NOVA

June 11, 2024

Florida League of Cities
301 S Bronough St, Suite 300
Tallahassee, FL 32301

Attention: Mr. Levi Holmstrom

Subject: **Report of Structural Condition Survey for Damaged Truss Members**
The Woman's Club of Lake City
257 SE Hernando Ave,
Lake City, FL 32025
NOVA Project No: 10124-2524088

Dear Mr. Holmstrom:

NOVA Engineering and Environmental, LLC (NOVA) has completed the Structural Condition Survey of the damaged wood truss members at the Women's Club of Lake City in Lake City Florida. The purpose of our work was to evaluate the structural condition of the damaged roof framing, collect wood samples from various roof members components for testing and provide our professional opinion of the overall condition and conceptual repair recommendations. This work was performed in general accordance with our proposal No: 10124-2524088, dated May 9, 2024.

SITE AND PROJECT INFORMATION

The subject building is a single-story building with a basement. It appeared to have load-bearing brick masonry walls and a wood framed roof. The building was reported to have been constructed circa 1915. No Structural Drawings were available/provided to us. A brief written report of the damaged roof wood trusses was provided to us. Our understanding of the subject project is based on email correspondence and conversations with Levi Holmstrom of Florida Lague of Cities, and our experiences with similar projects. The client requested NOVA to evaluate the condition of the damaged roof and provide conceptual repair recommendations.

Aerial View of Subject Building

OBSERVATIONS AND TEST RESULTS

On May 21, 2024, NOVA structural engineers Edison Tyto and Jorge Magallon visited the subject site to perform a visual structural condition survey of the damaged/broken roof truss members and obtain wood core/samples from the wood framing for testing. A ladder was used to access the attic space from an existing hatch in the ceiling.

The roof framing consists of 2x6 wood rafters supported by load-bearing walls and three (3) main wood trusses. 2x6 wood braces, supported by the load bearing walls and the main roof trusses were also present. The braces were supporting the common rafters and the hip rafters. For more details, refer to the attached NOVA drawings. Below are presented our significant observations and test results.

Roof Trusses:

- Truss-B appeared to be damaged. The top chord member of the truss was broken (see attached drawings for location). The broken top chord members have displaced laterally (buckled) which indicates a failure mode of the truss top chord members in compression. The top chord of the broken truss appeared to be not laterally braced and the existing vertical 2x6 braces of the hip rafters were disconnected from the rafters. The unbraced length of the top chord was approx. twenty-two (22) feet.

- The unbraced length in members working in compression significantly reduces the compression capacity of the member due to buckling. Our initial calculations indicate that the top chord of the subject truss should be laterally braced at least every six (6) feet along the entire length to be able to support the estimated loads of the roof and ceiling. The truss extension noted on the NOVA drawings 2/F-2, does provide some lateral support (bracing) but the connection on top has failed and no longer provides lateral support. We could not determine if the lateral support failed and caused the truss failure, or if the top chord truss failure caused the failed connection.
- Truss-A appeared to have a similar configuration as the failed truss (Truss-B), has slightly less load and more evenly distributed than the failed truss. The truss extensions shown on NOVA drawing 1/F-2, were in place and do provide some lateral support (bracing) of the top chord but additional, adequate bracing is required.
- Truss-C appeared to be in poor condition. We couldn't observe this truss from close distance due to safety concerns. Recent repairs and previous signs of water infiltrations appeared to be present at the north support of the truss and the bottom chord of the truss appeared to be sloping toward the north support. The sag on the ceiling joists (which bare on the bottom chord of the truss) also indicate the noted slope on the bottom chord.
- Signs of connection failure of the roof rafters to the ridge rafter were noted and the tie down 2x4 members of the ridge rafter were disconnected from the ridge rafter or the attic floor joist.
- An x-brace between Truss-A and Truss-B was present and both x-bracing members were broken. These bracing members were approx. nineteen (19) feet long and did not appear to be braced. The broken x-brace indicates significant horizontal and/or vertical differential displacement between these trusses.
- Two (2) of the valley rafter supports were also broken. They also appeared to be buckling and had significant length without lateral support.
- The exterior and interior bearing walls appeared to be in fair condition, but signs of marginal cracks were present. Further investigation might be required to determine the presence of a bond beam on top of the wall.

Wood Samples Testing:

During our visit, nine (9) wood samples were collected from different wood components of the roof. Samples 4-8 were sent to the lab for species identification and samples 1-3 and 9 were sent to the lab for FRT (Fire-Retardant-Treated) testing.

- Test results indicate that samples 4-8 were identified as being in the commodity group of SYP (southern yellow pine).
- Test results indicate that no fire-retardant chemicals were present in samples 1-3 and 9.

CONCLUSIONS AND CONCEPTUAL RECOMANDATIONS

Based on our observations, the main roof truss framing appears to be in poor condition and appears to be unstable with multiple broken members. The loads that were supported by the main broken truss (Truss-B) appear to have been redistributed to other roof framing components which are now overstressed and can fail causing a partial or total collapse of the roof. We believe that the lack of lateral bracing of the top chord members of the second main truss is the primary cause of the observed distress.

Based on the provided information, our observations to date, our preliminary calculations, lab test results and our experience with similar projects we recommend the following.

- Shore the attic floor joists, and roof rafters supported by Truss-B to decrease the load on the roof framing (main trusses) and provide safe access to the attic. Do NOT attempt to lift the attic joists/trusses. We recommend the shoring be designed by a professional engineer and installed by a licensed framing contractor.
- Once the main roof truss and attic joists have been shored, it is possible to further investigate and evaluate the roof framing. This evaluation is recommended to determine whether it is more feasible and cost-effective to repair or replace the roof framing.
- Further investigate the top of the perimeter wall, to ensure the presence of a bond beam at top of the wall is recommended. If no bond beams are present, we recommend the installation of a bond beam to provide continuity and mitigate the observed cracks on the masonry walls.

CLOSING

We appreciate the opportunity to provide our testing and engineering services to you on this important project. Please contact us if you have any questions or if we may be of further service.

Sincerely,

NOVA ENGINEERING AND ENVIRONMENTAL, LLC

Written: _____
Edison Tyto, E.I.T.
Project Engineer

Reviewed: _____
Kurt W. Heinrichs, P.E.
Principal Engineer
Florida Registration No. 44505

Attachments: *Photographs 1-8*
NOVA Drawings F1 & F-2

Photo 1: Attic view – Main Truss-B

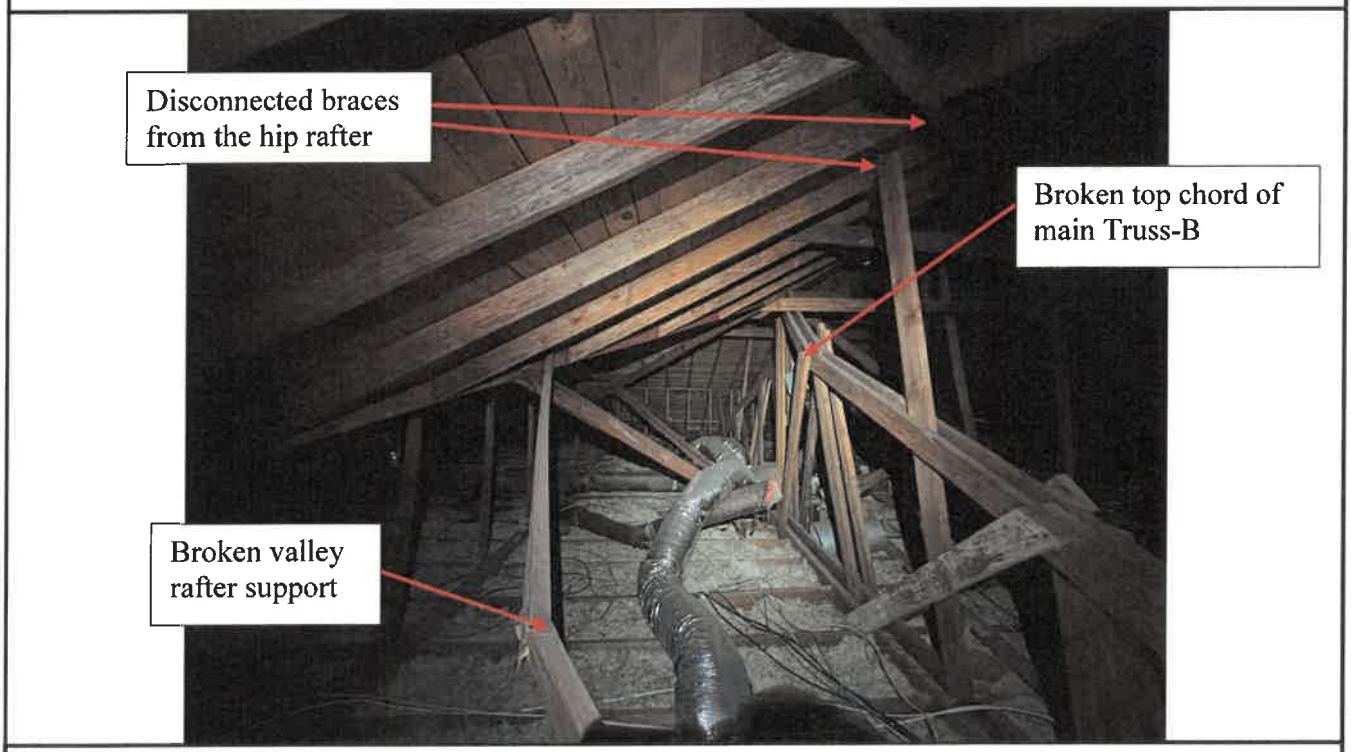


Photo 2: Attic View – Main Truss-B without truss extensions

Photo 3: Attic view – Truss-A

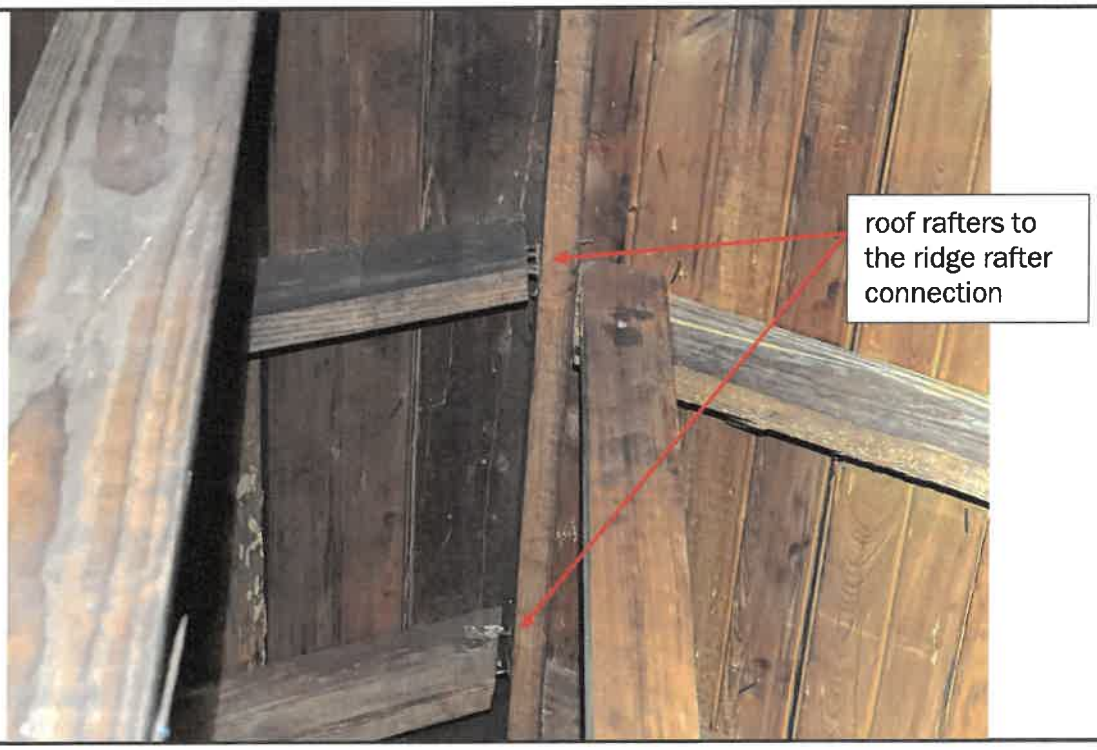


Photo 4: Failed connection at ridge rafter

Photo 5: Broken x-bracing between Truss-A and Truss-B

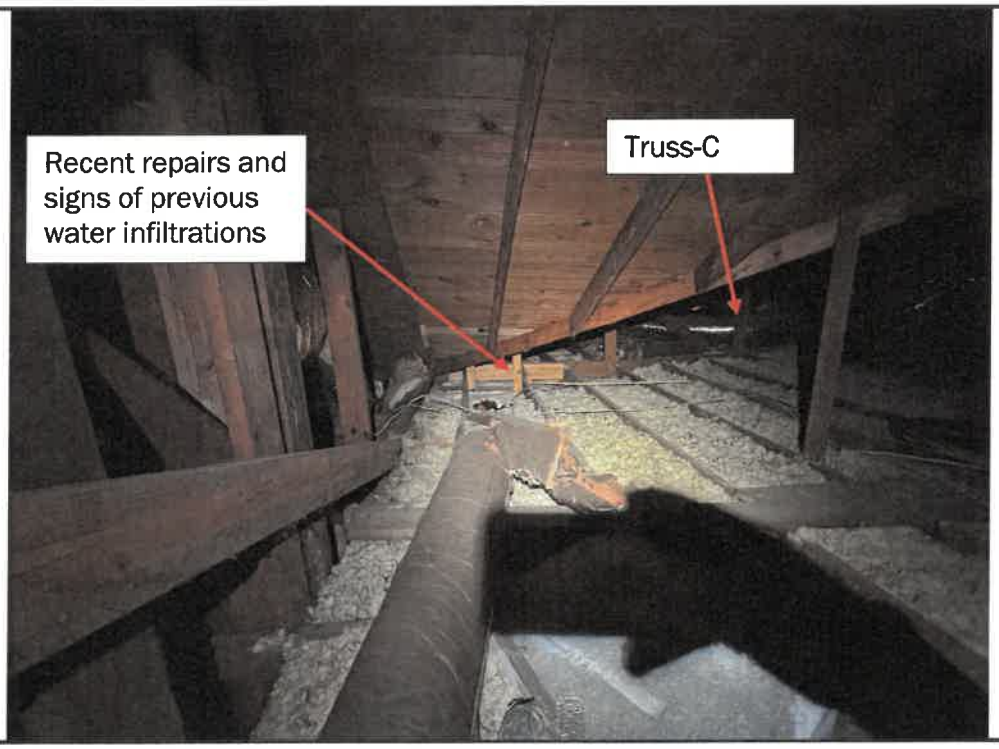


Photo 6: Signs of recent repairs

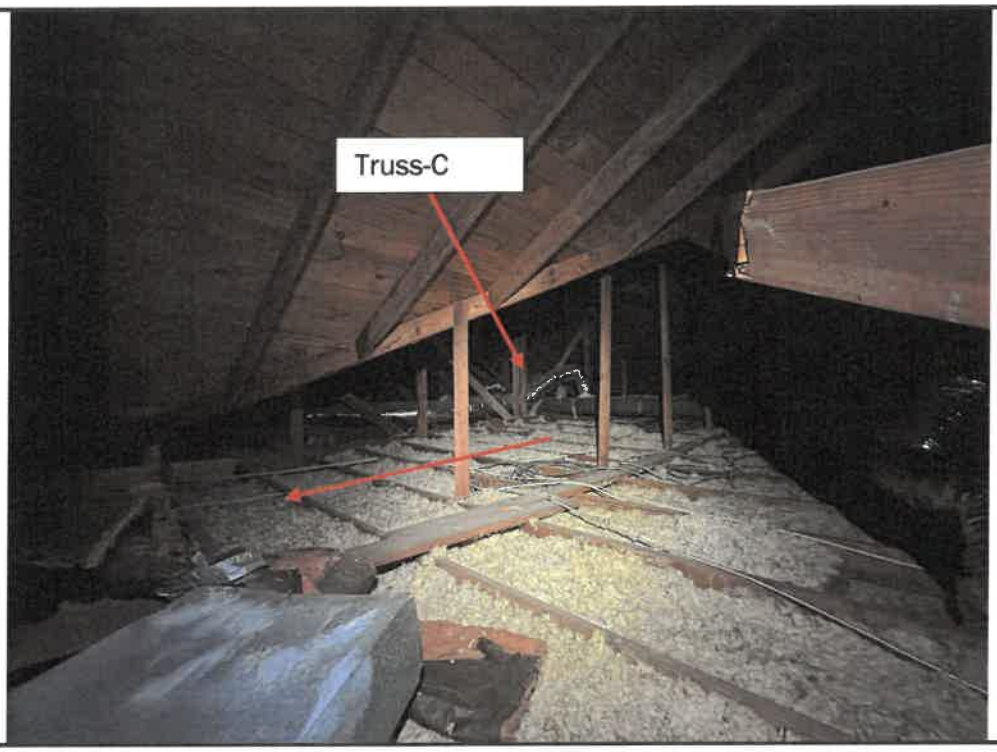
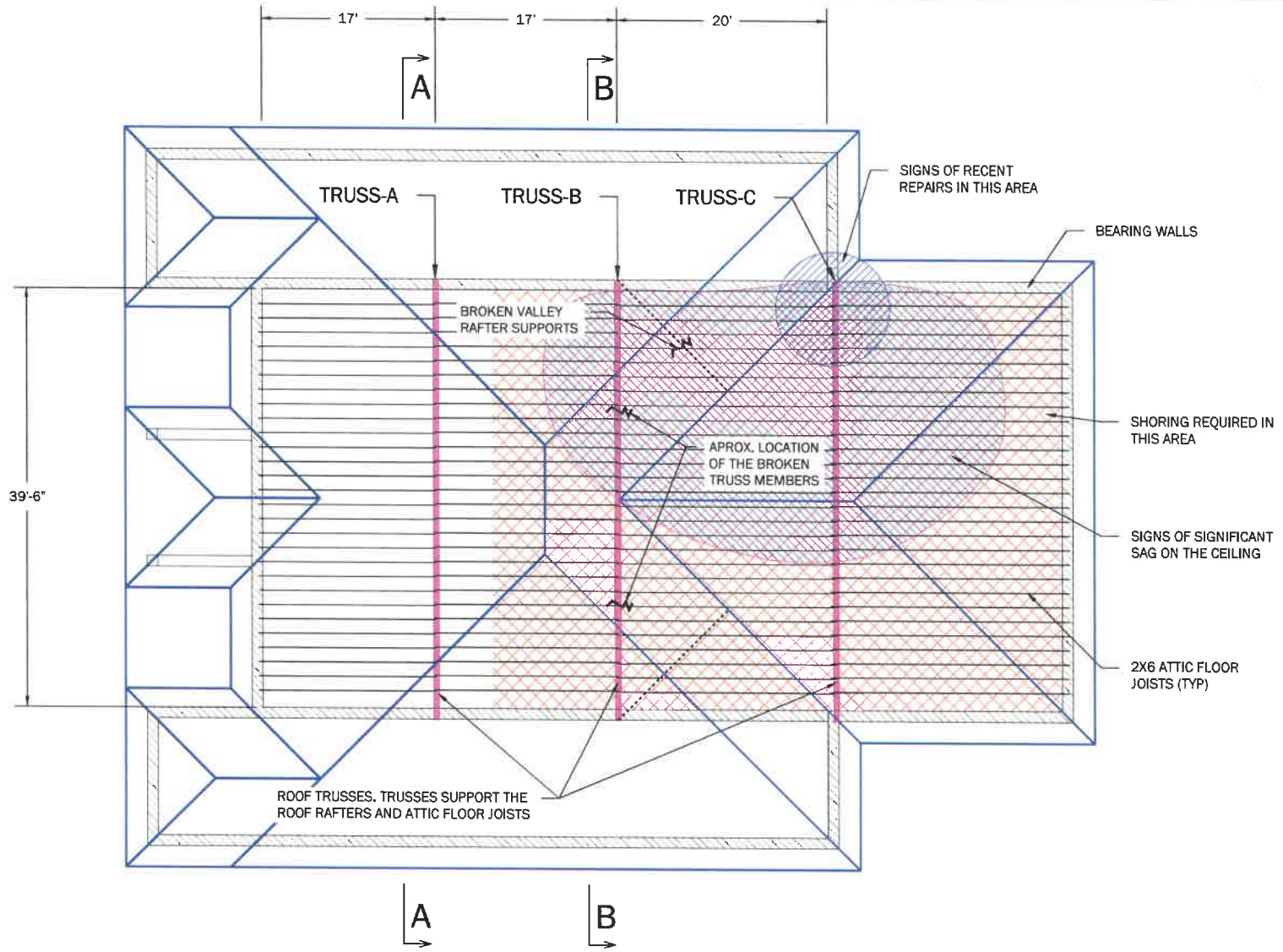


Photo 7: Attic view – Attic joists and bottom chord of the Truss-C slopping toward north

Photo 8: Cracks on the walls – Signs of marginal differential settlement and absence of a bond beam at the top of the wall.



1 ROOF PLAN

Scale: NTS

N

NOVA
75 MADDOX ROAD, SUITE 102
BUFORD, GEORGIA 30518
OFFICE: 770.904.7190

REV	DATE	SUBMITTAL/REVISION
A	06/04/24	ISSUED FOR PROJECT TEAM REVIEW
B	-	-
C	-	-
D	-	-
E	-	-
F	-	-
G	-	-

STRUCTURAL CONDITION SURVEY OF DAMAGED TRUSS MEMBERS
257 SE HERNANDO AVENUE,
LAKE CITY FL 32025

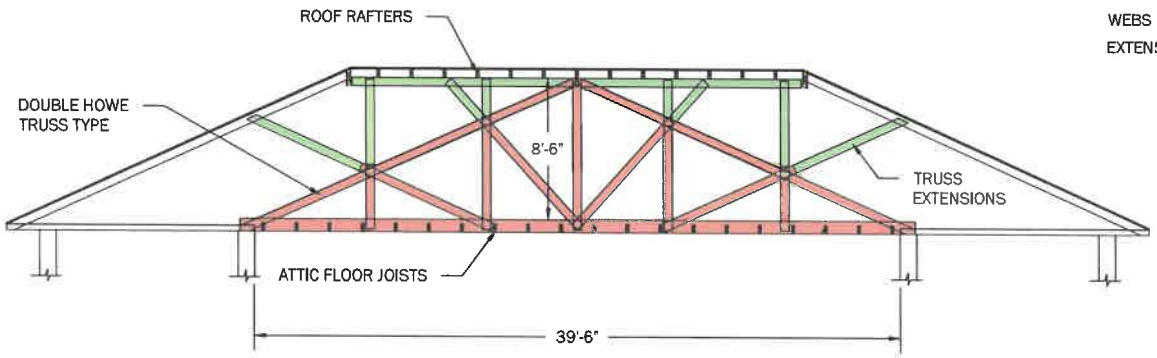
PREPARED FOR:
FLORIDA LEAGUE CISTIES
301 S BRONOUGH ST. SUITE
300, TALLAHASSEE, FL 322301
NOVA PROJECT NO.: 10124-2524088

DRAWN BY: E. TYTO
CHECKED BY: K. HEINRICHS

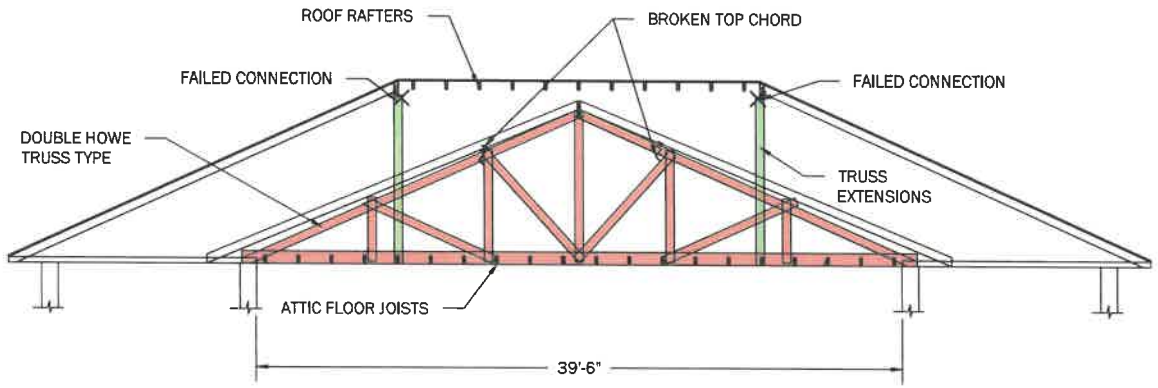
SHEET NUMBER
F-1

TRUSS COMPONENTS ACTUAL DIMENSIONS

BOTTOM CHORD	- (2) 2"x9 ½"
TOP CHORD	- (2) 1 ½"X5 ½"
WEBS	- (2) 1 ½"X5 ½"
EXTENSIONS	- (1) 1 ½"X5 ½"



1 SECTION A-A
Scale: NTS



2 SECTION B-B
Scale: NTS

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DRAWN BY: E. TYTO
CHECKED BY: K. HENRIOHS

SHEET NUMBER
F-2