Monitoring of Various Non-vented and Vented Vaulted Roofing Systems in Vancouver Home

Structure Monitoring Technology

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Acknowledgements

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Malarkey: Architectural Shingles
Interwrap: Titanium PSU 30
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Ridge Vent
SMT Research: Sensors & Data Acquisition

We also thank the Ryan Eno from SMT Research,
Dulay Roofing crew who communicated and assisted with all aspects of the installation.

- Re-shingling Quotations

  Not one came back with increasing airtightness or adding insulation.
- Methods of Insulation to Existing Structure

  Can you spray foam a sloped roof from Exterior?
- Types of Shingles

  What is the between 10, 12 and 15 year shingle?
- Do you really need attic ventilation?

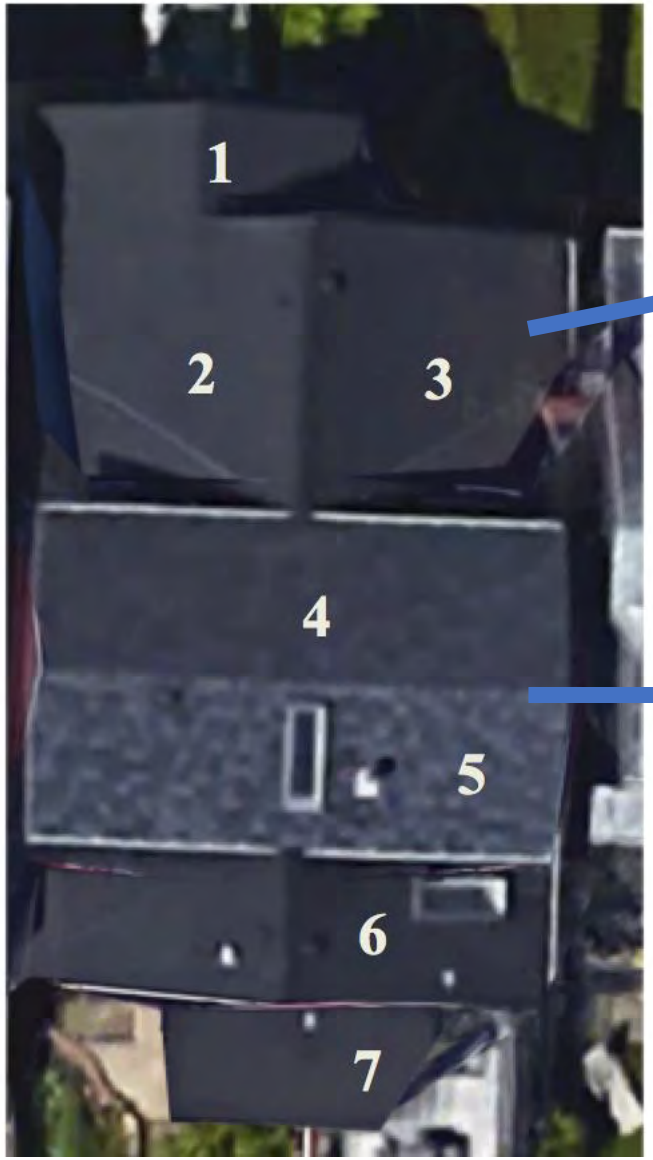
  Previous monitored attic spaces lead to questions.

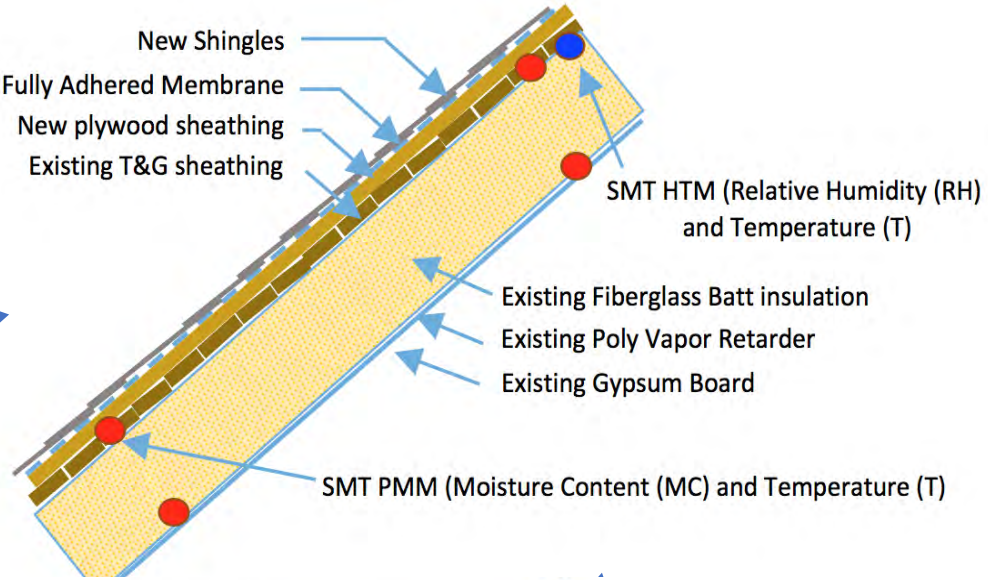
Typical Vancouver Re-Shingle Project

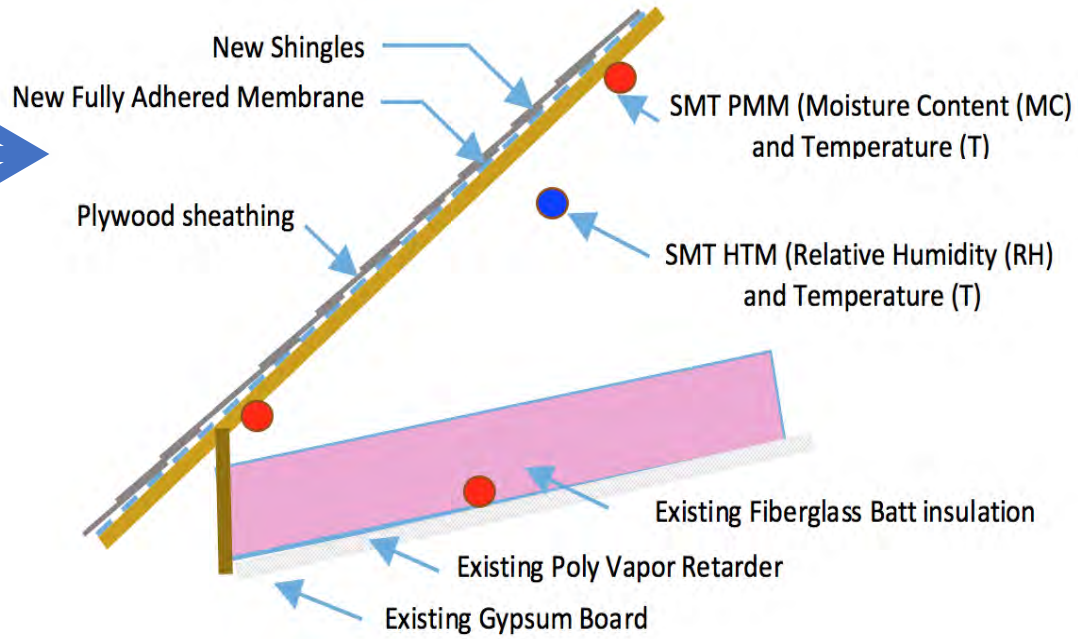
No permit is needed for

- Replacing fixtures, cabinets or flooring
- Painting
- Unclogging drains
- Replacing defective fuses, receptacles, or switches
- Installing roofing, gutters, or drain-pipes

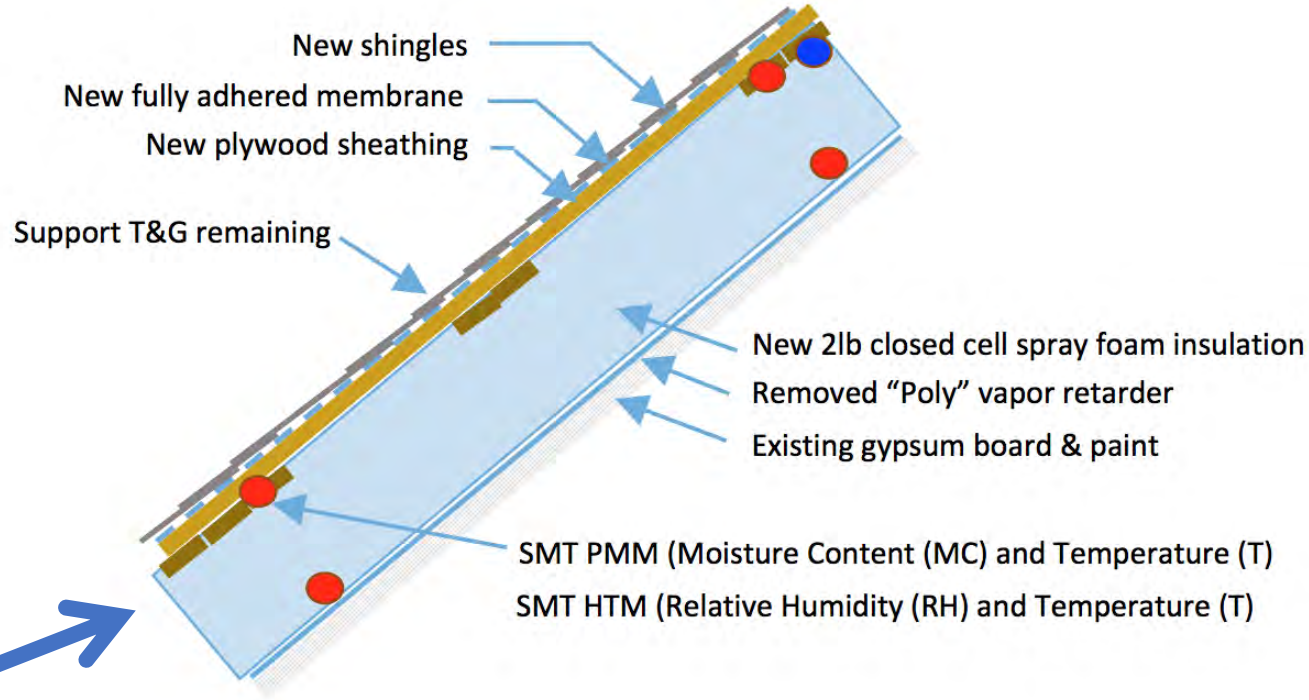
Existing Vaulted Ceiling and Attic Space







Vaulted Ceiling and Attic Space



Remove some sheathing….

Install Temperature and Moisture Content Sensors

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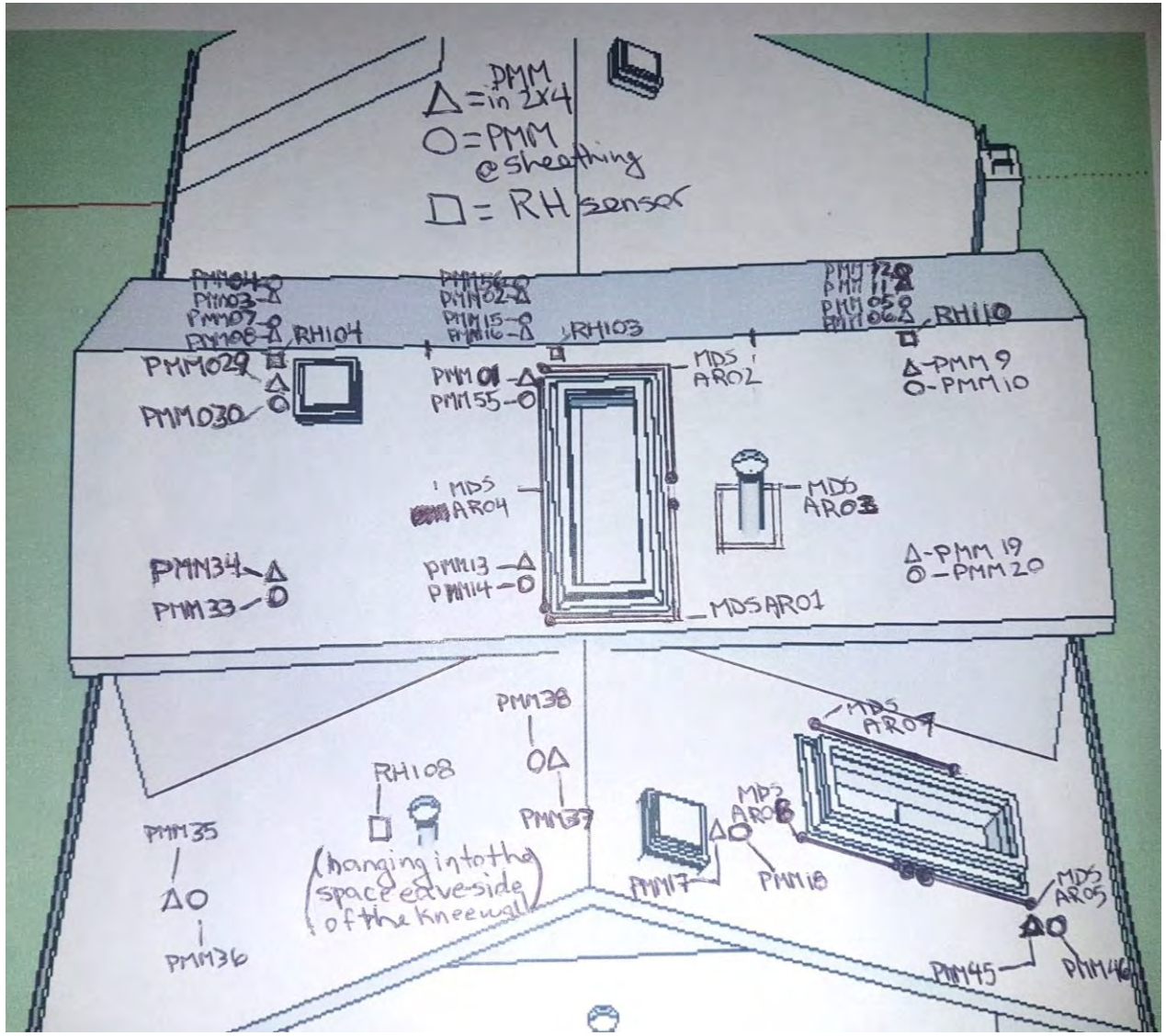

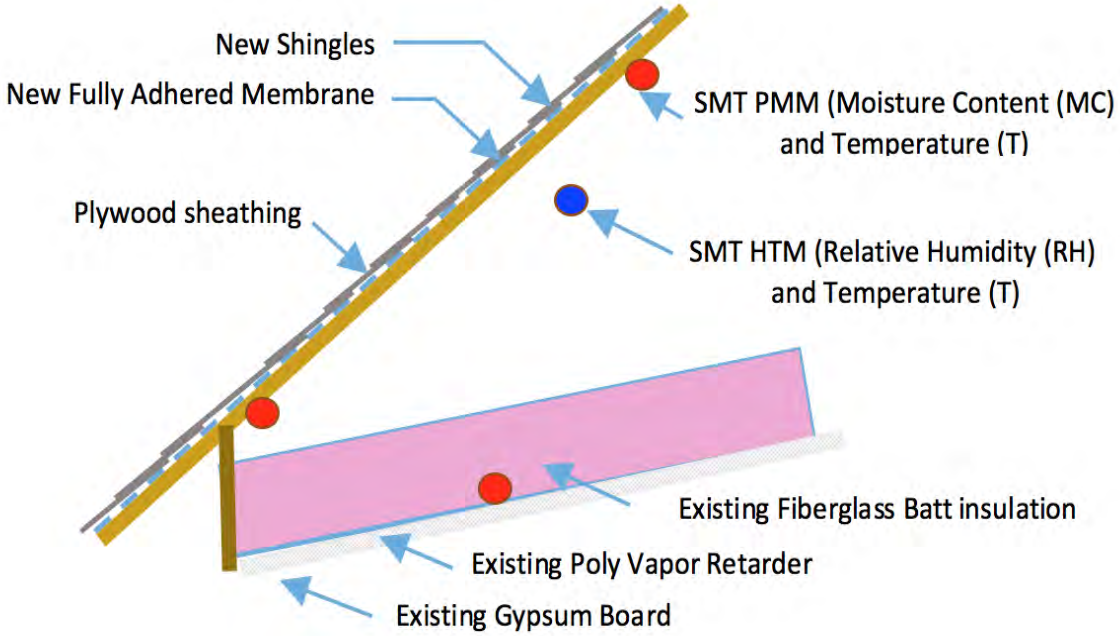

Spray Foam Installation

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Various Shingle Types

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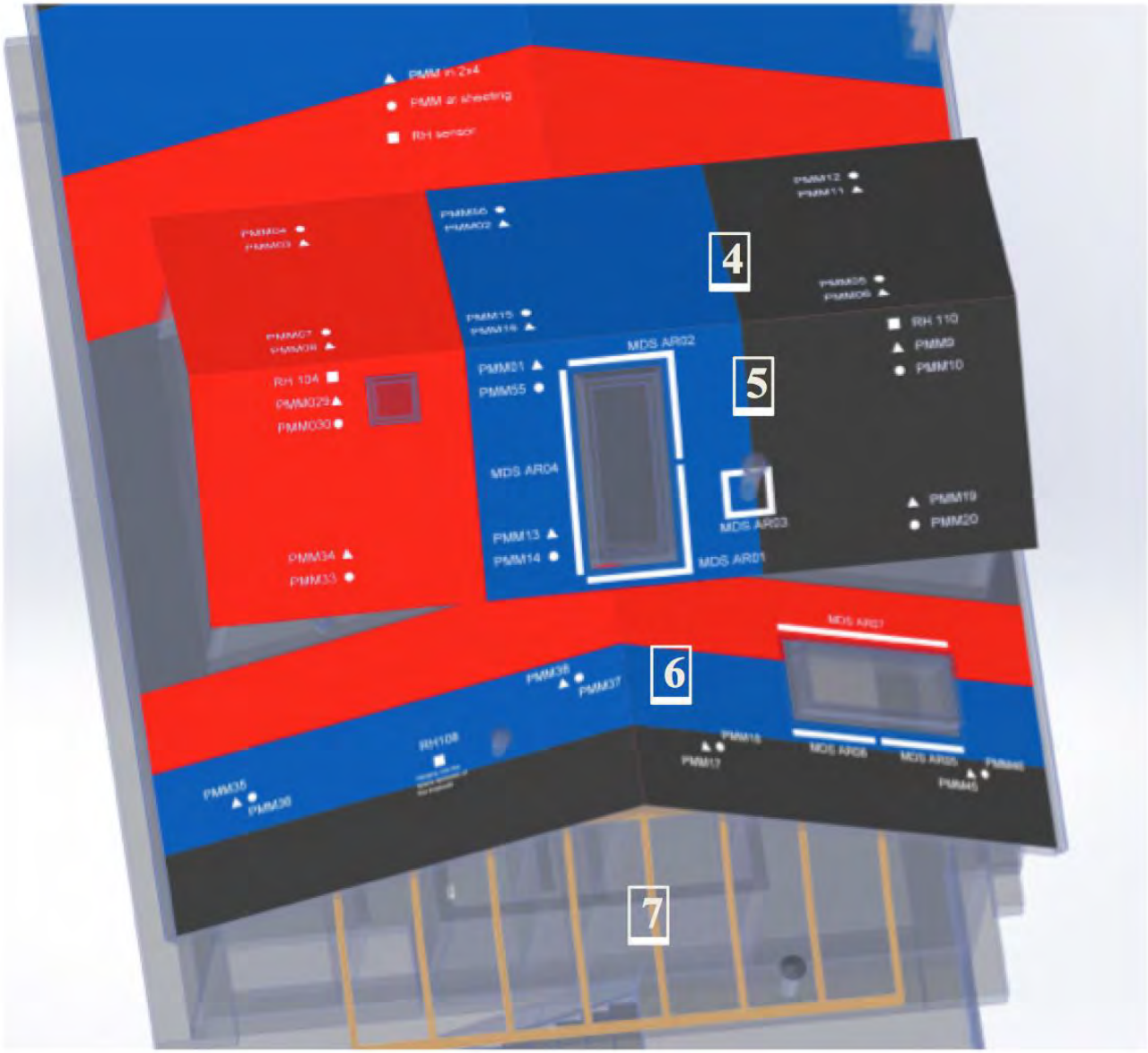
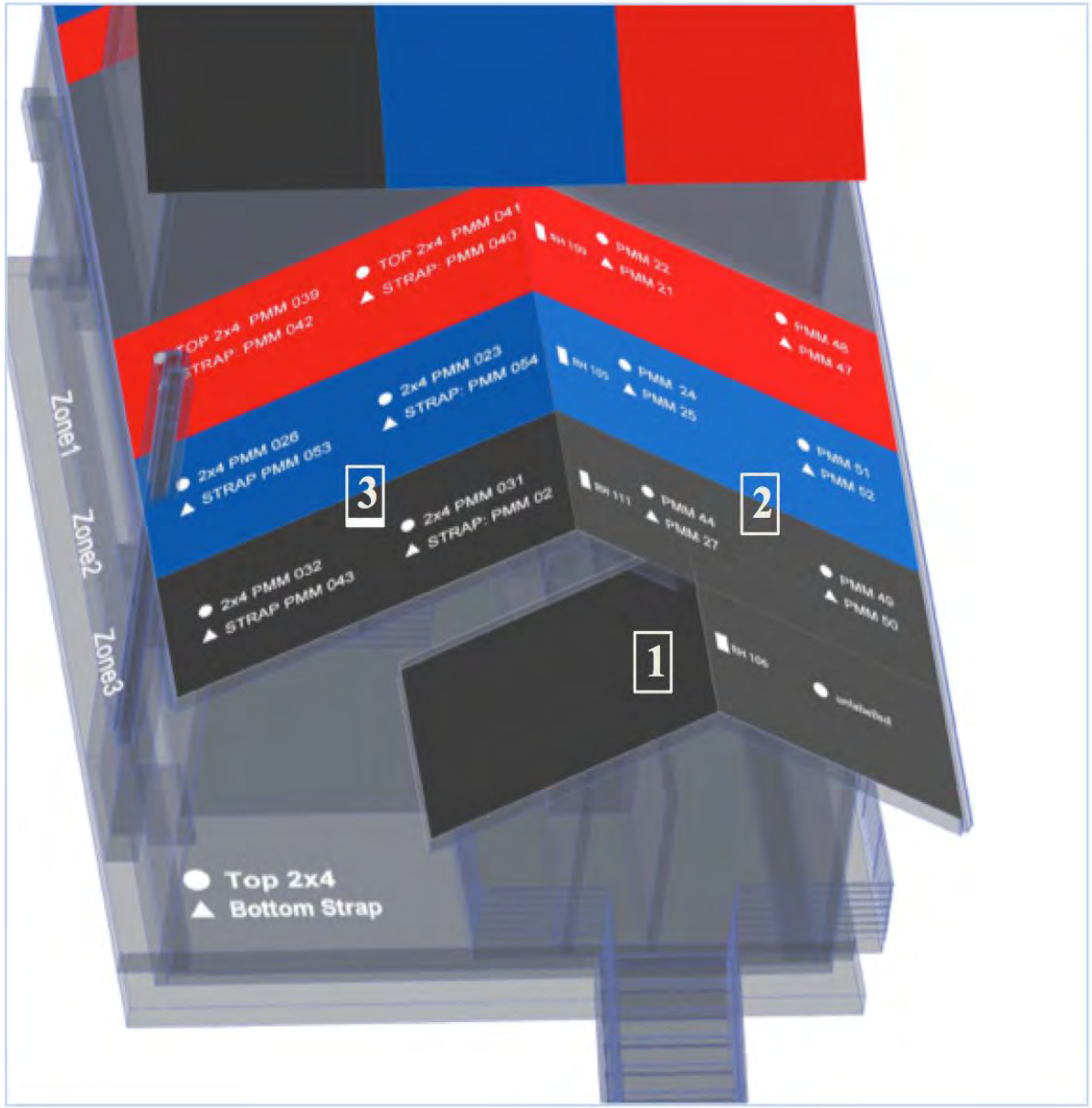


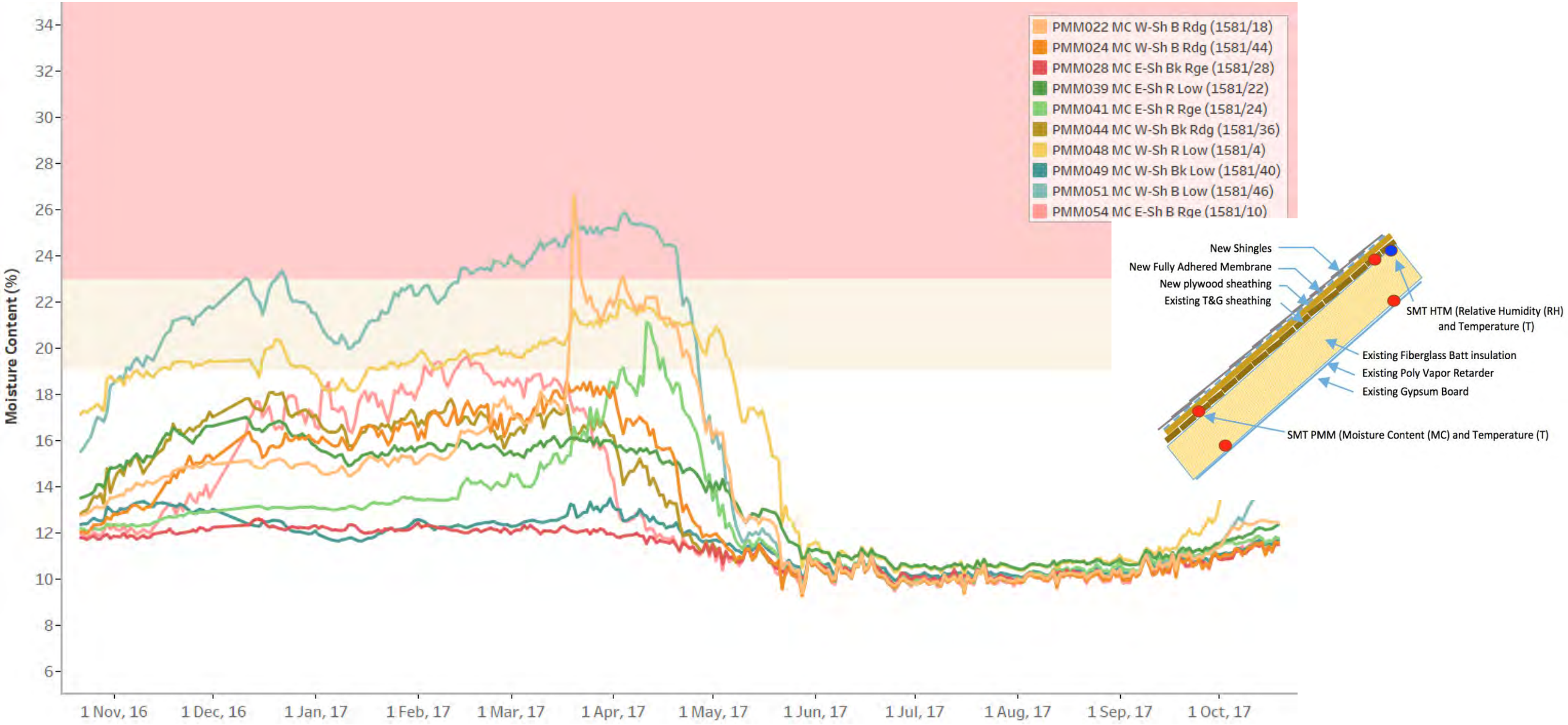


Shingle Types

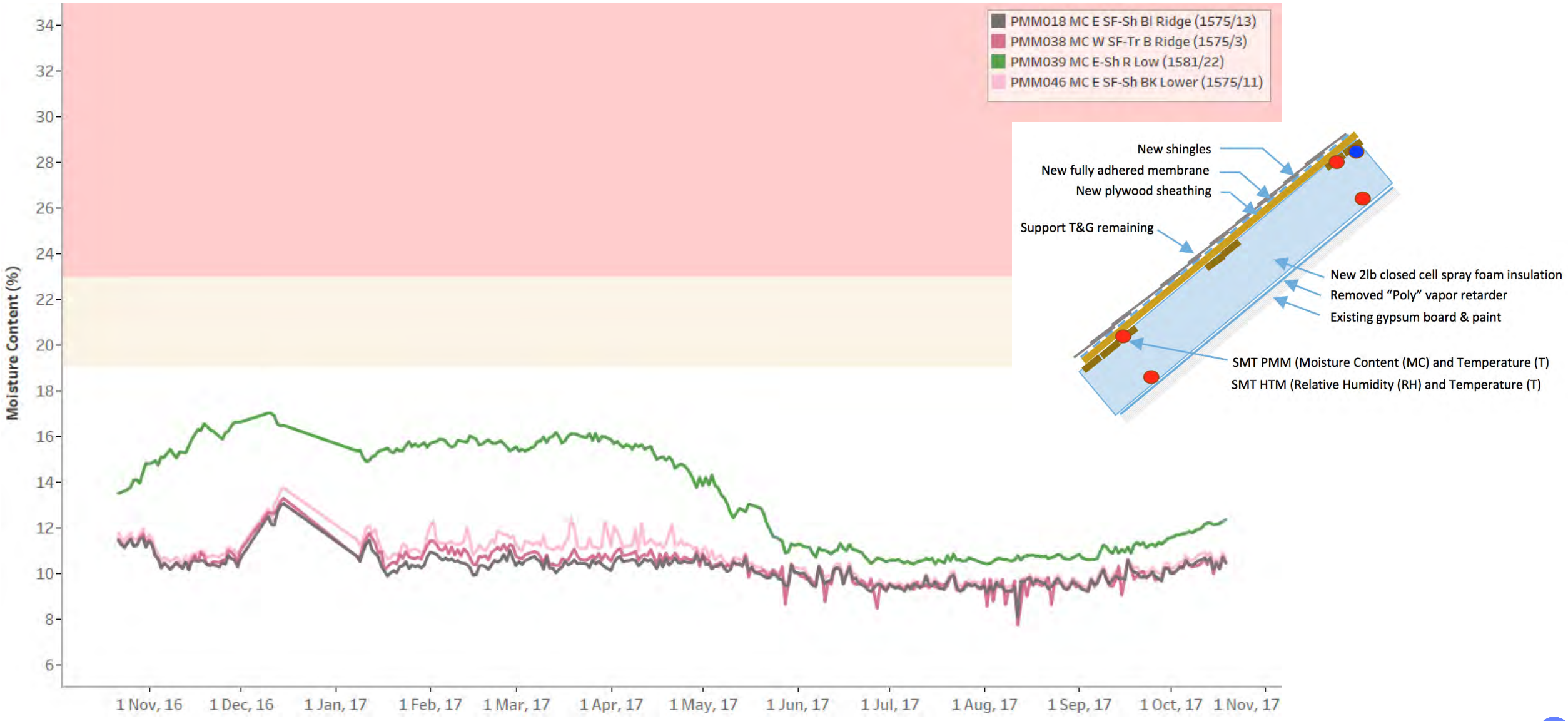
Malarkey Legacy XL Flexor™ asphalt	Malarkey Vista AR Nexgen™ asphalt: blend of Flexor™ asphalt	Malarkey Highlander
polymer modified asphalt Scotchgard™ Protector	with post-consumer recycled polymers Security against algae staining	Traditional asphalt Security against algae staining
15 year	12 year	10 year

Shingles

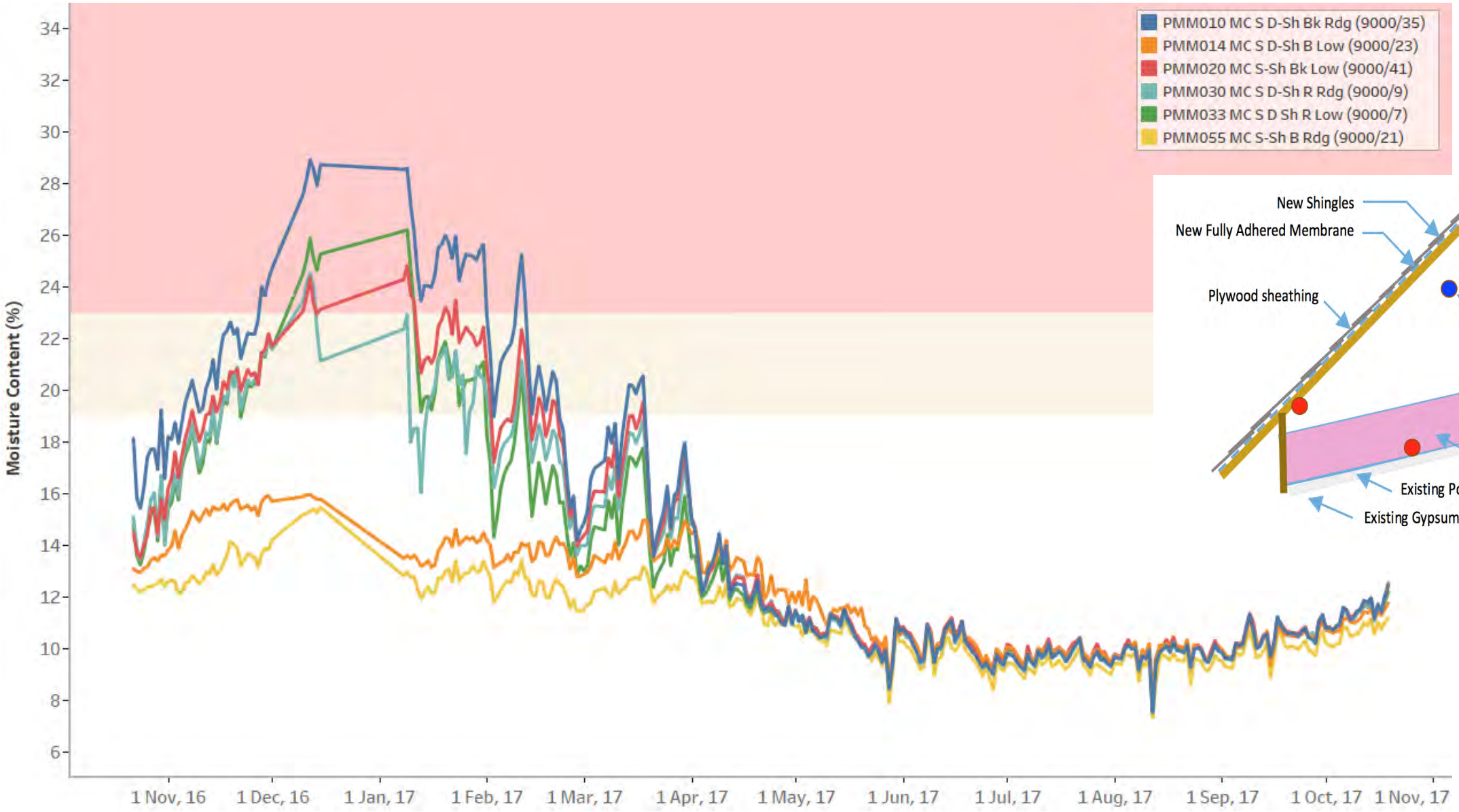
Results – Non-Vented Unchanged Insulation Vaulted Ceiling

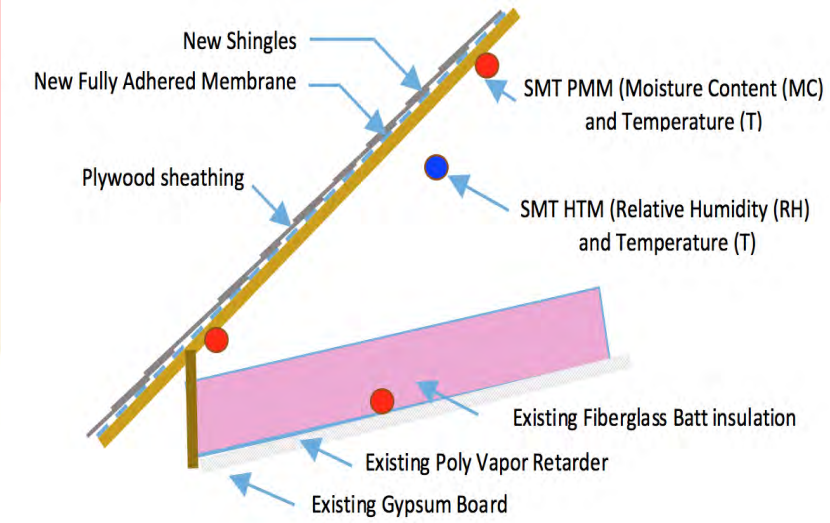


Results – Closed Cell Spray Foam Assembly

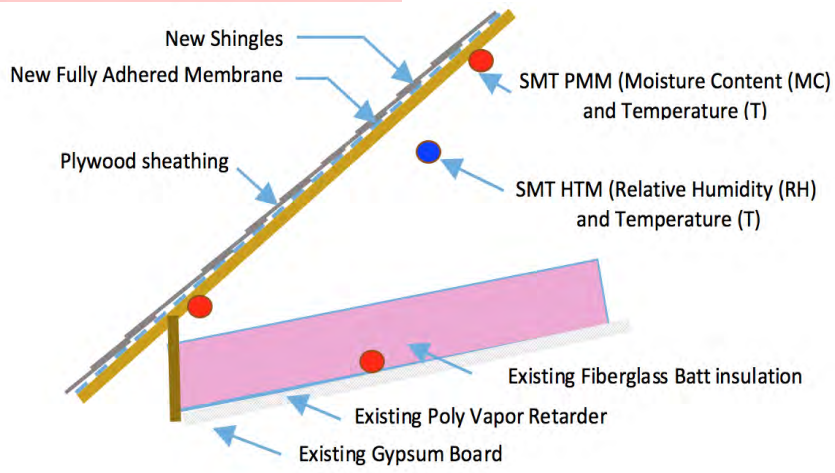


Results – Vented Dormer Roof – South Face





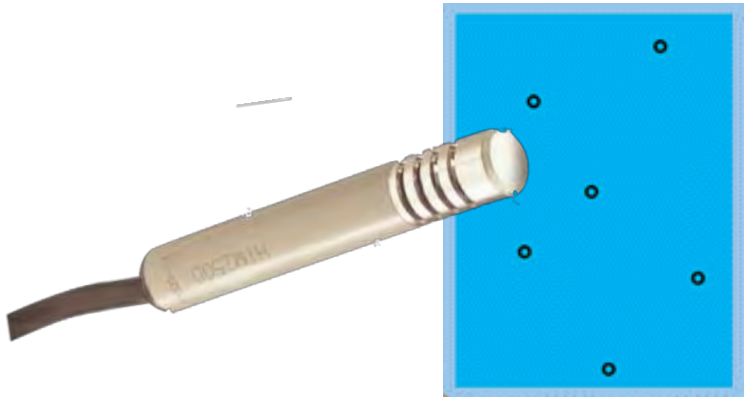
Results – Vented Dormer – North Face

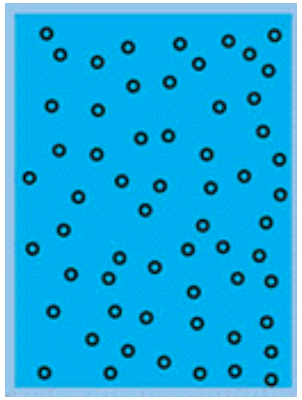


Results – Vented Dormer – North Face

Any questions?

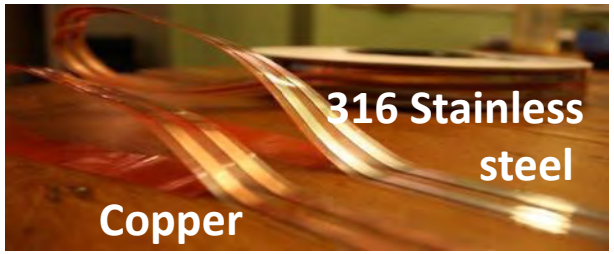
Relative Humidity versus moisture content





RH Air	20%	40%	60%	80%	95%	H_2O →		
MC Wood[1]	4.5%	7.7%	11%	16%	24%	30%	35%	>40%
MC Gypsum	0.1%	0.5%	0.75%	1%	2%	4%	>6%	
MC Sandstone	<0.5%	<0.75%	<1%	1.75%	2%			

Linear Moisture Sensor



Detects the presence of moisture
Has a wide coverage area
Has limited accuracy

WALL

ROOF

FLOOD