mesh screen is proposed to mitigate this issue. The possibility for pre-approved banners to be temporarily installed could add some value to this configuration.

SKETCHES/DIAGRAMS:

BASELINE CONCEPT



VALUE PROPOSAL CONCEPT



ASSUMPTIONS AND CALCULATIONS:

It is assumed that durable pavers will cover the roof membrane to ensure longevity of the roof system.

COST ESTIMATE FORM

A2

COMPONENT: Walkway Structure

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Roof Structure	1,700	SF	50.67	86,140	Roof Structure				
Floor Structure	3,400	SF	66.75	226,950	Floor Structure	3,400	SF	66.75	226,950
Curtain wall glazing system	5,342	SF	150	801,300	Curtain wall glazing system	2,330	SF	150	349,500
Aluminum glazed door, double	4	EA	10911.25	43,650	Ornamental mesh system	1,032	sf	60	61,920
Modified bit. roof covering + flashings	1,700	SF	29	49,300	Roofing w/ pedestal pavers	1,700	SF	50	85,000
Finishes + misc.	5,100	SF	25	127,500	Finishes + misc.	1,700	SF	25	42,500
HVAC & Electrical Systems	5,100	SF	75	382,500	HVAC & Electrical Systems	1,700	SF	75	127,500
Fire Sprinklers	5,100	SF	6	30,600	Fire Sprinklers	1,700	SF	6	10,200
Area separation fire doors assembly	2	ea.	30000	60,000	Aluminum glazed door, double	2	EA	10911.25	21,820
Subtotal				1,807,940	Subtotal				925,390
General Contractor Markup	40.16	%		726,069	General Contractor Markup	40.16	%		371,637
Total to nearest $1000				2,534,000	Total to nearest $1000				1,297,000
					Difference				1,237,000

MENG Analysis

Proposal **A2**

	PROPOSAL	A3
COMPONENT: Covered Play	**AUTHOR**	BC

BASELINE CONCEPT:

This project includes an open play area on the west side of the building serving the day care area.

VALUE PROPOSAL SYNOPSIS:

This proposal includes adding a partially covered roof structure to the play area so the children can avoid inclement weather.

SCHEDULE SAVINGS: Maintained

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Improved	Improved	Improved

FUNCTIONS:

Support Play	Endure Time	Shed Moisture

ADVANTAGES:

- Better experience for the children.
- More opportunities for play outdoors
- Kids do not get wet while playing
- Enhanced Safety

DISADVANTAGES:

- Some Redesign required
- Increased Material / Labor Costs
- Changes Aesthetic

DISCUSSION AND JUSTIFICATION

The current design for the children's outdoor play area includes an open uncovered space that is equal to 37' x 25'. It is surrounded by an 8' high ornamental fence. During inclement weather the children will need to remain indoors or risk getting rained on. This proposal includes adding a lightweight metal roof structure to cover approximately 50% of the space equaling 470 sf. Skylights are included to allow more daylight into the space.

SCHEDULE SAVINGS:

No change to the overall schedule. The structure can be fabricated and installed within the current construction schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Improved. The addition of the roof covering will protect the playground equipment and play surfaces.

Maintenance & Operations:

Improved. The play area will require less cleaning after stormy weather.

Functionality:

Improved. Children will have the opportunity to spend more time in the exterior allowing more access to air and light.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

They expressed interest and felt it would be a good addition to the project.

SKETCHES/DIAGRAMS:

BASELINE CONCEPT

VALUE PROPOSAL CONCEPT

ASSUMPTIONS AND CALCULATIONS:

The total area of the roof will be 470 sf assuming 50% coverage of the play area. It will be supported by steel columns incorporated into the existing ornamental design. Additional coverage can be made dependent upon the owner's preference.

COST ESTIMATE FORM

A3

COMPONENT: Covered Play

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
No canopy	0			0	Covered play canopy	470	sf	150	70,500
Subtotal				0	Subtotal				70,500
General Contractor Markup	40.16	%			General Contractor Markup	40.16	%		28,313
Total to nearest $1000				0	Total to nearest $1000				99,000
					Difference				-99,000

MENG Analysis

Proposal **A3**

	PROPOSAL	M1
COMPONENT: Integrated Design	**AUTHOR**	DCS

BASELINE CONCEPT:

Thermal envelope – 7% better than code minimum and full-sized HVAC system. The improvement is due entirely to the wall assembly.

VALUE PROPOSAL SYNOPSIS:

Premium thermal envelope – nominally 25% better than code minimum, with down-sized HVAC system. Improvements are made to all components except the walls.

SCHEDULE SAVINGS: Maintained

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Improved	Improved	Improved

FUNCTIONS:

Insulate Space	Conserve Energy	Condition Space

ADVANTAGES:

- Reduced First Cost
- Life Cycle Cost Savings
- Improved Energy Efficiency
- Clean Buildings Ready
- Reduced Noise Transmission

DISADVANTAGES:

- Requires Integrated Design
- Requires update to Architectural Details

DISCUSSION AND JUSTIFICATION:

The WSSP Checklist calls for energy savings beyond code minimum (7%), achieved with slightly better than code minimum thermal envelope, and moderately better than code minimum HVAC and lighting systems.

This proposal suggests a more balanced approach with thermal envelope improvements (25%) commensurate with the mechanical and electrical systems.

SCHEDULE SAVINGS:

No change in schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Improved due to simplicity of building insulation and glazing compared to mechanical and electrical systems.

Maintenance & Operations:

Maintenance & Operations are improved as above due to no maintenance for building insulation and less or smaller mechanical and electrical equipment.

Functionality:

Functionality is improved as more insulation reduces heating and cooling loads and increases occupant thermal comfort; additional insulation further reduces street noise inside the building.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

While the walls are currently exceeding code, some interest was expressed in further improving efficiency.

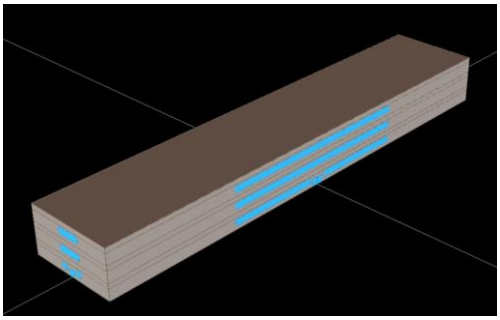
SKETCHES/DIAGRAMS:

BASELINE AND PROPOSED CONCEPT

Item	Code Minimum	Current Design	Proposed Design
Foundation	R-10 for 2 ft	R-10 for 2 ft	R-15 for 2 ft
Walls	R-13 batt plus R-10 ci	R-25 batt with R-15 ci	R-25 batt with R-15 ci
Windows	U-0.34 SHGC-0.38 Percent = 30% max	U-0.34 SHGC-0.38 Percent = 23.3%	U-0.25 SHGC-0.35 Percent = 18%
Doors, Glazed	U-0.60	U-0.60	U-0.34
Roof	R-38 ci	R-38 ci	R-49 ci
HVAC	As calculated	Full-size	Downsized (10%)

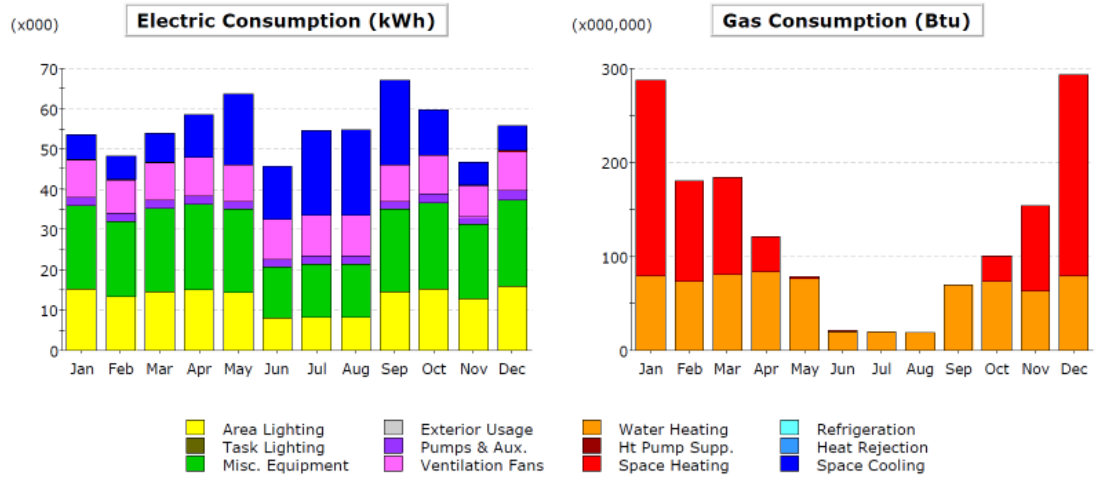
ASSUMPTIONS AND CALCULATIONS:

The following shoe-box energy model was prepared as the basis for energy life cycle costed proposals in this Study.



Geometry

Monthly Energy Use:



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	6.01	5.66	7.13	10.43	17.40	13.13	20.94	21.13	20.85	11.10	5.61	6.27	145.64
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.25	0.16	0.15	0.07	0.00	0.00	-	-	-	0.05	0.13	0.25	1.07
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	9.17	8.30	9.17	9.61	9.17	9.83	10.15	10.15	9.17	9.61	7.86	9.61	111.80
Pumps & Aux.	2.22	1.98	2.16	2.20	2.07	1.99	2.12	2.09	2.07	2.15	1.86	2.32	25.23
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	20.63	18.65	20.63	21.14	20.63	12.67	13.09	13.09	20.44	21.33	18.33	21.33	221.95
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	15.24	13.36	14.55	14.97	14.29	7.99	8.26	8.26	14.47	15.37	12.90	16.01	155.68
Total	53.51	48.11	53.79	58.41	63.55	45.61	54.56	54.74	67.00	59.60	46.69	55.79	661.36

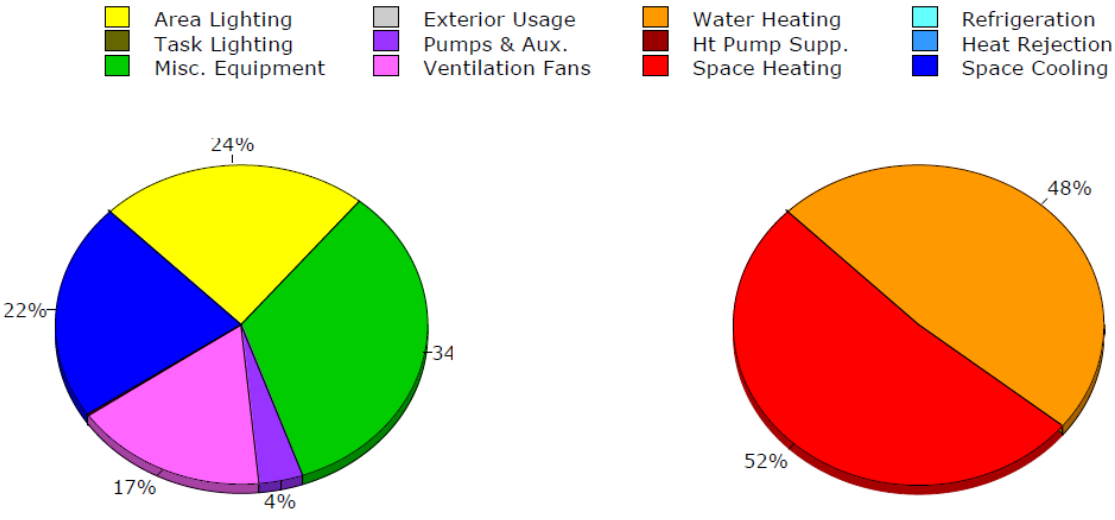
Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	207.8	107.4	103.2	36.8	1.2	1.4	-	-	-	26.3	91.0	212.7	787.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	79.2	73.1	80.9	83.8	76.9	20.0	19.9	19.4	69.2	74.0	62.9	80.0	739.2
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	287.0	180.5	184.1	120.7	78.2	21.3	19.9	19.4	69.2	100.2	153.9	292.7	1,527.1

Annual Energy Use:

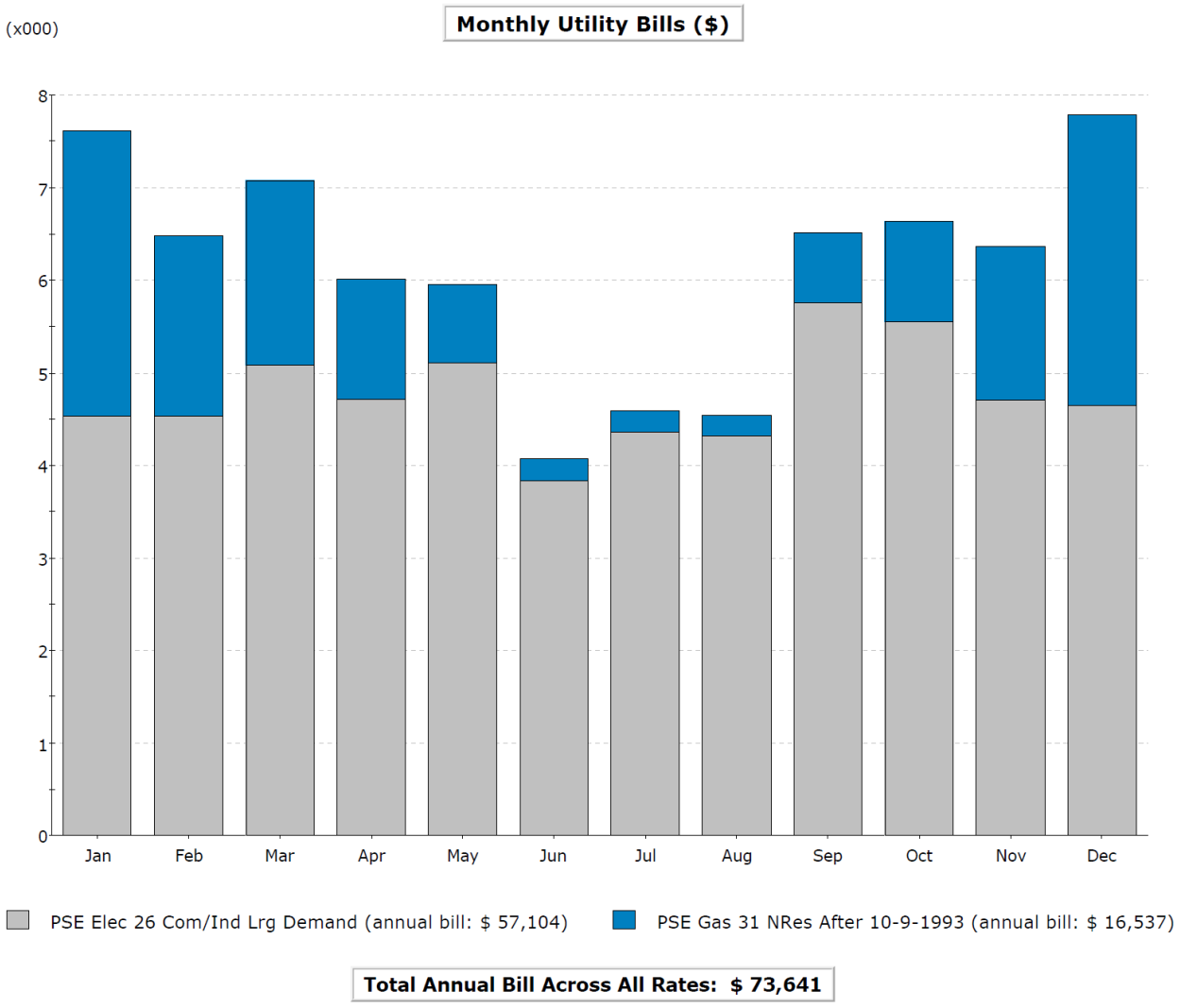
Annual Energy Consumption by Enduse

	Electricity kWh (x000)	Natural Gas MBtu	Steam Btu	Chilled Water Btu
Space Cool	145.64	-	-	-
Heat Reject.	-	-	-	-
Refrigeration	-	-	-	-
Space Heat	1.07	787.9	-	-
HP Supp.	-	-	-	-
Hot Water	-	739.2	-	-
Vent. Fans	111.80	-	-	-
Pumps & Aux.	25.23	-	-	-
Ext. Usage	-	-	-	-
Misc. Equip.	221.95	-	-	-
Task Lights	-	-	-	-
Area Lights	155.68	-	-	-
Total	661.36	1,527.1	-	-



Electricity **Natural Gas**

Annual Energy Cost:



COST ESTIMATE FORM

M1

COMPONENT: Integrated Design

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Foundation R-10 for 2 ft	3060	sf	5.27	16,130	Foundation R-15 for 2 ft	3060	sf	6.59	20,160
Walls R-25 batt with R-15 ci	46176	sf	107.49	4,963,460	Walls R-25 batt with R-15 ci	49176	sf	107.49	5,285,930
Windows U-0.34, SHGC-0.38, 23.3%	14094	sf	120	1,691,280	Windows U-0.25, SHGC-0.35, 18%	11094	sf	126	1,397,840
Doors, glazed U-0.60	11	ea	9000	99,000	Doors, glazed U-0.34	11	ea	9900	108,900
Roof R-38 ci	33996	sf	26	883,900	Roof R-49 ci	33996	sf	30	1,016,480
HVAC full-size	94752	sf	80.76	7,652,170	HVAC down-sized (by 5%)	94752	sf	76.72	7,269,560
Subtotal				15,305,940	Subtotal				15,098,870
General Contractor Markup	40.16	%		6,146,866	General Contractor Markup	40.16	%		6,063,706
Total to nearest $1000				21,453,000	Total to nearest $1000				21,163,000
					Difference				290,000

MENG Analysis

Proposal **M1**

COMPONENT LIFE CYCLE COST ANALYSIS (LCCA)

Client: Sumner-Bonney Lake School District — **M1**

Project: Sumner High School Addition - Phase 2 — proposal #

Date: 29-Aug-25

By: DCS

COMPONENT Integrated Design

COMPONENT # M1

Escalation rate 0.03

Discount rate 0.04

Study Period 50 Yrs.

Notes: Per shoebox energy model current design annual energy cost is $74K/yr, with $33K/yr (44%) for HVAC; assume half for envelope load or $16K/yr. The proposed thermal envelope improvement is 16%, hence saving $2.6K/yr. Assume 1% annual maintenance cost, 10% rehabilitation cost at year 25, and 10% salvage value at the end of project life.

Instructions: Enter escalation, discount, and study period above.
Enter annual costs, replacement costs (and appropriate replacement year), and salvage value.
Enter these costs in the shaded cells using today's (current) dollars. For annual costs, escalation rates will be automatically entered, but can be individually overwritten below for differential escalation.
All costs will automatically be escalated and discounted.

ALTERNATIVE A :	Current			ALTERNATIVE B:	Proposed			DIFFERENCE
INITIAL COSTS			INITIAL COST				INITIAL COST	DIFFERENCE
			21,453,000				$ 21,163,000	$ 290,000
O & M ANNUAL COSTS								
STAFFING OPERATIONS								
STAFFING MAINTENANCE								
SUPPLIES OPERATIONS								
SUPPLIES MAINTENANCE								
Subcomponents	Cost in current $	Esc.	Pres. Worth $	Subcomponents	Cost in current $	Esc.	Pres. Worth $	
Annual maintenance cost	214,530	0.03	$ 8,660,204	Annual maintenance cost	211,630	0.03	$ 8,543,136	$ 117,068
Annual energy cost	74,000	0.03	$ 2,987,252	Annual energy cost	71,400	0.03	$ 2,882,294	$ 104,957
		0.03	$ -			0.03	$ -	$ -
SUBT. O & M OVER LIFE CYCL	$ 288,530		$ 11,647,456		283,030		$ 11,425,430	$ 222,025
MAJOR REHAB REPLACEMENT COSTS								
Subcomponents	Cost in current $	Yr.	Pres. Worth $	Subcomponents	Cost in current $	Yr.	Pres. Worth $	
			$ -				$ -	$ -
Maintenance rehab	2,145,300	25	$ 1,725,957	Maintenance rehab	2,116,300	25	$ 1,702,626	$ 23,331
			$ -				$ -	$ -
			$ -				$ -	$ -
			$ -				$ -	$ -
			$ -				$ -	$ -
			$ -				$ -	$ -
SUBT. REPLACEMENT			$ 1,726,000				$ 1,703,000	$ 23,000
TOT. O & M & REPL. (Pres. Worth)			13,373,000				13,128,000	245,000
TOT. INITIAL, O&M, & REPL. (Pres. Worth)			34,826,000				34,291,000	535,000
	Cost in current $				Cost in current $			
SALVAGE VALUE	2,145,300	50	$ 1,389,000		2,116,300	50	$ 1,370,000	$ 19,000
TOT. INITIAL, O&M, REPL. MINUS SALVAGE			33,437,000				32,921,000	516,000

	PROPOSAL	M2
COMPONENT: Hydronic Distribution	**AUTHOR**	M2

BASELINE CONCEPT:

Six pipe hydronic system, with two two-way valves in the corridor ceiling space, and four-pipe run-outs to active beams, and separate heating and cooling coils in each active beam.

VALUE PROPOSAL SYNOPSIS:

Six pipe hydronic system, with one six-way valve in the corridor ceiling space and two-pipe run-outs to active beams; and one combined heating & cooling coil in each active beam.

SCHEDULE SAVINGS: Maintained

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Maintained	Improved	Maintained

FUNCTIONS:

Distribute Fluids	Control Temperature	Ventilate Space

ADVANTAGES:

- Reduced First Cost
- Simplified Controls
- Less Occupied Ceiling Space

DISADVANTAGES:

- Requires the same hot water and chilled water chemistry.
- Single point of failure for both heating and cooling modes.

DISCUSSION AND JUSTIFICATION

The current design is a six-pipe system, with four-pipe hydronic piping to each active beam and two separate control valves for each temperature control zone; plus, separate heating and cooling coils.

The VE proposal retains the six-pipe system with traditional four-pipe hydronic piping to one six-way control valve for each temperature control zone, then two-pipe hydronic piping to each active beam within the zone.

The six-way valve system cuts hydronic run-out piping in half, reducing project cost and complexity, and simplifying maintenance.

Since heating and cooling water are circulated through the same two-pipe run-out piping and a common active beam coil, water chemistry must be the same for the heating hot and cooling chilled water fluids.

Reportedly the HVAC system at Phase 1 has had multiple control issues that remain unsolved to present time; the complexity of the four-pipe run-out piping with two coils in each active beam may be complicating operation; the proposed simpler six-way valve approach may improve performance of the Phase 2 active beam system.

SCHEDULE SAVINGS:

No impact on schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Reliability is maintained with the simplicity of the six-way valve system traded-off with the loss of separate heating and cooling run-out piping and separate heating and cooling coils.

Maintenance & Operations:

M&O is improved with the simpler control system, reduced ceiling space piping, and just one coil to clean in each of the 200 active beams, instead of two (200 coils total, instead of 400).

Functionality:

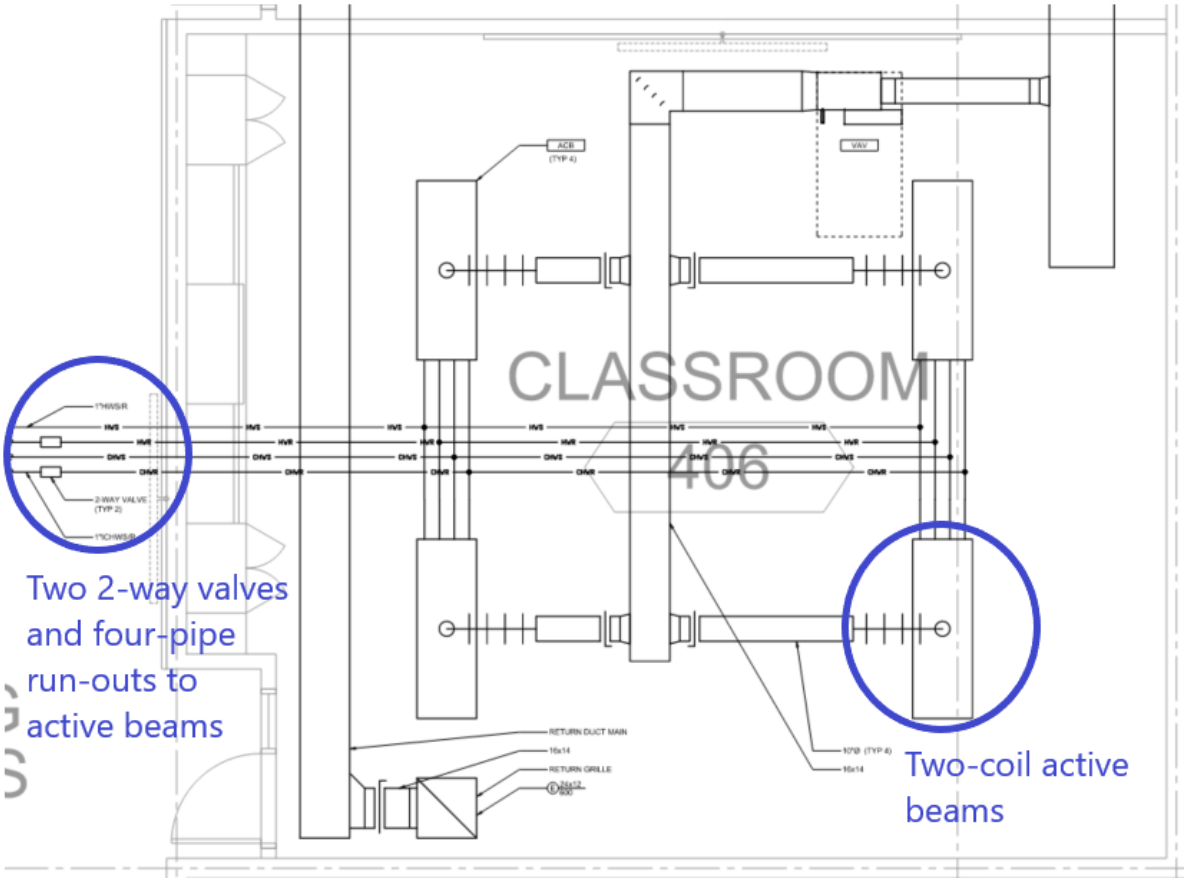
Heating and cooling functionality remains the same.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

Was not aware of six-way valve technology and expressed interest in reducing project cost and complexity but were concerned about added complexity or additional maintenance staff training, due to difference from the Phase 1 building.

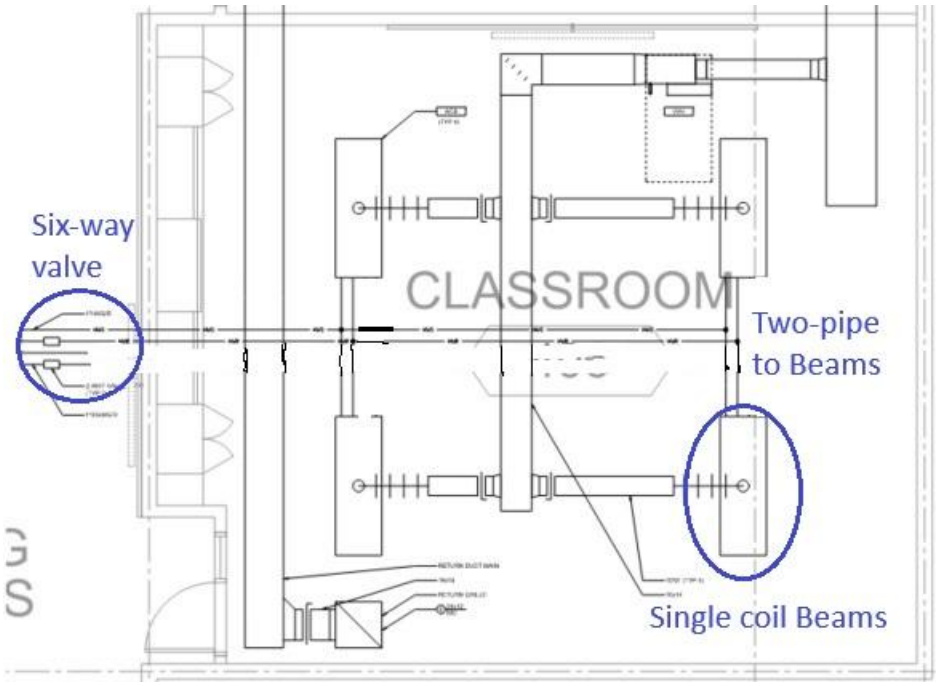
SKETCHES/DIAGRAMS:

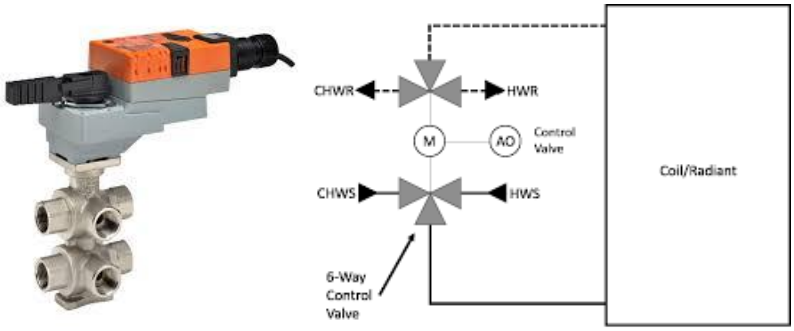
BASELINE CONCEPT



Two 2-way valves (left); four-pipe run-out to active beam (right).

VALUE PROPOSAL CONCEPT





Six-way valve (left); two-pipe runout to active beam (right).

ASSUMPTIONS AND CALCULATIONS:

The proposed six-way valve system is simpler than the current design two 2-way valve system, with the same type of control valve actuator – just one instead of two; hence assume specialized training is not required.

COST ESTIMATE FORM

M2

COMPONENT: Hydronic Distribution

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Hydornic piping, with four-pipe run-out	94752	sf	21.32	2,020,110	Hydornic piping, with two-pipe run-out	94752	sf	19.19	1,818,100
Controls, two 2-way valves for beams	94752	sf	14.01	1,327,480	Controls, one 6-way valve for beams	94752	sf	13.31	1,261,100
Active beams with two coils	200	ea	1517.78	303,560	Active beams with one coil	200	ea	1290.11	258,020
Subtotal				3,651,150	Subtotal				3,337,220
General Contractor Markup	40.16	%		1,466,302	General Contractor Markup	40.16	%		1,340,228
Total to nearest $1000				5,117,000	Total to nearest $1000				4,677,000
					Difference				440,000

MENG Analysis

Proposal **M2**

	PROPOSAL	M3
COMPONENT: Water Distribution	**AUTHOR**	DCS

BASELINE CONCEPT:

Horizontal domestic cold, hot and recirculating water in the corridor ceiling space of each floor.

VALUE PROPOSAL SYNOPSIS:

Horizontal distribution in the ceiling of the first floor, then risers to serve upper floor plumbing fixture groups only where needed.

SCHEDULE SAVINGS: No change

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Maintained	Maintained	Maintained

FUNCTIONS:

Distribute Fluids	Hygiene Occupants	Facilitate Maintenance

ADVANTAGES:

- Reduced first cost
- Simpler plumbing system
- Reduced ceiling space congestion

DISADVANTAGES:

- Reduced future flexibility
- Less intuitive plumbing piping run-out isolation valve locations

DISCUSSION AND JUSTIFICATION

The current design shows domestic cold, hot and recirculating water distribution piping in the corridor ceiling space along most the length of all three floors, but there are few plumbing fixtures at the north and south ends of the second and third floors, excepting the Culinary Arts program at the north end of the second floor.

This proposal suggests the more common multi-story building approach to plumbing distribution with more vertical and less horizontal distribution for the upper floors to reduce first cost and to reduce congestion in upper floor corridor ceiling space.

SCHEDULE SAVINGS:

No impact on schedule.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
No impact on reliability.

Maintenance & Operations:

While Maintenance & Operations may be impacted by less ready access to shut-off valves, this is counterbalanced by less piping and a simpler system, with net result of no impact on M&O.

Functionality:

No impact on functionality.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

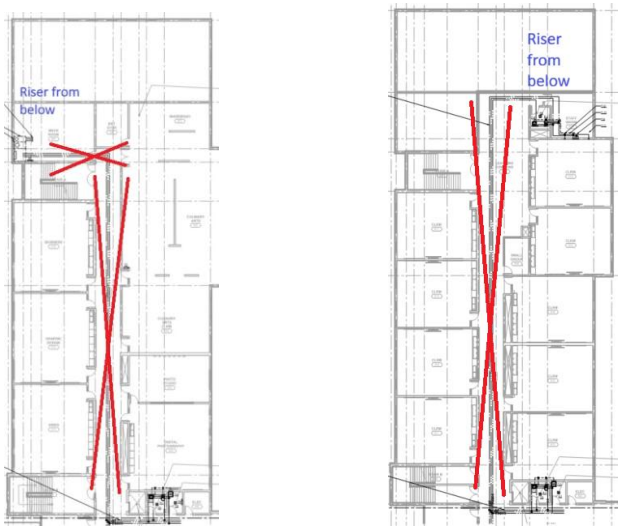
Of interest; agreed there is no need for piping in the corridor where there are no adjacent plumbing fixtures.

SKETCHES/DIAGRAMS:

BASELINE CONCEPT

Current Plumbing Distribution North – 2nd Floor (left); 3rd Floor (right)

VALUE PROPOSAL CONCEPT



Proposed Plumbing Distribution North – 2nd Floor (left); 3rd Floor (right)

ASSUMPTIONS AND CALCULATIONS:

None.

COST ESTIMATE FORM

M3

COMPONENT: Water Distribution

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Water distribution, horizontal all floors	94752	sf	7.11	673,690	Water distribution, horizontal first floor	94752	sf	6.40	606,320
					vertical to upper floors				
Subtotal				673,690	Subtotal				606,320
General Contractor Markup	40.16	%		270,554	General Contractor Markup	40.16	%		243,498
Total to nearest $1000				944,000	Total to nearest $1000				850,000
					Difference				94,000

MENG Analysis

M3 Proposal

	PROPOSAL	E1
COMPONENT: Panel Boards	**AUTHOR**	MW

BASELINE CONCEPT:

Dedicated power panels with separate surge protector device (SPD), feeder and circuit breaker connection from Sub Distribution Board SDB-2 are provided to feed loads in select classrooms on the 1st and 2nd floors. Other classrooms on the 1st, 2nd floors and 3rd floors are fed from electrical room panels on each floor.

VALUE PROPOSAL SYNOPSIS:

Consolidate and reduce power panel surge protector devices, feeders, and feeder circuit breakers.

SCHEDULE SAVINGS: Improved

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Improved	Improved	Maintained

FUNCTIONS:

Convey Power	Protect Surges	Power Equipment

ADVANTAGES:

- Reduced Material Costs
- Improves Schedule
- Reduced Labor
- Improved Maintenance

DISADVANTAGES:

- Reduced Panel Isolation
- Longer Conductors
- Reduced Surge Protection

DISCUSSION AND JUSTIFICATION

The Baseline Design provides dedicated power panels in classrooms Robotics (Panel S2A), Hort Science (Panel S3A), Fabrication & Cadd (Panel S4A), AG Science (Panel S5A), Business (Panel S6A), Graphic Design (Panel S7A), Video (Panel S8A), Culinary Arts & Classroom (Panels CA1A & CA1B), and Photo Studio & Digital Photography (Panel S9A). Each panel has a dedicated feeder and circuit breaker connection at Sub Distribution Board SDB-2. Each panel has a dedicated surge protector device (SPD).

This Value Proposal recommends:

- Feed Hort Science and AG Science panelboards panels from a single circuit breaker and feeder. Remove (1) SPD.
- Feed Robotics and Fabrication & Cadd panels from a single circuit breaker and feeder. Remove (1) SPD.
- Feed Business and Graphic Design panels from a single circuit breaker and feeder. Remove (1) SPD.
- Video (Panel S8A), and Photo Studio and Digital Photography (Panel S9A) are located near Electrical Room 543 and electrical room has room for panels.

SCHEDULE SAVINGS:

Improved compared to the baseline. Fewer feeder circuit breakers, feeders, and SPDs to furnish and install.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Improved compared to the baseline. Fewer feeder circuit breakers, feeders, and SPD's that can have issues over time.

Maintenance & Operations:

Improved compared to the baseline. Fewer feeder circuit breakers, feeders, and SPD's that can have issues over time.

Functionality:

Maintained compared to the baseline. Power panels are still located close to, or in the same room as, the loads being served, and are still protected from surges.

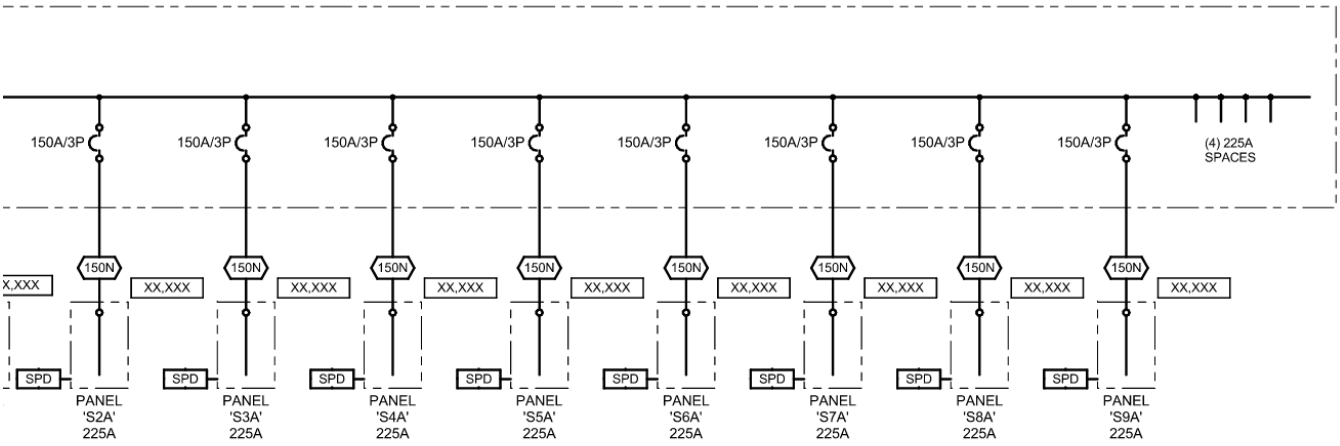
REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

Maintain flexibility for future loads by providing separate panels in specialty classrooms to feed power and control loads from within each specialty classroom.

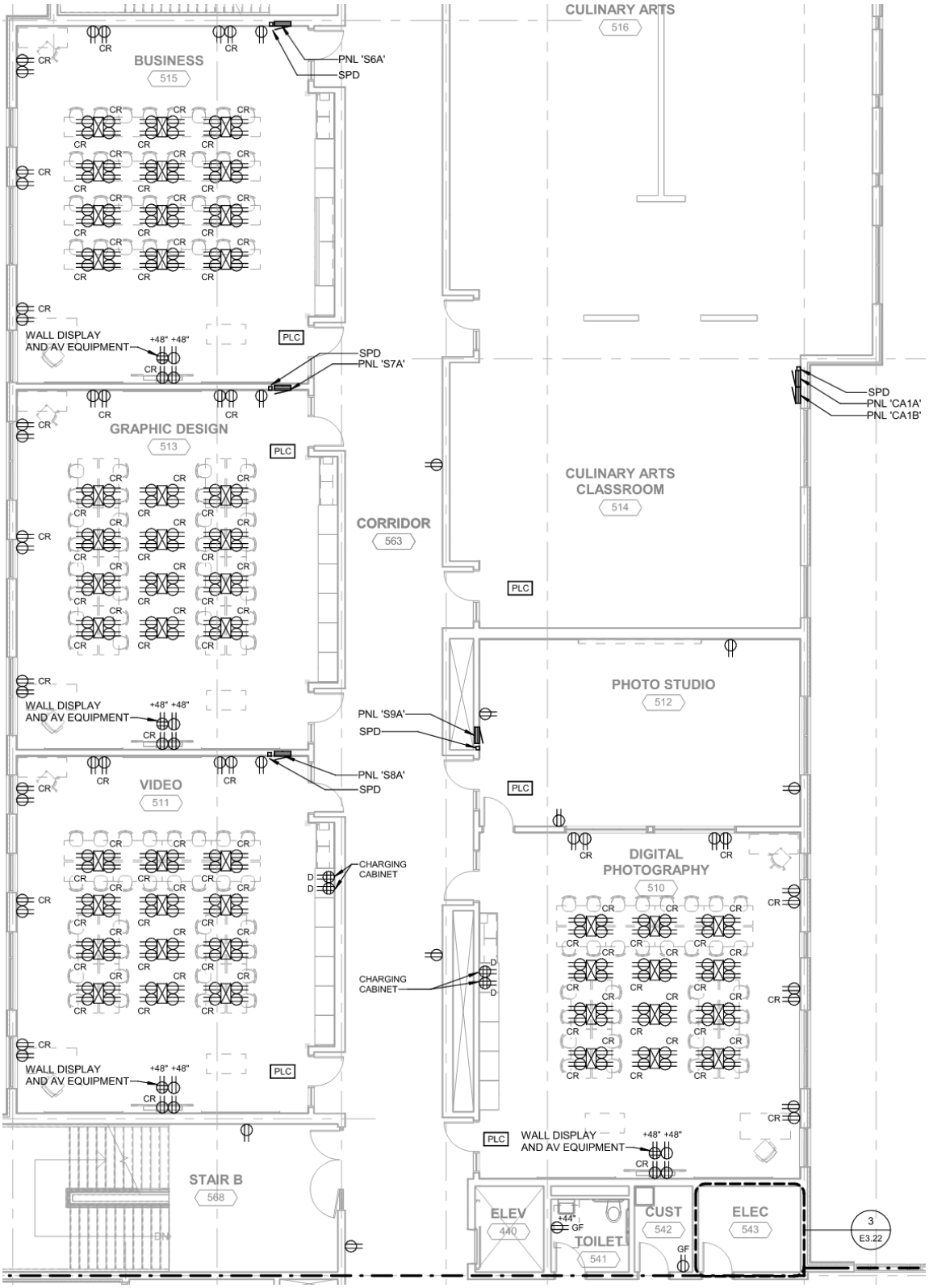
SKETCHES/DIAGRAMS:

Baseline Concept

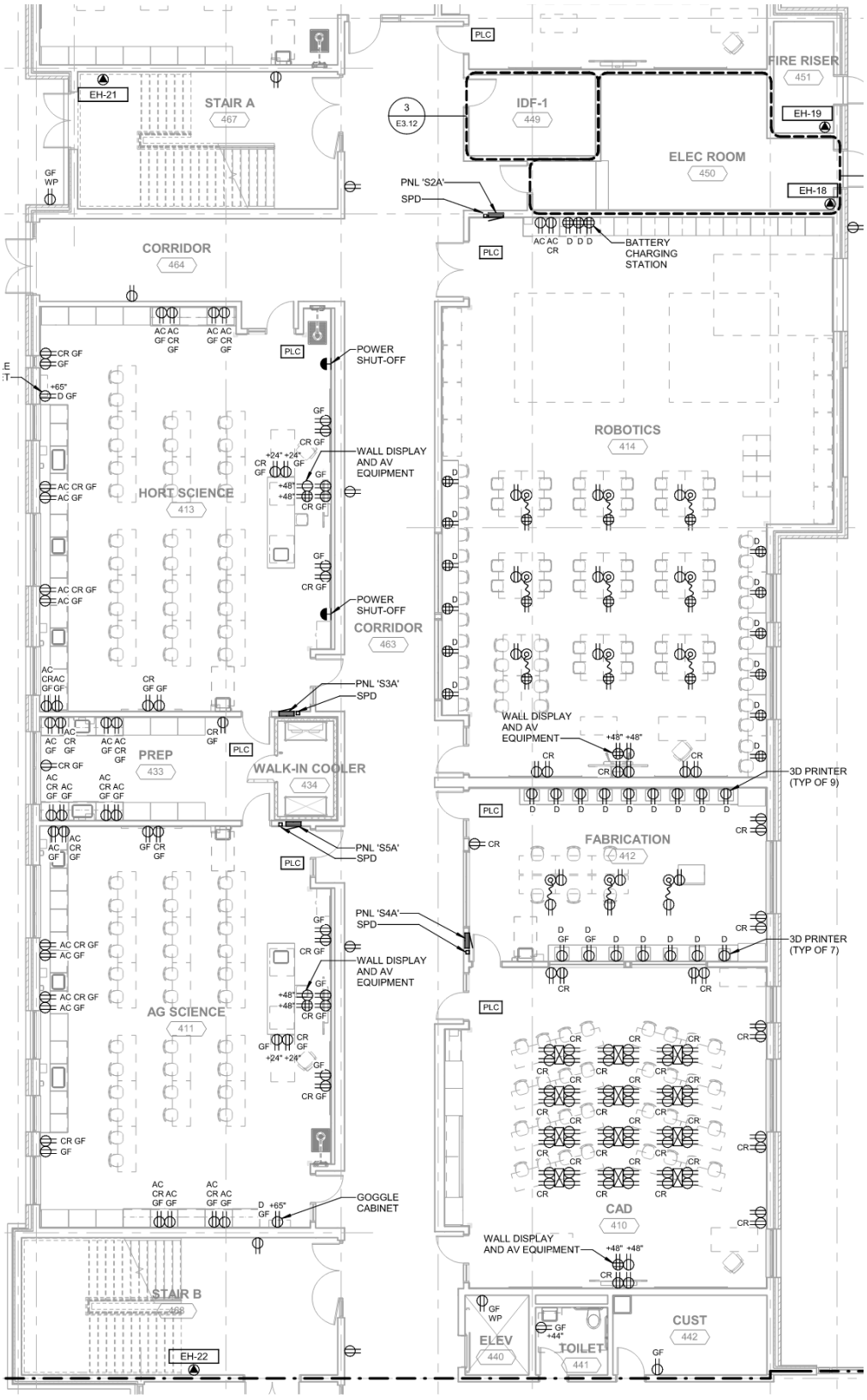
Dedicated power panels are provided in classrooms Robotics (Panel S2A), Hort Science (Panel S3A), Fabrication & Cadd (Panel S4A), AG Science (Panel S5A), Business (Panel S6A), Graphic Design (Panel S7A), Video (Panel S8A), Culinary Arts & Classroom (Panels CA1A & CA1B), and Photo Studio & Digital Photography (Panel S9A). Each panel has a dedicated feeder and circuit breaker connection at Sub Distribution Board SDB-2. Each panel also has a dedicated surge protector device (SPD).



Baseline Concept

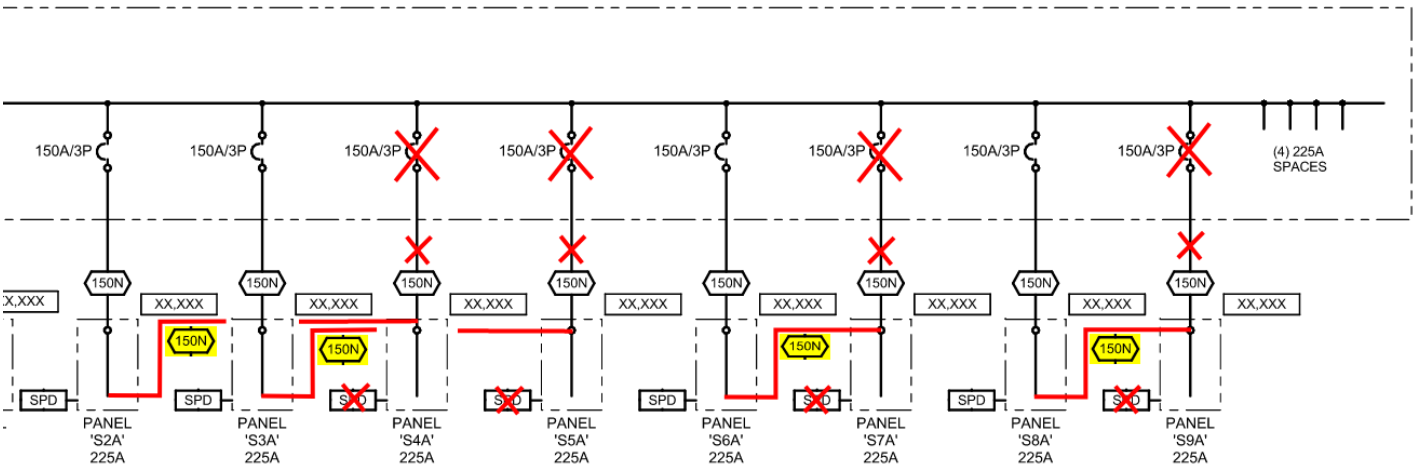


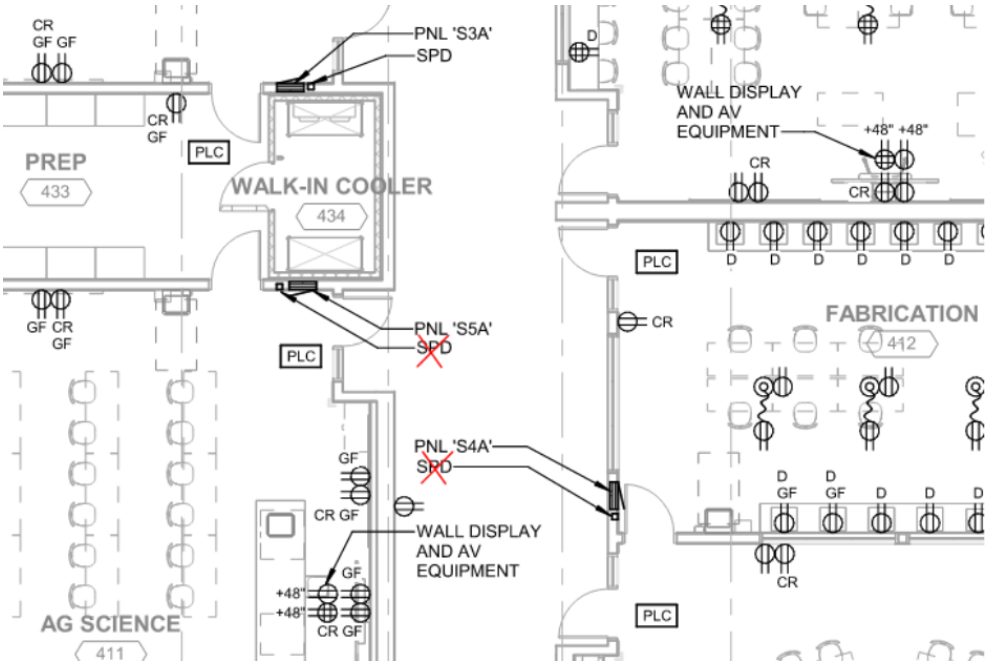
Baseline Concept



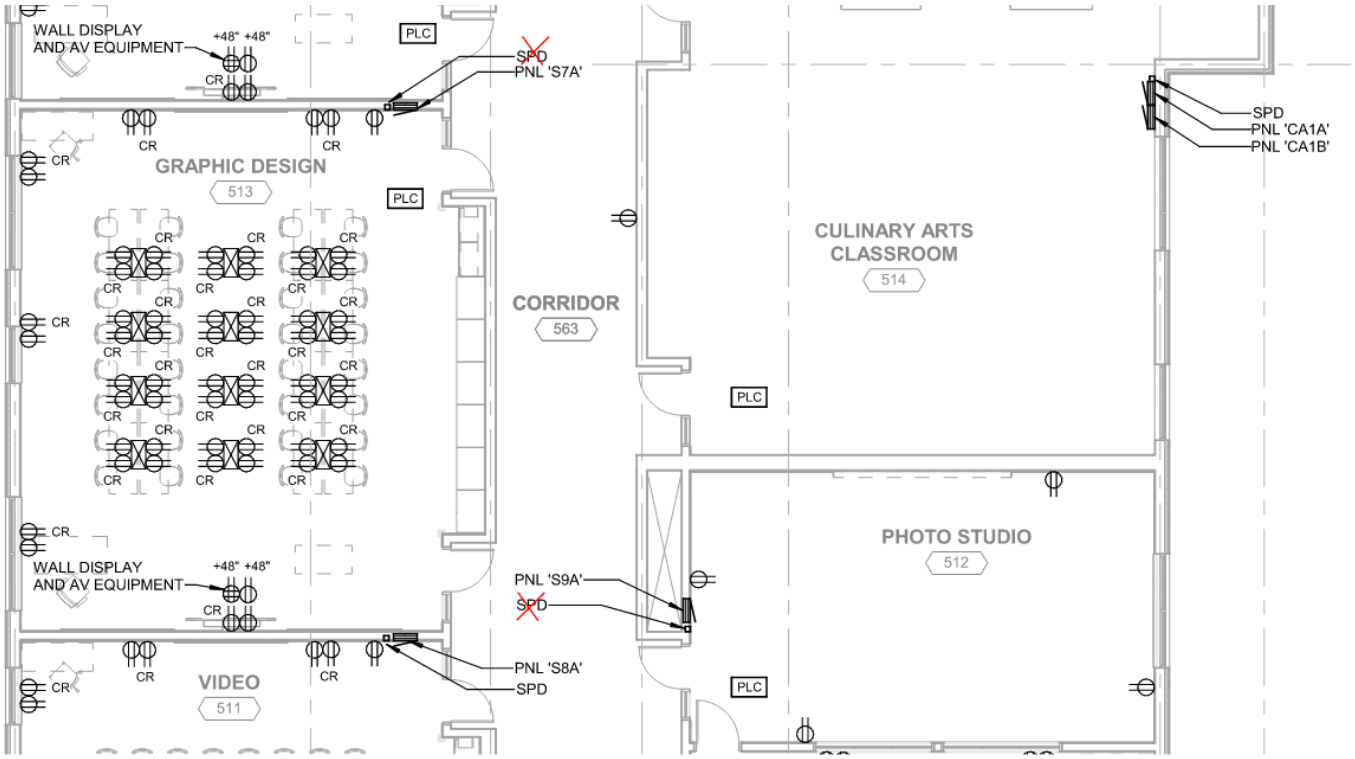
Value Proposal Concept:

- Feed Hort Science and AG Science panelboards panels from a single circuit breaker and feeder. Remove (1) SPD.
- Feed Robotics and Fabrication & Cadd panels from a single circuit breaker and feeder. Remove (1) SPD.
- Feed Business and Graphic Design panels from a single circuit breaker and feeder. Remove (1) SPD.
- Video (Panel S8A), and Photo Studio and Digital Photography (Panel S9A) are located near Electrical Room 543 and electrical room has room for panels.





Value Proposal Concept:



ASSUMPTIONS AND CALCULATIONS:

Existing designed panel dedicated feeder and circuit breaker connection at Sub Distribution Board SDB-2 are anticipated to be adequately sized to feed each pair of consolidated panels.

COST ESTIMATE FORM

E1

COMPONENT: Panel Boards

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Dedicated feeder circuit breakers in Sub Distribution Board SDB-2.	4	EA	750	3,000	Delete dedicated feeder circuit breakers in Sub Distribution Board SDB-2.	0	EA	750	0
Dedicated feeder from Sub Distribution Board SDB-2 to Panel	4	EA	6500	26,000	Delete dedicated feeder from Sub Distribution Board SDB-2 to Panel	0	EA	6500	0
Dedicated Surge Potection Device (SPD) for Panel	4	EA	5500	22,000	Delete dedicated Surge Potection Device (SPD) for Panel	0	EA	5500	0
Subtotal				51,000	Subtotal				0
General Contractor Markup	40.16	%		20,482	General Contractor Markup	40.16	%		0
Total to nearest $1000				71,000	Total to nearest $1000				0
					Difference				71,000

MENG Analysis

Proposal **E1**

	PROPOSAL	E2
COMPONENT: Lighting Density	**AUTHOR**	MW

BASELINE CONCEPT:

The current design provides 10% lower power density than code. Light fixture layout provides design light levels and maintains even light level uniformity.

VALUE PROPOSAL SYNOPSIS:

Provide 20% lower power density than code. Light fixture layout provides slightly lower light levels and maintains even or slightly reduced light level uniformity.

SCHEDULE SAVINGS: Improved

QUALITATIVE BENEFITS:

RELIABILITY	M&O	FUNCTIONALITY
Improved	Improved	Maintained

FUNCTIONS:

Enhance Vision	Illuminate Surfaces	Illuminate Egress

ADVANTAGES:

- Reduced Material Costs
- Improves Schedule
- Reduced Labor
- Improved Maintenance
- Life Cycle Cost Savings

DISADVANTAGES:

- Reduced Light Level
- Reduced Lighting Uniformity
- Added Supplemental Lighting.

DISCUSSION AND JUSTIFICATION

The Baseline Lighting Design in classrooms will be unchanged, as requested by owner.

This Value Proposal recommends an additional 10% or 20% total lower power density than code in all other spaces and corridors.

Proposed lighting design revisions include:

1. Reduce quantity of light fixtures
2. Relocate remaining lights to illuminate priority areas (e.g. workstations, equipment, main egress pathways, etc.)
3. Specify lighting fixtures with lower lumen output
4. Set dimmer switch high-end trim and daylighting photocell controls to reduce room light level
5. Supplement lower ambient light levels or less uniform lighting layout with other light fixtures, e.g. Task Lighting, Wall Washers, Undercabinet Lights, Desk Lights

The proposed lighting design revisions in other spaces and corridors will result in an additional 10% reduction in lighting power density. The effect on lighting will be slightly lower light levels and slightly less lighting uniformity.

SCHEDULE SAVINGS:

Improved compared to the baseline. There are fewer light fixtures that require procurement and installation.

QUALITATIVE BENEFITS – This proposal impacts the following:

Reliability:
Improved compared to the baseline. There are fewer light fixtures that can fail and will require maintenance or replacement.

Maintenance & Operations:

Improved compared to the baseline. There are fewer light fixtures that will require maintenance.

Functionality:

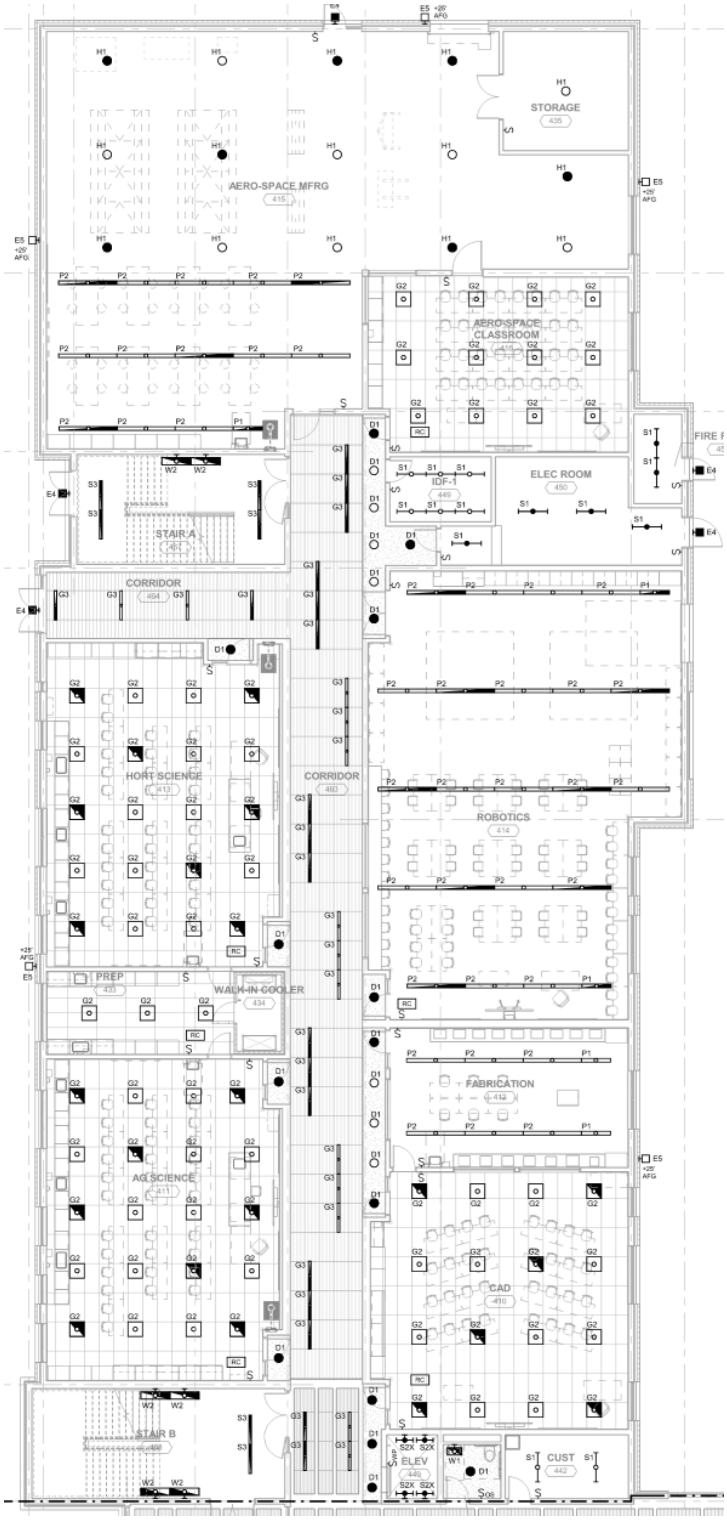
The lighting design in classrooms will be unchanged. The proposed lighting design in other spaces and corridors will result in an additional 10% reduction in lighting power density. The effect on lighting will be slightly lower light levels and slightly less lighting uniformity.

REVIEW COMMENTS: During the evaluation phase of the workshop, stakeholders participated in the mid-point evaluation phase review and had the following comments about this idea:

Maintain design lighting levels and uniformity in classrooms, so as not to interfere with classroom teaching environment and functionality, but in principle please do explore other areas where lighting power density can be reduced without impacting teaching and learning environments.

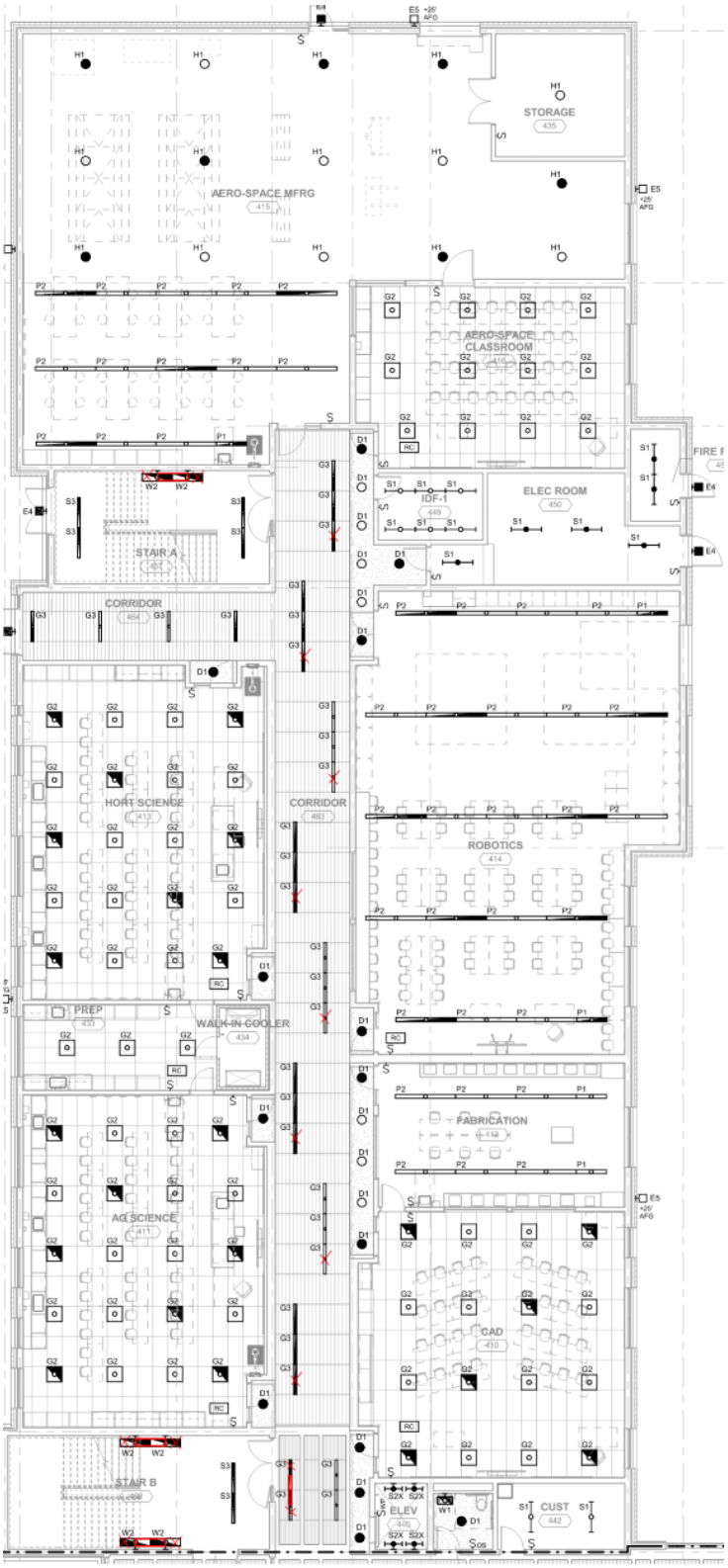
SKETCHES/DIAGRAMS:

Baseline Concept

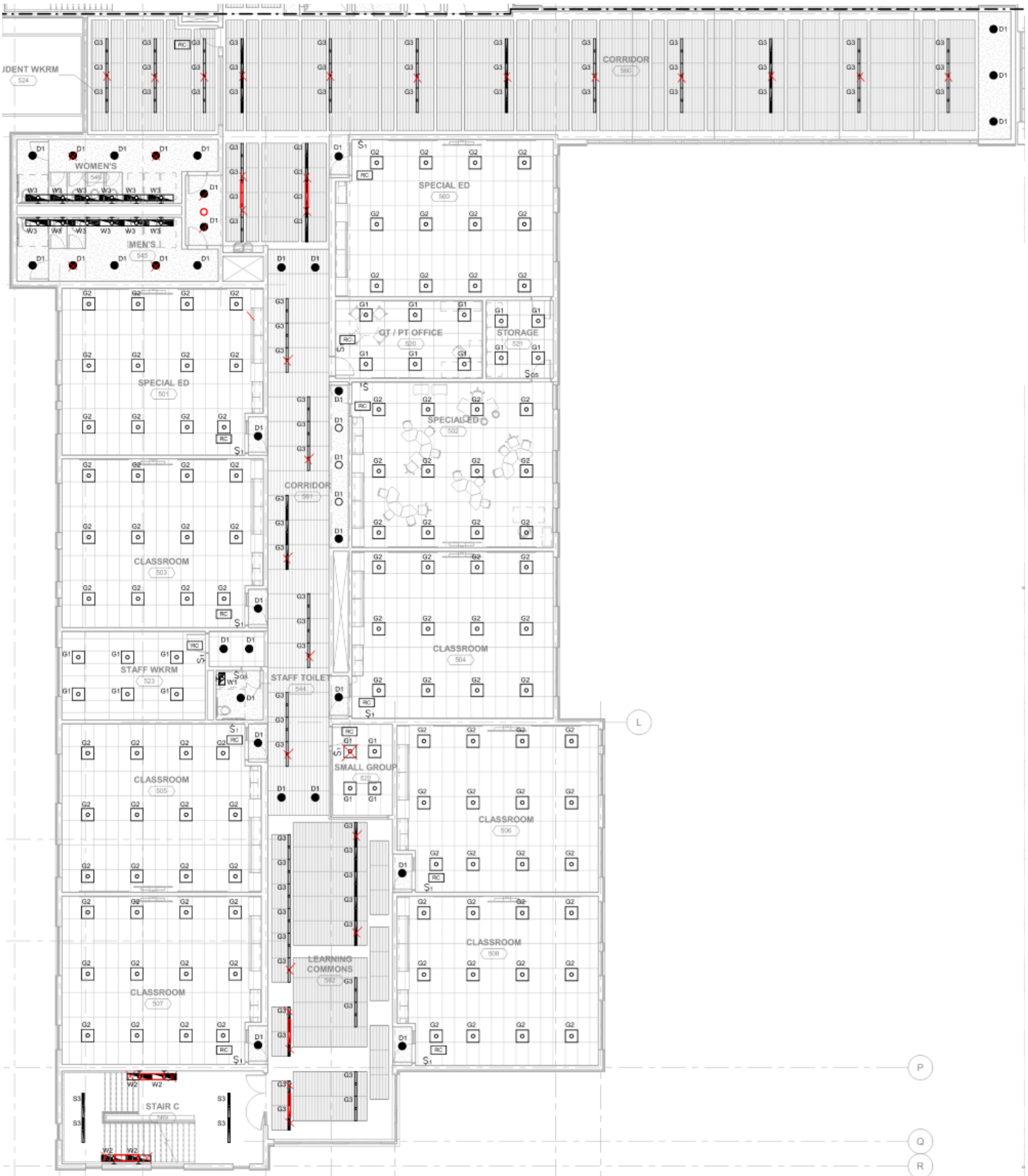


Baseline Concept

Value Proposal Concept

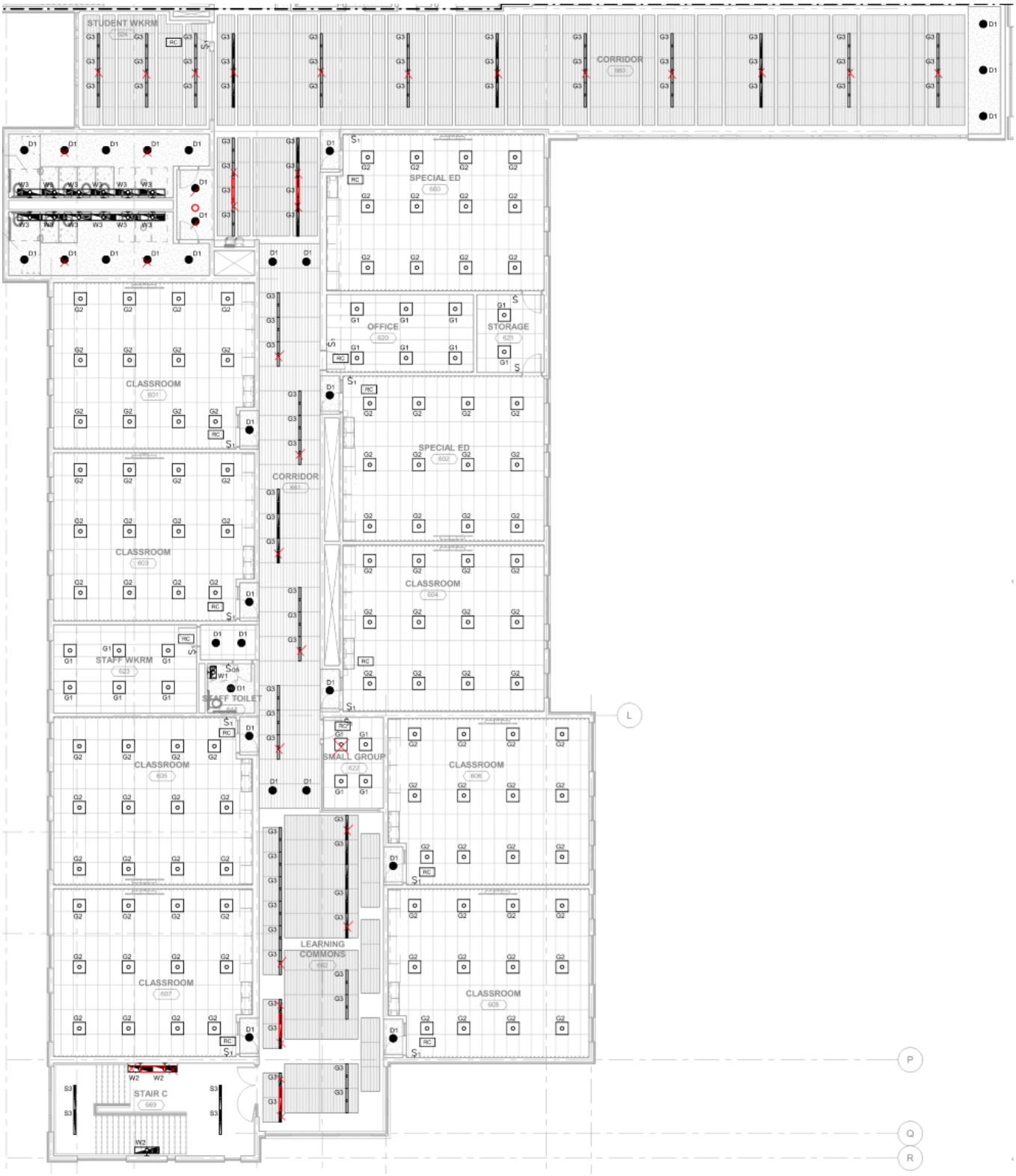


Value Proposal Concept



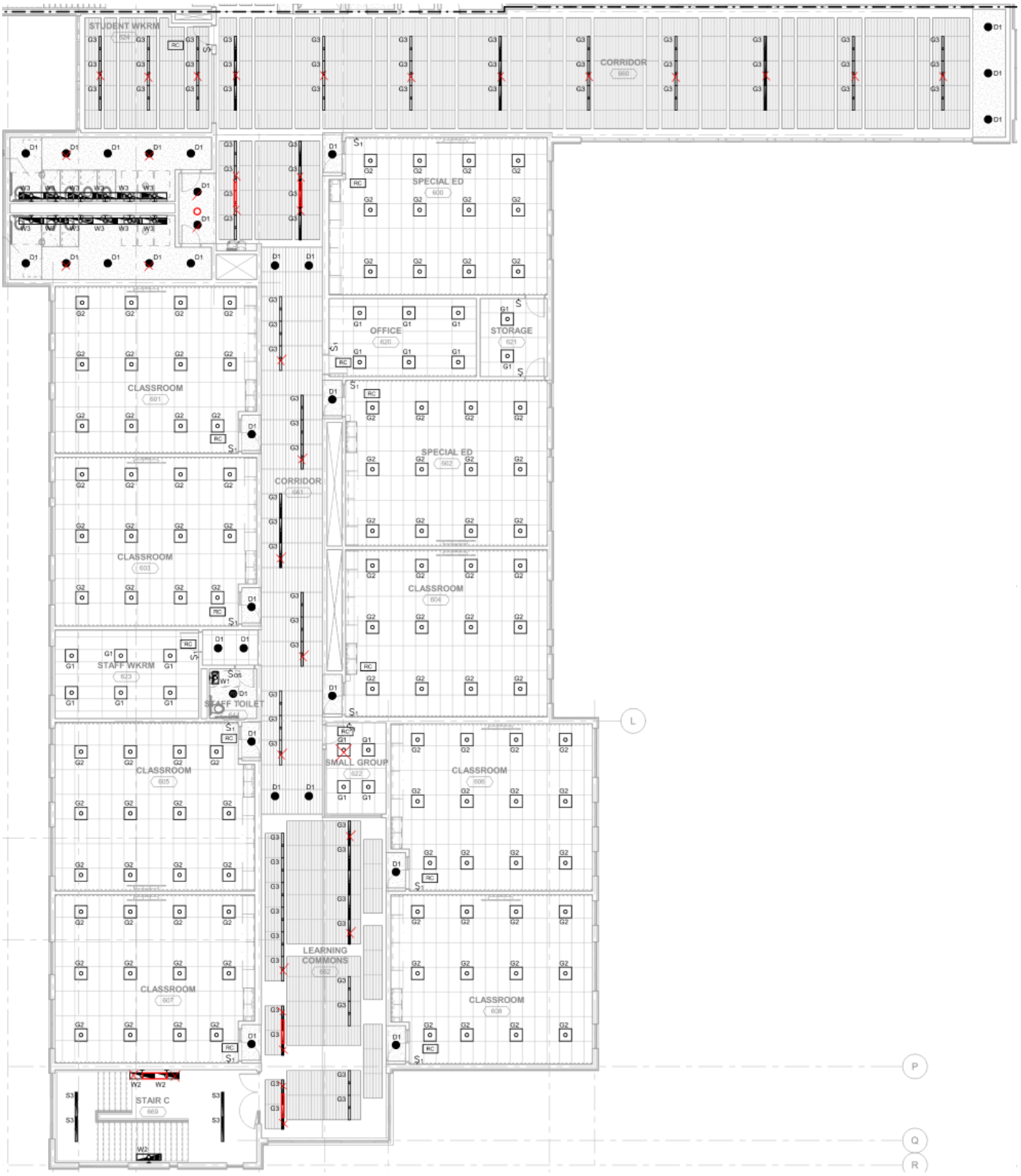
Value Proposal Concept

Value Proposal Concept



Value Proposal Concept

Value Proposal Concept



ASSUMPTIONS AND CALCULATIONS:

Lighting Power Allowance Calculation Example

Office 431: Baseline: 162 sq ft x .89 watts/sq ft = 144 watts allowed

(4) 2x2 lights x 35 watts/light = 129 watts

Value Proposal: 162 sq ft x .89 watts/sq ft x 90% = 129 watts allowed

(3) 2x2 lights x 35 watts/light = 105 watts

Light Fixture Reduction

- Level 1 Area A: 36 lights
- Level 1 Area B: 12 lights
- Level 2 Area A: 32 lights
- Level 2 Area B: 13 lights
- Level 3 Area A: 31 lights
- Level 3 Area B: 20 lights

Total Proposed Light Fixture Reduction: 144 lights

COST ESTIMATE FORM

E2

COMPONENT: Lighting Density

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Baseline Lighting Design	103,505	GSF	15.87	1,642,620	Value Proposal Lighting Design	103,505	GSF	14.83	1,534,620
					(Reduction of (144) light fixtures				
					including circuiting				
					and 10% lower lighting power				
					density (Not including Classrooms)				
Subtotal				1,642,620	Subtotal				1,534,620
General Contractor Markup	40.16	%		659,676	General Contractor Markup	40.16	%		616,303
Total to nearest $1000				2,302,000	Total to nearest $1000				2,151,000
					Difference				151,000

MENG Analysis

Proposal **E2**

IV. TECHNICAL REPORTS

No.	Name
T1	Energy Grants
T2	Contract Considerations

TECHNICAL REPORT	**PROPOSAL**	T-1
COMPONENT: Energy Grants	**AUTHOR**	DCS

CURRENT CONCEPT

While there is interest in utility energy efficiency grants and rebates, an application has not yet been submitted. Several project systems and equipment are currently better than code minimum, with opportunity for more.

CONSIDERATIONS

With the power grid under stress and the WA State Clean Buildings program to eliminate fossil fuel use over time, WA State energy utilities, in this case Puget Sound Energy (PSE), currently offer generous incentives to design and construct building energy systems better than code minimum, including thermal envelope, HVAC, lighting and certain plug loads, such as kitchen equipment.

Several programs are available but the most applicable may be the EUI approach, where actual energy use is compared to the WA State Clean Buildings target EUI and incentives paid on the order of $0.45/kW-hr saved for power and $8/therm for natural gas.

The Clean Buildings target Energy Use Intensity (EUI) for High Schools is 48, reduced by 15% for new construction, hence EUIt = 41. The project Engineering Life Cycle Cost Analysis (ELCCA) Plan reports the project is designed for EUI = 30. Hence, 27% energy savings are estimated, which is significant and should result in a substantial grant on the order of tens of thousands of dollars.

To obtain the highest grant, systems and equipment should be designed beyond code minimum where there are life cycle cost savings. The Grant will subsidize the additional capital cost. Additionally, the grant application should be submitted sooner, rather than later for maximum benefit, and in all cases before construction begins. Following construction PSE will verify energy saving measures are installed, then monitor energy use for one-year, followed by a performance-based incentive payment.

TECHNICAL REPORT	**PROPOSAL**	T2
COMPONENT: Contract Considerations	**AUTHOR**	TB

CURRENT CONCEPT

With intended the General Contractor / Construction Manager (GC/CM) delivery method, there are several opportunities that can be leveraged and should be considered for inclusion and assigned to the selected GC/CM:

CONSIDERATIONS

- Pothole utilities during design ILO during construction, assign to GC/CM pre-work.
- Unit price or alternate bids for unsuitable materials to manage risk for change orders.
- Define site development phasing requirements for GC/CM (especially schedule limits on activities impacting Phase I building and utilities).
- Have GC/CM develop a formal logistics plan.
- Develop air barrier leakage test plan (and provide in Permit document set).
- GC/CM team review control system to identify recommended economies.
- Define requirements for aggressive dewatering starting at mobilization and continuing throughout duration.
- Specify requirements for timely or expedited submittals to limit exposure to lead time or escalation issues.
- Long-lead item pre-ordering (Electrical, HVAC, etc...) .
- Identify potential substitutions or other strategies for materials or systems with potential tariff impacts.
- Utilize a single project management software for all project team collaboration and document controls (Require Procore).
- BIM model for MEP and all trade coordination. GC/CM provide back to District as As-Built documentation at conclusion.
- Provide GC/CM intel on where past project subcontractor off-site parking occurred (adjacent church?) or as backup overflow parking during peak sub-contractor activity.
- Define daily site cleanup requirements.
- Require GC/CM to integrate and serve the week embedded with the independent Constructability Review Team.
- Identify lessons learned for all disciplines from Phase 1 and take action as needed to improve Phase 2.

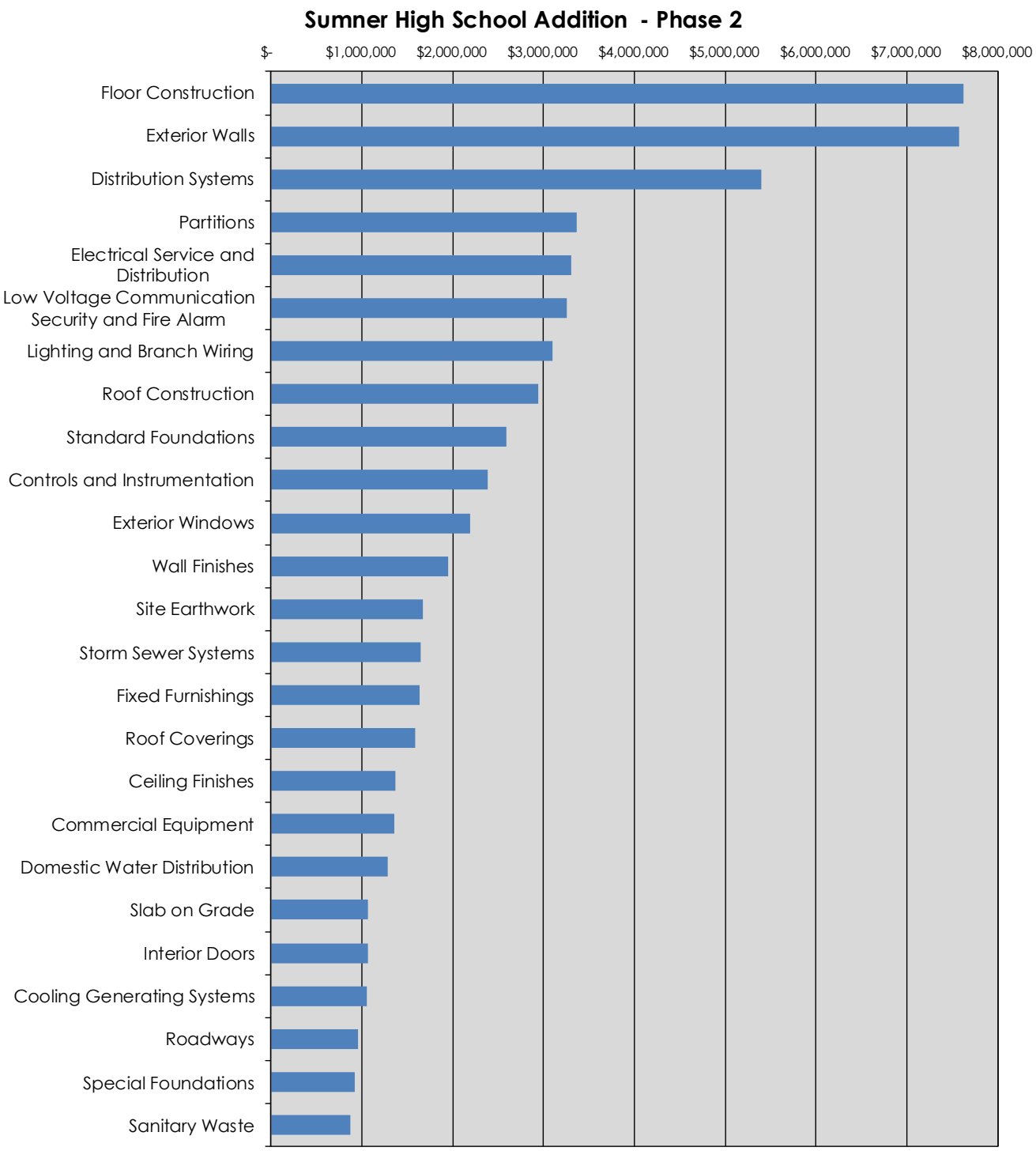
V. VALUE ENGINEERING

COST ANALYSIS

The VE team was not tasked to complete a detailed cost estimate review but as the various site and building systems were explored, the team did review and analyze certain cost categories and developed a cost model based upon the design team's cost estimate.

The cost model graph on the following page shows the cost estimate values broken down and grouped into function-based system costs (by Uniformat functions). This tool assists in evaluating where the largest percentage of the project's resources are being allocated towards different building functions.

For this project, floor construction represents the highest project cost, followed by exterior walls, then distribution systems.


Sumner High School Addition - Phase 2
$-
$1,000,000
$2,000,000
$3,000,000
$4,000,000
$5,000,000
$6,000,000
$7,000,000
$8,000,000
Floor Construction
Exterior Walls
Distribution Systems
Partitions
Electrical Service and Distribution
Low Voltage Communication Security and Fire Alarm
Lighting and Branch Wiring
Roof Construction
Standard Foundations
Controls and Instrumentation
Exterior Windows
Wall Finishes
Site Earthwork
Storm Sewer Systems
Fixed Furnishings
Roof Coverings
Ceiling Finishes
Commercial Equipment
Domestic Water Distribution
Slab on Grade
Interior Doors
Cooling Generating Systems
Roadways
Special Foundations
Sanitary Waste

Cost Estimate Comments

The cost estimate is generally well formatted and appropriate for this level of design. As noted previously, the VE team was not tasked to complete a detailed cost estimate review, but as the various site and building systems were explored, the team did review certain cost items. Some potential cost estimate issues were identified and listed in the summary below. The adjusted costs are used in specific VE proposals in order to make apples-to-apples comparisons.

No.	Building Component	Current Cost	VE Proposal Cost	Difference	Comment
CE1	GC/CM Delivery Method	$71,006,000	$76,686,000	($5,680,000)	Traditional Design-Bid-Build was basis at the time of the estimate. This Adjustment is to revise to GC/CM delivery Method. Review also lowering soft costs contingency.
CE2	Structural Slab on Grade	$913,000	$1,056,000	($143,000)	Anticipated design update
This is not a comment on the bottom overall estimate. The VE team highlighted these items for further study based on differing cost opinion discussions.					

COST ESTIMATE FORM

CE1

COMPONENT: GCCM Delivery Method

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Design - Bid - Build Delivery Method	1	ls	71005871	71,005,871	GCCM Delivery Method (8% Increase)	1	ls	76686341	76,686,341
					Typical premium = 15% however				
					estimate has adequate coverage				
					to reduce this				
Subtotal				71,005,871	Subtotal				76,686,341
General Contractor Markup				Incl. Above	General Contractor Markup		%		Incl. Above
Total to nearest $1000				71,006,000	Total to nearest $1000				76,686,000
					Difference				-5,680,000

MENG Analysis

Proposal **CE1**

COST ESTIMATE FORM

CE2

COMPONENT: Structural Slab on Grade

CURRENT DESIGN					VE PROPOSAL				
ITEM	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**ITEM**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**
Reinforces concrete slab on grade, 10"	33,966	sf	19.17	651,128	Structural slab on grade, 14"	33,966	SF	31.1	1,056,343
Subtotal				651,128	Subtotal				1,056,343
General Contractor Markup	40.16	%		261,493	General Contractor Markup		%		
Total to nearest $1000				913,000	Total to nearest $1000				1,056,000
					Difference				-143,000

MENG Analysis

Proposal **CE2**

RISK ANALYSIS

While risk management should be conducted throughout the life cycle of a project, risk analysis integrated into the review study utilizes the skills and experience of the independent subject matter expert design professionals on the VE team. The process is used in identifying, evaluating, and prioritizing potential project risks to assist the owner and design team with risk management plan activities.

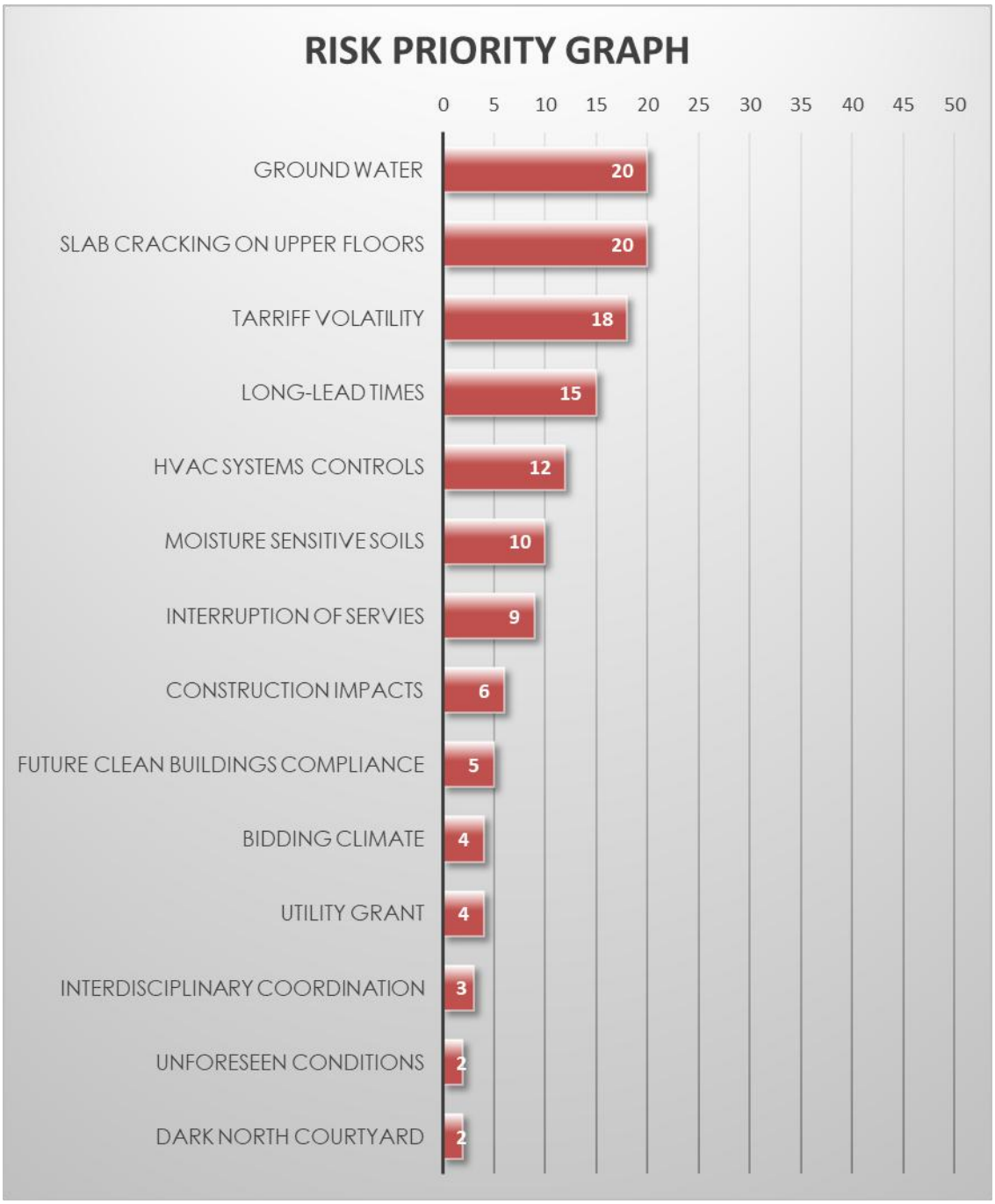
During the Evaluation Phase of the VE workshop, the team identified potential risks for the project quality, scope, cost, and schedule based on the current status of documents provided for the study. The team then conducted qualitative risk analysis with the nominal group technique collectively assessing risk probability, resultant potential cost, and project schedule impacts for each risk item on a scale of 1 to 5 (with 5 being high probability or impact). To prioritize the risk register, these impact scores are entered into a simple weighting formula:

Risk Priority = (Probability x Cost Impact) + (Probability x Schedule Impact)

The resultant weighted scores are then sorted and graphed. The project risk priority graph appears on the following page.

The intent of the risk analysis exercise is to identify major risk elements unique to each project for the benefit of the owner and design team and identify potential mitigation strategies where risk exposure can be controlled or reduced. The owner should collaborate with the design team to mitigate these risks.

Aside from known issues with an occupied site, and poor soils with a high ground water table, overall the project was considered by the team to be of reasonably moderate risk factors.
Additional unknown complications based on weather dependent ground water surges could present additional risks and delays if not addressed proactively and early with a dewatering program and monitoring by the GC/CM (see technical report T2
Upper floor slab cracking with this type of structural floor is common for commercial structures, however the intend for polished concrete as the finish increases risks (where in typical commercial structures those slab cracks are hidden by carpet of other flooring and are not an aesthetic issue. See proposal S2 for related risk mitigation strategies.
External risk factors related to Tarriff volatility will likely continue to impact material and equipment pricing and availability. (see technical report T2 for some ideas for assistance by the GC/CM in navigating and pivoting to these potential disruptors).


RISK PRIORITY GRAPH
0
5
10
15
20
25
30
35
40
45
50
GROUND WATER
20
SLAB CRACKING ON UPPER FLOORS
20
TARRIFF VOLATILITY
18
LONG-LEAD TIMES
15
HVAC SYSTEMS CONTROLS
12
MOISTURE SENSITIVE SOILS
10
INTERRUPTION OF SERVIES
9
CONSTRUCTION IMPACTS
6
FUTURE CLEAN BUILDINGS COMPLIANCE
5
BIDDING CLIMATE
4
UTILITY GRANT
4
INTERDISCIPLINARY COORDINATION
3
UNFORESEEN CONDITIONS
2
DARK NORTH COURTYARD
2

Example Risk Response Planning

In accordance with the Project Management Institute Standard for Project Risk Management, for each risk item, the District and design team should evaluate the risks and develop potential risk response actions:

> **Accept:** If you accept the risk, acknowledge and accept consequences (including political fallout). Identify contingency plan options to have in place if the event does occur. Contingency planning provides possible future actions to be taken in response to an event if it occurs, to hopefully reduce impacts.
>
> **Transfer:** How can risk be transferred? List options to shift responsibility/ownership to others (stakeholder/agency/contractor) or purchase insurance.
>
> **Mitigate:** What can be done now to take early action to reduce risk impact potential?
>
> **Avoid:** What concrete action can be taken to change the project and eliminate the risk?

As part of the risk management plan, the owner and design team are encouraged to evaluate identified risks, determine the appropriate risk planning response, and then assign responsibilities and timelines.

FUNCTION ANALYSIS

The process of Functional Analysis is unique to Value Engineering compared to other quality and cost control systems. The process frames the project's core needs, identifies the greatest opportunities for value improvement, and helps the team focus on what really matters. Additionally, the way the human brain works begins to set the stage for optimizing the Creativity Phase by triggering divergent thought processes to help generate even more ideas. You will see functions identified from this workshop in each proposal, and on the creativity alternative sheets in the appendix of this report.

Random Function Identification Technique

The team ran a quick synergistic brainstorm exercise to evaluate and generate unique functions pertaining to the project. These functions were then prioritized based on resource and/risk intensity, as well as District defined Priorities. Results of prioritized functions can be seen on the scanned creativity sheets in the appendix of this report.

VI. VE METHODOLOGY

Value engineering provides an independent, impartial project review by a team assembled specifically for this study. Value engineering itself is an organized creative process, which examines the proposed project and identifies alternatives to optimize cost and performance and assures compliance with project requirements. Through a structured system of investigation, idea generation, and analysis, the independent multidisciplinary team is able to consider and identify alternatives for site design, budget, schedule, and construction methods concurrently in a concentrated study.

After the initial presentation by Sumner-Bonney Lake School District and the design team, the VE team analyzed the budget and defined the basic functions of each project component. The VE team looked for ways to eliminate or modify design elements that add either first cost or life cycle cost without contributing to its required function. Specific proposals and reports were prepared and analyzed by the group for conformance to the project and VE study goals, prior to final prioritization.

Prioritization and brainstorming activities were conducted in group sessions alternating with additional small group and individual study sessions. All members supported an open-minded attitude to new suggestions, and all alternatives were considered valid until rejected by the entire team. Although the earlier sections of this report only elaborate or include the preferred alternatives, the appendix of this report includes all of the brainstorming notes from the workshop.

VII. APPENDIX

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KICKOFF MEETING SIGN-IN SHEET

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VE IMPLEMENTATION FORM

The following VE Implementation Form was received from the District on 10/13/2025 and replaces the blank form included in the draft report. This completed form documents the District's acceptance, modification, or rejection of the value engineering proposals and will be used by the School Board as part of the D-Form submittal process.

Our studies comply with WAC 392-343-080, WAC 392-344-065, and OSPI requirements.

Receipt of the completed VE Implementation Form also allows MENG Analysis to track and analyze results from our studies in order to continually improve the quality and effectiveness of our value engineering services.

CLIENT:	Sumner-Bonney Lake School District
PROJECT:	SUMNER HIGH SCHOOL ADDITION - PHASE 2
DATE:	September 12, 2025

Prop. #	COMPONENTS AND SYSTEMS	PROJECTED COST REVISION (Rough Order of Magnitude)	ACCEPT	REJECT	MODIFY	ACCEPTED VALUE OF PROPOSAL	COMMENTS / DISCUSSION
C1	Courtyard Drainage	30,000			X	Modify	JCE Response: MODIFY – At the time of the VE drawings, downspout locations had not been identified. In both the north and south courtyard, downspouts and other underground drainage piping will need to be considered in addition to the surface runoff collection. The proposed trench drain in place of all catch basins is not feasible, as the roof tightlines and landscape area drains require direct connection to a catch basin structure. A modified approach is being proposed to remove the number of catch basins and replace with some trench drains.
C2	Pavement Sections	12,000	X			12,000	JCE Response: ACCEPT. The primary bus and vehicular corridor will remain heavy duty asphalt, but the remainder of the vehicular surface parking lot will be standard asphalt paving.
L1	Courtyard Pavement	47,000		X		0	Fora Response: While it would look nice, the proposed material between precast panels would create potential acessibility/egress issues in addition to the maintenance challenges associated with loose material and weeds.
S1	Slab-On-Grade	676,000		X		0	PCS Response: * For seismic base shear resistance and transfer of lateral forces from foundations to subgrade base we rely on fixity at top of piles. Grade beams are working as pile caps and the anticipated fixity will be challenging to achieve with shallower drop caps. Therefore, we would not recommend the change. * We anticipate pile locations to be adjusted on site during construction due to site conditions and evidence of existing timber piles at subgrade. Based on the experience we have from Phase 1, we anticipate 5% - 7% of the piles to be relocated due to potential conflict with timber piles/boulders at the time of construction. Stiff grade beams provide flexibility of piles to be offset from their design location without the need to adjust the steel structure up above during tight construction schedules. This flexibility cannot be achieved with drop caps and therefore we would not recommend the change. * PT slab would limit the flexibility for future TI projects and increase the risk to damage the foundation system where the repairs would be very expensive. Therefore, we would not recommend the change
S2	Floor Structure	(256,000)			X	(256,000)	PCS Response: It would be uneconomical to add reinforcement in lieu of wire mesh everywhere due to limited amount of exposed concrete slab at elevated floors. However, we anticipate to have control joints and added reinforcement in the corridor areas (per typical detail 7/S5.11) to mitigate potential cracking. In addition, recommendations for shrinkage reducing admixtures for the concrete mix and requirements for strict QA/QC processes during concrete curing will also be added as part of the project specifications.
A1	Walkway Glazing	311,000			X	100,000	HOA Response: Will review design options to replace curtainwall with storefront glazing system.
A2	Walkway Structure	1,184,000		X		0	HOA Response: An enclosed walkway at all levels is desired by the Owner.
A3	Covered Play	(99,000)	X			(99,000)	HOA Response: A covered roof structure over the Tiny Sparts outdoor play area will be considered and reviewed.

CLIENT:	Sumner-Bonney Lake School District
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Prop. #	COMPONENTS AND SYSTEMS	PROJECTED COST REVISION (Rough Order of Magnitude)	ACCEPT	REJECT	MODIFY	ACCEPTED VALUE OF PROPOSAL	COMMENTS / DISCUSSION
M1	Integrated Design	290,000		X		0	Metrix Response: Mechanical system plant sizing is tied to considerations for future Phase 3 and is not able to decrease 5-10% based solely on envelope improvements from Phase 2. Additionally, the first nominal capacity size down for boiler plant equipment is minimum 15% less. Hydronic equipment costs will remain the same with an enhanced envelope. Airside equipment sizing is based primarily on occupancy and will remain the same with an enhanced envelope. The hydronic pipe size can decrease with an enhanced envelope and therefore, can anticpiate a 5% savings on pipe material costs. This equates to a roughly $30,000 mechanical savings, not the identified $383,000 mechanical savings.
M2	Hydronic Distribution	440,000		X		0	Metrix Response: Preliminary Metrix cost opinion suggests a credit for this is roughly $130,000, not the indicated $440,000. The current design of (2) 2-way valves matches the approach of Phase 1. 6-way valve control adds complexity not only in how the valve functions, but also because the sequence of operation for phase 2 chilled beams will not match phase 1. 6-way valves are also harder to maintain/troubleshoot because of the increased complexity.
M3	Water Distribution	94,000			X	31,330	Metrix Reponse: Domestic water pipe routing to be revised to reflect the more vertical approach proposed. Some areas of the building will remain as drawn because a vertical approach does not save pipe, therefore the full credit will not be realized.
E1	Panel Boards	71,000			X	35,500	Hargis Response: Suggested panelboard topography is reasonable and will be applied specifically for smaller (low relative load) science rooms and lab spaces. We wlil not plan on utilizing this approach for the lab spaces with largeer equipment and programmtic electrical loads. Proposed unit cost (cost savings) of surge protectors is 3-4x normal SPD costs. Realized value savings somewhat less than proposed.
E2	Lighting Density	151,000		X		0	Hargis Response: Reducing fixture quantity does not inherently mean 20% LPD reduction is achievable as the fixtures lumens and wattages are being prescriptively selected through photometric calculation. The suggested deletions particularly in the stairwells will make it nominal from a lighting level standpoint and make the PH2 stairs different than PH1 stairs. We do not suggest accepting this item.
R1	Use pavers ILO concrete in courtyards (assume 50%)	(280,460)		X		0	Fora Response: High quality pavers would add significant cost, however paving interest will be improved through creative placement of joints and use of surface retarder at select locations.
R2	Raise concrete crosswalks to slow traffic and improve safety	(17,100)		X		0	JCE Response: REJECT - Discussed with School District and architect, we will add speed bumps in-lieu of raised concrete to slow incoming traffic. Fora Response: Raised crosswalk would conflict with grading/drainage of parking lot, District has expressed interest in speed bumps with more limited cost impact - Fora will work with civil to locate these while minimizing impact to grading/drainging of parking lot.
R3	Provide 1,000 SF covered walkway between entrances of main building and animal science-green house buildings	(210,240)		X		0	HOA Response: Not required per program. Do not recommend adding this cost to the project.
R4	Add Silva cells at paking lot planter islands for storm water treatment, detention, and promoting tree health.	(49,259)		X		0	Fora Response: These would promote tree health, although the cost may not be justified given the opportunities to install trees with more generous traditional soil volumes near the building.

CLIENT:	Sumner-Bonney Lake School District
PROJECT:	SUMNER HIGH SCHOOL ADDITION - PHASE 2
DATE:	September 12, 2025

Prop. #	COMPONENTS AND SYSTEMS	PROJECTED COST REVISION (Rough Order of Magnitude)	ACCEPT	REJECT	MODIFY	ACCEPTED VALUE OF PROPOSAL	COMMENTS / DISCUSSION
R5	Add covered bike parking (assume 8'w x 15'L)	(25,229)		X		0	Fora Response: Some covered bicycle parking is being provided in Phase 2. Additional covered bicycle parking will be considered in Phase 3.
R6	Extend sidewalk in parking lot (in front of greenhouse) to connect with sidewalk in Mason Street	(2,523)	X			(2,523)	JCE Response: ACCEPT – The sidewalk extension will be provided to Mason Street on the north side. Fora Response: This revision improves circulation flexibility with minimal added cost and was incorporated into the plans prior to the issuance of the VE report
R7	Hydromechanical grease interceptor ILO vault-type	2,803			X	2,803	HOA Response: The design team will continue to evaluate based on City code requirements and ease of maintenance for the Owner.
R8	Spade out existing trees and re-plant (ILO remove at (E) parking islands, etc...)	1,402		X		0	Fora Response:This would require additional added costs for maintaining and staging trees between the time they are dug out and the time they are planted near the end of construction. There is also a high probabilty that some of them would not survive the staging and transplanting process.
R9	Add sculpture or artforms to enhance aesthetics (FF&E budget)	(30,000)		X		0	HOA Response: This is an option for the Owner if budget allows. Recommend ongoing discussions.
R10	Add moveable planted pots to courtyard areas (add in FFE budget)	(10,000)		X		0	Fora Response: Pots with high level of durability needed for HS use would have significant added cost.
R11	Provide smart irrigation controls with weather sensors	(5,000)	X			0	Fora Response: Controls are existing and have this feature already.
R12	Add umbrellas and tables in courtyards (add via FF&E)	(12,500)			X	0	Fora Response: Tables are already proposed. Umbrellas are not recommended due to the potential for misuse of removable elements in a high school context.
R13	Install vehicular gate at mainstreet drive entrance to thwart bypassing intersection and cutting through site.	(21,024)		X		0	Fora Response: District has indicated that this is not something they are looking for from an operational perspective.
R14	Retain existing 6' fence at existing parking property lines (ILO Demo)	545			X	2,000	Fora Response: Existing fencing at property line by bank will be retained where it is in good condition.
R15	Steel bar joist framing ILO WF steel at penthouse roof	48,637		X		0	PCS Response: Penthouse mechanical space will have considerable amount of overhead heavy piping and duct routing that would require to be suspended from and seismically braced by the roof framing. Proposed steel bar joist would limit the loading magnitude and location of point loads at panel points/truss joints and therefore limit the flexibility on site. In addition, fall restraint roof anchors would be required and developing the forces on top of steel bar joists will be challenging. Therefore, we would not recommend the change.
R16	Storefront ILO curtainwall (add aluminum panel clad exterior wall to reduce height to 12')	441,924			X	220,962	HOA Response: Design Team will review and consider. Additional design options will be presented to the district for consideration.
R17	Increase OH access door for large equipment through parking lot to east of Aero-Space MFRG. to 10'x12' with vision glass.	(1,402)		X		0	HOA Response: Size of existing proposed door is appropraite for the program needs. Will discuss with the Owner if this should be glazed to allow more light into the space or if it should remain solid for security reasons.
R18	Rigid insulation with thermal clip ILO structural insulated panel	258,881		X		0	HOA Response: The design team does not believe this item will result in a savings. Cost estimater will evaluate during the DD estimate.
R19	TPO in lieu of modified bituminous roofing system	47,607			X	0	HOA Response: Although this is a viable option to save money, the currently specified roofing system matches the current Phase 1 roof making it easier for district maintenance.
R20	True brick Wainscott at base to protect wall from impacts and splashback staining.	18,949		X		0	HOA Response: Phase 2 should reflect the Phase 1 design language. Owner has not had any issues with exterior panels at ground level.

CLIENT:	Sumner-Bonney Lake School District
PROJECT:	SUMNER HIGH SCHOOL ADDITION - PHASE 2
DATE:	September 12, 2025

Prop. #	COMPONENTS AND SYSTEMS	PROJECTED COST REVISION (Rough Order of Magnitude)	ACCEPT	REJECT	MODIFY	ACCEPTED VALUE OF PROPOSAL	COMMENTS / DISCUSSION
R21	Reduce aluminum window and storefront glazing by 10%	23,453			X	23,453	HOA Response: Location and size of glazing will continue to be refined as trhe design progresses.
R22	Reduce vinyl wall coverings and replace with paint at 50% of the area.	361,043		X		0	HOA Response: Vinyl wallcovering locations in Phase 2 are to match typical locations provided in Phase 1.
R23	Stained Concrete (no grind) ILO polished concrete.	183,686		X		0	HOA Response: Phase 2 should reflect the Phase 1 design language. District prefers polished concrete.
R24	Solid surface counters ILO Plam (in science and mfrg labs)	(34,577)	X			0	HOA Response: Epoxy resin countertops are proposed in the Horticultural and Agricultural Science Rooms. There is no built-in countertops in the Aero-Space Manufacturing Lab.
R25	Add 500 SF of Unistrut grid to Robotics ceiling	(10,512)		X		0	HOA Respoonse: Not required for program. Do not recommend added cost.
R26	Include glass casework in hallways outside robotics/digital media classrooms to showcase students work	(20,000)	X			0	HOA Response: Display cabinets are proposed in the corridors.
R27	Select more economical vinyl wall covering product (reduce from $15.56 / SF to $10 / SF)	258,023		X		0	HOA Response: Recommend selection of the same vinyl wallcovering to match what was installed in Phase 1.
R28	Mobile aisle high-density storage system for Aero-space manufacturing & Robotics (add in FFE budget)	(75,000)		X		0	HOA Response: Not required for the program.
R29	Expand a restroom to also accommodate nursing mothers (including casework)	(10,000)		X		0	HOA Response: Consider for Phase 3.
R30	Provide ceiling active beam filter access device for Maintenance Staff (rolling step ladder/platform or lift) coordinated with the furniture plan.	(2,500)		X		0	Metrix Response: Chilled beams do not have a filter. Vacuum of coils is typically required every 5 years.
R31	Integrate "Sesame Exposed Grid Ceiling Hatches" into ACT ceiling systems (50 ea) to facilitate maintenance of the hydronic and plumbing distribution piping, valves and controls.	(59,568)		X		0	Metrix Response: Mechanical items requiring service will be located above accessible ceilings or access panel provided otherwise.
R32	Covered drive drop off area at childcare (15' long by 10'w).	(31,536)		X		0	HOA Response: Recommend waiting until DD estimate is completed and evaluate if added cost is within budget.
R33	Provide 30% more outside air capacity than code minimum for improved health, well-being and economizer (free) cooling.	(300,000)	X			0	Metrix Response: Deisgn already allows for 30% more oustide air capacity in classrooms compared to code baseline. Previous budget included this cost.
R34	Non-metallic ILO metallic hydronic heating & cooling water distribution.	180,000		X		0	Metrix Response: Industry standard is metal pipe for hydronic piping for 50 year life cycle durabiity at the temperatures required for the heating water loop.
R35	Semi ILO fully-ducted DOAS return air. (simplifies and reduces ducting, saves energy, loss of WSSP credit).	100,000		X		0	Hargis Response: Revision to plenums in the hallways would require Plenum rated inrastructure (piping) and telecom cabling at 40% premium on the cabling. Metrix Response: Does not improve air quality and removes a WSSP point the project is targeting to achieve compliance with WSSP. Credit may not include added costs for plenum rated materials to achieve.
R36	Open-source control system ILO sole-source.	680,000			X	Modify	Metrix Response: Cost savings identified does not appear reasonable based on cost opinion for contols. Non-basis controls contractor will be requried to replace controls of phase 1, leading to signficant additional costs. Design team will continue to develop best approach to move forward.

CLIENT:	Sumner-Bonney Lake School District
PROJECT:	SUMNER HIGH SCHOOL ADDITION - PHASE 2
DATE:	September 12, 2025

Prop. #	COMPONENTS AND SYSTEMS	PROJECTED COST REVISION (Rough Order of Magnitude)	ACCEPT	REJECT	MODIFY	ACCEPTED VALUE OF PROPOSAL	COMMENTS / DISCUSSION
R37	Fixed-core DOAS heat recovery ILO heat wheels to eliminate cross-contamination and airborne contagion risk.	(150,000)		X		0	Metrix Response: Current heat wheel design and unit layout reduces cross-contaimination to a minimum. Added cost likely does not include additional mechanical room space to accommodate larger fixed-core units that can achieve the same heat recovery efficiency.
R38	Wild-fire and airborne contagion HVAC control modes.	(25,500)	X			0	Metrix Response: Phase 2 controls design includes wild-fire and airborne contagion HVAC control modes. Previous budget included this cost.
R39	Reduce pre-heating and pre-cooling at DOAS units; heat recovery pre-heats and pre-cools, with final heating and cooling by the active beams.	140,000		X		0	Metrix Response: Cooling within DOAS cannot be reduced as it is sized to address 100% of the latent load within spaces served. Chilled beams do not address latent load. Heating within DOAS is sized as small as possible to ensure comfortable delivery temperature within the space. Coil sizes cannot be reduced.
R40	Premium efficiency air handling equipment fans and motors ILO code minimum.	(50,000)	X			0	Metrix Response: Motors for fans are ECM and not code minimum efficiency. Previous budget included this cost.
R41	Ceiling fans for high-bay space and classrooms	(120,000)		X		0	Metrix Response: Classrooms provided with mechanical cooling and therefore ceiling fans do not improve comfort. Only high-bay space is CTE aerospace and clear ceiling area is required for MEP services.
R42	DDC monitoring of Walk-in Cooler Temperature Alarms	(1,700)	X			0	Metrix Response: DDC will monitor walk in cooler. Previous budget included this cost.
R43	Non-metallic (PEX) ILO metallic piping	100,000	X			0	Metrix Response: Phase 1 allowed PEX piping. Phase 2 design allows PEX piping. Previous budget included this credit.
R44	Sleeve grade-beams for gravity waste piping ILO multiple sewer connections	42,500	X			0	PCS Response: Sleeving through grade beams has been considered and detail 11/S3.01 has been added for structurally acceptable grade beam penetration requirements. Additional grade beam penetrations (for ease of sewer routing) not in compliance with typcal detail 11/S3.01 requirements will be evaluated on case by case basis as/if requested by mechanical engineer.
R45	Heat pump domestic water heater ILO gas-fired	(150,000)		X		0	Metrix Response: Masterplan and phase 1 infrastructure was designed for gas water heaters.
R46	Water Isolation Valves per room for maintenance.	(30,000)	X			0	Metrix Response: Metrix will provide isolation valves to zone groups of fixtures and majority of fixtures are provided with fixture isolation valves. Previous budget included this cost.
R47	Monitoring wells below each end of building	(15,000)		X		0	JCE Response: REJECT – Adding monitoring wells would provide little benefit, as no new information would be obtained beyond what is already available from the geotechnical reports and exploration borings.
R48	Change to non-plenum cabling where not installed in plenum spaces.	14,507		X		0	Hargis Response: Our basis of design is already noted as non-plenum. Cost savings is already incldued in design.
R49	Option for set screw instead of compression fittings, connectors and couplings for conduit.	92,556		X		0	Hargis Response: Our basis of design already includes set screw typ fittings. And not compression type. Cost savings is already incldued in the design.
R50	Include Power monitoring display near CTE wing for real time display of power use and generation learning (Corridor 460?)	(11,914)		X		0	Hargis Response: Defer to the owner regarding provide an energy dashboard. Owner confirmed dashboard not desired.
R51	Add equipment status panels at each lab space	(13,315)		X		0	Hargis Response: It's not clear what this is. VE team needs to clarify what this item is.

CLIENT:	Sumner-Bonney Lake School District
PROJECT:	SUMNER HIGH SCHOOL ADDITION - PHASE 2
DATE:	September 12, 2025

Prop. #	COMPONENTS AND SYSTEMS	PROJECTED COST REVISION (Rough Order of Magnitude)	ACCEPT	REJECT	MODIFY	ACCEPTED VALUE OF PROPOSAL	COMMENTS / DISCUSSION
R52	Coordinate with gear manufacturer to incorporate demand power metering ILO separate field install metering.	9,110	X			9,110	Hargis Response: We agree with this approach and will allow the gear manufacturer integral meters.
R53	Tunable Lighting for Child Development, Dev. Learning, Life Skills, Toddlers, Infants Areas	(16,819)	X			(16,819)	Hargis Response: Owner confirmed, tunable lighting is desired to be provided in both early child development areas as well as in OT/PT, ILC spaces. Will confirm exact spaces in post DD owner page turn.
R54	Additional interior motion sensors and door position switches for intrusion alarm at spaces with expensive equipment and tools (Robotics, Fabrication, Aerospace Labs).	(21,024)			X	(10,000)	Hargis Response: Hargis to review spaces identified as part of the follow up with district security team to asses security posture at the locations identified.
R55	Provide enhanced fire alarm detection, including specialty labs, shops and culinary arts; maybe child development and Developmental Learning spaces.	(24,528)		X		0	Hargis Response: Owner confirmed additional fire alarm devices is not required or desired. Code minimum system provides adequate detection of the school.
R56	Overhead festoon lighting at courtyards	(6,307)		X		0	Hargis Response: We believe by festoon, they mean catenary lighting. Catenary lighting is very aimed as aethetic/ environment / event usage lighting. Costs represented here are very low compared to our experience with catenary lighting. There are also addition costs for structural attachment/ design of the horizontal cables required for the catenary lighting to mount to which are represented here. Owner confirmed this is not desired. Fora Respoonse: These would improve the look of the courtyards, particularly to the north. However they would add cost and maintenance requirements that may not be justified.
	GRAND TOTAL ALL PROPOSALS					$ 52,816.48	

The owner has reviewed each of the Value Analysis proposals and recommends the responses contained herein.	GENERAL COMMENTS REGARDING THIS VALUE ANALYSIS STUDY:
by	Matt Quilanians
title	Bond Program Manager / Owner's Representative
date	10/11/25

CREATIVITY ALTERNATIVES SHEETS

The creativity alternatives sheets are a record of options discussed during the workshop. They are included here to illustrate the range of options considered during the study for key project elements.

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Construction Management

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Control	Costs	5	Communicate	Information
2	Ensure	Safety	6	Organize	Workflow
3	Control	Schedule	7	Document	Construction
4	Reduce	Risks	8	Reduce	Waste

# leave blank	votes			ALTERNATE PROPOSALS
			1	No GCCM
T2			2	Define requirements for aggressive dewatering starting at mobilization and continuing throughout duration.
T2			3	BIM model for MEP and all trade coordination
			4	Early site work package (what can occur in the Summer?)
T2			5	Long-lead pre-ordering (Electrical, HVAC, etc...)
			6	Over-the-shoulder reviews with AHJ, leading up to permit submittal to minimize risk for permit delays.
T2			7	Unit price or alternate bids for unsuitable materials to manage risk for change orders
T2			8	Specify requirements for timely submittals to limit exposure to lead time or escalation issues
			9	CTE outreach with district, provide student opportunities to learn about construction and follow project progress.
			10	Delay parking lot demo, use for contractor parking and staging, develop drop-off and parking at end of project.
T2			11	Identify where past project sub-contractor parking occurred off-site (adjacent church? or other as sub-contractor parking during peak)... shuttle to jobsite.
*			12	Develop IAQ Management plan per WSSP
T2			13	Develop air barrier leakage test plan (and provide in Permit document set)
			14	Commission thermal envelope with independent third party BECx
			15	Early site work package (what can occur before Summer break?)
T2			16	Have GCCM develop a formal logistics plan
.			17	Develop positive neighbor outreach program to ease concerns, reduce complaint risk, provide progress reports and contacts for response to issues.
*			18	Target 95% waste diversion
.			19	Install web cam for education and "Stop motion" development (include district use for public progress updates).
*			20	Host multiple pre-bid period information sessions to enhance bidder interest.
			21	Pre-Approved Traffic Control Plans included in bid packages as sample basis of design
			22	Dust Control Measure Plans
T2			23	Utilize a single project management software for all project team collaboration and document controls (Require Procore).
			24	
T2			25	Define daily site clean up requirements.

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Construction Management

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Control	Costs	5	Communicate	Information
2	Ensure	Safety	6	Organize	Workflow
3	Control	Schedule	7	Document	Construction
4	Reduce	Risks	8	Reduce	Waste

# leave blank	votes			ALTERNATE PROPOSALS
T2			26	Define site development phasing requirements for GCCM (especially schedule limits on activities impacting Phase I building and utilities).
			27	Contractor to provide BIM model to improve construction and support O&M after occupancy.
T2			28	Retain Independent third party Constructability Review, and require GC/CM serve on CR team review.
*			29	Enhanced project completion turn-over package including Commissioning Provider (CxP) review of O&M Manual, verify Owner training, as-built plans and similar.
T2			30	Identify lessons learned for all disciplines from Phase 1 and take action as needed to improve Phase 2.

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Civil

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Detain	Storm	5	Store	Vehicles
2	Filter	Storm	6	Circulate	Vehicles
3	Convey	Storm	7	Circulate	Pedestrians
4	Pump	Storm	8	Convey	Waste

# leave blank	votes			ALTERNATE PROPOSALS
			1	Above ground detention storage tank for roof drainage
C1			2	Grade courtyards to surface drain away from Phase1 and 2 buildings in the event that drain pipes become blocked
			3	Porous pavement for pedestrian walkways and courtyards
			4	Review exposed concrete alternates due to excessive cracking
C1			5	Use an edge drain ILO catch basins in the courtyards
			6	Retain existing parking layout and add for more (ILO re-work)
			7	Precast concrete vault ILO R-Tank
T2			8	Pothole utilities during design ILO during construction, assign to GCCM pre-work
			9	Add right-turn lane Westbound main at approach to west driveway
			10	Provide composite decking ILO concrete for courtyard areas to reduce impervious surface area
			11	Heated sidewalk to eliminate ice hazard in winter
C1			12	Grade pavement to convey stormwater and reduce storm pipes and catch basins
			13	Provide colored or textured walkway to facilitate wayfinding
R1			14	Use pavers ILO concrete in courtyards (assume 50%)
			15	Raise finish floor elevation to ease sanitary sewer connections from building
R2			16	Raise concrete crosswalks to slow traffic and improve safety
R3			17	Provide 1,000 SF covered walkway between entrances of main building and animal science-green house buildings
			18	Pond ILO vault
			19	Use an existing regional storm water detention facility
?			20	Large diameter concrete pipe instead of vault
*			21	Stormtech vault
			22	Injection well for disposing stormwater
			23	Expand Bioswale areas
			24	Rainwater harvesting to reduce storm load
			25	Pervious parking pavement ILO impervious
			26	Grass-crete ILO paved parking
			27	Detention vault under building ILO site
			28	Gravel parking ILO paved parking

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Civil

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Detain	Storm	5	Store	Vehicles
2	Filter	Storm	6	Circulate	Vehicles
3	Convey	Storm	7	Circulate	Pedestrians
4	Pump	Storm	8	Convey	Waste

# leave blank	votes			ALTERNATE PROPOSALS
			29	Treat storm water for make-up to campus swimming pool
			30	Sheet flow storm to neighboring properties
			31	Paved drive lanes with gravel parking stalls
			32	Eliminate onsite parking to eliminated need for water treatment
			33	Mandate all-electric vehicles (EVs) to reduce oil contamination of storm water
			34	Kinetic Pavers to generate power for pedestrian lighting, wayfinding, irrigation controller.
			35	One story parking structure with sports courts on top level
			36	Composting storm water filtration ILO cartridge type
			37	Sand-filter ILO bio-cartridge type storm water filtration
			38	Bioswale ILO cartridge type storm water filtration
			39	Route discharge from new vaults to bypass existing vaults to city sewer system
			40	Bucket brigade ILO piped storm water convenance
			41	Pre-filter storm at catch basins ILO all at cartridge system
			42	Designated flood area to deliberately allow flooding during heavy rain events
R4			43	Add Silva cells at pacing lot planter islands for storm water treatment, detention, and promoting tree health.
			44	Reconfigure catch basin layout to improve efficiency
			45	Filterra planted vaults for storm treatment
			46	Solar-powered storm water pumps
			47	Seniors or car-pool only parking (to reduce parking stalls required).
			48	Retain existing parking lot, and match grades with new (revise design of new to meet parking count).
C2			49	Reduce heavy pavement to just the main drive through lane used by buses and Fire
			50	Parking racks to double parking density
			51	Pay parking (waived for carpooling)
			52	Offsite parking with shuttle
			53	Offsite parking with enhanced pedestrian safety features
R5			54	Add covered bike parking (assume 8'w x 15'L)
			55	Secured bike parking in courtyard, and include pump and repair tool kits to further promote bicycle use.
			56	E-bike and e-scooter program (Ride share company such as Lime)

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Civil

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Detain	Storm	5	Store	Vehicles
2	Filter	Storm	6	Circulate	Vehicles
3	Convey	Storm	7	Circulate	Pedestrians
4	Pump	Storm	8	Convey	Waste

# leave blank	votes			ALTERNATE PROPOSALS
			57	Bicycle technology program in collaboration with CTE program
			58	Interior secured bike parking
*			59	E-bike and scooter battery chargers.
			60	Designate official rideshare e-bike / scooter parking area
			61	PE credit for riding bike
			62	More Carpool Parking Stalls
			63	Self-driving vehicle fleet for student use in morning and afternoon; to community at other times
R6			64	Extend sidewalk in parking lot (in front of greenhouse) to connect with sidewalk in Mason Street
*			65	Provide drop curb to improve material delivery access from east parking to Aero-Space Greenhouse and Animal Science, include access for culinary loading
			66	Widen sidewalks on the south side of the Phase 2 building and along Main Street
			67	Provide a delivery truck drop off access area on Mason to the Greenhouse, Animal Sci., and Aero-Space
			68	Provide curb-cut ramp and delivery access for Aero-space Mfg., Greenhouse, and Animal Sci.
*			69	Relocate grease interceptor vault away from Aero-space Mfg. overhead door.
			70	On-site waste water treatment system
			71	Sanitary sewer ejector (pump) station with fewer connections to building
R7			72	Hydromechanical grease interceptor ILO vault-type

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Landscape

FUNCTIONS:	2-word: Active Verb / Measurable Noun		Active Verb / Measurable Noun	
1	Beautify	Site	5 Secure	Site
2	Screen	Views	6 Rest	Pedestrian
3	Shade	Occupants	7 Secure	Bikes
4	Allow	Infiltration	8 Hydrate	Vegetation

# leave blank	votes		ALTERNATE PROPOSALS	
			1	Plant more trees and drought tolerant shrubs and ground cover and less grass
			2	Add plaque about the original occupants of the school site
R8			3	Spade out existing trees and re-plant (ILO remove at (E) parking islands, etc...)
R9			4	Add sculpture or artforms to enhance aesthetics (FF&E budget)
			5	Harvest rainwater for irrigation
			6	Add roof garden to reduce stormwater runoff
R10			7	Add moveable planted pots to courtyard areas (add in FFE budget)
			8	Provide informational plaques that identify native plants
			9	Use soaker hoses ILO sprinklers for planted areas
			10	Add inspirational quotes imprinted in the walkways or stairs
R11			11	Provide smart irrigation controls with weather sensors
			12	Enhance pedestrian lighting with low level lighting along walkways
			13	Add canopy over daycare play area
			14	Add retractable canopy over courtyards
			15	Add portable heating units to north courtyard
			16	Add permanent overhead radiant heat at north courtyard
			17	Decorative fence ILO chain-link on north side of building
R12			18	Add umbrellas and tables in courtyards (add via FF&E)
			19	Outdoor classroom in S. courtyard
			20	Sparts (childcare) play area in courtyard ILO adjacent to bus drop-off
L1			21	Concrete panels in courtyard separated by decorative gravel drain rock (for enhanced infiltration).
			22	Enclose north courtyard
			23	Add gas fire pit to north courtyard
			24	Replace some paving with more landscaping to reduce impervious / storm detention
			25	Substantial dog run at Animal Science and Greenhouse ILO small outdoor pen only
R56			26	Overhead festoon lighting at courtyards
			27	Wind Sail shade canopy at courtyards
R13			28	Install vehicular gate at mainstreet drive entrance to thwart bypassing intersection and cutting through site.

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Landscape

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Beautify	Site	5	Secure	Site
2	Screen	Views	6	Rest	Pedestrian
3	Shade	Occupants	7	Secure	Bikes
4	Allow	Infiltration	8	Hydrate	Vegetation

# leave blank	votes			ALTERNATE PROPOSALS
R14			29	Retain existing 6' fence at existing parking property lines (ILO Demo)
			30	Add soil conditioner to help retain moisture and minimize irrigation requirements at landscape areas.
			31	Temporary irrigation ILO permanent
			32	Drip irrigation systems ILO high volume heads.
			33	Use reclaimed water for irrigation (purple pipe).
			34	Install tree bags for new tree establishment irrigation ILO permanent irrigation system.
			35	Verify trees are wet root compatible species

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Structural

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Protect	Occupants	5	Span	Space
2	Resist	Gravity	6	Resist	Settlement
3	Resist	Lateral	7	Control	Vibrations
4	Distribute	Loads	8	Exclude	Moisture

# leave blank	votes		ALTERNATE PROPOSALS	
S1			1	PT Slab ILO thick first floor slab with grade beams
			2	Floating foundation ILO pile
*			3	Precast Concrete spandeck first floor
R15			4	Steel bar joist framing ILO WF steel at penthouse roof
*			5	Thicker flat slab versus grade beam and separate slab
.			6	Specify slab crack control in Specs with penalties for non-conformance
S2			7	Thicker concrete fill over metal deck with chaired deformed reinforcement crack control
*			8	List different deep foundation system as alternate (allow bidder choice)
			9	Design-build foundation option with performance specs
.			10	Water proofing concrete admixture in lieu of underslab membrane
			11	Slope Roof Structure more locations
			12	Post tensioned building with wide shallow beam floor structure and concrete shear walls
			13	Mass Timber
			14	Match Phase 1 second floor elevation
			15	Raise phase II slab (to help with sub-grade utilities), add ramps.
			16	Lower Phase II slab to match phase I and eliminate ramping
			17	Pre-engineered light wt building and reduce pile foundation elements.
			18	Thin brick ILO brick masonry to lighten structure
			19	Eliminate Brick and replace with light weight cladding
			20	Precast concrete lift slabs for floor system
			21	Podium first floor structure with light super-structure for 2nd, 3rd and Penthouse levels
			22	Lift (jack) slab system (ILO composite decks)
			23	Structural foam in lieu of thicker slab
			24	Eliminate the penthouse to lighten foundation load; use rooftop HVAC equipment
			25	Structural foam ILO sub grade imported rock
			26	Floating mat slab
			27	Cable-stayed structure
			28	Inflatable dome
			29	Freeze subgrade

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Structural

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Protect	Occupants	5	Span	Space
2	Resist	Gravity	6	Resist	Settlement
3	Resist	Lateral	7	Control	Vibrations
4	Distribute	Loads	8	Exclude	Moisture

# leave blank	votes			ALTERNATE PROPOSALS
			30	One or two story building
			31	One story light construction, moving parking.
			32	Geodesic dome structure ILO rectangular
			33	Two-story ILO three-story building (with or without penthouse) to lighten foundation load
			34	Suspension bridge between phases 1 and 2
			35	Sealed concrete ILO Polished Concrete
			36	Add sawtooth roof over Aeronautics with north facing clerestory windows
			37	Provide Unistrut members perpendicular to WF beams at bottom of steel framing in all class rooms North end of fist floor for current and future attachments of lifts or equipment in technical classrooms.
*			38	Adjust floor framing beams between Grids K & J to not block stacked restroom plumbing chase between restrooms (example see Section 1/A9.01)

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Architectural Exteriors

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Secure	Interior	5	Attenuate	Noise
2	Shed	Moisture	6	Endure	Time
3	Define	Aesthetics	7	Access	Building
4	Insulate	Space	8	Transmit	Light

# leave blank	votes		ALTERNATE PROPOSALS	
			1	Review wall panels at all exterior walls [insert specific idea]
			2	Enhance thermal properties of envelope
R16			3	Storefront ILO curtainwall (add aluminum panel clad exterior wall to reduce height to 12')
			4	Vegetated roof
			5	Operable windows ILO fixed
			6	Clerestory over Aeronautics area
A1			7	Reduce glazing in Bridge to just ribbon windows, (not full ht glass)
			8	Cover north courtyard with roof. Add skylights and large fans for light and ventilation.
			9	Eliminate bridge to Phase 1 building.
			10	Modify bridge to Phase 1 building. Main story corridor only with open walkway on top (2nd level access).
A2			11	Modify bridge to Phase 1 building. 2nd story structure only. Allows covered walkway at main floor and open walkway on top (3rd floor access).
			12	Rotate building 90 degrees to the north side and connect buildings at 2nd and 3rd floors with a corridor between. Courtyard covered by 2nd floor and open to the south.
			13	Add single direction sloped roof with attic to conceal and house mechanical equipment.
			14	Eliminate brick veneer on building and use same siding as 2nd and 3rd floor.
			15	Create unique design for phase 2 using existing phase 1 material palette.
?			16	Use prefabricated Structural Insulated Panels (non-combustible) in lieu of current proprietary and metal stud assembly.
R17			17	Increase OH access door for large equipment through parking lot to east of Aero-Space MFRG. to 10'x12' with vision glass.
			18	Reduce number of unlocked exterior doors. Limit access to select doors with lock-down provisions (building access only at 125 and 427 during open arrival times).
			19	Raise bottom of windows on 1st floor, to make intruded access more difficult
*			20	Conduct a CPTED study and implement resultant recommendations.
*			21	Vary glass laminate thicknesses of sandwich on West elevations to improve STC rating from train tracks (+_ 870 feet away)
R18			22	Rigid insulation with thermal clip ILO structural insulated panel
?			23	Look alike Sintered exterior cladding ILO exact match
			24	Utilize less expensive cladding in less visible areas
R19			25	TPO in lieu of modified bituminous roofing system
			26	Anti graffiti coating on bottom level of exterior wall panels and cladding

CLIENT: Sumner-Bonney Lake School District

PROJECT: Sumner High School Addition - Phase 2

COMPONENT: Architectural Exteriors

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Secure	Interior	5	Attenuate	Noise
2	Shed	Moisture	6	Endure	Time
3	Define	Aesthetics	7	Access	Building
4	Insulate	Space	8	Transmit	Light

# leave blank	votes			ALTERNATE PROPOSALS
			27	Peaked roof ILO flat, forming mechanical mezzanine along spine of building (partial attic).
			28	Building-integrated photo-voltaic (PV) for penthouse roof ILO free-standing PV panel.
			29	Increase STC rating at Childcare ext. assembly with CMU block and spray foam
			30	Cortan steel exterior skin
			31	Protective coating @ Sintered wall panels
			32	Provide roof eaves ILO parapet to add protection for walls
R20			33	True brick Wainscott at base to protect wall from impacts and splashback staining.
R21			34	Reduce aluminum window and storefront glazing by 10%
			35	Open stair tower to South ILO fully enclosed.
			36	More storefront ILO curtainwall

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Architectural Interiors

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Define	Space	5	Define	Aesthetics
2	Isolate	Sound	6	Protect	Privacy
3	Control	Access	7	Hide	Storage
4	Support	Equipment	8	Access	Systems

# leave blank	votes			ALTERNATE PROPOSALS
			1	Remove elevator stop at mechanical penthouse
R22			2	Reduce vinyl wall coverings and replace with paint at 50% of the area.
R23			3	Stained Concrete (no grind) ILO polished concrete.
R24			4	Solid surface counters ILO Plam (in science and mfrg labs)
			5	Eliminate acoustic ceilings and use open cloud ceilings including classrooms.
			6	Add more interior relights for supervision to adjacent spaces.
			7	Provide black-out shades for relights for use during lock-down events.
			8	Provide card-key access control to all classrooms, shops and offices.
*			9	Color coded wall paint colors to identify different functions.
			10	Demountable partitions ILO fixed.
*			11	Provide wall wraps in corridors that specifically celebrate functions with interesting and inspiring graphics (Aerospace history and innovation, Culinary Arts, etc...) Use percentage of VWC budget.
			12	Designate classroom space adjacent to Culinary Arts to double as a dining room for culinary arts special events (community fundraiser dinners).
*			13	Access control at Childcare lobby 427 + larger relites at Infant / Toddler entries for good visibility (door bell to enter and door release from inside) A-Phone.
			14	Designate 5, 10 and 30-year walls for long-term adaptability as programs change.
			15	Add chain hoist in Aerospace for lifting heavy loads.
R25			16	Add 500 SF of Unistrut grid to Robotics ceiling
			17	Add Unistrut grid to Robotics Fabrication
			18	Add gantry crane to Aerospace ceiling
			19	Add pegboard wall for tools in aerospace, robotics, and fabrication
			20	Operable partitions between one pair of classrooms on north and south wings of 2nd and 3rd floors for instructional flexibility.
R26			21	Include glass casework in hallways outside robotics/digital media classrooms to showcase students work
R27			22	Select more economical vinyl wall covering product (reduce from $15.56 / SF to $10 / SF)
			23	Add relites at corridor walls to allow viewership at culinary arts.
			24	Add Culinary Arts service counter / point of sale window / vending casework.
R28			25	Mobile aisle high-density storage system for Aero-space manufacturing & Robotics (add in FFE budget)

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Architectural Interiors

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Define	Space	5	Define	Aesthetics
2	Isolate	Sound	6	Protect	Privacy
3	Control	Access	7	Hide	Storage
4	Support	Equipment	8	Access	Systems

# leave blank	votes			ALTERNATE PROPOSALS
			26	Convert gender separated toilets to more secure and equitable gender neutral stalls (or consider conversion on 1 or two floors for choice)
R29			27	Expand toilet 444 to also accommodate nursing mothers (including casework)
			28	Tunable lighting in Dev. Learning and Child Dev. and Toddler/Infant Spaces.
			29	Expand penthouse by 1000 sf for maintenance support.
R30			30	Provide ceiling active beam filter access device for Maintenance Staff (rolling step ladder/platform or lift) coordinated with the furniture plan.
			31	Aerospace Classroom eliminate suspended ceiling (expose structure), and install Unistrut grid (for hanging display and educational elements).
R31			32	Integrate "Sesame Exposed Grid Ceiling Hatches" into ACT ceiling systems (50 ea.) to facilitate maintenance of the hydronic and plumbing distribution piping, valves and controls.
			33	Add acoustic panels at tech teaching and learning spaces with exposed structure.
*			34	Light wells integrated with mechanical shafts.
			35	Add suntubes to transmit daylight into interior spaces.
			36	Floor hatch at penthouse ILO Elevator stop

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Planning

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	[Articulate	Requirement]	5		
2			6		
3			7		
4			8		

# leave blank	votes		ALTERNATE PROPOSALS	
A3			1	Partial Cover outdoor play area
			2	Covered walkway between main building and animal science building
			3	Enclosed walkway between main building and animal science building
			4	Dark and dreary north courtyard [is there a specific alternative idea?]
			5	Culinary Arts on 1st Floor
			6	Prepare shop/lab equipment list
			7	Eliminate Connection at all levels
			8	Adjust story height to match elevations 2&3 of Phase1 building (no ramps, reduce floor 1 ceiling height).
			9	Add roof deck at north end building
			10	Covered walk to greenhouse and Animal Sci buildings
			11	Only Gound floor covered walk to phase 1 (eliminate 2nd and third floor bridges)
			12	Relocate greenhouse to above aerospace roof deck.
			13	Two ILO three story Bldg
			14	Retractable roof over courtyard
?			15	Industry trade partners - shop and lab equipment by District trade partner (local business)
R32			16	Covered drive drop off area at childcare (15' long by 10'w).
			17	Parking structure at west side parking lot
phase III			18	WELL or Fitwel for improved staff & student Health & Well-being and enhanced learning environment
			19	Podium Building with parking below to increase site flexibility and ease sewer and other utilities (bridge to phase1 building floors 2 & 3).
			20	Add covered drive-thru for drop off of children at child care.
			21	Add private shower/changing for staff (esp. bicycling).
			22	Covered walk only to Phase 1 (no multi-story bridges and not enclosed).
			23	Translucent panel system ILO 3-story curtain wall system at vestibule with individual vision panels added at each floor.
			24	Translucent panel system with vision glass panels at corridor Bridge ILO Curtain wall glass
			25	Move Culinary Arts to first floor for improved food and supply delivery and ship-out.
			26	Move Culinary Arts toward the bridge to Phase 1 to facilitate food delivery to Commons for special events / demonstration.

CLIENT: Sumner-Bonney Lake School District

PROJECT: Sumner High School Addition - Phase 2

COMPONENT: Planning

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	[Articulate	Requirement]	5		
2			6		
3			7		
4			8		

# leave blank	votes			ALTERNATE PROPOSALS
			27	Provide a flexible classroom adjacent to Culinary Arts to serve as a dinning room during special events.
			28	Feature stair B between 1st and 2nd floor to support special events and enhance circulation; especially related to the Culinary Arts program.
			29	Relocate the Greenhouse to the penthouse level of the Phase 2 building for improved solar access and reduced site impervious surface.
			30	Incorporate Animal Science into the Phase 2 building to simplify site development and reduce impervious surface.
			31	Tiny Sparts as a separate building ILO Animal Science and Greenhouse.

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: HVAC

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Distribute	Air	5	Chill	Fluid
2	Distribute	Fluid	6	Heat	Fluid
3	Control	Systems	7	Condition	Space
4	Handle	Air	8	Exhaust	Fume

# leave blank	votes		ALTERNATE PROPOSALS	
* M1			1	Premium thermal envelope for Integrated design with down-sized HVAC system.
			2	Active (geothermal) pile, producing condenser water for all-electric ground-source heat pump HVAC system.
			3	WA State Clean Buildings Compliance Plan (roadmap to zero net energy).
			4	Do not build in additional Phase 3 capacity now.
			5	Eliminate Penthouse to reduce building mass, hence reduced foundation pile depth; also reduces fan energy.
			6	Sub-meter Phase 2 Utilities.
			7	Design Outbuilding MEP.
			8	Compile Phase 1 lessons learned (received after start of VE Study).
*			9	Four-pipe ILO six-pipe hydronic, simplify controls and system, but address condensation concern.
			10	No new gas, return to original all-electric building design.
			11	Use auger-cast pile for ground source heat pumps (active pile - see above).
			12	Horizontal ILO vertical air distribution.
?			13	Non-metallic ILO galvanized sheet metal duct.
R33			14	Provide 30% more outside air capacity than code minimum for improved health, well-being and economizer (free) cooling.
			15	Fabric duct air distribution in shop/lab spaces ILO sheet metal.
			16	Basement air handling equipment ILO penthouse.
			17	Provide system of underground utilidors to ease installation of utilities in the future including phase 3.
R34			18	Non-metallic ILO metallic hydronic heating & cooling water distribution.
* M2			19	One six-way ILO two two-way valves for zonal active beam hydronic water control; reduce from four to two-pipe connection to each active beam.
R35			20	Semi ILO fully-ducted DOAS return air. (simplifies and reduces ducting, saves energy, loss of WSSP credit).
			21	Air handling mezzanine between floors ILO penthouse to reduce ductwork.
			22	One small DOAS unit in ceiling space for each temperature control zone ILO larger shared DOAS units in penthouse - eliminate the penthouse.
R36			23	Open-source control system ILO sole-source.
T2			24	GCCM team review of control system to identify recommended economies.
			25	Incorporate lessons learned from reported on-going Phase 1 control problems.

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: HVAC

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Distribute	Air	5	Chill	Fluid
2	Distribute	Fluid	6	Heat	Fluid
3	Control	Systems	7	Condition	Space
4	Handle	Air	8	Exhaust	Fume

# leave blank	votes		ALTERNATE PROPOSALS	
*			26	Integrate HVAC and lighting controls into one building automation system (BAS).
T1			27	High-efficiency DOAS heat recovery ILO code minimum.
R37			28	Fixed-core DOAS heat recovery ILO heat wheels to eliminate cross-contamination and airborne contagion risk.
			29	UV sterilization of recirculation air, such as in classroom overhead space.
R38			30	Wild-fire and airborne contagion HVAC control modes.
R39			31	Reduce pre-heating and pre-cooling at DOAS units; heat recovery pre-heats and pre-cools, with final heating and cooling by the active beams.
			32	Operable windows as back-up to the HVAC system for ventilation and cooling.
			33	Full economizer (free) cooling via over-sized DOAS system capacity.
R40			34	Premium efficiency air handling equipment fans and motors ILO code minimum.
			35	Add area for stand-alone phase II central plant (retain Phase 1 as is).
			36	All-electric air-source heat pump ILO boiler/chiller plant; and reduce PV system size to normal code minimum (not fossil fuel path).
			37	All-electric ground-source heat pump (GSHP) ILO boiler/chiller plant.
			38	Radiant floor for full heating and partial cooling with DOAS ILO active beam
R41			39	Ceiling fans for high-bay space and classrooms
			40	VRF with DOAS ILO active beam
			41	Single-zone rooftop units ILO DOAS with active beams
			42	High-efficiency kitchen hood system ILO code minimum for culinary arts
			43	Source capture exhaust snorkel in Aero-Space
			44	Provide exhaust system with flex connects for fabrication equipment exhaust and adjustable point exhaust.
			45	Merv 13 or better air filters
			46	Electrostatic filters
R42			47	DDC monitoring of Walk-in Cooler Temperature Alarms
			48	Mechanical equipment in pre-fabricated modular penthouses craned onto roof, ILO field constructed penthouse.
			49	UV light in DOAS supply for contagion elimination
			50	Groundwater well for ground source heat exchanger with re-injection wells to reject heat or cold.
.			51	MEP System Performance Kiosk (Remote Access & Display @ Lobby for Education)

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: HVAC

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Distribute	Air	5	Chill	Fluid
2	Distribute	Fluid	6	Heat	Fluid
3	Control	Systems	7	Condition	Space
4	Handle	Air	8	Exhaust	Fume

# leave blank	votes			ALTERNATE PROPOSALS
			52	Enhanced Building Metering
*			53	Enhanced Refrigerants (help future code change risk reduction)
			54	Electric Boilers
			55	Heat Exchanger Boilers
			56	Use air-to-water-heat pump ILO chiller.
			57	Active Beams with integrated lighting
			58	Ceiling fans in areas with exposed structure (Aerospace, robotics, fab.)
.			59	Enhanced Commissioning
			60	Add Heat Exchanger recovery for fluid return from active beams.
			61	Add supplemental pumps in Phase 2 building to increase flow from existing pumps
			62	WELL or Fitwel for improved health & well-being.
* T1			63	Energy grants for high-efficiency systems (better than code minimum).

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Plumbing

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Distribute	Water	5	Generate	Carbon
2	Convey	Waste	6	Avoid	Gradebeams
3	Hygiene	Occupants	7	Endure	High-water
4	Heat	Water	8	Drain	Roof

# leave blank	votes		ALTERNATE PROPOSALS	
			1	Store and reuse rainwater
			2	Vacuum sanitary ILO many connections
R43			3	Non-metallic (PEX) ILO metallic piping
R44			4	Sleeve grade-beams for gravity waste piping ILO multiple sewer connections
* M3			5	Vertical ILO horizontal water distribution; distribute horizontally at just one floor, then up or down distribution where needed.
			6	Rough-in for future sinks at two classrooms per floor and wing, where not already.
			7	Student coffee or snack bar in the Learning Commons on each floor.
			8	Staff shower in support of bicycle and exercise.
			9	More plumbing fixture-driven program spaces on upper floors to reduce need for waste piping below the first floor slab.
			10	Retain acid waste system at science program space for future flexibility.
			11	Provide support for shop programs including hard-piped compressed air.
R45			12	Heat pump domestic water heater ILO gas-fired
?			13	Foundation drainage system under the building inside a perimeter foundation curtain wall system.
			14	Gender-neutral ILO standard Men's & Women's restrooms.
			15	Relocate plumbing intensive programs towards center of building including Tiny Sparts and Culinary Arts.
			16	Solar Hot Water Pre-Heat Panels
			17	Tank-Less or Point of Use Hot Water Heaters
R46			18	Water Isolation Valves per room for maintenance.
			19	Ultra Low-Flow Toilets
			20	Water-less Urinals
			21	Instant Hot Water Dispensers
.			22	Water Fountain Filtered Water Bottle Filler.
*			23	Locate bottle filler at Corridor/bridge areas (conspicuous location), enhance brain performance.
*			24	Water sense labeled fixtures
			25	Include sumps and pumps for active groundwater management
R47			26	Monitoring wells below each end of building

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Fire

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Suppress	Fire	5	Comply	Code
2	Protect	Life	6	Endure	Time
3	Protect	Property	7	Ease	Maintenance
4	Detect	Fire	8	Resist	Corrosion

# leave blank	votes		ALTERNATE PROPOSALS	
			1	Pre-Action Fire Suppression in high value spaces
			2	Dry-Type Fire Suppression in very high value spaces
			3	3M system in cad, fabrication, and robotics
			4	Fogging fire suppression system ILO wet-pipe
			5	Design team design fire protection ILO bidder-design

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Electrical

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Generate	Power	5	Protect	Surges
2	Convey	Power	6	Meter	Power
3	Transform	Power	7	Illuminate	Surfaces
4	Power	Equipment	8	Control	Lighting

# leave blank	votes		ALTERNATE PROPOSALS	
			1	Central Battery Energy Storage System, to supplement the existing generator
			2	New dedicated 208V utility service to Bldg 2 ILO 480/208V transformer.
.			3	Don't show back to back electrical boxes (even if just diagrammatic) for acoustics
*			4	Provide spare site infrastructure for future EV Chargers, WAP, Cameras, Temp. Portables, etc.
*			5	Reduce power and data outlets.
E1			6	Consolidate and Reduce quantity of dedicated panelboards in classrooms.
			7	Add uplighting to building and trees
E1			8	Reduce quantity of Surge Protective Devices to Panelboards with sensitive electronic and other equipment.
.			9	Confirm Tamperproof Receptacles are provided at Toddlers, Child Development, Special Ed, Corridor, Infants, Lobby, etc.
.			10	Right Size Electrical Service to actual building loads and minimize excess spare capacity.
E2			11	Reduce quantity of lighting fixtures and lighting power density (at general spaces, not classrooms)
*			12	Floor Track instead of Floor Boxes
			13	More task and less ambient lighting luminaires, to help lower lighting power density.
R48			14	Change to non-plenum cabling where not installed in plenum spaces.
			15	Simplify classroom manual lighting controls to just (2) zones (no scene control) – General Room Dimming and Front Fixture Row.
			16	Provide aluminum conductors for 100A and larger feeders.
			17	Provide MC cable for all end of run branch circuits and feeders.
			18	Provide fire alarm system fire rated wiring and cabling installed open instead of wiring and cabling contained in metal conduit or raceways.
R49			19	Option for set screw instead of compression fittings, connectors and couplings for conduit.
			20	Provide system of utilidors between phases 1,2, and 3 to ease installation of new systems.
			21	Coordinate and obtain utility energy code reduction grants to reduce Owner direct cost.
			22	Reduce the quantity of power panels in classrooms. Provide higher capacity and space panels as required.
			23	Provide spare site power and communication conduits for future needs (e.g. portables, EV Chargers, Cameras, WAP's, access control, etc.).
.			24	Right size and reduce power distribution equipment ampacity and AIC ratings.
			25	Provide central emergency power battery inverter to augment existing generator.

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Electrical

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Generate	Power	5	Protect	Surges
2	Convey	Power	6	Meter	Power
3	Transform	Power	7	Illuminate	Surfaces
4	Power	Equipment	8	Control	Lighting

# leave blank	votes			ALTERNATE PROPOSALS
			26	Provide Motion Sensor Light Reduction for Corridor Lighting in each fixture (minimum lighting when unoccupied).
			27	Add kinetic pavers to generate power for lighting.
.			28	Add pedestrian lighting with low level lighting along walkways□
			29	Battery energy storage System connected to Solar PV to store energy for future use.
*			30	Add additional security lighting at building exterior.
*			31	Increase site lighting at crosswalks
			32	Change HVAC to all-electric and reduce PV system.
			33	Natural gas fueled generator ILO diesel
			34	Add Vertical Helix wind turbines on roof for more on-site generation and CTE program
R50			35	Include Power monitoring display near CTE wing for real time display of power use and generation learning (Corridor 460?)
			36	In pavement flashing lights at crosswalks
			37	Add a mini nuclear plant
			38	Cold Fusion reactor
			39	Add wind turbine
			40	Add biomass generator
			41	Micro hydro turbines in downspouts
.			42	Provide overhead pull down power cord-reels at Aerospace, Robotics, Fabrication for maximum learning space flexibility.
?			43	All 208V building (no 480V), given no large mechanical equipment in Phase 2; check specialty programs for any high-power requirements (e.g., shop and culinary arts)
?			44	Overhead bus-duct system in Aero-space Manufacturing and Robotics Lab.
.			45	USB 5V outlets for device charging from receptacles throughout.
*			46	All electric Culinary Arts (induction cooktops, electric ovens, etc...) to reduce fire liability, improve air quality, and reduce carbon footprint. - Discuss idea with Culinary Arts Staff.
R51			47	Add equipment status panels at each lab space
			48	Code minimum PV system ILO of expanded
			49	Combined heat & power (CHP) cogeneration system, especially if supports future Phase 3.
			50	Copper ILO aluminum for conductors
			51	Smart distribution panels ILO standard; for individual circuit metering and control

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Electrical

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Generate	Power	5	Protect	Surges
2	Convey	Power	6	Meter	Power
3	Transform	Power	7	Illuminate	Surfaces
4	Power	Equipment	8	Control	Lighting

# leave blank	votes			ALTERNATE PROPOSALS
			52	Early bid or expedited submittal and ordering process for long-lead items (Transformers, Service entry panels, specialty lighting...)
.			53	Set-up Energy Star Portfolio Manager (ESPM) for automatic reporting to meet Clean Buildings requirements.
R52			54	Coordinate with gear manufacturer to incorporate demand power metering ILO separate field install metering.
R53			55	Tunable Lighting for Child Development, Dev. Learning, Life Skills, Toddlers, Infants Areas
			56	Integrate lighting control into the DDC building automation system.
			57	Wireless controlled lighting
			58	Native DC power to LED fixtures for increased efficiency.
			59	Reduced number of light fixture and driver types to simplify maintenance.
			60	Clap-on Clap-off light controls
.			61	Light-colored interior surfaces to better reflect light.
.			62	Scene control for typical classrooms.
.			63	Recessed LED wall wash with color changing light in corridor for interest and themes

CLIENT: Sumner-Bonney Lake School District
PROJECT: Sumner High School Addition - Phase 2
COMPONENT: Low Voltage

FUNCTIONS:

	2-word: Active Verb / Measurable Noun			Active Verb / Measurable Noun	
1	Detect	Fire	5	Control	Access
2	Connect	Communications	6	Assist	Rescue
3	Enhance	Voice	7	Support	Responders
4	Detect	Intruders	8	Monitor	Occupants

# leave blank	votes			ALTERNATE PROPOSALS
.			1	Provide more WAP's, less data outlets.
			2	Right size quantity and location of classroom assisted listening speakers.
			3	LV Systems (e.g. Access Control, Intrusion Detection, Cameras, AV) provided by owner, with infrastructure rough-in, power and communication only to be provided by contractor.
			4	Provide Internet Protocol (IP) & Power over Ethernet (POE) based low voltage systems instead of hardwired.
*			5	Provide fire alarm system fire rated wiring and cabling installed open instead of wiring and cabling contained in metal conduit or raceways. □
.			6	Provide pathway-only for future DAS System, if required after AHJ communications testing.
*			7	Provide basket type cable tray, except ladder type cable tray only in communication rooms. Reduce amount of ladder tray in MDF & IDF Rooms.
.			8	Reduce quantity of doors with access control electronic door hardware.
.			9	Reduce quantity of Video Security Cameras.
			10	Reduce intrusion detection motion sensors from exterior rooms and provide only in rooms with higher importance assets and 1st floor corridors.
.			11	Change horn/strobes and speaker/strobes to strobe-only in small storage, office, toilet, etc., where there is an adjacent horn/strobe and speaker/strobe.
			12	Reduce quantity of data jacks at each outlet location.
			13	Limit access to select doors with lock-down provisions.
.			14	Beam detectors in high bay Aerospace lab
*			15	Bluetooth noise cancelling headphones with assisted Listening link at Fabrication lab.
			16	CPTED study for more passive and less active electronic security.
R54			17	Additional interior motion sensors and door position switches for intrusion alarm at spaces with expensive equipment and tools (Robotics, Fabrication, Aerospace Labs).
			18	VESDA advanced smoke detection system for high-value spaces, such as Robotics.
R55			19	Provide enhanced fire alarm detection, including specialty labs, shops and culinary arts; maybe child development and Developmental Learning spaces.
			20	Rough in DAS only, unit cost for equipment and test for need to install system.
			21	Biometric security
			22	Card-key access for at least one door to each space.