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Office of the Inspector General

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February 21, 2007

Jack Hathaway, Town Administrator
Town of Norfolk
One Liberty Lane
Norfolk, Massachusetts 02056

RE: H. Olive Day School, Norfolk, Massachusetts

Dear Mr. Hathaway:

On May 23, 2006 my office received an anonymous complaint for an action taken by the Norfolk Annual Town Meeting, relating to a 1999 addition ("Addition") to the H. Olive Day School. The complaint stated that, on May 9, 2006, the Norfolk town meeting approved a $75,000 appropriation to repair the Addition. The complaint also stated that the town had not sought compensation from the architect or contractor, even though the appropriation was (according to the Norfolk Advisory Board Recommendations) needed as "a direct result of poor design and poor construction of the [school] addition." Regarding the design and construction problems related to the Addition's roof, the Advisory Board concluded its report by stating, "If left unattended continued ice buildup, leaking, and the potential for mold will exist."

Prompted by this complaint, my office conducted an investigation of the construction and current status of the Addition and its roof.

*Background*

On June 23, 2006 the Office of the Inspector General (OIG) sent its architect to inspect the Addition's attic. In addition, he conducted interviews with certain town employees, and was provided with copies of relevant design details. His professional opinion was that the architect had detailed the plans in an appropriate manner. Our architect was therefore confused when he observed that none of the components set forth in the architect's details were seen as in place. He confirmed that a sheetrock barrier above the interior ceiling in the Addition was not installed per the plans, with a resulting discrepancy in the attic between the architect's plans (Attachment A) and its configuration as built (Attachment B).

My staff subsequently interviewed members of the town's government and school department, as well as professionals who worked on the Addition and other individuals familiar with the project. These interviews and the record strongly suggest that the difference between the attic plan and the current attic configuration was the result of errors in planning, oversight and execution in the installation of the Addition's fire sprinkler system.

*Fire Sprinkler System*

As you know, the Addition originally was to have had both wet and dry fire sprinkler systems.

A dry pipe fire sprinkler system is one in which pipes are filled with pressurized air or nitrogen, rather than water. It is useful for spaces where freezing is possible. In a dry system, water is not standing in the overhead pipes, which remain unfilled, or dry, until the sprinkler is activated. In a wet system the water fills the pipe right up to its outlet. However, the space around a wet pipe must be temperature controlled to prevent freezing, and possible rupture. Wet and dry systems use different grades of pipe. A dry system requires a higher grade of pipe (galvanized) to prevent rust since the system has air in it most of the time. A wet system can use a lower grade of pipe since it is filled with water at all times and so will not rust.

If the system is dry, insulation can be laid on the floor of the attic below the pipes, as would be the case in the architect's plan (Attachment A). If, however, the system is wet, insulation would have to be installed above the pipes, as in Attachment B.

The Addition was constructed between the end of 1998 through most of 1999. The

Addition was to be built beside the existing school. The original plans called for a large atrium-style connector between the two school buildings. The atrium was abandoned due to lack of funds, so access between the Addition and the existing school building was through a modest corridor between the two buildings ("Corridor").

The project principals[1] met on a weekly basis throughout the construction period. In their April 8, 1999 minutes item 18.01 appears. It states

> Dry systems calls for use of galvanized piping. Balldon Fire Protection installed the approved schedule to 40 black iron pipe. Mike Maloney [*sic*] [2] reviewed situation on site and changed to all wet system. JC [3] will forward to [the general contractor] request for credit proposal.

It appears that a subcontractor installed the wrong type of pipe, i.e., it installed iron pipes for a wet system when the specifications called for galvanized pipes for a dry system. (The minutes do not specify whether these pipes were in the Addition or the Corridor, nor do they state why the mistake was not corrected by the subcontractor.) Architect notes for a meeting two months later (June 24, 1999) state that the sprinkler system

> was originally installed incorrectly w/ C.I. [cast iron] pipe as opposed to galv. for dry system. EA [Ernie Alix, town clerk of the works] noticed & informed [the general contractor]. Value engineering to change system.

A note on the minutes for May 13, 1999 states, "dry system to wet system."

A dry to wet change would require an evaluation of the air temperature in the attic where the sprinkler pipes are located since dry pipes can tolerate cold air and wet pipes cannot. There is no record in the file that this was done. According to the OIG architect, a possible solution would be to move insulation from the attic floor as shown in Attachment A to the underside of the attic roof as shown in Attachment B. Moving the insulation may explain the elimination of layers of sheet rocking above the interior ceiling as noted in a contractor change order of August 4, 1999 ("Delete [gypsum wall board] @ Ceiling Truss"), which saved the town $6,400.

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1 The town's clerk of the works, the architect, and the general contractor.

2 Mike *Moloney* was employed by the mechanical engineering firm.

3 "JC" refers to Mike Bingley, who was employed by the architect.

None of the principals was able to explain the discrepancy between Attachment A and Attachment B, which is not surprising given the lapse of over seven years. Nonetheless, the general contractor stated that no change would have been made without a prior authorization by the architect; that the change in the configuration of the attic would have resulted in no profit to his company; and that the general contractor was not the project manager. The architect stated it did not inspect construction, even though its contract with the town states that "[o]n the basis of on-site observations as an architect, the Architect shall keep the Owner informed …and shall endeavor to guard the owner against defects and deficiencies in the Work." The architect too stated that he did not approve any change in the attic design, and stated that the change in the attic configuration also would have had no financial gain motive for his firm. The clerk of the works stated on August 16, 2006 that the "sprinkler system had something to do with the change." The president of the permanent building committee and the superintendent of building maintenance also remembered a problem with the sprinkler system.

In mid-January 2000, the first winter after the Addition was built, the sprinkler pipes in the Corridor froze. On Wednesday January 20, 2000, the chairman of the town's permanent building committee sent a letter to the architect, stating that the freezing sprinkler system "is a very serious problem." The writer stated further that "[w]hether this is a design and/or construction problem, we believe you must take a proactive role in immediately rectifying this problem." A note from the architect asks the mechanical engineer, "Any progress on this? (Faxed)" The architect's response to the permanent building committee was issued on January 20, 2000, and stated that the "installer/designer of the sprinkler system" would diagnose and repair the problem.

The mechanical engineer had written to the architect on January 6, 2000, stating that freezing should not happen since heat should migrate from the interior space through the ceiling to keep the sprinkler pipe at 60ºF.

There is no record in the file of how the frozen pipes were repaired and made serviceable.

*Ice Damming*

Another problem appeared in 2002—ice damming on the Addition roof, especially on the west side of the building. The insulation had been moved from the attic floor as shown in Attachment A to the attic ceiling as shown in Attachment B. The underside of the exterior roof was not designed to accommodate the type of insulation installed there.

A September 12, 2005 report from an independent consultant stated that the insulation could not serve its proper purpose as installed. The result was ice dams, and also "damage to wood framing, wet interior walls which lead to mold conditions, and if not addressed …to bug damage." The consultant's report contained a proposal for correction of the roof problems. The proposal called for the readjustment and re-support of the existing roof insulation to allow ½ inch of airspace between the underside of the roof and the insulation. The consultant suggested three options, priced at $43,540, $48,000 and $62,000.

It is the understanding of the OIG that this report was the basis for the May 9, 2006 Norfolk Advisory Board Recommendation to appropriate $75,000 for roof repairs.

*Vendor Contracts*

We note that the town's contracts with its vendors include terms that provide possible recourse to the town in the event of design and construction defects. However, the town may have forgone any right of action based on the statutes of repose. The statute of limitations for contracts under seal is 20 years. [M.G.L. c. 260, §1] Since none of the applicable contracts were executed under seal the right of action expires six years "after the cause of action accrues." [M.G.L. c. 260, §2]

It is clear that problems with the sprinkler pipes in the Corridor surfaced almost immediately after the project was finished (2000) and in the Addition roof shortly thereafter (2002). The OIG architect observed that the absence of sheetrock above the classroom ceilings in the Addition has resulted in deterioration of the interior due to condensation which he noted may cause bad interior air quality. Interviews with town officials show a roof which has needed constant special maintenance and repair. Curiously, the general contractor and the architect say that they had no knowledge of roof problems until they were contacted by this office in mid-2006.

Clearly the town did not get what it had contracted for.

*Conclusion*

Based on the evidence described above, there was a deviation from the architect's plans which has resulted in continuous malfunction and expense for almost seven years. The genesis of this situation appears to have been the installation of the wrong sprinkler pipe in 1999. It may be that no legal action has been taken because the principals all consented to corrective modifications, either affirmatively or by

acquiescence.

It is not the purpose of this letter to identify a responsible party and assess blame: the damage has been done and liability will be extremely difficult and expensive to establish after so many years. The resources of the commonwealth are better used to prevent the recurrence of this type of situation. This is not to say that you may not seek such remedies as the law permits.

The investigation to date, while perhaps not exhaustive, does provide lessons for the Town of Norfolk and other cities and towns in the commonwealth for their future building projects. The H. Olive Day School Addition illustrates that waste is more often passive than active. There was no single, qualified person responsible for evaluating the ramifications of the sprinkler system design and construction changes. In their contracts, the design and construction services vendors carefully demarcated their boundaries of responsibility, and the permanent building committee and town staff, without professional training in large project construction, were left to manage as best they could. They were no doubt trying to complete the Addition by the start of the 1999-2000 school year, which may have made them susceptible to imprudent suggestions.

In 1995 this office issued a report on a school construction project in the hope of identifying "how some problems might have been prevented and how future municipal construction and renovation efforts can be better managed and controlled." *The Pollard Middle School Project In Needham: A Management Review*, p. i (June 1995).

The OIG recognizes that Norfolk's public building committee, like many local building committees, was composed of citizens of dedication and integrity, "many of whom had other jobs and obligations, volunteering their time in order to serve their community." *Completion of the Greenfield Middle School Renovation Project: Building Committee Oversight*, p. 59 (February 2003). They were not, however, professional designers and contractors, and appear to have relied on paid professionals who did not wholly manage the project on behalf of the town. In our Needham Middle School report, we observed that "over reliance on any private consultant or vendor is risky and can be imprudent." *Pollard*, p. 71.

Based on the record, the source of the roof problems appears to be the unexplained deviation from plans which specified dry and wet pipe with the installation of wet instead of dry pipe in April 1999. Neither the records of the town nor those of the architect disclose who made the decision to proceed without correcting this error. Moreover, the contracts do not make clear who was responsible for errors of judgment.

It appears that decisions made apparently without consideration of the long term consequences were ultimately not in the town's best interest. As you know, new regulations applicable to state-funded school building projects of over $5 million require the retention of a qualified owner's project manager,[4] as do public building projects estimated to cost more than $1.5 million.[5] A single project manager can serve as the focal point of responsibility and accountability for a town, and can assess the broad consequences of piecemeal decisions. The OIG contends that if a qualified owner's project manager had been present in 1999, the present problems may have been avoided.

Admittedly, "[i]n the current economic and political climate, persuading taxpayers to fund extra project management staff or consultants can be difficult." *Pollard*, p. 72. However, as the present project shows, any savings made in 1999 may have been lost in subsequent expenditures, culminating in the $75,000 appropriation request on May 9, 2006.

*Recommendations*

Accordingly, and based on the foregoing, I suggest the following management safeguards for future construction and renovation projects:

1. Assign or contract for a qualified project manager to oversee the project from the feasibility study to project completion.

2. Maintain complete, accurate project records, particularly with respect to any deviation from approved plans.

3. All changes in the project, together with an analysis of the impact, should be documented in writing and countersigned by the designer, the general contractor and any affected sub-contractors.

4. Contracts with vendors should be reviewed to assure accountability, should be executed under seal and be governed by Massachusetts law.

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[4] *See* M.G.L. c. 70B and 963 C.M.R. Part 1.00. The Massachusetts School Building Authority website can be found at http://www.massschoolbuildings.org/.

[5] M.G.L. c.149, §44A½.

These suggestions are made in the hope that you may in the future avoid the unfortunate circumstances in which the town finds itself, not just with respect to school renovations, but with respect to all municipal building projects. As far as the present situation is concerned, I suggest you discuss our findings with your town attorney.

I hope this information is helpful.

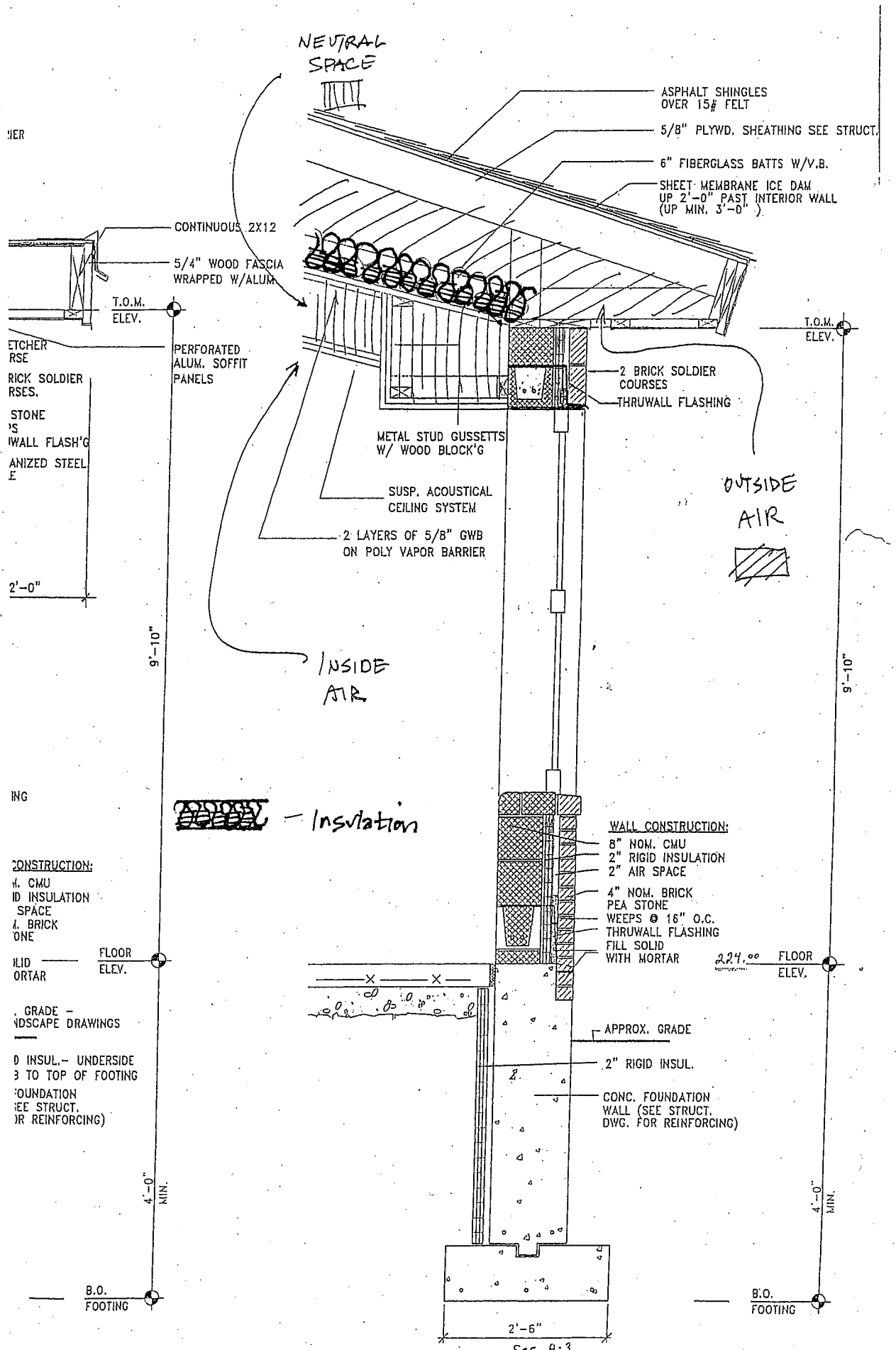
Sincerely,

Gregory W. Sullivan

Gregory W. Sullivan
Inspector General

cc: James C. Lehan, Chair, Norfolk Board of Selectmen
George Hall, Esq., Anderson & Kreiger

# ATTACHMENT A



# ATTACHMENT B