

Reflectance Testing of Steep Sloped Roofing in the Field

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Waiting For the Sun









Outline

Sustainability

Preservation/Restoration

Solar Reflectance Testing

**Field Testing (Evaluate
alternate for E1918)**

Why Reflective Roofing?

Save Energy

Cooler Cities

LEED

Building Codes

Preservation/Restoration

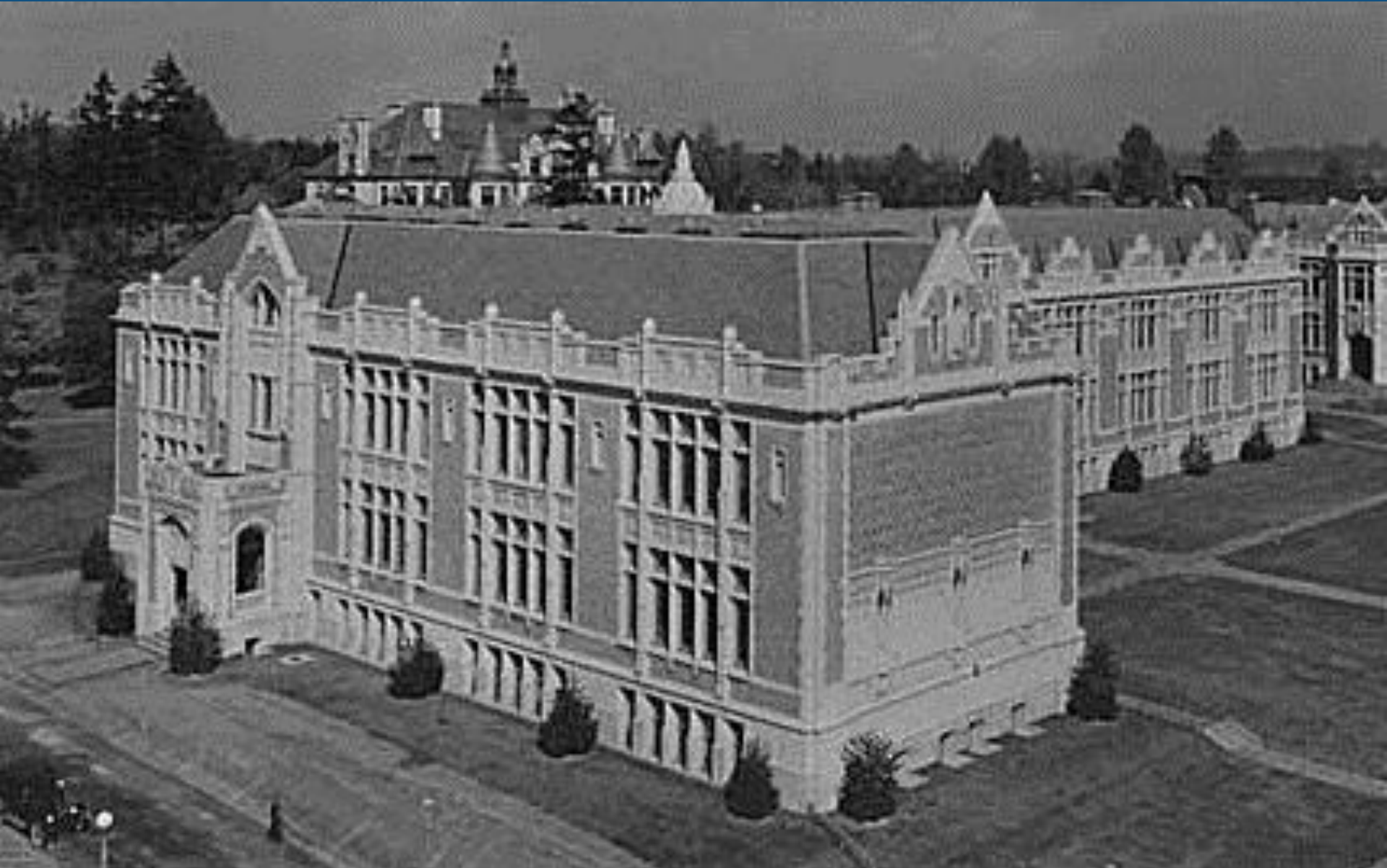
Traditional Materials

Roof Cleaning

University of Washington



Savery Hall 1920



Savery Hall

**Renovated
2005-2009**

**Terra Cotta
Stone Masonry**



Savery Hall



Savery Hall

Steep Slope Slate Roofing



Savery Hall

Low Slope Roofing

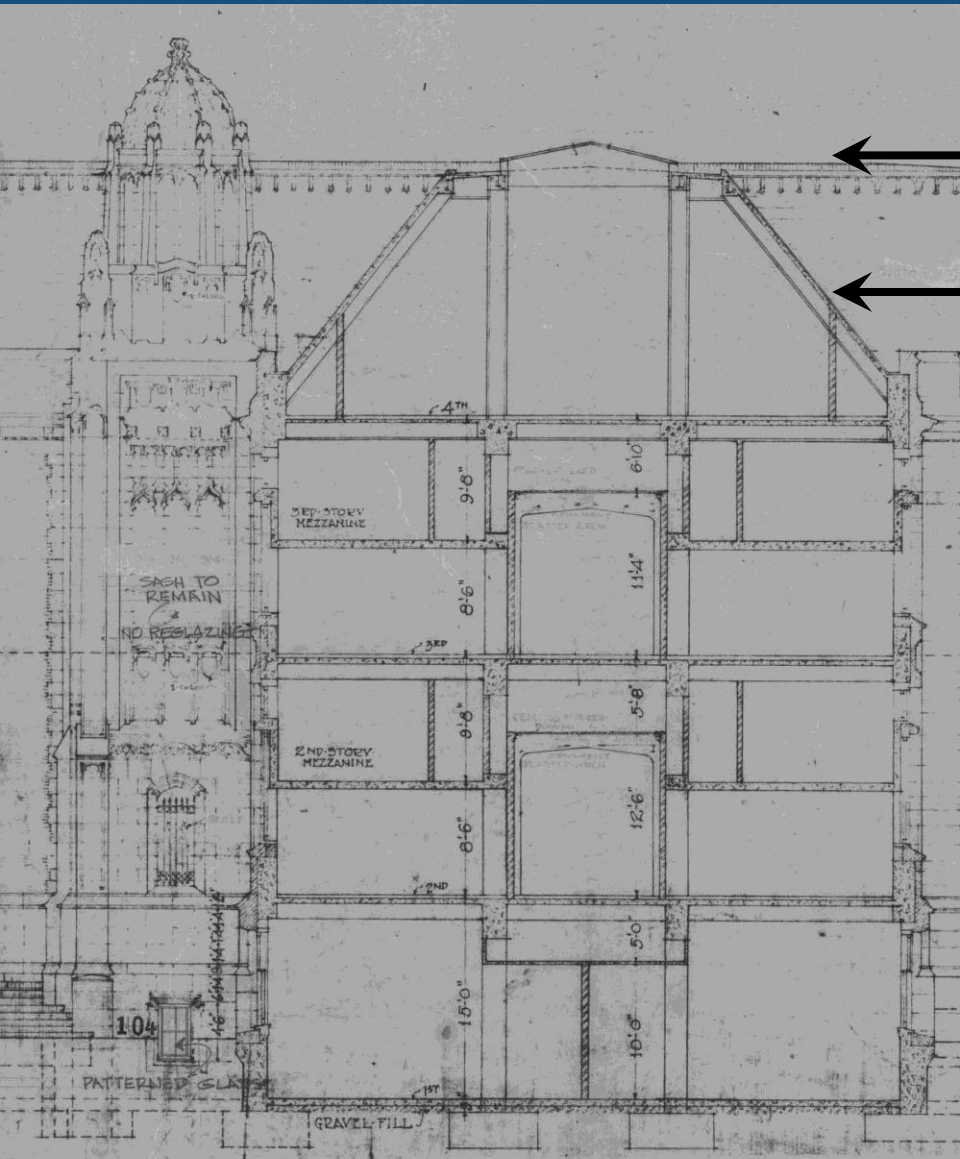


Savery Hall

**2010
Certified
LEED
Gold**



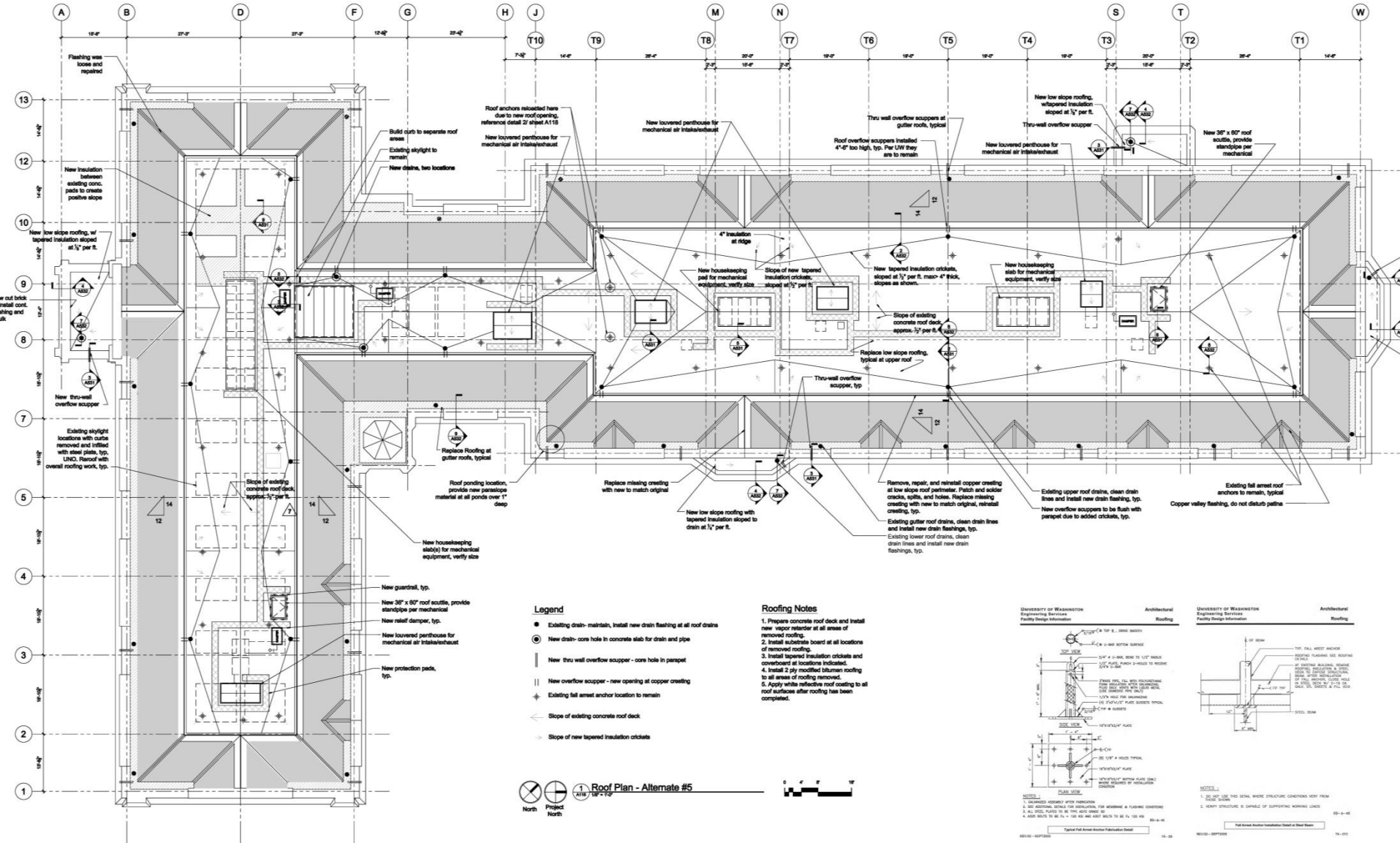
Savery Hall Building Section



Low Slope Roofing

14:12 Steep Slope
Slate Roofing

Savery Hall Roof Plan



Slate Roofing



Slate Roofing



**Light Colored
Unfading Green
Vermont Slate**

**LEED Credit for
Heat Island
Effect?**

ASTM Testing Standards

E-903 (1996)

**Standard Test Method for
Solar Absorptance,
Reflectance, and
Transmittance of Materials
using Integrating Spheres**

ASTM Testing Standards

E-1918 (1997)

**Standard Test Method for
measuring Solar Reflectance
of Horizontal and Low Sloped
Surfaces in the Field**

ASTM E-1918

Pyranometer

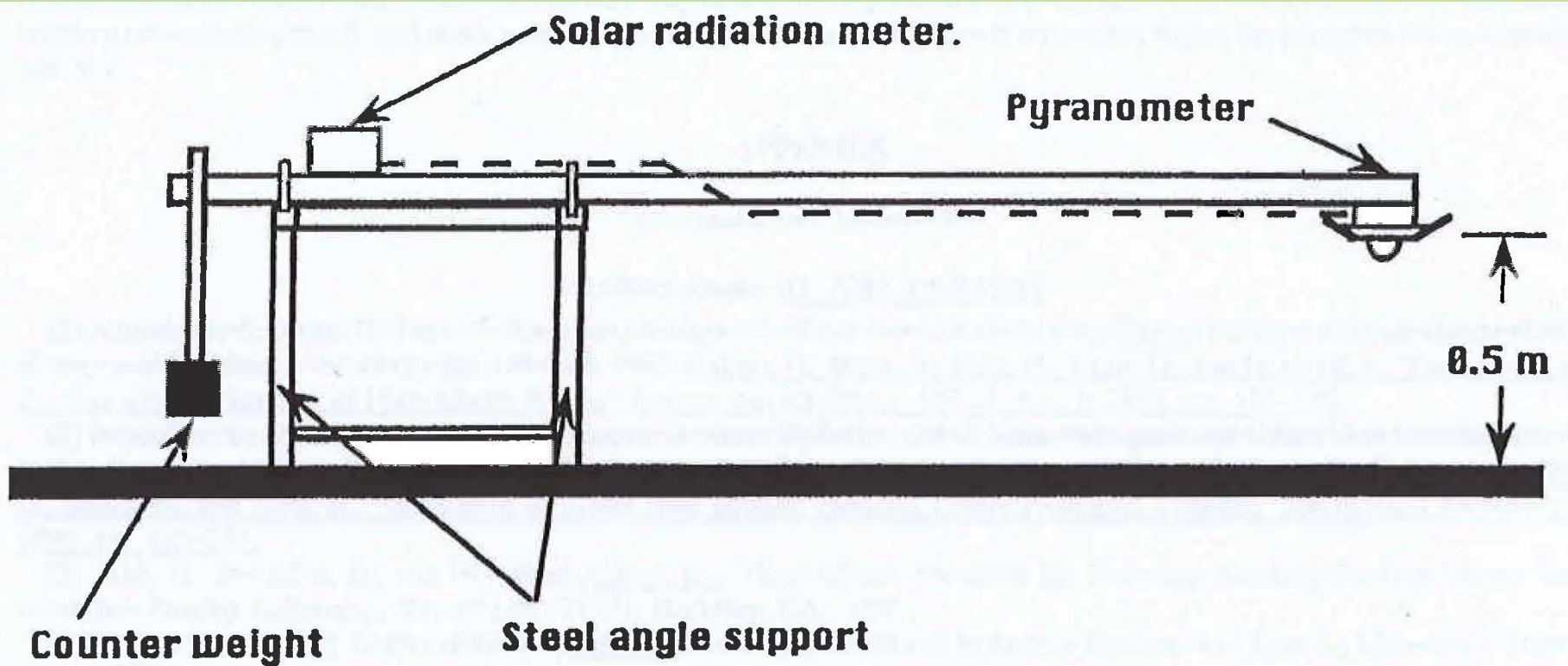


FIG. 1 A Schematic of the Pyranometer and its Stand

ASTM Testing Standards

C-1549 (2002)

**Standard Test Method for
Determination of Solar
Reflectance Near Ambient
Temperature using a Portable
Solar Reflectometer**

ASTM Testing Standards

E-903

WITHDRAWN

E-1918

UNDER REVIEW

C-1549

Reflectance Testing

4 Slate Samples

ASTM C1539

**LEED Required
Reflectance**

0.25

**Savery Hall Slate
Reflectance**

0.22

Fast Forward 5 years

2010

Proposed Alternate E-1918A

Similar to ASTM E-1918

Black and White Mask

1.0 m² Test Area

Sloped Roofs up to 45°

Incident Solar Angles of up to 60°

Low Slope Roofing

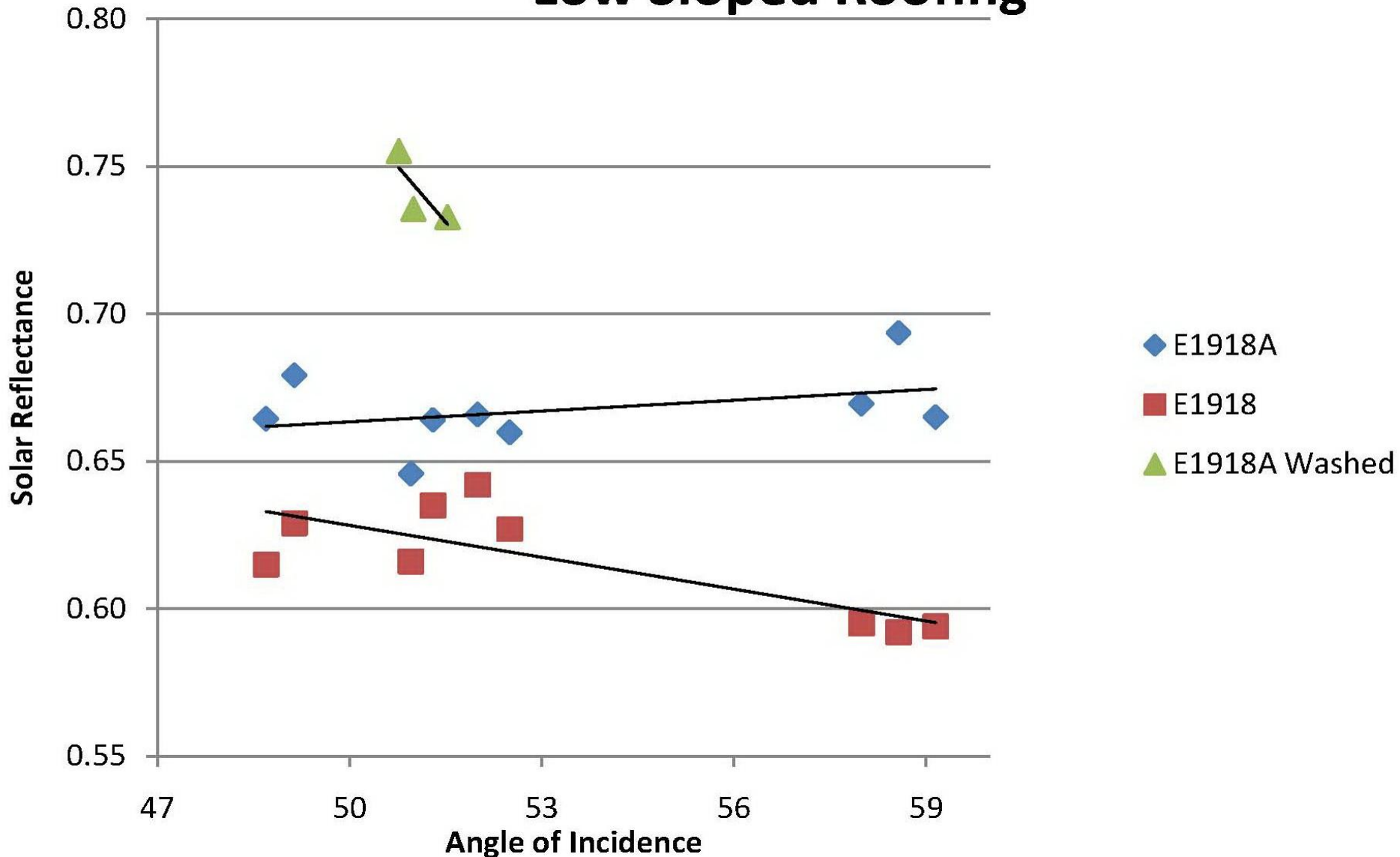


Cleaning



Reflectance

Low Sloped Roofing



Savery Hall



Savery Hall

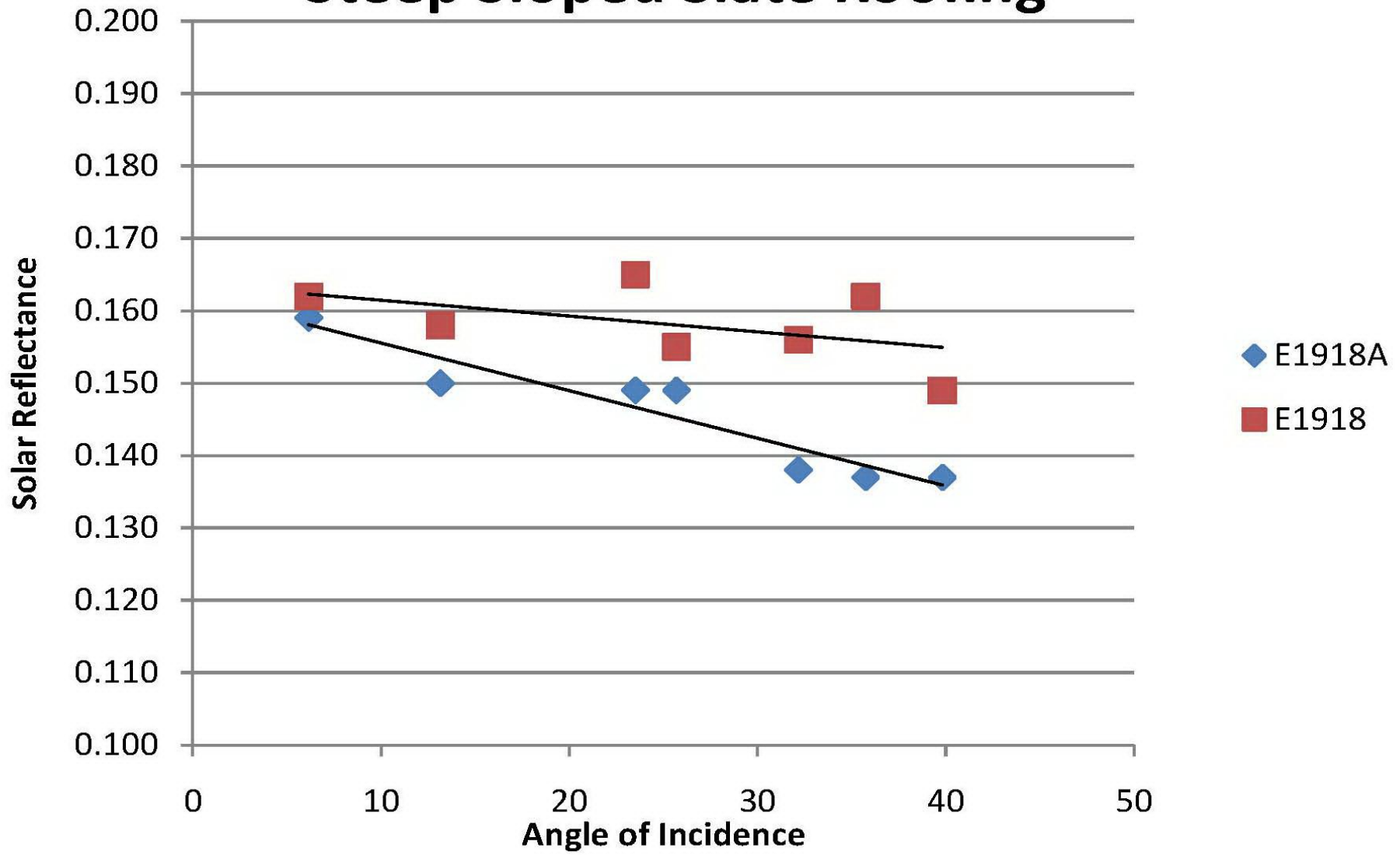


Slate Tile



Savery Hall

Steep Sloped Slate Roofing



Conclusions

- **E-1918A is OK for Low Sloped Roofs and**
- **Incident Solar Angles of up to 60°**

Conclusions

- **E-1918A is NOT OK for Extremely Steep Roofs**

Savery Hall 14:12

49° Roof Slope

Recommendations

- **ASTM E-1918 be revised to Incorporate E-1918A**
- **Raise Incident Solar Angle Limitation from 45° to 60°**
- **Raise Roof Slope Limitation from 9.5° to 30° (based on studies by others)**

Recommendations

- **Develop New Test and Equipment**
- **Integral Light Source That Matches Solar Spectrum**

Non-Contact Thermometer



Closing

Sustainability

Preservation/Restoration

Test Standards

Thank You

Wiss, Janney, Elstner Associates Inc.

University of Washington

George Pool - Pool Manning Building

SRG Partnership (Architect of Record)