

Garland Canada Inc.

Infrared Thermographic Roof Inspection



since 1895

**Town of Deep River
Town Hall & Deep River Water Treatment Plant
100 Deep River Road & 177 River Road
Deep River, Ontario
K0J 1P0**



Inspection Date: **June 4, 2024**
Verification Date: **June 5, 2024**
Representative: **Mr. Matthew McNeely**



Introduction to Infrared Thermography

The purpose of the infrared roof inspection is to locate areas of subsurface moisture content in your buildings flat roofing system. This is the basic principle on how it works:

During the day the sun heats up the roofs surface and insulation. At night the roof cools down and areas of any wet roofing insulation that may be present, retain the heat (which was absorbed during the day) longer than the surrounding dry areas. It is this difference in the time it takes to cool itself that allows the infrared inspection to image and define areas of wet roofing.

The inspection is done in the following three phases:

- (1) The roof history, design and composition must be known or tested prior to the inspection.
- (2) The roof is inspected using an infrared imaging camera at night during proper weather conditions, i.e.:
 - (a) Roof must be dry, low or no wind, and temperature differential must be significant enough to create a thermal difference between the wet and dry roof.
 - (b) At this time suspected areas due to thermal abnormalities are outlined on the roof surface with marking paint.
- (3) Physical verification is done the following day, or shortly thereafter.
 - (a) This will involve doing core samples and electronic moisture sensitive probes to examine the top pour, felts, insulation, vapour barrier and the deck at both problem and non-problem areas.

For documentation, thermograms are taken of the thermally suspect areas, and this is grouped with corresponding real time pictures. The reports will contain certain comments and photos of the roof cores. Additional comments may be made on overall roof maintenance. What you will receive by doing this type of inspection is a formal report that documents your roofs verified areas of moisture, complete with pictures, comments, and a detailed roofing diagram.

To summarize, the infrared camera detects heat, and wet roofing is hotter than dry roofing during its cooling cycle. The inspection crew finds, then verifies areas of moisture damage utilizing thermographic technology. It should be noted that the inspection is complicated by adverse weather conditions, variations in the roof system mass, uneven areas of solar load on a roof and the thermal variations than are inherent to the multitude of roofing designs. In light of all the complexities of this inspection technique, **GARLAND CANADA** uses both a high-quality infrared imaging system and skilled certified thermographers to inspect your roof and provide your report.



Inspection Summary

Environmental Conditions

Ambient Temperature	20.9 °C
Wind Speed	4 km/h
Air Pressure	99.63 kPa
Relative Humidity	84 %



Equipment Specifications

Thermal Imager	Flir T660
Emissivity	0.95
Moisture Meter	Delmhorst BD-10
Roof Repair Adhesive	Garla-Flex



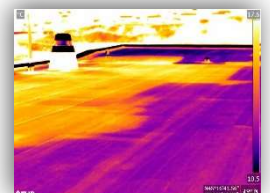
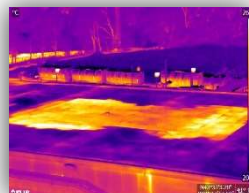
Core, Probe & Anomaly Data

Total Anomalies	6
Total Probes	9
Total Cores	1
Total V-Cuts	0



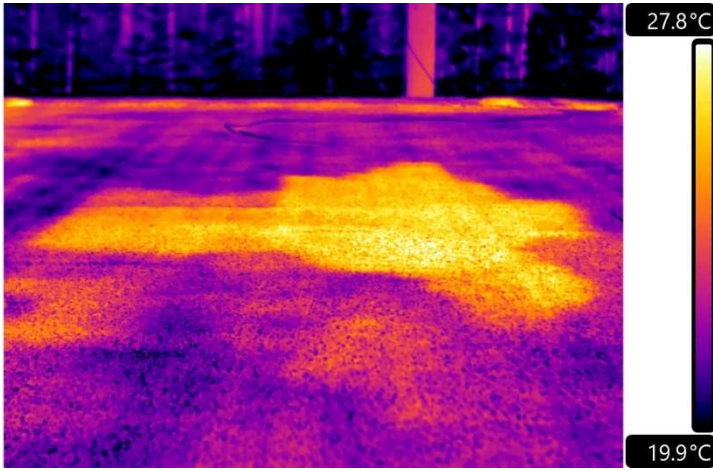
Scan Data

Scan Date	June 4, 2024
Verification Date	June 5, 2024
Total Roof Area Scanned	8,733 Sqft
Total Deficient Roof Area	1,802 Sqft
Total Deficient Area Percentage	20.63%





Vantage Point #1



Observations

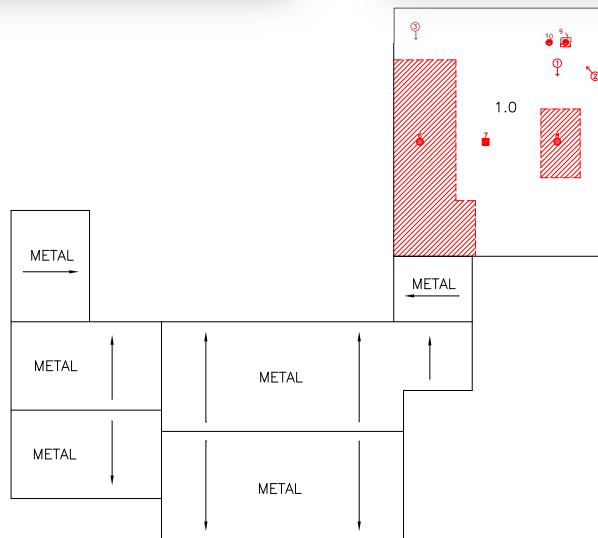
Thermogram looking at confirmed anomaly on Roof Section 1.0 – Water Treatment Plant.

Verified Probe #8 – Wet.

Roof edge shown in background of images.

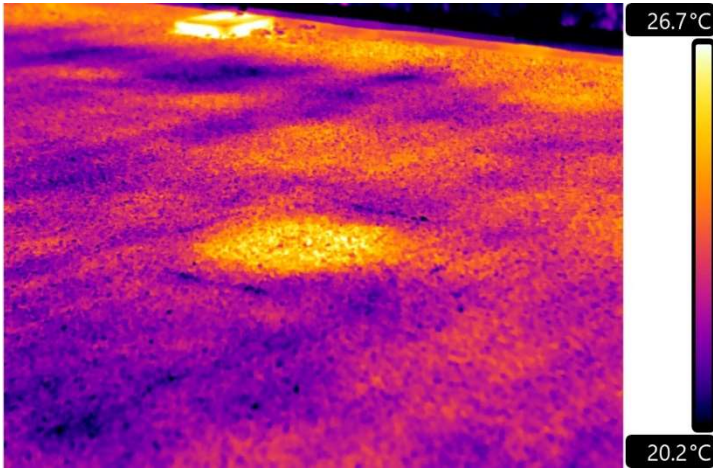


Anomaly Area...
252 sqft





Vantage Point #2



Observations

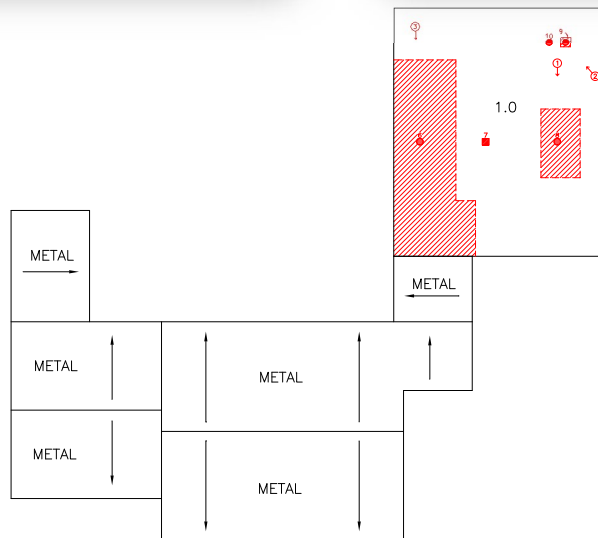
Thermogram looking at confirmed anomaly on Roof Section 1.0 – Water Treatment Plant.

Verified Probe #9 – Wet.

Roof edge shown in background of images.

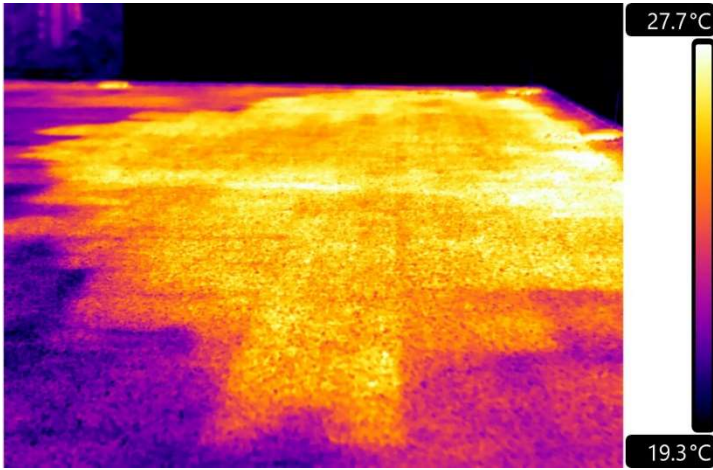


Anomaly Area...
9 sqft





Vantage Point #3



Observations

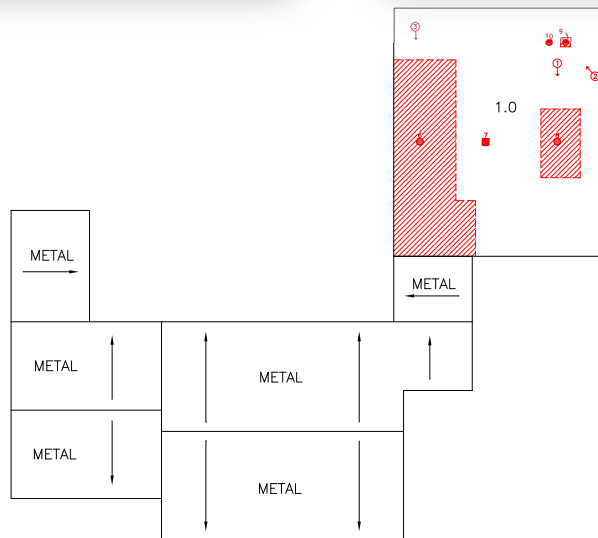
Thermogram looking at confirmed anomaly on Roof Section 1.0 – Water Treatment Plant.

Verified Probe #6 – Wet.

Roof edge shown in background of images.

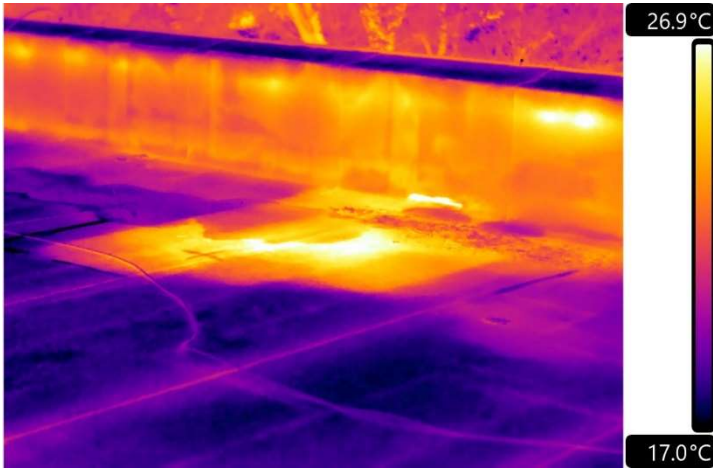


Anomaly Area...
1,242 sqft





Vantage Point #4



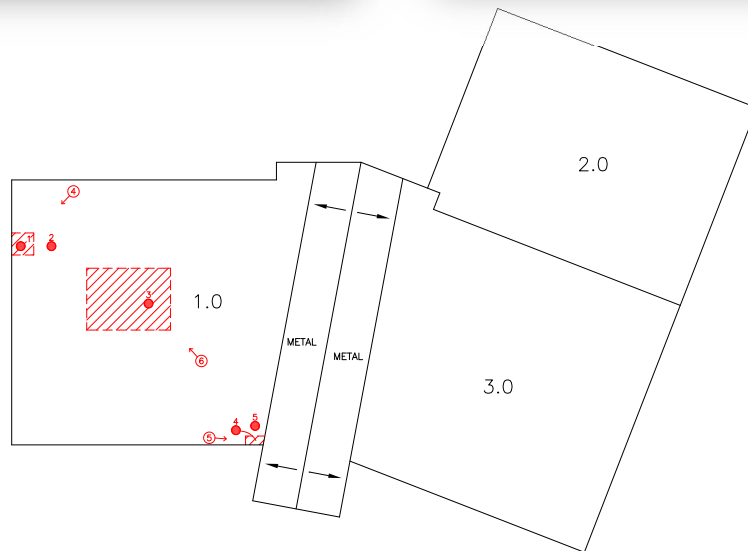
Observations

Thermogram looking at confirmed anomaly on Roof Section 1.0 – Town Hall.

Verified Probe #1 – Wet.

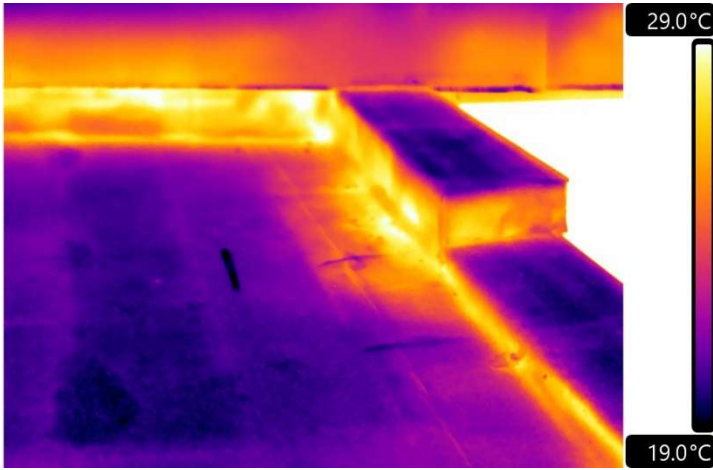
Parapet wall shown in background of images.

Anomaly Area...
25 sqft





Vantage Point #5



Observations

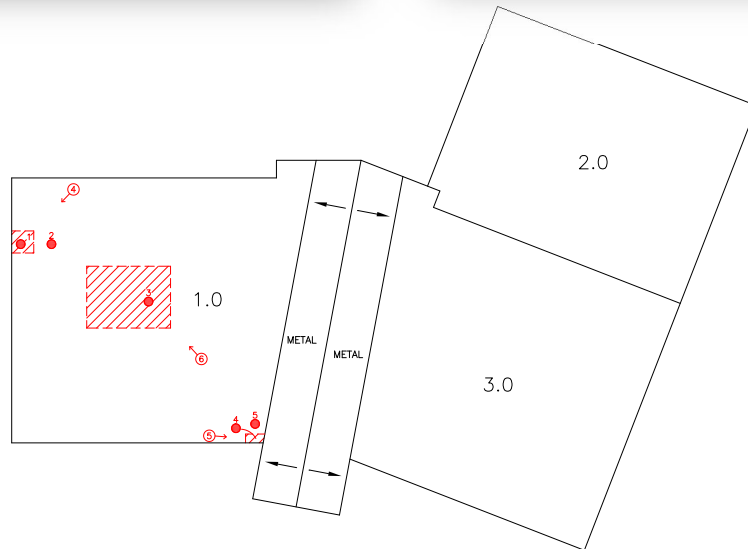
Thermogram looking at confirmed anomaly on Roof Section 1.0 – Town Hall.

Verified Probe #4 – Wet.

Roof edge shown in background of images.

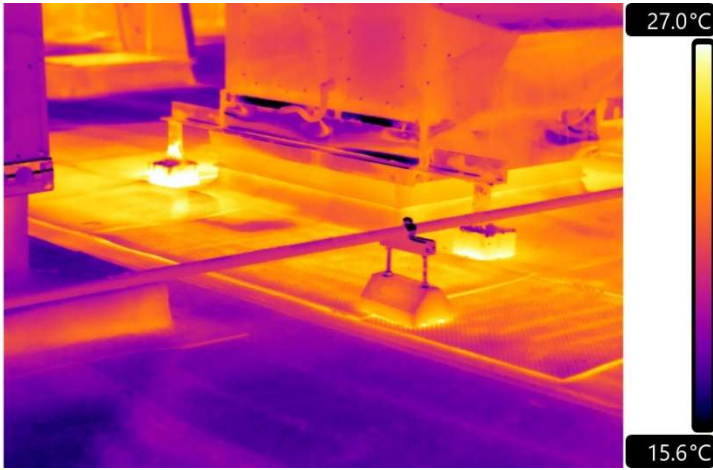


Anomaly Area...
8 sqft





Vantage Point #6



Observations

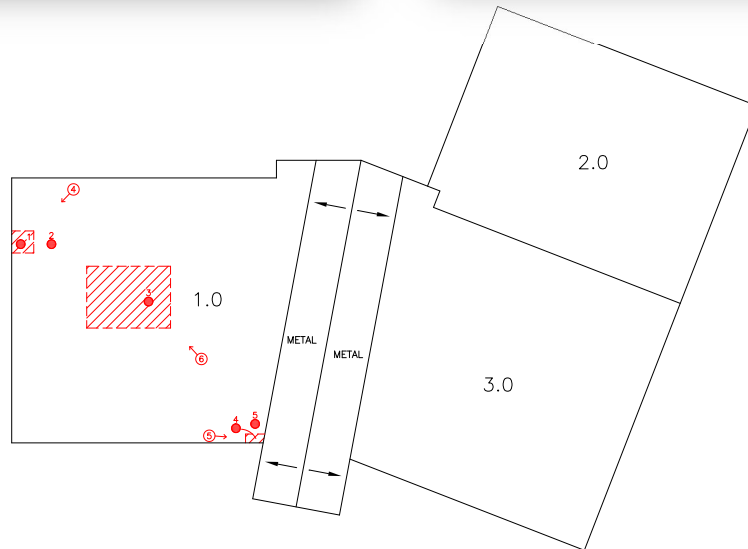
Thermogram looking at confirmed anomaly on Roof Section 1.0 – Town Hall.

Verified Probe #3 – Wet.

HVAC unit shown inside confirmed anomaly.



Anomaly Area...
266 sqft





Core Cut #7



Core Assembly - Roof Section 1.0 – Water Treatment Plant

Layer Type	Description	Condition	Thickness
Surfacing	3/8" Gravel	-	-
Membrane	Built Up Roof - Asphalt & Gravel	Poor	-
Felts	4 Ply	Dry	-
Insulation	Fibreboard	Dry	1/2"
Insulation	Polyisocyanurate	Dry	2"
Vapour Barrier	None	-	-
Deck	Metal	Poor – Minor Rust	-

Town of Deep River – Town Hall & Water Treatment Plant

100 Deep River Road & 177 River Road, Deep River, Ontario.



Probe Readings – Image & Data



Probe #1 Roof Section 1.0 – Town Hall

Moisture Probe Reading: Wet Insulation



Probe #2 Roof Section 1.0 – Town Hall

Moisture Probe Reading: Dry Insulation



Probe Readings – Image & Data



Probe #3 Roof Section 1.0 – Town Hall

Moisture Probe Reading: Wet Insulation



Probe #4 Roof Section 1.0 – Town Hall

Moisture Probe Reading: Wet Insulation



Probe Readings – Image & Data



Probe #5 Roof Section 1.0 – Town Hall

Moisture Probe Reading: Dry Insulation



Probe #6 Roof Section 1.0 – Water Treatment Plant

Moisture Probe Reading: Wet Insulation



Probe Readings – Image & Data



Probe #8 Roof Section 1.0 - Water Treatment Plant

Moisture Probe Reading: Wet Insulation



Probe #9 Roof Section 1.0 - Water Treatment Plant

Moisture Probe Reading: Wet Insulation



Probe Readings – Image & Data



Probe #10 Roof Section 1.0 - Water Treatment Plant

Moisture Probe Reading: Dry Insulation

