NEW MILFORD BOARD OF EDUCATION
New Milford Public Schools
25 Sunny Valley Road, Suite A
New Milford, Connecticut 06776

FACILITIES SUB-COMMITTEE
MEETING NOTICE

DATE:	**November 14, 2023**
TIME:	**6:45 P.M.**
PLACE:	**Sarah Noble Intermediate School Library Media Center**

AGENDA

New Milford Public Schools Mission Statement

The mission of the New Milford Public Schools, a collaborative partnership of students, educators, family, and community, is to prepare each and every student to compete and excel in an ever-changing world, embrace challenges with vigor, respect and appreciate the worth of every human being, and contribute to society by providing effective instruction and dynamic curriculum, offering a wide range of valuable experiences, and inspiring students to pursue their dreams and aspirations.

1. **Call to Order**
2. **Public Comment**
   An individual may address the Board concerning any item on the agenda for the meeting subject to the following provisions:
   A. A three-minute time limit may be allocated to each speaker with a maximum of twenty minutes being set aside per meeting. The Board may, by a majority vote, cancel or adjust these time limits.
   B. If a member of the public comments about the performance of an employee or a Board member, whether positive, negative, or neutral, and whether named or not, the Board shall not respond to such comments unless the topic is an explicit item on the agenda and the employee or the Board member has been provided with the requisite notice and due process required by law. Similarly, in accordance with federal law pertaining to student confidentiality, the Board shall not respond to or otherwise discuss any comments that might be made pertaining to students.
3. **Items for Information and Discussion**
   A. NMHS Updates:
      1.) NMHS Woodshop HVAC
      2.) Roof Project
      3.) NMHS Gym Ceilings
      4.) Belfor Restorations
   B. Central Office Update
   C. HVAC Reports & Grants
   D. McCarthy Observatory
   E. Facilities Offices (Larson Farmhouse)
4. **Public Comment**
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accordance with federal law pertaining to student confidentiality, the Board shall not respond to or otherwise discuss any comments that might be made pertaining to students.

5. Adjourn

Sub-Committee Members:	**Brian McCauley, Chairperson**
	Eric Hansell
	Pete Helmus
	Tom O'Brien
Alternates:	Wendy Faulenbach
	Olga I. Rella

NEW MILFORD PUBLIC SCHOOLS

Facilities Subcommittee Report

November 14, 2023

Items for Information and Discussion

A. NMHS Updates

1. NMHS Woodshop HVAC

Hawley Construction Corp has been in receipt of stamped drawings. They are pursuing a mechanical permit and developing submittals for the dust collection equipment.

2. Roof Project

Roofing contractor Greenwood Industries is still completing punch list items. No plan for the potential addition of fasteners and clips has been presented as of this writing. A report on the current safety of the roof was delivered to the BOE and Town and is included in this meeting's packet.

3. Gym Ceilings

The gym ceilings were finished as of this writing except for punch list items.

4. Belfor Restorations

Belfor Restoration has provided an updated calendar which has them completing the science labs at New Milford High School in late November.

B. Central Offices

Facilities has obtained a permit for the installation of a first and second floor set of doors to help divide the Central Offices from Sarah Noble classrooms. This work has already begun.

C. HVAC Reports & Grants

The Department of Administrative Services has opened a second round on grants for HVAC improvements at Schools. Additionally, as of January 1, 2025 Districts will need to employ the services of qualified companies to perform evaluations of current HVAC equipment within their schools. These inspections will then be reported to the State.

In an effort to be prepared for both of these processes, Facilities has posted an RFQ/RFP for A&E services relating to HVAC grants and the new non-funded state mandated compliance reports. Those requests were opened on October 20, 2023. Interviews with the final three firms were conducted and we are recommending a firm this evening.

D. McCarthy Observatory

After walking the roof of the observatory with a consultant a contractor was brought in to perform minor repairs and preventive maintenance. In addition, an obsolete satellite dish and associated ballast was removed from the roof.

E.Facilities Offices (Larson Farmhouse)

Over the past few months, fluorescent lighting was replaced with LED, new led emergency lighting was installed, and a hot water heater was replaced.

FUSS & O'NEILL

October 10, 2023

Mr. Jack Healy, P.E.
Town of New Milford
10 Main Street
New Milford, CT 06776

RE: Structural Engineering Review of Roofing Installation
New Milford High School
Fuss & O'Neill Reference No. 20191275.K10

Dear Mr. Healy:

Fuss & O'Neill, Inc. (F&O) has completed our independent review and assessment of the conditions of the installed standing seam metal roof at the New Milford High School at 388 Danbury Road in New Milford, Connecticut.

Project Background

During the course of replacement of the sloped roof areas at the New Milford High School (see aerial image on the next page for overall building layout and extent of the sloped roofs) with a new standing seam metal system, deficiencies were noted in the attachment of the metal panels, specifically with the attachment of the clips supporting the metal roofing panels to the substrate. The bonding company providing coverage under a previously breached contract has indicated their intention to study the roof installation to determine whether remedial actions are required. The Town of New Milford requested that Fuss & O'Neill perform an independent analysis of the contract documents and completed installation to evaluate the integrity of the as-built roofing system and determine what steps, if any, are appropriate to ensure the safety of the occupants of the school. This report presents the conclusions of this review.

Document Review

The following documents were provided for F&O to develop an understanding of the roof construction and history of the project, and to facilitate the review of the roofing connections:

- Original construction documents and Project Manual for the New Milford High School Partial Roof Replacement prepared by Silver Petrucelli (State Project No. 096-0036 RR), dated March 12, 2021 and issued for bid May 3, 2021.

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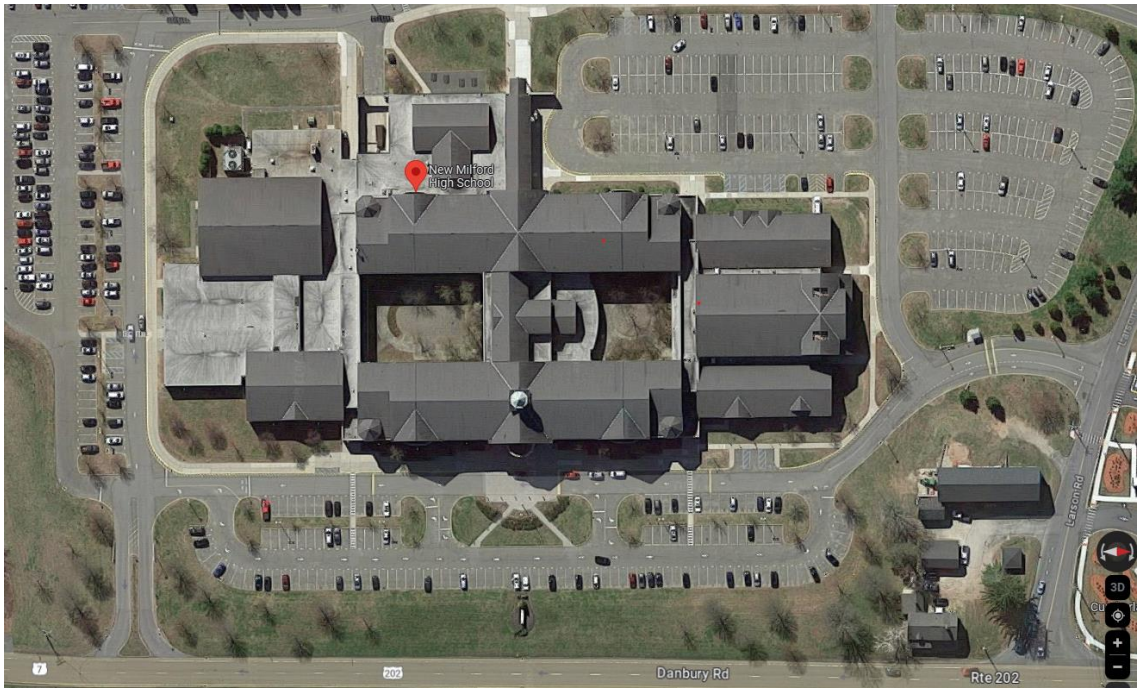
- Letter from Dean A. Petrucelli, AIA to Mr. Peter Helmus dated May 22, 2023 related to probes performed at the metal roof by Greenwood Industries to evaluate the fastening details.
- Shop drawing sheets 1-8 prepared by The Garland Company Inc. for the metal roof installation, dated 10-01-21, reviewed without exception by Silver Petrucelli and returned on 10-19-21.
- Installation Support Package submittal (78 pages) prepared by The Garland Company, Inc for the metal roof installation, reviewed and accepted with noted corrections by Silver Petrucelli and returned on 10-19-21.
- StressPly IV Membranes data sheet submitted by The Garland Company, Inc. and reviewed without exception by Silver Petrucelli and returned on 10-29-21.



.Aerial Image of New Milford High School

Pertinent Information

The following summarizes the information provided on the documents above in relation to the fastening of the roofing system.

- The original contract documents fully define the load parameters for the fastening of the roof, along with prescriptive requirements for the fasteners themselves. Specifically:
    - The specifications for the Standing-Seam Metal Roof Panels (Section 074113) specify the roof uplift pressures for 3 zones of the roof: 23.7 PSF at Zone 1 (Field of Roof), 41.2 PSF at Zone 2 (Eaves, Ridges, Hips and Rakes) and 61.0 PSF at Zone 3 (Corners).
    - The specifications also define building parameters to enable independent calculation of wind uplift forces.
    - The specifications specify an ultimate pullout value (564#) for each of two (2) self-tapping fasteners specified to connect each panel anchor to the decking or framing system.
- The roofing project was issued for bid on March 12, 2021. At that time, the 2018 Connecticut State Building Code was in effect. This code referenced the 2015 International Building Code, which in turn referenced ASCE 7-10 for design wind loads.
- The Code Information on the Contract Drawings (Drawing C1) specifies that the roofing shall conform to the requirements of Factory Mutual Engineering and Research Corporation (FM), with a wind uplift requirement of I-60 for the field, I-90 for perimeter and I-120 for corners, in accordance with FM Property Loss Prevention Data Sheet 1-28.
- The letter from Dean Petrucelli dated May 22, 203 indicates that two panels were removed from the roof at the west side of the main gymnasium, and it was confirmed that single screws were used at a number of roofing clips.
- The shop drawings submitted by Garland have a substantial amount of information, all of which is essentially in agreement with the design documents, but provide more detail. These drawings were reviewed and accepted without comment by Silver Petrucelli. Among other information, these drawings clearly indicate the pullout capacity of a single "#14-13 DP1, concealer-type self-tapping fastener" (609# - in excess of the value specified on the contract drawings) and layout of the clips, which vary based on the wind zone in which they are located. At each clip, 2 screws are specified in all zones, but the clip spacing varies depending on the specified wind uplift load (5'-0" max at Zone 1, 3'-11" max at Zone 2 and 2'-7" max at Zone 3). At all 3 zones, the perpendicular spacing of clips is shown at nominally 18" to correspond to the deck panel width. Plans are provided that clearly indicate the location and extent of each zone.
- The Installation Support Package submittal provides detailed information about the hardware, transition elements, closures, etc. provided with the roofing panels. There are several details that show the screws used to fasten the clips to the substrate, but all such details note fasteners "by erector" or "as required." Silver Petrucelli's only comment was to provide stainless steel clips. This is not relevant to this review.
- The Membrane data sheet contains no information relevant to this review.

Field Observations

A Fuss & O'Neill Structural Engineer met with a representative for the Town of New Milford at the site on September 27, 2023. The roof construction was observed from the underside at isolated locations where it was most visible: at the wood shop, auditorium (observed close-up from catwalks), gymnasium and auxiliary gymnasium. The screws used for fastening the roofing were designed to penetrate an existing insulation and plywood assembly, engage with the upper, structural portion of the roof deck, and also penetrate the bottom sheet metal of the roof deck, so they are visible in some areas from the interior of the building at the underside of the cellular deck. Several other areas of the building were also observed, but either had hard ceilings or spray fireproofing, which conceal the roofing fasteners penetrating the deck.

The following observations were noted:

1. Each of the areas observed has acoustic cellular deck. In each case, most screws penetrate at the solid portion of the acoustic deck (where the top sheet metal corrugation abuts the bottom flat sheet metal panel) but there were occasions where screws were observed through the perforated cellular portion of the deck (see photo #1).
2. Single screws were noted at many locations in all the spaces observed (see photos #2 & 3).
3. In all the spaces observed, the spacing of screws varied significantly. There were areas where the spacing exceeded 5 feet (see photo #4), which was the maximum spacing indicated on the Garland shop drawings. Some, but not all, of these variations relate to dormers on the roof.
4. The shop drawings indicate clips at the ends of each panel at a spacing of 18". Generally, screws were noted at this spacing, but there were locations where they were not. Some 18" intervals were skipped, and other varied (see photos #5 & 6).
5. The prescribed 2'-7" clip spacing at corners was not observed (see photo #7).
6. At some locations, the prescribed 3'-11" spacing at perimeters was exceeded (see photo #8). Only single screws were visible at some of these locations.

Independent Calculations

Fuss & O'Neill performed independent calculations to verify the design loads for roof and compare with the reported pullout capacity. Since the contract drawings reference both the Connecticut State Building Code and FM requirements, both sets of criteria were applied.

In March of 2021, when the Building Permit was presumably issued, the 2018 Connecticut State Building Code (CSBC) was effective. This code referenced the 2015 International Building Code

(IBC), which in turn referenced ASCE 7-10 for wind loads. Since that time, the 2022 CSBC has been adopted, which invokes the newer ASCE 7-16 for wind loads. The FM provisions are closely aligned with ASCE 7-16 and not only yields higher loads, but also differentiates between edge conditions at the ridge and eave. For the purposes of this review, we used the provisions of the CSBC in effect at the time of the design, which used the loads prescribed in ASCE 7-10.

Assuming the roofing was installed in strict accordance with the contract documents and Garland shop drawings, there would be 2 screws at each clip, spaced as specified on the shop drawings and indicated above. Based on the wind uplift loads in ASCE 7-10 and an ultimate pullout capacity of 609#, the installation is adequate as designed with the following factors of safety in each zone:

Zone 1: 4.1
Zone 2: 3.0
Zone 3: 3.1

With a single screw installed at each clip, but spaced as specified on the shop drawings, the factor of safety would be roughly half of these values, or:

Zone 1: 2.1
Zone 2: 1.5
Zone 3: 1.5

Please note that the spacings specified on the shop drawings were not consistently observed in the field, so these factors of safety with single screws are overstated for some areas.

Based on this analysis, the code prescribed wind loads will not exceed the ultimate capacity of the clip attachments if they are installed in accordance with the contract drawings. However, the contract drawings specify a minimum factor of safety of 1.67 for the clip installation, which is not met in Zones 2 or 3 with a single screw, even if spaced appropriately. Therefore, the adequacy of the as-built installation in reference to the 2018 CSBC cannot be confirmed.

In reference to FM requirements, it is our understanding that Factory Mutual has not underwritten this project, so these requirements need not be applied to the project. But since they are referenced in the contract documents, it is important to note that the FM wind uplift provisions are higher than those prescribed by the 2018 CSBC, and the factor of safety requirements prescribed in the specifications are not met by any of the roof areas under those criteria.

An additional consideration is the pullout capacity of the #14-13 DP1 self-tapping fasteners, which are stated on the Garland submittal to be 609# when fastened to 22 gage galvanized steel. An

independent review of published load capacities did not confirm this value. Concealer Technical Data published by Triangle Fastener Corporation for Pancake Head Screws indicates that #14-13 fasteners into 22 gage, grade 50 steel yields an ultimate pullout capacity of 360#. This particular fastener is reported to carry FM approval. It should be confirmed that the reported 609# capacity of the screws used for this project have been validated by an independent entity, such as ICC or FM. No such verification was provided in any of the reviewed materials. If this value is adjusted to the 360# value reported by Triangle, the factor of safety is depleted significantly, and in some cases, completely.

Discussion and Recommendations

There is no question that the installed roof system does not conform with the contract documents or the submittals provided by Garland. The following concerns were found, which represent either clear deficiencies or inability to verify adequacy:

- Single screws were found at many clips in all the observed roof areas.
- Spacing of screws were sporadic to varying degrees in all observed roof areas.
- Spacing of screws do not clearly and consistently correspond to variations in design wind load conditions, i.e. there did not appear to be more screws along edges and at corners than in the field of the roofs in every case.

The question remains as to the level of "safety" of the roofing system as installed. In order to respond to this question, it is first necessary to define the acceptance criteria. It is appropriate to apply the provisions of the Connecticut State Building Code (CSBC) that was in effect at the issuance of the Building Permit (2018 edition) as the governing document for the appropriate wind loads. As the analysis above indicated, assuming that the clip pattern conforms with the contract documents and Garland shop drawings, even with single screws at each clip, there is a factor of safety greater than 1.0 under the design wind condition based on a basic wind speed (based on maximum 3-second gust) of 123 MPH. While this provides some reassurance, it is important to note that the clip positions do NOT consistently conform with the maximum spacings indicated on the shop drawings. In addition, even where visible, precise measurements of clip spacings could not be made, and most of the sloped roof areas were not accessible to view from the underside, so most of the actual clip configuration remains unknown. There are many areas of roof that were not visible, the limited observations that were possible show a large degree of variation, and there are some areas that are known not to be in conformance. Therefore, it is not possible to confirm that the roof as constructed is in conformance with the 2018 CSBC.

Furthermore, the analysis provided herein assumes that the ultimate screw pullout capacity is as stated in the Garland submittal, but this should also be verified, either by an independent certifying agency or test data.

It may be feasible to confirm the actual uplift capacity of the as-built roofing system through field testing, but given the variety of observed conditions, a large number of representative locations would have to be tested, and very conservative acceptance criteria should be applied.

In conclusion, the deficiencies noted are only significant in a severe weather event that results in wind speeds (specifically, in the range of 120 mph) and resulting uplift forces close to the design conditions. Given the low probability that school would be in session and students or community members will be outside the building under such conditions, we do not feel that the installation poses an immediate safety risk to occupants. Nevertheless, the conditions are less than what was specified and do not meet the intent of the design or the Building Code.

Please contact us if you have any questions or comments. Thank you for the opportunity to work with you on this project.

Sincerely,

Richard C. Boggs, PE, LEED AP
Senior Project Manager

Photos

Photo 1: Variations in screw spacing, some at perforated deck sections

Photo 2: Line of single screws at gymnasium

Photo 3: Single and double screws at auditorium

Photo 4: Excessive fastener spacing at gable end

Photo 5: Variations in clip spacing

Photo 6: Variations in clip spacing and single screws

Photo 7: Inadequate clip spacing at corner

Photo 8: Inadequate clip spacing at eave