



SCHOOL BUILDING COMMITTEE

LINCOLN SCHOOL, LINCOLN MASSACHUSETTS 01773

September 28, 2011

To: School Building Committee
From: Buckner Creel

Subject: Repair Analysis -- Lincoln School

Background. In May, 2011, Town citizens asked the School Building Committee (SBC) about alternative strategies which would perform some repairs to the Lincoln School at a cost lower than the to an MSBA-compliant project under discussion at the time. Subsequently, the SBC was approached by the Selectmen, who asked that a formal review of this alternative be conducted as part of the on-going Feasibility Study. Although this analysis would be outside the scope of the contract with the Office of Michael Rosenfeld (omr), the SBC felt that establishing a benchmark comparison would be useful for the community discussion key to the SBC's charge. A team consisting of Marshall Clemens, Town citizen; Noah Eckhouse, Selectman; Dan Tavares, Skanska, Owner's Project Manager; Buck Creel, Administrator for Business and Finance, Lincoln Schools conducted the analysis.

Process. At the end of June, omr agreed to start the process by providing the analysis team with an array of estimates they had developed earlier in the Feasibility Study to support the development of various options for SBC consideration. These parametric estimates were based on a calculation of square footage affected times a cost-per-square-foot for similar work constructed in the past. The initial array was divided into major and minor repair categories, and presented by omr on June 27.

Over the next two and one-half months, the analysis team asked a number of questions, and omr and their consultants provided answers. Early on, the team agreed that the repair effort would have to address a number of life-safety and code issues, and that the scope of the repairs being considered would cross thresholds which triggered requirements for seismic, fire sprinkler and other upgrades. The team agreed that the scope would repair existing facilities; that any construction of new space would be clearly identified and separated; and that the repair analysis would not provide for the programmatic improvements contemplated by the SBC preferred option. Gradually, some of the minor and major repair items were fused into a single task list, as the team realized that a properly-functioning facility required certain tasks identified in one list or the other.

In mid-September, the team realized that each refinement of the analysis resulted in relatively small pluses and minuses which all netted to the same approximate total estimate. At the same time, the SBC noted that the preferred option had shifted significantly since the start of the repair analysis, as had the omr estimates for its cost. Dan Tavares went through one final effort with the omr estimators and engineering consultants to ensure that the estimated repair task costs reflected the latest information, and that the estimates reflect the third quarter of 2014 as the midpoint of construction, so that the document would allow an "apples-to-apples" comparison to the SBC's Preferred Option (5E.1).

Conclusion. The attached summary shows that the tasks identified by the team to be part of the needed repairs total \$24.26M. Additional alternates to provide two small cafeterias, to move the Smith boilers out of the flooding basement into a new boiler room, and to provide an enclosed walkway to the Reed Gym total \$6.18M. The complete repair analysis package totals \$30.45M.

25 Sep 11 v. 4

		Repair Tasks		
Building Component	Construction Cost(\$)	Project Cost(\$)	Remarks	
	(1.5 x Cost)	(1.30 x C. Cost)		
Architectural Sub-total	\$ 5,722,500	\$ 7,439,250		
Structural Sub-total	\$ 1,365,000	\$ 1,774,500	See Arch for Snow/Drift Load upgrade	
Civil/ Landscaping Sub-total	\$ 427,500	\$ 555,750		
Fire Protection Sub-total	\$ 840,000	\$ 1,092,000		
Plumbing Sub-total	\$ 1,036,500	\$ 1,347,450		
HVAC Sub-total	\$ 3,678,000	\$ 4,781,400		
Electrical Sub-total	\$ 2,940,000	\$ 3,822,000		
Additional Requirements				
x Phasing/ Occupancy Relocation	\$ 1,950,000	\$ 2,535,000	30 Months, 5 Phases, (3 summers) Allowance to relocate: 12 classrooms/ phase	
x Hazmat Abatement	\$ 450,000	\$ 585,000	Abatement based on CDW detailed report and estimate. Extent of Lead Paint and PCB caulk abatement unknown	
x Replace abated materials	\$ 255,000	\$ 331,500	Based on review of CDW detailed report. VCT included in Architectural	
Additional Requirements Sub-total	\$ 2,655,000	\$ 3,451,500		
TOTAL	18.66M	24.26M	Numbers shown reflect 3Q2014 as Midpoint of Construction. Escalation compounded at 3% per annum, taken as the sum of sub total of Construction Cost, General Conditions & Special Conditions	
Add Alternates				
x New above-ground boiler room	\$ 375,000	\$ 487,500	Approx 1000 GSF, similar to existing	
x Café/ Kitch/ Servery Equip.	\$ 3,300,000	\$ 4,290,000	8,550 GSF @ \$375/SF(2 kitchens/2 servery's/ 2 Café's)	
Kitchen/Servery Equipment	\$ 480,000	\$ 624,000		
x Reed Field House Connection	\$ 600,000	\$ 780,000	2,600 GSF @ \$290/SF (reduced)	
Add Alternates Sub-total	\$ 4,755,000	\$ 6,181,500		
TOTAL (Includes Add Alternates)	23.42M	30.45M		

Significant Differences between SBC Preferred Option and Repair Analysis

SBC Preferred Option 5E.1 – Repair Analysis version 4

September 28, 2011

SBC Preferred Option Compliant with MSBA guidelines Estimated 40% reimbursement	Repair Analysis Not necessarily compliant with MSBA guidelines Eligibility for reimbursement unknown
Architectural	
<ul style="list-style-type: none"> • Compact building design enhances energy efficiency and promotes collaboration among faculty. New space arrangements allow for ease of providing differentiated instruction, easier grade transition and improved community use of the buildings. 	<ul style="list-style-type: none"> • Current layout and room patterns remain essentially unchanged.
<ul style="list-style-type: none"> • Exterior Envelope – all new energy efficient insulated windows and window wall structures. 	<ul style="list-style-type: none"> • Exterior Envelope -- replaces single pane windows and rotted wood trim only.
<ul style="list-style-type: none"> • Flooring -- complete new flooring with easier –to-maintain materials and new entrance ways. 	<ul style="list-style-type: none"> • Flooring – replace only VAT removed during asbestos abatement.
<ul style="list-style-type: none"> • Entrance – Designed as part of admin offices with security features and access control. Energy-conserving vestibules with dirt control measures. 	<ul style="list-style-type: none"> • Entrances – replace rotting wood only. No additional security features, no access control improvements, no vestibules for energy savings.
<ul style="list-style-type: none"> • Paint – all new finishes, either paint or more durable surface. New hallway surfaces easier to maintain. 	<ul style="list-style-type: none"> • Paint – 50% repainting, for surfaces disturbed by other work. Remainder deferred.
<ul style="list-style-type: none"> • All new ceilings and soffits. 	<ul style="list-style-type: none"> • Ceilings & soffits – partial replacement to accommodate mechanical changes.
<ul style="list-style-type: none"> • Doors and hardware – All replaced with energy efficient, ADA compliant materials. 	<ul style="list-style-type: none"> • Doors and hardware -- 50% replacement, as required for ADA compliance. Remainder deferred.
<ul style="list-style-type: none"> • Reduced number of exterior doors promotes increased physical security, reduces required maintenance and cleaning and enhances security. 	<ul style="list-style-type: none"> • Same layout and room pattern with large number of exterior doors.
Civil/Landscaping	
<ul style="list-style-type: none"> • Roadway Pavement – Complete redesign of parking and circulation. Drop-off and visitor parking improvements. Renewed surfaces. 	<ul style="list-style-type: none"> • Roadway Pavement – 50% repair allowance to correct worst problems; remainder deferred. No parking or circulation improvements.
<ul style="list-style-type: none"> • Curbs – Complete redesigns and replacement. 	<ul style="list-style-type: none"> • Curbs – replacement of worst 50%. Remainder deferred.
<ul style="list-style-type: none"> • Site drainage – Significant regrading of low areas, and control measures for storm water and site runoff into sensitive wetlands to meet environmental regulations. 	<ul style="list-style-type: none"> • Site drainage – Allowance for limited regrading of lowest areas. No control measures for storm water and site runoff into sensitive wetlands.
<ul style="list-style-type: none"> • Landscaping – Coordinated plan to restore campus beauty after project 	<ul style="list-style-type: none"> • Landscape repair – Allowance to address limited areas & construction disturbance.
Plumbing	
<ul style="list-style-type: none"> • Replacement of all fixtures with water-conserving, low-flow models with modern flush valves and faucets. Results in reduced water use. 	<ul style="list-style-type: none"> • Only fixtures and valves required to be replaced by codes are replaced.
<ul style="list-style-type: none"> • Significant replacement of gas supply piping 	<ul style="list-style-type: none"> • No replacement of gas piping

SBC Preferred Option Compliant with MSBA guidelines Estimated 40% reimbursement	Repair Analysis Not necessarily compliant with MSBA guidelines Eligibility for reimbursement unknown
Heating, Ventilating and Cooling	
<ul style="list-style-type: none"> • New HVAC system concept, replacing noisy, higher-maintenance unit ventilators with a coherent system of zone units supplying air through ductworks. Controlled climate for increased comfort level and decreased energy usage. 	<ul style="list-style-type: none"> • New boiler plant equipment at Smith and Books, including new boilers, pumps and controls. System concept and classroom heating and ventilation remains the same, using unit ventilators.
<ul style="list-style-type: none"> • Compact building allows for single boiler room with two high-efficiency boilers, reducing maintenance costs. 	<ul style="list-style-type: none"> • Heat plant will continue with the current two boiler rooms with four boilers.
<ul style="list-style-type: none"> • Replacement of air handling units at Link, Library, Auditorium and other locations with high efficiency model to improve operation and decrease energy usage. 	<ul style="list-style-type: none"> • Replacement of air handling units in limited number of small areas such as the communications headend server room.
<ul style="list-style-type: none"> • Significant improvement in solar orientation of building results in increased ability to make use of southern exposure and passive thermal measures while reducing the problems caused by heat loads in the Smith Building. 	<ul style="list-style-type: none"> • No significant change in building layout or architecture means a continuation of current solar conditions.

Electrical and Networks	
<ul style="list-style-type: none"> • Replacement of lighting fixtures in all areas with latest energy-saving models in a coherent design utilizing daylight and indirect approaches to improve task lighting, particularly in classrooms. Occupancy sensors and lighting controls will be part of a centralized energy management system to reduce energy consumption. Significant improvement in solar orientation of building results in increased control over natural light. 	<ul style="list-style-type: none"> • Allowance for replacement of lighting affected by other work, mostly in hallways and common areas. Classrooms largely unaffected.
<ul style="list-style-type: none"> • Preferred option will use advanced lighting controls, improved solar orientation and daylighting features to decrease energy usage for lighting. 	<ul style="list-style-type: none"> • No significant change to current architecture, including window arrangement and number of skylights, which limits opportunity for increased use of natural lighting to save energy.
<ul style="list-style-type: none"> • New, higher-speed network cabled with Cat 6A for data and Voice-Over-IP telephone system. 	<ul style="list-style-type: none"> • No allowance for change in network wiring from Cat 5 hybrid system. Upgrade deferred.
<ul style="list-style-type: none"> • Access control system based on card technology will provide improved access control and visual surveillance. 	<ul style="list-style-type: none"> • No allowance for improved security and access control systems.
<ul style="list-style-type: none"> • Site lighting improvements based on new circulation will decrease energy usage and improve compliance with Town Dark Sky initiative. 	<ul style="list-style-type: none"> • No allowance for site lighting changes. Improvements in energy conservation and Dark Sky Initiative deferred.
<ul style="list-style-type: none"> • All classrooms will have increased circuits for electrical receptacles to support increased level of electronic devices required in 21st Century education practices. 	<ul style="list-style-type: none"> • Very limited increase in new receptacles or other increases to electrical system

<p align="center">SBC Preferred Option Compliant with MSBA guidelines Estimated 40% reimbursement</p>	<p align="center">Repair Analysis Not necessarily compliant with MSBA guidelines Eligibility for reimbursement unknown</p>
<p>Program changes, additional requirements and Add/Alternates</p>	
<ul style="list-style-type: none"> • Design provides for one larger cafeteria to service all grades, located near community entrance and part of a commons to allow for multiple uses by school and Town organizations. 	<ul style="list-style-type: none"> • Optional allowance for two small cafeterias: one with a cooking kitchen at Brooks, one with a serving kitchen at Smith.
<ul style="list-style-type: none"> • Avoids cost of swing space and reduces impacts on education. Use of current building allows for construction in two major phases. Cost of swing space, over \$2.5M, is avoided. 	<ul style="list-style-type: none"> • Requires 5 phases over 30 months, and the construction of swing space costing over \$2.5M. Significant disruption to ongoing education.
<ul style="list-style-type: none"> • Reed Gym incorporated into building mass, avoiding the need for a separate connector. 	<ul style="list-style-type: none"> • Optional allowance for connector to Reed Gym to avoid need for dressing for the outside when going to lunch and phys ed classes.
<ul style="list-style-type: none"> • Single boiler room at Brooks will service the entire school and eliminate the need for a separate boiler room at Smith. 	<ul style="list-style-type: none"> • Optional allowance of \$488K for bringing Smith boiler room above ground and out of the flooding basement.
<ul style="list-style-type: none"> • While the current plans call for demolition of the entire Smith Building, a coordinated Town plan could preserve the Smith Gym and two contiguous classrooms wings for use by the Rec Department, Council on Aging or other purposes. The demolition costs avoided could reduce the MSBA project and be applied to cost of creating the Community Center. 	<ul style="list-style-type: none"> • Entire Smith-Link-Brooks complex will remain in place, providing no opportunities for other Town needs.

25 Sep 11 v. 4

Repair Tasks			
Building Component	Construction Cost(\$) (1.5 x Cost)	Project Cost(\$) (1.30 x C. Cost)	Remarks
Architectural			
x Building code, ADA/MAAB	\$ 450,000	\$ 585,000	Additional cost for new toilet partitions and accessories
x Roofing System:	\$ 3,705,000	\$ 4,816,500	
-- Roofing Material	\$ 3,300,000	\$ 4,290,000	120,500 SF x \$18/SF (Does not include Reed Fieldhouse)
-- Snow/Drift Loads	\$ 270,000	\$ 351,000	15% @ \$15/SF
-- Seismic Upgrades (roof)	\$ 135,000	\$ 175,500	(\$7.50/SF) Roof = 20% of overall seismic upgrades
x Exterior Envelope	\$ 600,000	\$ 780,000	Replace original windows/rotted wood trim
x New Floors	\$ 75,000	\$ 97,500	New VCT at VAT removal
x Paint	\$ 210,000	\$ 273,000	Partial Repairs in Minor Scope (50%)
x New Ceilings (ACT)	\$ 210,000	\$ 273,000	Full replacement to accommodate MEP/ FP (35,000 @ \$4/SF)
x New Ceilings & Soffits (Gyp. Bd)	\$ 300,000	\$ 390,000	replace/patch to accommodate MEP/ FP (20,000 SF at \$10/SF)
x New Doors and Hardware	\$ 90,000	\$ 117,000	Partial Repairs in Minor Scope (50%)
-- Auditorium/Lect Hall Seating	\$ -	\$ -	
-- Operable Partitions	\$ -	\$ -	
x Boiler Room Drainage	\$ 82,500	\$ 107,250	See Add Alternates below for new Boiler Room Allowance
Architectural Sub-total	\$ 5,722,500	\$ 7,439,250	
Structural			
x Seismic Upgrades (walls)	\$ 1,125,000	\$ 1,462,500	(\$7.50/SF) Walls = 75% of overall seismic upgrades
x Wood Rot Damage	\$ 105,000	\$ 136,500	
x Fly Loft Rigging Connections	\$ 15,000	\$ 19,500	
x Structural Penetrations	\$ 120,000	\$ 156,000	Allowance for beam, wall and ceiling penetrations for Work
Structural Sub-total	\$ 1,365,000	\$ 1,774,500	See Arch for Snow/Drift Load upgrade
Civil/ Landscaping			
x Roadway Pvmnt repair	\$ 112,500	\$ 146,250	150,000 SF @ \$1.50/SF. Partial in Minor Scope (50,000 SF)
x Walkway Pvmnt	\$ 52,500	\$ 68,250	11,000 SF @ \$3.40/SF. Partial (50%)
x Curbs (pre-cast)	\$ 75,000	\$ 97,500	15,000 LF @ \$14.00/SF (Partial at 50%)
-- Sewer Line(s)	\$ -	\$ -	
x Drainage	\$ 75,000	\$ 97,500	Address regrading for positive drainage at low areas
x Landscape repair allow.	\$ 112,500	\$ 146,250	\$75K allowance to address areas around site and roads
Civil/ Landscaping Sub-total	\$ 427,500	\$ 555,750	
Fire Protection			
x Automatic Sprinklers	\$ 840,000	\$ 1,092,000	Adjusted for Building Size at \$4.00/SF
Fire Protection Sub-total	\$ 840,000	\$ 1,092,000	
Plumbing			
x New Plumbing Fixtures	\$ 30,000	\$ 39,000	Replace Drinking Fountains
x New Domestic Water	\$ 210,000	\$ 273,000	Partial Repairs in Minor Scope (50%)
-- New Hot Water Heater	\$ -	\$ -	
x New Non-Potable Water in Science Area	\$ 310,500	\$ 403,650	Required by Code
x New Holding Tank for Science Waste	\$ 186,000	\$ 241,800	Required by Code
x New Tepid Water to Science Area Emergency Fixtures	\$ 207,000	\$ 269,100	Required by Code
x New Grease Interceptors and related Kitchen Waste Piping	\$ 93,000	\$ 120,900	
-- New Gas Piping	---	\$ -	
Plumbing Sub-total	\$ 1,036,500	\$ 1,347,450	

		Repair Tasks		
<u>Building Component</u>	<u>Construction Cost(\$)</u> (1.5 x Cost)	<u>Project Cost(\$)</u> (1.30 x C. Cost)	<u>Remarks</u>	
HVAC				
x New Hydronic Heating Plant - Brooks Building - Including New Boilers, Pumps w/VFDs, Breeching, Header Piping, Accessories and Controls.	\$ 585,000	\$ 760,500	Based on costs provided by engineer (GGD)	
x New Hydronic Heating Plant - Smith Building - Including New Boilers, Pumps w/ VFDs, Breeching, Header piping, Accessories and Controls.	\$ 855,000	\$ 1,111,500	Based on costs provided by engineer (GGD)	
x Replace Hydronic System Secondary Pumps	\$ 30,000	\$ 39,000	Partial Repairs in Minor Scope (50%)	
-- Building - Clean Existing Ductwork	\$ -	\$ -		
-- Building - Piping insulation should be repaired and or replaced	\$ -	\$ -		
x Building - Misc Piping and Valve Repairs	\$ 154,500	\$ 200,850		
x Building - Misc Ductwork and Damper Repairs	\$ 103,500	\$ 134,550		
-- Replace Locker room air handling units (typ 2), ductwork and fin tube radiation	\$ -	\$ -		
-- Replace existing Field House heating and ventilation units (typ 2)	\$ -	\$ -		
-- Auditorium and Lecture Hall - Replace air handling units (typ. 3)	\$ -	\$ -		
x Classroom exhaust fans - test and repaired as required	\$ 72,000	\$ 93,600		
-- Provide new Kitchen exhaust and Make-up air system for Kitchens (typ 2.)	\$ -	\$ -		
-- Replace Admin area AHUs (typ. 2)	\$ -	\$ -		
-- Repair/Replace Cooling system for Smith building Teacher work room and break room PTAC units	\$ 15,000	\$ 19,500		
x Repair Library VAV box serving Computer Room	\$ 4,500	\$ 5,850		
x Provide new Computer Room AC unit for Computer Server Room	\$ 18,000	\$ 23,400		
-- Replace existing Library AHU DX cooling coil and remote air cooled condensing unit with Higher Efficiency Model	\$ -	\$ -		
x Replace CUHs, convectors and fin tube radiation heating equipment throughout building.	\$ 207,000	\$ 269,100		
x Provide New Direct Digital Control Energy Management System to replace existing control system.	\$ 1,245,000	\$ 1,618,500	Based on costs provided by engineer (GGD)	
x HVAC Demolition	\$ 93,000	\$ 120,900		
x Test, adjust and Balance all new and existing to remaining HVAC systems	\$ 145,500	\$ 189,150		
x Commission all new and existing to remaining HVAC systems.	\$ 150,000	\$ 195,000	reduced for minor repair	
HVAC Sub-total	\$ 3,678,000	\$ 4,781,400		

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<u>Building Component</u>	<u>Construction Cost(\$)</u> (1.5 x Cost)	<u>Project Cost(\$)</u> (1.30 x C. Cost)	<u>Remarks</u>
Electrical			
x New Electrical switchgear, panels and all associated wiring and equipment for Brooks and Field House	\$ 645,000	\$ 838,500	Based on costs provided by engineer (GGD)
x New Fire Alarm System for both Smith and Brooks Buildings and Link.	\$ 615,000	\$ 799,500	
New 75kw Supplemental Emergency Generator with exterior enclosure	\$ 105,000	\$ 136,500	New supplemental Generator includes exterior sound attenuated enclosure with transfer switches
x New Emergency lighting in Smith and Brooks Buildings and Link including 2hr feeders, panels and branch circuits. Existing battery units to be removed.	\$ 1,350,000	\$ 1,755,000	Based on costs provided by engineer (GGD)
x New lighting in Smith Building including branch circuits.	\$ 112,500	\$ 146,250	Affected by other work (Allowance)
x New lighting in Brooks Building including branch circuits.	\$ 112,500	\$ 146,250	Affected by other work (Allowance)
-- New receptacles for computers in Smith Building including branch circuits.	---	\$ -	
-- New receptacles for computers in Brooks Building including branch circuits.	---	\$ -	
-- New cat 6A Data & Ip Video System for Smith Building.	---	\$ -	
-- New cat 6A Data & IP Video for Brooks Building.	---	\$ -	
-- New cat 6A Data & IP Video for Link.	---	\$ -	
-- New cat 6A security system for Smith Building.	---	\$ -	
-- New cat 6A security system for Brooks Building.	---	\$ -	
-- New Security for Link.	---	\$ -	
-- A/V for Auditorium	---	\$ -	
-- Theatrical including house lighting	---	\$ -	
-- Photo Voltaic Solar Panels	---	\$ -	Assumes 100kw system, generating 113,230 kwh, savings approximately \$13,300 annually
-- Site Lighting	---	\$ -	
Electrical Sub-total	\$ 2,940,000	\$ 3,822,000	

Additional Requirements			
x Phasing/ Occupancy Relocation	\$ 1,950,000	\$ 2,535,000	30 Months, 5 Phases, (3 summers) Allowance to relocate: 12 classrooms/ phase
x Hazmat Abatement	\$ 450,000	\$ 585,000	Abatement based on CDW detailed report and estimate. Extent of Lead Paint and PCB caulk abatement unknown
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Additional Requirements Sub-total	\$ 2,655,000	\$ 3,451,500	

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Add Alternates			
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