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November 17, 2012

Michael McKeon
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VIA EMAIL 3 Pages Total

RE: Minuteman High School, Seismic Evaluation Report ADDENDUM

Dear Michael,

Per request of the school superintendent at our meeting on October 15, 2012 at Minuteman High School in Lexington, MA, we have prepared this addendum to our Seismic Evaluation report of the same date. The purpose of this addendum is to provide a rough order of magnitude range of costs to implement the recommendations provided in the "Summary and Recommendations" section of the report. We understand that these estimates are to be used by the school for future planning and prioritization of potential projects.

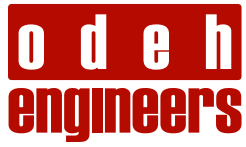
NOTE: These cost estimates are approximate and based on our professional judgment based on our investigation only (i.e., no design was performed), and are not a substitute for the services of a professional cost estimator or construction manager with direct information about market conditions and overhead costs associated with construction work in the local area. Costs are for implementation of the structural work only, assuming standard working conditions and hours for structural trades, and do not include general conditions or other overhead costs associated with a general contractor (which will vary based on the size and timing of any work to be implemented).

Additional costs may also be incurred due to reconstruction of architectural and mechanical/electrical/plumbing systems that must be modified or relocated due to the proposed work, and/or other unforeseen conditions that may arise. Therefore, we recommend that the owner carry an adequate contingency for any budgeting, and confirm all pricing with a professional cost estimator before finalizing any decisions.

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Recommended Retrofit	General scope of work (final design to be determined based on detailed analysis)	Approximate Budget Range for Structural Work Only (\$,000s)
Correct torsional irregularity in the upper floor level diaphragms by introducing new bracing or moment resisting frames near the exterior of the building in the longitudinal direction.	Insertion of 8-10 steel braced frames or moment frames along exterior wall lines.	\$750-\$1,000.
Correct load path deficiencies at isolated diaphragm levels by introducing new bracing or moment resisting frames tied directly to these floor areas.	Reinforce 24 columns that support the mezzanine floor levels (see Figure 4 of report) with new steel bracing and/or welded reinforcing plates.	\$250-\$350
Review the vertical irregularity in floor mass (due to substantial additional mass at roof level of building compared to some lower levels) as part of a more detailed seismic study to better understand the influence of this condition on the dynamic response of the structure. Implement supplemental or strengthened bracing and moment resisting frames to ensure adequate capacity of the lateral force resisting system.	Scope of work based on analysis results.	Budget to be determined based on more detailed analysis.
Implement and/or improve the seismic bracing of mechanical, electrical, and plumbing equipment.	Provide seismic anchorage and bracing for critical equipment (to include main fire protection lines, emergency electrical equipment, major suspended equipment that could be a life safety hazard).	Assumed approximately \$2-\$3/sf, total of 330,000 gsf: \$660-\$990.



Recommended Retrofit	General scope of work (final design to be determined based on detailed analysis)	Approximate Budget Range for Structural Work Only (\$,000s)
Provide bracing and anchorage of heavy architectural components (such as heavy lighting fixtures) and tall/slender contents (such as filing cabinets).	Provide seismic anchorage and bracing for suspended components that could be a life safety hazard, anchors for filing cabinets and tall shelving.	Assumed approximately \$2-3/sf, total of 330,000 gsf \$660-\$990.
Provide out of plane bracing for unreinforced masonry partition walls within the building.	Install new steel clip angles at top of walls to underside of structure, or steel bracing from top of wall to structure as required.	Total linear feet of wall is not known without further study, cost based on range of \$3-4/sf: \$990-\$1320
Correct deficiencies in the building expansion joints to allow for adequate seismic movement across the joint and proper isolation of the individual parts of the superstructure as intended by the original design.	Cut away existing restraint to thermal expansion and install new expansion joint at floors and roofs.	Approximately 1100 linear feet of joint material at \$50-75/LF: \$55-\$85
Provide adequate flexible joints between existing masonry infill walls at gymnasium and surrounding moment resisting frames (to ensure displacement compatibility with the system and prevent unintended transfer of seismic loads to the gym walls).	Cut away existing masonry from steel frames and install appropriate sealer to allow for independent movement. Also install adequate bracing for top of walls.	Approximately 350 LF of wall, assumed \$100-150/lf: \$35-\$55
Rebuild and/or strengthen deficient portions of the unreinforced masonry walls at the stair towers (as also described in the 7-30-2012 Structural Evaluation Report) to correct seismic deficiencies	Remove and reconstruct top floor of four existing masonry stair towers, including provision for addition of reinforcing steel in grouted cores.	Assumed \$50-75,000. Lump sum cost for each stair tower: \$200-\$300