



**SCHOOL CAPITAL PROJECT COMMITTEE  
WATERTOWN, CT**

**REGULAR MEETING AGENDA  
WEDNESDAY, February 21, 2024 7:00 p.m.**

**WATERTOWN TOWN HALL  
TOWN COUNCIL CHAMBERS  
61 ECHO LAKE RD.  
WATERTOWN, CT 06795**

1. Call Meeting to Order.
2. Pledge of Allegiance.
3. Roll Call
4. Minutes.

a. Regular Meeting – January 17, 2024

5. New Business

a. Discussion and possible action on projects invoices to be authorized:

	Vendor	Invoice No.	Dated	Amount Due
1	Hartford Courant	082066983000	10/23/23	\$948.25

- b. Discussion and possible approval regarding proposal from Silktown Roofing for additional roof test cuts at Watertown High School.
- c. Discussion and possible action regarding pre-renovation roof survey revisions at Watertown High School by Pennoni Associates, Inc.
- d. Discussion regarding Infrared Thermographic Roof Moisture Analysis report of John Trumbull Primary School.
- e. Presentation by Roger LaFleur and Hibbard Rosa to discuss timeline of events leading up to Roof Project beginning.
- f. Discussion on possible bi-weekly meetings.

6. Old Business.

7. Adjournment.

Matters not provided on the agenda may be considered if 2/3 vote of the members attending vote to do so.



**SCHOOL CAPITAL PROJECT COMMITTEE  
WATERTOWN, CT**

**REGULAR MEETING  
WEDNESDAY, JANUARY 17, 2024– 7:00 P.M.  
MINUTES**

**WATERTOWN TOWN HALL  
TOWN COUNCIL CHAMBERS  
61 ECHO LAKE RD.  
WATERTOWN, CT 06795**

**1. Call Meeting to Order.**

Chairman Robert Porter called the meeting to order at 7:00 p.m.

**2. Pledge of Allegiance.**

Chairman Robert Porter led the pledge of allegiance.

**3. Roll Call**

Robert Porter, Chairman

Mark Guerrero, Vice Chairman

Anthony Ciriello

Jeffrey Desmarais

Jeff Franson

Brian Mays

Dr. Alison Villanueva, Superintendent of Schools

Mary Ann Rosa, Chairman of the Watertown Town Council

Donna Ford, Purchasing, Purchasing Agent/Building Supervisor

Luigi Velardi, BOE Facilities

Absent: David Demirs, Jim Lehner, Thomas Walsh

Others Present:

**4. Minutes.**

**a. Regular Meeting – December 13, 2023**

Motion: Mark Guerrero seconded by Mary Ann Rosa to accept the December 13, 2023 meeting minutes as amended.

Mary Ann Rosa and Jeff Franson stated on Line item 5b it should read regarding the vote; 2 Nay for Mary Ann Rosa and Jeff Franson and 0 for abstain.

Aye: 5 Porter, Guerrero, Franson, Rosa, Villanueva

Nay: 0

Abstain: 3 Ciriello, Desmarais, Mays

Motion passes

## 5. New Business

### a. Discussion and possible action on projects invoices to be authorized:

	Vendor	Invoice No.	Dated	Amount Due
1	KBA	23009.00-6	12/29/2023	\$2,250.00
2	Republican American	RA0915642	12/22/2023	\$675.85

Motion: Jeffrey Desmarais seconded by Brian Mays to accept the invoice from KBA for \$2,250.00.

Motion passed unanimously

Motion: Jeff Franson seconded by Jeffrey Desmarais to accept the invoice for Republican American for \$675.85.

Motion passed unanimously

### b. Discussion and possible action on selection of an architect for Two Roof Projects (JTPS and WHS) - bids received 01/17/2024.

Discussion and questions amongst the commission regarding the architects for the roof projects.

Motion: Anthony Ciriello seconded by Mark Guerrero to accept and approve the proposal Hibbard & Rosa Architects LLC. dated January 5, 2024. On that bid being paid \$83,300, for additional services \$5,700 for the high school and \$5,700 for John Trumbull Primary School for hazardous material design services if needed.

Motion passed unanimously

6. Old Business.

Chair Robert Porter stated there appears to be additional services.

Dr. Alison Villanova stated this is for 2 documents needed for John Trumbull. The first one is for hazardous materials testing for asbestos and other materials, the other one is for an infra-red moisture analysis.

Motion: Mark Guerrera seconded by Jeffrey Desmarais that we approve the expenditures for the hazmat testing and the roof survey

Motion passed unanimously

7. Adjournment.

Motion: Jeffrey Desmarais seconded by Brian Mays to adjourn meeting at 7:20 p.m.

Motion passed unanimously

Respectfully submitted

---

Robert Porter, Chairman  
Watertown Public Buildings Committee



# Hartford Courant

media group

PO Box 8026  
Willoughby, OH 44096

adbill.ng@tribpub.com  
844-348-2442

## Invoice & Summary

Billed Account Name: Watertown Bd Of Education  
Billed Account Number: CU00256274  
Invoice Number: 082066983000  
Amount: \$948.25  
Billing Period: 10/01/23 - 10/31/23  
Due Date: 11/30/23

## INVOICE/SUMMARY

Page 1 of 2

### Invoice & Summary Details

Date	trunc Reference #	Description	Ad Size/ Units	Rate	Gross Amount	Total
<b>Current Activity</b>						
10/23/23	HTF82066983	Classified Listings, Online				948.25
10/27/23		Legal Notice FR Daily				
		7518111				
<b>Total Current Advertising</b>						948.25

*Project Manager -  
Roof Project*

**Total:** \$948.25

### Account Summary

Current	1-30	31-60	61-90	91+	Unapplied Amount
948.25	0.00	0.00	0.00	0.00	0.00

Please detach and return this portion with your payment.

# Hartford Courant

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PO Box 8026  
Willoughby, OH 44096

### Remittance Section

Billed Period: 10/01/23 - 10/31/23  
Billed Account Name: Watertown Bd Of Education  
Billed Account Number: CU00256274  
Invoice Number: 082066983000

Return Service Requested

WATERTOWN BD OF EDUCATION  
MARY  
10 DEFOREST ST  
WATERTOWN CT 06795-2116

For questions regarding this billing, or change of address notification,  
please contact Customer Care:

Hartford Courant  
PO Box 8026  
Willoughby, OH 44096



# SILKTOWN ROOFING

MANCHESTER, CT

Silktown Roofing Corp. • 151 Water St. • Derby, CT 06418 • (203) 735-0552 • fax (203) 732-7649 • voytek@silktownroofing.com

Date: 2/1/2024



Attn: Steve Botelho - Garland

RE: **Additional roof test Cuts \_ Watertown High School**

To perform test cuts to determine deck types on the above referenced project our cost would be: \$1,400.00.

Test cuts as required to evaluate specific roof assemblies due to multiple deck types on this project.

**Qualifications:**

Garland representatives need to be present, to record the findings for the record.

**Exclusions:**

· CT Sales Tax,

Please let me know if you have any questions.  
Thank you.

Sincerely,  
Silktown Roofing

Wojciech "Voytek" Florkiewicz  
Project Manager

December 20, 2023

**WAPUS23001 (CO#01)**

Luigi Velardi  
Director of Facilities & Security  
Watertown Public Schools  
61 Echo Lake Road  
Watertown, CT 06795

**RE: PRE-RENOVATION ROOF SURVEY REVISIONS  
WATERTOWN HIGH SCHOOL  
324 FRENCH STREET  
WATERTOWN, CT 06795**

Dear Mr. Velardi:

**HYGENIX Division of Pennoni (HDP)** is pleased to present this proposal for professional services for the above referenced project. This proposal is based on my e-mails with Steve Botelho of The Garland Company and previous inspections HDP has performed on the high school building. It is our understanding that the project consists of the complete removal and replacement of the buildings white flat roofing system 324 French Street in Watertown CT.

Based on our current understanding of the project, HDP proposes the following Scope of Services:

#### **SCOPE OF SERVICES**

##### **TASK 1: ASBESTOS SURVEY**

HDP will provide United States Environmental Protection Agency (USEPA) accredited, and Connecticut licensed Asbestos Inspectors to conduct a visual inspection of the roof drains of the building and revise the asbestos inspection report that was prepared by HYGENIX Inc. in February of 2021. The inspection will be performed in accordance with guidelines established by the USEPA and Connecticut asbestos regulations. It is understood that no additional sampling is required for the High School roof replacement.

#### **FEES**

HDP will complete the scope of services outlined in **TASKS 1** above for the Lump Sum Fee of **\$800.00.**



This fee and schedule are based on the following assumptions:

**ASSUMPTIONS/CLARIFICATIONS**

- Unrestricted, safe access to all scheduled renovation areas within the building will be available on the requested time and date of the site visit.
- We will provide our report electronically to you within one week of receipt of analytical data.

**BILLING AND PAYMENT**

An invoice for professional services will be provided monthly is due upon receipt. The Client acknowledges that the method of billing and payment has been discussed in detail, that the terms agreed upon can only be changed by a written addendum agreed to by both parties, and that work may be stopped until payment is made in accordance with the agreement.

**TERMS AND CONDITIONS**

Pennoni's General Terms and Conditions (Form LE01, revised December 2015) are attached hereto and are considered as part of the scope of services. The Client indicates by the execution of this proposal that they have reviewed and understand the General Terms and Conditions.

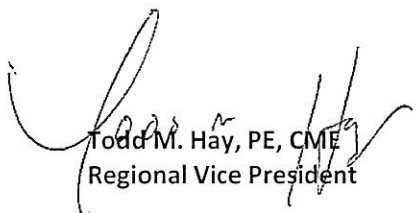
Thank you for affording us the opportunity to work with you on this project. If you have any questions, please feel free to contact us.

Sincerely,

**PENNONI ASSOCIATES INC.**



James Twitchell  
Senior Industrial Hygienist II



Todd M. Hay, PE, CME  
Regional Vice President



Please indicate your acceptance of this proposal by signing and returning a copy as our authorization to proceed. In signing this proposal, the Client authorizes Pennoni to complete the professional services outlined in this proposal in accordance with the attached terms and conditions.

**Accepted By:**

---

**(Authorized Representative of the Client)**

---

**(Print Name & Title)**

---

**(Date)**



## PENNONI ASSOCIATES INC. GENERAL TERMS & CONDITIONS

1. Unless withdrawn sooner, proposals are valid for thirty (30) days.
2. The technical and pricing information in proposals is the confidential and proprietary property of Pennoni Associates Inc. ("Pennoni") or any Pennoni subsidiary or affiliate. Client agrees not to use or to disclose to third parties any technical or pricing information without Pennoni's written consent.
3. The agreement created by the Client's acceptance of a proposal and these Terms & Conditions is hereinafter referred to as the "Agreement." If a proposal is submitted to Client and Client fails to return a signed copy of the proposal but knowingly allows Pennoni to proceed with the services, then Client shall be deemed to have accepted the terms of the proposal and these General Terms & Conditions. If there is a conflict or inconsistency between any express term or condition in the proposal and these General Terms & Conditions, then the proposal shall take precedence. The proposal and these General Terms & Conditions constitute the entire Agreement, and supersede any previous agreement or understanding.
4. Payment is due upon receipt of invoices as submitted. If Client chooses to make any payment via major credit card, Client agrees to pay a 3% surcharge or 1.03 times the total amount invoiced. Client agrees to pay interest at the rate of 1½ percent per month on invoices that are more than 30 days past due. If an invoice is 30 or more days past due, then Pennoni may suspend services and refuse to release work on this Agreement or any other agreement between Client and Pennoni until Client has paid all amounts due. Unless Pennoni receives written notice of Client's dispute of an invoice within 30 days of the invoice date, the invoice will be presumed correct. If payment is not made in accordance with the Agreement, then Client agrees to pay reasonable costs and attorney's fees incurred by Pennoni to collect payment.
5. All drawings, sketches, specifications and other documents ("Documents") in any form, including electronic, prepared by Pennoni are instruments of Pennoni's services, and as such are and shall remain Pennoni's property. Upon payment in accordance with the Agreement, Client shall have the right to use and reproduce the Documents solely for the purposes of constructing, remediating, using or maintaining the project contemplated by the Agreement ("Project"). The Documents are prepared for use on this Project only, and are not appropriate for use on other projects, any additions or alterations of the Project, or completion of the Project by others. Client shall not use the Documents in violation of this paragraph without Pennoni's express written consent; and such use is at the Client's sole risk. Client agrees to indemnify, defend and hold harmless Pennoni from any claims, damages, losses, liabilities and expenses arising from such prohibited use.
6. The proposed fees and schedule constitute Pennoni's best estimate of the charges and time required to complete the Project. As the Project progresses, facts uncovered may dictate revisions in scope, schedule or fee. The hourly rate schedule for services provided on a time and material basis will be subject to increases annually.
7. Fee and schedule commitments will be subject to change for delays caused by Client's failure to provide specified facilities or information, or for delays caused by third parties, unpredictable occurrences or force majeure.
8. Where the method of payment is based on time and materials, Client agrees that the following will apply: The minimum time segment for charging work is one-quarter hour, except the minimum time segment for charging of field survey work is four (4) hours. Client reimbursable expenses include travel and living expenses of personnel when away from the home office on business connected with the Project; subcontractor and subconsultant costs; identifiable communications, mailing and reproduction costs; identifiable drafting and stenographic supplies; and expendable materials and supplies purchased specifically for the Project. A ten (10) percent administrative and handling charge will be added to client reimbursable expenses.
9. Client's termination of this Agreement will not be effective unless Client gives Pennoni seven (7) days prior written notice with accompanying reasons and details, and affords Pennoni an opportunity to respond. Where the method of payment is "Lump Sum," Client agrees that the final invoice will be based on services performed to the effective date of cancellation, plus an equitable adjustment to provide for costs Pennoni incurred for commitments made prior to cancellation. Where the method of payment is time and materials, Client agrees that the final invoice will include all services and direct expenses up to the effective date of cancellation plus an equitable adjustment to provide for costs Pennoni incurred for commitments made prior to cancellation.
10. Pennoni will maintain at its own expense Workman's Compensation insurance, Commercial General Liability insurance, and Professional Liability insurance.
11. Neither the Client nor Pennoni shall assign this Agreement without the written consent of the other.



12. Pennoni does not represent or warrant that any permit or approval will be issued by any governmental or regulatory body. Pennoni will endeavor to prepare applications for such permit or approval in conformance with applicable requirements; but, in view of the complexity of and the frequent changes in applicable rules and regulations and interpretations by the authorities, Pennoni cannot guarantee that any such application will be considered complete or will conform to all applicable requirements.
13. Pennoni will perform its work in accordance with generally accepted professional standards. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED. This Agreement is solely for the benefit of the Client and its successors. There is no third-party beneficiary of this Agreement.
14. CLIENT AND PENNONI HAVE CONSIDERED THE RISKS AND REWARDS ASSOCIATED WITH THIS PROJECT, AS WELL AS PENNONI'S TOTAL FEE FOR SERVICES. CLIENT AGREES THAT, TO THE FULLEST EXTENT PERMITTED BY LAW, PENNONI'S TOTAL AGGREGATE LIABILITY (INCLUDING THE LIABILITY OF ITS OFFICERS, DIRECTORS, EMPLOYEES, AGENTS, SUBCONTRACTORS AND CONSULTANTS) TO THE CLIENT (AND ANYONE CLAIMING BY, THROUGH OR UNDER THE CLIENT) FOR ANY AND ALL INJURIES, CLAIMS, LOSSES, EXPENSES OR DAMAGES ARISING OUT OF THIS AGREEMENT FROM ANY CAUSE OR CAUSES IS LIMITED TO THE TOTAL FEE RECEIVED BY PENNONI UNDER THIS AGREEMENT OR \$50,000, WHICHEVER IS GREATER. SUCH CAUSES INCLUDE, BUT ARE NOT LIMITED TO, PENNONI'S NEGLIGENCE, ERRORS, OMISSIONS, STRICT LIABILITY, OR BREACH OF CONTRACT OR WARRANTY.  
IN THE EVENT THE CLIENT IS UNABLE TO ACCEPT THE ABOVE LIMITATION OF LIABILITY, PENNONI AGREES TO INCREASE THE LIMITATION TO \$1,000,000 UPON ITS RECEIPT, PRIOR TO PERFORMING ANY SERVICES, OF CLIENT'S WRITTEN AGREEMENT TO PAY AN ADDITIONAL SUM OF NOT LESS THAN 10% OF THE TOTAL FEE UNDER THIS AGREEMENT OR \$1,000, WHICHEVER IS GREATER.
15. Client shall make no claim against Pennoni unless the Client first provides a written certification, executed by an independent design professional, specifying those acts or omissions which the independent design professional contends is a violation of generally accepted professional standards and upon which the claim will be premised. The independent design professional must be licensed to practice in the state where the Project is located and in the discipline related to the claim. Client agrees that the independent design professional's certification is a condition precedent to the Client's right to institute any judicial proceeding.
16. If required under the scope of services, Pennoni shall visit the Project site to become generally familiar with the progress and quality of the work for which Pennoni prepared contract documents, and Pennoni shall not make exhaustive or continuous onsite inspections. Pennoni's services do not include supervision or direction of the contractor's work. Observation by Pennoni field representatives shall not excuse the contractor for defects or omissions in its work. Pennoni shall not control construction means, methods, techniques, sequences, or procedures, and the contractor is solely responsible for all work on the Project, including safety of all persons and property.
17. If Client does not retain Pennoni to render construction phase services, then Client waives any claim it may have against Pennoni and agrees to indemnify, defend, and hold harmless Pennoni from any loss or liability, including attorneys fees and other defense costs, arising out of or related to the interpretation of Pennoni's plans and specifications, the review of shop drawings, the evaluation of contractor's request for change orders, or the failure to detect and correct obvious errors or omissions in Pennoni's plans and specifications.
18. Unless and until a court determines that Pennoni's preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, specifications and/or Pennoni's giving or failure to give instructions is the primary cause of any damage, claim, loss or expenses, Client shall indemnify, defend and hold harmless Pennoni and its officers, employees and consultants from and against all damages, claims, losses or expenses, including reasonable attorneys fees and other costs of defense, arising out of this Agreement. In the event the Client is required to defend Pennoni under this paragraph, Pennoni shall have the right to select its attorneys.
19. Client agrees to pay reasonable expert witness fees if Pennoni or any of its employees is subpoenaed to testify as a fact or opinion witness in any court proceeding, arbitration, or mediation to which the Client is a party.
20. Unless otherwise provided in this proposal, Pennoni shall have no responsibility for the discovery, presence, handling, removal, or disposal of hazardous materials or underground structures at the Project site.
21. Client and Pennoni waive consequential damages arising out of this Agreement.
22. This Agreement shall be governed by the laws of Connecticut.
23. Both Pennoni and Client agree to waive the right to subrogation for covered losses and each shall obtain similar waivers from Owner, subcontractors, property and casualty insurers, and any other party involved in this Project.



# Infrared Thermographic Roof Moisture Analysis

PERFORMED FOR: Town of Watertown  
61 Echo Lake Road  
Watertown, CT 06795

LOCATION: John Trumbull Primary School  
Watertown, CT

CONDUCTED ON: February 3, 2024

REQUESTED BY: Donna Ford

PERFORMED BY: Mike Hemenway, Certified Thermographer

IR Analyzers  
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- IV. Instrumentation
- V. Survey Procedures
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Core Sample Analysis
- VIII. Thermographic Documentation
- IX. Roof Maps

February 7, 2024

Donna Ford  
Town of Watertown  
61 Echo Lake Road  
Watertown, CT 06795

Dear Donna,

This report summarizes the findings of our Infrared Roof Moisture Analysis of the roofs at the John Trumbull Primary School, Watertown, CT, performed on February 3, 2024.

Included in this report are Thermograms and Control Photos taken during the inspection, and information about interpreting these images. Included is an AutoCAD® map of the roof. All moisture damaged areas of the roof are marked on the maps. The moisture damaged areas and the locations of the core sample and moisture probe are marked on the roof surface with long-lasting spray paint. This report also includes descriptions of Infrared Thermography, as well as roof construction details, survey procedures and the weather conditions on the date of the infrared testing.

#### WEATHER CONDITIONS

The Infrared Roof Moisture Survey was performed during the night of February 3, 2024. During the day the weather was sunny with a high temperature of approximately 42°F. At night the sky was clear, with calm winds and an ambient nighttime temperature of approximately 32°F.

**IR ANALYZERS**  **Vector Mapping**  
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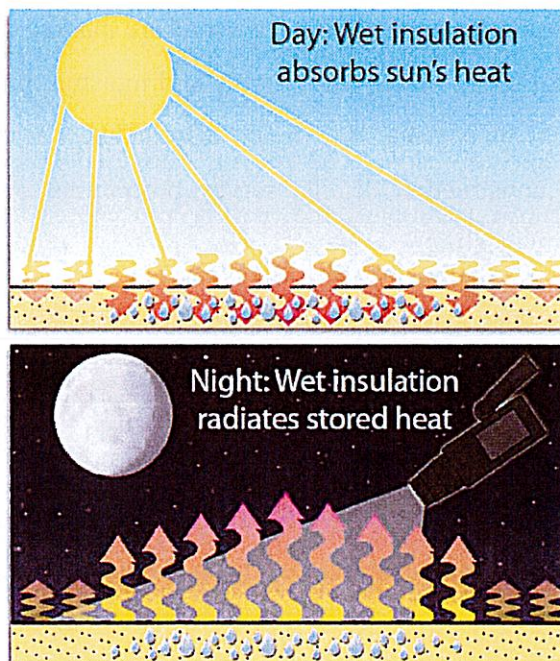


### INFRARED THERMOGRAPHY

All objects emit heat (i.e. infrared radiation). This radiation is constantly being absorbed and re-emitted by ourselves and everything around us. "Infrared scanning" and "thermography" are the terms used to describe the process of making this thermal radiation visible and capable of interpretation.

Infrared Roof Moisture Analysis locates areas of moisture damage within a flat roofing system. These areas of moisture damage can be pinpointed with the infrared scanner because moisture damaged and dry insulations have different abilities to conduct, absorb and retain heat. The thermal differences between moisture damaged and dry insulation are especially evident under two sets of circumstances.

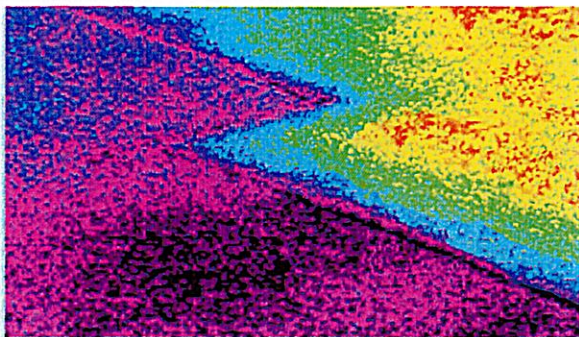
First, moisture damaged roof insulation absorbs much more heat than dry insulation. Moisture damaged insulation also stores more heat over a longer period of time than intact, dry materials. During the day, the sun's heat raises the temperature of moisture damage in the roofing system. As the roof cools off at night, the areas of moisture damage will stay warm longer than the dry areas. During the evening, this stored "solar gain" is released as radiant heat that is detectable with the infrared camera. As the evening progresses, areas of moisture damage will appear warmer to the camera than adjacent dry roofing.



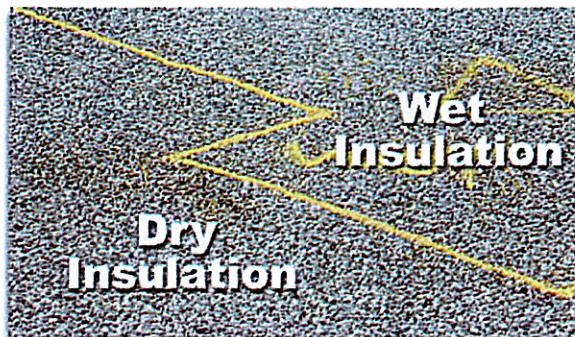
Second, when there is a significant difference in ambient temperature between the interior and exterior of the building, heat losses from inside the building will be greater through the moisture



damaged areas due to the reduced R-value of the moisture damage. This is especially true during the heating season. In both instances, when viewed from the roof side, moisture damage areas will show up as warmer in the infrared image. Often these two phenomena work together, creating strong, long-lasting thermal images that clearly illustrate the differences between moisture damaged and dry insulation.



Thermographic image from infrared camera



Control image, wet sections marked for removal

Our Infrared cameras can also be used in a variety of other Nondestructive testing applications:

- Infrared Electrical/Mechanical Inspections pinpoint developing problems in power delivery systems. The infrared scanner can “see” hot spots where there are going to be failures, before they happen. This Predictive Maintenance approach provides for time to repair these problem areas before they cause equipment damage, unscheduled outages, and downtime. Problem areas are pinpointed, prioritized and fully documented.
- Infrared Steam System Inspections pinpoint failing steam traps, malfunctioning heat exchangers and boiler problems. These surveys can save thousands of dollars by reducing energy usage.
- Infrared Building Envelope Analysis locates and documents building heat loss problems, including sources of mold, drafts, and excess moisture. Infrared thermography is the only nondestructive and complete system for locating the causes of frozen pipes, ice dams, missing or moisture damaged areas and high heating costs. Infrared Building Envelope

**IR ANALYZERS**  **Vector Mapping**

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Surveys provide valuable performance data for newly constructed buildings and energy retrofits.

### INSTRUMENTATION

The roofs were inspected with a FLIR T420, a professional long wave infrared camera. In combination with the powerful FLIR Tools+ software, the T420 system enables highly detailed image/data processing in the Windows® environment.



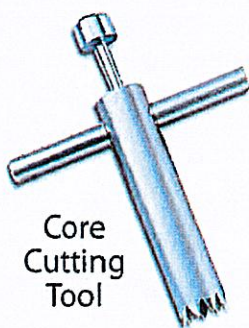
FLIR® T-420 Specifications	
Detector	FPA uncooled microbolometer 320 x 240
Spectral band	7.5 to 13 $\mu$ m
Sensitivity (NETD @ 30°C)	< 0.045°C
Temperature measurement range	-20 to 650° C
Focus range	9" to infinity
FOV (standard lens)	25° x 19°
Zoom	4x continuous
Minimum Focus Distance	0.4 meters
Video/Image Output Format	MPEG-4, USB, Wi-Fi

## SURVEY PROCEDURES

The IR Analyzers Certified Thermographers followed defined survey procedures when inspecting your roof.

**GUIDELINES:** Every square foot of roofing in the contract was scanned a minimum of two times. All moisture damaged areas were marked on the roof with long-lasting paint. Invasive testing was employed to confirm the presence of moisture and tested locations were marked on the surface.

**VERIFICATION:** Infrared Thermography is a powerful tool for Nondestructive Testing of flat roofing systems. However, to ensure complete accuracy of the survey results, it is necessary to physically verify the presence of moisture within the roofing system. We employ two methods for physical verification of the roof's condition: Core Samples and Moisture Probes. In all, 1 core sample and 1 moisture probe were taken on the roof to verify the findings of the Infrared Survey.



**CORE SAMPLES:** When taking a core sample, the Thermographer typically extracts a small section of the roof down to the roof deck. This allows for a complete physical examination of all construction details and roofing materials. The only exception to this practice is when core samples are taken in areas of moisture damaged roofing. In these instances, the Thermographer will usually not cut the vapor retarder or bottom roof, as this may allow moisture to leak into the building.

A core sample of the roof may be taken for several different reasons. First, the insulation can be physically inspected to determine its condition and if it is moisture damaged or dry. Second, core samples provide invaluable information about the construction of the roofing system. Of particular interest to the Thermographer is the type and thickness of the membrane, insulation type and thickness, possible presence of vapor retarder, if any, and type of decking and condition

**IR ANALYZERS**  **Vector Mapping**

*Smarter Testing. Faster Response.*



of the deck in the area cored. All core sample sites were filled and sealed using the standard repair techniques approved by the National Roofing Contractors' Association. For information about the roof's construction, see Appendix A: Core Analysis.

**MOISTURE PROBES:** Physical testing for the presence of moisture can also be accomplished through the use of moisture probes. This test technique is quicker and less invasive than core sampling. The Delmhorst Instrument Company Model BD-8 Moisture Tester was employed during and after the survey to verify the condition of the roofing materials. This electrical resistance probe measures the flow of direct current between two electrodes. The electrodes are driven into the roofing materials, and readings are taken at different levels to insure the highest degree of accuracy. As the conductivity of the insulation increases, the readings on the resistance probe increase. An increase in the moisture content of the roofing materials increases its electrical conductivity and the meter reading. The holes made by the electrical probes were filled and sealed using standard repair techniques approved by the National Roofing Contractors Association.



**BOUNDARIES:** Every effort is made to have the lines painted on the roof indicate accurately the boundaries of the moisture damaged areas. However, the nondestructive nature of the testing can sometimes result in small inaccuracies. Therefore, the Thermographer will generally mark outside the moisture damaged area by about 6" to 12" to provide a reasonable margin of error. In other instances, it may be advisable to calculate a slightly larger area of insulation than what is actually painted on the roof. Additionally, the way moisture migrates through insulation may not be homogenous, and it may happen that there are a few square feet of dry insulation within the boundaries of the larger moisture damaged area. As a practical matter, these small dry spots are not significant, and the Thermographer will just define the overall boundaries of the moisture damaged area.



PONDING: During the inspection, we found areas where the roof surface was damp or had standing water. Typically, evaporative cooling will make it difficult for the Thermographer to determine if the insulation underneath the membrane is moisture damaged or dry in these areas. In addition, it is not good practice to perform moisture probes or take core samples where the roof is moist because it is difficult to properly repair wet membranes. Therefore, these small areas should be considered as not inspected, and it may be advisable to have a professional physically sample these areas at a time when the roof surface is dry. These areas are documented on the roof maps.

MAPPING: After all the scanning and verification were completed, the roof was mapped. A draft copy of your drawing was made at the site, documenting all the information generated during the inspection. A final copy of the map was plotted in the office using an AutoCAD System. Please note that the measurements displayed in these maps should not be used as a substitute for as-built drawings.

### **FINDINGS**

As per our survey procedures, the entire roof area in the contract was scanned a minimum of two times. A total of 8 moisture damaged areas were detected in the roofing.

The total size of the roofs that were inspected with the infrared camera is approximately 24,438 square feet. The total amount of moisture damaged areas equals approximately 167 square feet. The amount of moisture damaged areas is <1% of the total roof area. These moisture damaged areas are marked on the roof surface and on the maps provided. Please refer to these maps when reviewing the report.



### **THERMOGRAM INTERPRETATION AND DOCUMENTATION**

Hard copy documentation of the survey findings is provided through the use of two different types of photographs. Color Thermograms (photographs of the infrared image) and Control Photos (conventional pictures of the same scene taken during the inspection) are provided of sample moisture damaged areas uncovered during the inspection. Dry areas of roofing are cooler, while moist areas are warmer. In the thermograms, temperatures are indicated in various colors. The following is a chart illustrating the hierarchy of colors that the FLIR T420 uses to represent the relative temperature differences of the moisture damaged areas and adjacent dry roofing:



The next section of the report contains the 15 sets of thermograms and control photos that were generated during the inspection. The locations and directions from which these photos were taken are marked on the roof maps and directly on the roof surface with spray paint.

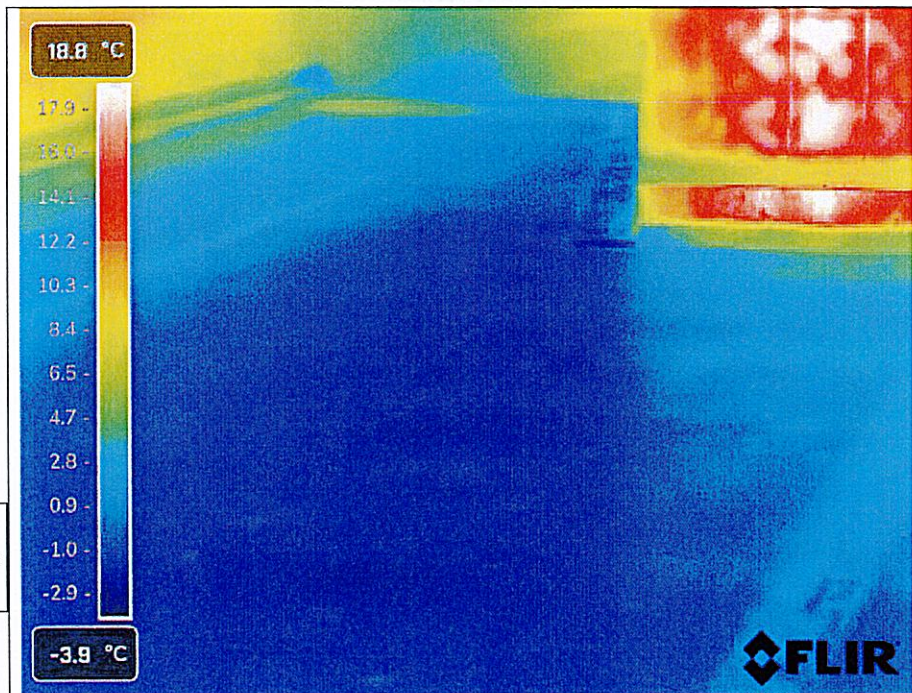


Control Photo:  
Visible Light  
Image



Dry area of roofing

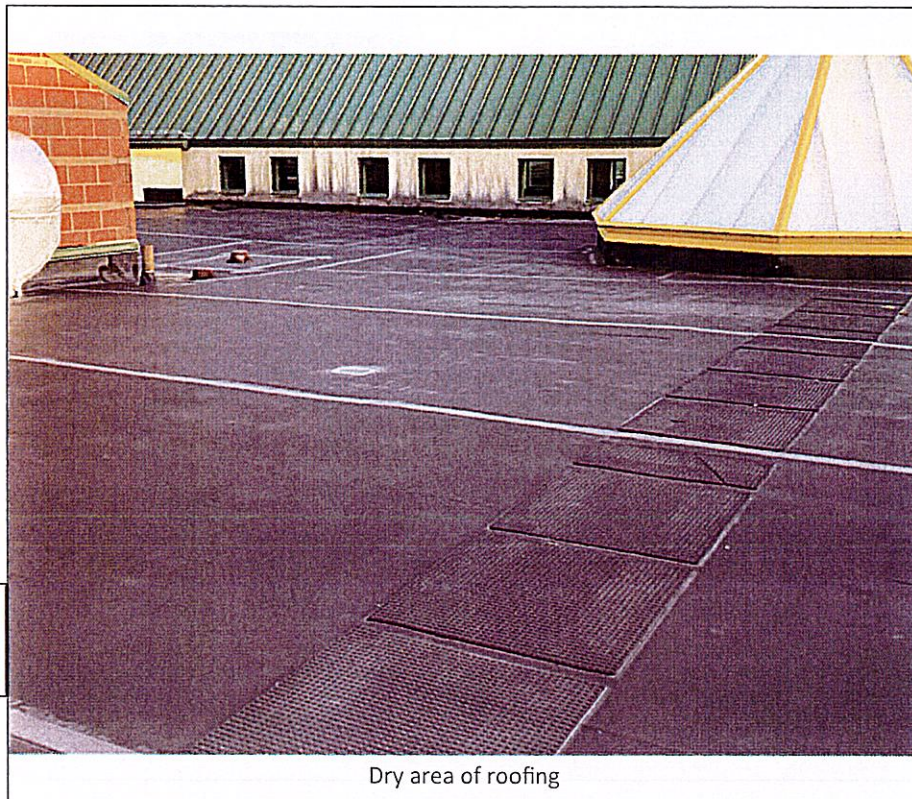
Thermogram:  
Infrared Image



Thermogram #1

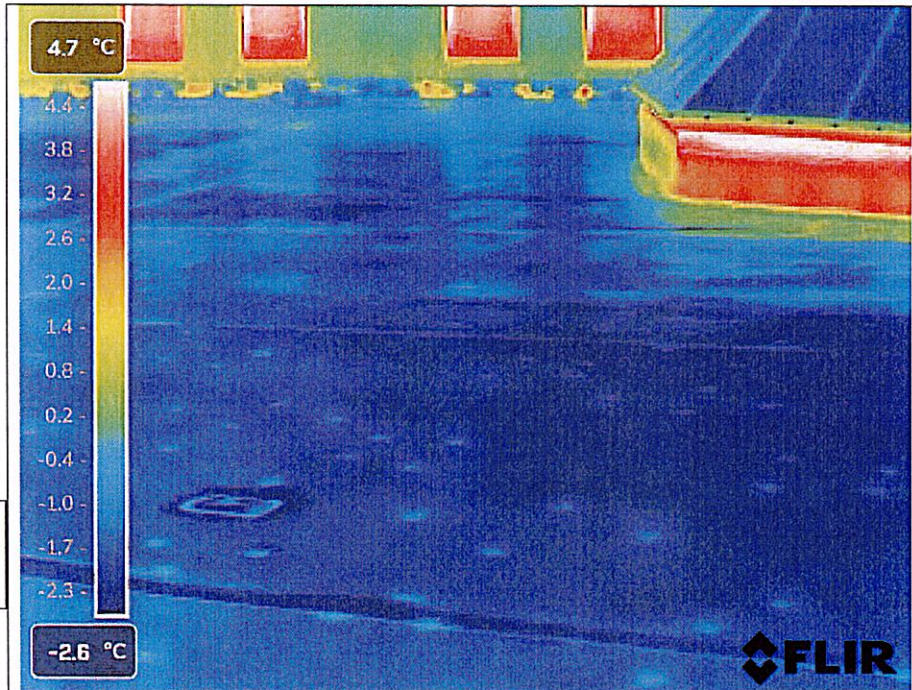


Control Photo:  
Visible Light  
Image



Dry area of roofing

Thermogram:  
Infrared Image



Thermogram #2

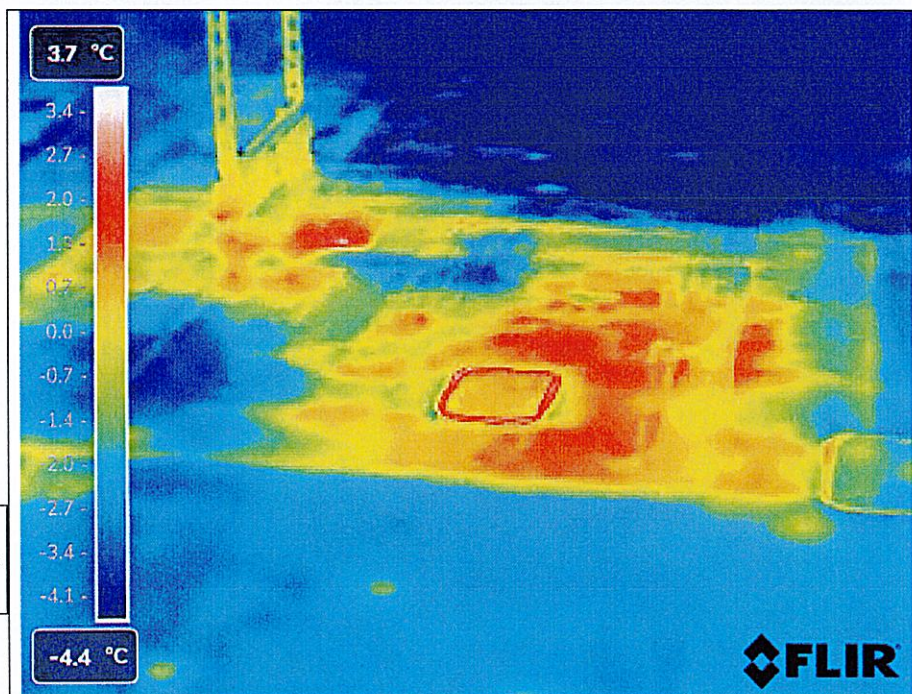


Control Photo:  
Visible Light  
Image



WET AREA #1

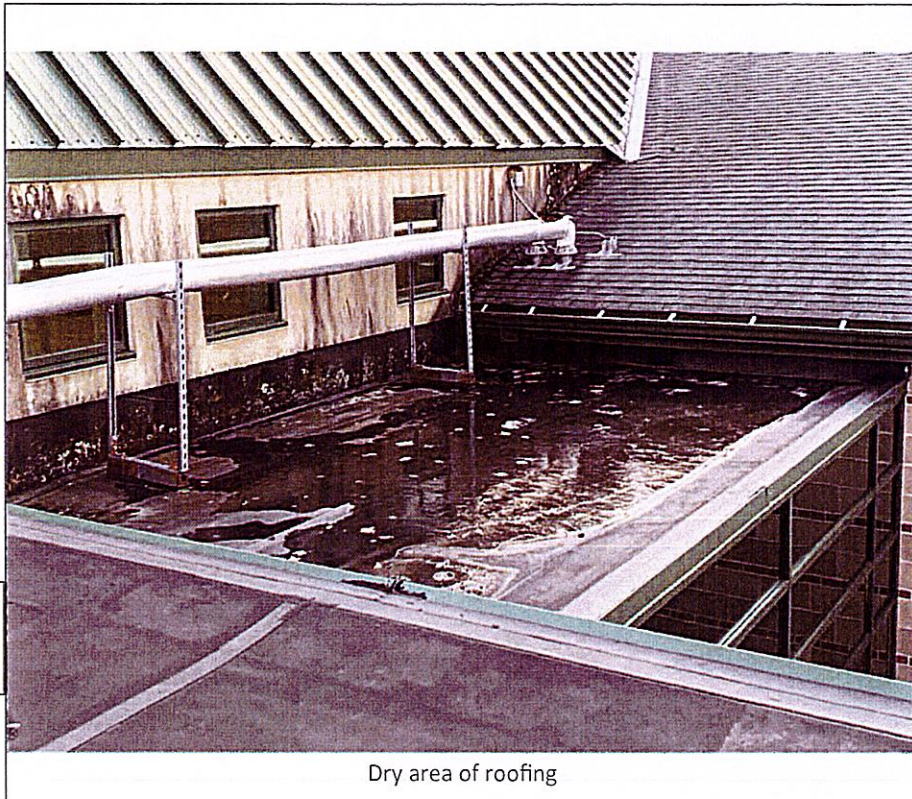
Thermogram:  
Infrared Image



Thermogram #3

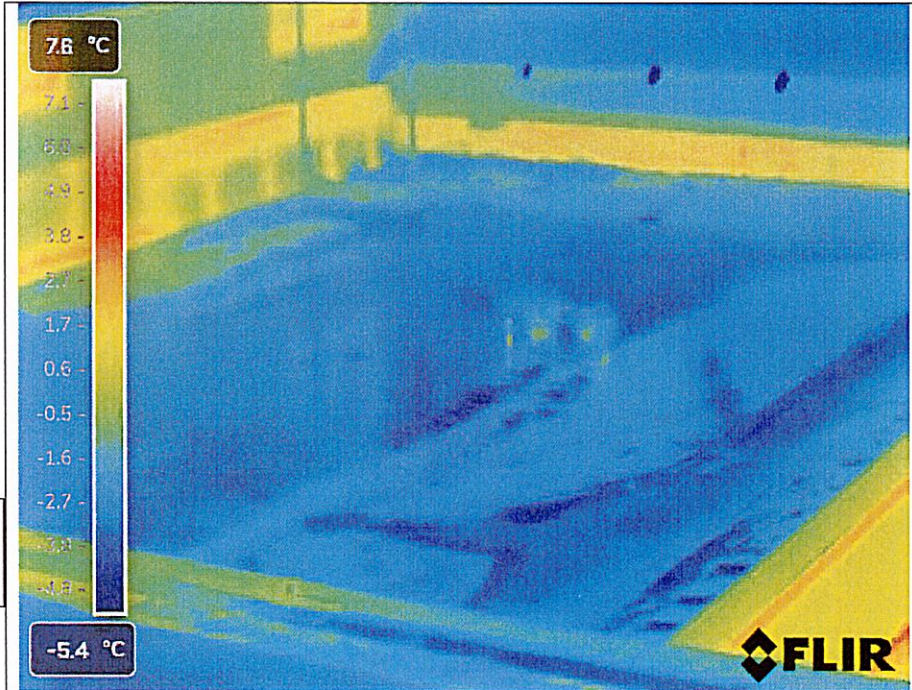


Control Photo:  
Visible Light  
Image



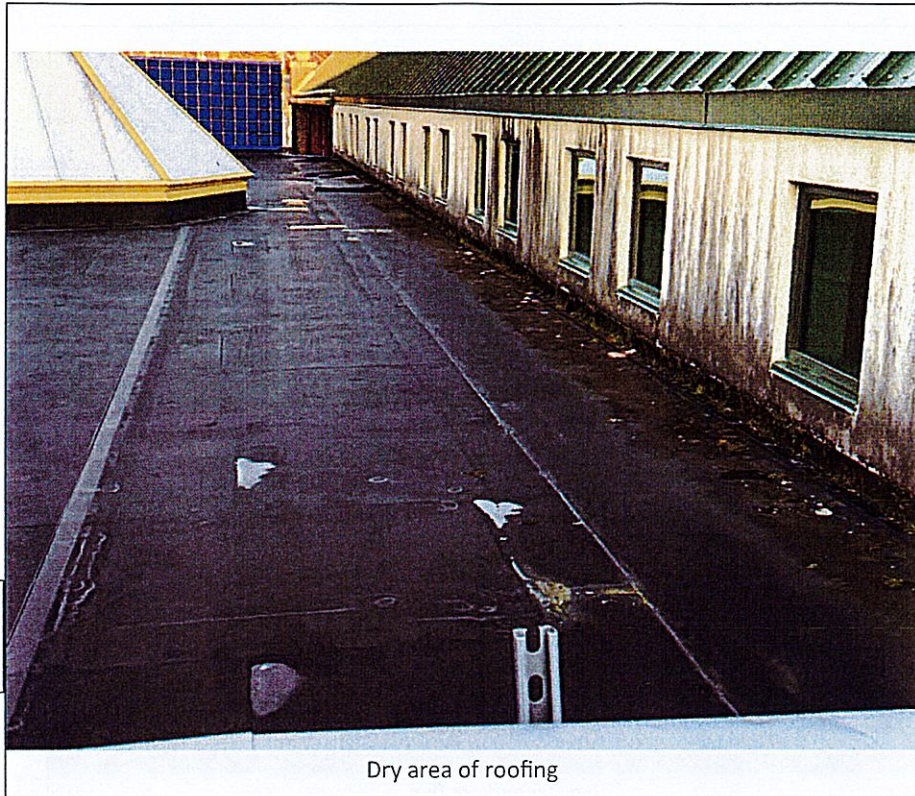
Dry area of roofing

Thermogram:  
Infrared Image



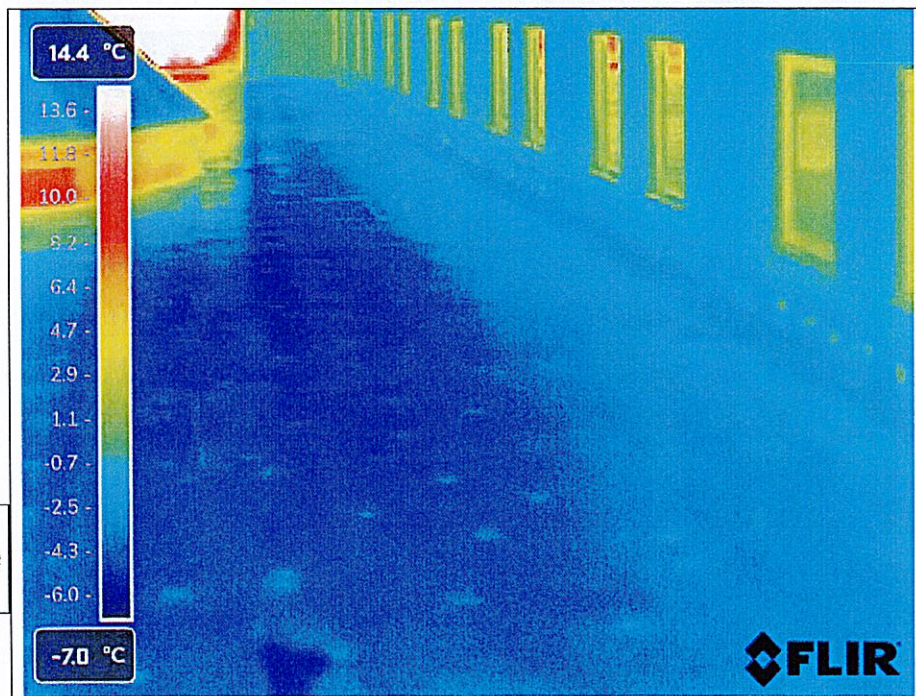
Thermogram #4





Control Photo:  
Visible Light  
Image

Dry area of roofing

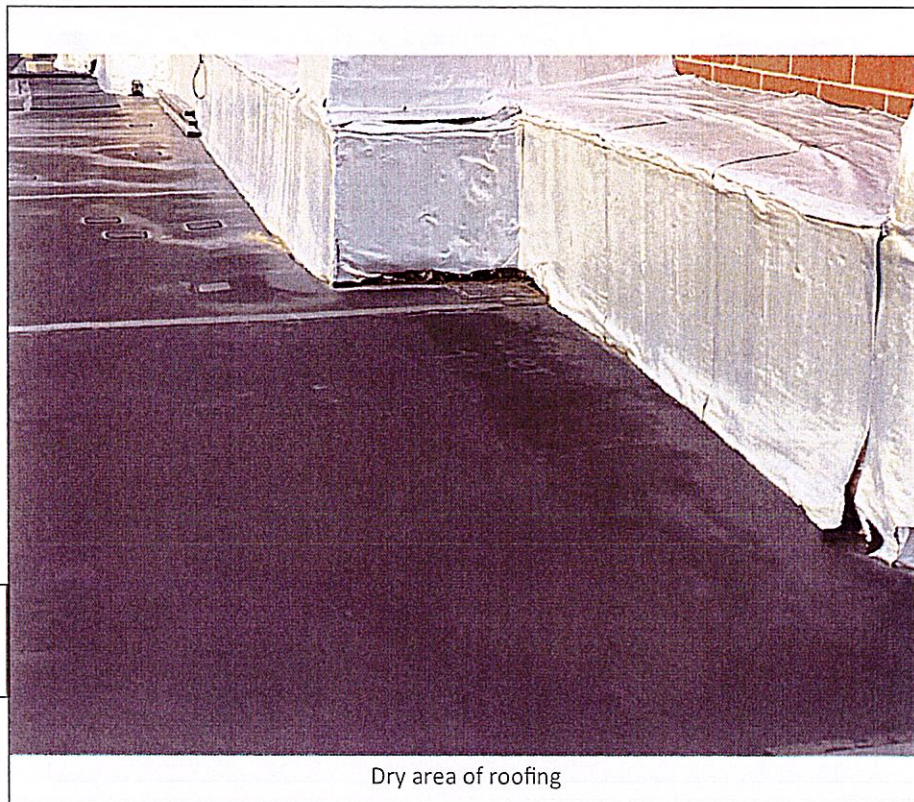


Thermogram:  
Infrared Image

Thermogram #5

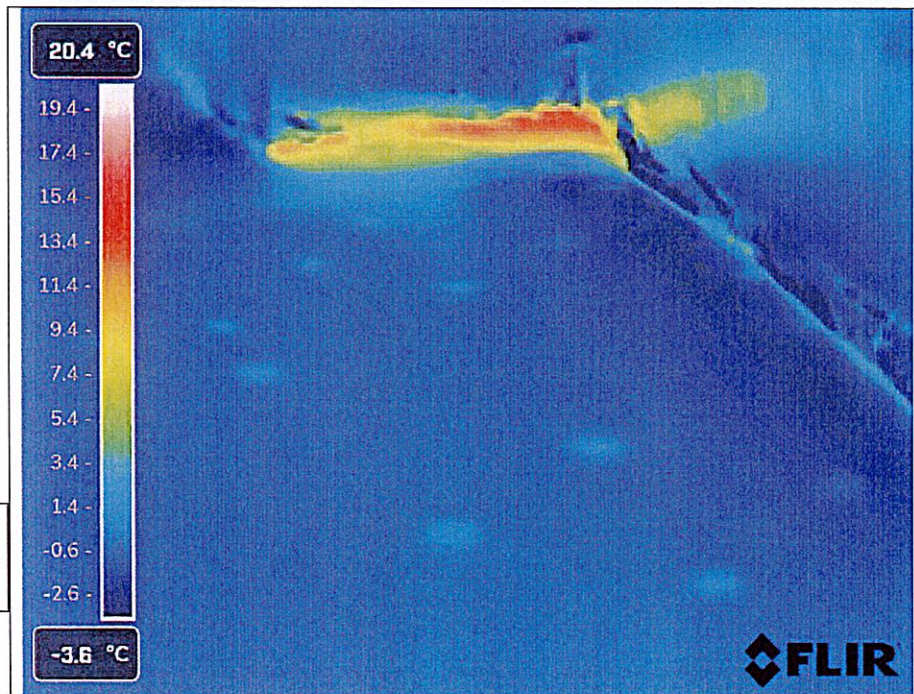


Control Photo:  
Visible Light  
Image



Dry area of roofing

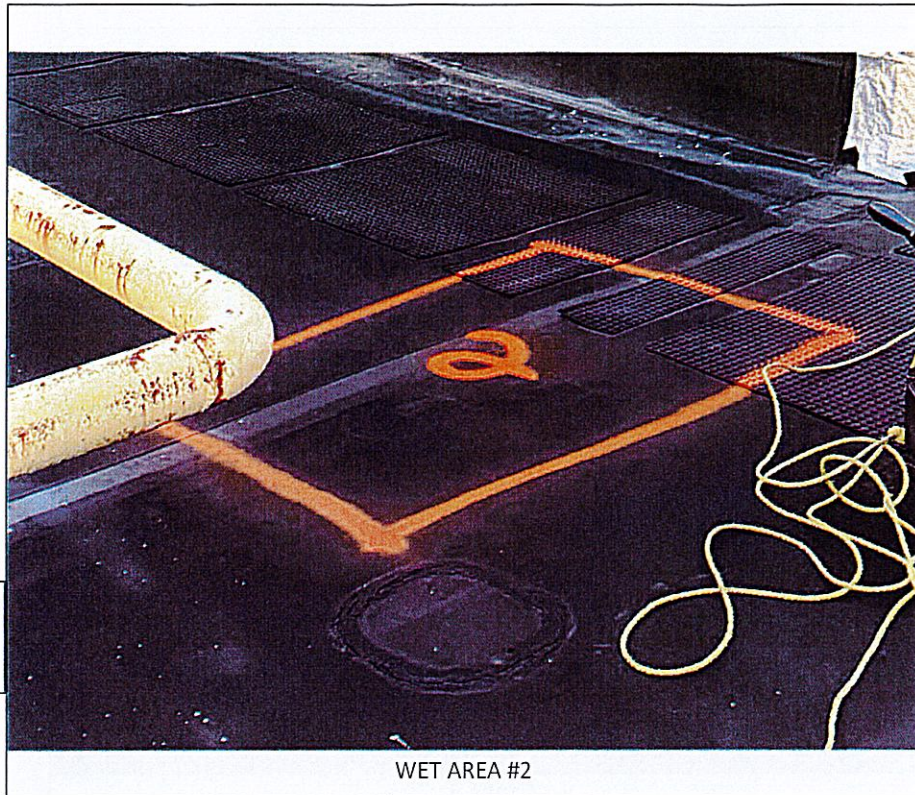
Thermogram:  
Infrared Image



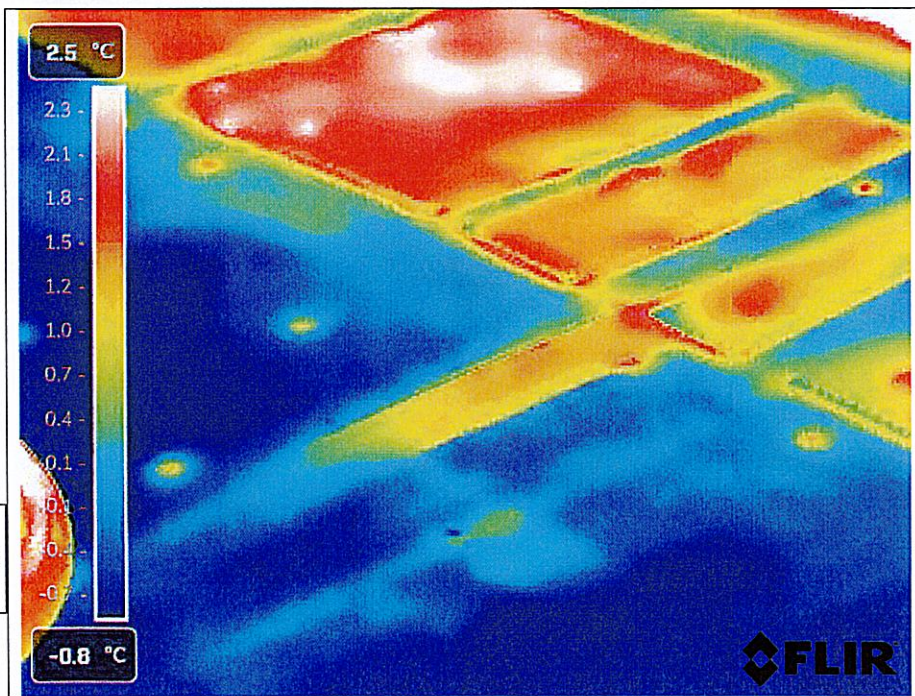
Thermogram #6



Control Photo:  
Visible Light  
Image



Thermogram:  
Infrared Image



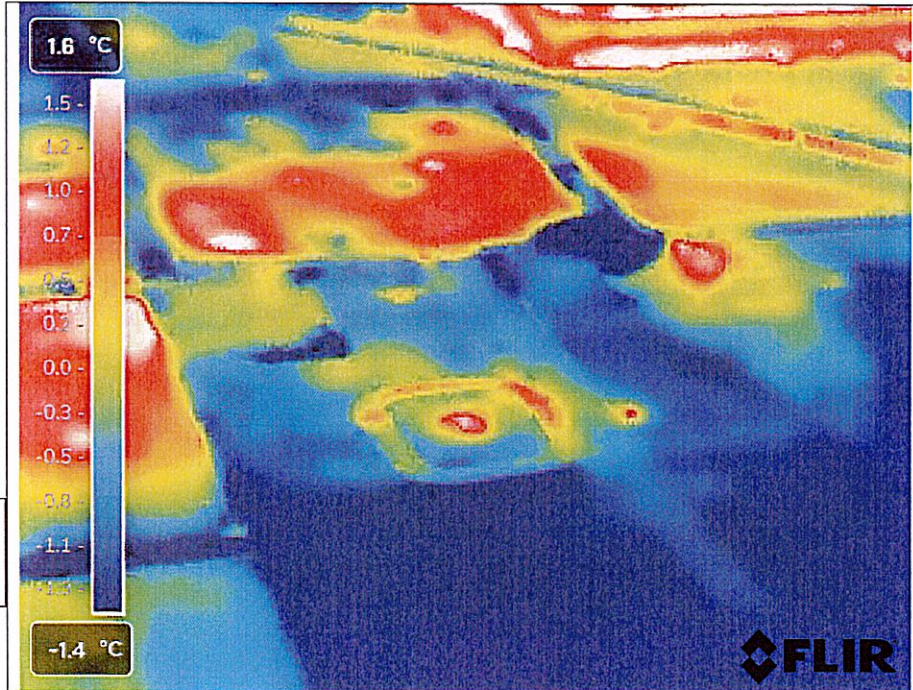
Thermogram #7





Control Photo:  
Visible Light  
Image

WET AREA #3

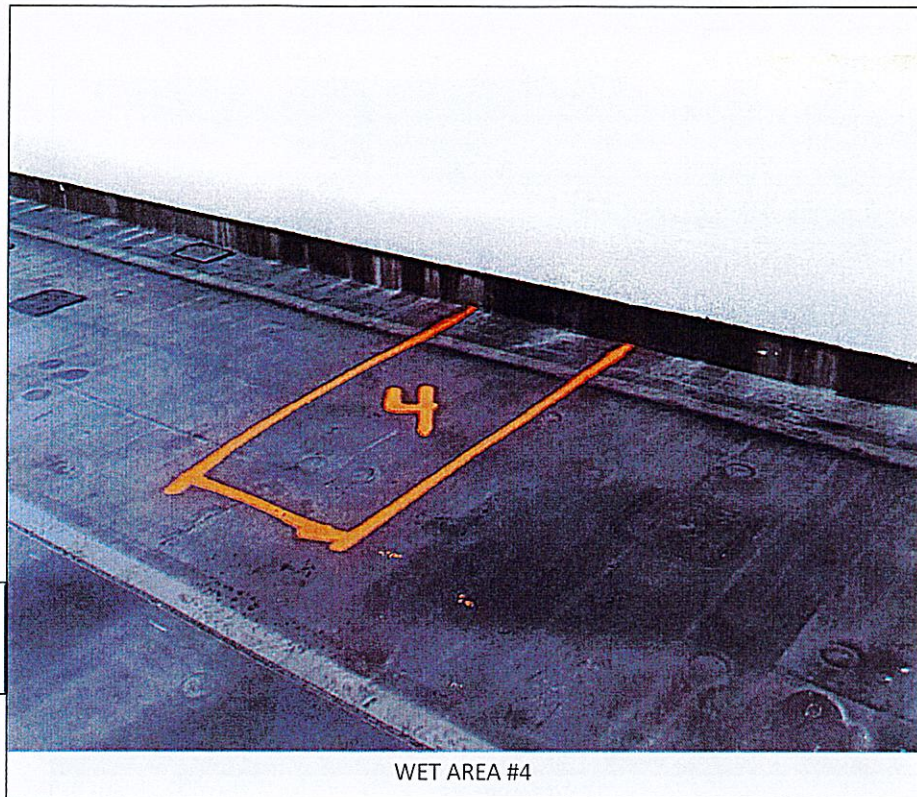


Thermogram:  
Infrared Image

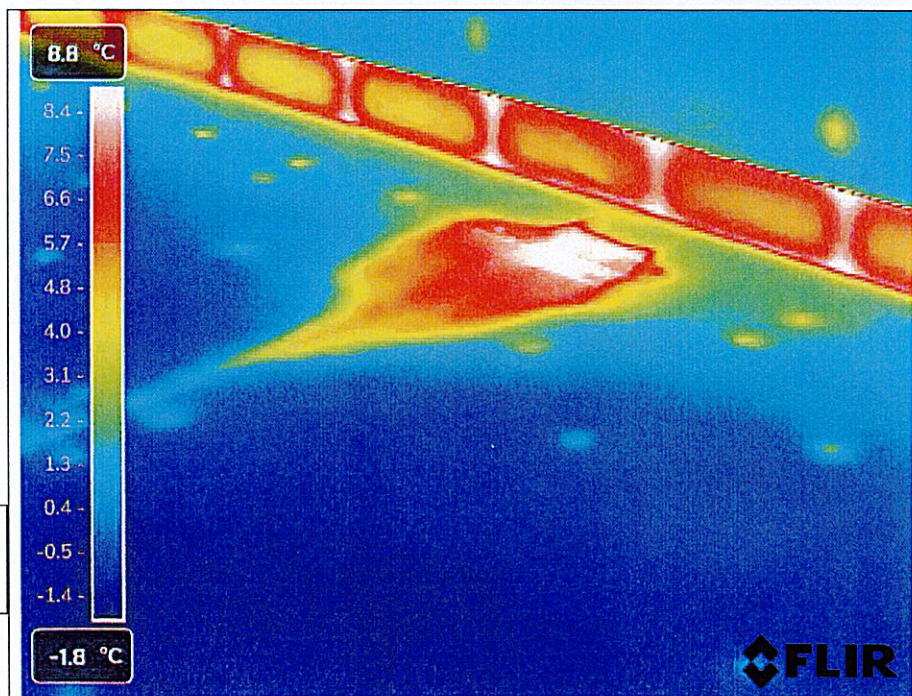
Thermogram #8



Control Photo:  
Visible Light  
Image

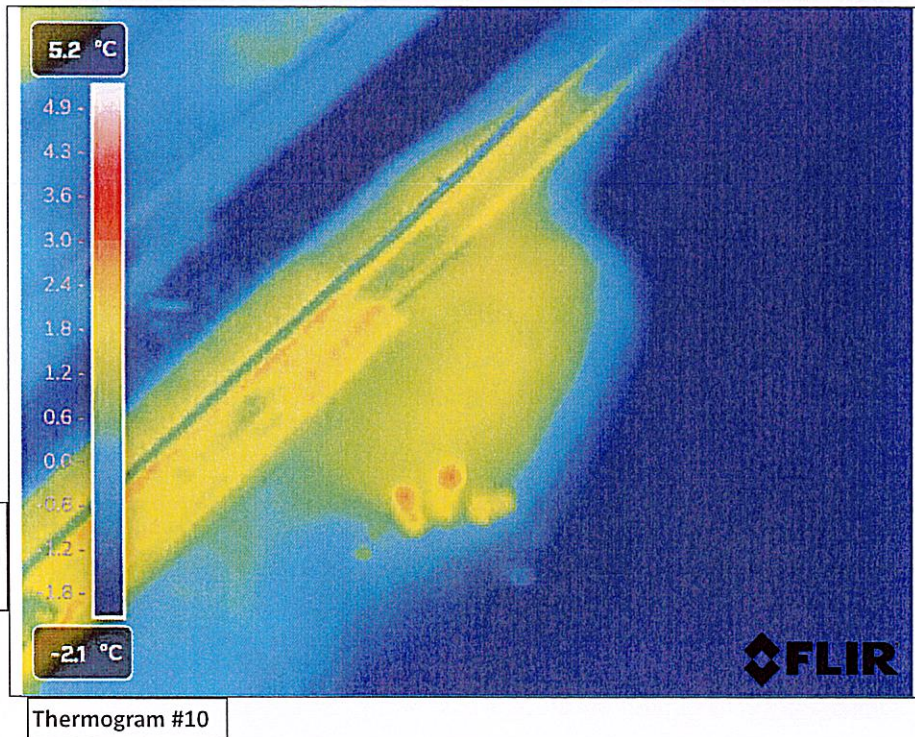


Thermogram:  
Infrared Image



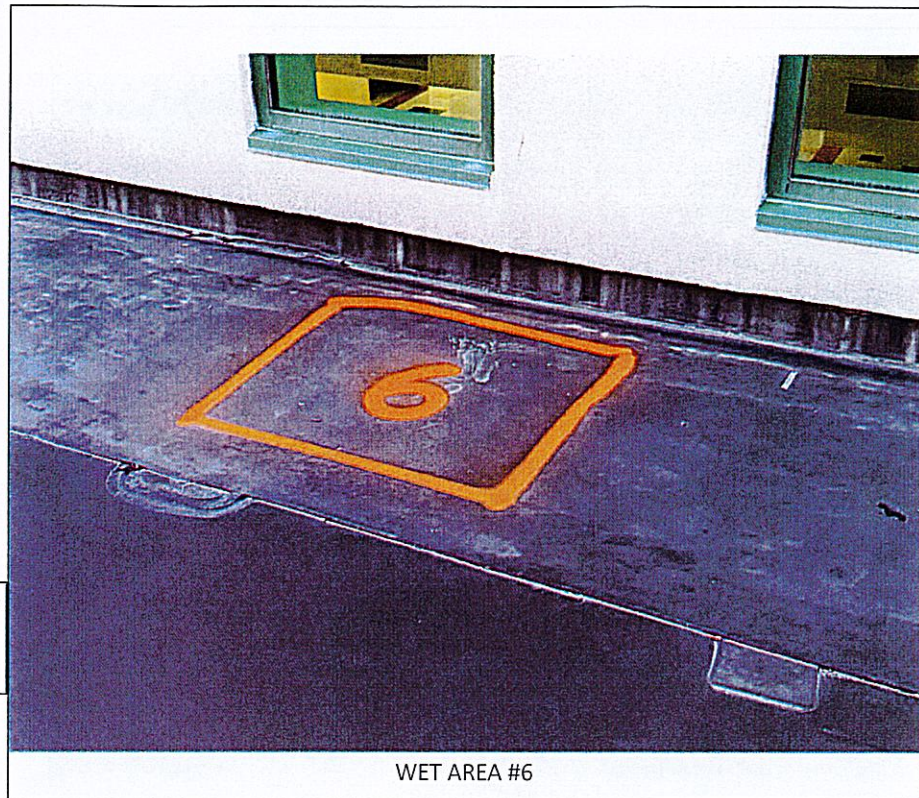
Thermogram #9



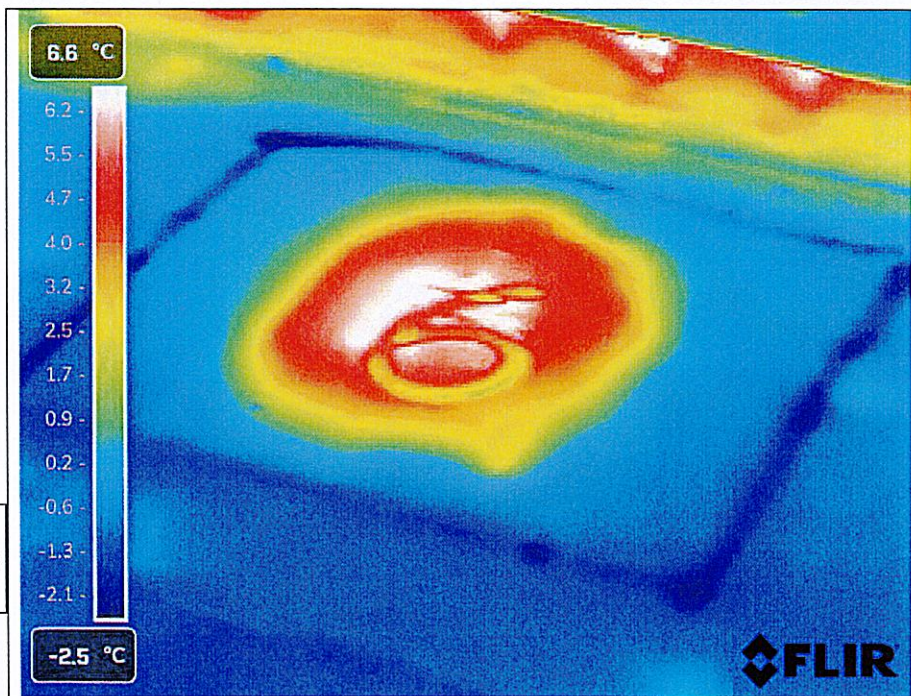




Control Photo:  
Visible Light  
Image



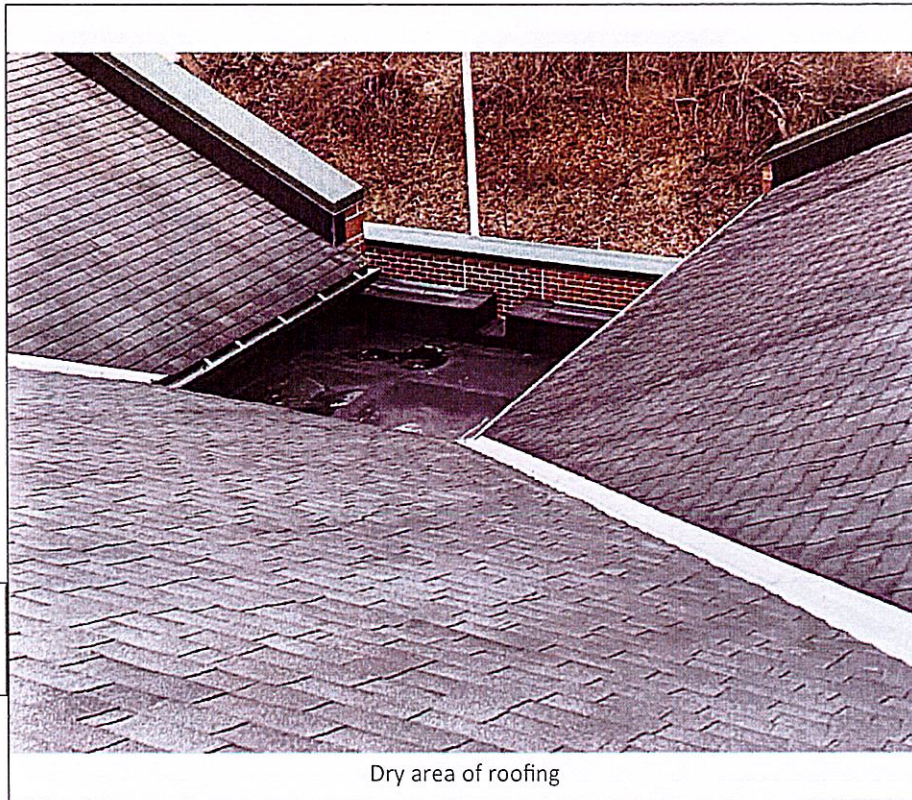
Thermogram:  
Infrared Image



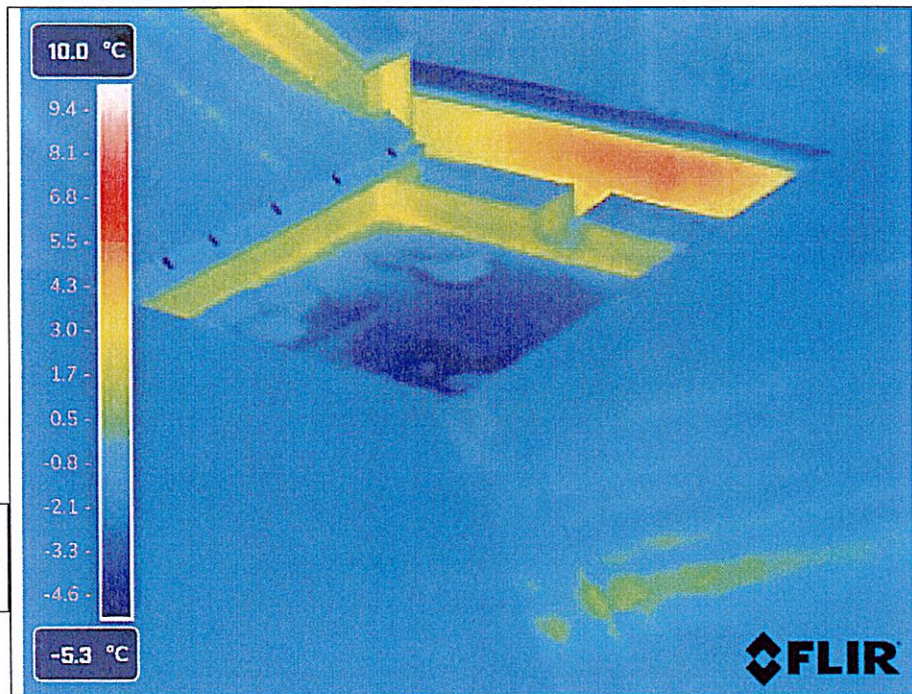
Thermogram #11



Control Photo:  
Visible Light  
Image



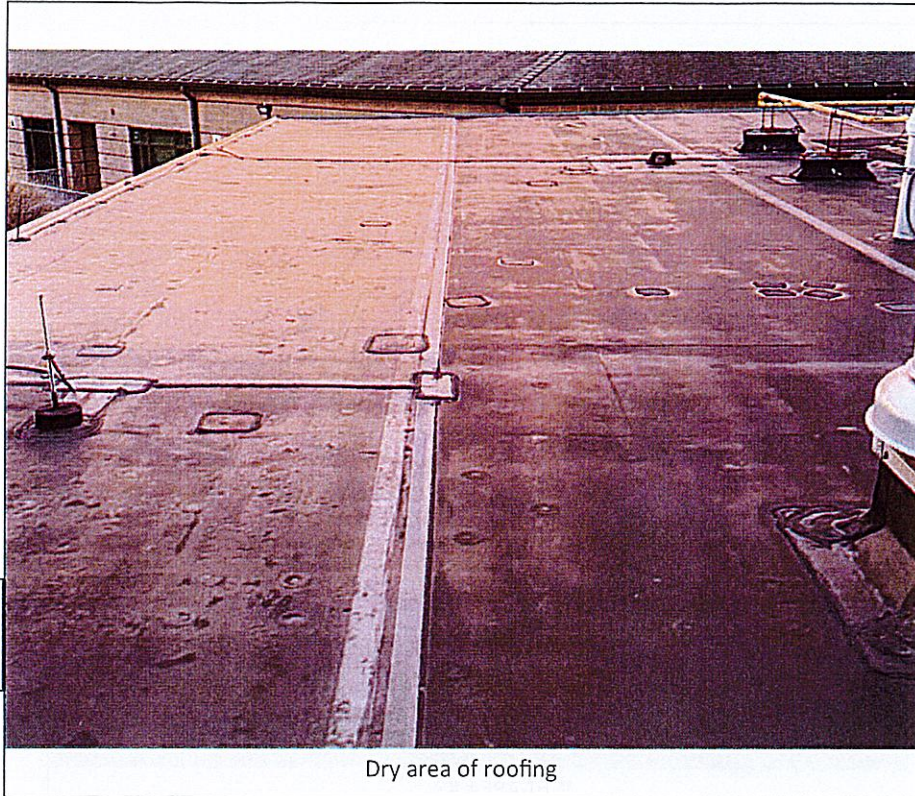
Thermogram:  
Infrared Image



Thermogram #12

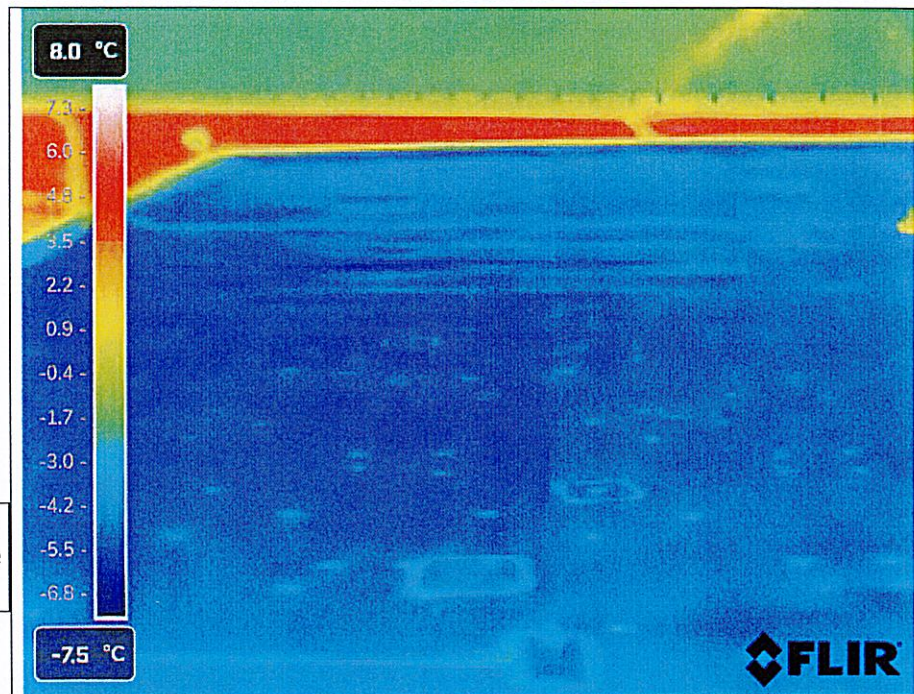


Control Photo:  
Visible Light  
Image



Dry area of roofing

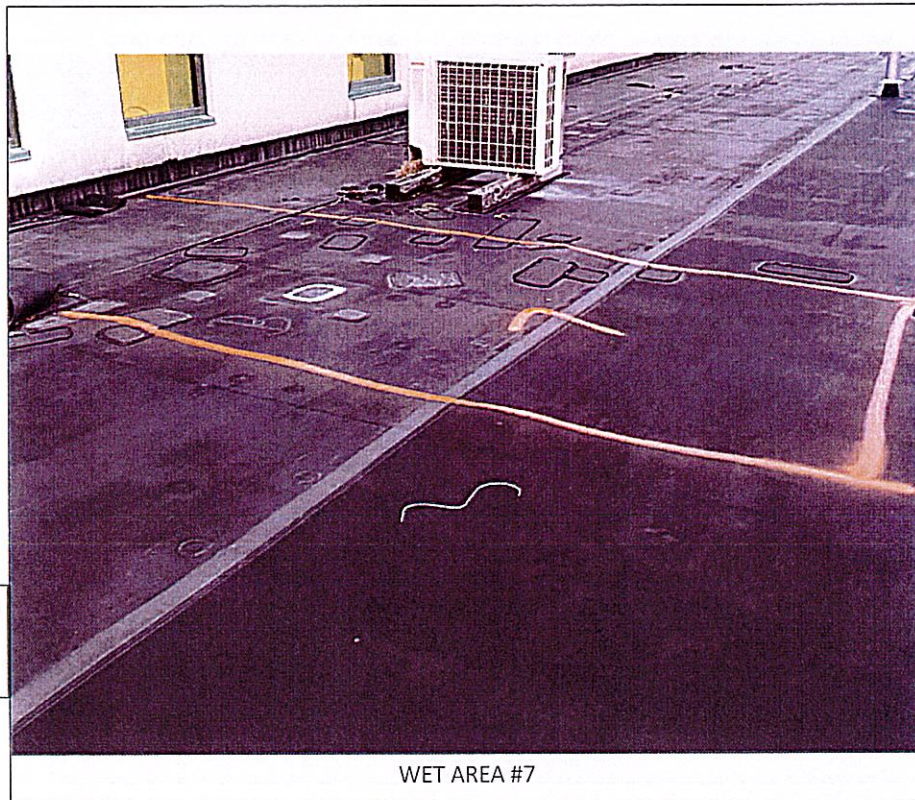
Thermogram:  
Infrared Image



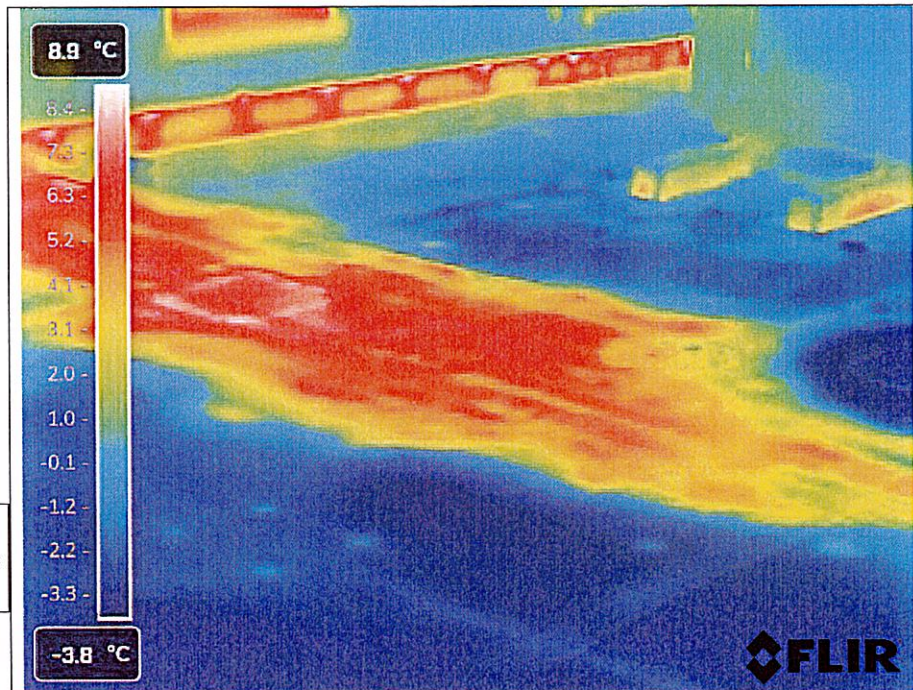
Thermogram #13



Control Photo:  
Visible Light  
Image

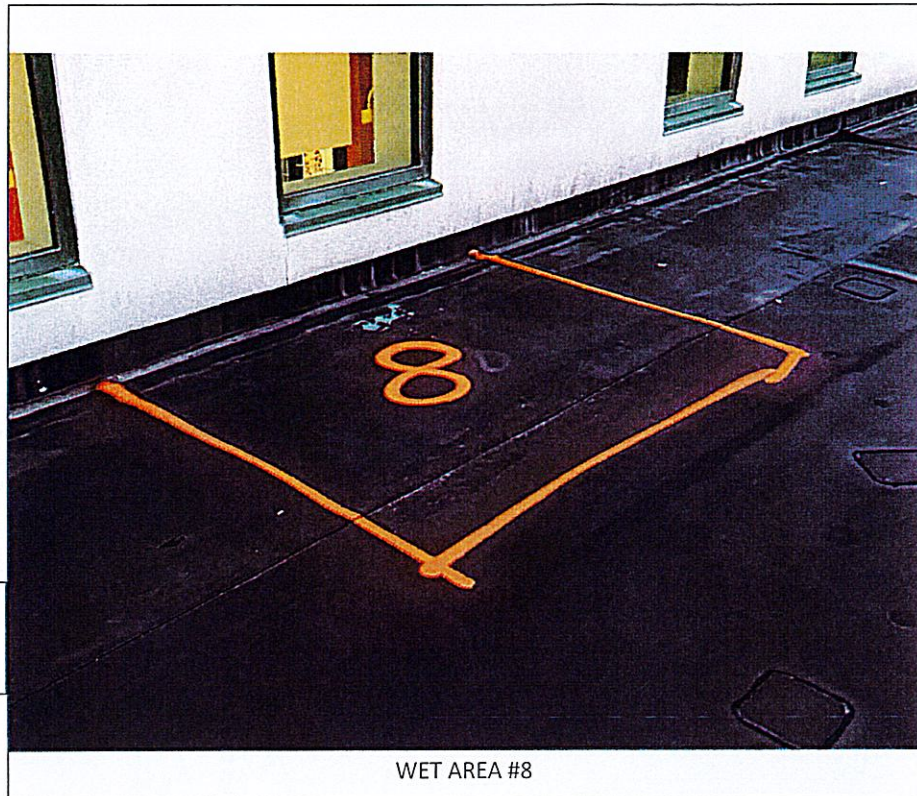


Thermogram:  
Infrared Image

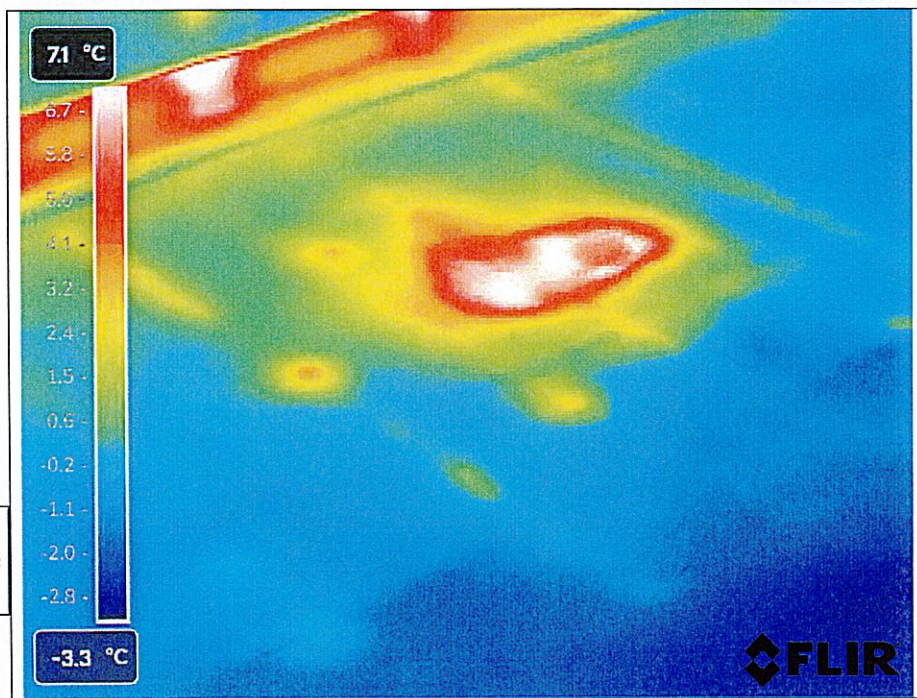


Thermogram #14





Control Photo:  
Visible Light  
Image



Thermogram:  
Infrared Image

Thermogram #15



### ROOF MAPS

The last part of the bound hard-copy version of this report contains four copies each of a map of the roofs. These scaled drawings were plotted on an AutoCAD system and complete the documentation of the findings of the survey.

This report documents the locations and extent of moisture damage at the time of the inspection. No information regarding the integrity of the roofing system or building is provided or implied in this report. Many factors, including sunlight, precipitation, wind, foot traffic, and building movement and the like can affect a roof over a short period of time. Regular inspections ensure early detection of problems and can extend the life of a roof membrane.

Donna, thank you for using our Infrared Services. Please call me if you have any questions regarding this report, or if I can help in any way.

Sincerely,



Denise Richard  
Director of Operations



## **APPENDIX A: ROOF CONSTRUCTION**

The roof construction details are documented on the following Core Analysis sheet(s). Each core sample provides information about the roof materials at that particular site in the field of the roof. The age of the roof and the amount of traffic on the roof may affect the thickness of the insulation, and there may be changes in construction from one section of the roof to another. Occasionally, a roof that appears to be homogeneous may actually contain two or more types of insulation or membrane. Therefore, any core sample is only a true picture of the roof construction at the site where it was taken.

### **CORE A: (Dry)**

### **Approximate R-Values**

	EPDM Membrane w/smooth surface	0.02
3"	Polyisocyanurate	17.10
	Metal	Nominal
	Inside Air Film (still air)	0.92
	Outside Air Film (moving air)	0.25
	Total Estimated Known R-Values:	18.29

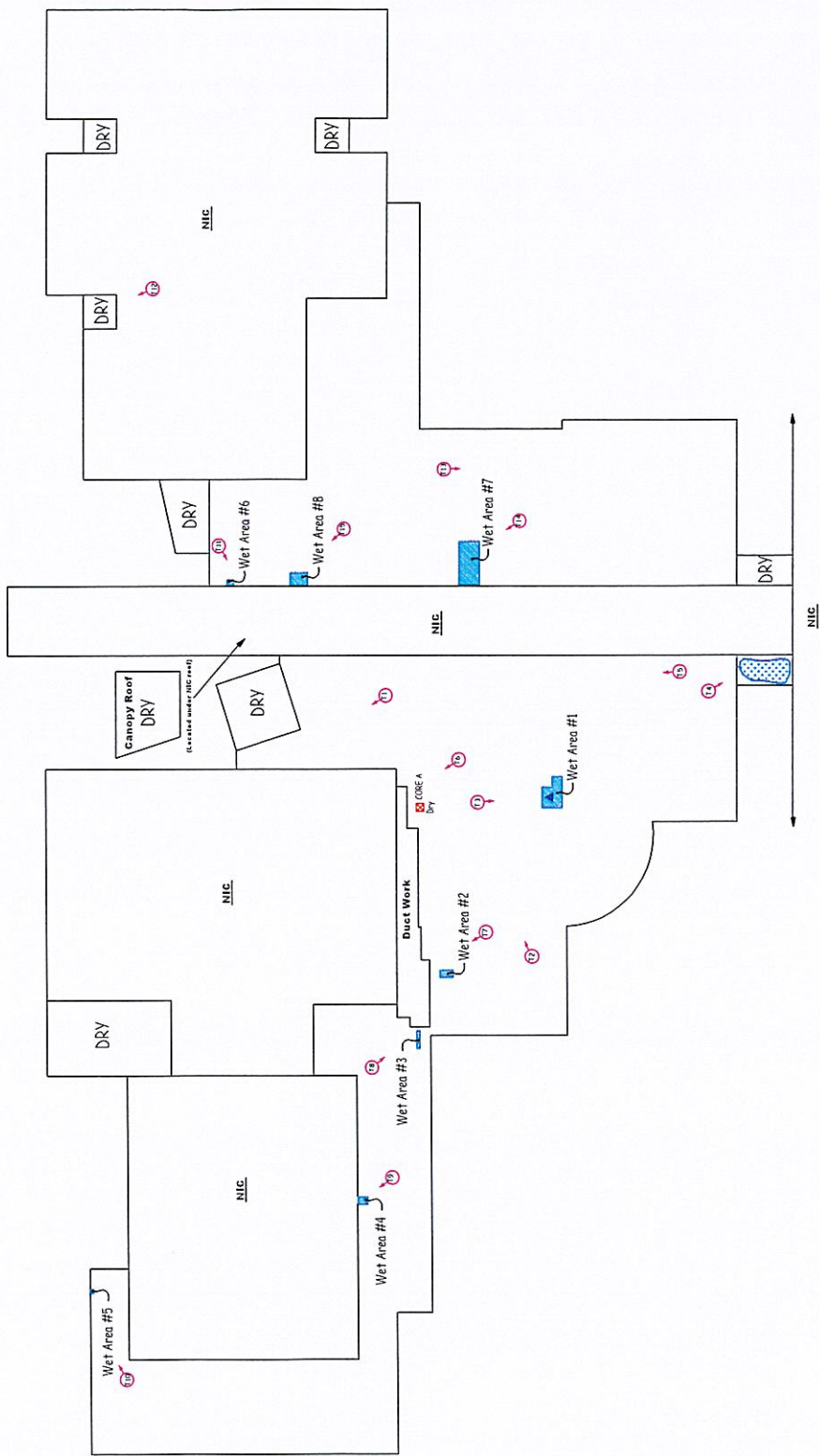
**IR ANALYZERS**  **Vector Mapping**

*Smarter Testing. Faster Response.*



Areas: Total of All Roofs Tested  
 (in approximate square feet)  
 Square Footage of Roof Inspected: 24,438  
 Square Footage of Wet Area: 167  
 Percentage of Wet Area: <1%

- Legend**
- CORE SAMPLE
  - MOISTURE PROBE - W
  - THERMOGRAM
  - MOISTURE DAMAGE
  - NIC NOT IN CONTRACT
  - PONDING



# INFRARED ROOF MOISTURE ANALYSIS

	TOWN OF WATERTOWN WATERTOWN, CT		SCALE: 1/16"=1'
	JOHN TRUMBULL PRIMARY SCHOOL WATERTOWN, CT		DATE: 02-03-24
			PAGE: 1 OF 1
			DRAWN BY: 2404



**Develop application packet for each school, these are comprised of the following items:**

- SCG-049 - Grant application form (X)
- Certified copies of the three resolutions (X)
  - Establishing a building committee
  - Authorizing the development of drawings and specifications
  - Authorizing the filing of the grant application
- Board of Education approval of the Educational Specifications (X)
- Certified documentation of funding (X)
- SCG-053 Site analysis form (X)
- Completed cost estimate Form SCG-2005 in Unifomat (X)
- Roof sketch and key plan labeled with programmatic areas (X)

**The above items, have been assembled and should be uploaded no later than 2/13/24 into the Core CT system by the Superintendent, the project manager will assist in this process.**

- Once the application is successfully uploaded it will be reviewed at the state (*this can take several weeks hopefully the application review is completed by the end of February*)
- If approved the State will issue project numbers (*These are required before any review scheduling can occur*)
- The state will formalize the projects with a letter confirming the project numbers, amount authorized and the reimbursement rate.
- The project manager will immediately schedule a Pre-bid Conformity Review with the State to review the plans and specifications for each roof project. (*This date is dependent on the number of applications submitted before ours. Hopefully we can secure a date by the end of March*)
- The project manager will work with the architect and superintendent to prepare the submission packets for the review process. (*A minimum of 20 forms will need to be completed by the administration with project manager assistance*). These forms, along with the plans and specifications, will comprise the next packet
- This packet will include a review of the plans by local officials with their sign-off.
- The State review process takes approximately 2 weeks
- Following a successful review of the plans at the state a letter will be issued allowing the projects to "go out to bid" for contractors.

In summary, if things go well with the State and the review schedule these projects could be out to bid by mid-April, but much of the timing is dependent on the State.