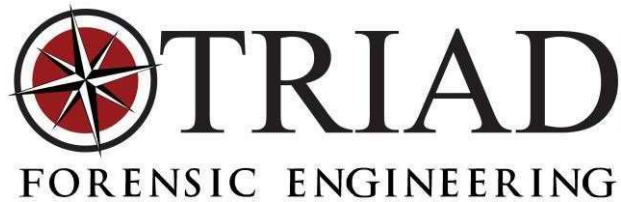




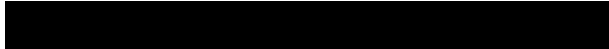
FORENSIC ENGINEERING REPORT

TRIAD
Construction / Engineering / Insurance Consulting / Construction Consulting / Expert Witness
www.asktriad.com
2801 Alt 19 Dunedin, FL 34698 727-216-6350 office@asktriad.com



Cause & Origin Investigation:

File Name:



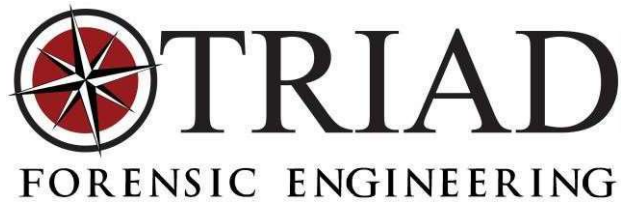
Property Address:



Matthew, PE of Triad Forensic Engineering (Triad) performed a site inspection of the Lonker property located at [REDACTED] Boynton Beach, FL on 1/4/2022.

The purpose of this limited assessment was to document our observations and report our findings on the reported wind and water damages and provide recommendations for repairs.

This report is not intended to cover hidden or unforeseen conditions and/or defects unless specifically identified herein. Triad reserves the right to supplement the information and/or opinions contained within this report as necessary due to changes in the conditions of the property and/or the availability of new information.



General Description:

Based upon review of the Manatee County Property Appraiser web site and our site inspection, the single-story residential structure was built in 1989 with a total square footage of 4,040. The structure was constructed of masonry block load bearing walls and the exterior walls were clad with a stucco finish. The roof system was a hip-style design and covered with roof tiles. The interior walls were covered with painted drywall. For the purposes of this report the structure generally faces east.

Document Review:

- Orbis Consulting Photo Report – dated September 8, 2020

Weather Data:

We reviewed the historical weather data recorded by the Delray Beach Weather Station #D4717. On September 10, 2017, the weather station recorded wind gusts of 84 mph and sustained winds up to 57 mph. This weather station was located approximately 6 miles to the southeast of the subject structure.

Owner History:

The following information was provided by the owner during the site inspection:

- Purchased the home in October 2012.
- They have a maintenance contract for the roof. Routine repairs and cleaning had been performed yearly leading up to the reported storm event.
- In September 2017, a windstorm had damaged the roof system and resulted in water staining on the interior.
- The roofers were called out to do repairs and fix the leak once or twice before reporting that the leak was not from the valley they thought and must be storm damages.
- Staining within the hallway bathroom was painted over.

Survey of the Building Exterior:

The following conditions were observed at the time of the assessment:

- The roof tiles were stamped with the “Gory” mark. Refer to *Figure 1*.



Figure 1

- Sporadic hip and ridge tiles were found to have been debonded from the roof system throughout. Refer to *Figure 2*.



Figure 2

- Sporadic tiles evidenced lower right corner cracking as a result of wind damages during the storm event. Refer to *Figures 3 and 4*.



Figure 3

- Larger upper and lower corner tile cracking was observed with sporadic tiles as a result of wind damages during the storm event. Refer to *Figures 4 and 5*.

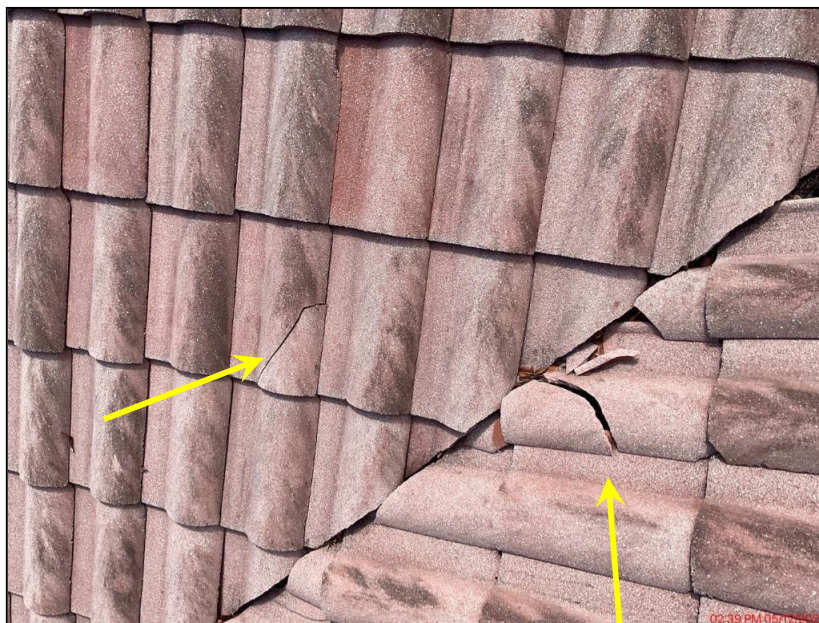


Figure 4

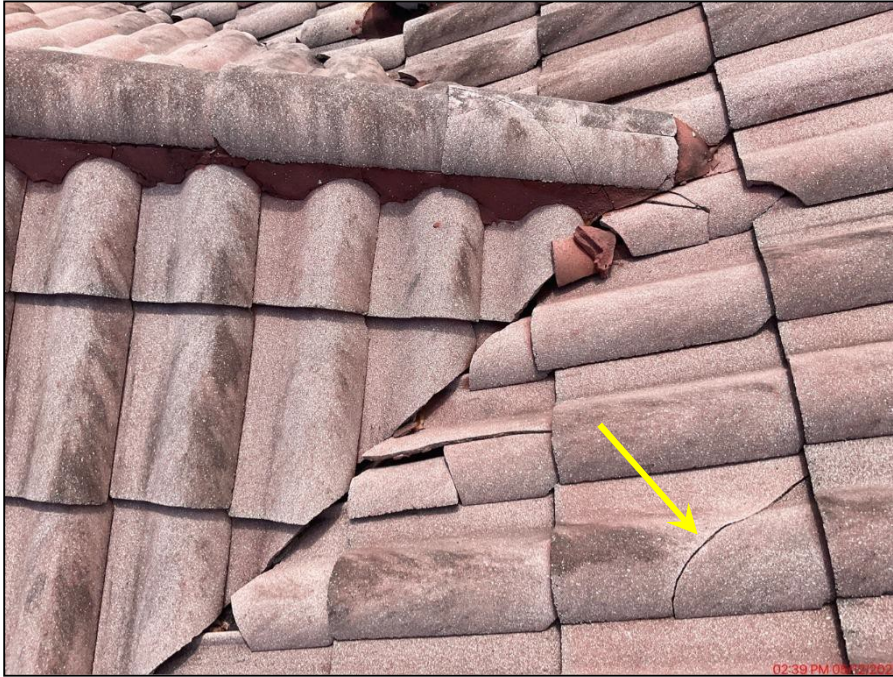


Figure 5

- Spider cracking was observed in several off-ridge and valley tiles as a result of foot traffic damage during previous inspection. Refer to *Figures 6 and 7*.



Figure 6

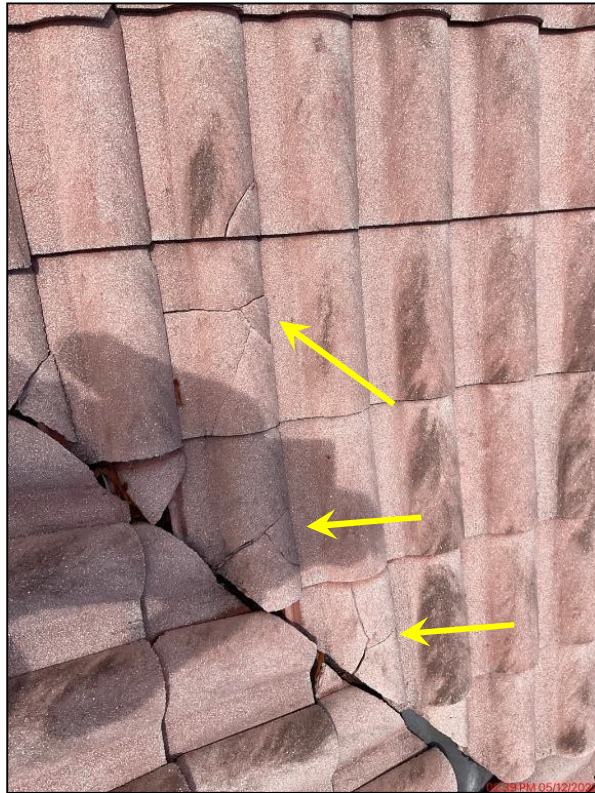



Figure 7

- The chimney cap evidenced having been displaced as a result of wind damages. Refer to *Figure 8*.



Figure 8

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- The windows around the front dining room evidenced bent and/or broken window framing due to flexure during wind loading during the storm event. Refer to *Figures 9 and 10*.



Figure 9



Figure 10

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- The window screen frames throughout evidenced bent and/or broken framing due to flexure during wind loading during the storm event. Refer to *Figures 11 and 12*.



Figure 11



Figure 12

Survey of the Building Interior:


- The garage ceiling evidenced staining as a result of short-term water intrusion through the roof system above during the reported storm event. Refer to *Figures 13 and 14*.



Figure 13



Figure 14

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- The ceiling within the bathroom evidenced staining as a result of short-term water intrusion through the roof system above during the storm event. Refer to *Figure 15*.




Figure 15

- The ceiling within the hall bathroom evidenced staining as a result of short-term water intrusion through the roof system above during the storm event. Refer to *Figure 16*.



Figure 16

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- The ceiling and walls within the family room evidenced staining as a result of short-term water intrusion through the roof system above during the reported storm event. Refer to *Figures 17 and 18.*

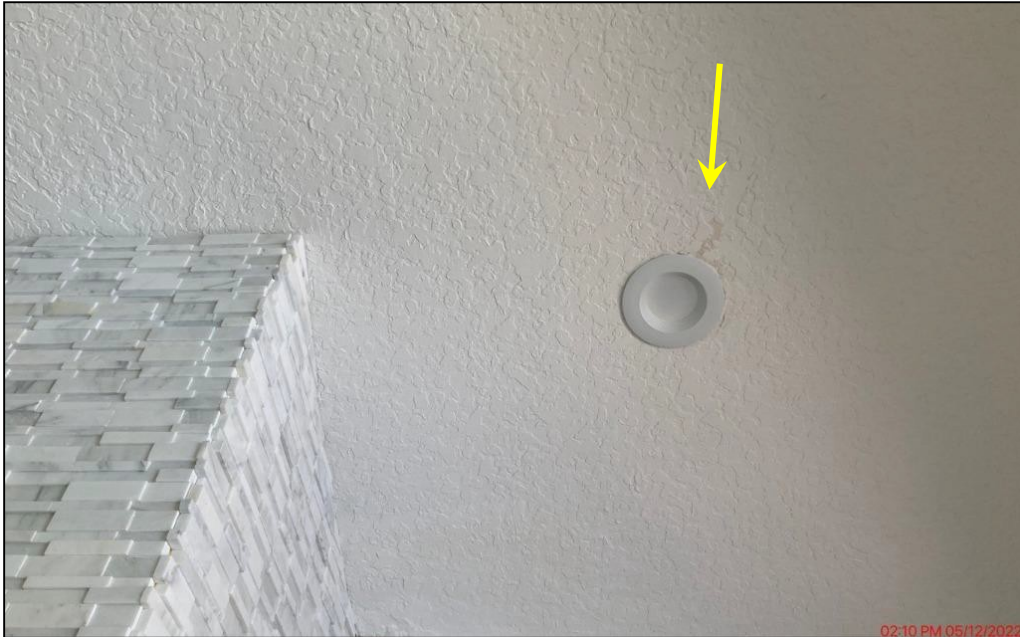


Figure 17



Figure 18

- The ceiling within the office evidenced painted staining as a result of short-term water intrusion through the roof system above during the storm event. Refer to *Figure 19*.




Figure 19

- The windows within the dining room evidenced staining as a result of short-term water intrusion through the window framing during the storm event. Refer to *Figure 20*.



Figure 20

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- The attic space evidenced staining of the plywood decking as a result of short-term water intrusion through the roof system above during the storm event. Refer to *Figures 21 to 24*. Note, these areas of staining were no located at points of flashing.



Figure 21



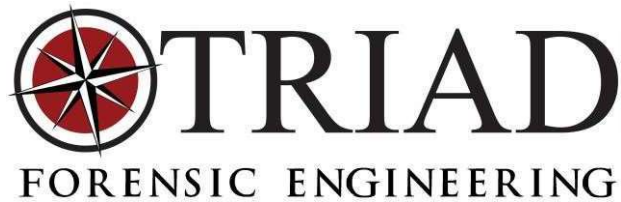
Figure 22



Figure 23



Figure 24



Conclusions and Recommendations:


Based on the conditions observed, it was our opinion the Lonker Property had experienced damages caused by a high wind event on September 10, 2017. Damages observed and reported at the Lonker Property consisted of dislodged/cracked tiles, roof tiles with corner chips, water intrusion through roof tile fastener penetrations, damaged window framing, and water intrusion through the dining room window openings.

The tiles were observed to be mechanically attached to the roof deck. During high wind events, mechanically attached tiles are known to “chatter” which can cause tiles to crack and/or become dislodged. Tiles can also break during high wind events due to wind-borne debris impacts. These conditions were observed at the Lonker roof as a result of windstorm damages. The “chattering” of the tiles can also cause the mechanical attachments to enlarge the holes in the underlayment and subsequently create points for moisture intrusion to occur. The attic evidenced multiple areas of staining to the underside of the plywood emanating from roof fastener locations.

It was also our opinion that, even though the windows were not broken during the storm, wind driven water intrusion occurred through the dining room window components during the storm event. Residential doors and windows that protect a home from weather will leak during a high wind event without damaging the system. Most windows installed in the last five years in Florida have a design pressure (DP) rating of 35-50 pounds per square foot. According to the American Architectural Manufacturers Association, a window with a DP of 35 will have water intrusion in a wind-driven rain of 45 miles per hour, while one with a DP of 50 will have water intrusion in a wind-driven rain of 54 miles per hour. While these window components are rated for zones with much higher wind speeds, that threshold is set for resulting damages sustained from wind pressures or wind-borne debris. Lower speed windstorms can cause water intrusion without permanently damaging the window system itself.

Triad Forensic Engineering recommends the following scope of work:

1. Based on the measurements taken, the amount of roof tiles that were found to be cracked, dislodged, or chipped did not exceed 25% of the roof area. However, a letter prepared by the Tile Roofing Institute (TRI) outlines that “Gory” stamped tiles were “obsolete and do not interlock with profiles currently offered”. This letter is attached to this report for reference. Based on the lack of availability of replacement tiles, and the letter from TRI stating that new tiles do not interlock with the existing tiles, the roof system is recommended to be completely removed and replaced.



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2. During the replacement of the roof system, the roof deck should be surveyed and areas evidencing damages/deterioration should be removed and replaced.
3. Upon removal of the roof system, the roof deck fastening pattern should be inspected for conformance to the *Florida Building Code*. If the deck fastening is found to not conform, the deck should be refastened in conformance with the building code.
4. Any insulation or interior finishes that were affected by moisture or cracking should be removed and replaced.

Thank you for the opportunity to provide you with professional engineering services. The opinions and conclusions in this report have been formulated within a reasonable degree of professional certainty.

This report is not intended to cover hidden or unforeseen conditions and/or defects unless specifically identified herein. Triad reserves the right to supplement the information and/or opinions contained within this report as necessary due to changes in the conditions of the property and/or the availability of new information. Unauthorized use of this report, without the permission of Triad, shall not result in any liability or legal exposure to Triad Forensic Engineering.

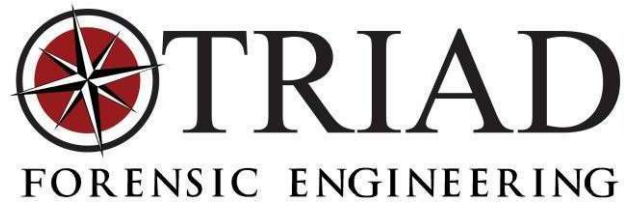
Sincerely,

Triad Forensic Engineering, Inc.



This document has been electronically signed and sealed by **Matthew R. Depin, PE**, on **12/6/2022** using Digital Signatures.

Printed copies of this document are not considered signed and sealed and the Digital Signature authentication code must be verified on any electronic copies.



Appendix: Tile Roofing Institute

Obsolete Tile Letter



Date: September 22, 2017 **rev October 5, 2017**

To: All Roofing, Building, Restoration and Insurance Industry Professionals

Re: Obsolete Concrete Roof Tiles Formerly Produced in Florida

In response to the vast amount of hurricane damage related inquiries from industry professionals, please note the following list of concrete roof tiles that have been produced in or shipped to Florida over the past several decades.

The following roof tiles are obsolete and do not interlock with the profiles currently offered by our existing member roof tile manufacturers. Identifying marks on the back of each tile may include Pioneer, Currier, Entegra, Wallin, P, Bender and or Hanson.

Identifying marks on the back of each tile may include Pioneer, Currier, Entegra, Wallin, P, Bender and or Hanson

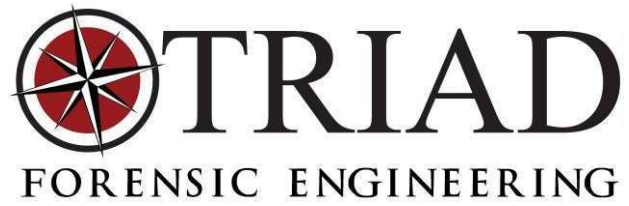
- o Any tile with Wallin/Pioneer Spanish S
- o Any tile with Wallin/Pioneer 9" Flat
- o Any tile with Wallin/Pioneer Two Piece Barrel
- o Any tile with Wallin/Pioneer Cottage Shingle
- o Any tile with Pioneer Flat
- o Any tile with Currier Venetian
- o Any tile with Hanson/Pioneer/Bender Palema
- o Any tile with Hanson/Pioneer Bender Nordic Flat
- o Any tile with Hanson Flat including Horizon/Slate/
Southern Shake/Victorian Slate/Old World
- o Any tile with Hanson/Pioneer Hacienda
- o Any tile with Hanson Regal
- o Any tile with Entegra Valencia
- o Any tile with Entegra Skandia Flat
- o Any tile with Entegra Estate manufactured in
Indiantown or Pompano Beach
- o Any tile with Entegra Europa (WAVE) tile
- o Any Flat or "S" tiles labeled "Gory" or "GAI"
- o Any Flat or "S" tiles labeled "Vanguard"
- o Any Flat or "S" tiles labeled "Bender"
- o Any Flat or "S" tiles labeled "Wallin"
- o Any Flat or "S" tiles labeled "Duntex"
- o Any Flat or "S" tiles labeled "Currier"
- o Any Flat or "S" tiles labeled "APE"
- o Any flat or "S" tiles labeled "Pioneer"
- o Any Flat or "S" tiles labeled "Marley"
- o Any flat of "S" tiles labeled "Ceetile"
- o Any Flat or "S" tiles labeled "Lifetile"
- o Any Flat or "S" tiles labeled "Monray"
- o Any Flat or "S" tiles labeled "Monier"
- o Any Flat or "S" tiles labeled "Superior"
- o Any flat or "S" tiles labeled "Westile"
- o Any flat tile labeled Boral Lifetile "BUSA"

In the event that a tile roof requires a complete replacement, our existing member manufacturers will strive to offer colors that closely resemble the existing roof, however the likelihood of an exact color replacement is highly unlikely.

If we might provide any additional information or assistance, please feel free to email us at [REDACTED]

Sincerely,

[REDACTED]



Appendix: Offsite Roof Report

19 May 2022



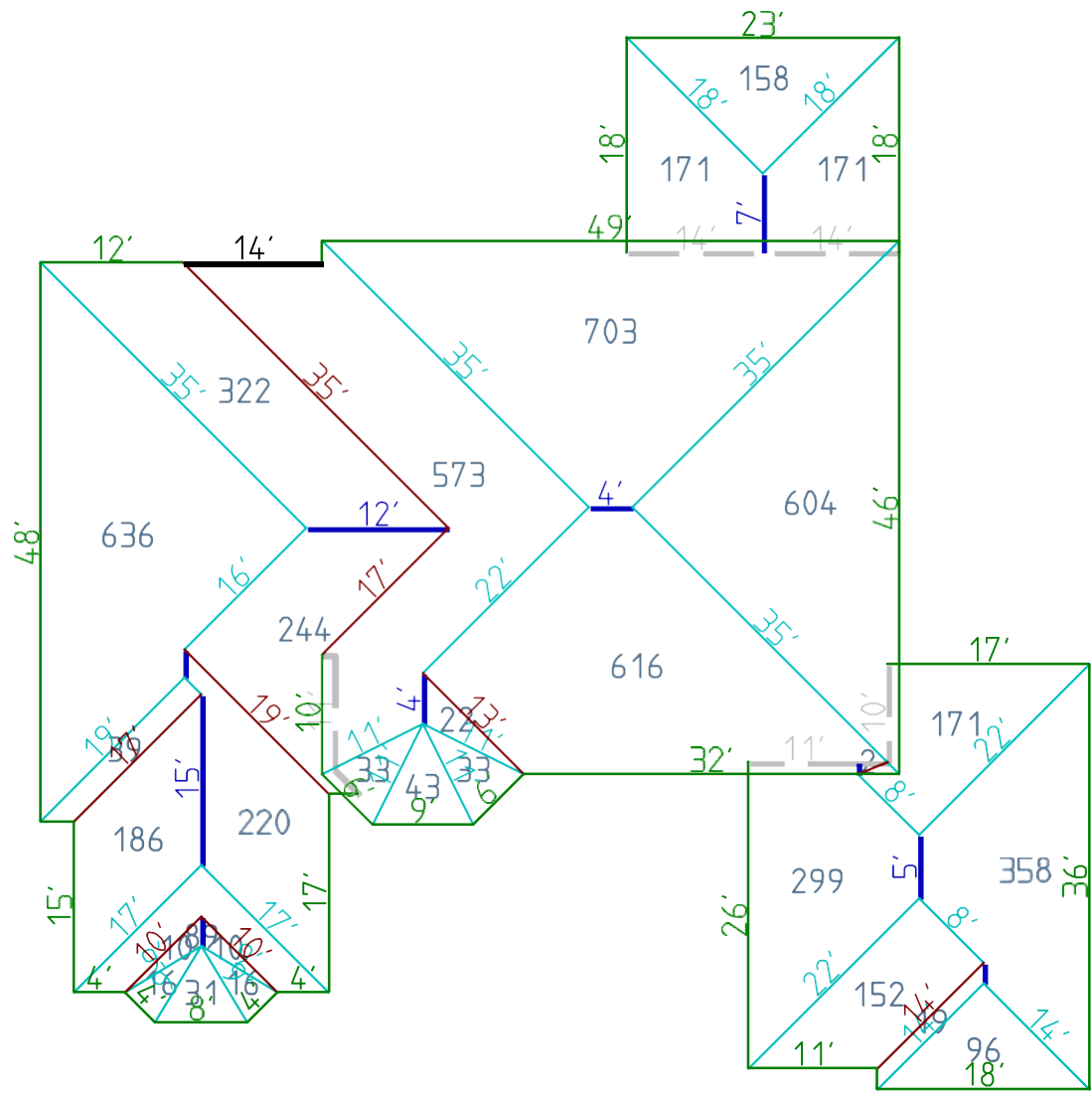
Triad Restoration Services

Phone: 727-216-6350

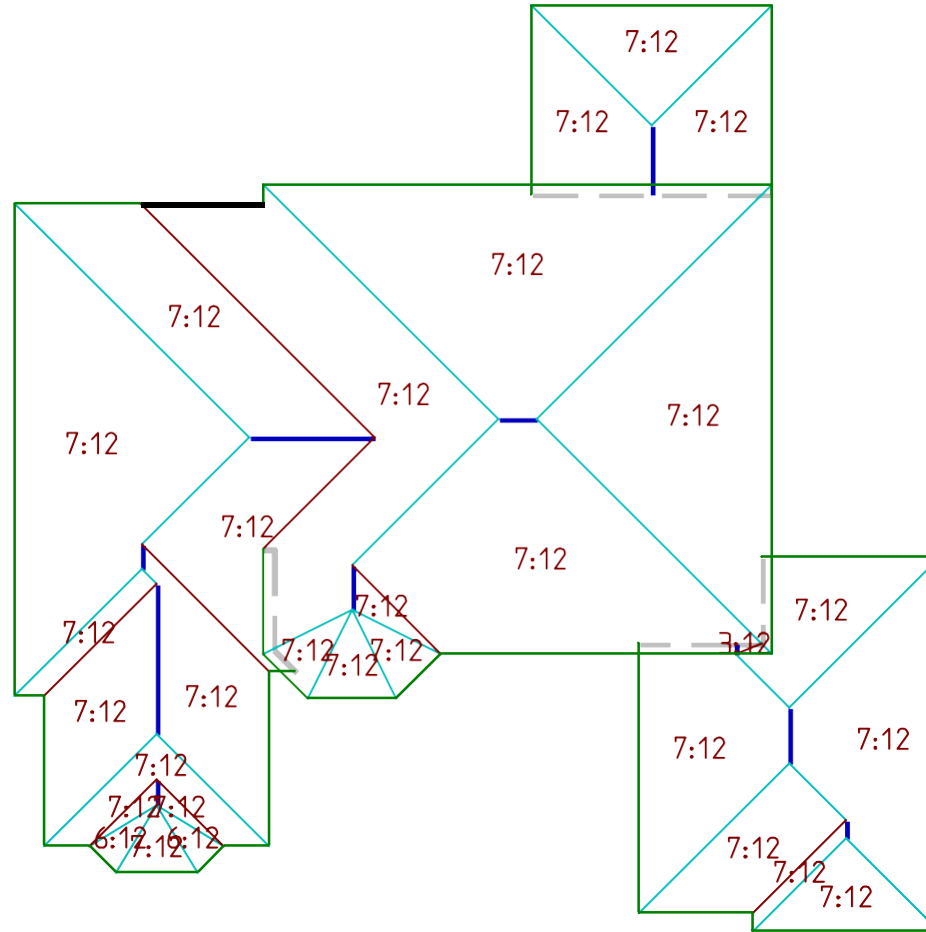
Email: office@asktriad.com

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Slope Diagram Quantities Breakdown	3

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Total Quantities	
Total Squares	60.26
-Waste Factor-	
10%	66.28
15%	69.29
20%	72.31
25%	75.32
Ridge Length	55'
Eave Length	452'
Hip Length	434'
Valley Lengths	137'
Transition Length	0'
Rake/Gable Length	14'
Step Flashing	65'
Apron Flashing	1'
Perimeter (Eave + Gable)	466'
Notes:	



	7:12
Total Squares	60.26
Ridge Length (ft)	55'
Eave Length (ft)	452'
Hip Length (ft)	434'
Valley Length (ft)	137'
Gable Length (ft)	14'
Step Flashing (ft)	65'
Apron Flashing (ft)	1'