Mays Consulting
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PRELIMINARY ASSESSMENT
RIVER VALLEY LOCAL SCHOOL DISTRICT
ROOF REPLACEMENT PROJECT
CALEDONIA, OHIO
ISSUE DATE: 03-01-2024
ROH50-001

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1.0 BUILDING CODE INFORMATION

The applicable building code is the 2024 Ohio Building Code. This code is based on the 2021 International Building Code.

Thermal Performance

The 2024 Ohio Building Code requires the use of the 2021 International Energy Conservation Code.

The project is located within climate zone 5A.

For roof insulation entirely above the roof deck, the Prescriptive R-value Requirement is R-30.

To achieve the R-30 insulation requirement, approximately 5.4" of polyisocyanurate roof insulation is required.

The following is the amount of existing roof insulation on each type of roof system on each building:

Heritage Elementary – Low-Sloped Roof Areas
3" Polyisocyanurate Insulation

Liberty Elementary – Low-Sloped Roof Areas
3" Polyisocyanurate Insulation

Middle School – Low-Sloped and Steep Sloped Roof Areas
3" Polyisocyanurate Insulation*

*Some roof areas of fully tapered and have a varying thickness of insulation.

High School – Low-Sloped and Steep Sloped Roof Areas
3" Polyisocyanurate Insulation

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1.1 EXISTING ROOF SYSTEM INFORMATION

The following is a summary of the general condition and composition of the existing roof systems on the schools. All buildings were constructed in the 2002 to 2003 time period with all roofs being the original roof system.

1.1.1 Heritage Elementary School (South)

The low sloped roof areas on this building are approximately 49,656 square feet. There is a small steep sloped standing seam metal roof area, but this is outside the scope of this project.

A series of test cuts were performed, and the low-sloped roof system composition was found to be the following on all roof areas:

- Unreinforced EPDM – Adhered
- 1-1/2" Polyisocyanurate Insulation – Mechanically Fastened
- 1-1/2" Polyisocyanurate Insulation – Loose Laid
- Steel Roof Decking

Based on the test cuts and the original project drawings, all roof areas are structurally sloped with tapered insulation installed in valley line areas and in areas to obtain back slope. There were varying degrees of ponding water along drain lines that can be reduced during the roof replacement by adding tapered insulation in some of these areas.

Generally, the roof appears to have been maintained, but is near the end of its useful life, with periodic roof leaks reported.

1.1.1.1 Overall view of Roof Area A, along a line of roof drains showing there is no significant ponding water at this area.

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1.1.1.8 Another overall view of Roof Area D, showing another line of roof drains with minor ponding. This ponding can be reduced by adding tapered insulation around the roof drains.

1.1.2 Liberty Elementary School (North)

The low sloped roof areas on this building are approximately 49,656 square feet. There is a small steep sloped standing seam metal roof area, but this is outside the scope of this project.

A series of test cuts were performed, and the low-sloped roof system composition was found to be the following on all roof areas:

- Unreinforced EPDM – Adhered
- 1-1/2” Polyisocyanurate Insulation – Mechanically Fastened
- 1-1/2” Polyisocyanurate Insulation – Loose Laid
- Steel Roof Decking

Based on the test cuts and the original project drawings, all roof areas are structurally sloped with tapered insulation installed in valley line areas and in areas to obtain back slope. There were varying degrees of ponding water along drain lines that can be reduced during the roof replacement by adding tapered insulation in some of these areas.

Generally, the roof appears to have been maintained, but is near the end of its useful life, with periodic roof leaks reported.

1.1.2.1 View of a line of roof drains on Roof Area A showing there is no significant ponding water.

1.1.2.2 View of a line of roof drains on Roof Area B showing there is no significant ponding water. There is some minor ponding water near the roof drains. This can be corrected with addition of tapered insulation around the roof drains.

1.1.2.3 View of a line of roof drains on Roof Area C showing there is no significant ponding water. There is some minor ponding water near the roof drains. This can be corrected with addition of tapered insulation to create back slope to the roof drains and tapered insulation around the roof drains.

1.1.2.4 View of a line of roof drains on Roof Area D showing there is no significant ponding water. There is some minor ponding water near the roof drains. This can be corrected with addition of tapered insulation around the roof drains.

1.1.2.5 View of a line of roof drains on Roof Area D showing there is no significant ponding water. There is some minor ponding water near the roof drains. This can be corrected with addition of tapered insulation around the roof drains.

1.1.3 River Valley Middle School

The roof areas on this building are approximately 69,740 square feet. There are several low-sloped roof areas and several steep slope shingle roof areas.

A series of test cuts were performed, and the low-sloped and steep sloped roof system composition was found to be the following on all roof areas:

Low Sloped Roof Areas – A, B (partially tapered), C, and I

- Unreinforced EPDM – Adhered
- 1-1/2" Polyisocyanurate Insulation – Mechanically Fastened
- 1-1/2" Polyisocyanurate Insulation – Loose Laid
- Steel Roof Decking

Low Sloped Roof Areas – F and G

- Unreinforced EPDM – Adhered
- Fully-Tapered Polyisocyanurate Insulation (Multiple Layers) – Mechanically Fastened
- Steel Roof Decking

Steep Sloped Roof Areas – All Steep Slope Roof Areas

- Asphalt Shingles
- Underlayment
- Vented Nailbase Insulation
  - ½" OSB
  - ¾" Airspace (with blocking 24" on-center)
  - 1-1/2" Polyisocyanurate Insulation
- 1-1/2" Polyisocyanurate Insulation
- Steel Roof Deck

Based on the test cuts and the original project drawings, most of the low-sloped roof areas are structurally sloped with tapered insulation installed in valley line areas and in areas to obtain back slope. There are also some roof areas that have flat roof decking and a fully-tapered roof insulation system. There were varying degrees of ponding water along drain lines that can be reduced during the roof replacement by adding and/or revising the tapered insulation in these areas.

The steep sloped roof areas sloped at a rate of 6" per 1 foot and are comprised of asphalt shingles installed over a vented nailbase roof system. This type of roof system provides the thermal insulation for the building above the roof deck. The space below the roof deck may appear to be an attic space, it is actually within the building's thermal envelope and is considered conditioned space.

Generally, the low sloped roofs appear to have been maintained, but are near the end of their useful life, with periodic roof leaks reported. There was one (1) roof area on Roof Area C where the base securement has been compromised and a portion of the roof membrane has become unadhered. We recommend temporary securement be installed to help prevent more significant damage prior to the planned roof replacement.

Generally, the steep slope shingle roofs appear to have been maintained but are near the end of their useful life. There were areas where raised shingles were observed which could lead to future wind damage and leaks if the roofs are not replaced.

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1.1.3.14 Overall view of Roof Area H2 there are numerous raised shingles on this roof area.

1.1.3.15 Overall view of Roof Area J2 there are numerous raised shingles on this roof area.

1.1.4 River Valley High School

The roof areas on this building are approximately 107,526 square feet. There are several low-sloped roof areas and several steep slope shingle roof areas.

A series of test cuts were performed, and the low-sloped and steep sloped roof system composition was found to be the following on all roof areas:

Low Sloped Roof Areas – All Roof Areas Except Roof Area I

- Unreinforced EPDM – Adhered
- 1-1/2" Polyisocyanurate Insulation – Mechanically Fastened
- 1-1/2" Polyisocyanurate Insulation – Loose Laid
- Steel Roof Decking

Low Sloped Roof Areas – Roof Area I

- Unreinforced EPDM – Adhered
- 1-1/2" Polyisocyanurate Insulation – Mechanically Fastened
- 1-1/2" Polyisocyanurate Insulation – Loose Laid
- 5/8" Gypsum Substrate Board
- Steel Roof Decking

Steep Sloped Roof Areas – All Steep Slope Roof Areas

- Asphalt Shingles
- Underlayment
- Vented Nailbase Insulation
  - ½" OSB
  - ¾" Airspace (with blocking 24" on-center)
  - 1" Polyisocyanurate Insulation
- 2" Polyisocyanurate Insulation
- Steel Roof Deck

Based on the test cuts and the original project drawings, the low-sloped roof areas are structurally sloped with tapered insulation installed in valley line areas and in areas to obtain back slope. There was typically only minor ponding water along drain lines that can be reduced during the roof replacement by adding and/or revising the tapered insulation in these areas.

The steep sloped roof areas sloped at a rate of 6" per 1 foot and are comprised of asphalt shingles installed over a vented nailbase roof system. This type of roof system provides the thermal insulation for the building above the roof deck. The space below the roof deck may appear to be an attic space, it is actually within the building's thermal envelope and is considered conditioned space.

Generally, the low sloped roofs appear to have been maintained, but are near the end of their useful life, with periodic roof leaks reported.

Generally, the steep slope shingle roofs appear to have been problematic with shingle blow off during high winds, with numerous areas that have been replaced over the life of the roof. There was one (1) area observed during a site visit where there were currently shingles missing. It is recommended that these be replaced in order to prevent leaks until the roof system is replaced.

1.1.4.1 Overall view of the typical steep slope shingle roof area construction.

1.1.4.2 View showing that the rigid insulation was not tightly mitered together and there was no fiberglass batt insulation installed between the rigid insulation at the ridge on this building. There was a gap between the rigid insulation of approximately 6” at this location.

1.1.4.3 Overall view of Roof Area B3 where there has been shingle replacement due to shingles blowing off during high winds.

1.1.4.4 Overall view of Roof Area B4 where there has been significant shingle replacement due to shingles blowing off during high winds.

1.1.4.5 View of an area on Roof Area D2 showing there is no significant ponding on this roof area.

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1.1.4.7 Overall view of Roof Area F1 where there has been shingle replacement due to shingles blowing off during high winds. There are currently additional shingles that have blown off and need to be replaced.

1.1.4.8 View of an area on Roof Area L showing there is no significant ponding on this roof area.

1.1.4.9 View of an area on Roof Area N showing there is no significant ponding on this roof area.

1.1.4.10 View of an area on Roof Area N showing there is no significant ponding on this roof area. Additional tapered insulation would be installed around the drains and larger crickets installed between the roof drains to improve the drainage.

1.1.4.11 View of an area on Roof Area N showing there is no significant ponding on this roof area.

1.1.4.12 View of an area on Roof Area N showing there is no significant ponding on this roof area.

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1.2 ROOF SYSTEM REPLACEMENT OPTIONS

The following is a general discussion of the recommended roof replacement options for each type of roof system. Following this general discussion, there is a discussion of the roof system material options for each roof cover including a discussion of longevity, warranty availability, material attributes, etc.

1.2.1 Low Sloped Roof Areas (All Buildings)

***Recover Option**:*
All of the low-sloped roof systems on all of the buildings have one (1) roof system in place, all of the existing roof insulation is polyisocyanurate, and appear to have been maintained over the roof life and we don't believe there will be a substantial amount of wet insulation.

This makes these roofs candidates for a roof recover or to leave the existing roof system in place and install additional rigid roof insulation to meet the current energy code requirement and install a new roof cover.

In this case, an infrared roof moisture survey would be completed which will identify areas of wet insulation. Any areas of wet roof insulation would be specified to be removed and new roof insulation installed prior to the installation of the new roof system. There may also be some additional areas where the existing tapered insulation will need to be removed in order to install new tapered insulation to improve the roof system drainage.

In this case (recover), the new roof system warranty would only cover new components and would not cover the existing roof insulation. If an issue arises with the existing roof insulation, this would not be covered by the roof system warranty. However, the existing roof insulation is a material that we do not typically see issues arise.

Roof Replacement Option:
As an alternative, the existing roof system could be removed down to the structural steel roof deck and a new roof system installed. The new roof system would be the following composition:

- Roof Cover
- Coverboard
- Roof Insulation – Multiple Layers
- Vapor Retarder
- Gypsum Substrate Board – Acoustical Deck Areas
- Existing Steel Roof Deck

In this case, the roof system warranty would cover all materials since they would be supplying all of the materials.

1.2.2 Steep Sloped Roof Areas (Middle School and High School)

Standing Seam Metal Panels:
Due to the existing ventilation space, we recommend the existing roof systems be removed down to the structural steel roof deck. The new roof system would be the following composition:

- Standing Seam Metal Roof Panels
- Self-Adhering Underlayment
- Roof Insulation – Multiple Layers
- Vapor Retarder
- Existing Steel Roof Deck

See the photographs in this section for an example of a project completed with this type of roof system.

Colored Thermoplastic Membrane with Ribs:
As an alternative roof system, a colored thermoplastic membrane with ribs could be installed. Again, we recommend the existing roof system be removed down to the structural steel roof deck in order to eliminate the existing ventilation space. The new roof system would be the following composition:

- Aesthetic Ribs
- Color Thermoplastic Membrane
- Coverboard
- Roof Insulation – Multiple Layers
- Vapor Retarder
- Existing Steel Roof Deck

See the photographs in this section for an example of a project completed with this type of roof system.

Asphalt Shingles:
Based on our review of the existing shingle roof systems, there have been several areas where shingles have blown off over time. The existing vented nailbase system does not include an air barrier as part of the assembly and the ventilation space is below the code required minimum (and necessary to properly ventilate the space).

In addition, shingle warranties are typically shorter term, pro-rated, and provide limited protection, when compared to other commercial roof systems. Therefore, we do not recommend shingles be considered for a replacement roof system.

1.2.2.1 Overall view of a typical standing seam metal roof system.

1.2.2.2 Overall view of a typical standing seam metal roof system.

1.2.2.3 Overall view of a typical colored thermoplastic membrane roof system with aesthetic ribs.

1.2.2.4 Overall view of a typical colored thermoplastic membrane roof system with aesthetic ribs.

1.2.3 Roof Membrane Options

We considered the PVC-based thermoplastic membrane and EPDM roof membrane as options for the low-sloped roof areas. We recommend the PVC Thermplastic Membrane be considered for this project due to longer anticipated life.

PVC Thermoplastic Membrane
This membrane material is comprised of sheets of reinforced PVC polymer and is typically 60 mils in thickness. These membrane sheets are joined together by a process known as hot-air welding. This process heats the two (2) adjoining sheets to the melting point with a specialized welder that then applies pressure while the membrane cools and forms a monolithic sheet with no adhesives.

We recommend the membrane be installed as an adhered roof system, which provides better wind performance by distributing the wind loads across the roof deck in a more uniform manner.

These membranes are typically white and highly reflective. However, they do have a limited selection of colors available for steep sloped applications. They also have an aesthetic rib accessory available to simulate a standing seam metal roof system.

These membranes do tend to be very slippery when there is frost or snow on the roof surface. Membrane walkway would be specified to help provide more slip resistance at higher traffic areas.

Recommended manufacturers will have a long track record in the manufacturer of these roof membranes.

The recommended warranty for this roof system would be a 20-year, full-system, no-dollar-limit, watertightness warranty that includes wind speeds up to 90 mph and hail up to ¾" in diameter.

These roof systems have a 20-year warranty, but the actual roof system life should exceed this with regular care and maintenance. There are examples of some roofs like this still in place after 30 years of service in the central Ohio area.

EPDM Roof Membrane
This membrane is a synthetic rubber material comprised of an unreinforced sheet and is typically 60 mils in thickness. These sheets are joined together with seam tape and liquid adhesive. These adhesives are a weakness of these systems as the deteriorate over time.

We recommend the membrane be installed as an adhered roof system, which provides better wind performance by distributing the wind loads across the roof deck in a more uniform manner.

These membranes are typically black in color.

These membranes have a long track record, and their performance has improved with advancement in seaming/adhesive technology.

The recommended warranty for this roof system would be a 20-year, full-system, no-dollar-limit, watertightness warranty that includes wind speeds up to 90 mph and hail up to ¾" in diameter.

These roof systems have a 20-year warranty, but the actual roof system life should exceed this with regular care and maintenance. Based on our experience, these roof systems can tend to develop more leaks as they age requiring more maintenance to achieve a life cycle exceeding 25 years.

1.2.4 Standing Seam Metal Roof Panels

For the standing seam metal roof panels, we recommend a 16" wide roof panel with a 2" high seam with internal sealant within the seam to prevent water penetration through the seam. The roof panels would be attached to the existing steel roof deck with a concealed clips that allows for expansion and contraction of the roof panel.

The roof panels would be provided in full length panels so that they would be continuous from ridge-to-eave. Based on the building dimensions, most panels would be under 50' in length, but some panels at the high school would be close to 60' in length. In discussing this with a typical standing seam metal roof system manufacturer, they can manufacturer and ship panels easily up to 80 feet in length.

With this system, we recommend a self-adhering underlayment (i.e. ice and watershield membrane). This material allows the existing roof system to be removed, new roof insulation installed, and the self-adhering underlayment installed for temporary weather protection. Once the existing roof system has been removed from the entire roof area, the metal panel installation can be started.

1.2.5 Roof Insulation

Polyisocyanurate insulation is the most common roof insulation and is recommended for this project. We also recommend utilizing a coated glass facer and 25 psi compressive strength material. The coated glass facer eliminates the organic material from the standard insulation material making the insulation less susceptible to moisture damage (i.e. leaks, condensation, etc.) The 25-psi compressive strength makes the material more durable.

The NRCA recommends a maximum thickness of 2-1/2", as thicker insulation can experience dimensional stability issues.

1.2.6 Vapor Retarder

Based on some preliminary hygrothermal analysis (and experience), we recommend a thin film vapor retarder, when the existing roof system is being removed. The roof assemblies with a vapor retarder had lower moisture levels within the insulation system during annual cycles.

1.3 MASONRY THROUGH WALL FLASHINGS

The masonry walls on these buildings are installed as veneer walls or walls that include a cavity space behind the masonry veneer and a structural back-up wall (concrete masonry in these cases). A masonry veneer wall resists water penetration by using this cavity space to allow any water that penetrates the outer brick veneer to travel downward to a flashing at the base of the wall. A masonry through wall flashing is a waterproof flashing that collects any penetrated water and directs it out of the wall.

All of the buildings have masonry veneer walls that extend above various roof areas (low-sloped and steep sloped).

There are signs that there have been previous leaks associated with the masonry walls that extend above the roof lines. It was reported by maintenance personnel that there have been leaks related to the masonry walls and masonry water repellents have been installed in those areas which have eliminated the leaks.

The following is a summary of the observed conditions of the masonry through wall flashings at each of the schools:

Heritage Elementary (South)

- A sheet metal flashing is installed at the masonry through wall flashing location, but it is not a 2-piece receiver. At some areas asphalt can be seen extending (drool) out from the masonry flashing indicating that the masonry through wall flashing is likely constructed from a self-adhering rubberized asphalt sheet.
- Sealant has been installed over the masonry weeps, then later removed.
- Sealant has been installed between the sheet metal flashing and brick veneer. This is a location where water should be allowed to weep out of the wall system.

Based on the above observations and no current or on-going leak issues, we do not recommend the masonry through wall flashing to be replaced. However, there have been past issues and based on our experience these leaks could return and now would be a good time to replace them so that any future replacement work does not damage the new roof system. We have included a cost estimate to replace these masonry through wall flashings in case the Owner would like to include these into the scope of this project.

Liberty Elementary (North)

- A sheet metal flashing is installed at the masonry through wall flashing location, but it is not a 2-piece receiver. At some areas asphalt can be seen extending (drool) out from the masonry flashing indicating that the masonry through wall flashing is likely constructed from a self-adhering rubberized asphalt sheet.
- Sealant has been installed between the sheet metal flashing and brick veneer. This is a location where water should be allowed to weep out of the wall system.

Based on the above observations and no current or on-going leak issues, we do not recommend the masonry through wall flashing to be replaced. However, there have been past issues and based on our experience these leaks could return and now would be a good time to replace them so that any future replacement work does not damage the new roof system, so we have included a cost estimate to replace these masonry through wall flashings in case the Owner would like to include these into the scope of this project.

River Valley Middle School

- Laminated copper masonry through wall flashing was utilized. In many areas the flashing was left extending out of the wall.
- There were locations observed where the masonry through wall flashing was terminated, but there was no end dam in place.
- There were a couple of locations observed where the outer portion of the masonry through wall flashing was missing.
- There were no masonry through wall flashings observed above the steep sloped roof area (where there was brick masonry).

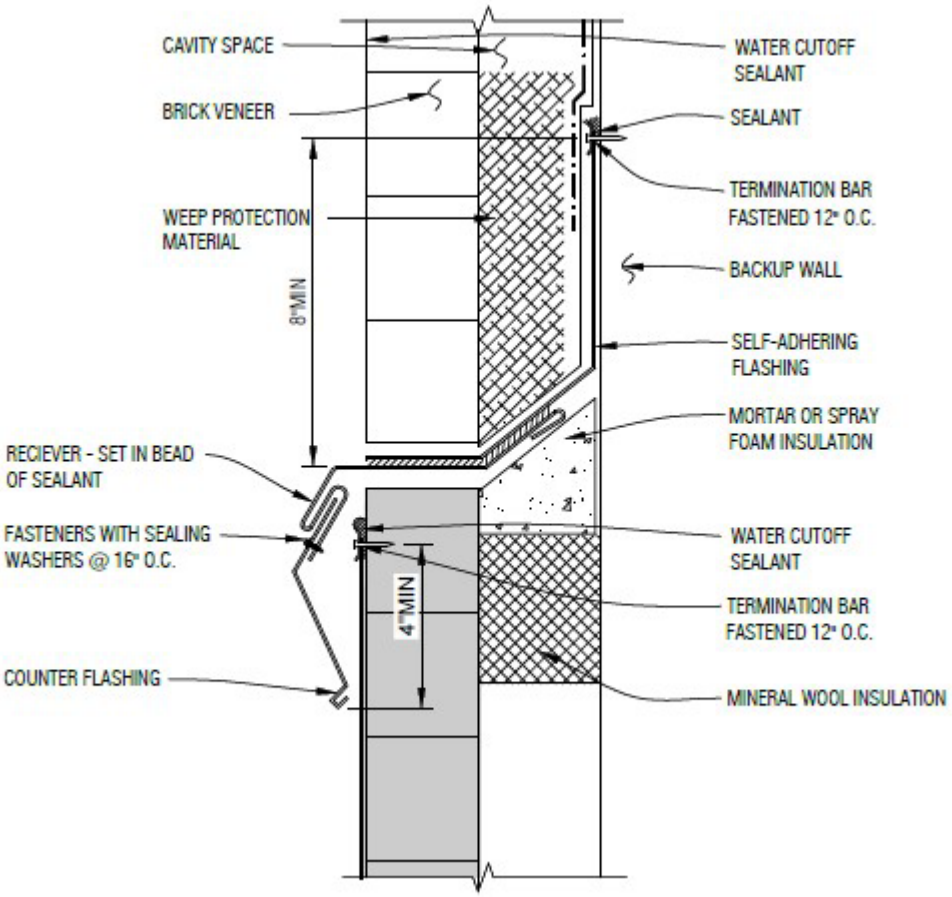
Based on the above observations and no current or on-going leak issues, we do not recommend the complete replacement of the masonry through wall flashings. Since there are no flashings in place above some steep sloped roof areas, we recommend that masonry through wall flashings be installed at these locations.

However, there have been past issues and based on our experience these leaks could return and now would be a good time to replace them so that any future replacement work does not damage the new roof system, so we have included a cost estimate for the complete replacement of the masonry through wall flashings in case the Owner would like to include these into the scope of this project.

River Valley High School

- A 2-piece receiver and counterflashing was installed above the roof termination. These sheet metal flashings typically had weeps directly above them, but there were several locations where the weeps were located a few courses above.
- There were locations observed where the masonry through wall flashing was terminated, but there was no end dam in place, or it extended behind a parapet wall. The masonry through wall flashing was not typically stepped over the parapet wall intersections.
- There was typically no evidence (i.e. weeps) of masonry through wall flashing above sloped roofs. There was an area that had weeps, but there was no stepped counterflashing installed to protect the unflashed masonry.
- There were some cracks observed at outside corners in the brick masonry.

Based on the leak damage observed at some areas and that the flashings are not properly installed at many locations, we recommend all masonry through wall flashings be replaced on this building.



1.3.1 Detail of the ideal masonry through wall flashing.

1.3.2 **Heritage Elementary** - View showing a sheet metal flashing has been installed at the masonry through wall flashing location, but it is not a 2-piece flashing that allows it to be removed to replace the roof base flashing. In addition, sealant has been installed (then removed) from the weeps.

1.3.3 **Heritage Elementary** - View showing additional sealant has been applied to the joint between the sheet metal flashing and the brick masonry.

1.3.4 **Liberty Elementary** - View showing a sheet metal flashing has been installed at the masonry through wall flashing location, but it is not a 2-piece flashing that allows it to be removed to replace the roof base flashing.

1.3.5 **Liberty Elementary** - View showing a sheet metal flashing has been installed at the masonry through wall flashing location, but it is not a 2-piece flashing that allows it to be removed to replace the roof base flashing.

1.3.6 **Liberty Elementary** - View of an area where additional sealant has been installed between the sheet metal flashing and brick masonry.

1.3.7 **Liberty Elementary** - View of an area where asphalt can be seen extending out from under the brick veneer at the sheet metal flashing.

1.3.8 **River Valley Middle School** – View of an area where laminated copper flashing (red arrow) extends out of the wall.

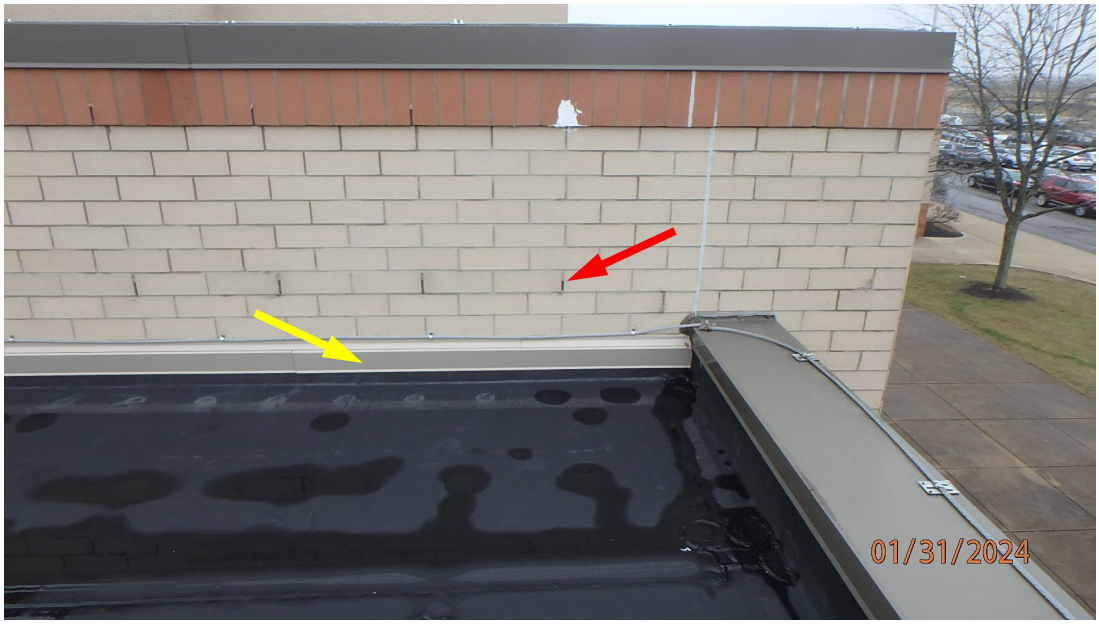
1.3.9 **River Valley Middle School** – Close-up view of the laminated copper masonry through wall flashing material.

1.3.10 **River Valley Middle School** – View of a transition location between a low-sloped roof and a steep sloped roof. It is uncertain if the masonry through wall flashing is terminated. There is also no stepped masonry through wall flashing at the sloped roof area.

1.3.11 **River Valley Middle School** – View of a section where the outer portion of the masonry through wall flashing is missing.

1.3.12 **River Valley Middle School** – View of a masonry through wall flashing that is terminated in the middle of a brick, so it cannot be properly end dammed.

1.3.13 **River Valley High School** – View of an area where the masonry through wall flashing does not step up over the coping cap.

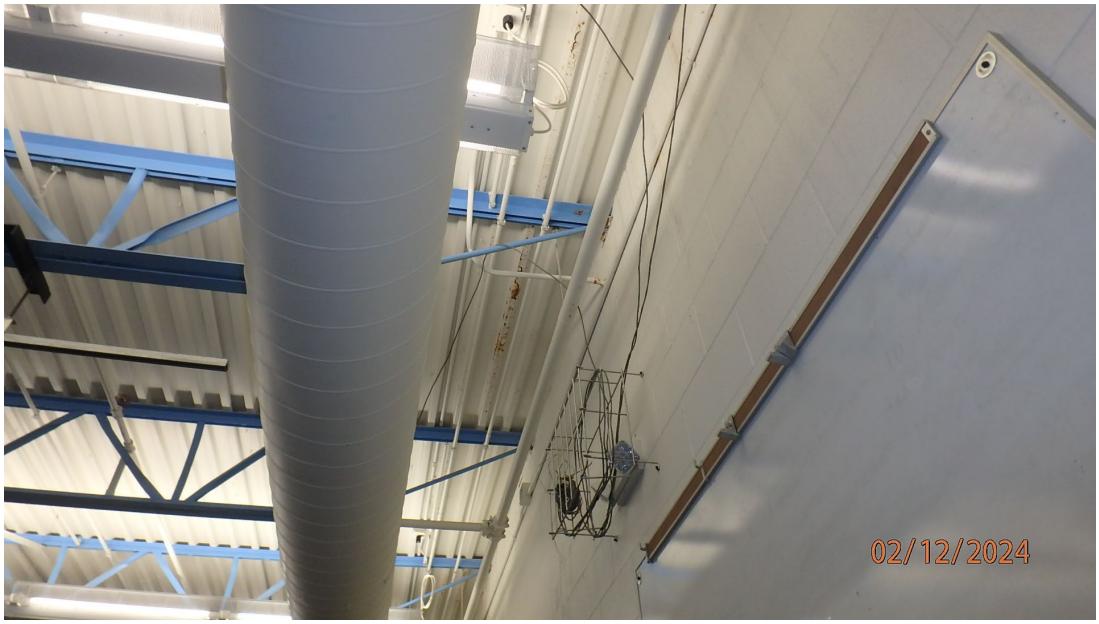


1.3.14 **River Valley High School** – View of an area where the weeps (red arrow) are 2 courses higher than the counterflashing (yellow arrow), leaving 2 courses of masonry that are not flashed.

1.3.15 River Valley High School – Close-up view showing a 2-piece counterflashing has been installed at the through wall flashing location. Sealant has been installed between the sheet metal receiver and brick masonry.

1.3.16 **River Valley High School** – View of another location where the masonry through wall flashing is not stepped up over the coping cap.

1.3.17 **River Valley High School** – View of an area where the weeps are one (1) course above the receiver.



1.3.18 **River Valley High School** – View of severely deteriorated steel decking along the upper wall in the wrestling room. The wall extends above the roof and at this location, there is one (1) course of unflashed masonry between the roof counterflashing and the weeps.

1.3.19 **River Valley High School** – View of an area at the rear of the stage where there is efflorescence in the masonry wall. Efflorescence is caused by moisture and this damage could be related to leakage at the masonry through wall flashing.

1.3.20 **River Valley High School** – View of an area where there is no apparent through wall flashing above the steep sloped roof area.

1.3.21 **River Valley High School** – Close-up view of an area where the weeps are installed 1 course above the receiver and sealant has been installed between the receiver and the brick masonry.

1.3.22 **River Valley High School** – Overall view of an area where the weeps are 3 courses above the receiver.

1.3.23 **River Valley High School** – View of an area where there are no weeps observed above the receiver.

1.3.24 **River Valley High School** – View of another area where there is no apparent masonry through wall flashing above the steep sloped roof area.

1.3.25 **River Valley High School** – View of a steep sloped roof area where there are weeps above the roof, but there are no stepped counterflashings installed to eliminate unflashed masonry.

1.3.26 **River Valley High School** – View of crack observed in the masonry at an outside corner.

1.3.27 **River Valley High School** – View of crack in the masonry at another outside corner location.

1.4 INFRARED BUILDING ENVELOPE SURVEY

It was reported that a sprinkler line/head froze once during cold exterior temperatures at the high school building.

A common problem we find when this occurs is the lack of an air seal between the top of the masonry wall and the bottom of the roof deck at overhang areas on steep sloped roofs. In order to evaluate if this is a problem at the middle school and high school buildings, an infrared building envelope survey was completed.

The basic tool of the Infrared Survey is a FLIR high resolution Infrared Thermal Imager. The Imager is able to distinguish between surface temperature differences as minute as one-tenth of one (1) degree Fahrenheit. The Infrared Imager produces a color image on the system monitor, with different colors representing different surface temperatures. The Infrared Thermographer can then interpret the thermal images produced and identify and document any thermal anomalies present within the building envelope and related exterior wall system components.

When surveyed from building's interior, thermal anomalies are created as cold exterior air infiltration occurs, in effect, cooling the construction components relative to the surrounding areas. As this sequence occurs, the Thermographer can then identify, interpret and document any thermal anomalies identified, due to the temperature differentials created. The opposite sequence occurs when surveying from the building's exterior. The thermal anomaly area becomes heated relative to the surrounding area, due to conditioned air exfiltration from the building's interior. Infiltration is the unintentional introduction of outside air into a building, typically through defects or voids in the building envelope. The unintentional leakage of conditioned air out of a building is called exfiltration.

Please note that the findings of the Thermographic Building Envelope Survey can only be accurate and representative for the time of the survey. When conducting a building envelope survey, it is essential to have a temperature differential of 30 degrees Fahrenheit from interior to exterior.

1.4.1 River Valley Middle School

The exterior portion of the Thermographic Building Envelope Survey was conducted on the exterior of the middle school facility during the morning hours of February 6th and 8th, 2024. During the morning of February 6th ambient exterior temperatures were in the upper 20 to low 30-degree Fahrenheit range and upper 30-degre Fahrenheit range on the morning of February 8th. The HVAC system controls were in occupied setting during the survey and pressure readings taken indicated positive building pressure differentials during the exterior portion of the survey. Interior temperatures during the exterior survey were in the 68-to-71-degree Fahrenheit range. The interior portion of the survey has not yet been completed at this time.

Each exterior wall elevation and accessible roof area was surveyed from the exterior of the building.

The following thermal-related abnormalities within the building envelope were identified during the survey:

1. **Warm Conditioned Interior Air Exfiltration through Soffit Detailing at Roof-To-Wall Transitions**

   From the exterior of the building, warm conditioned interior air exfiltration was identified through the soffit detailing at roof-to-wall transitions throughout the facilities steep slope (asphalt shingle) roof sections. This condition appears to be caused by an unsealed/insulated condition within the interior at the roof-to-wall interface transitions, allowing the air exfiltration to occur through the soffit detailing throughout the facilities steep slope asphalt shingle roof areas. See Exhibit A Illustrations #1 through #8 and the plan view drawing for deficiency locations.

2. **Warm Conditioned Interior Air Exfiltration at Roof-to-Wall Transition Detailing**

   From the exterior of the building, warm conditioned interior air exfiltration was identified at two (2) locations through the base flashing detailing located at roof-to-wall transitions within of the facilities steep slope asphalt shingle roof areas. This condition appears to be caused by an unsealed/insulated condition within the interior at these locations, allowing the air exfiltration to occur. See Exhibit A Illustrations #9 and #12 and the attached plan view drawing for illustration locations.

3. **Warm Conditioned Interior Air Exfiltration through Thermal Voids at Steep Slope Asphalt Shingle Ridge Vent Detailing**

   From the exterior of the building, warm conditioned interior air exfiltration was identified through thermal voids within the steep slope asphalt shingle ridge vent detailing at two (2) locations. This condition appears to be caused by thermal voids within the interior insulation detailing at these locations, allowing the air exfiltration to occur. See Exhibit A Illustrations #10 and #11 and the attached plan view drawing for illustration locations.

We recommend the identified issues be addressed during the roof replacement project and we have included an estimated cost for this work.

1.4.1.1 View of the construction above the drop ceiling at a classroom area. Drywall has been installed across the bottom of the cold-formed metal trusses. We removed a previously installed cover panel to see the eave detail.

1.4.1.2 View showing batt insulation has been installed between the roof deck and the top of the wall.

1.4.1.3 View of the batt insulation removed showing that the majority of the space between the top of the wall and the bottom of the roof deck has been covered with drywall and supplemental framing. This is likely why no air exfiltration issues were identified at the eaves of the middle school.

1.4.2 River Valley High School

The exterior portion of the Thermographic Building Envelope Survey was conducted during the morning hours of February 6, 2024. During the exterior survey, ambient exterior temperatures were in the upper 20 to low 30-degree F range. The HVAC system controls were in occupied setting during the survey and pressure readings taken indicated positive building pressure differentials during the exterior portion of the survey.

The interior portion of the Thermographic Building Envelope Survey was conducted throughout the evening hours of February 6, 2024. During the interior survey, ambient exterior temperatures were in the low 30 to high 20-degree F range. The building HVAC control were manipulated by River Valley personnel resulting in negative building pressure differentials during the interior portion of the survey. Interior temperatures during both the exterior and interior surveys were in the 68-to-71-degree Fahrenheit range.

Each exterior wall elevation and accessible roof areas were surveyed from both the interior and exterior of the building. The following thermal-related abnormalities within the building envelope were identified during the survey:

1. **Conditioned Warm Interior Air Exfiltration through Soffit and Ridge Vent Detailing**

   From the exterior of the building, warm conditioned interior air exfiltration was identified through the soffit detailing at roof-to-wall transitions and through ridge vent detailing throughout the facility's steep slope (asphalt shingle) roof sections. This condition appears to be caused by an unsealed/insulated condition within the interior at the roof-to-wall interface transitions, allowing the air exfiltration to occur through the soffit and ridge vent detailing throughout the facilities steep slope asphalt shingle roof areas. See Exhibit B Illustrations #1 through #20 and the attached plan view drawing for deficiency locations.

2. **Cold Exterior Air Infiltration through uninsulated Roof-to-Wall Transition Detailing – South Elevation Wall within Vo-Ag Lab**

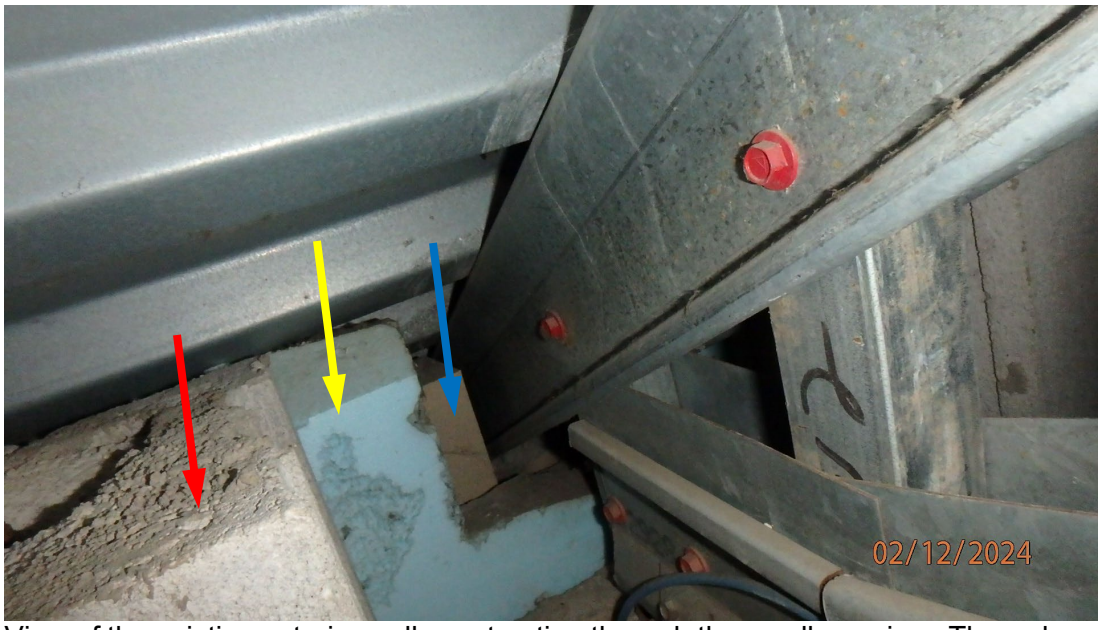
   From the interior, significant cold exterior air infiltration was occurring at unsealed structural detailing located at the roof-to-wall transition within the Vo-Ag Lab on the south elevation wall. See Exhibit B Illustration #21 and the attached plan view drawing for illustration location.

3. **Cold Exterior Air Infiltration at Through-Roof Pipe Penetrations – Southwest Corner Vo-Ag Lab**

   From the interior of the building, cold exterior air infiltration was identified at two (2) through-roof pipe penetrations located in the southwest corner of the Vo-Ag Lab classroom. The openings through the roof deck appear to be poorly sealed/insulated, allowing exterior air infiltration to occur. See Exhibit B Illustration #22 and the attached plan view drawing for deficiency location.

We recommend the identified issues be addressed during the roof replacement project and we have included an estimated cost for this work.

1.4.2.1 View of the construction above the drop ceiling at a classroom area. Drywall has been installed across the bottom of the cold-formed metal trusses.



1.4.2.2 View of the existing exterior wall construction through the small opening. The red arrow indicated the CMU back-up wall, the yellow arrow indicates the cavity insulation, and the blue arrow indicates the exterior brick veneer. There is no air barrier installed at this location.

1.4.2.3 View of the same area from a different angle showing there is no air barrier installed at this location.

1.4.2.4 View above the drop ceiling at an adjacent hallway area, where a frozen sprinkler line/head was reported. There is no drywall attached to the bottom of the cold-formed metal trusses at these locations and there is no air barrier between the top of the wall and the bottom of the roof deck.

1.3 ROOF SYSTEM DETAIL CONSIDERATIONS

The following is a discussion of some of the common roofing details and how we propose addressing each situation. This is not an all-inclusive list.

1.3.1 Existing Lightning Protection System – All Buildings

Each building has a lightning protection system currently installed. I do not know if these systems have been inspected to maintain their UL Master Label, but we plan to specify that the existing system be removed and the components saved and re-used to the greatest extent possible. When the system is re-installed, we plan to specify it to be installed to the current lightning protection standards and a UL Master Label provided upon completion. This will help assure the system is properly installed and help protect the building against lightning strikes.

During the replacement, the lightning rods at the coping caps will be attached independently of the coping cap to comply with the coping cap manufacturer's requirements.

1.3.2 Steep Slope to Low-Sloped Roof Tie-In – River Valley Middle School

When there is a transition from a steep sloped roof system to a low-sloped roof system, we prefer that there be a step between the roofs so that each roof system can be replaced or modified independent of the other roof system. This becomes more problematic when the low-sloped roof system life expectancy is substantially less than the steep sloped roof system.

At one location on the middle school, there is an area where the low-sloped and steep sloped roof systems intersect without this step transition. While not ideal, these two (2) roof systems can be integrated together. We can make detail provisions that would allow for a portion of the steep sloped roof to be removed more easily if the low-sloped roof system needed to be replaced.

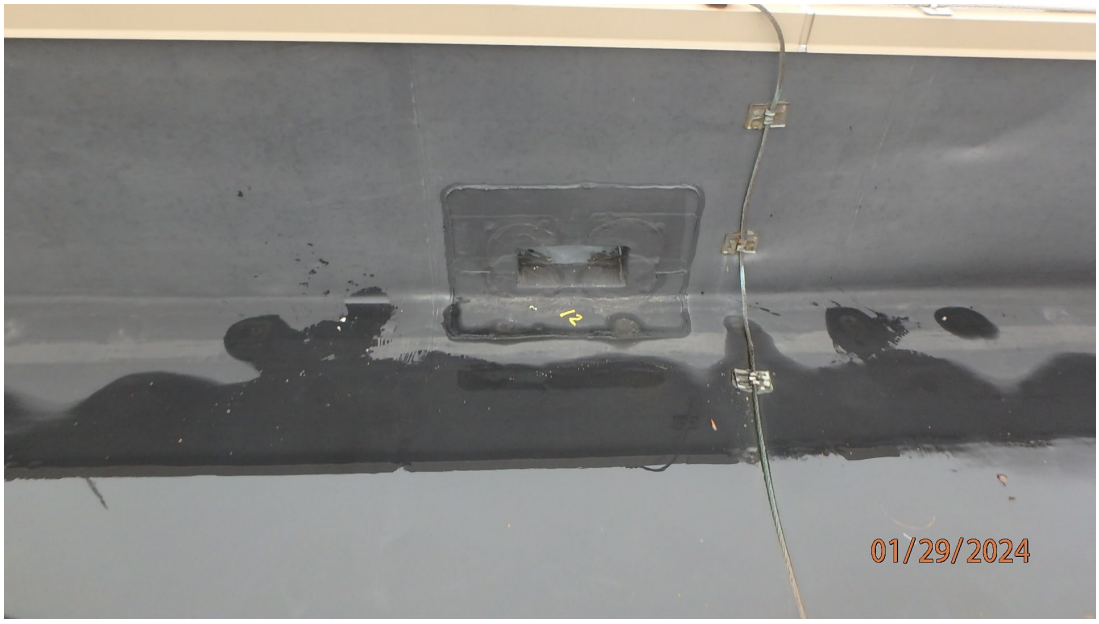
In addition, upgrades to the low-sloped roof system could be specified that would make the low-sloped roof system have a longer life cycle, more closely matching the steep sloped roof system.

1.3.2.1 River Valley Middle School – View of an area where the steep slope roof directly ties into the low-sloped roof system.

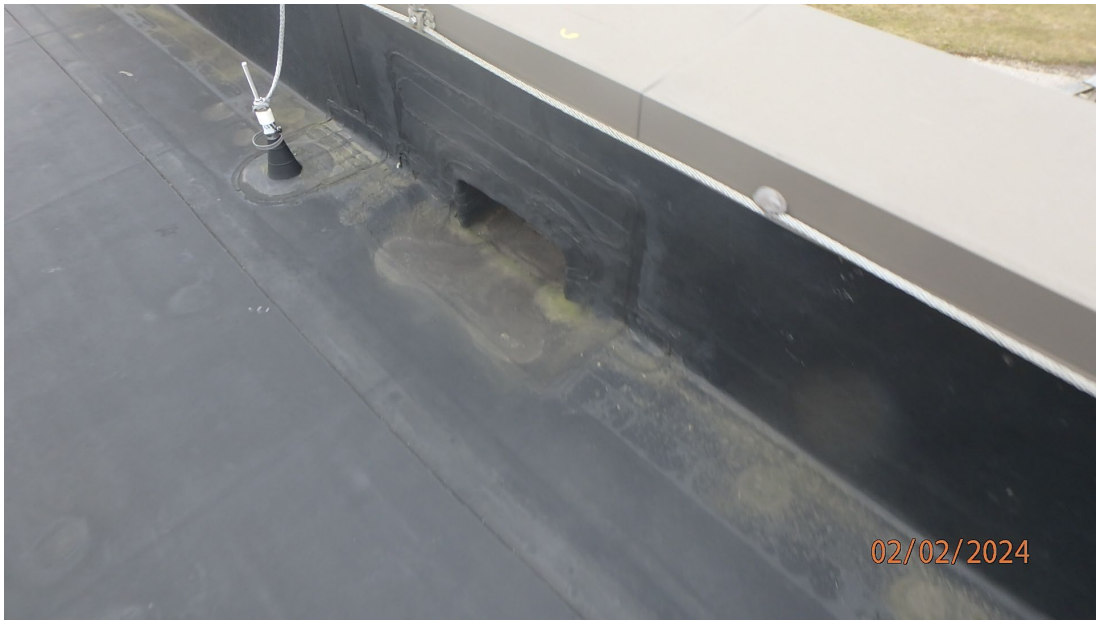
1.3.3 Roof Drainage – All Buildings

Generally, all of the low-sloped roof systems have good drainage. There are some areas around roof drains or areas that require back slope, where there is some minor to moderate ponding (See Section 1.1 Existing Roof System Information). During the roof replacement, we plan to specify modifications to the tapered insulation at these areas in order to improve the roof system drainage.

All roof areas have overflow drainage provisions, and these will be maintained. In some cases, the overflow drainage scuppers are close to the roof surface and the opening may need to be modified slightly to accommodate the thickness of the new roof system.



1.3.3.1 **Heritage Elementary** – View of roof overflow drainage scupper that may need to be modified slightly to accommodate the new roof system.



1.3.3.2 **River Valley Middle School** – View of a roof overflow drainage scupper that will need to be modified to accommodate the new roof system.

1.3.4 Gas Line Modifications

In some locations, the case lines are in close proximaty to the roof system. Based on our current observations, we are planning to change to a hanging pipe support system so that the gas line does not have to be modified.

1.3.4.1 **Heritage Elementary** – View of a typical gas line where a hanger type support will need to be utilized so that the gas line does not need to be modified.

1.3.5 Base Flashing at Exterior Insulation and Finish System (EIFS)

In some areas, the façade material of the above roof walls is Exterior Insulation and Finish System (EIFS). Typically the roof membrane has been extended up the wall behind this material and is now inaccessible.

If the current base flashing has enough height to accommodate the new roof system, a portion of the existing membrane can be left in place and a counterflashing installed.

In areas where there is not enough flashing height to accommodate the new roof system, a portion of the EIFS would need to be removed, a receiver installed, and EIFS re-installed over the new receiver. This will then allow the roof system to be installed and a counterflashing installed into the receiver.

Where the EIFS intersects the coping caps, a portion of the EIFS will have to be removed and re-worked to allow for a watertight transition to be installed to the roof system.

1.3.5.1 **River Valley Middle School –** View of an area where there is EIFS above the low-sloped roof system. The existing roof base flashing may be high enough that the EIFS does not need to be modified in this area.

1.3.5.2 **River Valley Middle School** – View of an area where the EIFS will need to be modified so that a watertight transition can be provided at the coping cap. In addition, the base flashing height may need to be raised to accommodate the new roof system.

1.3.5.3 **River Valley Middle School** – View of an area where the EIFS will need to be modified in order to accommodate the height of the new roof system.

1.3.6 Interior Acoustic Insulation

At the high school, there are some areas (i.e. music, art, etc.) that have a spray-applied cellulose insulation (K-13) applied to the underside of the roof deck that is exposed to the interior of the building as a finish.

The existing roof fasteners will need to be removed and new roof fasteners installed. Since it is unknown if this will be damaged (or to what extent) by the existing fastener removal and new fastener installation, we recommend these areas be reviewed and either repaired on a change order basis or as a separate small project.

1.3.6.1 **River Valley High School** - View of the K-13 insulation installed on the bottom of the roof deck in Room 100.

1.3.7 Special Detail Conditions

There are some areas where there are non-typical details that will require special details where the low-sloped and steep sloped roof systems intersect.

In addition, there are other non-typical details within the steep sloped roof systems.

Special details can be developed for these for whichever roof system is selected.

1.3.7.1 **River Valley High School** – There are some special detail conditions where the steep slope and low-sloped roof system intersect.

1.3.7.2 **River Valley High School** – View of a non-typical detail within the steep sloped roof system.

1.3.7.3 **River Valley High School** – View of a non-typical detail within the steep sloped roof system.

1.6 ROOF CONSTRUCTION CONSIDERATIONS

The removal and replacement of an existing roof system is a substantial construction project that is typically completed over an operating and occupied facility in a manner to maintain the building watertight at all times during construction.

The following is a discussion of some of the items we have encountered on similar projects and how we have dealt with them.

Safety

While the contractor is responsible for safety, we will specify some measures to help facilitate a safe site, especially while school is in session.

We typically specify a 4' high plastic fencing be installed to enclose any areas around the building where the contractor is working in order to prevent pedestrian traffic from entering a construction area.

If work needs to be performed over an entryway while the building is occupied, scaffolding tunnels can be specified in order to safely maintain the entry open or at least for emergency egress.

We can specify that construction traffic (i.e. lift movement, etc.) be stopped during school arrival and dismissal since these will be times of high pedestrian and parent pick-up and drop off traffic.

While we do not anticipate very much roof deck replacement, there is an area along a masonry wall at the high school that will need to be replaced. This will need to be coordinated so that this room is unoccupied during this work. If other areas are encountered, the same approach would need to be taken.

Noise

The noise related to the removal and replacement of the roof system is another factor that is typically encountered on similar projects. At the steep slope roof areas, the interstitial space created between the bottom of the roof deck and the drywall that has been applied to the bottom of the trusses should help mitigate this to some extent.

All roof areas have steel roof decks. The roof insulation will be mechanically fastened to the roof deck. During the securement of the roof insulation, there will be multiple workers using drills to attach the roof insulation to the steel deck with screws, which will cause some noise. The noise is for a limited amount of time and will move as the roof replacement process progresses.

We recommend the roof installation be performed during the daylight hours. During non-daylight hours moisture will be forming on the roof surfaces, which would compromise the adhesion of the new roof system and entrap moisture within the roof system.

The project schedule can be reviewed and modified in an effort to complete work on areas where noise will be more critical during the summer break.

Odors

Odors are always an area of concern with a roofing project. On this project, there will be a roof membrane adhesive and potentially a primer for the self-adhering underlayment. There is always the potential for these to enter the building and be objectionable to the building occupants.

Many times, the buildings HVAC system can be utilized to help prevent odor entry into the building. This could include shutting down the outside air intake and covering the intake louver when working close to the intake.

Leaving the existing roof membrane in place would help mitigate this to some extent since it would be a barrier that helps prevent odors from migrating into the building.

On other projects, the Owner has elected to change the HVAC filters to activated carbon filters which help absorb VOC's and remove odors from the filtered air.

1.5 PRELIMINARY SCHEDULE

See Exhibit C for a copy of the Preliminary Project Schedule. This project schedule should be reviewed by the client team and comments provided regarding changes. This project schedule will be included in the project specifications and will form the basis for the contractor's schedule during construction.

The schedule reflects work being completed at multiple buildings at the same time, with on-site work starting in early August and on-site work being complete on all buildings the around the end of the year.

Currently, there are no supply chain issues that we are aware of that would have an impact on the project and materials are anticipated to be available within the time frames outlined in the schedule.

2.0 PROJECT COST ESTIMATES

The following are budgetary estimates for the anticipated hard bid costs from the roofing contractor. This does not include soft costs such as the cost for design services, construction administration, owner contingency, etc.

A spreadsheet with a summary of the estimates has been provided as Exhibit D.

2.1 Heritage Elementary School (South)

For the recover estimates it is assumed that the existing roof system will remain in place (5% allowance included for removing wet insulation), 2.5" thick polyisocyanurate insulation will be installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

For the tear-off and replacement estimate it is assumed that the existing roof system will be removed down to the structural steel deck, 2 layers of 2.5" thick polyisocyanurate insulation will be installed, a ½" high density polyisocyanurate coverboard installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

PVC-Based Thermoplastic Membrane Roof System:
Recover: $869,000.00
Tear-Off and Replacement: $1,349,000.00

EPDM Membrane Roof System:
Recover: $858,000.00
Tear-Off and Replacement: $1,338,000.00

Non-Roof Repair Items:
Masonry Through Wall Flashing Replacement: $0.00
Repair of Air Infiltration Issues: $0.00

2.2 Liberty Elementary School (North)

For the recover estimates it is assumed that the existing roof system will remain in place (5% allowance included for removing wet insulation), 2.5" thick polyisocyanurate insulation will be installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

For the tear-off and replacement estimate it is assumed that the existing roof system will be removed down to the structural steel deck, a thin film vapor retarder installed, 2 layers of 2.5" thick polyisocyanurate insulation will be installed, a ½" high density polyisocyanurate coverboard installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

PVC-Based Thermoplastic Membrane Roof System:
Recover: $869,000.00
Tear-Off and Replacement: $1,349,000.00

EPDM Membrane Roof System:
Recover: $858,000.00
Tear-Off and Replacement: $1,338,000.00

Non-Roof Repair Items:
Masonry Through Wall Flashing Replacement: $0.00
Repair of Air Infiltration Issues: $0.00

2.3 River Valley Middle School

Low-Sloped Roof Areas

For the recover estimates it is assumed that the existing roof system will remain in place (5% allowance included for removing wet insulation), 2.5" thick polyisocyanurate insulation will be installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

For the tear-off and replacement estimate it is assumed that the existing roof system will be removed down to the structural steel deck, a thin film vapor retarder installed, 2 layers of 2.5" thick polyisocyanurate insulation will be installed, a ½" high density polyisocyanurate coverboard installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

PVC-Based Thermoplastic Membrane Roof System:
Recover: $600,000.00
Tear-Off and Replacement: $958,000.00

EPDM Membrane Roof System:
Recover: $526,000.00
Tear-Off and Replacement: $884,000.00

Steep Sloped Roof Areas

For the standing seam metal estimates it is assumed that the existing roof system will be removed down to the structural steel roof deck, a thin film vapor retarder installed, 3 layers of 1.8" thick polyisocyanurate insulation installed, a self-adhering underlayment installed, and a 22-gauge Galvalume coated steel standing seam roof panel installed. This system includes snow guards to help control sliding ice and snow. All sheet metal flashings (i.e. gutters, fascia, soffit, etc.) are included for replacement.

For the thermoplastic membrane with aesthetic ribs it is assumed that the existing roof system will be removed down to the structural steel roof deck, a thin film vapor retarder installed, 3 layers of 1.8" thick polyisocyanurate insulation installed, a ½" gypsum coverboard installed (adhered), and a 60-mil fleece-backed colored PVC-based thermoplastic membrane installed. Aesthetic ribs spaced approximately 18" on-center is assumed. This system also includes snow guards to help control sliding ice and snow. All sheet metal flashings (i.e. gutters, fascia, soffit, etc.) are included for replacement.

Standing Seam Metal Roof System:
Tear-Off and Replacement: $1,318,000.00

Colored Thermoplastic Membrane Roof System:
Tear-Off and Replacement: $1,577,000.00

Recommended Non-Roof Repair Items:
Masonry Through Wall Flashing Replacement: $93,600.00
Repair of Air Infiltration Issues: $32,900.00

2.4 River Valley High School

Low-Sloped Roof Areas

For the recover estimates it is assumed that the existing roof system will remain in place (5% allowance included for removing wet insulation), 2.5" thick polyisocyanurate insulation will be installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

For the tear-off and replacement estimate it is assumed that the existing roof system will be removed down to the structural steel deck, a thin film vapor retarder installed, 2 layers of 2.5" thick polyisocyanurate insulation will be installed, a ½" high density polyisocyanurate coverboard installed, and an adhered roof membrane cover (PVC or EPDM) will be installed.

PVC-Based Thermoplastic Membrane Roof System:
Recover: $1,454,000.00
Tear-Off and Replacement: $2,342,000.00

EPDM Membrane Roof System:
Recover: $1,175,000.00
Tear-Off and Replacement: $2,063,000.00

Steep Sloped Roof Areas

For the standing seam metal estimates it is assumed that the existing roof system will be removed down to the structural steel roof deck, a thin film vapor retarder installed, 3 layers of 1.8" thick polyisocyanurate insulation installed, a self-adhering underlayment installed, and a 22-gauge Galvalume coated steel standing seam roof panel installed. This system includes snow guards to help control sliding ice and snow. All sheet metal flashings (i.e. gutters, fascia, soffit, etc.) are included for replacement.

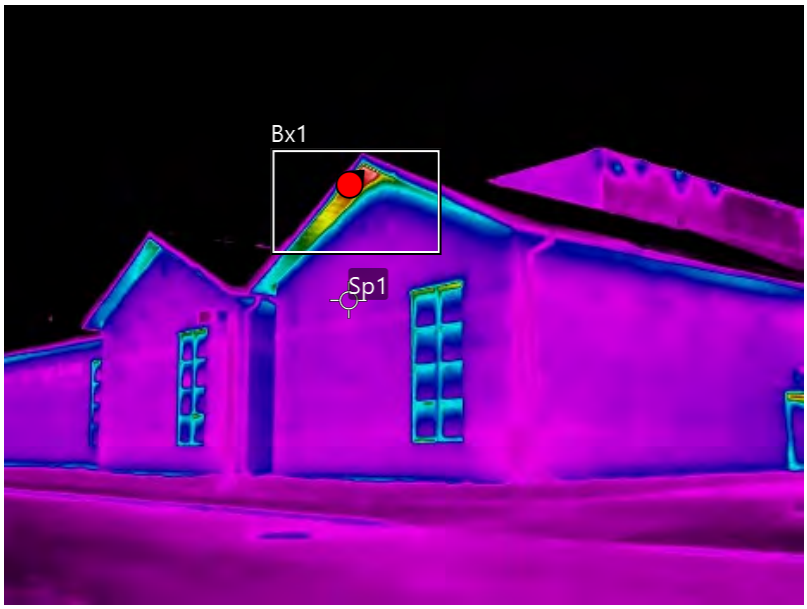
For the thermoplastic membrane with aesthetic ribs it is assumed that the existing roof system will be removed down to the structural steel roof deck, a thin film vapor retarder installed, 3 layers of 1.8" thick polyisocyanurate insulation installed, a ½" gypsum coverboard installed (adhered), and a 60-mil fleece-backed colored PVC-based thermoplastic membrane installed. Aesthetic ribs spaced approximately 18" on-center is assumed. This system also includes snow guards to help control sliding ice and snow. All sheet metal flashings (i.e. gutters, fascia, soffit, etc.) are included for replacement.

Standing Seam Metal Roof System:
Tear-Off and Replacement: $1,485,000.00

Colored Thermoplastic Membrane Roof System:
Tear-Off and Replacement: $1,742,000.00

Recommended Non-Roof Repair Items:
Masonry Through Wall Flashing Replacement: $456,000.00
Repair of Air Infiltration Issues: $137,470.00

Illustration #1



Parameters

Atmospheric temp.	30.0 °F

Measurements

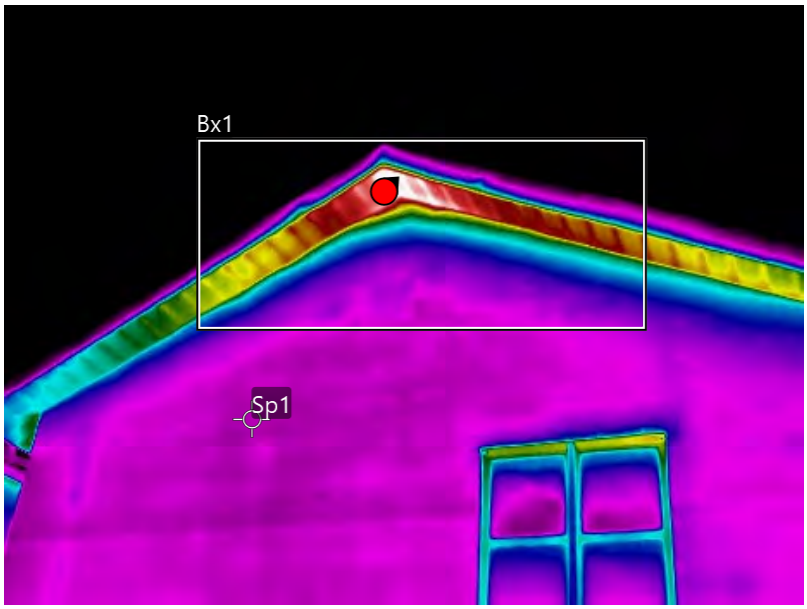
Bx1	
Max	49.1 °F
Sp1	31.0 °F
Dt1	
Bx1.Max -Sp1	18.1 °F

FLIR5699.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, south elevation. See plan view drawing for location.

Illustration #2



Parameters

Atmospheric temp.	30.0 °F

Measurements

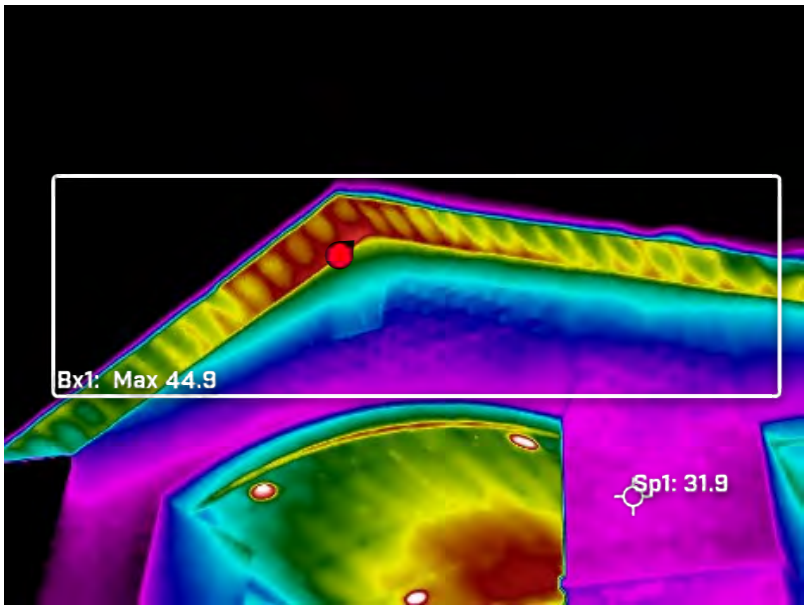
Bx1	
Max	52.6 °F
Sp1	30.9 °F
Dt1	
Bx1.Max -Sp1	21.7 °F

FLIR5701.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, south elevation. See plan view drawing for location.

Illustration #3



Parameters

Atmospheric temp.	30.0 °F

Measurements

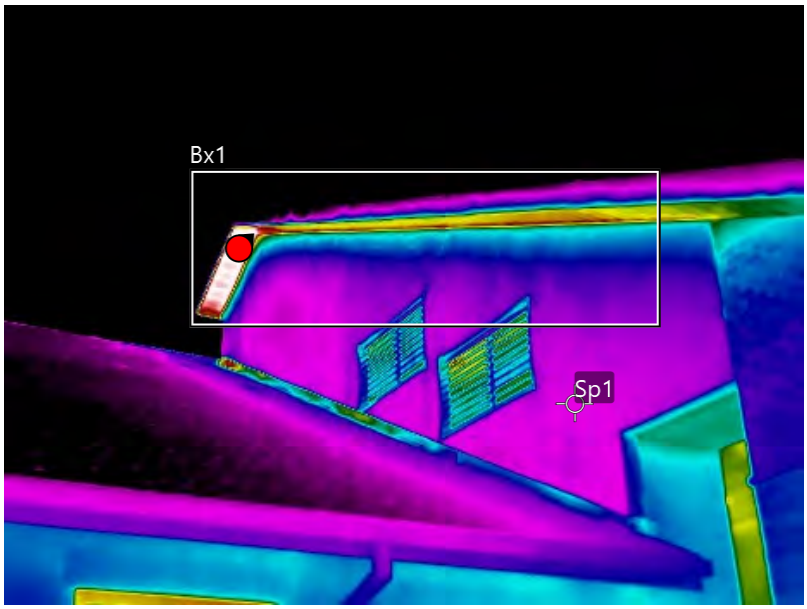
Bx1	
Max	44.9 °F
Dt1	
Bx1.Max -Sp1	13.1 °F
Sp1	31.9 °F

FLIR5704.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, south elevation. See plan view drawing for location.

Illustration #4



Parameters

Atmospheric temp.	30.0 °F

Measurements

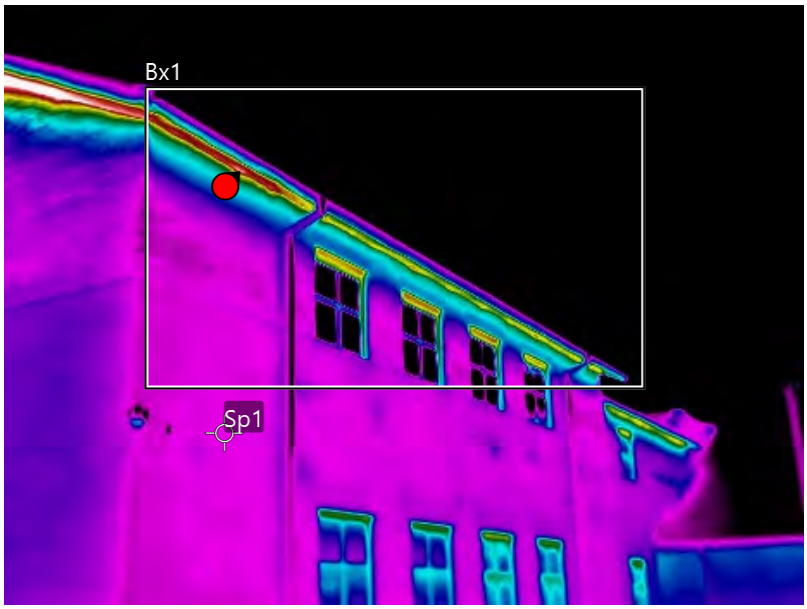
Bx1	
Max	54.4 °F
Sp1	28.2 °F
Dt1	
Bx1.Max -Sp1	26.2 °F

FLIR5705.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #5



Parameters

Atmospheric temp.	30.0 °F

Measurements

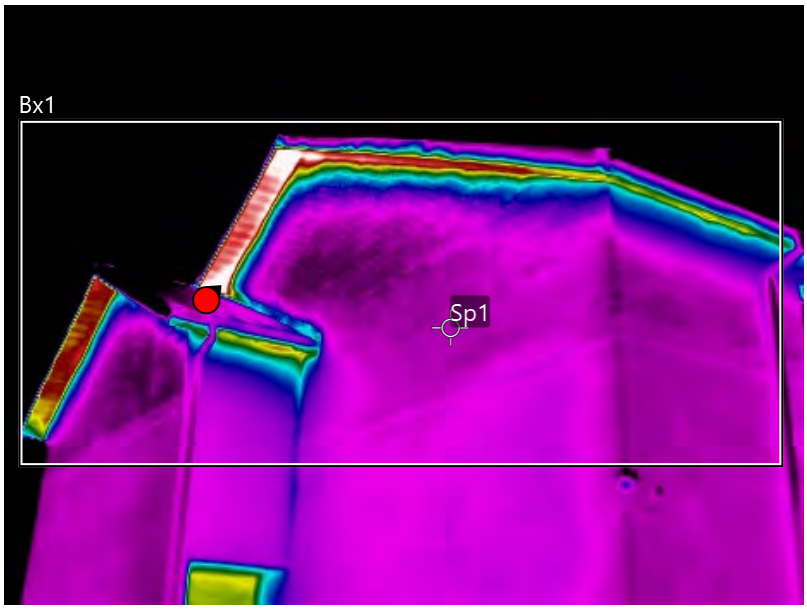
Bx1	
Max	50.2 °F
Sp1	28.7 °F
Dt1	
Bx1.Max -Sp1	21.5 °F

FLIR5709.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, east elevation. See plan view drawing for location.

Illustration #6



Parameters

Atmospheric temp.	30.0 °F

Measurements

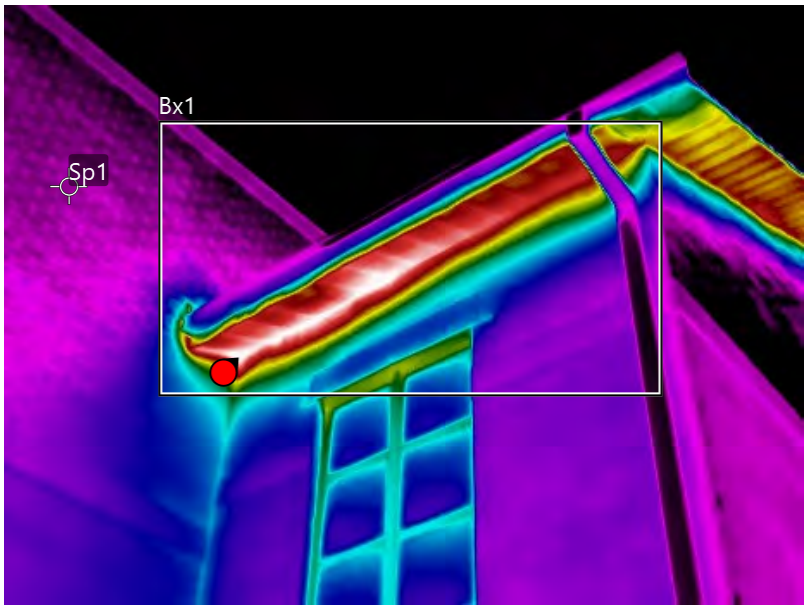
Bx1	
Max	66.0 °F
Sp1	29.2 °F
Dt1	
Bx1.Max -Sp1	36.8 °F

FLIR5710.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, south elevation. See plan view drawing for location.

Illustration #7



Parameters

Atmospheric temp.	30.0 °F

Measurements

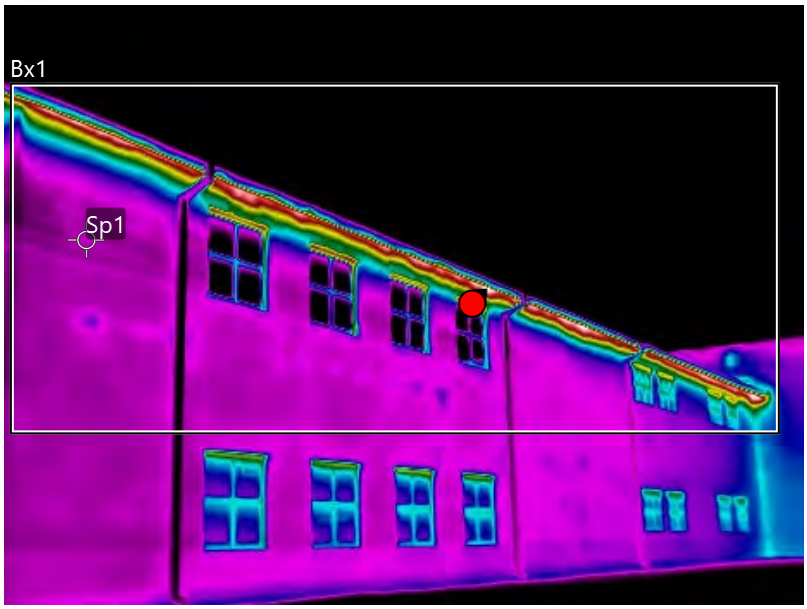
Bx1	
Max	62.8 °F
Sp1	28.4 °F
Dt1	
Bx1.Max -Sp1	34.4 °F

FLIR5715.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #8



A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

Parameters

Atmospheric temp.	30.0 °F

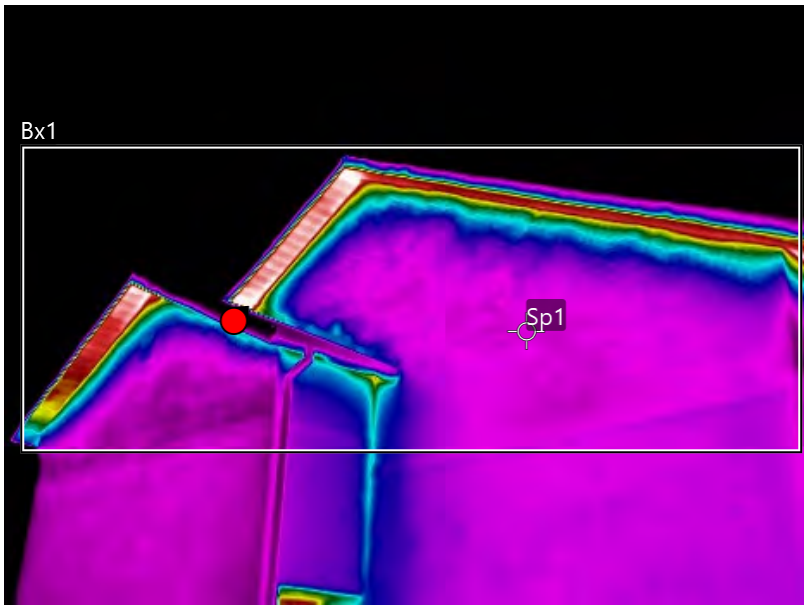
Measurements

Bx1	
Max	56.6 °F
Sp1	29.5 °F
Dt1	
Bx1.Max -Sp1	27.1 °F

FLIR5719.jpg

B. Photograph indicates area in which above thermal image was recorded - High School, south elevation. See plan view drawing for location.

Illustration #9



Parameters

Atmospheric temp.	30.0 °F

Measurements

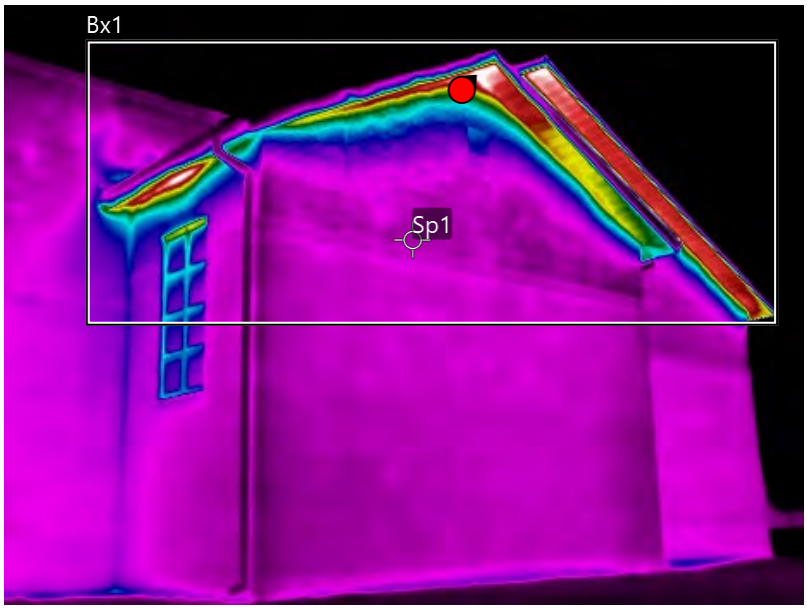
Bx1	
Max	59.8 °F
Sp1	29.7 °F
Dt1	
Bx1.Max -Sp1	30.2 °F

FLIR5720.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #10



Parameters

Atmospheric temp.	30.0 °F

Measurements

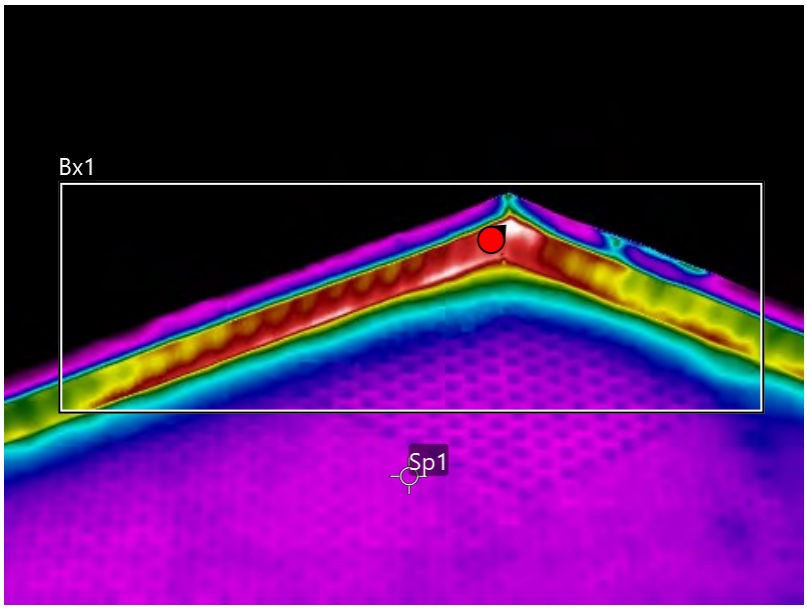
Bx1	
Max	59.0 °F
Sp1	29.0 °F
Dt1	
Bx1.Max -Sp1	30.0 °F

FLIR5723.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #11



Parameters

Atmospheric temp.	30.0 °F

Measurements

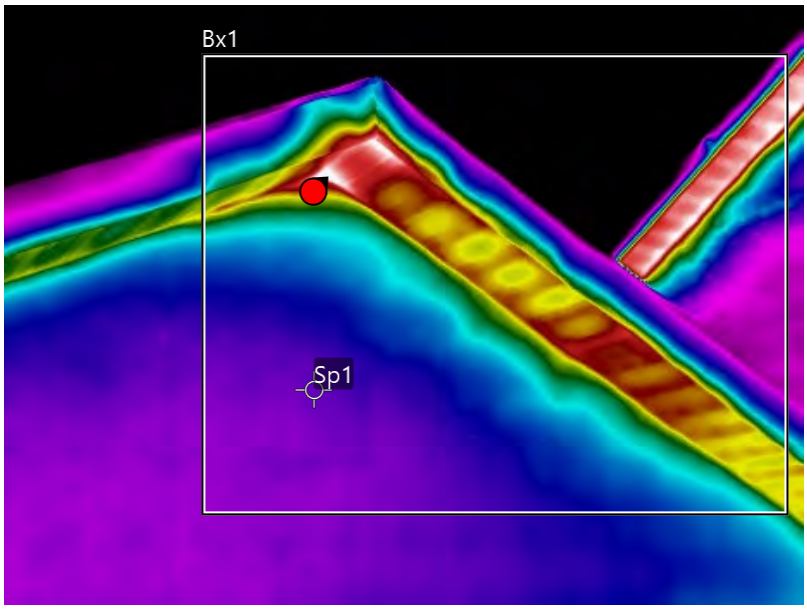
Bx1	
Max	56.6 °F
Sp1	29.7 °F
Dt1	
Bx1.Max -Sp1	26.8 °F

FLIR5727.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #12



Parameters

Atmospheric temp.	30.0 °F

Measurements

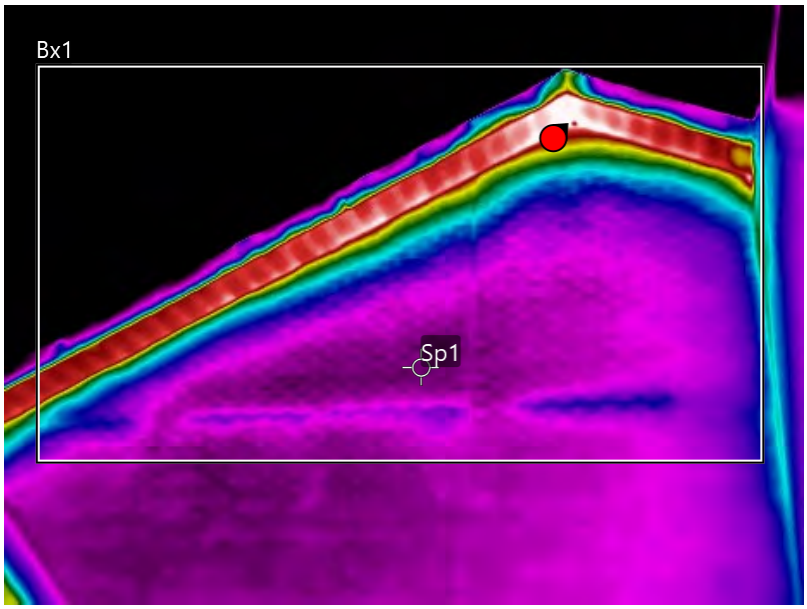
Bx1	
Max	52.7 °F
Sp1	31.7 °F
Dt1	
Bx1.Max -Sp1	21.0 °F

FLIR5736.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, north elevation. See plan view drawing for location.

Illustration #13



Parameters

Atmospheric temp.	30.0 °F

Measurements

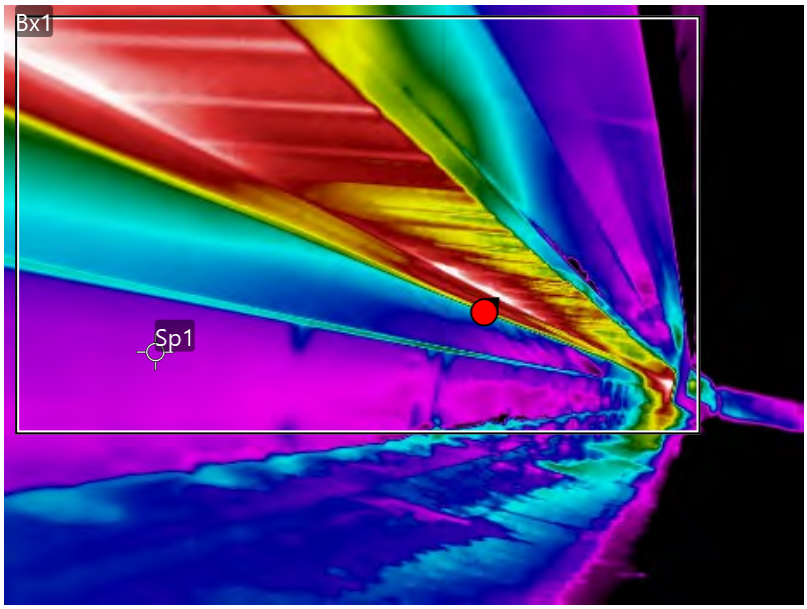
Bx1	
Max	57.7 °F
Sp1	28.6 °F
Dt1	
Bx1.Max -Sp1	29.2 °F

FLIR5737.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, east elevation. See plan view drawing for location.

Illustration #14



Parameters

Atmospheric temp.	30.0 °F

Measurements

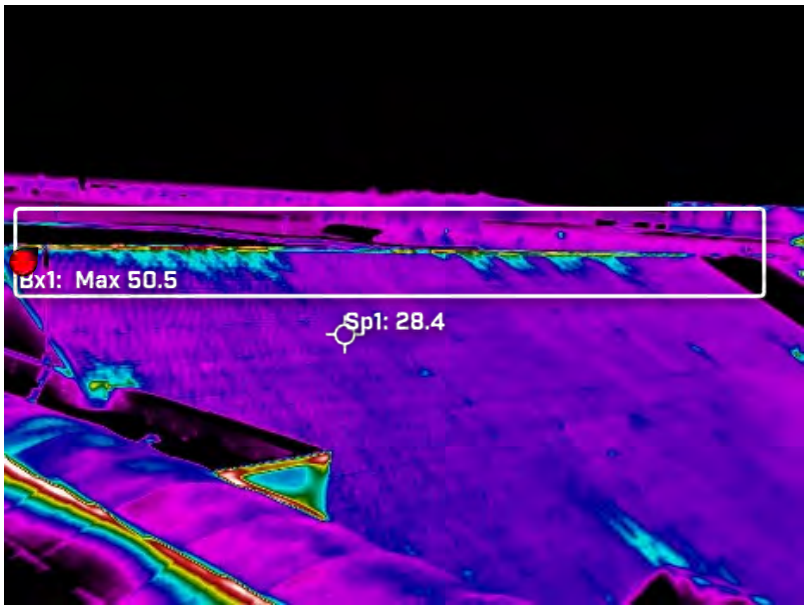
Bx1	
Max	60.0 °F
Sp1	30.4 °F
Dt1	
Bx1.Max -Sp1	29.5 °F

FLIR5746.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #15



Parameters

Atmospheric temp.	30.0 °F

Measurements

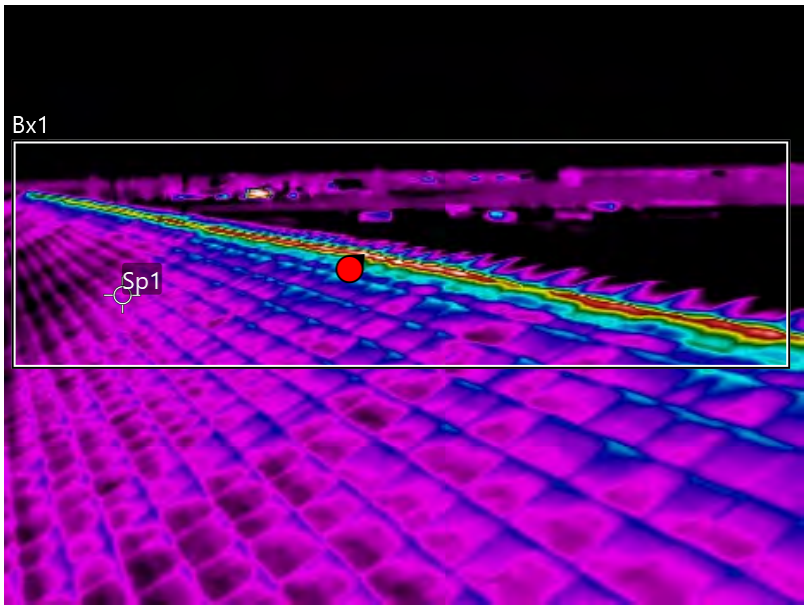
Bx1	
Max	50.5 °F
Sp1	28.4 °F
Dt1	
Bx1.Max -Sp1	22.1 °F

FLIR5750.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, south elevation. See plan view drawing for location.

Illustration #16



Parameters

Atmospheric temp.	30.0 °F

Measurements

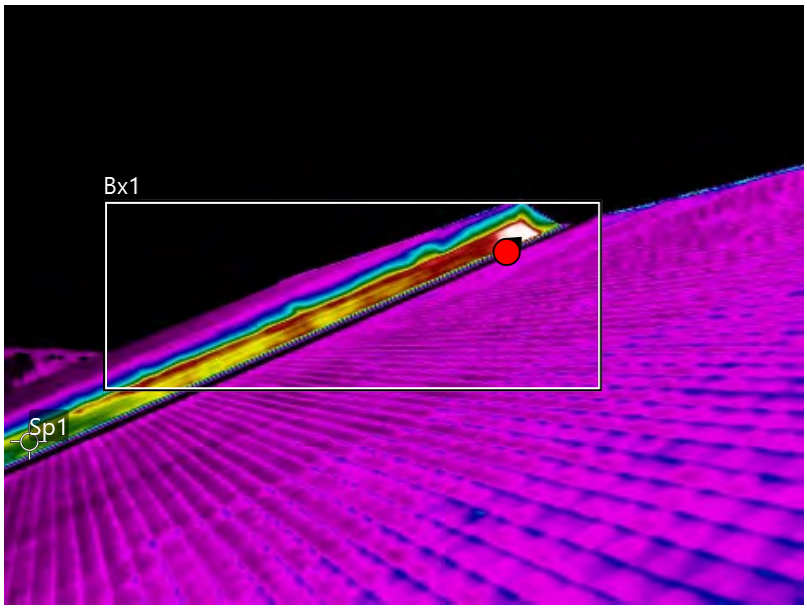
Bx1	
Max	58.9 °F
Sp1	30.2 °F
Dt1	
Bx1.Max -Sp1	28.7 °F

FLIR5752.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, south elevation. See plan view drawing for location.

Illustration #17



A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

Parameters

Atmospheric temp.	30.0 °F

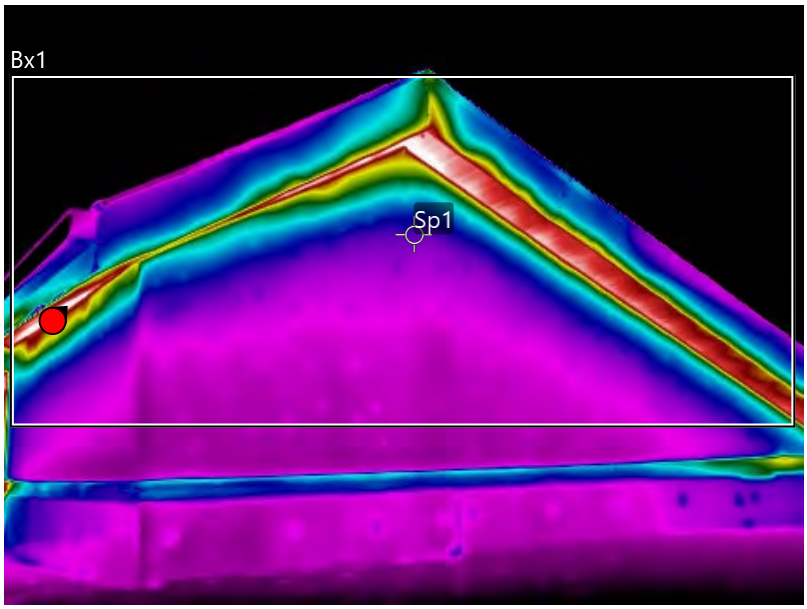
Measurements

Bx1	
Max	63.1 °F
Sp1	44.2 °F
Dt1	
Bx1.Max -Sp1	18.9 °F

FLIR5755.jpg

B. Photograph indicates area in which above thermal image was recorded - High School, north elevation. See plan view drawing for location.

Illustration #18



Parameters

Atmospheric temp.	30.0 °F

Measurements

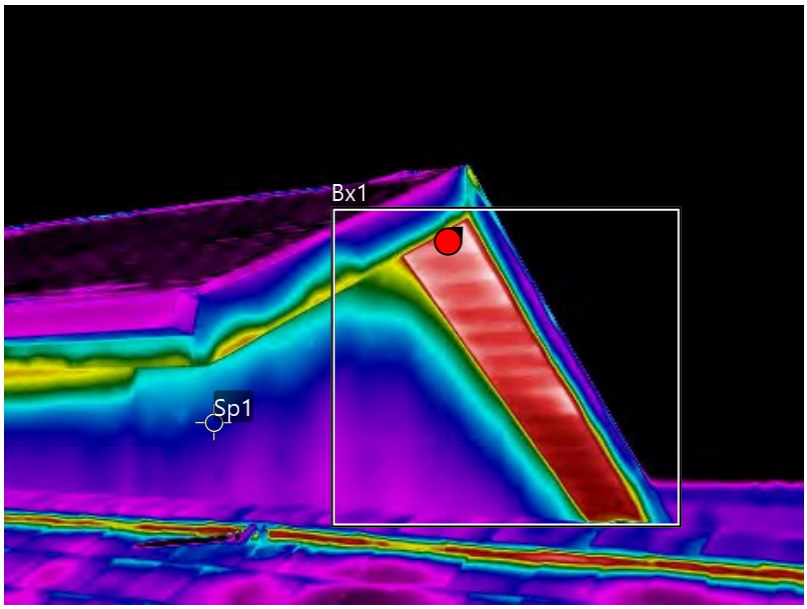
Bx1	
Max	63.9 °F
Sp1	28.6 °F
Dt1	
Bx1.Max -Sp1	35.3 °F

FLIR5756.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #19



Parameters

Atmospheric temp.	30.0 °F

Measurements

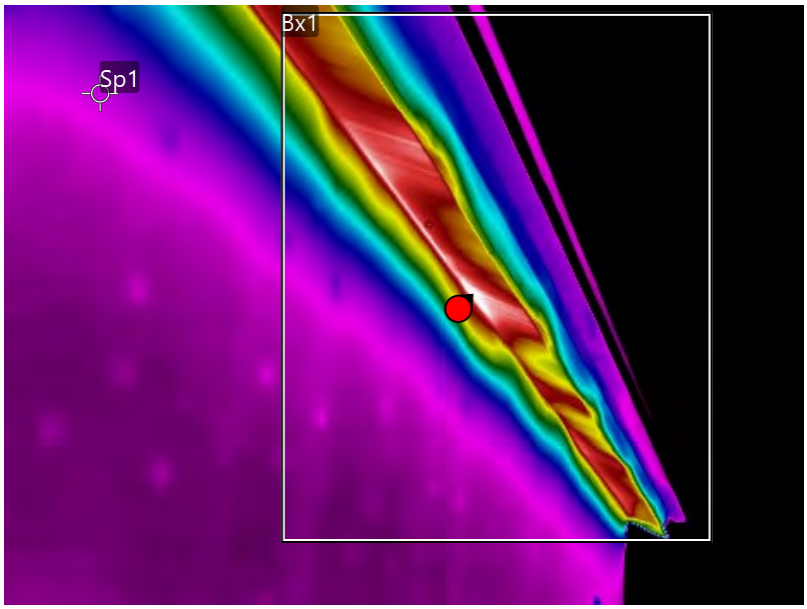
Bx1	
Max	56.1 °F
Sp1	30.0 °F
Dt1	
Bx1.Max -Sp1	26.1 °F

FLIR5761.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, west elevation. See plan view drawing for location.

Illustration #20



Parameters

Atmospheric temp.	30.0 °F

Measurements

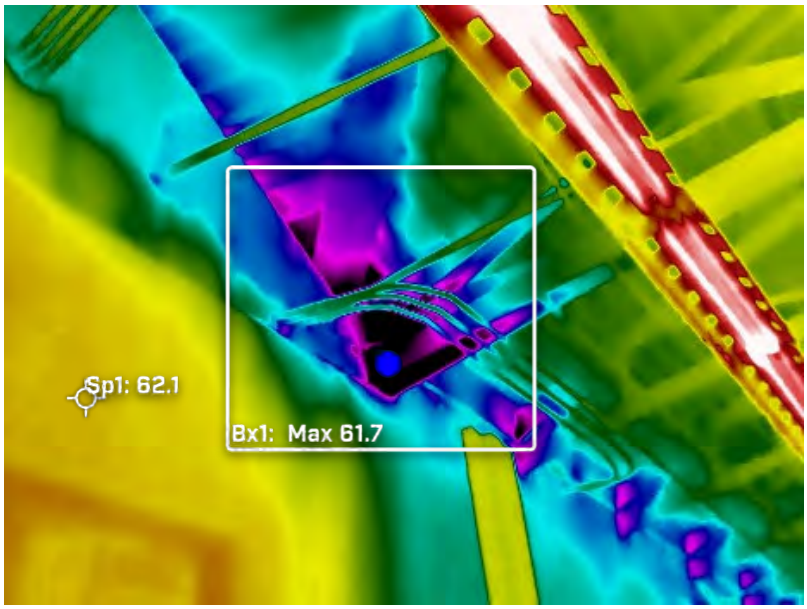
Bx1	
Max	59.2 °F
Sp1	27.8 °F
Dt1	
Bx1.Max -Sp1	31.4 °F

FLIR5762.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - High School, north elevation. See plan view drawing for location.

Illustration #21



A. Thermal image indicates significant cold exterior air infiltration occurring at roof-to-wall transition detailing.

Parameters

Atmospheric temp.	70.0 °F

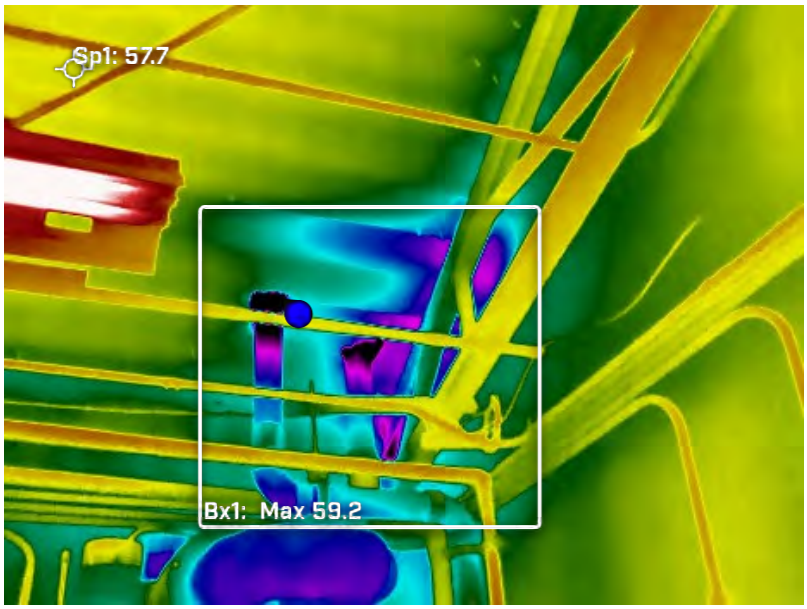
Measurements

Bx1	
Min	45.8 °F
Sp1	62.1 °F
Dt1	
Bx1.Min-Sp1	-16.4 °F

FLIR5782.jpg

B. Photograph indicates area in which above thermal image was recorded - High School, VO-AG Lab, south elevation wall. See plan view drawing for location.

Illustration #22



Parameters

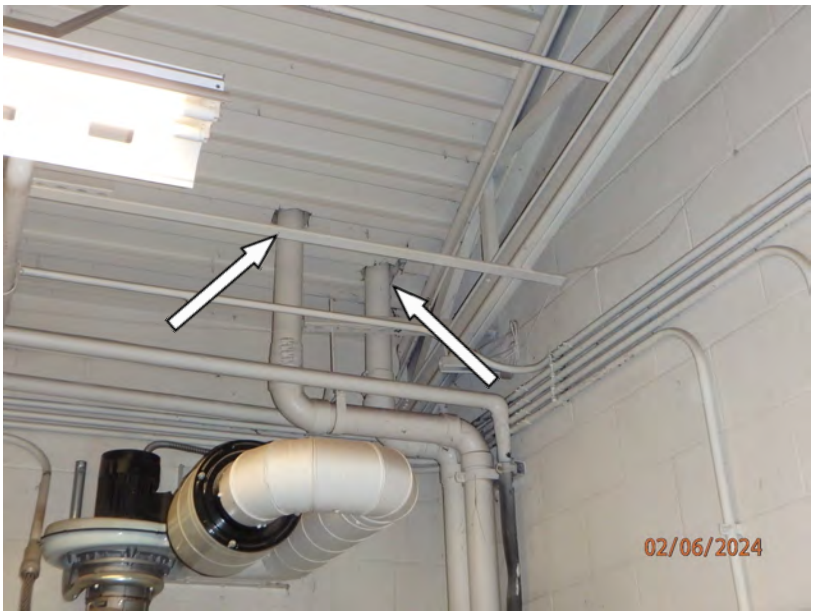
Atmospheric temp.	70.0 °F

Measurements

Bx1	
Min	37.5 °F
Sp1	57.7 °F
Dt1	
Bx1.Min-Sp1	-20.2 °F

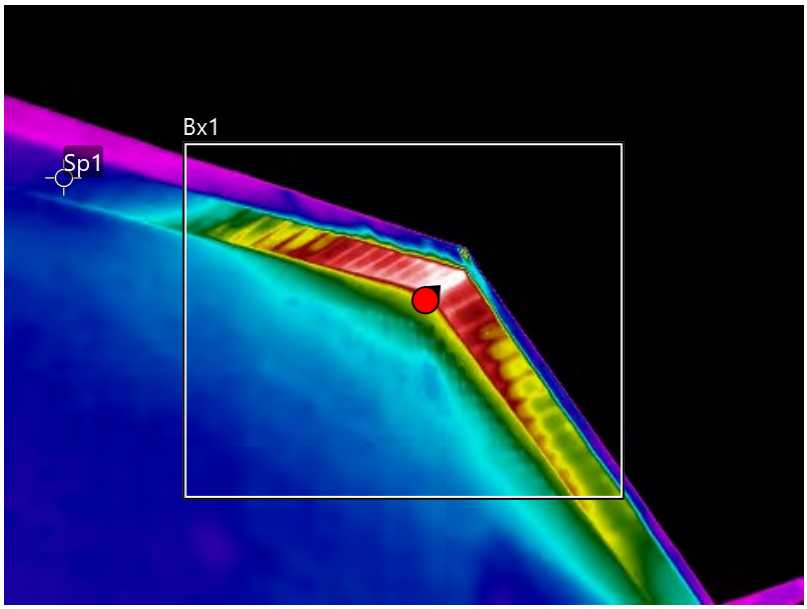
FLIR5783.jpg

A. Thermal image indicates significant cold interior air infiltration occurring at through-roof pipe penetrations.



B. Photograph indicates area in which above thermal image was recorded - High School, VO-AG Lab, southwest corner. See plan view drawing for location.

Illustration #1



Parameters

Atmospheric temp.	30.0 °F

Measurements

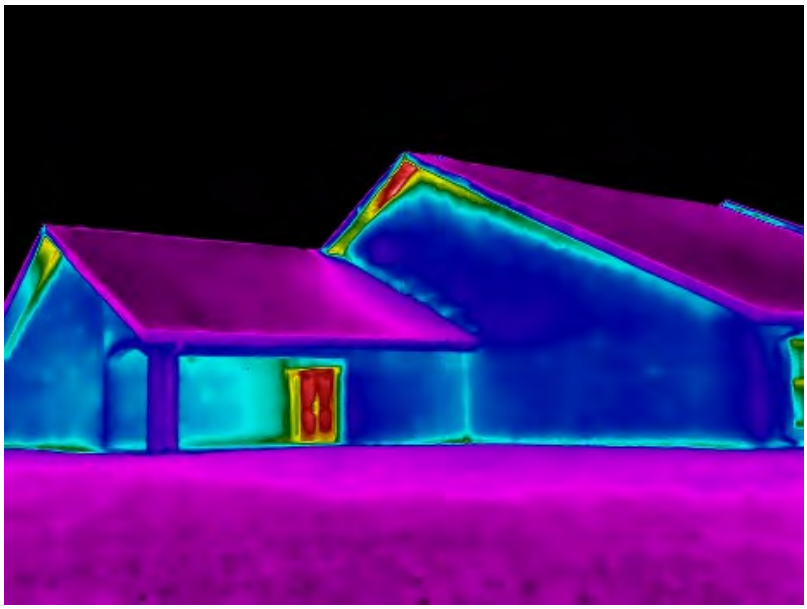
Bx1	
Max	49.2 °F
Sp1	31.7 °F
Dt1	
Bx1.Max -Sp1	17.5 °F

FLIR5670.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - MIddle School, west elevation. See plan view drawing for location.

Illustration #2



Parameters

Atmospheric temp.	**30.0 °F**

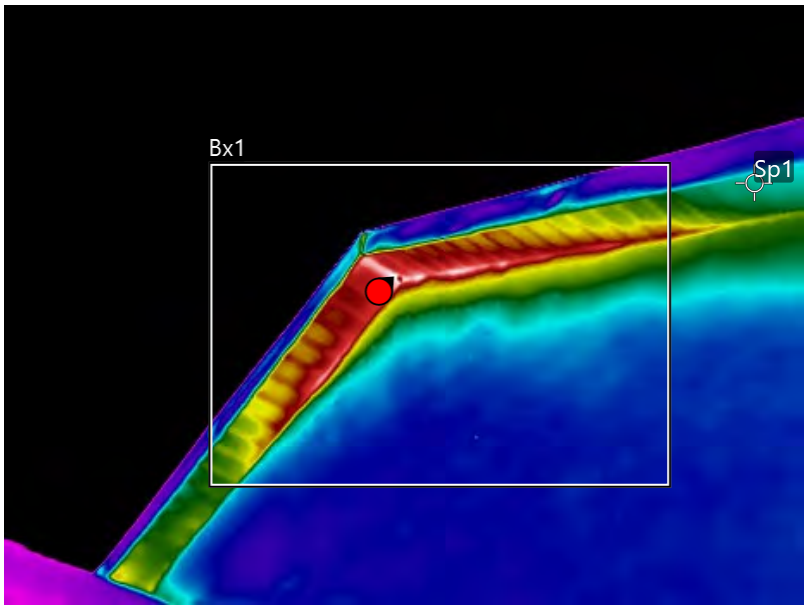
Measurements

FLIR5683.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - Middle School, south elevation. See plan view drawing for location.

Illustration #3



Parameters

Atmospheric temp.	30.0 °F

Measurements

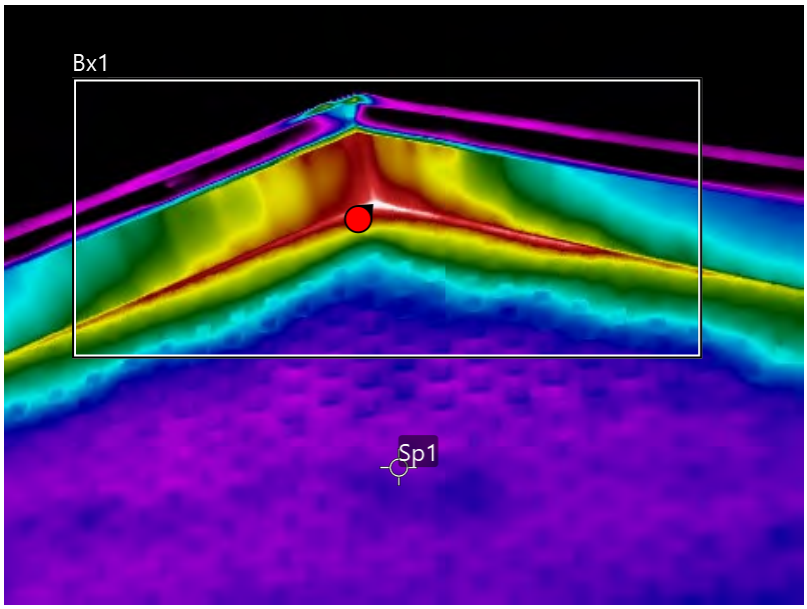
Bx1	
Max	49.1 °F
Sp1	34.3 °F
Dt1	
Bx1.Max -Sp1	14.8 °F

FLIR5684.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - Middle School, south elevation. See plan view drawing for location.

Illustration #4



Parameters

Atmospheric temp.	30.0 °F

Measurements

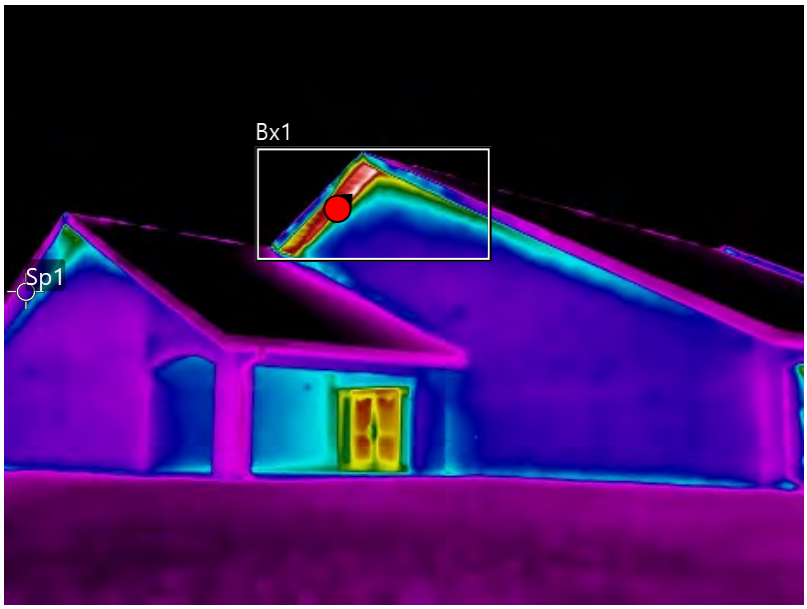
Bx1	
Max	46.9 °F
Sp1	31.1 °F
Dt1	
Bx1.Max -Sp1	15.7 °F

FLIR5685.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - Middle School, south elevation. See plan view drawing for location.

Illustration #5



A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

Parameters

Atmospheric temp.	30.0 °F

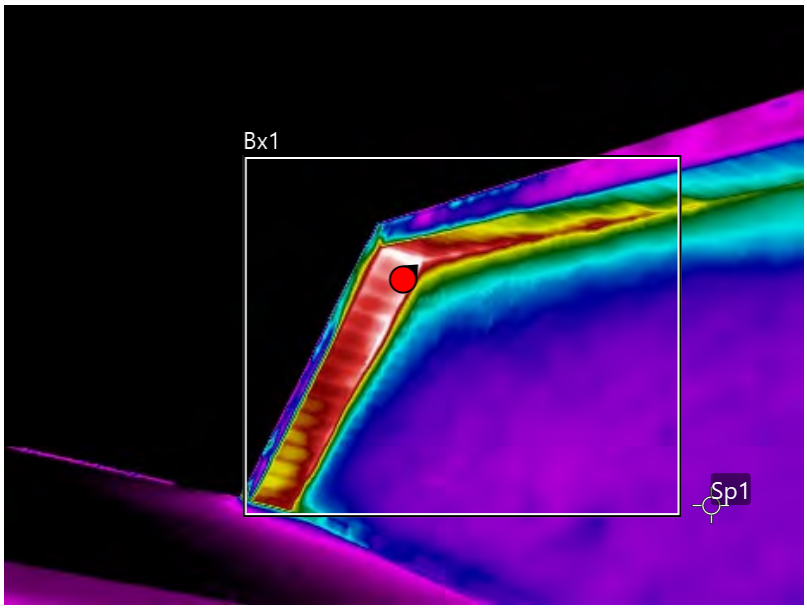
Measurements

Bx1	
Max	53.7 °F
Sp1	32.4 °F
Dt1	
Bx1.Max -Sp1	21.3 °F

FLIR5690.jpg

B. Photograph indicates area in which above thermal image was recorded - Middle School, west elevation. See plan view drawing for location.

Illustration #6



Parameters

Atmospheric temp.	30.0 °F

Measurements

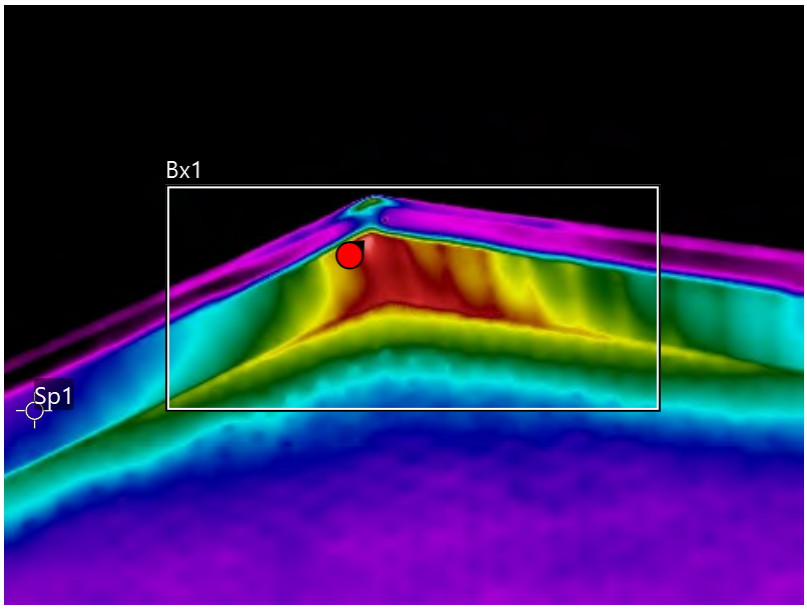
Bx1	
Max	55.6 °F
Sp1	32.2 °F
Dt1	
Bx1.Max -Sp1	23.4 °F

FLIR5692.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - Middle School, west elevation. See plan view drawing for location.

Illustration #7



Parameters

Atmospheric temp.	30.0 °F

Measurements

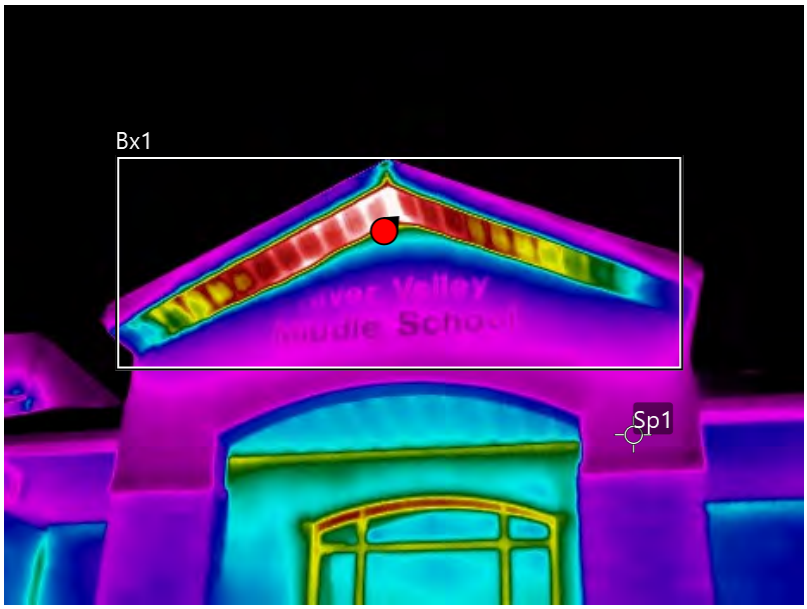
Bx1	
Max	46.7 °F
Sp1	32.6 °F
Dt1	
Bx1.Max -Sp1	14.2 °F

FLIR5693.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - Middle School, west elevation. See plan view drawing for location.

Illustration #8



Parameters

Atmospheric temp.	30.0 °F

Measurements

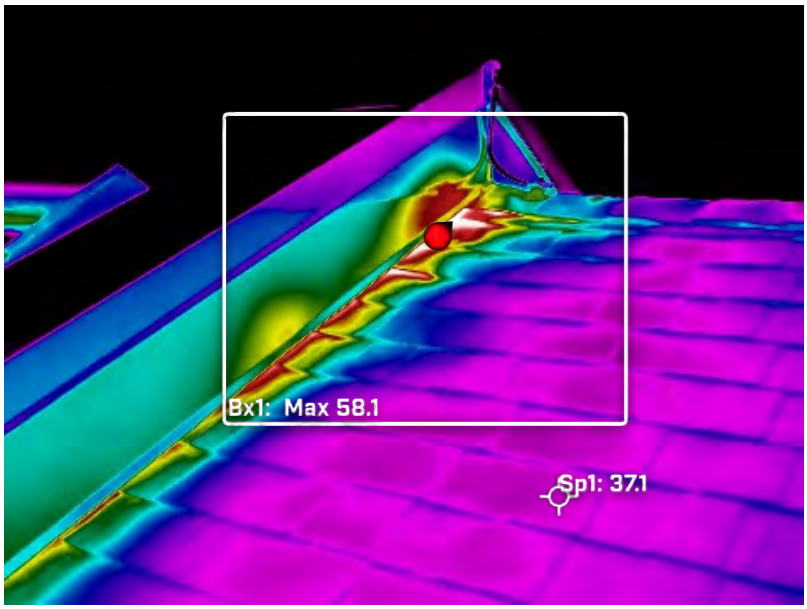
Bx1	
Max	54.4 °F
Sp1	29.6 °F
Dt1	
Bx1.Max -Sp1	24.8 °F

FLIR5697.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through soffit detailing at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - Middle School, west elevation. See plan view drawing for location.

Illustration #9



A. Thermal image indicates significant warm interior air exfiltration occurring at the roof-to-wall transition.

Parameters

Atmospheric temp.	38.0 °F

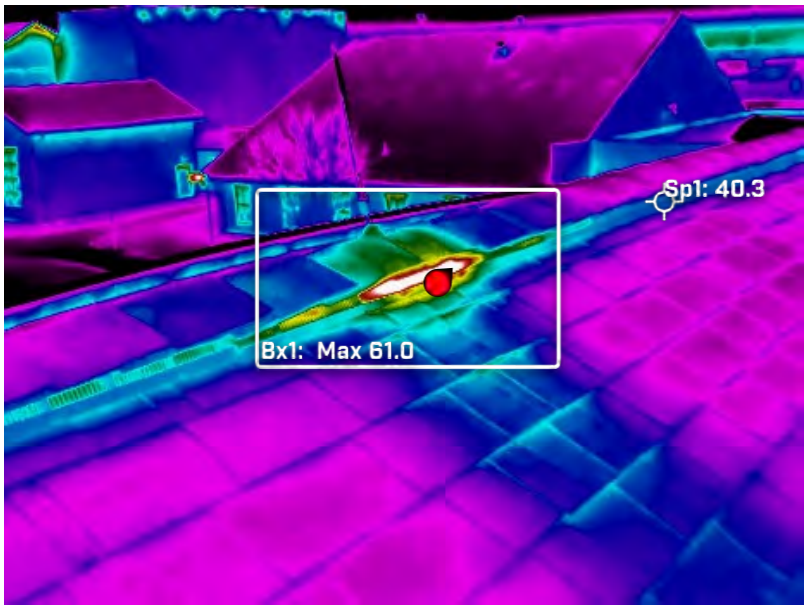
Measurements

Bx1	
Max	58.1 °F
Sp1	37.1 °F
Dt1	
Bx1.Min-Sp1	-43.1 °F

FLIR5822.jpg

B. Photograph indicates area in which above thermal image was recorded - Middle School. See plan view drawing for location.

Illustration #10



A. Thermal image indicates significant warm interior air exfiltration occurring through ridge vent detailing.

Parameters

Atmospheric temp.	38.0 °F

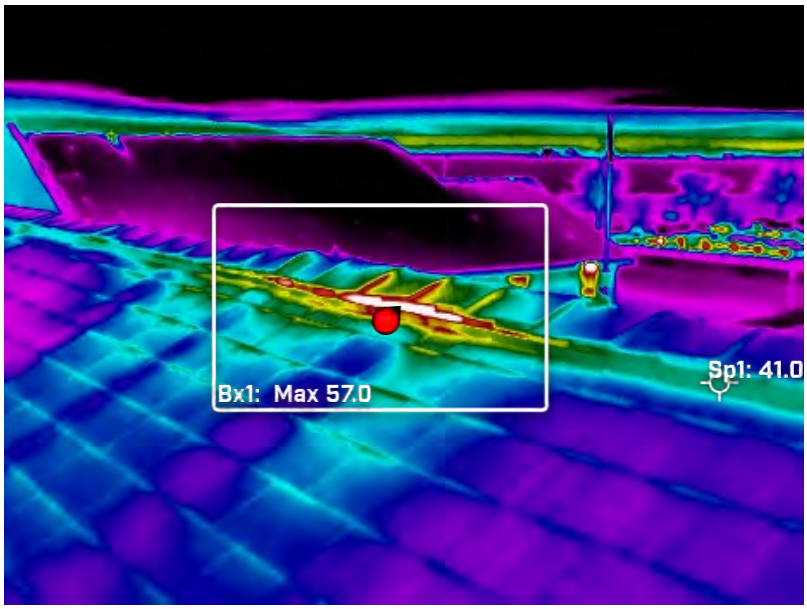
Measurements

Bx1	
Max	61.0 °F
Sp1	40.3 °F
Dt1	
Bx1.Max -Sp1	20.8 °F

FLIR5823.jpg

B. Photograph indicates area in which above thermal image was recorded - Middle School. See plan view drawing for location.

Illustration #11



Parameters

Atmospheric temp.	38.0 °F

Measurements

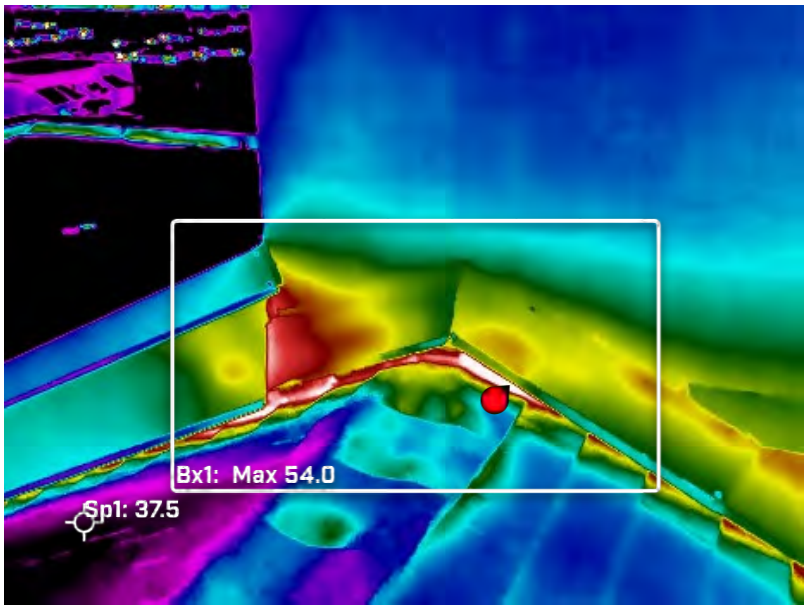
Bx1	
Max	57.0 °F
Sp1	41.0 °F
Dt1	
Bx1.Max -Sp1	16.0 °F

FLIR5824.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring through ridge vent detailing.

B. Photograph indicates area in which above thermal image was recorded - Middle School. See plan view drawing for location.

Illustration #12



Parameters

Atmospheric temp.	38.0 °F

Measurements

Bx1	
Max	54.0 °F
Sp1	37.5 °F
Dt1	
Bx1.Max -Sp1	16.5 °F

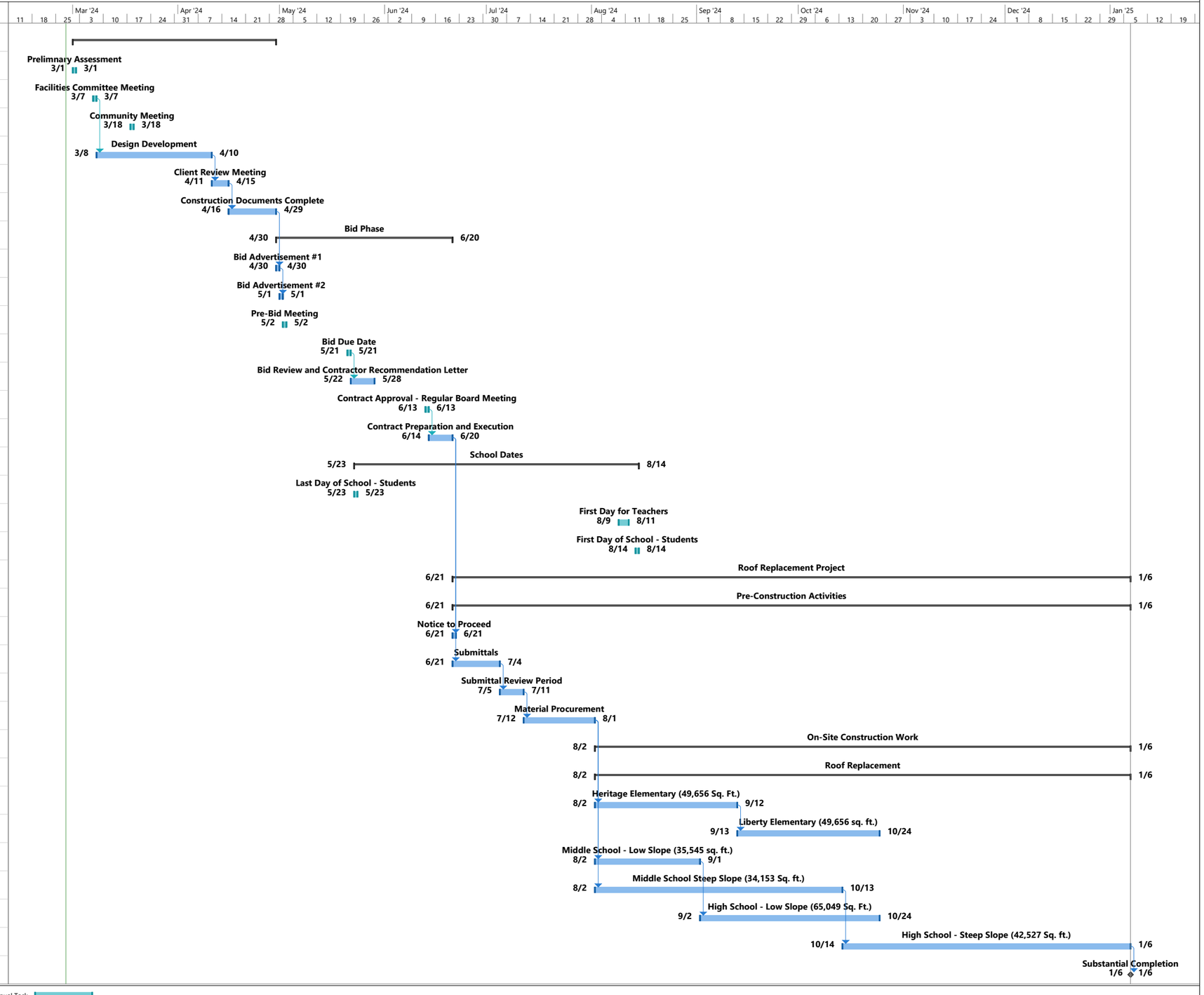
FLIR5830.jpg

A. Thermal image indicates significant warm interior air exfiltration occurring at the roof-to-wall transition.

B. Photograph indicates area in which above thermal image was recorded - Middle School. See plan view drawing for location.

PRELIMINARY SCHEDULE

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Design Phase**	**60 days**	**Fri 3/1/24**	**Mon 4/29/24**	
2		Prelimnary Assessment	1 day	Fri 3/1/24	Fri 3/1/24	
3		Facilities Committee Meeting	1 day	Thu 3/7/24	Thu 3/7/24	
4		Community Meeting	1 day	Mon 3/18/24	Mon 3/18/24	
5		Design Development	34 days	Fri 3/8/24	Wed 4/10/24	3
6		Client Review Meeting	5 days	Thu 4/11/24	Mon 4/15/24	5
7		Construction Documents Complete	14 days	Tue 4/16/24	Mon 4/29/24	6
8		**Bid Phase**	**52 days**	**Tue 4/30/24**	**Thu 6/20/24**	
9		Bid Advertisement #1	1 day	Tue 4/30/24	Tue 4/30/24	7
10		Bid Advertisement #2	1 day	Wed 5/1/24	Wed 5/1/24	9
11		Pre-Bid Meeting	1 day	Thu 5/2/24	Thu 5/2/24	
12		Bid Due Date	1 day	Tue 5/21/24	Tue 5/21/24	
13		Bid Review and Contractor Recommendation Letter	7 days	Wed 5/22/24	Tue 5/28/24	12
14		Contract Approval - Regular Board Meeting	1 day	Thu 6/13/24	Thu 6/13/24	
15		Contract Preparation and Execution	7 days	Fri 6/14/24	Thu 6/20/24	14
16		**School Dates**	**84 days**	**Thu 5/23/24**	**Wed 8/14/24**	
17		Last Day of School - Students	1 day	Thu 5/23/24	Thu 5/23/24	
18		First Day for Teachers	3 days	Fri 8/9/24	Sun 8/11/24	
19		First Day of School - Students	1 day	Wed 8/14/24	Wed 8/14/24	
20		**Roof Replacement Project**	**200 days**	**Fri 6/21/24**	**Mon 1/6/25**	
21		**Pre-Construction Activities**	**200 days**	**Fri 6/21/24**	**Mon 1/6/25**	
22		Notice to Proceed	1 day	Fri 6/21/24	Fri 6/21/24	15
23		Submittals	14 days	Fri 6/21/24	Thu 7/4/24	15
24		Submittal Review Period	7 days	Fri 7/5/24	Thu 7/11/24	23
25		Material Procurement	21 days	Fri 7/12/24	Thu 8/1/24	24
26		**On-Site Construction Work**	**158 days**	**Fri 8/2/24**	**Mon 1/6/25**	
27		**Roof Replacement**	**158 days**	**Fri 8/2/24**	**Mon 1/6/25**	
28		Heritage Elementary (49,656 Sq. Ft.)	42 days	Fri 8/2/24	Thu 9/12/24	25
29		Liberty Elementary (49,656 sq. ft.)	42 days	Fri 9/13/24	Thu 10/24/24	28
30		Middle School - Low Slope (35,545 sq. ft.)	31 days	Fri 8/2/24	Sun 9/1/24	25
31		Middle School Steep Slope (34,153 Sq. ft.)	73 days	Fri 8/2/24	Sun 10/13/24	25
32		High School - Low Slope (65,049 Sq. Ft.)	53 days	Mon 9/2/24	Thu 10/24/24	30
33		High School - Steep Slope (42,527 Sq. ft.)	85 days	Mon 10/14/24	Mon 1/6/25	31
34		Substantial Completion	0 days	Mon 1/6/25	Mon 1/6/25	33



Client: River Valley Schools
Project: 2024 Roof Replacement Project
Date: February 28, 2024

Task | Summary | Manual Task

RIVER VALLEY LOCAL SCHOOL DISTRICT
ROOF REPLACEMENT PROJECT
PRELIMINARY ASSESSMENT

EXHIBIT D - ESTIMATE SUMMARY
2/27/2024

Low-Sloped Roof Replacements					
Overlay	**Square Footage**	**Thermoplastic Estimates**	**$/Sq. Ft.**	**EPDM Estimates**	**$/Sq. Ft.**
Heritage Elementary School	49,656	$869,000	$17.50	$858,000	$17.28
Liberty Elementary School	49,656	$869,000	$17.50	$858,000	$17.28
Middle School	31,791	$600,000	$18.87	$526,000	$16.55
High School	65,017	$1,454,000	$22.36	$1,175,000	$18.07
		$3,792,000		**$3,417,000**	

Tear-Off and Replacement	**Square Footage**	**Thermoplastic Estimate**	**$/Sq. Ft.**	**EPDM Estimate**	**$/Sq. Ft.**
Heritage Elementary School	49,656	$1,349,000	$27.17	$1,338,000	$26.95
Liberty Elementary School	49,656	$1,349,000	$27.17	$1,338,000	$26.95
Middle School	31,791	$958,000	$30.13	$884,000	$27.81
High School	65,017	$2,342,000	$36.02	$2,063,000	$31.73
Totals		**$5,998,000**		**$5,623,000**	

Steep Slope Roofing	**Square Footage**	**Thermoplastic Estimates**	**$/Sq. Ft.**	**Standing Seam Metal Estimates**	**$/Sq. Ft.**
Heritage Elementary	N/A	N/A	N/A	N/A	N/A
Liberty Elementary	N/A	N/A	N/A	N/A	N/A
Middle School	37,949	$1,577,000	$41.56	$1,318,000	$34.73
High School	42,509	$1,742,000	$40.98	$1,485,000	$34.93
Totals		**$3,319,000**		**$2,803,000**	

Masonry Through Wall Flashing Replacement	**Minimum Recommended Replacement**	**Total Replacement**
Heritage Elementary	$0	$148,500
Liberty Elementary	$0	$148,500
Middle School	$93,600	$162,000
High School	$456,000	$456,000
Totals	**$549,600**	**$915,000**

Perimeter Edge Air Sealing	**Recommended Work**
Heritage Elementary	$0
Liberty Elementary	$0
Middle School	$32,900
High School	$137,470
Totals	**$170,370**

LEGEND:

ROOF AREA = (A)

NOT IN SCOPE =

1
R1.0

ROOF PLAN

SCALE: NOT TO SCALE

NORTH

ROOF SYSTEM SQUARE FOOTAGES:

ROOF AREA	SQUARE FOOTAGE
A	5,830
B	9,529
C	8,002
D	26,295
TOTAL	49,656

* SQUARE FOOTAGES ARE APPROXIMATE
* SQUARE FOOTAGES ACCOUNT FOR ROOF SLOPE

Mays Consulting &
Evaluation Services, Inc.
201 Pennsylvania Avenue
P.O. Box 1020
Delaware, Ohio 43015
740.363.9511

No.	Revision/Issue	Date

Project:
2024 ROOF REPLACEMENT
RIVER VALLEY LOCAL SCHOOLS
HERITAGE ELEMENTARY SCHOOL
720 COLUMBUS-SANDUSKY RD S
MARION, OHIO 43302

Approved By: DAL

Date: 02.27.2024

Job No.: ROH50-001

Scale: AS NOTED

Drawn By: EMD

Sheet: R1.0

Sheet Name: ROOF PLAN

LEGEND:

ROOF AREA = (A)

NOT IN SCOPE =

1
R1.0

ROOF PLAN

SCALE: NOT TO SCALE

NORTH

ROOF SYSTEM SQUARE FOOTAGES:

ROOF AREA	SQUARE FOOTAGE
A	5,830
B	9,529
C	8,002
D	26,295
TOTAL	49,656

* SQUARE FOOTAGES ARE APPROXIMATE
* SQUARE FOOTAGES ACCOUNT FOR ROOF SLOPE

Mays Consulting &
Evaluation Services, Inc.
201 Pennsylvania Avenue
P.O. Box 1020
Delaware, Ohio 43015
740.363.9511

No.	Revision/Issue	Date

Project:
2024 ROOF REPLACEMENT
RIVER VALLEY LOCAL SCHOOLS
LIBERTY ELEMENTARY SCHOOL
1932 WHETSTONE RIVER RD N
CALEDONIA, OHIO 43314

Approved By: DAL

Date: 02.27.2024

Job No.: ROH50-001

Scale: AS NOTED

Drawn By: EMD

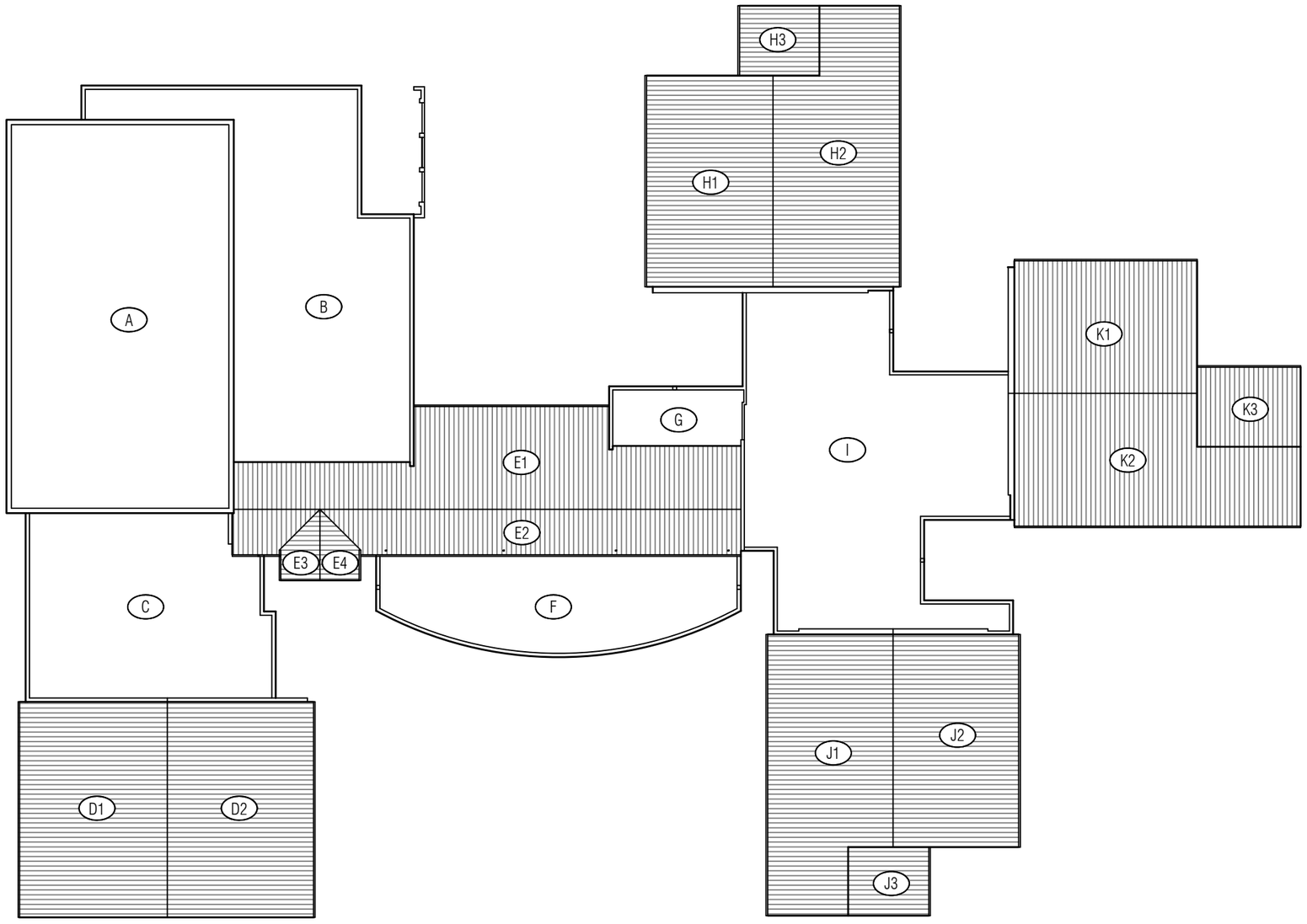
Sheet: R1.0

Sheet Name: ROOF PLAN

LEGEND:

ROOF AREA = A

SHINGLE ROOF =



ROOF SYSTEM SQUARE FOOTAGES:

ROOF AREA	SQUARE FOOTAGE
A	8,893
B	6,759
C	4,522
D1	3,448
D2	3,448
E1	3,922
E2	2,250
E3	215
E4	215
F	3,200
G	771
H1	2,846
H2	3,440
H3	593
I	7,302
J1	3,430
J2	2,843
J3	587
K1	2,583
K2	3,458
K3	875
TOTAL	69,698

* SQUARE FOOTAGES ARE APPROXIMATE
* SQUARE FOOTAGES ACCOUNT FOR ROOF SLOPE

1 / R1.0

ROOF PLAN

SCALE: NOT TO SCALE

NORTH

MAYS CONSULTING

Mays Consulting & Evaluation Services, Inc.

201 Pennsylvania Avenue
P.O. Box 1020
Delaware, Ohio 43015
740.363.9511

No.	Revision/Issue	Date

Project:

2024 ROOF REPLACEMENT

RIVER VALLEY LOCAL SCHOOLS

RIVER VALLEY MIDDLE SCHOOL

4334 MARION-MT. GILEAD ROAD
CALEDONIA, OHIO 43314

Approved By: DAL

Date: 02.27.2024

Job No.: ROH50-001

Scale: AS NOTED

Drawn By: EMD

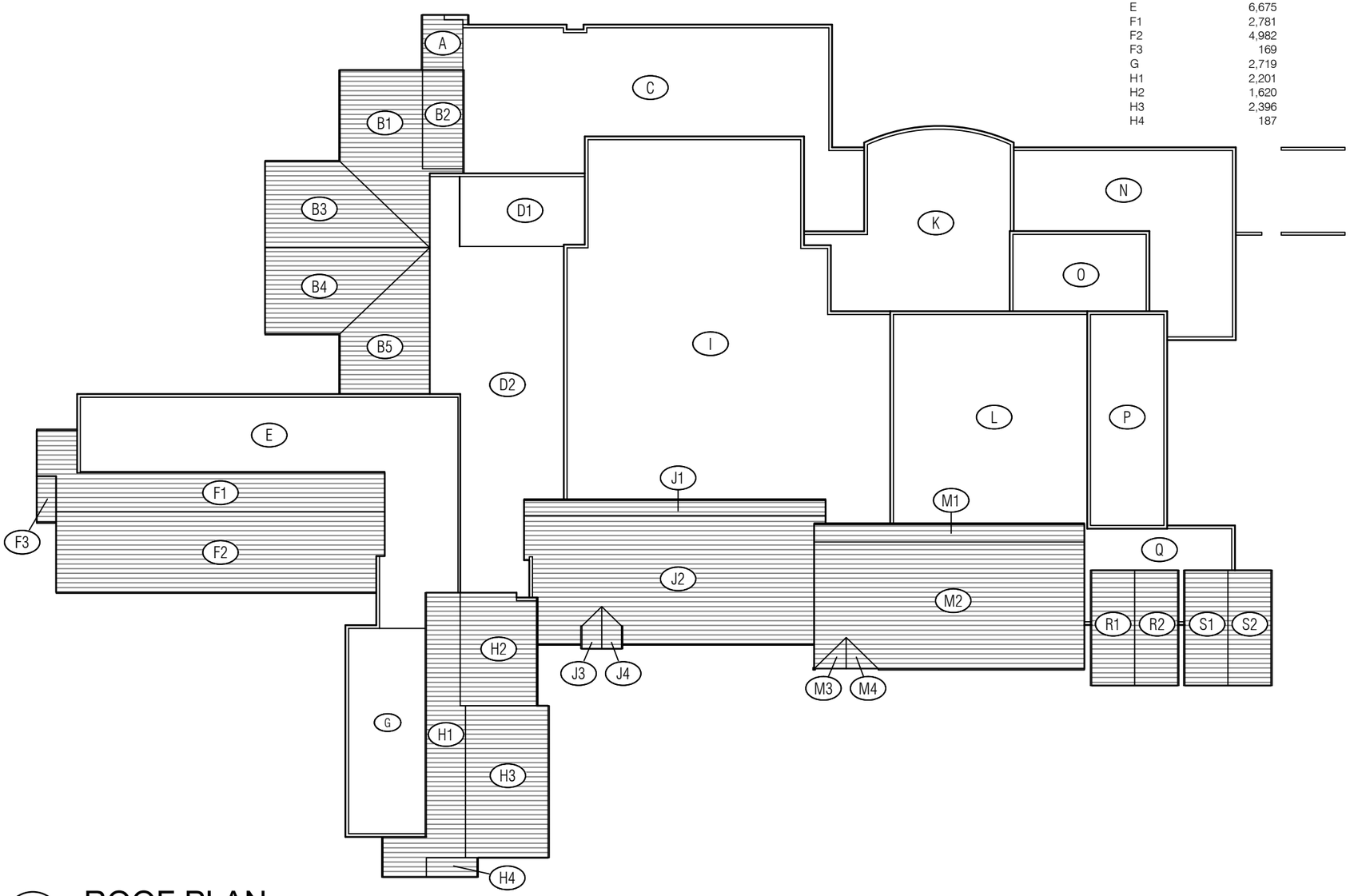
Sheet: R1.0

Sheet Name: ROOF PLAN

LEGEND:

ROOF AREA = (A)

SHINGLE ROOF =



ROOF SYSTEM SQUARE FOOTAGES:

ROOF AREA	SQUARE FOOTAGE	ROOF AREA	SQUARE FOOTAGE
A	433	I	17,368
B1	2,196	J1	884
B2	760	J2	6,732
B3	1,968	J3	123
B4	1,968	J4	123
B5	1,768	K	4,830
C	8,406	L	6,927
D1	1,483	M1	916
D2	6,650	M2	6,344
E	6,675	M3	96
F1	2,781	M4	96
F2	4,982	N	4,425
F3	169	O	1,743
G	2,719	P	2,642
H1	2,201	Q	1,175
H2	1,620	R1	946
H3	2,396	R2	946
H4	187	S1	946
		S2	946
		TOTAL	107,576

* SQUARE FOOTAGES ARE APPROXIMATE
* SQUARE FOOTAGES ACCOUNT FOR ROOF SLOPE

NORTH

1 / R1.0

ROOF PLAN

SCALE: NOT TO SCALE

MAYS CONSULTING

Mays Consulting & Evaluation Services, Inc.

201 Pennsylvania Avenue
P.O. Box 1020
Delaware, Ohio 43015
740.363.9511

No.	Revision/Issue	Date

Project:

2024 ROOF REPLACEMENT

RIVER VALLEY LOCAL SCHOOLS

RIVER VALLEY HIGH SCHOOL

4280 MARION-MT. GILEAD ROAD
CALEDONIA, OHIO 43314

Approved By: DAL

Date: 02.27.2024

Job No.: ROH50-001

Scale: AS NOTED

Drawn By: EMD

Sheet: R1.0

Sheet Name: ROOF PLAN